



Alcatel-Lucent 1665

Data Multiplexer (1665 DMXtend) | Release 9.0

Installation Manual

365-372-327R9.0
CC109696708
Issue 1
July 2010

Alcatel, Lucent, Alcatel-Lucent and the Alcatel-Lucent logo are trademarks of Alcatel-Lucent. All other trademarks are the property of their respective owners.

The information presented is subject to change without notice. Alcatel-Lucent assumes no responsibility for inaccuracies contained herein.

Copyright © 2010 Alcatel-Lucent. All Rights Reserved.

Conformance statements

Federal Communications Commission (FCC) Part 15 Class A

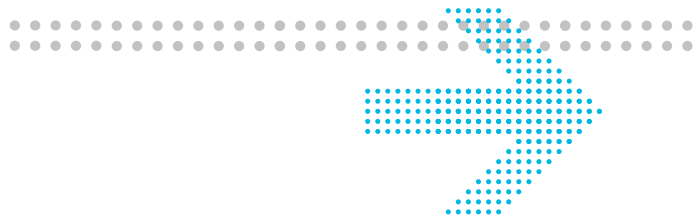
This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protections against harmful interference when the equipment is operated in a commercial environment. This equipment generates, 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.



Contents

About this document

Purpose	xi
Reason for reissue	xi
Intended audience	xii
\How to use this document	xii
Safety information	xv
Conventions used	xv
Technical support	xvi
How to order	xvii
How to comment	xvii
Packaging collection and recovery requirements	xvii
Material content compliance	xvii

1 Safety

Laser safety	1-1
Electrostatic discharge ESD considerations	1-3
Laser product classification	1-9
Alcatel-Lucent 1665 DMXtend optical specifications	1-11

Part I: Physical and power installation

2 Physical installation

Planning	2-1
Inspection	2-5
Alcatel-Lucent 1665 DMXtend center divider	2-5
Alcatel-Lucent 1665 DMXtend shelf installation	2-8
Power cable installation	2-13
Final operations	2-17

3 Cable and fiber installation

Planning	3-2
Connector references	3-4

Inspection	3-5
DS1/E1 cable installation	3-6
DS3/EC-1 cable installation	3-13
10/100BASE-T Ethernet cable installation	3-40
IAO LAN and TCP/IP cable installation	3-44
Modem cable installation	3-47
Sync cable installation	3-49
Office alarm cable installation	3-53
Miscellaneous (environmental) discrete telemetry cable installation	3-58
OC-3/OC-12/OC-48/OC-192 main optical fiber cable installation	3-62
OC-3/OC-12/OC-48 low-speed optical fiber cable installation	3-65
100/1000BASE-X optical fiber cable installation	3-66
CIT (RS-232) cable installation	3-68
Final operations	3-70
4 Circuit pack installation	
Description	4-1
Powering	4-2
Circuit pack compatibility	4-6
Initial circuit pack installation	4-9
Part II: Stand-alone installation tests	
5 Stand-alone node setup	
Software installation	5-2
Circuit pack installation	5-3
Use of WaveStar® CIT software	5-6
Circuit pack program version verification	5-13
Alcatel-Lucent 1665 DMXtend shelf initialization	5-14
6 Stand-alone installation testing	
LBO software settings	6-4
Clearing alarms	6-7
Local equipment and cross-connect tests	6-8
DS1/E1 testing	6-9
DS3/EC1 testing	6-15

LNW66, LNW74, and LNW87 testing	6-21
OC-3 low-speed testing	6-26
OC-12 low-speed testing	6-30
OC-48 low-speed testing	6-33
LED test	6-37
Office alarm test	6-38
Automatic protection switching and alarm test	6-42
Manual switching tests	6-46
External timing verification	6-49
Miscellaneous (environmental) discrete telemetry test	6-52
Modem connection test	6-54
Final operations	6-56

Part III: Network turn-up and testing

7 Connecting adjacent network elements

Fiber installation	7-3
Optical transmission test (OC-192, OC-48, OC-12, OC-3)	7-10
Automatic protection switching test	7-11
Manual switching tests	7-13
Final operations	7-15

8 WDMX setup and testing: integration procedures

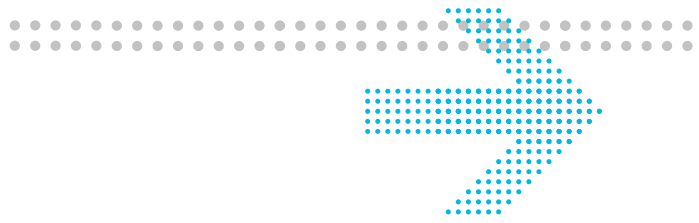
Turn-up and test the LNW785 8-channel OMD	8-4
Turn up and test the LNW705 muxponder	8-6
Integrating the LNW705 into the LNW785	8-9
Removing provisioning and equipage from the LNW705 and LNW785	8-11
Connecting the ring (Mains) to the WDMX	8-14
Removing provisioning and equipage from the LNW785	8-16

Part IV: Miscellaneous detailed installation procedure and reference material

A Fiber cleaning

Equipment requirements and recommendations	A-2
Safety instructions	A-3
Cleaning/inspecting optical connectors	A-3

	Cleaning pluggable optics module	A-9
B	Pluggable Transmission Module (PTM) installation	
	PTM modules	B-2
	Install pluggable modules	B-8
C	Installing fiber connectors and LBOs	
	LBOs	C-2
	Fiber connections	C-4
D	Backplane pin replacement	
	Pin and connector background	D-2
	Repair kits and tools	D-3
	Simple repair methods	D-4
	Replacement methods	D-5
E	Fiber labeling	
	Fiber description	E-1
	Fiber labels	E-3
GL	Glossary	
GL	Terms and definitions	



List of tables

About this document

Alcatel-Lucent 1665 DMXtend documentation set	xvi
---	-----

1 Safety

1-1 Laser classes	1-10
1-2 Alcatel-Lucent 1665 DMXtend optical circuit pack laser safety specifications	1-11
1-3 Alcatel-Lucent 1665 DMXtend optical PTM laser safety specifications	1-12
1-4 Dispersion-limited receiver sensitivity for OC-192 DWDM PTMs	1-21
I-1 Computer requirements	I-4
I-2 Installation checklist	I-6

2 Physical installation

2-1 Cable requirements and options	2-4
2-2 Power cable assemblies	2-16
2-3 Power connections	2-16

3 Cable and fiber installation

3-1 Cable requirements and options	3-3
3-2 DS1/E1 cable assemblies	3-9
3-3 DS1 transmission connections	3-11
3-4 DS3/EC-1 cable assemblies	3-17
3-5 Twenty-four cable DS3/EC-1 transmission connections	3-26
3-6 Twelve cable DS3/EC-1 transmission connections	3-30
3-7 DS1 and DS3 hybrid cable assemblies	3-35
3-8 DS1 and DS3 hybrid cable DS3 transmission connections	3-39
3-9 DS1 and DS3 hybrid cable DS1 transmission connections	3-39
3-10 10/100Base-T Ethernet cable assemblies	3-42
3-11 10/100BaseT Ethernet connections	3-43
3-12 LAN 10BaseT cable assemblies	3-45
3-13 LAN 10Base-T cross-over cable connections	3-47
3-14 LAN 10Base-T straight-through cable connections	3-47
3-15 Modem cable assemblies	3-48

3-16	Modem cable connections	3-49
3-17	Synchronization cable assemblies (SYNC1 and SYNC2)	3-52
3-18	Synchronization cable (DS1 timing reference) connections	3-53
3-19	Office alarm cable assemblies	3-57
3-20	Alarm office connections	3-57
3-21	Miscellaneous discrete cable assemblies	3-61
3-22	Miscellaneous (environmental) discrete telemetry connections	3-61
3-23	CIT Cable Assembly	3-69
3-24	Standard CIT cable connection	3-69
3-25	RJ-45 to DB-9 connector connections	3-70
4	Circuit pack installation	
4-1	Alcatel-Lucent 1665 DMXtend shelf power supply requirements	4-2
4-2	R9.0 circuit pack slot compatibility	4-6
6	Stand-alone installation testing	
6-1	Office alarm connections	6-39
6-2	Miscellaneous (environmental) discrete telemetry connections	6-54
7	Connecting adjacent network elements	
7-1	Attenuation table	7-6
8	WDMX setup and testing: integration procedures	
8-1	Channel/port assignments	8-13
8-2	XM10G/8 PTM port guidelines	8-14
8-3	Channel/port assignments	8-19
8-4	Attenuation Table	8-19
A	Fiber cleaning	
A-1	Required and recommended equipment and materials	A-2
B	Pluggable Transmission Module (PTM) installation	
B-1	Alcatel-Lucent approved PTMs	B-2
D	Backplane pin replacement	
D-1	Backplane locations of METRAL™ pins	D-3
D-2	Metral™ pins	D-3



List of figures

1 Safety

1-1	Static control wrist strap	1-5
-----	----------------------------------	-----

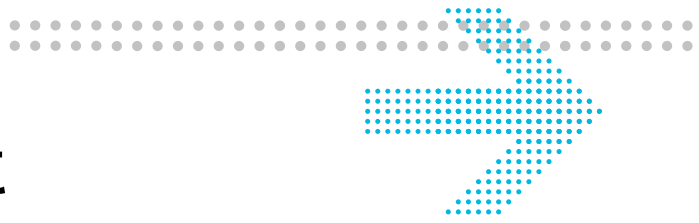
2 Physical installation

2-1	Shelf mount rear cover kit 849001367	2-3
2-2	Bay mount rear cover kit 849001060	2-4
2-3	Center divider	2-6
2-4	Center divider with circuit packs installed.	2-7
2-5	Alcatel-Lucent 1665 DMXtend mounting bracket positions - 23-Inch/19-Inch frame	2-10
2-6	Fiber duct mounting	2-11
2-7	Safety ground screw.	2-12
2-8	Fiber spools	2-13
2-9	Power connection	2-14

3 Cable and fiber installation

3-1	Connector types and pinouts	3-5
3-2	DS1/E1 cable connectors	3-7
3-3	DS1/E1 cable routing to the right	3-8
3-4	DS1/E1 cable routing to the left	3-8
3-5	DS3/EC-1 cable connections	3-15
3-6	DS3/EC-1 cable routing to the right	3-15
3-7	DS3/EC-1 cable routing to the left	3-16
3-8	DS1 and DS3 hybrid cable connections	3-33
3-9	DS1 and DS3 hybrid cable routing	3-33
3-10	10/100BASE-T/TX cable connections	3-41
3-11	10/100BASE-T cable routing	3-41
3-12	IAO LAN/TCP-IP cable connection to rear of Alcatel-Lucent 1665 DMXtend	3-45
3-13	Modem cable connection	3-48
3-14	Sync cable connections	3-50
3-15	Office alarm cable connections	3-55
3-16	Office alarm cable routing	3-55

3-17	Miscellaneous discrete cable connection	3-59
3-18	Miscellaneous discrete cable routing	3-59
3-19	Optical fiber routing	3-64
4	Circuit pack installation	
4-1	Power connections on Alcatel-Lucent 1665 DMXtend backplane	4-4
4-2	Alcatel-Lucent 1665 DMXtend shelf	4-8
6	Stand-alone installation testing	
6-1	Alcatel-Lucent 1665 DMXtend shelf backplane	6-51
6-2	Miscellaneous (environmental) discrete functions	6-53
A	Fiber cleaning	
A-1	Cleaning the ferrule endface	A-4
A-2	CLETOP cleaner	A-5
A-3	Acceptability criteria for fiber cleaning	A-7
B	Pluggable Transmission Module (PTM) installation	
B-1	Pluggable optics module	B-8
B-2	Module types	B-9
B-3	Latch type 3	B-11
B-4	Latch type 4	B-11
B-5	Electrical PTM routing	B-14
C	Installing fiber connectors and LBOs	
C-1	LC-type connector ports on circuit pack	C-2
C-2	LC-type LBO	C-3
C-3	LC-type LBO inserted into LC-type connector port	C-3
C-4	Removing LC-type LBO from LC-type connector port	C-4
C-5	LC-type fiber connector	C-5
C-6	LC-type fiber connection	C-5



About this document

Purpose

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

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 DMXtend are compatible with the LNW87.
- LNW302 OC-3 Main circuit pack supports a single PTM-based OC-3 signal. All OC-3 PTMs currently supported by Alcatel-Lucent 1665 DMXtend are compatible with the LNW302.
- LNW382 OC-12 Main circuit pack supports a single PTM-based OC-12 signal. All OC-12 PTMs currently supported by Alcatel-Lucent 1665 DMXtend are compatible with the LNW382.
- LNW705 Muxponder circuit pack (XM10G/8) multiplexes up to 8 ports of high bandwidth client interfaces onto a single 10G wavelength is supported in the G2 slot.
- 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 LNW84.
- 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.

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 DMXtend 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 Extend (DMXtend) User Operations Guide 365-372-325*
- *Alcatel-Lucent 1665 Data Multiplexer Extend (DMXtend) Maintenance and Trouble Clearing Guide 365-372-326*

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 changes to this document.

Chapter 1, “Safety”

This chapter provides laser safety information and precautions.

Part I: “Physical and power installation”

Part I covers Chapters 2, 3, and 4. These sections covers the physical mounting of the Alcatel-Lucent 1665 DMXtend shelf using the Horizontal Bay Mount. This section includes the running and connecting of power cables, interconnecting cables, alarm cables, and as required, external timing, communication cables, and covers initial circuit pack installation (not seated). This section also provides the recommended checklist [Table I-2 “Installation checklist”](#) to follow when installing a Alcatel-Lucent 1665 DMXtend system. 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 chapter provides equipment installation instructions for the Alcatel-Lucent 1665 DMXtend shelf using the horizontal bay mount configuration. The Alcatel-Lucent 1665 DMXtend shelves with the removable center divider can support either half width or full width cards in the Main function slots.

Chapter 3, “Cable and fiber installation”

This chapter provides cabling instructions for the Alcatel-Lucent 1665 DMXtend shelf using the horizontal bay mount configuration.

Chapter 4, “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”

Part II covers Chapters 5 and 6. These sections cover the initial Graphical User Interface (GUI) or Craft Interface Terminal (CIT) software installation and turn-up testing on a new Alcatel-Lucent 1665 DMXtend shelf. It is intended to verify correct electrical DS1/DS3/FE cable wiring to the DSX panel or punch down block as well SONET fiber routing to the LGX panel from the faceplates of installed packs. This section also the recommended checklist “[Installation checklist](#)” to follow when installing a Alcatel-Lucent 1665 Data Multiplexer Extend (Alcatel-Lucent 1665 DMXtend) system. 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 5, “Stand-alone node setup”

This chapter provides procedures for initial Graphical User Interface (GUI) or Craft Interface Terminal (CIT) software installation and circuit packs provided via work order. Also, the use of the Graphical User Interface (GUI) or Craft Interface Terminal (CIT).

Chapter 6, “Stand-alone installation testing”

This chapter is to verify proper transmission cabling installation and R9.0 functionality as well as the associated functionality of the Alcatel-Lucent 1665 DMXtend shelf.

Part III: “Network turn-up and testing”

Part III covers fiber connections between nodes in a ring. It is not intended to replace acceptance test procedures. This section also provides the recommended checklist “[Installation checklist](#)” to follow when installing a Alcatel-Lucent 1665 DMXtend system. 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 7, “Connecting adjacent network elements”

This chapter is used to make fiber connections between nodes in a ring. It is not intended to replace acceptance test procedures.

Chapter 8, “WDMX setup and testing: integration procedures”

This chapter is used to verify WDMX connectivity between Alcatel-Lucent 1665 Data Multiplexer Extend (Alcatel-Lucent 1665 DMXtend) nodes. The chapter includes the LNW785 8 channel Optical Multiplexer Demultiplexer (OMD) circuit pack. It is not intended to replace acceptance test procedures.

Part IV: “Miscellaneous detailed installation procedure and reference material”

Part IV provides supplementary information that is useful when installing the Alcatel-Lucent 1665 DMXtend system and using this Installation Manual.

Appendix A, “Fiber cleaning”

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.

Appendix C, “Installing fiber connectors and LBOs”

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

Appendix D, “Backplane pin replacement”

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

Appendix E, “Fiber labeling”

This appendix describes the labeling of the fiber.

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 DMXtend frame and handling circuit packs, disk drives, and tapes. 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 Extend (DMXtend) User Operations Guide 365-372-325*.



CAUTION

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.

Arial Bold typeface signifies a window, section, command or parameter used with the **Graphical User Interface**

Helvetica typeface indicates a faceplate or Alcatel-Lucent 1665 DMXtend 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-DMXTEND:LUC01:ctag::DMXTND2.5G;**

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

Alcatel-Lucent 1665 DMXtend Documentation Set

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

Table 1 Alcatel-Lucent 1665 DMXtend documentation set

Comcode	Document number	Title
NA	365-372-330	<i>WaveStar® CIT User Guide</i>
109 696 757	365-372-324R9.0	<i>Alcatel-Lucent 1665 Data Multiplexer Extend (DMXtend) Applications and Planning Guide</i>
109 696 674	365-372-325R9.0	<i>Alcatel-Lucent 1665 Data Multiplexer Extend (DMXtend) User Operations Guide</i>
109 696 682	365-372-326R9.0	<i>Alcatel-Lucent 1665 Data Multiplexer Extend (DMXtend) Alarm Messages and Trouble Clearing Guide</i>
109 696 708	365-372-327R9.0	<i>Alcatel-Lucent 1665 Data Multiplexer Extend (DMXtend) Installation Manual</i>
109 696 724	365-372-328R9.0	<i>Alcatel-Lucent 1665 Data Multiplexer Extend (DMXtend) TL1 Message Details</i>
NA	ED8C951-10	<i>Alcatel-Lucent 1665 Data Multiplexer Extend (DMXtend) Engineering and Ordering Information</i>
NA	ED8C951-20	<i>Alcatel-Lucent 1665 Data Multiplexer Extend (DMXtend) Interconnect Information</i>
109 747 055	NA	<i>Alcatel-Lucent 1665 Data Multiplexer Extend (DMXtend) Release 9.0.0 Software Release Description (Paper)</i>
109 747 063	NA	<i>Alcatel-Lucent 1665 Data Multiplexer Extend (DMXtend) Release 9.0.0 Software Release Description (CD-ROM)</i>
109 747 071		<i>Alcatel-Lucent 1665 Data Multiplexer Extend (DMXtend) Release 9.0.0 Customer Documentation CD-ROM</i>

Technical support

For technical support, contact your local Alcatel-Lucent customer support team. See the [Alcatel-Lucent Support web site \(http://www.alcatel-lucent.com/support\)](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) (<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) (<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/>)

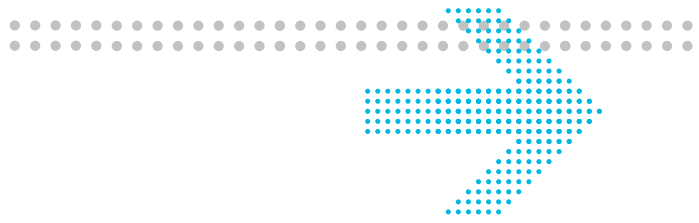
Recycling/take-back/disposal of product

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) (http://www.alcatel-lucent.com/product_takeback) or contact [Alcatel-Lucent Take-Back Support](mailto:takeback@alcatel-lucent.com) (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 Extend (Alcatel-Lucent 1665 DMXtend).

Contents

This appendix provides information on the following topics:

Laser safety	1-1
Electrostatic discharge ESD considerations	1-3
Laser product classification	1-9
Alcatel-Lucent 1665 DMXtend optical specifications	1-11

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.

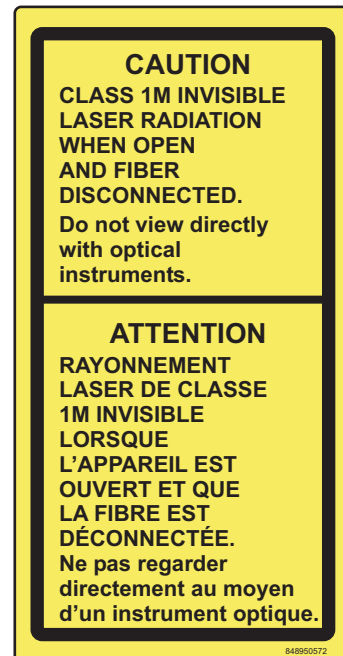
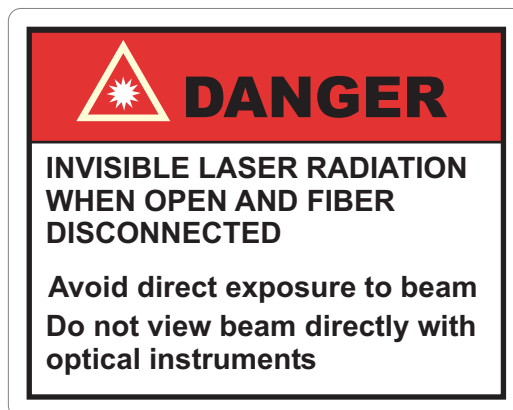
1



2



3



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

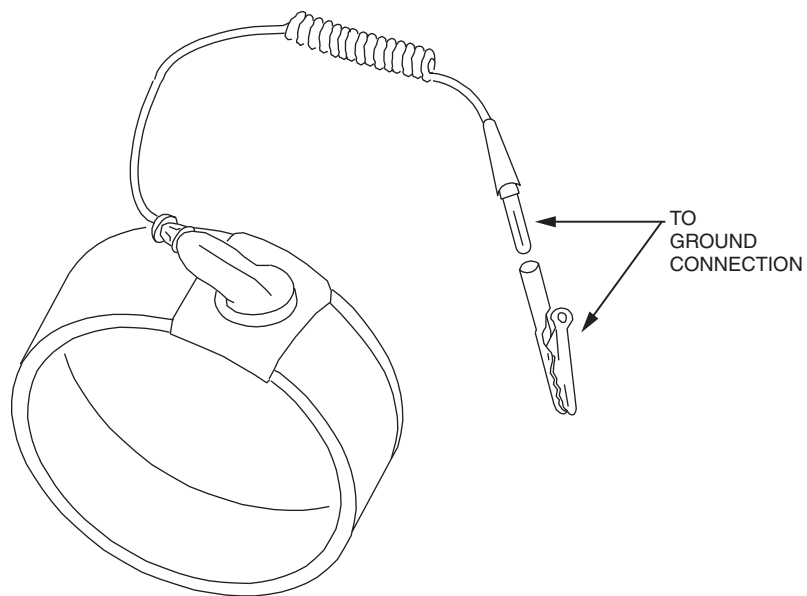
Industry experience has shown that all integrated circuit packs can be damaged by static electricity that builds up on work surfaces and personnel. The static charges are produced by various charging effects of movement and contact with other objects. Dry air allows greater static charges to accumulate. 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” \(p. 1-5\)](#) 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

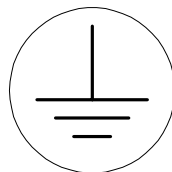


The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying this product.

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 Data Multiplexer Extend (Alcatel-Lucent 1665 DMXtend) 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 Extend (DMXtend) User Operations Guide 365-372-325*



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 power 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 DMXtend optical specifications

Overview

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

Table 1-2 Alcatel-Lucent 1665 DMXtend 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
LNW31 OC-48	1310	0.0	0.0/-18.0	SM (9)	LC	I(LN50)/1
LNW38 OC-12	1310	-8.0	-8.0/-28.0	SM (9)	LC	I(LN50)/1
LNW40 OC-3	1310	-8.0	-8.0/-28.0	SM (9)	LC	I(LN50)/1
LNW51 OC-12	1310	+2.0	-7.0/-30.5	SM (9)	LC	I(LN50)/1
LNW52 OC-48	1310	+3.0	-9.0/-27.0	SM (9)	LC	I(LN50)/1
LNW140 OC-3/16DS1	1310	-8.0	-8.0/-28.0	SM (9)	LC	I(LN50)/1
LNW380 OC-12	1550	+2.0	-8.0/-29.0	SM (9)	LC	I(LN50)/1
LNW601 OC-3	1310	0.0	0.0/-34.0	SM (9)	LC	I(LN50)/1

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

Table 1-3 Alcatel-Lucent 1665 DMXtend 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	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-TC1-electrical	LNW63 LNW64 LNW87 LNW170	NA	NA	NA	NA	RJ45	NA
ESCON-MM-I1	LNW73/73C	1310	-14.0	-14.4/-29.0	MM (50 and 62.5)	LC	I(LN50)/1
GE-1X2XFC-LX-C1	LNW64 LNW73/73C LNW87 LNW170	1310	-3.0	-3.0/-19.0	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
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-C1	LNW64 LNW73/73C LNW87 LNW170	850	-2.5	0.0/-17.0	MM (50 and 62.5)	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
OC3SR1-I1 (S155I2)	LNW37 LNW45 LNW55 LNW84 LNW302 LNW705	1310	-8.0	-8.0/-23.0	SM (9)	LC	I(LN50)/1
OC3IR1-I1	LNW37 LNW45 LNW55 LNW84 LNW302 LNW705	1310	-8.0	-15.0/-28.0	SM (9)	LC	I(LN50)/1
OC3LR1-I1	LNW37 LNW45 LNW55 LNW84 LNW302 LNW705	1310	-0.0	-10.0/-34.0	SM (9)	LC	I(LN50)/1
OC3X12X48 IR1-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			

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
OC3X12X48 LR1-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			
OC12IR1-I1	LNW49 LNW55 LNW84 LNW382 LNW705	1310	-8.0	-8.0/-28.0	SM (9)	LC	I(LN50)/1
OC12LR1-I1	LNW49 LNW55 LNW84 LNW382 LNW705	1310	+2.0	-8.0/-28.0	SM (9)	LC	I(LN50)/1
OC12LR2-I1	LNW49 LNW55 LNW84 LNW382 LNW705	1550	+2.0	-8.0/-28.0	SM (9)	LC	I(LN50)/1
S622C47EL	LNW37 LNW45 LNW49 LNW55 LNW84	1471	+5.0	-8.0/-28.0	SM (9)	LC	I(LN50)/1
S622C49EL	LNW37 LNW45 LNW49 LNW55 LNW84 LNW705	1491	+5.0	-8.0/-28.0	SM (9)	LC	I(LN50)/1
S622C51EL	LNW37 LNW45 LNW49 LNW55 LNW84 LNW705	1511	+5.0	-8.0/-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
S622C53EL	LNW37 LNW45 LNW49 LNW55 LNW84 LNW705	1531	+5.0	-8.0/-28.0	SM (9)	LC	I(LN50)/1
S622C55EL	LNW37 LNW45 LNW49 LNW55 LNW84 LNW705	1551	+5.0	-8.0/-28.0	SM (9)	LC	I(LN50)/1
S622C57EL	LNW37 LNW45 LNW49 LNW55 LNW84 LNW705	1571	+5.0	-8.0/-28.0	SM (9)	LC	I(LN50)/1
S622C59EL	LNW37 LNW45 LNW49 LNW55 LNW84 LNW705	1591	+5.0	-8.0/-28.0	SM (9)	LC	I(LN50)/1
S622C61EL	LNW37 LNW45 LNW49 LNW55 LNW84 LNW705	1611	+5.0	-8.0/-28.0	SM (9)	LC	I(LN50)/1
OC48SR1-I1	LNW41 LNW55 LNW62 LNW84 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
OC48LR1-I1	LNW41 LNW55 LNW62 LNW84 LNW402 LNW705	1310	+3.0	-9.0/-27.0	SM (9)	LC	I(LN50)/1
OC48LR2-I1	LNW41 LNW55 LNW62 LNW84 LNW402 LNW705	1550	+3.0	-9.0/-28.0	SM (9)	LC	I(LN50)/1
S155I2 (OC3SR1-I1)	LNW41 LNW55 LNW62 LNW84 LNW302 LNW705	1310	-8.0	-8.0/-23.0	SM (9)	LC	I(LN50)/1
S2D23C6	LNW41 LNW55 LNW62 LNW84 LNW402	1558.983	+4.0	-9.0/-28.0	SM (9)	LC	I(LN50)/1
S2D25C6	LNW41 LNW55 LNW62 LNW84 LNW402	1557.363	+4.0	-9.0/-28.0	SM (9)	LC	I(LN50)/1
S2D27C6	LNW41 LNW55 LNW62 LNW84 LNW402	1555.747	+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
S2D31C6	LNW41 LNW55 LNW62 LNW84 LNW402	1552.524	+4.0	-9.0/-28.0	SM (9)	LC	I(LN50)/1
S2D33C6	LNW41 LNW55 LNW62 LNW84 LNW402	1550.918	+4.0	-9.0/-28.0	SM (9)	LC	I(LN50)/1
S2D35C6	LNW41 LNW55 LNW62 LNW84 LNW402	1549.315	+4.0	-9.0/-28.0	SM (9)	LC	I(LN50)/1
S2D37C6	LNW41 LNW55 LNW62 LNW84 LNW402	1547.715	+4.0	-9.0/-28.0	SM (9)	LC	I(LN50)/1
S2D45C6	LNW41 LNW55 LNW62 LNW84 LNW402	1541.349	+4.0	-9.0/-28.0	SM (9)	LC	I(LN50)/1
S2D47C6	LNW41 LNW55 LNW62 LNW84 LNW402	1539.766	+4.0	-9.0/-28.0	SM (9)	LC	I(LN50)/1
S2D49C6	LNW41 LNW55 LNW62 LNW84 LNW402	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	LNW41 LNW55 LNW62 LNW84 LNW402	1535.036	+4.0	-9.0/-28.0	SM (9)	LC	I(LN50)/1
S2D55C6	LNW41 LNW55 LNW62 LNW84 LNW402	1533.465	+4.0	-9.0/-28.0	SM (9)	LC	I(LN50)/1
S2D59C6	LNW41 LNW55 LNW62 LNW84 LNW402	1530.334	+4.0	-9.0/-28.0	SM (9)	LC	I(LN50)/1
S2G7C47LI	LNW41 LNW55 LNW62 LNW84 LNW402	1471	+5.0	-8.0/NA	SM (9)	LC	I(LN50)/1
S2G7C49LI	LNW41 LNW55 LNW62 LNW84 LNW402	1491	+5.0	-8.0/NA	SM (9)	LC	I(LN50)/1
S2G7C51LI	LNW41 LNW55 LNW62 LNW84 LNW402	1511	+5.0	-8.0/NA	SM (9)	LC	I(LN50)/1
S2G7C53LI	LNW41 LNW55 LNW62 LNW84 LNW402	1531	+5.0	-8.0/NA	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
S2G7C55LI	LNW41 LNW55 LNW62 LNW84 LNW402	1551	+5.0	-8.0/NA	SM (9)	LC	I(LN50)/1
S2G7C57LI	LNW41 LNW55 LNW62 LNW84 LNW402	1571	+5.0	-8.0/NA	SM (9)	LC	I(LN50)/1
S2G7C59LI	LNW41 LNW55 LNW62 LNW84 LNW402	1591	+5.0	-8.0/NA	SM (9)	LC	I(LN50)/1
S2G7C61LI	LNW41 LNW55 LNW62 LNW84 LNW402	1611	+5.0	-8.0/NA	SM (9)	LC	I(LN50)/1
OC192IR2-II	LNW141 LNW705	1550	+2.0	-7.0/-24.0	SM (9)	LC	I(LN50)/1
X10G21C5	LNW141	1560.606	+3.0	-8.0/Table 1 -4	SM (9)	LC	I(LN50)/1
X10G22C5	LNW141	1559.794	+3.0	-8.0/Table 1 -4	SM (9)	LC	I(LN50)/1
X10G23C5	LNW141	1558.983	+3.0	-8.0/Table 1 -4	SM (9)	LC	I(LN50)/1
X10G24C5	LNW141	1558.173	+3.0	-8.0/Table 1 -4	SM (9)	LC	I(LN50)/1
X10G25C5	LNW141	1557.363	+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
X10G26C5	LNW141	1556.555	+3.0	- 8.0/Table 1 -4	SM (9)	LC	I(LN50)/1
X10G27C5	LNW141	1555.747	+3.0	- 8.0/Table 1 -4	SM (9)	LC	I(LN50)/1
X10G28C5	LNW141	1554.940	+3.0	- 8.0/Table 1 -4	SM (9)	LC	I(LN50)/1
X10G31C5	LNW141 LNW705	1552.524	+3.0	- 8.0/Table 1 -4	SM (9)	LC	I(LN50)/1
X10G33C5	LNW141 LNW705	1550.918	+3.0	- 8.0/Table 1 -4	SM (9)	LC	I(LN50)/1
X10G35C5	LNW141 LNW705	1549.315	+3.0	- 8.0/Table 1 -4	SM (9)	LC	I(LN50)/1
X10G37C5	LNW141 LNW705	1547.715	+3.0	- 8.0/Table 1 -4	SM (9)	LC	I(LN50)/1
X10G45C5	LNW141 LNW705	1541.349	+3.0	- 8.0/Table 1 -4	SM (9)	LC	I(LN50)/1
X10G47C5	LNW141 LNW705	1539.766	+3.0	- 8.0/Table 1 -4	SM (9)	LC	I(LN50)/1
X10G49C5	LNW141 LNW705	1538.186	+3.0	- 8.0/Table 1 -4	SM (9)	LC	I(LN50)/1
X10G52C5	LNW141	1535.822	+3.0	- 8.0/Table 1 -4	SM (9)	LC	I(LN50)/1
X10G53C5	LNW141	1535.036	+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
X10G54C5	LNW141	1534.250	+3.0	-8.0/Table 1-4	SM (9)	LC	I(LN50)/1
X10G55C5	LNW141	1533.465	+3.0	-8.0/Table 1-4	SM (9)	LC	I(LN50)/1
X10G56C5	LNW141	1532.681	+3.0	-8.0/Table 1-4	SM (9)	LC	I(LN50)/1
X10G57C5	LNW141	1531.898	+3.0	-8.0/Table 1-4	SM (9)	LC	I(LN50)/1
X10G58C5	LNW141	1531.116	+3.0	-8.0/Table 1-4	SM (9)	LC	I(LN50)/1
X10G59C5	LNW141	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 and power installation

Overview

Introduction

Part I covers the physical mounting of the Alcatel-Lucent 1665 Data Multiplexer Extend (Alcatel-Lucent 1665 DMXtend) shelf using the Horizontal Bay Mount. This section includes running and connecting power cables, interconnecting cables, alarm cables, and as required, external timing, and communication cables. Initial circuit pack installation (not seated) is also included.

Part I provides a recommended checklist [Table I-2 “Installation checklist”](#) to follow when installing Alcatel-Lucent 1665 DMXtend. 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.

Note: The Alcatel-Lucent 1665 DMXtend shelf does not require the installation of an additional fan shelf since the fan unit is integral to the shelf itself.

Contents

This part includes the following chapters:

Chapter 2, “Physical installation”	
Chapter 3, “Cable and fiber installation”	
Chapter 4, “Circuit pack installation”	

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.

Qty.	Description	Comments
1	19" Mounting Brackets 849011804	The 19" mounting brackets (C849011804) must be ordered separately and are required to install the Alcatel-Lucent 1665 DMXtend in a 19" bayframe.
	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	Thomas & Betts * R-5648B Crimping Tool	The crimping tool and wire stripper are only required if installing DS3/EC1 cables. The replacement cassette is for the wire stripper tool.
2	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/E1 cable and must be able to accommodate 24 gauge wire.
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 DMXtend shelf to the frame. It is also used when reattaching the mounting brackets to the Alcatel-Lucent 1665 DMXtend shelf.
1	Metric & Inch Series Tool Set R-6001	Because some of our Optical Networking Products (also know as Transport) may have some metric fasteners, please ensure that the proper metric tools are available.
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.

Qty.	Description	Comments
1	Ohmmeter ITE-6379C	An ohmmeter is required to verify that the Alcatel-Lucent 1665 DMXtend is properly grounded.
1	DS1/E1 Error Rate Test Set ITE-7113	A DS1/E1 error rate test set is required for testing of DS1/E1 cabling. A T-BERD 2209 or equivalent is recommended.
1	DS3/EC1 Error Rate Test Set ITE-7113	A DS3/EC1 error rate test set is required for testing of DS3/EC1 cabling. A T-BERD 209 or equivalent is recommended.
1	Optical Test Set (Optional)	A Optical test set is required for testing of low speed optics OC3/12/48. An 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 DMXtend 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.
1	15-dB LC-type LBO ITE-7196 (108279480)	LBOs are only required when optically looping the Alcatel-Lucent 1665 DMXtend 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
	Noyes OFS 300-200X Optical Fiber Scope ITE-7129	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 optical fiber scope may not be needed
	2.5mm 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
	Individual presaturated alcohol wipes ITE-7136	99% pure isopropyl alcohol

Qty.	Description	Comments
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"

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 DMXtend.

Quantity	Description	Comments
1	Personal Computer (PC)	See <i>PC minimum requirements</i> .
1	RS-232 Interface Cable	8-ft. long RJ45 to 9-pin D-sub serial cable (Comcode 848748869)
1	RJ45 to RJ45 Cross-over Cable	

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:

Table I-1 Computer requirements

Components	Minimum	Recommended
Processor	Pentium II 266 MHz	Pentium IV 1 GHz or higher
RAM (1 system view)	256 MB	512 MB

Components	Minimum	Recommended
RAM (up to 5 system views)	256 MB	1 GB
Virtual Memory	139 MB	267 MB
Available Hard Disk Space*	750 MB (Alcatel-Lucent 1665 DMXtend view only)	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 10/100 BASE-T LAN interface Pin Designations/signals are: <ul style="list-style-type: none"> • 1 TD+ • 2 TD- • 3 RD+ • 6 RD- 	
CD ROM Drive	Required	
Operating System	Microsoft Windows® 2000 or Microsoft Windows® XP The customer is responsible for ensuring that the PC remains virus-free.	
Internet Browser	Internet Explorer 5.0/5.5/6.0/7.0	Internet Explorer 5.0/5.5/6.0/7.0

Notes:

* 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 DMXtend backup files.

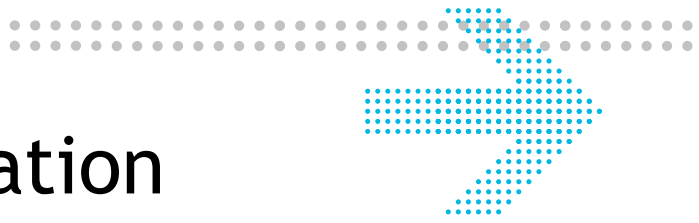
Note: Minimum requirements are sufficient to run two to three GUI **System Views**, unless otherwise noted. Recommended requirements are intended to be used as a general guideline to optimize WaveStar® CIT performance. As the CIT is used with multiple NE connections and multiple NE types, the processor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

Table I-2 Installation checklist

Section and chapter	Procedure	Required	Completed	
			Yes	No
Part I: "Physical and power installation"				
Chapter 2, "Physical installation"	Inspection (p. 2-5)	Yes		
	Alcatel-Lucent 1665 DMXtend center divider (p. 2-5)	See Note 1		
	Alcatel-Lucent 1665 DMXtend shelf installation (p. 2-8)	Yes		
	Power cable installation (p. 2-13)	Yes		
Chapter 3, "Cable and fiber installation"	Inspection (p. 3-5)	Yes		
	DS1/E1 cable installation (p. 3-6)	See Note 1		
	DS3/EC-1 cable installation (p. 3-13)	See Note 1		
	DS1 and DS3 hybrid cable installation (p. 3-32)	See Note 1		
	10/100BASE-T Ethernet cable installation (p. 3-40)	See Note 1		
	IAO LAN and TCP/IP cable installation (p. 3-44)	See Note 1		
	Modem cable installation (p. 3-47)	See Note 1		
	Sync cable installation (p. 3-49)	See Note 1		
	Office alarm cable installation (p. 3-53)	See Note 1		
	Miscellaneous (environmental) discrete telemetry cable installation (p. 3-58)	See Note 1		
	OC-3/OC-12/OC-48/OC-192 main optical fiber cable installation (p. 3-62)	See Note 1		
	OC-3/OC-12/OC-48 low-speed optical fiber cable installation (p. 3-65)	See Note 1		
	100/1000BASE-X optical fiber cable installation (p. 3-66)	See Note 1		
	CIT (RS-232) cable installation (p. 3-68)	See Note 1		
	Final operations (p. 3-70)	Yes		

Section and chapter	Procedure	Required	Completed	
			Yes	No
Chapter 4, "Circuit pack installation"	Powering (p. 4-2)	Yes		
	Initial circuit pack installation (p. 4-9)			
	LNW2 (SYSCTL) installation (p. 4-9)	Yes		
	OC-3/OC-12/OC-48/OC-192 main OLIU installation (p. 4-10)	Yes		
	LNW39/LNW391 (DS1/DS3/16/3), LNW111 (3DS3) and LNW112 (16DS1) installation (optional) (p. 4-16)	See Note 1		
	LNW7 (28DS1PM) and LNW8/LNW801 (56DS1E1) installation (optional) (p. 4-11)	See Note 1		
	LNW16 (12DS3/EC1) and LNW19B (48DS3/EC1) installation (optional) (p. 4-12)	See Note 1		
	LNW18 (12TMUX) and LNW20 (48TMUXDS3EC1) installation (optional) (p. 4-13)	See Note 1		
	LNW63 (GBE PL) 4 port or LNW64 (GBE PL) 8-port installation (optional) (p. 4-20)	See Note 1		
	LNW37 (OC-3 4 port PTM OLIU) or LNW45 (OC-3 8 port PTM OLIU) (p. 4-15)	See Note 1		
	LNW49 (OC-12 4 port PTM OLIU) low-speed installation (optional) (p. 4-17)	See Note 1		
	LNW62 (4 OC-48 PTM OLIU) or LNW55 (OC-3/OC-12/OC-48 12/4 port OLIU) low speed installation (optional) (p. 4-18)	See Note 1		
	LNW63 (GBE PL) 4 port or LNW64 (GBE PL) 8-port installation (optional) (p. 4-20)	See Note 1		
	LNW73/73C (4-Fiber channel FICON/ESCON) installation (optional) (p. 4-20)	See Note 1		
	LNW66 (10/100T), LNW74 (10/100-PL), LNW87 (FE/GBE PL) installation (optional) (p. 4-21)	See Note 1		
	LNW170 (GigE/FE) (p. 4-22)	See Note 1		

Section and chapter	Procedure	Required	Completed	
			Yes	No
	LNW402 OC48 1310 nm, 1550 nm, or DWDM PTM Optics (p. 4-23)	See Note 1		
	LNW63 (GBE PL) 4 port or LNW64 (GBE PL) 8-port installation (optional) (p. 4-20)	See Note 1		
	LNW785 OMD5/8 8-channel low-loss DWDM optical mux/demux (p. 4-25)	See Note 1		
	LNW43, LNW96 (apparatus blank) installation (optional) (p. 4-26)	See Note 1		
	LNW42, LNW95 apparatus blank installation (optional) (p. 4-27)	See Note 1		
<p>Notes:</p> <p>1. Only required if equipped.</p>				



2 Physical installation

Overview

Purpose

This section provides equipment installation instructions for the Alcatel-Lucent 1665 Data Multiplexer Extend (Alcatel-Lucent 1665 DMXtend) shelf using the horizontal bay mount configuration. The Alcatel-Lucent 1665 DMXtend shelves with the removable center divider can support either half width or full width cards in the Main function slots.

Contents

This chapter provides information on the following topics:

Planning	2-1
Inspection	2-5
Alcatel-Lucent 1665 DMXtend center divider	2-5
Alcatel-Lucent 1665 DMXtend shelf installation	2-8
Power cable installation	2-13
Final operations	2-17

Planning

Description

This section provides information about the following:

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

Tools, test equipment and accessories

Listed below are the tools, test equipment and accessories necessary to perform the procedures in this section.

Quantity	Description	Comments
1	19" Mounting Brackets 849011804	The 19" mounting brackets (849011804) must be ordered separately and are required to install the Alcatel-Lucent 1665 DMXtend in a 19" bayframe.
	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 R-4987C	A wrist strap must be worn when handling circuit packs. Use the electrostatic discharge (ESD) jack provided on the shelf.
1	Multimeter (Optional) ITE-6379	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	Torque Wrench ITE-5952	A torque wrench (50-250 IN-LBS) is used when tightening the Alcatel-Lucent 1665 DMXtend shelf to the frame. It is also used when reattaching the mounting brackets to the Alcatel-Lucent 1665 DMXtend shelf.
1	Metric & Inch Series Tool Set R - 6001	Because some of our Optical Networking Products (also know as Transport) may have some metric fasteners, please ensure that the proper metric tools are available.
1	Ohmmeter ITE-6379	An ohmmeter is required to verify that the Alcatel-Lucent 1665 DMXtend is properly grounded.

Mounting options

The Horizontal Bay Mount mounting brackets on the Alcatel-Lucent 1665 DMXtend are designed to allow for mounting in the following:

- Standard 23-inch wide network bay frames

The recommended network bay frames are the ED-8C500-50 and the ED-8C501-50 (rear access only).

- Mounted in 23-inch seismic network bay frame

The ED-8C800-50 and ED-8C801-50 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

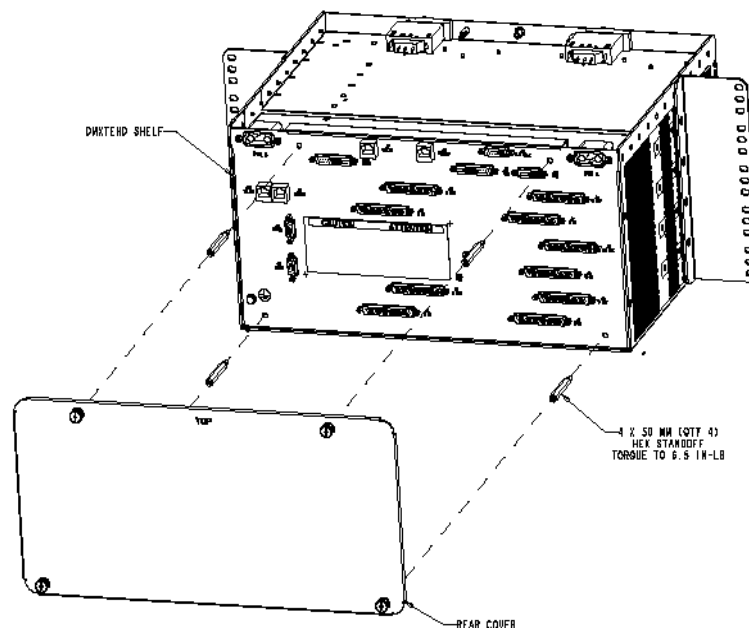
Rear cover assembly

This section describes the optional rear cover assembly kits for both Alcatel-Lucent 1665 DMXtend shelves, (Bay Mount Kit number 849001060) or Alcatel-Lucent 1665 DMXtend shelves (Shelf mount Kit number 849001367). Both kit assemblies will fit either the 19" or 23" bracket assemblies. [Figure 2-1](#) shows the shelf mount Kit assembly.

Note: The shelves (Shelf mount Kit number 849001367) have four pre-drilled holes in the shelf assembly backplane. If the shelf assembly backplane have the four non-drilled holes, then the bay mount kit (Bay Mount Kit number 849001060) must be used.

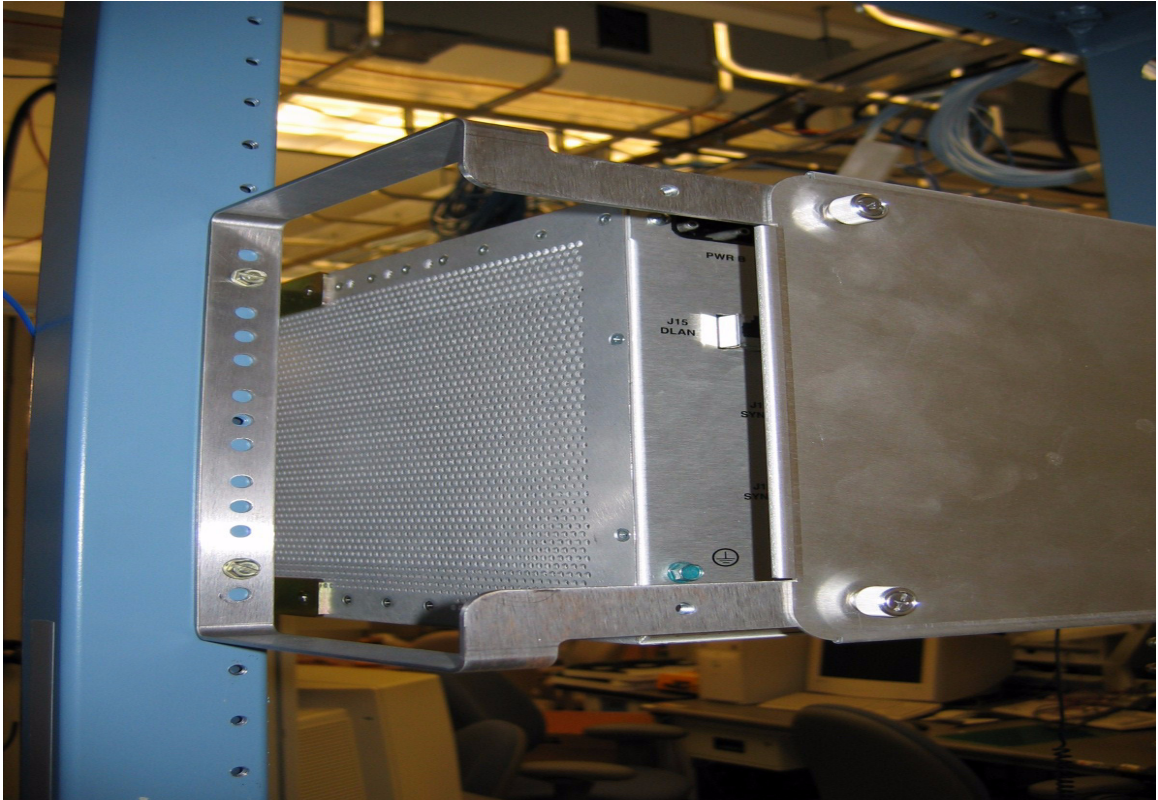
Shelf mount rear cover

Figure 2-1 Shelf mount rear cover kit 849001367



Bay mount rear cover

Figure 2-2 Bay mount rear cover kit 849001060



Note: The rear bay cover requires the front mounting configuration of the Alcatel-Lucent 1665 DMXtend shelf. This is mounting the shelf on the front of the bay with 5 inches of the shelf protruding from the front of the bay.

Cabling checklist

This section briefly describes cabling information, including the number of particular cables required. For information regarding available cable lengths and ordering comcodes, see the tables in this chapter.

[Table 2-1, “Cable requirements and options” \(p. 2-4\)](#) lists available cables along with the required number (if any).

Table 2-1 Cable requirements and options

Cable assembly description	Required	See note
Power	Yes	1

1. One -48VA and -48VB main power feeder is required per shelf. The shelf requires the use of a right angle power connector on each feed.

Inspection

Description

Perform the following procedure before installing the Alcatel-Lucent 1665 DMXtend shelf.

Steps

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

Note: If any backplane pins are damaged, see [Appendix D, “Backplane pin replacement”](#) for instructions on repairing the damaged pin(s).

-
- 2 Each Alcatel-Lucent 1665 DMXtend shelf comes with an installation kit. The bag containing the kit is attached inside the Alcatel-Lucent 1665 DMXtend shelf. The kit contains the following items:

Quantity	Description
6	Thread Cutting Screws
1	ESD Jack stud
1	Caution Label

Verify that the kit is available and contains the items listed above.

-
- 3 Check off the appropriate box in the [Table I-2, Installation checklist](#).

END OF STEPS

Alcatel-Lucent 1665 DMXtend center divider

Description

The Alcatel-Lucent 1665 DMXtend shelves, comcode 849031372, come shipped with center dividers which can support half-width cards. The center dividers are removed for full-width cards. This section describes the procedure to remove the center dividers on a Alcatel-Lucent 1665 DMXtend shelf if supporting full width cards.

New installation

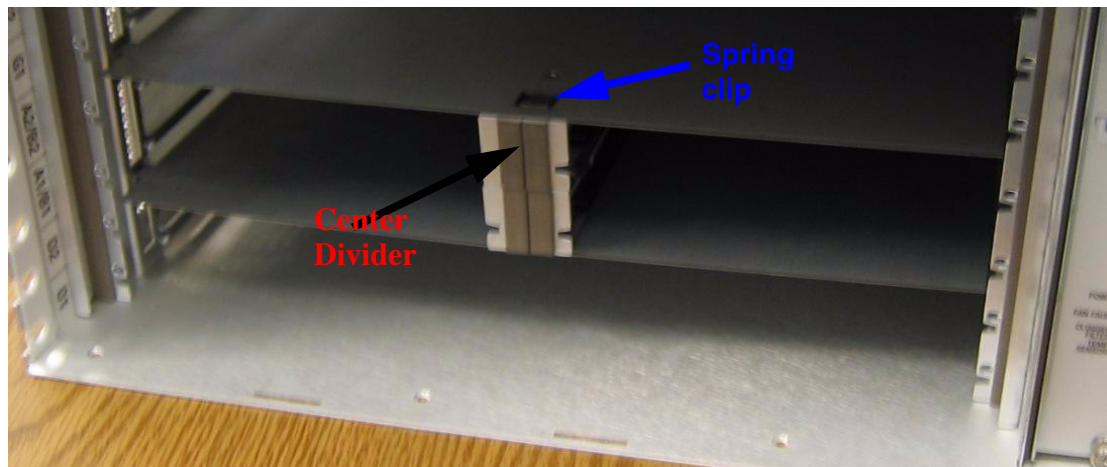
The procedure below describes how to remove the center dividers for new installations.

Steps

The figure below shows the new Alcatel-Lucent 1665 DMXtend shelf with the center dividers inserted.

Note: The center dividers come equipped with a spring clip CC849027222 not shown in [Figure 2-3, “Center divider”](#) (p. 2-6) that latches the dividers together. Remove this spring clip by inserting a finger into the hole and pulling gently away from the shelf. Keep this spring clip available if there is ever a need to reinstall the center divider for the use of half-width cards in the shelf.

Figure 2-3 Center divider



-
- 1 To remove the top center divider, depress the spring clip latch located on top of the divider and slide the divider out.
 - 2 Remove the bottom center divider by depressing the bottom spring clip and sliding the divider out.

END OF STEPS

Existing installation

This procedure is used to remove the center dividers if circuit packs are installed above or below the dividers and the spring clip is not accessible.

Steps

The figure below shows the Alcatel-Lucent 1665 DMXtend shelf with both center dividers inserted and a working circuit pack installed above the top divider.

Figure 2-4 Center divider with circuit packs installed.



-
- 1 Using a small flat screwdriver, separate the padding as shown in [Figure 2-4, “Center divider with circuit packs installed.”](#) (p. 2-7).
 - 2 Insert the screwdriver approximately two thirds of the way up from the bottom of the top divider and depress the latch.
 - 3 Gently slide out the center divider.
 - 4 Repeat for the bottom center divider if necessary. The latch on the bottom divider moves bottom to top.

END OF STEPS

Alcatel-Lucent 1665 DMXtend shelf installation

Description

As an example of the Alcatel-Lucent 1665 DMXtend shelf installation, the following steps describe mounting the shelf from the front of a 23-inch bay frame. Mounting from the rear 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.

Note: If the Alcatel-Lucent 1665 DMXtend shelf is to be used in an outside cabinet with no exchange of outside air, the air filter **must be** removed.

Steps

1 Position the Alcatel-Lucent 1665 DMXtend shelf on a stable work surface.

2 Open the front cover, remove the installation kit bag, and remove the caution label from the bag.

3 Apply the label to the shelf in a position where it will be visible when the shelf is mounted in the bayframe.

Note: The recommended position is on the left side of the inside of the front cover, but the customer may position it to fit their local practices as long as it is visible when accessing the front of the Alcatel-Lucent 1665 DMXtend shelf.

4 Close and latch the front cover.

- 5 Determine the mounting configuration for the Alcatel-Lucent 1665 DMXtend 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 DMXtend shelf is shipped with the mounting brackets positioned for mounting to the front of a 23-inch wide network bay frame with a 5 in. setback.

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

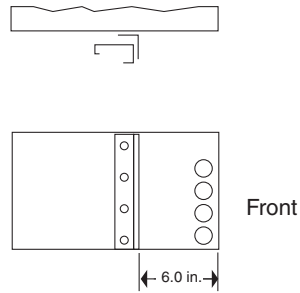
- 6 If necessary, reposition the shelf mounting brackets accordingly.

For 23-inch frame, front or rear mounting, see [Figure 2-5, “Alcatel-Lucent 1665 DMXtend mounting bracket positions - 23-Inch/19-Inch frame”](#) (p. 2-10).

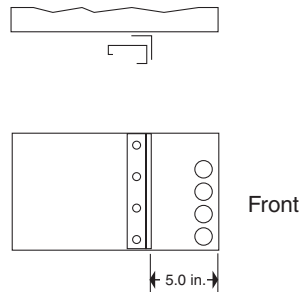
Note: The 19" mounting brackets (C849011804) must be ordered separately and are required to install the Alcatel-Lucent 1665 DMXtend in a 19" bayframe.

For 19-inch frame, front or rear mounting, see [Figure 2-5, “Alcatel-Lucent 1665 DMXtend mounting bracket positions - 23-Inch/19-Inch frame”](#) (p. 2-10).

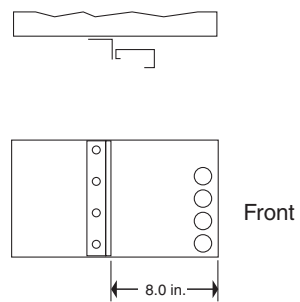
Figure 2-5 Alcatel-Lucent 1665 DMXtend mounting bracket positions - 23-Inch/19-Inch frame



Front Mount Left Side



Front Mount Left Side



Rear Mount Left Side

- 7 Determine the position that the Alcatel-Lucent 1665 DMXtend shelf will be mounted.

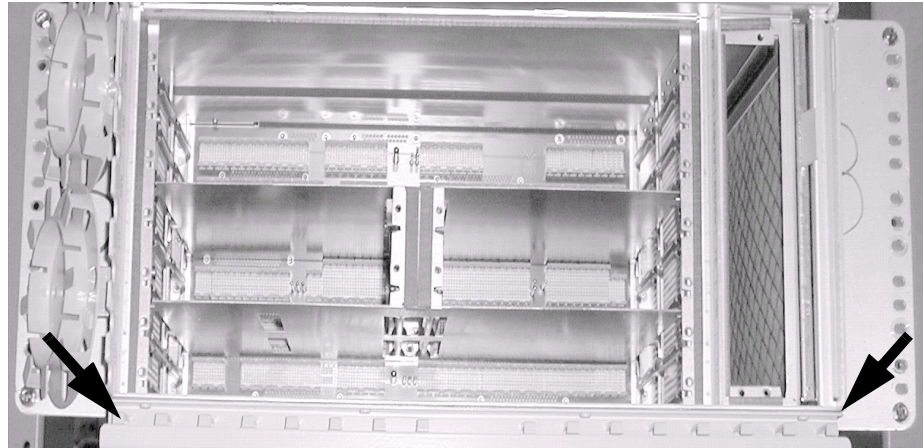
Note: Start at the bottom of the bay and add shelves from bottom to top.

Fiber duct

This section will describe how to install an optional fiber duct.

Note: If a fiber duct is being used to diversify fiber, a 1-inch space is required to accommodate the duct below the existing Alcatel-Lucent 1665 DMXtend. Use the Assembly Fiber Duct kit drawing 848949152 to attach the duct to the Alcatel-Lucent 1665 DMXtend. See [Figure 2-6, "Fiber duct mounting"](#) (p. 2-11).

Figure 2-6 Fiber duct mounting



-
- 8 Position the Alcatel-Lucent 1665 DMXtend shelf in the frame and secure the shelf to the frame using the thread-forming screws included with the shelf (3 screws per side). Tighten the screws to 21 in.-lb. (minimum)/30 in.-lb. (maximum).

Note: There is a jumper on the fan controller board, at the corner closest to the top-rear of the chassis as installed. It is labeled "FILT BLK" and the two positions are "ENABLE" and "DISABLE." The fan ships with the jumper in the disable position which prevents the filter alarm from working. To enable the filter alarm, move the jumper to the "ENABLE" position. This is the only jumper on the board. The OSP cabinet must be engineered so that the Alcatel-Lucent 1665 DMXtend does not impede air flow to other equipment in the cabinet. The OSP cabinet must be engineered to provide a two inch open space on the left and right sides of the Alcatel-Lucent 1665 DMXtend for air flow. Mounting frame and flanges may intrude on this space.

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.

Note: For bays that use power coat paint e.g., most 19" bays, studies on that type of paint indicate that the material is not always removed cleanly using the thread forming screws and can create a poor ground, thus we recommend a secondary ground be used.

The secondary ground would consist of a 12 AWG wire from the UL (Green M5 Screw) safety ground on the lower left side of the rear of the shelf to the bayframe (where the bayframe has been scraped clean of paint and treated with no-ox) or directly to the office ground. See [Figure 2-7, “Safety ground screw.”](#) (p. 2-12).

Figure 2-7 Safety ground screw.

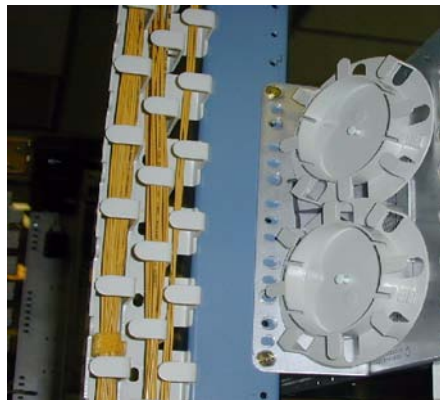


-
- 9 Mount the ESD Jack Stud on the rear of the bayframe where it will be accessible when accessing the rear of the shelf.

 - 10 If fiber spools are to be used, attach the spools to the Alcatel-Lucent 1665 DMXtend using the Fiber Spool Bracket Kit drawing 848949152. Attach the bracket to the shelf first and then the top fiber spool to the bracket. The lower fiber spool will need to overlap the top spool to snap into place. Run the excess fiber per office practices around the spools to minimize the bend radius. See [Figure 2-8, “Fiber spools”](#) (p. 2-13).

 - 11 If Alcatel-Lucent fiber ducts are used, see [Figure 2-8, “Fiber spools”](#) (p. 2-13). All high-speed fibers are to be run in the duct closest to the shelf for both left and right ducts. The next two ducts away from the shelf are for low-speed fibers.

Figure 2-8 Fiber spools



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

Requirement: The ohmmeter reads less than 1 ohm.

- 13 Verify with an ohmmeter that the ESD Jack Stud mounted at the rear of the shelf is grounded to the bay frame. Measure between the ESD Jack Stud and the office ground lug on the bay frame.

Requirement: The ohmmeter reads less than 1 ohm.

- 14 Check off the appropriate box in the [Table I-2, Installation checklist](#).

END OF STEPS

Power cable installation

Description

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

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 DMXtend bay.

Table 2-2, “Power cable assemblies” (p. 2-16) and Table 2-3, “Power connections” (p. 2-16) lists the available power cable assemblies and power connections, respectively.



CAUTION

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

Steps

- 1 Connect the A and B power cables to the A and B power connector housings on the back of the Alcatel-Lucent 1665 DMXtend Shelf. See [Figure 2-9, “Power connection”](#) (p. 2-14).



CAUTION

Ensure that the four parts of the terminal 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 2-9 Power connection



-
- 2 Route the power cable out of the bay and toward the BDCBB or BDFB, stacking the cable in the bay.

Note: The Alcatel-Lucent 1665 DMXtend is powered by -48 V DC.



CAUTION

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

-
- 3 Splice feeders from the BDCBB or BDFB to the Alcatel-Lucent 1665 DMXtend power cable. See [Table 2-3, “Power connections”](#) (p. 2-16). and should be labeled as follows;

Note: Four wires are spliced to the power cables.

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

Note: Each feeder at the BDCBB or BDFB should be fused for 25 amperes for bay arrangements and 15 amperes for a single shelf.

- 4 Leave the BDCBB breakers off or BDFB fuses out until you are ready to perform the procedures in [Chapter 4, “Circuit pack installation”](#) of this manual.
-

- 5 Check off the appropriate box in the [Table I-2, Installation checklist](#).

END OF STEPS

Table 2-2 Power cable assemblies

Description	Cable assembly #	Cable length (feet)	Jacket color	Alcatel-Lucent 1665 DMXtend backplane connections
Power Cable Kits with Right Angle Connectors and Two 6 Gauge cables	848929493	85	One Red and One Blue	Connectors on rear of the shelf (BAT A and BAT B)
	848929501	100		
Power Cable Kits with Right Angle Connectors and Two 8 Gauge cables	848929519	55		
	848929527	100		
Power Cable Kits with Right Angle Connectors and 10 Gauge cables	848929535	12		
	848929543	50		
	848929550	75		
	848929568	100		
	848841839	12		
14 AWG	848999496	15		

Table 2-3 Power connections

Alcatel-Lucent 1665 DMXtend bkpl conn.	Shelf power connectors	Pin #	Color		Designation	Name
			Cable	Wire		
P10	BAT A	1	Red	R	-48VA	BAT A
		2		W	-48RTNA	BAT A RTN
P11	BAT B	1	Blue	R	-48VB	BAT B
		2		W	-48RTNB	BAT B RTN

Final operations

Description

Final check on equipment installation.

Steps

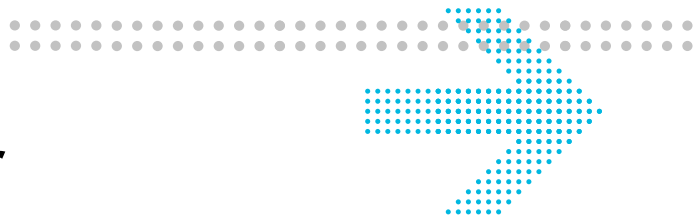
-
- 1 Verify that all the power cables are properly dressed/connected.

 - 2 Verify that all power cables are properly labeled.

 - 3 Replace rear cover on shelf if ordered.

 - 4 Check off the appropriate box in the [Table I-2, Installation checklist](#).

END OF STEPS



3 Cable and fiber installation

Overview

Purpose

This section provides cabling instructions for the Alcatel-Lucent 1665 Data Multiplexer Extend (Alcatel-Lucent 1665 DMXtend) shelf using the horizontal bay mount configuration. The Alcatel-Lucent 1665 DMXtend shelves with the removable center divider can support either half width or full width cards in the Main function slots.

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.

Contents

This chapter provides information on the following topics

Planning	3-2
Connector references	3-4
Inspection	3-5
DS1/E1 cable installation	3-6
DS3/EC-1 cable installation	3-13
DS1 and DS3 hybrid cable installation	3-32
10/100BASE-T Ethernet cable installation	3-40
IAO LAN and TCP/IP cable installation	3-44
Modem cable installation	3-47
Sync cable installation	3-49
Office alarm cable installation	3-53

Miscellaneous (environmental) discrete telemetry cable installation	3-58
OC-3/OC-12/OC-48/OC-192 main optical fiber cable installation	3-62
OC-3/OC-12/OC-48 low-speed optical fiber cable installation	3-65
100/1000BASE-X optical fiber cable installation	3-66
CIT (RS-232) cable installation	3-68
Final operations	3-70

Planning

Description

This section provides information about the following:

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

Tools, test equipment and accessories

Listed below are the tools, test equipment and accessories necessary to perform the procedures in this section.

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	Thomas & Betts ¹ R-5648B Crimping Tool	1. The crimping tool, wire stripper and soldering iron are only required if installing DS3/EC-1 cables. The replacement cassette is for the wire stripper tool.
2	Paladin ² Coaxial Wire Stripper R-5648B D5	
	Replacement Paladin ² Cassette R-5648B D5	
1	Wire-Wrap Gun R-4496A	The wire-wrap gun is required for terminating DS1/E1 cable and must be able to accommodate 24 gauge wire.

Quantity	Description	Comments
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	Multimeter (Optional) ITE-6379	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.

Notes:

1 Registered trademark of Thomas & Betts Corporation

2 Registered trademark of Paladin Corporation.

Cabling checklist

This section briefly describes cabling information, including the number of particular cables required. For information regarding available cable lengths and ordering comcodes, see the tables in this chapter.

[Table 3-1, “Cable requirements and options” \(p. 3-3\)](#) lists available cables along with the required number (if any).

Table 3-1 Cable requirements and options

Cable assembly description	Required	See note
CIT	Yes	1
DS1/E1	Optional	2
DS3/EC-1	Optional	3, 4
DS1/DS3 Hybrid	Optional	5
Office Alarm	Optional	6
Office Alarm Mult	Optional	6
Miscellaneous Discrete	Optional	
LAN 10BASE-T (Crossover)	Optional	7
LAN 10BASE-T (Straight Through)	Optional	7
Sync Timing	Optional	
Modem	Optional	

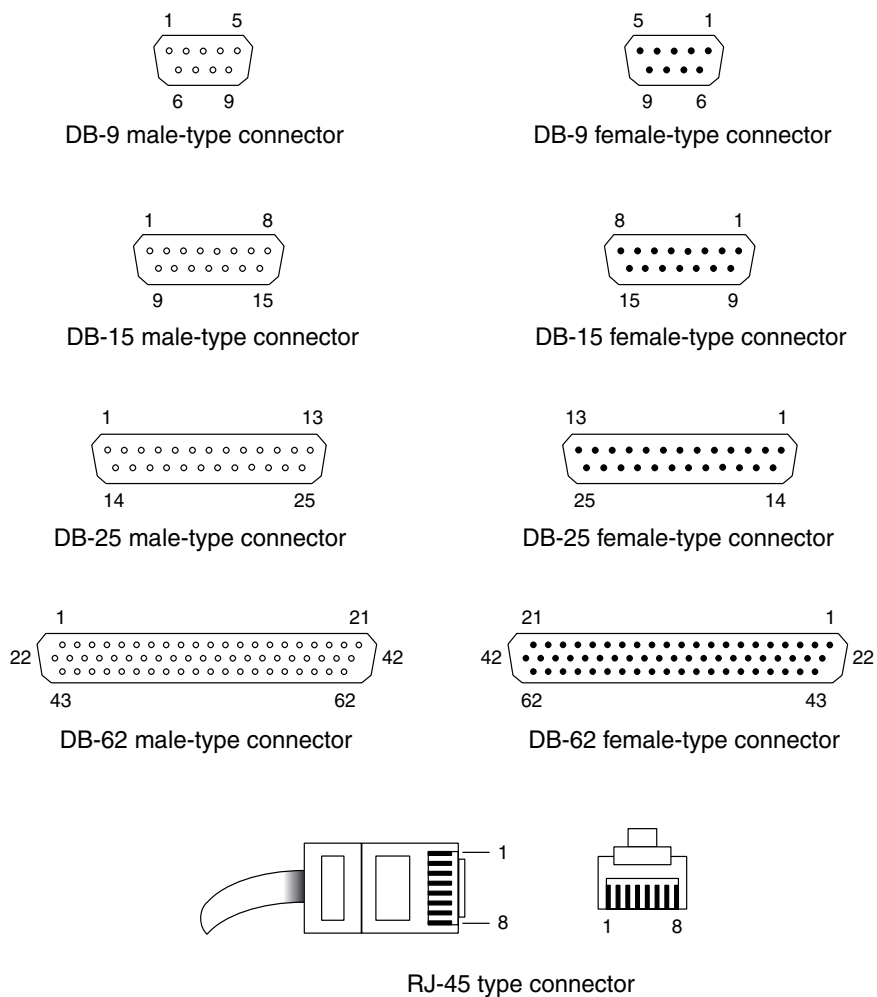
1. One CIT Cable Assembly is required for PC interface with the Alcatel-Lucent 1665 DMXtend (not included with equipment).
2. Two DS1/E1 Cable Assembly are required for each D or G function unit group that will support additional DS1/E1 traffic using the LNW8. Each DS1/E1 Cable Assembly consists of two separate cable assemblies, both containing 28 pairs of 24 gauge cable. One cable is for input and the other cable is for output.
3. One DS3/EC-1 Cable Assembly is required for each D or G function unit group that will support 12 DS3's of traffic. Each DS3/EC-1 Cable Assembly consists of two separate cable assemblies, both containing 735A cables. One cable consists of 12 inputs and the other cable consists of 12 outputs.
4. Two DS3/EC-1 Cable Assembly are required for each D or G function unit group that will support additional DS3/EC-1 traffic using the LNW19B or LNW20. Each DS3/EC-1 Cable Assembly consists of two separate cable assemblies, both containing 735A cables. One cable consists of 24 inputs and the other cable consists of 24 outputs.
5. One DS1/DS3 Hybrid Cable Assembly is required for A/B function unit Group to support use of the LNW39 (16DS1/3DS3), LNW84 (16DS1/3DS3), LNW111 (3DS3), LNW112 (16DS1), LNW140 (16DS1) and LNW391 (16DS1/3DS3) Hybrid. Each DS1/DS3 Hybrid Cable Assembly consists of two separate cable assemblies, both containing 28 pairs of 24 gauge cable a Coaxial 735A cable. One cable is for input and the other cable is for output.
6. When cabling the Alcatel-Lucent 1665 DMXtend for office alarm applications, one Office Alarm Cable Assembly is required for the bottom Alcatel-Lucent 1665 DMXtend shelf in a bay frame. One Office Alarm Mult Cable Assembly is required for each additional Alcatel-Lucent 1665 DMXtend shelf in the bay frame. For example, if four Alcatel-Lucent 1665 DMXtend shelves are located in a single 7-foot bay frame, one Office Alarm Cable Assembly and three Office Alarm Mult Cable Assemblies are required.
7. These cables are used for IAO LAN (OSI/TCP-IP)/Front LAN (OSI/TCP-IP) connection (J16 and Front LAN port). LAN 10BASE-T cross over cable should be used if the shelf is directly connected to a PC and LAN 10BASE-T straight through cable should be used if shelf is connected to a hub.

Connector references

Description

[Figure 3-1](#) provides the pinouts of some of the connectors used to interface with the Alcatel-Lucent 1665 DMXtend.

Figure 3-1 Connector types and pinouts



Inspection

Description

Perform the following procedure before installing the Alcatel-Lucent 1665 DMXtend cables.

Steps

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

Note: If any backplane pins are damaged, see [Appendix D, “Backplane pin replacement”](#) for instructions on repairing the damaged pin(s).

- 2 Check off the appropriate box in the [Table I-2, Installation checklist](#).

.....
E N D O F S T E P S

DS1/E1 cable installation

Description

This section describes how to connect the DS1/E1 transmission cables for function group D or G, to the shelf, route the cables out of the bay and connect the cables to the DSX. Perform this procedure if DS1/E1 cables are required.

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

The cables have connectors at the Alcatel-Lucent 1665 DMXtend shelf end and must be wire-wrapped at the DSX end. A total of two function groups fully cabled will have 112 DS1/E1 drop capacity.

Note: The 112 DS1 drops do not include the 16 port DS1 drop available when using the LNW39/LNW391 DS1/DS3/16/3 combo card in slot A/B. Instructions for cabling slot A/B are provided in [“DS1 and DS3 hybrid cable installation”](#) (p. 3-32).

Note: The connectorized cable end is grounded to the Alcatel-Lucent 1665 DMXtend frame ground through the backplane. Alcatel-Lucent recommends that the shield at both ends of the DS1/E1 cable be grounded. Ground at the DSX end per office requirements.

Steps

- 1 See the engineering job specification. Obtain the DS1/E1 cables per [Table 3-2, “DS1/E1 cable assemblies”](#) (p. 3-9) and note the function group where each cable will be used. Label the cables, indicating bay, shelf, function group (D or G) and direction (IN or OUT of the bay) at each end.

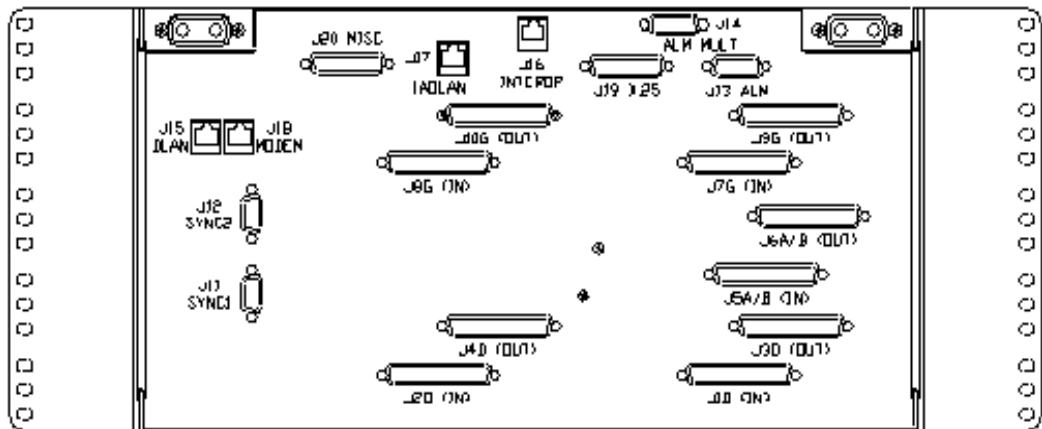
- 2 Connect the function group cables at the Alcatel-Lucent 1665 DMXtend end, carefully matching the correct connector with the appropriate backplane connectors as shown in [Figure 3-2, “DS1/E1 cable connectors”](#) (p. 3-7).

Note: DS1/E1 cable retaining screws must be tightened to a maximum of 6.5 in-lb. Do not overtighten.

Note: The first 28 DS1/E1s of a Function Group must be connected to the right side connectors (J1D, J3D, J7G, and J9G). An additional capacity of 28 DS1/E1s, 29-56, are used when the LNW8 circuit pack is used. The second 28 DS1/E1s of a Function Group are connected to the backplane (J2D, J4D, J8G, and J10G).

Note: The DS1/E1 cables that connect to the right side connectors (J1D, J3D, J7G, and J9G) are different from the cables that connect to the connectors in the center of the backplane (J2D, J4D, J8G, and J10G). See [Table 3-2, “DS1/E1 cable assemblies”](#) (p. 3-9) for more information.

Figure 3-2 DS1/E1 cable connectors



- 3 Route the cables along the backplane and out of the bay to the DSX.

Note: Cables from J1D, J3D, J7G, and J9G route to the right of the shelf (when facing the rear of the shelf) and up the bay frame. See [Figure 3-3, “DS1/E1 cable routing to the right”](#) (p. 3-8). Cables from J2D, J4D, J8G, and J10G route to the left of the shelf (when facing the rear of the shelf) and up the bay frame. See [Figure 3-4, “DS1/E1 cable routing to the left”](#) (p. 3-8).

Note: When dressing the cables from the connectors in the center of the shelf be sure to allow for access to connectors to the left or right of the center connectors depending

on whether cable dresses to the right or the left. See [Figure 3-4, “DS1/E1 cable routing to the left”](#) (p. 3-8).

Figure 3-3 DS1/E1 cable routing to the right

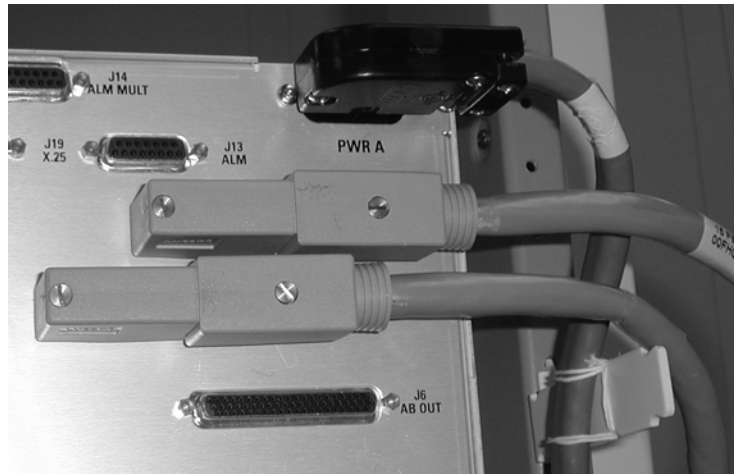


Figure 3-4 DS1/E1 cable routing to the left



- 4 Route the cables along the cable rack and into the terminating bay.
- 5 Remove slack and cut the DS1/E1 cables to the desired length at the DSX.
- 6 Referring to [Table 3-3, “DS1 transmission connections”](#) (p. 3-11), carefully observe color codes and wire-wrap the cables at the DSX.

- 7 Check off the appropriate box in the [Table I-2, Installation checklist](#).

END OF STEPS

Table 3-2 DS1/E1 cable assemblies

Cable length (feet)	Cable assembly #	Description	Alcatel-Lucent 1665 DMXtend backplane connections
10	848954988		
20	848955001		
30	848923074	Function Group G DS1/E1 In (CA1) and DS1/E1 Out (CA2) Cable Function Group D DS1/E1 In (CA1) and DS1/E1 Out (CA2) Cable	These cables route to the <i>left</i> (as viewed from the rear of the shelf) and should be used with connectors J2D (IN), J4D (OUT) and J8G (IN), J10G (OUT)
50	848548327		
75	848923082		
100	848548335		
125	848923090		
150	848548343		
175	848923108		
200	848923116		
250	848548350		
350	848790762		
450	848548368		
550	848790770		
655	848790788		

Cable length (feet)	Cable assembly #	Description	Alcatel-Lucent 1665 DMXtend backplane connections
10	848954962	Function Group G DS1/E1 In (CA1) and DS1/E1 Out (CA2) Cable	These cables route to the <i>right</i> (as viewed from the rear of the shelf) and should be used with connectors J1D (IN), J3D (OUT) and J7G (IN), J9G (OUT)
20	848954970		
30	848934964	Function Group D DS1/E1 In (CA1) and DS1/E1 Out (CA2) Cable	
50	848912473		
75	848934972		
100	848912564		
125	848934980		
150	848912648		
175	848934998		
200	848935003		
250	848912671		
350	848912978		
450	848912986		
550	848913000		
655	848935011		
Notes:			
<ol style="list-style-type: none"> Each Cable Assembly # is a kit that contains 2 cables. For Input connections use cable CA1 (DS1/E1 IN) and for Output connections use cable CA2 (DS1/E1 OUT). Each Cable Assembly # that routes to the <i>right</i> (when facing the rear of the shelf), listed includes all the DS1/E1 cables for one function group using the 28DS1 card. In addition to each Cable Assembly # that route to the <i>right</i> (when facing the rear of the shelf), one Cable Assembly # of cables that route to the <i>left</i> (when facing the rear of the shelf), must be ordered for the additional capacity of the 56DS1/E1 card. Alcatel-Lucent 1665 DMXtend connectors J1D through J4D and J7G through J10G can be used for either DS1/E1 or DS3/EC-1 cabling. Cables are terminated in J1D through J4D and J7G through J10G connectors at the Alcatel-Lucent 1665 DMXtend end and unterminated at the other end for wire-wrap installation. The cable connectors are 62 pins D-Sub male-type connectors and fit into J1D through J4D and J7G through J10G. The DS1/E1 cables are 24 Gauge. 			

Table 3-3 DS1 transmission connections

DSX-1 connections				Alcatel-Lucent 1665 DMXtend backplane connections				
Group	ChanD S1	T/R term	T/R color	62-Pin conn. pin# T/R	Function group D conn.		Function group G conn.	
					In	Out	In	Out
1	1 (1)	B8/B7	W/BL ¹	19/40	J1D	J3D	J7G	J9G
	2 (2)	B6/B5	W/O ¹	18/39	D	D	G	G
	3 (3)	B4/B3	W/G ¹	60/59	In	Out	In	Out
	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 DMXtend backplane connections				
Group	ChanD S1	T/R term	T/R color	62-Pin conn. pin# T/R	Function group D conn.		Function group G conn.	
					In	Out	In	Out
7	1 (25)	B8/B7	V/S	3/24				
	2 (26)	B6/B5	W/BL ¹	2/23				
	3 (27)	B4/B3	W/O ¹	44/43				
	4 (28)	B2/B1	W/G ¹	1/22				
1	1 (29)	B8/B7	W/BL ¹	19/40				
	2 (30)	B6/B5	W/O ¹	18/39	J2D	J4D	J8G	J10G
	3 (31)	B4/B3	W/G ¹	60/59	D	D	G	G
	4 (32)	B2/B1	W/BR	17/38	In	Out	In	Out
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 DMXtend backplane connections				
Group	ChanD S1	T/R term	T/R color	62-Pin conn. pin# T/R	Function group D conn.		Function group G conn.	
					In	Out	In	Out
7	1 (53)	B8/B7	V/S	3/24				
	2 (54)	B6/B5	W/BL ¹	2/23				
	3 (55)	B4/B3	W/O ¹	44/43				
	4 (56)	B2/B1	W/G ¹	1/22				
Notes:								
1. Some wire colors are used twice. White binder cables are for Channel 1 through 25 or Channel 29 through 53 and blue binder cables are for Channels 26, 27 and 28 or Channels 54, 55 and 56 are shaded.								

DS3/EC-1 cable installation

Description

This section describes how to connect the DS3/EC-1 cables to the Alcatel-Lucent 1665 DMXtend shelf and route the cables out of the bay and to the DS3/EC-1 terminating equipment. This procedure covers both the 12 cable and the 24 cable DS3/EC1 cables. Perform this procedure if DS3/EC-1 cables are required.

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

DS3/EC-1 cable options are listed in [Table 3-4, “DS3/EC-1 cable assemblies”](#) (p. 3-17).

DS3/EC-1 transmission connections are in [Table 3-5, “Twenty-four cable DS3/EC-1 transmission connections”](#) (p. 3-26) and [Table 3-6, “Twelve cable DS3/EC-1 transmission connections”](#) (p. 3-30). Total of two function groups fully cabled will have 96 DS3 drop capacity.

Note: The 96 DS3 figure does not include the 3 DS3 drops available when using the LNW39/LNW391 16/DS1/3/DS3 combo card in slot A/B. Instructions for cabling slot A/B are provided in [“DS1 and DS3 hybrid cable installation”](#) (p. 3-32).

Steps

- 1 See the engineering job specification. Obtain the DS3/EC-1 cables per [Table 3-4, “DS3/EC-1 cable assemblies”](#) (p. 3-17) and note the function group where each cable will be used. Label the cables, indicating bay, shelf, function group (D or G) and direction (IN or OUT of the bay) at each end.

Note: The first 12/24 ports of a function unit must be cabled to the right side connectors (J1D, J3D, J7G, and J9G), the additional DS3/EC-1 capacity ports (25 - 48) are cabled to the center connectors of the shelf (J2D, J4D, J8G, and J10G).

- 2 Connect the function group cables at the Alcatel-Lucent 1665 DMXtend end, carefully matching the correct connector with the appropriate backplane connectors as shown in [Figure 3-5, “DS3/EC-1 cable connections”](#) (p. 3-15).

Function group	Associated connector (DS3/EC-1)
G	G IN (J7G and J8G) G OUT (J9G and J10G)
D	D IN (J1D and J2D) D OUT (J3D and J4D)

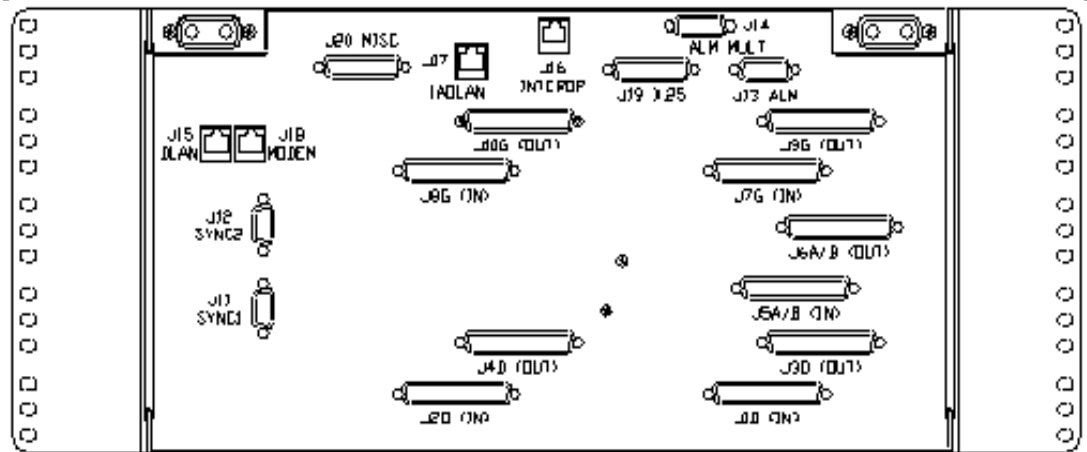
Note: DS3/EC-1 and TMUX cable retaining screws must be tightened to a maximum of 6.5 in-lb. Do not overtighten.

Note: The 12 conductor DS3/EC-1 cables that support the LNW16 12DS3/EC-1 pack connect only to the right side connectors (J1D, J3D, J7G, and J9G). The connectors in the center of the backplane (J2D, J4D, J8G, and J10G) are not used with the LNW16. See [Table 3-4, “DS3/EC-1 cable assemblies”](#) (p. 3-17) for more information.

Note: The first 12/24 DS3/EC-1s of a Function Group must be connected to the right side connectors (J1D, J3D, J7G, and J9G). See [Figure 3-6, “DS3/EC-1 cable routing to the right”](#) (p. 3-15). The additional capacity of 24 DS3/EC-1s of the Function Group use the connectors located to the center of the backplane (J2D, J4D, J8G, and J10G).

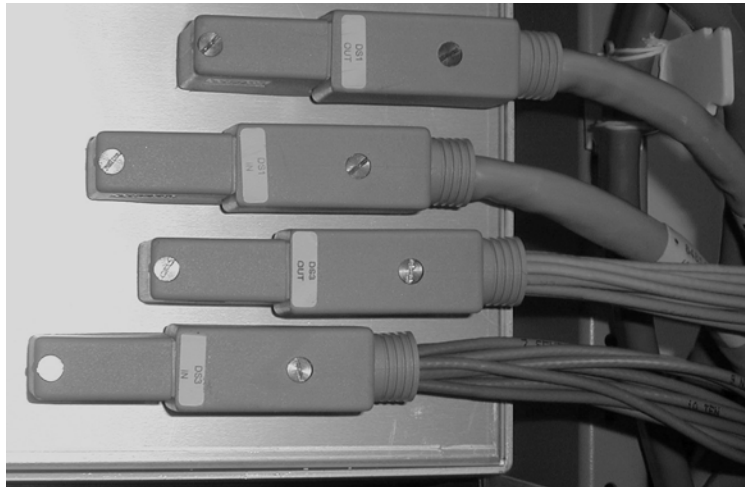
Note: The 24 conductor DS3/EC-1 cables that connect to the right side connectors (J1D, J3D, J7G, and J9G) are different from the 24 cable DS3/EC-1 cables that connect to the connectors in the center of the backplane (J2D, J4D, J8G, and J10G). See [Table 3-4, “DS3/EC-1 cable assemblies”](#) (p. 3-17) for more information.

Figure 3-5 DS3/EC-1 cable connections



- 3 Route the cables along the backplane and out of the bay to the DSX per [Figure 3-6](#), “DS3/EC-1 cable routing to the right” (p. 3-15).

Figure 3-6 DS3/EC-1 cable routing to the right



Notes: The 12-conductor DS3/EC-1 cable is showing that this cable could be either the 12- or 24-conductor DS3/EC-1 cable.

Figure 3-7 DS3/EC-1 cable routing to the left



Notes: The 12-conductor DS3/EC-1 cable is shown.

- 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/EC-1 signals as a result of improperly installed BNC connectors.

- 6 Connect the cables to their respective positions on the terminating equipment. See [Table 3-5, “Twenty-four cable DS3/EC-1 transmission connections”](#) (p. 3-26) or [Table 3-6, “Twelve cable DS3/EC-1 transmission connections”](#) (p. 3-30) for DS3/EC-1 connections.

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 DS3/EC-1 Signals are common between both cables.

- 7 Check off the appropriate box in the [Table I-2, Installation checklist](#).

Table 3-4 DS3/EC-1 cable assemblies

Description	Cable assembly #	Cable length (feet)	Alcatel-Lucent 1665 DMXtend backplane connections
Function group D and G 12 Cable DS3/EC-1 In (CA1) and 12 Cable DS3/EC-1 Out (CA2) Cable	848955084	10	
	848955092	20	
	848955100	30	
	848955118	40	
	848912234	50	These cables route to the right (as viewed from the rear of the shelf) and should be used with connectors J1D (IN), J3D (OUT) and J7G (IN), J9G (OUT)
	848994109	60	
	848912242	100	
	848912259	150	
	848912267	250	
	848912192	450	Ne to Ne Only
	848912333	450	735/734 Splice
	848912200	700	735/734 Splice
	848912218	900	735/734 Splice
Function group D and G DS3/EC-1#1-12 Cables w/ no BNC, for LNW16, LNW18 similar to above except no BNCs are shipped loose. See below for different vendors' BNC plugs.	849040787	10	
	849040795	20	
	849040803	30	
	849040811	40	
	849040829	50	
	849040837	60	
	849040845	100	
	849040852	150	
	849040860	250	
	849040878	450	Ne to Ne Only
	849041751	450	735/734 Splice
	849041769	750	735/734 Splice
	849041777	900	735/734 Splice

Description	Cable assembly #	Cable length (feet)	Alcatel-Lucent 1665 DMXtend backplane connections
The following kits include 12 individually bagged BNCs with instructions plus one spare:			
KINGS 75ohm 735A cable type (12)BNC Plug Kit	848965778		
KINGS 75ohm 734D cable type (12)BNC Plug Kit	848965786		
TROMPETER 75ohm 735A cable type (12)BNC Plug Kit	848965794		
TROMPETER 75ohm 734D cable type (12)BNC Plug Kit	848965802		

Description	Cable assembly #	Cable length (feet)	Alcatel-Lucent 1665 DMXtend backplane connections
Right side cables for function group D and G 24 Cable DS3/EC-1 In (CA1) and 24 Cable DS3/EC-1 Out (CA2) Cable	848940011	10	These cables route to the <i>right</i> (as viewed from the rear of the shelf) and should be used with connectors J1D (IN), J3D (OUT) and J7G (IN), J9G (OUT)
	848940029	20	
	848940037	30	
	848940045	40	
	848940052	50	
	848940060	60	
	848940078	70	
	848940086	80	
	848940094	90	
	848940102	100	
	848940110	110	
	848940128	120	
	848940136	140	
	848940144	150	
	848940151	160	

Description	Cable assembly #	Cable length (feet)	Alcatel-Lucent 1665 DMXtend backplane connections
Right side cables for function group D and G 24 Cable DS3/EC-1 In (CA1) and 24 Cable DS3/EC-1 Out (CA2) Cable	848940169	180	
	848940177	200	
	848940185	250	
	848940193	300	Ne to Ne Only
	848940201	400	Ne to Ne Only
	848940219	450	Ne to Ne Only
	848939856	250	735A/734 Splice
	848939864	300	735A/734 Splice
	848939872	300	735A/734 Splice
	848939880	325	735A/734 Splice
	848939898	350	735A/734 Splice
	848939906	375	735A/734 Splice
	848939914	400	735A/734 Splice
	848939922	425	735A/734 Splice
	848939930	450	735A/734 Splice
	848939948	750	735A/734 Splice NE to NE
848939955	900	735A/734 Splice NE to NE	
Right side cables for function group D and G similar to above except no BNC's are shipped loose. See below for different vendors' BNC Plug Kits.	849041108	10	These cables route to the right (as viewed from the rear of the shelf) and should be used with connectors J1D (IN), J3D (OUT) and J7G (IN), J9G (OUT)
	849041116	20	
	849041124	30	
	849041132	40	
	849041140	50	
	849041157	60	
	849041165	70	
	849041173	80	
	849041181	90	
	849041199	100	

Description	Cable assembly #	Cable length (feet)	Alcatel-Lucent 1665 DMXtend backplane connections
<p>Right side cables for function group D and G similar to above except no BNC's are shipped loose. See below for different vendors' BNC Plug Kits.</p>	849041207	110	These cables route to the <i>right</i> (as viewed from the rear of the shelf) and should be used with connectors J1D (IN), J3D (OUT) and J7G (IN), J9G (OUT)
	849041215	120	
	849041223	140	
	849041231	150	
	849041249	160	
	849041256	180	
	849041264	200	
	849041272	250	
	849041280	300	Ne to Ne Only
	849041298	400	Ne to Ne Only
	849041306	450	Ne to Ne Only
	849041892	250	735A/734 Splice
	849041900	275	735A/734 Splice
	849041926	300	735A/734 Splice
	849041934	325	735A/734 Splice
	849041942	350	735A/734 Splice
	849041959	375	735A/734 Splice
	849041967	400	735A/734 Splice
	849041975	425	735A/734 Splice
	849041983	450	735A/734 Splice
849041991	750	735A/734 Splice NE to NE	
849042007	900	735A/734 Splice NE to NE	
These kits include 25/50 individually bagged BNCs w/ assembly instructions			
KINGS 75ohm 735A cable type (24)BNC Plug Kit	848963062		
KINGS 75ohm 734D cable type (24)BNC Plug Kit	848963070		

Description	Cable assembly #	Cable length (feet)	Alcatel-Lucent 1665 DMXtend backplane connections
TROMPETER 75ohm 735A cable type (24)BNC Plug Kit	848963088		
TROMPETER 75ohm 734D cable type (24)BNC Plug Kit	848963096		
ITT CANON 75ohm 735A cable type (24)BNC Plug Kit	409013554		
ITT CANON 75ohm 734D cable type (24)BNC Plug Kit	409013588		
ITT CANON 75ohm 735A cable type (50)BNC Plug Kit	409013562		
ITT CANON 75ohm 734D cable type (50)BNC Plug Kit	409013570		

Description	Cable assembly #	Cable length (feet)	Alcatel-Lucent 1665 DMXtend backplane connections	
Left side cables for function group D and G 24 Cable DS3/EC-1 In (CA1) and 24 Cable DS3/EC-1 Out (CA2) Cable	848923124	10	These cables route to the <i>left</i> (as viewed from the rear of the shelf) and should be used with connectors J2D (IN), J4D (OUT) and J8G (IN), J10G (OUT)	
	848923132	20		
	848923140	30		
	848923157	40		
	848839478	50		
	848923165	60		
	848923173	70		
	848923181	80		
	848923199	90		
	848839486	100		
	848923207	110		
	848923215	120		
	848923223	140		
	848839494	150		
	848923231	160		
	848923249	180		
	848923256	200		
	848839502	250		
	848923264	300		Ne to Ne Only
	848923272	400		Ne to Ne Only
848839510	450	Ne to Ne Only		
848932083	250	735A/734 Splice		
848932018	275	735A/734 Splice		
848932026	300	735A/734 Splice		
848932034	325	735A/734 Splice		
848932042	350	735A/734 Splice		
848932059	375	735A/734 Splice		
848932067	400	735A/734 Splice		

Description	Cable assembly #	Cable length (feet)	Alcatel-Lucent 1665 DMXtend backplane connections
Left side cables for function group D and G 24 Cable DS3/EC-1 In (CA1) and 24 Cable DS3/EC-1 Out (CA2) Cable	848932075	425	735A/734 Splice
	848839528	450	735A/734 Splice
	848839536	750	735A/734 Splice Ne to Ne
	848839544	900	735A/734 Splice Ne to Ne
Left side cables for function group D and G Similar to above except no BNC's are shipped loose. See above for different vendors' BNC Plug Kits	849040886	10	These cables route to the <i>left</i> (as viewed from the rear of the shelf) and should be used with connectors J2D (IN), J4D (OUT) and J8G (IN), J10G (OUT)
	849040894	20	
	849040902	30	
	849040910	40	
	849040928	50	
	849040936	60	
	849040944	70	
	849040951	80	
	849040969	90	
	849040977	100	
	849040985	110	
	849040993	120	
	849041009	140	
	849041017	150	
	849041025	160	
	849041033	180	
	849041041	200	
	849041066	250	
	849041074	300	
	849041082	400	Ne to Ne Only
849041090	450	Ne to Ne Only	
848932083	250	735A/734 Splice	

Description	Cable assembly #	Cable length (feet)	Alcatel-Lucent 1665 DMXtend backplane connections
<p>Left side cables for function group D and G</p> <p>Similar to above except no BNC's are shipped loose.</p> <p>See above for different vendors' BNC Plug Kits</p>	848932018	275	735A/734 Splice
	848932026	300	735A/734 Splice
	848932034	325	735A/734 Splice
	848932042	350	735A/734 Splice
	848932059	375	735A/734 Splice
	848932067	400	735A/734 Splice
	848932075	425	735A/734 Splice
	848839528	450	735A/734 Splice
	848839536	750	735A/734 Splice Ne to Ne
848839544	900	735A/734 Splice Ne to Ne	
<p>Notes:</p> <ol style="list-style-type: none"> 1. All the DS3/EC-1 cable assemblies can be used for either function group D or G. 2. Alcatel-Lucent 1665 DMXtend connectors J1D through J4D and J7G through J10G can be used for either DS1/E1 or DS3/EC-1 cabling. 3. Each Cable assembly # listed above contains two cable assemblies therefore a quantity of two per function group in the case of the 24 pair cables, must be ordered for the additional capacity. 4. For Input connections use cable CA1 (DS3/EC-1 IN) and for Output connections use cable CA2 (DS3/EC-1 OUT). 5. 735A cable is used to connect Alcatel-Lucent 1665 DMXtend to DSX-3 or another NE (10 to 450 ft. length). 6. The cable connectors are 62 pins D-Sub male-type connectors and fit into J1D through J4D and J7G through J10G. 			

Table 3-5 Twenty-four cable DS3/EC-1 transmission connections

Coaxial cable	Lead designation	Name	Connector pin#
Connectors J1D (IN), J3D (OUT) and J7G (IN), J9G (OUT) This cable routes to the right.			(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

Coaxial cable	Lead designation	Name	Connector pin#
13	DS3 13R/12T	Signal	59
	FRG13	Ground	60
14	DS3 14R/12T	Signal	16
	FRG14	Ground	37
15	DS3 15R/12T	Signal	36
	FRG15	Ground	15
16	DS3 16R/12T	Signal	55
	FRG16	Ground	56
17	DS3 17R/12T	Signal	12
	FRG17	Ground	33
18	DS3 18R/12T	Signal	32
	FRG18	Ground	11
19	DS3 19R/12T	Signal	9
	FRG19	Ground	30
20	DS3 20R/12T	Signal	49
	FRG20	Ground	50
21	DS3 21R/12T	Signal	28
	FRG21	Ground	7
22	DS3 22R/12T	Signal	5
	FRG22	Ground	26
23	DS3 23R/12T	Signal	45
	FRG23	Ground	46
24	DS3 24R/12T	Signal	43
	FRG24	Ground	44
Connectors J2D (IN), J4D (OUT) and J8G (IN), J10G (OUT) This Cable Routes to the Left.			(Ports 25 - 48)
25	DS3 25R/12T	Signal	40
	FRG25	Ground	19

Coaxial cable	Lead designation	Name	Connector pin#
26	DS3 26R/12T	Signal	17
	FRG26	Ground	38
27	DS3 27R/12T	Signal	57
	FRG27	Ground	58
28	DS3 28R/12T	Signal	13
	FRG28	Ground	34
29	DS3 29R/12T	Signal	53
	FRG29	Ground	54
30	DS3 30R/12T	Signal	10
	FRG30	Ground	31
31	DS3 31R/12T	Signal	51
	FRG31	Ground	52
32	DS3 32R/12T	Signal	6
	FRG32	Ground	27
33	DS3 33R/12T	Signal	47
	FRG33	Ground	48
34	DS3 34R/12T	Signal	4
	FRG34	Ground	25
35	DS3 35R/12T	Signal	24
	FRG35	Ground	3
36	DS3 36R/12T	Signal	1
	FRG36	Ground	22
37	DS3 37R/12T	Signal	59
	FRG37	Ground	60
38	DS3 38R/12T	Signal	16
	FRG38	Ground	37
39	DS3 39R/12T	Signal	36
	FRG39	Ground	15

Coaxial cable	Lead designation	Name	Connector pin#
40	DS3 40R/12T	Signal	55
	FRG40	Ground	56
41	DS3 41R/12T	Signal	12
	FRG41	Ground	33
42	DS3 42R/12T	Signal	32
	FRG42	Ground	11
43	DS3 43R/12T	Signal	9
	FRG43	Ground	30
44	DS3 44R/12T	Signal	49
	FRG44	Ground	50
45	DS3 45R/12T	Signal	28
	FRG45	Ground	7
46	DS3 46R/12T	Signal	5
	FRG46	Ground	26
47	DS3 47R/12T	Signal	45
	FRG47	Ground	46
48	DS3 48R/12T	Signal	43
	FRG48	Ground	44
<p>Notes:</p> <p>1. 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.</p>			

Table 3-6 Twelve cable DS3/EC-1 transmission connections

Coaxial cable	Lead designation	Name	Connector pin#
Connectors J1D (IN), J3D (OUT) and J7G (IN), J9G (OUT) This Cable Routes to the Right.			(Ports 1 - 12)
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

Coaxial cable	Lead designation	Name	Connector pin#
Notes: 1. Lead designation for EC-1 connection for cable# x should be read as EC1 xR/xT instead of DS3 xR/xT, where x is a number from 1 to 12.			

DS1 and DS3 hybrid cable installation

Description

This section describes how to connect the DS1 and DS3 Hybrid cables to the Alcatel-Lucent 1665 DMXtend shelf and route the cables out of the bay and to the DS1 and DS3 Hybrid Cable terminating equipment. Perform this procedure if DS1 and DS3 Hybrid cables are required.

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

DS1 and DS3 Hybrid cable options are listed in [Table 3-7, “DS1 and DS3 hybrid cable assemblies”](#) (p. 3-35).

DS1 and DS3 Hybrid Cable transmission connections are in [Table 3-9, “DS1 and DS3 hybrid cable DS1 transmission connections”](#) (p. 3-39).

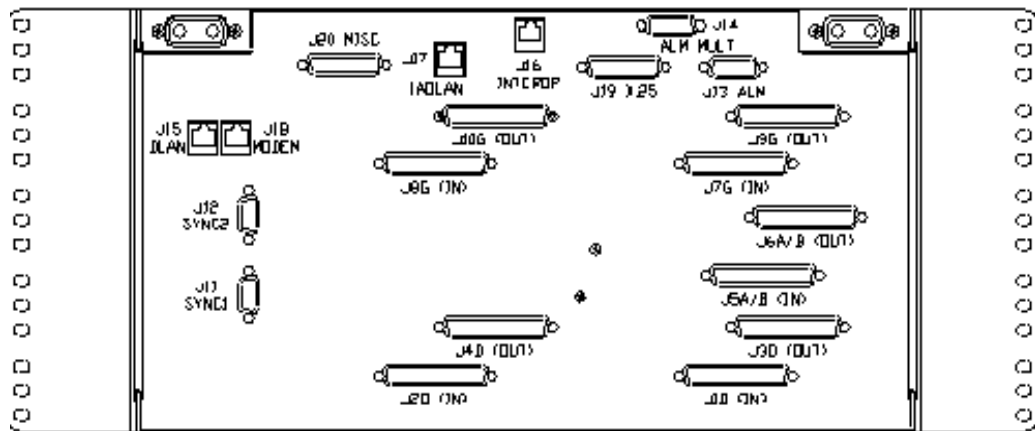
Steps

- 8 See the engineering job specification. Obtain the DS1 and DS3 Hybrid cables per [Table 3-7, “DS1 and DS3 hybrid cable assemblies”](#) (p. 3-35) and note the function group where each cable will be used. Label the cables, indicating bay, shelf, function group (A and B) and direction (IN or OUT of the bay) at each end.
- 9 Connect the function group A/B cables at the Alcatel-Lucent 1665 DMXtend end, carefully matching the correct connector with the appropriate backplane connectors as shown in [Figure 3-8, “DS1 and DS3 hybrid cable connections”](#) (p. 3-33).

Note: The DS1 and DS3 cable retaining screws must be tightened to a maximum of 6.5 in-lb. Do not overtighten.

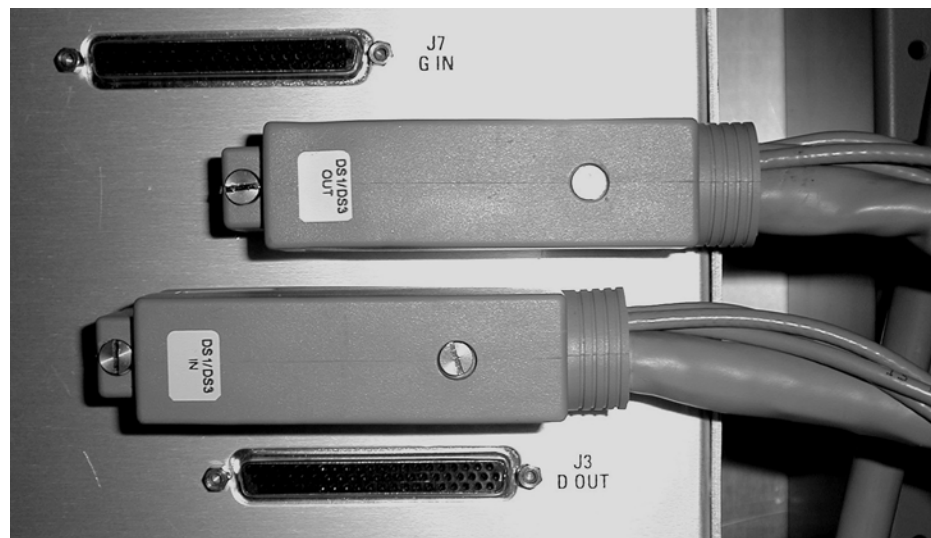
Note: The DS1 and DS3 Hybrid Cable only supports slots A1/B1 and A2/B2 and only connects to J5A/B (IN) and J6A/B (OUT).

Figure 3-8 DS1 and DS3 hybrid cable connections



- 10 Route the cables along the backplane and out of the bay to the DSX per [Figure 3-9, “DS1 and DS3 hybrid cable routing”](#) (p. 3-33).

Figure 3-9 DS1 and DS3 hybrid cable routing



- 11 Route the DS1 cables along the cable rack and into the terminating bay (DSX-1 or other terminating transmission equipment), and route the DS3 cables along the cable rack and into the terminating bay (DSX-3 or other terminating transmission equipment).
- 12 Cut the coaxial 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.

- 13 Referring to [Table 3-8, "DS1 and DS3 hybrid cable DS3 transmission connections" \(p. 3-39\)](#) connect the cables to their respective positions on the terminating equipment or DSX.
- 14 Remove slack and cut the DS1 cables to the desired length at the DSX.
- 15 Referring to [Table 3-9, "DS1 and DS3 hybrid cable DS1 transmission connections" \(p. 3-39\)](#), carefully observe color codes and wire-wrap the cables at the DSX.
- 16 Check off the appropriate box in the [Table I-2, Installation checklist](#).

END OF STEPS

Table 3-7 DS1 and DS3 hybrid cable assemblies

Description	Cable assembly #	Cable length (feet)	Alcatel-Lucent 1665 DMXtend backplane connections
Function group A/B DS1 and DS3 hybrid cable In (CA1) and DS1 and DS3 hybrid cable Out (CA2)	848955035	10	J5A/B(IN) J6A/B(OUT)
	848955043	20	
	848935029	30	
	848875043	50	
	848935037	75	
	848875050	100	
	848935045	125	
	848875076	150	
	848935052	175	
	848935060	200	
	848875084	250	
	848875100	350	
	848875126	450 ⁶	
	848935078	550 ⁷	
	848935086	655 ⁷	

Description	Cable assembly #	Cable length (feet)	Alcatel-Lucent 1665 DMXtend backplane connections
<p>Function group A/B DS1 and DS3 hybrid cable In (CA1) and DS1 and DS3 hybrid cable Out (CA2)</p> <p>Similar to above except no BNC plugs ship loose.</p> <p>See below for different vendors' BNC plugs.</p>	849041561	10	J5A/B(IN) J6A/B(OUT)
	849041579	20	
	849041587	30	
	849041595	50	
	849041603	75	
	849041611	100	
	849041629	125	
	849041637	150	
	849041645	175	
	849041652	200	
	849041660	250	
	849041678	350	J5A/B(IN) J6A/B(OUT)
	849041686	450	
	849041694	550	
	849041702	655	

Description	Cable assembly #	Cable length (feet)	Alcatel-Lucent 1665 DMXtend backplane connections
Function group A/B DS1 and DS3 hybrid cable In (CA1) and DS1 and DS3 hybrid cable Out (CA2) Similar to above Hybrids - no BNC plugs ship loose, except the DS3 is short and staggered for interbay use.	849006903	50	J5A/B(IN) J6A/B(OUT)
	849006911	75	
	849006929	100	
	849006937	125	
	849006952	150	
	849006960	175	
	849006978	200	
	849006986	250	
	849006994	350	
	849007000	450	
	849007018	550	
849007026	650		
The following kits include 13 individually bagged BNCs with instructions:			
KINGS 75ohm 735A cable type (12)BNC Plug Kit	848965778		
KINGS 75ohm 734D cable type (12)BNC Plug Kit	848965786		
TROMPETER 75ohm 735A cable type (12)BNC Plug Kit	848965794		
TROMPETER 75ohm 734D cable type (12)BNC Plug Kit	848965802		

Description	Cable assembly #	Cable length (feet)	Alcatel-Lucent 1665 DMXtend backplane connections
<p>Notes:</p> <ol style="list-style-type: none"> 1. All the DS1 and DS3 Hybrid (28 DS1/3DS3) cable assemblies can only be used for function group A/B. 2. Alcatel-Lucent 1665 DMXtend connectors J5A/B(IN) and J6A/B(OUT) can only be used for the DS1 and DS3 Hybrid (16 DS1/3DS3) cable assemblies. 3. Each Cable assembly# listed above contains two cable assemblies. 4. For Input connections use cable CA1 (DS1 and DS3 Hybrid IN) and for Output connections use cable CA2 (DS1 and DS3 Hybrid OUT). 5. For the Coaxial cable 735A cable is used to connect Alcatel-Lucent 1665 DMXtend to DSX-3 or another NE (50 to 350 ft. length). 6. For the Coaxial cable the 450 ft. cable (848548319) is not suitable for connection to a DSX-3. 7. For the Coaxial cable the longest distance allowed to connect Alcatel-Lucent 1665 DMXtend to another NE is 450ft. of length. The 550 and 655 ft. cables are for the DS1 cables only and the Coaxial cable must be terminated at 450 ft. 8. The DS1 cables are 24 Gauge. 9. J5A/B(IN) and J6A/B(OUT) are 62 pins DSUB male type connectors. 			

Table 3-8 DS1 and DS3 hybrid cable DS3 transmission connections

Coaxial cable	Lead designation	Name	Connector pin#
1	DS3 1R/1T	Signal	62
	FRG1	Ground	61
2	DS3 2R/2T	Signal	42
	FRG2	Ground	41
3	DS3 3R/3T	Signal	21
	FRG3	Ground	20

Table 3-9 DS1 and DS3 hybrid cable DS1 transmission connections

DSX-1 connections				Alcatel-Lucent 1665 DMXtend backplane connections				
Group	ChanD S1	T/R term	T/R color	62 pin conn. pin# T/R	Function group A conn.			
					In		Out	
1	1 (1)	B8/B7	W/BL ¹	19/40	J5A/ B(IN)		J6A/ B(OUT)	
	2 (2)	B6/B5	W/O ¹	18/39				
	3 (3)	B4/B3	W/G ¹	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				

10/100BASE-T Ethernet cable installation

Description

This section describes how to connect the 10/100BASE-T cables to the Alcatel-Lucent 1665 DMXtend shelf and route the cables out of the bay and to the 10/100BASE-T terminating equipment. Perform this procedure if 10/100BASE-T cables are required.

This section describes how to route the 10/100BASE-T cables from the interconnecting equipment (for example, a *110/RJ45* punch down block) to the Alcatel-Lucent 1665 DMXtend backplane.

Steps

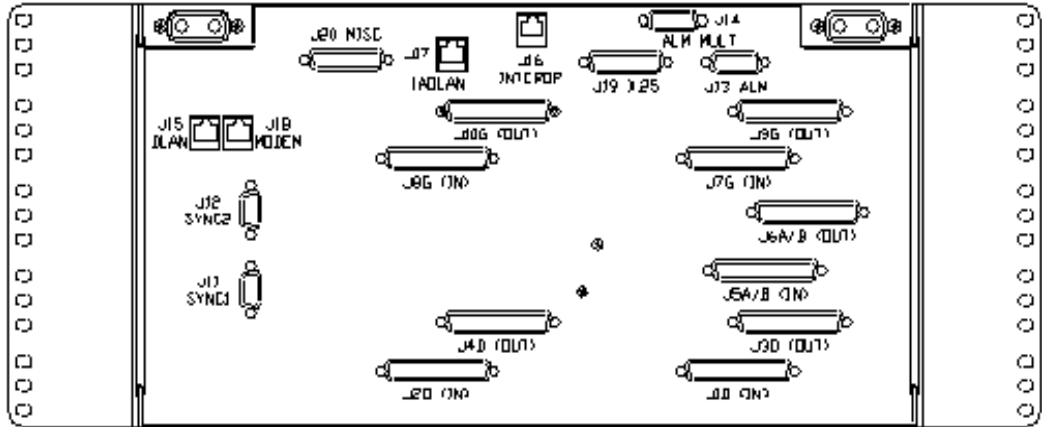
- 1 See the engineering job specification. Obtain the 10/100BASE-T Ethernet cables per [Table 3-10, “10/100Base-T Ethernet cable assemblies”](#) (p. 3-42) and note the function group where each cable will be used. Label the cables, indicating bay, shelf and function group (D or G) at each end.
- 2 Connect the function group cables at the Alcatel-Lucent 1665 DMXtend end, carefully matching the correct connector with the appropriate backplane connectors as shown in [Figure 3-10, “10/100BASE-T/TX cable connections”](#) (p. 3-41).

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

- J1D, J3D ➡ Function Group D
- J7G, J9G ➡ Function Group G

Note: 10/100Base-TX Ethernet cable retaining screws must be tightened to a maximum of 6.5 in-lb. Do not overtighten.

Figure 3-10 10/100BASE-T/TX cable connections

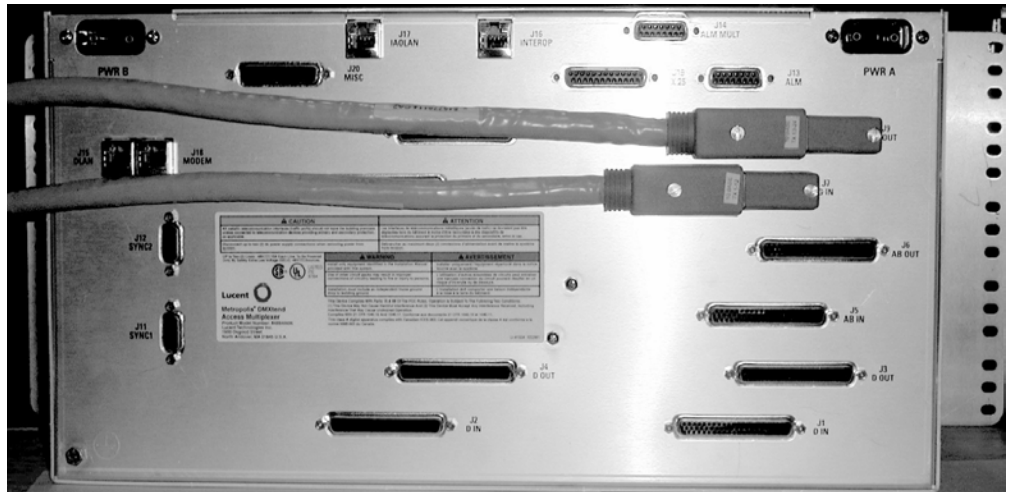


- 3 Route the cables to the left along the backplane and out of the bay to the 110/RJ45 punch down block. Route the cables in the same manner as DS3/EC1 cables. See [Figure 3-11](#), “10/100BASE-T cable routing” (p. 3-41).

Note: These cables will connect to J1D, J3D, J7G, and J9G on the right of the shelf as viewed from the rear but they will route to the left of the shelf due to the forming of the connector.

Note: In routing to the left side of the shelf these cables will make access to connectors J2D, J4D, J8G, and J10G difficult, but there are currently no plans to use these connectors in a 10/100BASE-T application.

Figure 3-11 10/100BASE-T cable routing



- 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 3-11, “10/100BaseT Ethernet connections”](#) (p. 3-43) for pin out assignments.



CAUTION

The LNW66 and LNW74 10/100 BaseT-Ethernet pack does 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.

- 6 Check off the appropriate box in the [Table I-2, Installation checklist](#).

END OF STEPS

Table 3-10 10/100Base-T Ethernet cable assemblies

Description	Cable assembly #	Cable length (feet)	Alcatel-Lucent 1665 DMXtend backplane connections
10/100BASE-T/TX Ethernet cable	848819090	8	J1D, J3D, J7G, and J9G
	848778114	20	
	848923280	35	
	848778122	50	
	848923298	75	
	848778106	100	
	848923306	125	
	848778148	150	
	848923314	175	
	848923322	200	
	848923330	225	
	848923348	250	
	848923355	275	
	848778130	300	

Table 3-11 10/100BaseT Ethernet connections

Port# (1-24)		Wire color	dsup 62M pin#	Signal	RJ-45 pin#
J1D, J7G	J3D, J9G				
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
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:

- 10/100BASE-T/TX ethernet cables have transmit and receive on the same cable.

IAO LAN and TCP/IP cable installation

Description

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

Alcatel-Lucent 1665 DMXtend supports an IntraOffice LAN (IAO LAN) interface for operations data communications to support operations systems such as the Navis[®] Optical EMS (formerly WaveStar[®] SNMS).

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 DMXtend shelf. The following tables provide additional information:

- [Table 3-12, “LAN 10BaseT cable assemblies” \(p. 3-45\)](#)
- [Table 3-14, “LAN 10Base-T straight-through cable connections” \(p. 3-47\)](#)
- [Table 3-13, “LAN 10Base-T cross-over cable connections” \(p. 3-47\)](#)

Steps

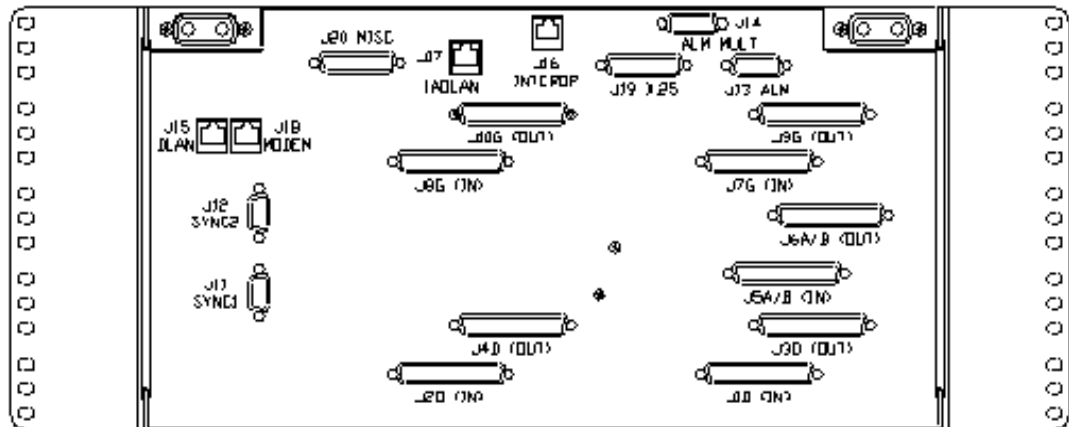
- 1 If connecting directly to a PC, use a LAN 10BASE-T Cross-over Cable Assembly [see [Table 3-12, “LAN 10BaseT cable assemblies” \(p. 3-45\)](#)].

If connecting to a hub, use a LAN 10BASE-T Straight-through Cable Assembly [see [Table 3-13, “LAN 10Base-T cross-over cable connections” \(p. 3-47\)](#)].

- 2 If connecting to the front of the Alcatel-Lucent 1665 DMXtend shelf, connect the cable to the LAN (RJ45) jack on the SYSCTL circuit pack.

If connecting to the rear of the Alcatel-Lucent 1665 DMXtend shelf, connect the cable to the J17 port (IAO LAN) on the Alcatel-Lucent 1665 DMXtend backplane and route to the left side of the shelf. See [Figure 3-12, “IAO LAN/TCP-IP cable connection to rear of Alcatel-Lucent 1665 DMXtend” \(p. 3-45\)](#).

Figure 3-12 IAO LAN/TCP-IP cable connection to rear of Alcatel-Lucent 1665 DMXtend



- 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 the [Table I-2, Installation checklist](#).

END OF STEPS

Table 3-12 LAN 10BaseT cable assemblies

Description	Cable assembly #	Cable length (feet)	Alcatel-Lucent 1665 DMXtend connections	
			Front	Rear
LAN 10BASE-T Cross-over cable to PC / CIT	109321810	10	SYSCTL LAN jack	J17 (IAO LAN)
	848605028	50		
	848605036	100		
	848605051	150		
	848605069	200		
	848605077	300		

Description	Cable assembly #	Cable length (feet)	Alcatel-Lucent 1665 DMXtend connections	
			Front	Rear
LAN 10BASE-T Straight-through cable to Ethernet hub / router	109321836	20	SYSCTL LAN jack	J17 (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		
	109321984	260		
109321992	280			
848604997	300			

Table 3-13 LAN 10Base-T cross-over cable connections

Connection	Alcatel-Lucent 1665 DMXtend bkpl	Color	Other side
J17 (IAO LAN)	1	BL - W	3
	2	W - BL	6
	3	O - W	1
	6	W - O	2

Table 3-14 LAN 10Base-T straight-through cable connections

Connection	Alcatel-Lucent 1665 DMXtend bkpl	Color	Other side
J17 (IAO LAN)	1	BL - W	1
	2	W - BL	2
	3	O - W	3
	6	W - O	6

Modem cable installation

Description

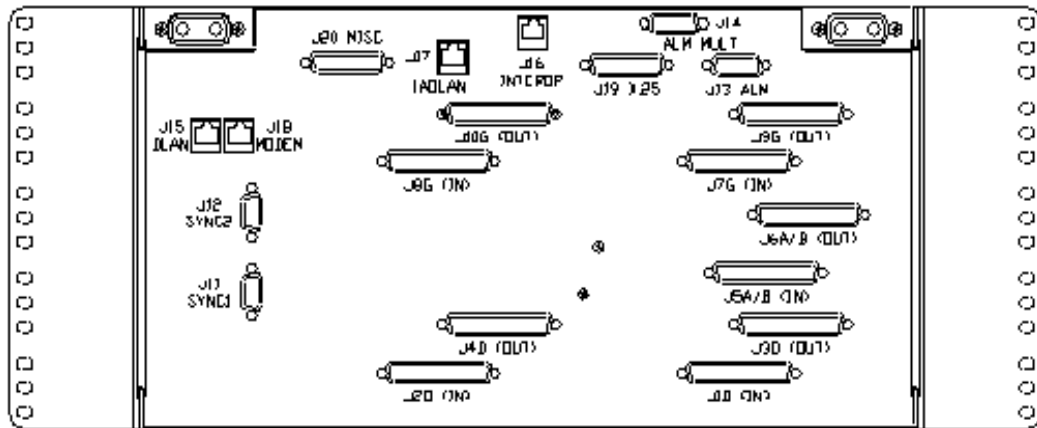
The use of a modem will allow the Alcatel-Lucent 1665 DMXtend to be accessed remotely via dial up.

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

Steps

- 1 Obtain the modem cable per [Table 3-15, “Modem cable assemblies” \(p. 3-48\)](#). Connect the RJ45 end of the modem cable to the MODEM port (J18) of Alcatel-Lucent 1665 DMXtend shelf and route it to the left side of the shelf. (See [Figure 3-13, “Modem cable connection” \(p. 3-48\)](#)).

Figure 3-13 Modem cable connection



- 2 Route the modem cable out of the Alcatel-Lucent 1665 DMXtend bay to the modem or distribution frame.
- 3 Dress and tie the modem cable to the Alcatel-Lucent 1665 DMXtend backplane per [Figure 3-13, “Modem cable connection”](#) (p. 3-48).
- 4 Connect the modem cable to the modem or distribution frame.
- 5 Check off the appropriate box in the [Table I-2, Installation checklist](#).

END OF STEPS

Table 3-15 Modem cable assemblies

Description	Cable assembly #	Cable length (feet)	Alcatel-Lucent 1665 DMXtend connections
Modem cable	848756508	50	J18 (MODEM)
	848756524	100	
	848756516	150	
	848756532	250	

Table 3-16 Modem cable connections

Connection	RJ45 connector pin#	Color	DB25 connector pin#
Modem cable (J18)	1	W - O	8
	2	BR	20
	3	W - BL	3
	5	O / Shield	7
	6	G	2

Sync cable installation

Description

The section provides the instructions for installing the two types of synchronization (Sync) cables to the Alcatel-Lucent 1665 DMXtend.

A Sync cable is required if the shelf is to be externally timed. The Alcatel-Lucent 1665 DMXtend 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 DMXtend 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.

See [Table 3-17, “Synchronization cable assemblies \(SYNC1 and SYNC2\)”](#) (p. 3-52) for ordering information.

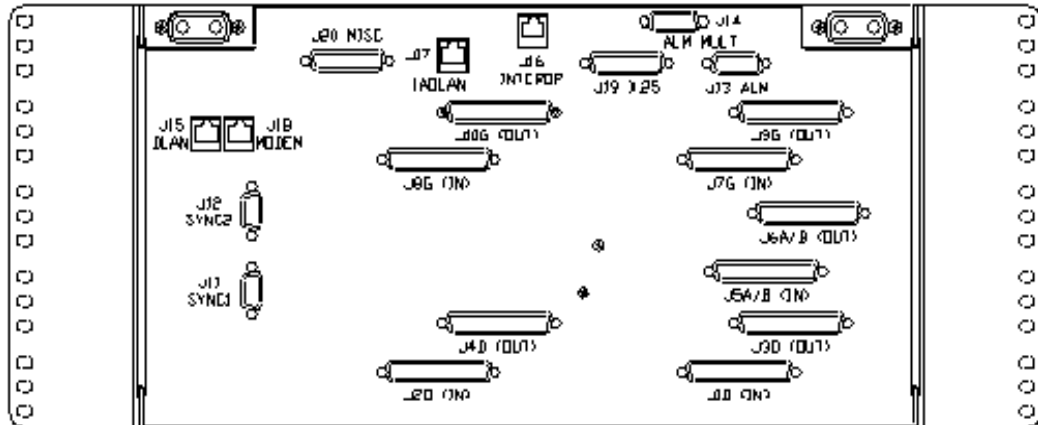
Note: Each of the Sync connections on the backplane may provide an input (gray) and output (red) termination for timing. See [Table 3-18, “Synchronization cable \(DS1 timing reference\) connections”](#) (p. 3-53) for the pinouts.

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 (J11) port on the Alcatel-Lucent 1665 DMXtend backplane. See [Figure 3-14, “Sync cable connections” \(p. 3-50\)](#).

Figure 3-14 Sync cable connections



- 2 Route the cable to proper location and cut to desire length.
- 3 Terminate the wires in the red jacket for an output signal. See [Table 3-18, “Synchronization cable \(DS1 timing reference\) connections” \(p. 3-53\)](#) for connection information.
- 4 Terminate the wires in the gray jacket for an input signal. See [Table 3-18, “Synchronization cable \(DS1 timing reference\) connections” \(p. 3-53\)](#) for connection information.
- 5 Repeat [Step 1](#) through [Step 4](#) to connect the Sync cable to the SYNC2 (J12) port.
- 6 Check off the appropriate box in the [Table I-2, Installation 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 (J11). See [Figure 3-14, “Sync cable connections”](#) (p. 3-50).
- 2 Wire-wrap Rx1 and Tx1 (red cable) on the D-Sub connector for an output signal per [Table 3-18, “Synchronization cable \(DS1 timing reference\) connections”](#) (p. 3-53).
- 3 Wire-wrap Rx2 and Tx2 (gray cable) on the D-Sub connector for an input signal per [Table 3-18, “Synchronization cable \(DS1 timing reference\) connections”](#) (p. 3-53)
- 4 Route the cable to proper location and cut to desire length.
- 5 Terminate the other end to a clock source or equipment. See [Table 3-18, “Synchronization cable \(DS1 timing reference\) connections”](#) (p. 3-53) for connection information.
- 6 Repeat [Step 1](#) through [Step 5](#) for SYNC2 (J12) connection.
- 7 Check off the appropriate box in the [Table I-2, Installation checklist](#).

.....
E N D O F S T E P S

Table 3-17 Synchronization cable assemblies (SYNC1 and SYNC2)

Description		Cable assembly #	Cable length (feet)	Alcatel-Lucent 1665 DMXtend backplane connections
	Sync1 (J11) and Sync2 (J12) cables, straight connector,	848839619	50	J11 (Sync1)/ J12 (Sync2)
	DS1 timing reference for DS1	848923363	75	
	external Sync In/Out timing	848839627	100	
	2 cables per code.	848923371	125	
		848839635	150	
		848923389	175	
		848923439	200	
		848923447	225	
		848839643	250	
		848923454	275	
		848923462	300	
	848839650	450		
	Customer specific Sync1 (J11)	848929311	50	
	and Sync2 (J12)	848929329	100	
	Sync input signal only, with filter	848929337	150	
	connectors, 2 cables per code,	848929345	250	
	with wire-wrap terminals and	848929352	450	
	covers, as required by the			J11 (Sync1)/
	customer.			J12 (Sync2)
	Customer specific Sync1 (J11)	848631255	50	
	and Sync2 (J12) cable harness,			
	with filter connectors,	848631271	100	
	Two cables taped together as one	848631289	150	
	harness per code, with wire wrap	848631297	250	
terminals and covers, as required	848631305	450		
by the customer.				

Description	Cable assembly #	Cable length (feet)	Alcatel-Lucent 1665 DMXtend backplane connections
Notes:			
1. The Sync cable is 22 gauge.			
2. Ground the Filter connectors either at the bay frame ground or at the office timing source. See office records.			

Table 3-18 Synchronization cable (DS1 timing reference) connections

Conn.	Jacket	Color	9-pin conn.	Special conn.	Designation	Name
Sync1 (J11)/ Sync2 (J12)	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 DMXtend to limit transient voltages and currents.

Office alarm cable assemblies are listed in [Table 3-19, “Office alarm cable assemblies” \(p. 3-57\)](#).

Alarm mult

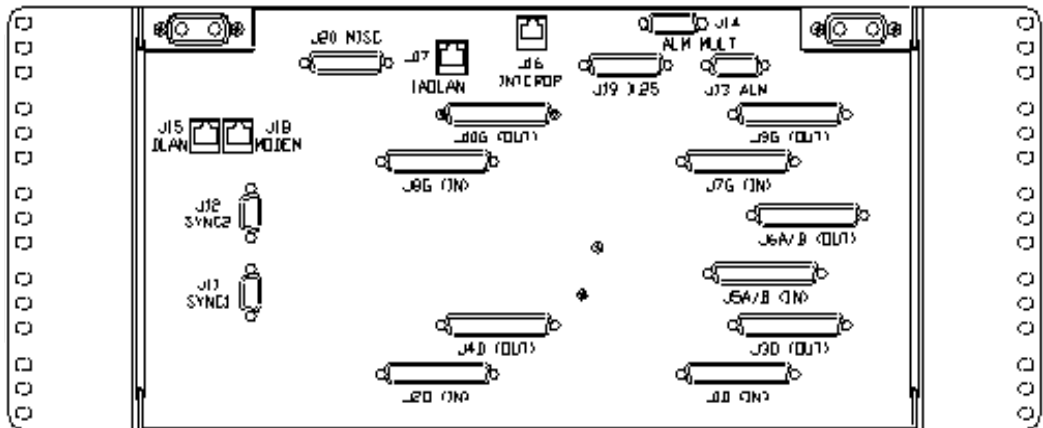
Office alarm cabling in a Alcatel-Lucent 1665 DMXtend bay starts at the bottom shelf which is cabled directly to the office alarm system. Then as shelves are added to the bay, the office alarm connection is extended by multing the alarm cabling from shelf to shelf (bottom to top). Alarm mults do not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

For example, J13 of one shelf should be connected to the office alarm terminal. J14 of the same shelf should be connected to J13 of the shelf above shelf and the same procedure should be continued to connect more shelves.

Steps

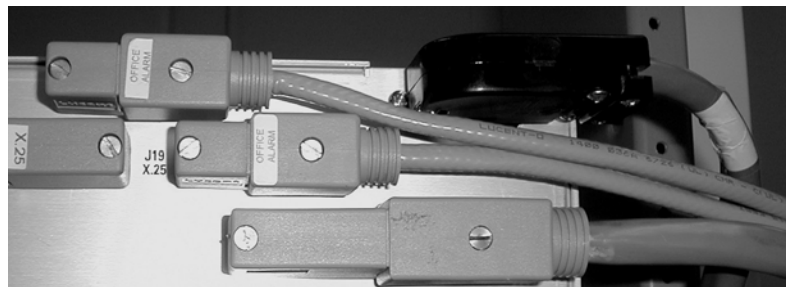
- 1 Obtain the office alarm cable per [Table 3-19, “Office alarm cable assemblies”](#) (p. 3-57). Connect the office alarm cable to ALM (J13) of the bottom Alcatel-Lucent 1665 DMXtend shelf. See [Figure 3-15, “Office alarm cable connections”](#) (p. 3-55).

Figure 3-15 Office alarm cable connections



- 2 Route the office alarm cable from the bottom shelf out of the Alcatel-Lucent 1665 DMXtend bay per [Figure 3-16, “Office alarm cable routing”](#) (p. 3-55) to the office alarm panel.

Figure 3-16 Office alarm cable routing



- 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 3-19, “Office alarm cable assemblies” \(p. 3-57\)](#).

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.

- 6 Obtain the office alarm mult cable 848589602 for Alcatel-Lucent 1665 DMXtend. Connect one end to ALM MULT (J14) of the Alcatel-Lucent 1665 DMXtend shelf. See [Figure 3-15, “Office alarm cable connections” \(p. 3-55\)](#).
- 7 Route the office alarm mult cable to the side of the bay and connect it to ALM (J13) of the Alcatel-Lucent 1665 DMXtend shelf above. See [Figure 3-16, “Office alarm cable routing” \(p. 3-55\)](#).
- 8 Repeat this procedure for each shelf in the bay (stopping at the top).
- 9 Check off the appropriate box in the [Table I-2, Installation checklist](#).

END OF STEPS

Table 3-19 Office alarm cable assemblies

Description	Cable assembly #	Cable length (feet)	Alcatel-Lucent 1665 DMXtend backplane connections
Office Alarm Cable	848558193	50	J13
	848562286	100	
	848562294	150	
	848562302	250	
Office Alarm Mult Cable	848589602	3	J14 to J13
Office Alarm Mult Cable to Lambda Unite	848861530	3	J14
	848861530	3	J13

Table 3-20 Alarm office connections

Conn.	Pin#	Color	Designation	Name
J13-J14	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 P13 is run for each Alcatel-Lucent 1665 DMXtend shelf assembly when used in a miscellaneous mounted individual application or from the first Alcatel-Lucent 1665 DMXtend shelf 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 DMXtend.

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 18 miscellaneous user-settable alarm status indications (SI) at the remote terminal for transmission toward the central office.

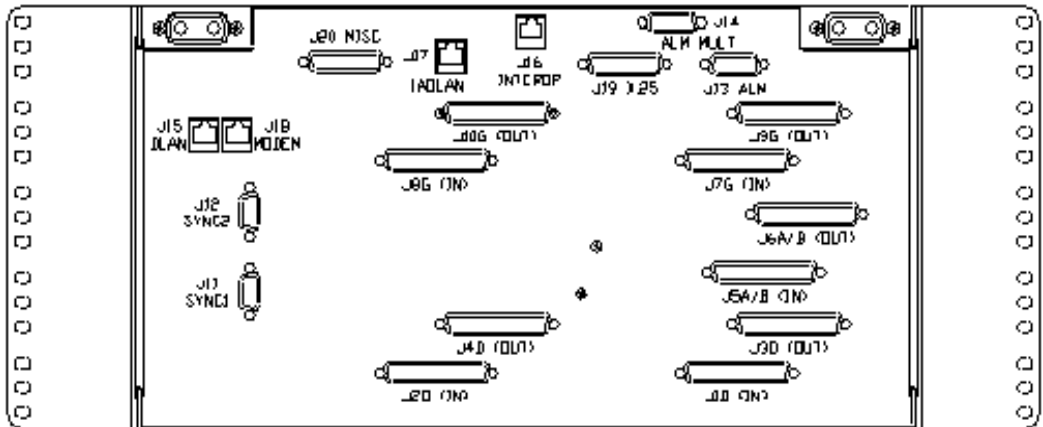
Miscellaneous (environmental) discrete telemetry cable assemblies and the length options are listed in [Table 3-21, “Miscellaneous discrete cable assemblies”](#) (p. 3-61).

Steps

This procedure is performed for Alcatel-Lucent 1665 DMXtend shelves requiring miscellaneous (environmental) discrete telemetry.

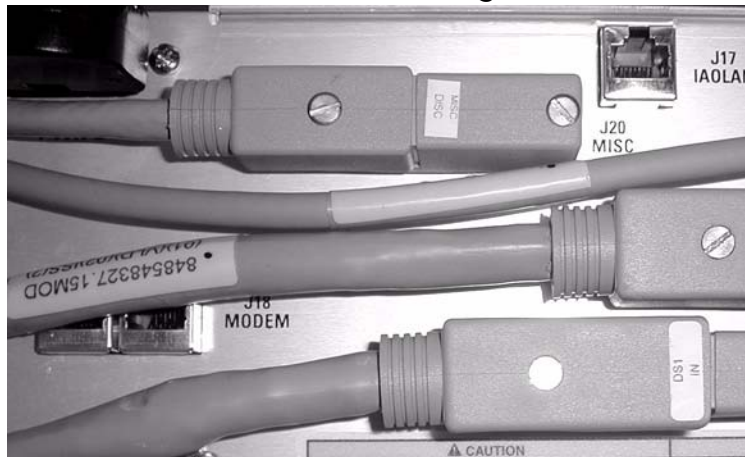
- 1 Connect the miscellaneous discrete telemetry cable to the J20 MISC connector on the backplane of the Alcatel-Lucent 1665 DMXtend shelf per [Figure 3-17, “Miscellaneous discrete cable connection”](#) (p. 3-59).

Figure 3-17 Miscellaneous discrete cable connection



- 2 Route the cable out of the Alcatel-Lucent 1665 DMXtend bay per [Figure 3-18](#), “Miscellaneous discrete cable routing” (p. 3-59) to the telemetry panel.

Figure 3-18 Miscellaneous discrete cable routing



- 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 3-21](#), “Miscellaneous discrete cable assemblies” (p. 3-61).

Note: Each miscellaneous (environmental) discrete telemetry designation is connected to the Alcatel-Lucent 1665 DMXtend 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 the [Table I-2, Installation checklist](#).

END OF STEPS

Table 3-21 Miscellaneous discrete cable assemblies

Description	Cable assembly #	Cable length (feet)	Alcatel-Lucent 1665 DMXtend backplane connections
Miscellaneous discrete cable	848979399	15	J20
	848979407	30	
	848549598	50	
	848549606	100	
	848549614	150	
	848549622	250	
	848549630	350	

Table 3-22 Miscellaneous (environmental) discrete telemetry connections

Conn.	Pin#	Color	Designation	Name
J20	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
	16	R-G	TLMI16	Env. Input - #16

Conn.	Pin#	Color	Designation	Name
	17	BR-R	TLMI17	Env. Input - #17
	18	R-BR	TLMI18	Env. Input - #18
	19	S-R	TLMI19	Env. Input - #19
	20	R-S	TLMIC48VTR N	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

OC-3/OC-12/OC-48/OC-192 main optical fiber cable 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 OC-3/OC-12/OC-48/OC-192 Main OLIUs of the Alcatel-Lucent 1665 DMXtend. This procedure does not cover routing the optical fiber cable between sites.

The optical fiber cables will be connected to the Alcatel-Lucent 1665 DMXtend after the circuit packs are installed. The Alcatel-Lucent 1665 DMXtend 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 DMXtend 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.



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



Invisible laser radiation exists 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 left side of the Alcatel-Lucent 1665 DMXtend. See [Figure 3-19, “Optical fiber routing”](#) (p. 3-64).

Note: Protective covers must be left on cables.

Note: Enough slack must be left in the fibers to allow them to be moved out of the way of the A/B 1 and 2 slots to allow circuit pack insertion and removal in those slots if required.

Figure 3-19 Optical fiber routing



- 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). See [Appendix E, “Fiber labeling”](#) for more details.

- 4 Check off the appropriate box in the [Table I-2, Installation checklist](#).

END OF STEPS

OC-3/OC-12/OC-48 low-speed optical fiber cable installation

Description

This section describes how to route the single-mode fiber optical cables from the interconnecting equipment (for example, an *LGX*[®] optical fiber distributing frame) to the Alcatel-Lucent 1665 DMXtend 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 OC-3/OC-12/OC-48 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 DMXtend 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.



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



Invisible laser radiation exists 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 either the D or G function 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 left side of the Alcatel-Lucent 1665 DMXtend and into the OC-3/OC-12/OC-48 optical ports. See [Figure 3-19, “Optical fiber routing” \(p. 3-64\)](#).
- 4 Place the optical fiber cables in a protective tube or channel.
- 5 Check off the appropriate box in the [Table I-2, Installation checklist](#).

END OF STEPS

100/1000BASE-X optical fiber cable installation

Description

This section describes how to route the 100/1000BASE-X optical fiber cables from the interconnecting equipment (for example, an *LGX*[®] optical fiber distributing frame) to the 100/1000BASE-X optical ports. The LNW63, LNW64, and LNW170 single mode or multimode fiber can be used depending on the SFP provided with the work order.

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 DMXtend 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.



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



Invisible laser radiation exists 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. If equipped with the VLF mains (LNW141 or LNW84) the 100/1000BASE-X pack can be inserted into any function slots D1, D2, G1 or G2. Otherwise, if equipped with the non-VLF mains the 100/1000BASE-X pack can be inserted only into function slots D1 or G1.
- 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 left side of the Alcatel-Lucent 1665 DMXtend and into the 100/1000BASE-X optical ports. See [Table 3-19, “Optical fiber routing” \(p. 3-64\)](#).
- 4 Place the optical fiber cables in a protective tube or channel.
- 5 Check off the appropriate box in the [Table I-2, Installation checklist](#).

END OF STEPS

CIT (RS-232) cable installation

Description

This section provides the procedure to connect the CIT (RS-232) cable from the LNW2 (SYSCTL) to a PC (serial port). This will allow communications between the PC and the RS-232 port located on the LNW2.

CIT cable assemblies and the length options are listed in [Table 3-23, “CIT Cable Assembly” \(p. 3-69\)](#).

Steps

- 1 Connect the RJ45 end of the CIT cable to the RS-232 jack located on the LNW2 (SYSCTL).

- 2 Connect the 9-pin D-type connector to the serial port on the PC.
- 3 Check off the appropriate box in the [Table I-2, Installation checklist](#).

END OF STEPS

Table 3-23 CIT Cable Assembly

Description	Cable assembly #	Cable length	Alcatel-Lucent 1665 DMXtend connections
Front CIT cable	848748869	8 feet	CIT/RS-232 jack on System Controller (LNW2)

Table 3-24 Standard CIT cable connection

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 10BASE-T LAN cable then, see [Table 3-25, “RJ-45 to DB-9 connector connections”](#) (p. 3-70).

Table 3-25 RJ-45 to DB-9 connector connections

From RJ45 connector		To DB-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 10BASE-T LAN cable.

Final operations

Description

Final check on 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 Verify that all the fibers are properly dressed/connected.
- 5 Verify that all fibers are properly labeled. See [Appendix E, “Fiber labeling”](#).

- 6 Verify that designations where fibers were terminated are properly labeled.
- 7 Replace rear cover on shelf if ordered.
- 8 Check off the appropriate box in the [Table I-2, Installation checklist](#).

END OF STEPS.....



4 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 Extend (DMXtend) User Operations Guide 365-372-325*

Contents

This chapter provides information on the following topics:

Description	4-1
Powering	4-2
Circuit pack compatibility	4-6
Initial circuit pack installation	4-9

Description

Overview

This section should be performed on all shelf installations.

Tools, test equipment, and accessories

Listed below are the tools, test equipment and accessories necessary to perform the procedures in this section.

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	Personal Computer (PC)	Required to run the WaveStar [®] CIT software.
1	CIT RS-232 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.

Powering

Overview

The following table lists the requirements for the Alcatel-Lucent 1665 Data Multiplexer Extend (Alcatel-Lucent 1665 DMXtend) shelf.

Table 4-1 Alcatel-Lucent 1665 DMXtend shelf power supply requirements

Item	Description
Voltage range, all components	-40.0V to -60.0V DC
Power feeders	Two -48V power feeders PWR A and PWR B

Item	Description
Voltage range, all components	-40.0V to -60.0V DC
Circuit breakers (one per feeder) or fuse (one per feeder)	15.0 A 15.0 A

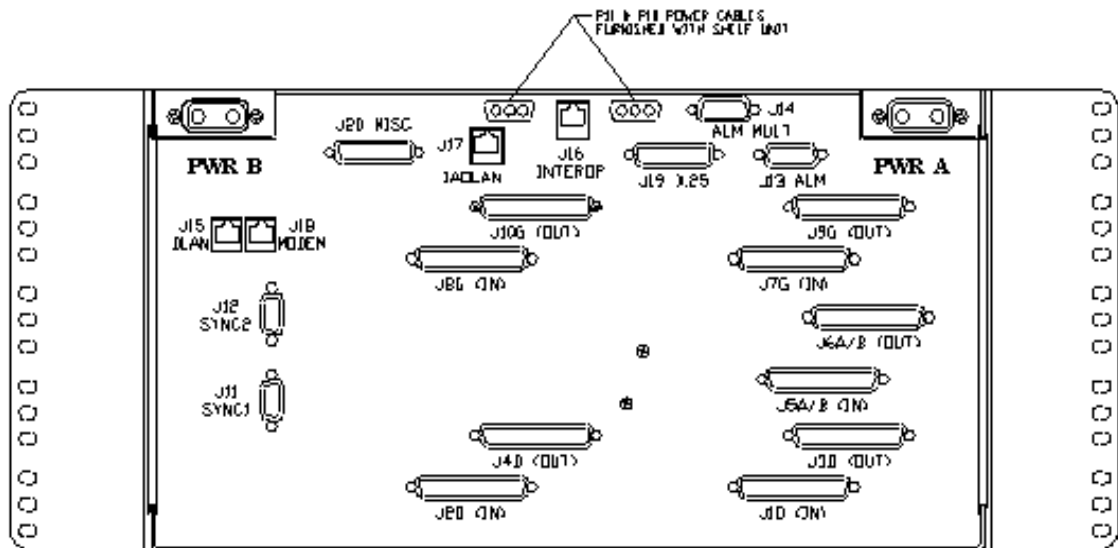
Steps

- 1 Verify that the frame or structure into which the Alcatel-Lucent 1665 DMXtend Shelf is installed is properly grounded.
 - 2 Verify that both 10 ampere circuit breakers on the Alcatel-Lucent 1665 DMXtend are in the OFF position. These breakers are located on the front of the Alcatel-Lucent 1665 DMXtend shelf.
-

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

- 3 Disconnect the power cables from the backplane connectors PWR A on the right side of the shelf and PWR B on the left side of the shelf.

Figure 4-1 Power connections on Alcatel-Lucent 1665 DMXtend backplane



- 4 If fuses are being used, install 25-ampere fuses in the battery distribution fuse board (BDFB) that powers the Alcatel-Lucent 1665 DMXtend A and B feeders.
- 5 If breakers are being used, verify that 25-ampere breakers are installed and switch the breakers to the ON position for the Alcatel-Lucent 1665 DMXtend A and B feeders.
- 6 At the Alcatel-Lucent 1665 DMXtend power cable 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 of power cable	Color of internal shelf cable	Position on power cable connector facing connector with clip release up
BAT A	Red	Red	Right
BAT A RTN		Red/Black	Left
BAT B	Blue	Red	Right
BAT B RTN		Red/Black	Left

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

- 7 Reconnect the “A” feed of the power cable to the backplane connector (PWR A), and reconnect the “B” feed of the power cable to the backplane connector (PWR B).

- 8 Place both 10-ampere circuit breakers on the Alcatel-Lucent 1665 DMXtend shelf in the ON position. These breakers are located on the front of the Alcatel-Lucent 1665 DMXtend shelf.

- 9 Verify that the fans have started running.

- 10 At the BDFB either remove the fuse or put the circuit breaker, associated with the “B” feed of the Alcatel-Lucent 1665 DMXtend, in the OFF position.

- 11 Verify the PWR A LED on the Alcatel-Lucent 1665 DMXtend shelf is lighted with only the “A” feed powered.

- 12 At the BDFB either insert the fuse or put the circuit breaker, associated with the “B” feed of the Alcatel-Lucent 1665 DMXtend, in the ON position. Then either remove the fuse or put the circuit breaker, associated with the “A” feed of the Alcatel-Lucent 1665 DMXtend, in the OFF position.

- 13 Verify the PWR B LED on the Alcatel-Lucent 1665 DMXtend shelf is lighted with only the “B” feed powered.

- 14 At the BDFB either insert the fuse or put the circuit breaker, associated with the “A” feed of the Alcatel-Lucent 1665 DMXtend, in the ON position.

- 15 Verify that the both the PWR A LED and PWR B LED on the Alcatel-Lucent 1665 DMXtend user panel are lighted with both the “A” and “B” feeds powered.

- 16 Verify that the fans are still running and are moving air.

- 17 Check off the appropriate box in the “Installation checklist” (p. I-6).

END OF STEPS

Circuit pack compatibility

Overview

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

See Figure 4-2, “Alcatel-Lucent 1665 DMXtend shelf” (p. 4-8) for slot locations.

Table 4-2 R9.0 circuit pack slot compatibility

Slot name				
CTL	G1, G2 ¹	A1/B1, A2/B2	M1, M2	D1, D2 ¹
LNW2				
	LNW7			LNW7
	LNW8			LNW8
	LNW16			LNW16
	LNW18			LNW18
	LNW19B			LNW19B
	LNW20			LNW20
	LNW31			LNW31
	LNW37			LNW37
			LNW38	
		LNW39		
			LNW40	
			LNW41	
	LNW45			LNW45
	LNW49			LNW49
			LNW51	

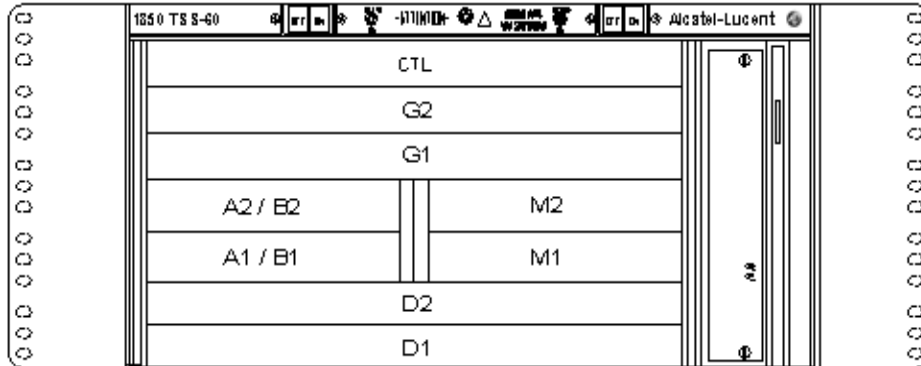
Slot name				
CTL	G1, G2 ¹	A1/B1, A2/B2	M1, M2	D1, D2 ¹
			LNW52	
	LNW55			LNW55
	LNW62			LNW62
	LNW63 ²			LNW63 ²
	LNW64 ²			LNW64 ²
	LNW66 ²			LNW66 ²
	LNW73/73C ²			LNW73/73C ²
	LNW74 ²			LNW74 ²
		LNW84	LNW84	
	LNW87 ²			LNW87 ²
		LNW111		
		LNW112		
		LNW140	LNW140	
		LNW141	LNW141	
	LNW170 ²			LNW170 ²
			LNW302	
			LNW380	
			LNW382	
		LNW391		
	LNW402			LNW402
			LNW601	
	LNW705 ³			
	LNW785			LNW785
	LNW801			LNW801
	177D ¹			177D ¹
		LNW43 ⁴	LNW42 ⁵	
		LNW96 ⁴		

Slot name				
CTL	G1, G2 ¹	A1/B1, A2/B2	M1, M2	D1, D2 ¹
			LNW95 ⁵	
	LNW98 ⁶			LNW98 ⁶

Notes:

- 1 177D Apparatus Blanks are required in all unequipped function unit slots to provide proper air flow for cooling.
- 2 This pack will only work in slot 1 unless the shelf is equipped with LNW141 or LNW84.
- 3 The LNW705 can only be installed in the G2 slot.
- 4 LNW43 Apparatus Blanks or LNW96 System Detectable Blanks are required in all unequipped A/B Slots to provide proper air flow for cooling.
- 5 LNW42 Apparatus Blanks or LNW95 System Detectable Blanks are required in all unequipped Main Slots to provide proper air flow for cooling.
- 6 System Detectable Blank Card for slots D and G. Apparatus Blanks are required in all unequipped function unit slots to provide proper air flow for cooling.

Figure 4-2 Alcatel-Lucent 1665 DMXtend shelf



Initial circuit pack installation

Description

This section provides instructions for installing, but not fully seating, circuit packs into the Alcatel-Lucent 1665 DMXtend shelf. After circuit packs have been unpacked, they may be placed in their respective slots in the Alcatel-Lucent 1665 DMXtend shelf but not fully engaged in the backplane connector. The circuit packs will be fully installed (seated) in the next section.

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.



CAUTION

177D or LNW98 Apparatus Blanks are required in all unequipped D and G function unit slots to provide proper air flow for cooling.

LNW42 or LNW95 Apparatus Blanks are required in all unequipped Main slots to provide proper air flow for cooling.

LNW43 or LNW96 Apparatus Blanks are required in all unequipped A/B 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.

LNW2 (SYSCTL) installation

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

-
- 1 Remove the SYSCTL circuit pack from the packing material.

 - 2 Identify the CTL slot on the Alcatel-Lucent 1665 DMXtend shelf. See [Figure 4-2, “Alcatel-Lucent 1665 DMXtend shelf”](#) (p. 4-8).

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

- 4 Check off the appropriate box in the “[Installation checklist](#)” (p. I-6).

END OF STEPS

OC-3/OC-12/OC-48/OC-192 main OLIU installation

Follow this procedure to install the following OC-3/OC-12/OC-48/OC-192 main OLIU circuit packs in the Alcatel-Lucent 1665 DMXtend shelf.

- LNW38 OC-12 IR
- LNW40 OC-3 IR
- LNW41 OC-48 PTM
- LNW51 OC-12 LR
- LNW84 OC-3/OC-12/OC-48 PTM
- LNW140 OC-3 IR
- LNW141 OC-192 PTM
- LNW302 OC-3 PTM
- LNW380 OC-12 LR
- LNW382 OC-12 PTM
- LNW601 OC-3 LR1



CAUTION

Equipment damage

The LNW38, LNW40, LNW51, LNW140, LNW380 and LNW601 OLIU circuit packs are equipped with optics that do not meet GR-78 R9-3 requirements on ESD susceptibility. Always use proper ESD procedures when handling these OLIU circuit packs to avoid equipment damage.

Note: The LNW140, LNW141 and LNW84 require the comcode 849031372 shelf that allows the center dividers to be removed. See [Chapter 2, “Alcatel-Lucent 1665 DMXtend center divider”](#) for details on how to remove them.

-
- 1 Remove the first main OLIU circuit pack from the packing material.
 - 2 Identify the M1 slot on the Alcatel-Lucent 1665 DMXtend shelf. See [Figure 4-2, “Alcatel-Lucent 1665 DMXtend shelf”](#) (p. 4-8).

- 3 Place the main OLIU circuit pack into the M1 slot on the Alcatel-Lucent 1665 DMXtend shelf. Do **NOT** engage the circuit pack in the backplane connector.
 - 4 Remove the second main OLIU from the packing material.
 - 5 Identify the M2 slot on the Alcatel-Lucent 1665 DMXtend shelf. See [Figure 4-2, “Alcatel-Lucent 1665 DMXtend shelf”](#) (p. 4-8).
 - 6 Place the second main OLIU circuit pack into the M2 slot on the Alcatel-Lucent 1665 DMXtend shelf. Do **NOT** engage the circuit pack in the backplane connector.
- Important!** If any of the main slots are to remain unequipped, install a LNW42 or LNW95 apparatus blank to provide proper air flow for cooling. For LNW140, LNW141 or LNW84 main OLIUs the center divider must be removed and in the unused slot a LNW98 apparatus blanks installed to provide proper air flow for cooling.
- 7 Check off the appropriate box in the [“Installation checklist”](#) (p. I-6).

END OF STEPS

LNW7 (28DS1PM) and LNW8/LNW801 (56DS1E1) installation (optional)

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

Note: The LNW7 is not supported when the LNW141 or LNW84 VLF main OLIU is used.

- 1 See the engineering job specification. Identify the proper function group slots that LNW7, LNW8, or LNW801 circuit pack will be installed into.
- 2 Remove the LNW7, LNW8, or LNW801 from the packing material.

- 3 Place the circuit pack into the shelf (slot D1 or G1 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 177D or LNW98 Apparatus Blank into the protection circuit pack slot (D2 or G2 as required), then proceed to [Step 8](#).

Important! 177D or LNW98 Apparatus Blanks are required in all unused slots D and G 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 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 D or G to be equipped with LNW7, LNW8 or LNW801 circuit packs.
- 8 Check off the appropriate box in the [“Installation checklist”](#) (p. I-6).

END OF STEPS

LNW16 (12DS3/EC1) and LNW19B (48DS3/EC1) installation (optional)

Follow this procedure only if installing LNW16 (12DS3/EC1) or LNW19B (48DS3/EC1) circuit packs into the Alcatel-Lucent 1665 DMXtend shelf.

- 1 See the engineering job specification. Identify the proper function group(s) where LNW16 or LNW19B will be installed.
- 2 Remove the LNW16 or LNW19B from the packing material.

- 3 Place the circuit pack into the shelf (slot D1 or G1 as required). Do **NOT** engage the circuit pack in the backplane connector.
- 4 If a protection circuit pack is required, continue with the [Step 5](#). If not, install a 177D or LNW98 Apparatus Blank into the protection circuit pack slot (D2 or G2 as required), then proceed to [Step 7](#).

Important! 177D or LNW98 Apparatus Blanks are required in all unused slots D and G to provide proper air flow for cooling.

- 5 Remove the second LNW16 or LNW19B from the packing material.
- 6 Place the circuit pack into the shelf (slot 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 to be equipped with LNW16 or LNW19B circuit packs.
- 8 Check off the appropriate box in the [“Installation checklist”](#) (p. I-6).

END OF STEPS

LNW18 (12TMUX) and LNW20 (48TMUXDS3EC1) installation (optional)

Follow this procedure only if installing LNW18 (12TMUX) or LNW20 (48TMUXDS3EC1) into the Alcatel-Lucent 1665 DMXtend shelf.

- 1 See the engineering job specification. Identify the proper function group(s) where LNW18 or LNW20 will be installed.
- 2 Remove the LNW18 or LNW20 from the packing material.

- 3 Place the circuit pack into the shelf (slot D1 or G1 as required). Do **NOT** engage the circuit pack in the backplane connector.
- 4 If a protection circuit pack is required, continue with the [Step 5](#). If not, install a 177D or LNW98 Apparatus Blank into the protection circuit pack slot (D2 or G2 as required), then proceed to [Step 7](#).

Important! 177D or LNW98 Apparatus Blanks are required in all unused slots D and G to provide proper air flow for cooling.

- 5 Remove the second LNW18 or LNW20 from the packing material.
- 6 Place the circuit pack into the shelf (slot 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 to be equipped with LNW18 or LNW20 circuit pack.
- 8 Check off the appropriate box in the [Table I-2, "Installation checklist"](#) (p. I-6).

END OF STEPS

LNW31 (OC-48 OLIU) low-speed installation (optional)

Follow this procedure only if installing LNW31 (OC-48 OLIU) circuit packs into the Alcatel-Lucent 1665 DMXtend shelf.

- 1 See the engineering job specification. Identify the proper function group(s) and/or growth slot(s) where LNW31 circuit pack will be installed.
- 2 Remove the LNW31 from the packing material.

- 3 Place the circuit pack into the shelf (slot D1 or G1 as required). Do **NOT** engage the circuit pack in the backplane connector.
- 4 If a companion circuit pack is required, continue with the [Step 5](#). If not, install a 177D or LNW98 Apparatus Blank into the protection circuit pack slot (D2 or G2 as required), then proceed to [Step 7](#).
Note: 177D or LNW98 Apparatus Blanks are required in all unused slots D and G to provide proper air flow for cooling.
- 5 Remove the second LNW31 from the packing material.
- 6 Place the circuit pack into the shelf (slot D2 or G2 as required).
- 7 Repeat [Step 1](#) through [Step 6](#) for each additional function group and/or growth slot to be equipped with LNW31 circuit packs.
- 8 Check off the appropriate box in the [Table I-2, Installation checklist](#).

END OF STEPS

LNW37 (OC-3 4 port PTM OLIU) or LNW45 (OC-3 8 port PTM OLIU)

Follow this procedure if installing the LNW37 (OC-3 4 port PTM OLIU) or LNW45 (OC-3 8 port PTM OLIU) circuit packs into the Alcatel-Lucent 1665 DMXtend shelf.

Note: The LNW37 or LNW45 circuit pack comes in separate boxes, with one box containing the circuit pack, and the other containing the ordered quantity of PTMs. This procedure will consist of two parts.

- Install the circuit card
 - Install the PTM.
-

- 1 See the engineering job specification. Identify the proper function group(s) and/or growth slot(s) where LNW37 or LNW45 circuit pack will be installed.

- 2 Remove the LNW37 or LNW45 from the packing material.
- 3 Place the circuit pack into the shelf (slot D1 or G1 as required). Do **NOT** engage the circuit pack in the backplane connector.
- 4 If a companion circuit pack is required, continue with [Step 5](#). If not, install a 177D or LNW98 Apparatus Blank into the protection circuit pack slot (D2 or G2 as required), then proceed to [Step 7](#).

Important! 177D or LNW98 Apparatus Blanks are required in all unused slots D and G to provide proper air flow for cooling.

- 5 Remove the second LNW37 or LNW45 from the packing material.
- 6 Place the circuit pack into the shelf (slot D2 or G2 as required).
- 7 Repeat [Step 1](#) through [Step 6](#) for each additional function group and/or growth slot to be equipped with LNW37 or LNW45 circuit packs.
- 8 Check off the appropriate box in the [Table I-2, Installation checklist](#).

END OF STEPS

LNW39/LNW391 (DS1/DS3/16/3), LNW111 (3DS3) and LNW112 (16DS1) installation (optional)

Follow this procedure only if installing LNW39/LNW391 (DS1/DS3/16/3), LNW111 (3DS3) or LNW112 (16DS1) circuit packs into the Alcatel-Lucent 1665 DMXtend shelf.

Note: The LNW39, LNW391, LNW111 and LNW112 are not supported when the LNW140 main OLIU and LNW141 or LNW84 VLF main OLIU is used.

- 1 See the engineering job specification. Identify the proper function group slots where LNW39, LNW391, LNW111 or LNW112 circuit pack will be installed.

- 2 Remove the LNW39, LNW391, LNW111 or LNW112 from the packing material.
 - 3 Place the circuit pack into the shelf (slot A1/B1). 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 an LNW43 or LNW96 Apparatus Blank into the protection circuit pack slot (A2/B2), then proceed to [Step 7](#).
- Important!** LNW43 or LNW96 Apparatus Blanks are required in all unused slots A1/B1 and A2/B2 to provide proper air flow for cooling.
- 5 Remove the second LNW39, LNW391, LNW111 or LNW112 from the packing material.
 - 6 Place the circuit pack into the shelf (slot A2/B2). Do **NOT** engage the circuit pack in the backplane connector.
 - 7 Check off the appropriate box in the [Table I-2, Installation checklist](#).

END OF STEPS

LNW49 (OC-12 4 port PTM OLIU) low-speed installation (optional)

Follow this procedure only if installing the LNW49 (OC-12 4 port PTM OLIU) circuit packs into the Alcatel-Lucent 1665 DMXtend shelf.

Note: The LNW49 (OC-12 4 port PTM OLIU) circuit pack comes in separate boxes, with one box containing the circuit pack, and the other containing the ordered quantity of PTMs. This procedure will consist of two parts.

- Install the circuit card
- Install the PTM.

- 1 See the engineering job specification. Identify the proper function group(s) and/or growth slot(s) where LNW49 circuit pack will be installed.

- 2 Remove the LNW49 from the packing material.
- 3 Place the circuit pack into the shelf (slot D1 or G1 as required). Do **NOT** engage the circuit pack in the backplane connector.
- 4 If a companion circuit pack is required, continue with the [Step 5](#). If not, install a 177D or LNW98 Apparatus Blank into the protection circuit pack slot (D2 or G2 as required), then proceed to [Step 7](#).

Note: 177D or LNW98 Apparatus Blanks are required in all unused slots D and G to provide proper air flow for cooling.

- 5 Remove the second LNW49 from the packing material.
- 6 Place the circuit pack into the shelf (slot D2 or G2 as required).
- 7 Repeat [Step 1](#) through [Step 6](#) for each additional function group and/or growth slot to be equipped with LNW49 circuit packs.
- 8 Check off the appropriate box in the [Table I-2, Installation checklist](#).

END OF STEPS

LNW62 (4 OC-48 PTM OLIU) or LNW55 (OC-3/OC-12/OC-48 12/4 port OLIU) low speed installation (optional)

Follow this procedure only if installing the LNW62 (4 OC-48 PTM OLIU) or LNW55 (OC-3/OC-12/OC-48 12/4 PTM OLIU) circuit packs into the Alcatel-Lucent 1665 DMXtend shelf.

Note: A deeper shelf cover (comcode 849064282) is required for shelves equipped with LNW55 OC3/OC12/OC48, LNW84 OC3/OC12/OC48, LNW705 XM10G/8, and/or LNW785 OMD, circuit packs. This shelf cover provides more space to prevent fibers from touching the front cover when the cover is closed.

Note: The LNW62 and the LNW55 circuit packs require the LNW141 or LNW84 VLF main OLIU to be used.

Note: The LNW62 and LNW55 circuit pack comes in separate boxes, with one box containing the circuit pack, and the other containing the ordered quantity of PTMs. This procedure will consist of two parts.

- Install the circuit card
 - Install the PTM.
-

1 See the engineering job specification. Identify the proper function group(s) and/or growth slot(s) where LNW62 or LNW55 circuit pack will be installed.

2 Remove the LNW62 or LNW55 from the packing material.

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

4 If a companion circuit pack is required, continue with the [Step 5](#). If not, install a 177D or LNW98 Apparatus Blank into the protection circuit pack slot (D2 or G2 as required), then proceed to [Step 7](#).

Note: 177D or LNW98 Apparatus Blanks are required in all unused slots D and G to provide proper air flow for cooling.

5 Remove the second LNW62 or LNW55 from the packing material.

6 Place the circuit pack into the shelf (slot D2 or G2 as required).

7 Repeat [Step 7](#) through [Step 6](#) for each additional function group and/or growth slot to be equipped with LNW62 circuit packs.

8 Check off the appropriate box in the [Table I-2, Installation checklist](#).

END OF STEPS

LNW63 (GBE PL) 4 port or LNW64 (GBE PL) 8-port installation (optional)

Follow this procedure only if installing LNW63 (GBE PL) 4 port or LNW64 (GBE PL) 8 port circuit packs into the Alcatel-Lucent 1665 DMXtend shelf.

Note: The LNW63 (GBE PL) 4 port or LNW64 (GBE PL) 8 port requires either a LX or SX PTM.

-
- 1 See the engineering job specification. Identify the proper function group slot (D1 or G1) where the LNW63 or LNW64 circuit pack will be installed.

Note: LNW63 or LNW64 circuit pack can only be installed in slot 1 of any function group unless the LNW141 or LNW84 VLF main OLIU is used. See *Alcatel-Lucent 1665 Data Multiplexer Extend (DMXtend) Applications and Planning Guide 365-372-324* for allowed combinations.

-
- 2 Remove the LNW63 or LNW64 circuit pack from the packing material.

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

-
- 4 Install a 177D or LNW98 Apparatus Blank into the companion circuit pack slot (D2 or G2 as required).

Important! 177D or LNW98 Apparatus Blanks are required in all unused slots D and G to provide proper air flow for cooling.

-
- 5 Repeat [Step 1](#) through [Step 4](#) for each additional function group to be equipped with LNW63 or LNW64 circuit packs.

-
- 6 Check off the appropriate box in the [Table I-2, Installation checklist](#).

END OF STEPS

LNW73/73C (4-Fiber channel FICON/ESCON) installation (optional)

Follow this procedure only if installing LNW73 or LNW73C circuit packs into the Alcatel-Lucent 1665 DMXtend shelf.

- 1 See the engineering job specification. Identify the proper function group slot (D1 or G1) where the LNW73/73C circuit pack will be installed.

Note: LNW73/73C circuit pack can only be installed in slot 1 of any function group unless the LNW141 or LNW84 VLF main OLIU is used. See *Alcatel-Lucent 1665 Data Multiplexer Extend (DMXtend) Applications and Planning Guide 365-372-324* for allowed combinations.

- 2 Remove the LNW73/73C from the packing material.
-

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

- 4 Install a 177D or LNW98 Apparatus Blank into the companion circuit pack slot (D2 or G2 as required).

Important! 177D or LNW98 Apparatus Blanks are required in all unused slots D and G to provide proper air flow for cooling.

- 5 Repeat [Step 1](#) through [Step 4](#) for each additional function group to be equipped with LNW73 or 73C circuit packs.
-

- 6 Check off the appropriate box in the [Table I-2, Installation checklist](#).

END OF STEPS

LNW66 (10/100T), LNW74 (10/100-PL), LNW87 (FE/GBE PL) installation (optional)

Follow this procedure if installing LNW66 (10/100T), LNW74 (10/100-PL), or LNW87 (FE/GBE PL) circuit packs into the Alcatel-Lucent 1665 DMXtend shelf.

- 1 See the engineering job specification. Identify the proper function group slot (D1 or G1) where the LNW66, LNW74, or LNW87 circuit pack will be installed.

Note: The LNW66, LNW74, or LNW87 circuit pack can only be installed in slot 1 of any function group. The LNW74 or LNW87 can be installed into any function slots (D1, D2, G1 or G2) if the LNW141 or LNW84 VLF main OLIU is used. See *Alcatel-Lucent 1665 Data Multiplexer Extend (DMXtend) Applications and Planning Guide 365-372-324* for allowed combinations.

Note: The LNW74 has 4 100BASE-LX ports that require PTM optics in addition to 16 10/100BASE-TX ports that are cabled from the rear of the shelf.

Note: The LNW87 is a 8-port, PTM-based Private Line Fast Ethernet/Gigabit Ethernet pack. The ports can be populated with either, 4 optical, 8 electrical PTMs, or a mix of 4 electrical and 4 optical PTMs.

2 Remove the pack from the packing material.

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

4 Install a 177D or LNW98 Apparatus Blank into the companion circuit pack slot (D2 or G2 as required).

Note: 177D or LNW98 Apparatus Blanks are required in all unused slots D and G to provide proper air flow for cooling.

5 Repeat [Step 1](#) through [Step 4](#) for each additional function group (slot D1 or G1 as required) to be equipped with LNW66, LNW74, or LNW87 circuit packs.

6 Check off the appropriate box in the [“Installation checklist”](#) (p. I-6).

END OF STEPS

LNW170 (GigE/FE)

Follow this procedure only if installing LNW70/170 circuit packs into the Alcatel-Lucent 1665 DMXtend shelf.

Note: The LNW170 circuit packs support both electrical and optical PTMs for both gigE and FE. When inserting them into ports, provision the card appropriately.

- 1 See the engineering job specification. Identify the proper function group slot (D-G) where the LNW70 or LNW170 circuit pack will be installed.

- 2 Remove the LNW170 from the packing material.

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

- 4 If slot 2 is empty, install a 177D or LNW98 Apparatus Blank into the companion circuit pack slot.
Important! 177D or LNW98 Apparatus Blanks are required in all unused slots D and G to provide proper air flow for cooling.

- 5 Repeat [Step 1](#) through [Step 4](#) for each additional function group to be equipped with LNW170 circuit packs.

- 6 Check off the appropriate box in the [“Installation checklist”](#) (p. I-6).

END OF STEPS

LNW402 OC48 1310 nm, 1550 nm, or DWDM PTM Optics

Follow this procedure to install the LNW402 circuit packs in the Alcatel-Lucent 1665 DMXtend shelf. The high-speed LNW402 is a single-port OLIU that employs PTM pluggable optics to offer 1310 nm, 1550 nm, or DWDM optics with a 12 STS-1 VT fabric. The LNW402 circuit pack and three of the supported OC-48 PTMs are approved for OSP deployments.

- 1 See the engineering job specification. Identify the proper function group slots where the LNW402 circuit packs will be installed.

- 2 Remove the first LNW402 circuit pack from the packing material.

- 3 Place the circuit pack into the shelf (slot D1 or G1 as required). Do **NOT** engage the circuit pack in the backplane connector.
- 4 Repeat [Step 2](#) and [Step 3](#) if a second LNW402 is required in the companion function/growth slot. If not, install a 177D or LNW98 Apparatus Blank into the protection circuit pack slot (D2 or G2 as required).

Note: 177D or LNW98 Apparatus Blanks are required in all unused slots D and G to provide proper air flow for cooling.

- 5 Repeat [Step 2](#) through [Step 4](#) if an additional function/growth group is to be equipped with an LNW402 circuit pack.
- 6 Check off the appropriate box in the [“Installation checklist”](#) (p. I-6).

END OF STEPS

LNW705 XM10G/8 muxponder pack

Follow this procedure to install a LNW705 circuit pack in an Alcatel-Lucent 1665 DMXtend. 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 849064282) is required for shelves equipped with LNW55 OC3/OC12/OC48, LNW84 OC3/OC12/OC48, LNW705 XM10G/8, and/or LNW785 OMD, 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 G2 slot where the LNW705 circuit pack will be installed.

- 2 Remove the LNW705 circuit pack from the packing material.
- 3 Place the circuit pack into the shelf (slot G2). Do **NOT** engage the circuit pack in the backplane connector.
- 4 See [Appendix E, “Install pluggable modules”](#) (p. B-8).
- 5 Check off the appropriate box in [“Installation checklist”](#) (p. I-6).

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 DMXtend shelf. The LNW785 OMD5/8 circuit pack multiplexes/demultiplexes up to 8 DWDM optical channels.

Note: A deeper shelf cover (comcode 849064282) is required for shelves equipped with LNW55 OC3/OC12/OC48, LNW84 OC3/OC12/OC48, LNW705 XM10G/8, and/or LNW785 OMD, 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 the 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 D1 or G1 as required). Do **NOT** engage the circuit pack in the backplane connector.
- 4 Repeat [Step 2](#) and [Step 3](#) if a second LNW785 is required in the companion function/growth slot. If not, install a 177D or LNW98 Apparatus Blank into the protection circuit pack slot (D2 or G2 as required).

Note: 177D or LNW98 Apparatus Blanks are required in all unused slots D and G to provide proper air flow for cooling.

- 5 Repeat [Step 2](#) through [Step 4](#) if an additional function/growth group is to be equipped with an LNW785 circuit pack.

- 6 Check off the appropriate box in the “[Installation checklist](#)” (p. I-6).

END OF STEPS

177D, LNW98 (Apparatus Blank) installation (optional)

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

Note: 177D or LNW98 Apparatus Blanks are required in all unused slots D and G to provide proper air flow for cooling.

- 1 Identify all the unequipped function unit (D or G) slots.

- 2 Remove the 177D or LNW98 Apparatus Blank from the packing material.

- 3 Place the 177D or LNW98 Apparatus Blank into an unequipped slots D and G on the shelf. Do **NOT** engage the blank pack in the backplane connector.

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

- 5 Check off the appropriate box in the “[Installation checklist](#)” (p. I-6).

END OF STEPS

LNW43, LNW96 (apparatus blank) installation (optional)

Follow this procedure to installs LNW43 or LNW96 Apparatus Blank(s) into the Alcatel-Lucent 1665 DMXtend shelf.

Note: A LNW43 or LNW96 Apparatus Blank is required in any unequipped A1/B1 or A2/B2 slots to provide proper air flow for cooling.

- 1 Identify any unequipped A1/B1 or A2/B2 slots.

- 2 Remove the LNW43 or LNW96 Apparatus Blank from the packing material.

- 3 Place the LNW43 or LNW96 Apparatus Blank into the unequipped A/B slot on the shelf. Do **NOT** engage the blank pack in the backplane connector.

- 4 Continue with the next unequipped slot until all the unused A1/B1 or A2/B2 slots are equipped with an LNW43 or LNW96 Apparatus Blank.

- 5 Check off the appropriate box in the [“Installation checklist”](#) (p. I-6).

END OF STEPS

LNW42, LNW95 apparatus blank installation (optional)

Follow this procedure to install LNW42 or LNW95 Apparatus Blank(s) into the Alcatel-Lucent 1665 DMXtend shelf.

Note: A LNW42 or LNW95 Apparatus Blank is required in any unequipped Main slots to provide proper air flow for cooling.

- 1 Identify any unequipped Main slots.

- 2 Remove the LNW42 or LNW95 Apparatus Blank from the packing material.

- 3 Place the LNW42 or LNW95 Apparatus Blank into the unequipped Main slot on the shelf. Do **NOT** engage the blank pack in the backplane connector.

- 4 Check off the appropriate box in the “[Installation checklist](#)” (p. I-6).

END OF STEPS



Part II: Stand-alone installation tests

Overview

Purpose

Part II covers Chapters 5 and 6. These sections cover the initial Graphical User Interface (GUI) or Craft Interface Terminal (CIT) software installation and turn-up testing on a new Alcatel-Lucent 1665 Data Multiplexer Extend (Alcatel-Lucent 1665 DMXtend) shelf. It is intended to verify correct electrical DS1/DS3/FE cable wiring to the DSX panel or punch down block as well SONET fiber routing to the LGX panel from the faceplates of installed packs.

Part II also provides the recommended checklist “[Installation checklist](#)” to follow when installing a Alcatel-Lucent 1665 DMXtend system. 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.

Contents

This part contains the following chapters:

Stand-alone node setup	Chapter 5
Stand-alone installation testing	Chapter 6

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.

Qty.	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	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.
2	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/E1 cable and must be able to accommodate 24 gauge wire.
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	Ohmmeter ITE-6379C	An ohmmeter is required to verify that the Alcatel-Lucent 1665 DMXtend is properly grounded.
1	DS1/E1 Error Rate Test Set ITE-7113	A DS1/E1 error rate test set is required for testing of DS1/E1 cabling. A T-BERD 2209 or equivalent is recommended.
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	Optical Test Set (Optional)	A Optical test set is required for testing of low speed optics OC3/12/48. An 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 DMXtend 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.

Qty.	Description	Comments
1	15-dB LC-type LBO ITE-7196 (108279480)	LBOs are only required when optically looping the Alcatel-Lucent 1665 DMXtend 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
	Noyes OFS 300-200X Optical Fiber Scope ITE-7129	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 optical fiber scope may not be needed
	2.5mm 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 [†]	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
	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"

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 DMXtend.

Quantity	Description	Comments
1	Personal Computer (PC)	See PC minimum requirements below.
1	RS-232 Interface Cable	8-ft. long RJ45 to 9-pin D-sub serial cable (Comcode 848748869)
1	RJ45 to RJ45 Cross-over Cable	

PC minimum requirements

For PC minimum requirements see [“PC minimum requirements”](#).

Installation checklist

Section and chapter	Procedure	Required	Completed	
			Yes	No
Part II: "Stand-alone installation tests"				
Chapter 5, "Stand-alone node setup"	"Software installation" (p. 5-2)	See Note 1		
	"Circuit pack installation" (p. 5-3)	See Note 1		
	"Use of WaveStar® CIT software" (p. 5-6)	Yes		
	"Steps" (p. 5-6)	Yes		
	"Circuit pack program version verification" (p. 5-13)	Yes		
	"Alcatel-Lucent 1665 DMXtend shelf initialization" (p. 5-14)	Yes		
Chapter 6, "Stand-alone installation testing"	"LBO software settings" (p. 6-4)	See Note 1		
	"Clearing alarms" (p. 6-7)	See Note 1		
	"Local equipment and cross-connect tests" (p. 6-8)	See Note 1		
	"DS1/E1 testing" (p. 6-9)	See Note 1		
	"DS3/EC1 testing procedure" (p. 6-15)	See Note 1		
	"LNW66 (10/100T), LNW74 (10/100), LNW87 (FE/GBE PL) TX Ethernet cabling testing" (p. 6-21)	See Note 1		
	"OC-3 low-speed testing" (p. 6-26)	See Note 1		
	"OC-3 low-speed LNW37 PTM testing procedure" (p. 6-26)	See Note 1		
	"OC-3 low-speed LNW45 or LNW55 PTM testing procedure" (p. 6-28)	See Note 1		
	"OC-12 low-speed LNW49 and LNW55 PTM testing procedure" (p. 6-30)	See Note 1		
	"OC-12 low-speed LNW49 and LNW55 PTM testing procedure" (p. 6-30)	See Note 1		
	"OC-48 low-speed testing procedure" (p. 6-33)	See Note 1		

Section and chapter	Procedure	Required	Completed	
			Yes	No
	“OC-48 PTM equipped low-speed testing procedure” (p. 6-35)	See Note 1		
	“LED test” (p. 6-37)	Yes		
	“Office alarm test” (p. 6-38)	See Note 1		
	“Automatic protection switching and alarm test” (p. 6-42)	See Note 1		
	“Manual switching tests” (p. 6-46)	See Note 1		
	“External timing verification” (p. 6-49)	See Note 1		
	“Miscellaneous (environmental) discrete telemetry test” (p. 6-52)	See Note 1		
	“Modem connection test” (p. 6-54)	See Note 1		
	“Final operations” (p. 6-56)	Yes		
<p>Notes:</p> <p>1. Only required if equipped.</p>				



5 Stand-alone node setup

Overview

Purpose

The purpose of this chapter is to provide procedures for Graphical User Interface (GUI) or Craft Interface Terminal (CIT) software installation and circuit packs provided via work order. Also, the use of the Graphical User Interface (GUI) or Craft Interface Terminal (CIT).

Contents

This chapter provides information on the following topics

Software installation	5-2
Circuit pack installation	5-3
Use of WaveStar® CIT software	5-6
Circuit pack program version verification	5-13
Alcatel-Lucent 1665 DMXtend shelf initialization	5-14

Tools, test equipment and accessories

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

Quantity	Description	Comments
1	Personal Computer (PC)	Required to run the WaveStar® CIT software.

Quantity	Description	Comments
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.
	CIT Cross-Over Cable	This cable is used for IAO LAN (OSI/TCP-IP) Front LAN connection cross over cable should be used if the shelf is directly connected to a PC and LAN 10BASE-T straight through cable should be used if shelf is connected to a hub
1	Software CD-ROM	Verify latest software version is being used.
1	Software Release Description (SRD)	Verify latest the issue of the SRD is being used, for the software that is used.
	LBOs	15-dB, 10-dB and 5-dB LBOs are required when looping back the main OLIUs on themselves.

PC minimum requirements

For PC minimum requirements see [“PC minimum requirements”](#).

Software installation

Description

Installation of the Alcatel-Lucent 1665 Data Multiplexer Extend (Alcatel-Lucent 1665 DMXtend) WaveStar® CIT software is covered in detail in the *Alcatel-Lucent 1665 Data Multiplexer Extend (DMXtend) Release 9.0.0 Software Release Description*, which is provided with the software CD. To install the CIT software, please follow the procedures in the “Installing software and documentation on a PC” section of the SRD.

Software installation

CIT software installation is accomplished by performing the “Installing software and documentation on a PC” section in the *Alcatel-Lucent 1665 Data Multiplexer Extend (DMXtend) Release 9.0.0 Software Release Description* which is shipped with the software CD. When the software installation is complete, Check off the appropriate box in the [“Installation checklist”](#) (p. II-5).

Circuit pack installation

Description

This section provides instructions and the recommended order for installing (fully seating) the circuit packs in the Alcatel-Lucent 1665 DMXtend shelf. The procedures in this section assume that the SYSCTL is installed and operational.

Locations of circuit packs (function unit slots) are shown in [Figure 4-2, “Alcatel-Lucent 1665 DMXtend shelf”](#) (p. 4-8).

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



CAUTION

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 then extinguish.



CAUTION

ESD hazard

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



CAUTION

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”](#).

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

Steps

- 1 Fully insert one or both (if two are equipped) M1 and M2 OLIUs into the shelf.



CAUTION

Equipment damage

The LNW38, LNW40, LNW51, LNW140, LNW302, LNW380, LNW382, and LNW601 OLIU circuit packs are equipped with optics that do not meet GR-78 R9-3 requirements on ESD susceptibility. Always use proper ESD procedures when handling these OLIU circuit packs to avoid equipment damage.

Note: Using a gentle steady pressure on both ends of the circuit pack, slide the circuit pack into the slot until it is fully seated. Then close the faceplate latch and tighten the retainer screw on the other end.

Note: The LNW140, LNW141, and LNW84 require shelf comcode 849031372 with the center dividers removed. See [Chapter 2, “Alcatel-Lucent 1665 DMXtend center divider”](#) (p. 2-5) to remove the dividers

Note: A deeper shelf cover (comcode 849064282) is required for shelves equipped with LNW55 OC3/OC12/OC48, LNW84 OC3/OC12/OC48, LNW705 XM10G/8, and/or LNW785 OMD, circuit packs. This shelf cover provides more space to prevent fibers from touching the front cover when the cover is closed.

- 2 Fully seat LNW42 or LNW95 Apparatus Blanks in any unequipped Main slots. For LNW140, LNW141 or LNW84 main OLIUs the center divider must be removed and in the unused slot a LNW98 apparatus blanks installed to provide proper air flow for cooling.

Note: Using a gentle steady pressure on both ends of the circuit pack, slide the circuit pack into the slot until it is fully seated. Then close the faceplate latch and tighten the retainer screw on the other end.

- 3 If the LNW41 (OC-48), LNW141 (OC-192) or LNW84 (OC-3/OC-12/OC-48) mains are being used, insert the PTMs at this time. See [Appendix B, “PTM modules”](#) for proper insertion.
- 4 Connect IN to OUT on the OLIU in the M1 slot of the Alcatel-Lucent 1665 DMXtend shelf using an optical fiber jumper cable and a 15-dB LBO. 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 DMXtend shelf using an optical fiber jumper cable and a 15-dB LBO.



CAUTION

Equipment damage

The LNW38, LNW40, LNW51, LNW140, LNW302, LNW380, LNW382, and LNW601 OLIU circuit packs are equipped with optics that do not meet GR-78 R9-3 requirements on ESD susceptibility. Always use proper ESD procedures when handling these OLIU circuit packs to avoid equipment damage.

Result: After a few minutes the flashing FAULT LEDs should extinguish on each OLIU circuit pack. If the shelf is externally timed the flashing FAULT LEDs may not extinguish until correct framing is selected. 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 in the [“Clearing alarms” \(p. 6-7\)](#) section.

- 5 Starting with slot A1/B1, fully seat the circuit pack slotted there using a steady pressure on both of the faceplate latches (where applicable) at the same time until the circuit pack is fully seated.

Note: The ACTIVE and FAULT LEDs should light when circuit packs are inserted and the FAULT LED should extinguish after a short period of time.

Note: For slots A1/B1 and A2/B2 only; using a gentle steady pressure on both ends of the circuit pack, slide the circuit pack into the slot until it is fully seated. Then close the faceplate latch.

- 6 Continue seating circuit packs with slot A2/B2 and then on to G1, G2, D1, and D2.

Note: Some circuit packs such as the LNW63, LNW66, and LNW170 may take several minutes before their FAULT LEDs extinguish.

- 7 Fully seat 177D or LNW98 Apparatus Blanks in any other unfilled D and G slots.

- 8 Fully seat LNW43 or LNW96 Apparatus Blanks in any A/B unfilled slots.

Note: Using a gentle steady pressure on both ends of the circuit pack, slide the circuit pack into the slot until it is fully seated. Then close the faceplate latch.

- 9 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 any flashing FAULT LEDs on any of the low speed circuit packs.

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

- 11 Any other alarms will be cleared later on in [Chapter 6, “Stand-alone installation testing”](#), [“Clearing alarms”](#) (p. 6-7).

- 12 Check off the appropriate box in the [“Installation checklist”](#) (p. II-5).

.....
E N D O F S T E P S

Use of WaveStar® CIT software

Description

Complete the following steps to login to the Alcatel-Lucent 1665 DMXtend via WaveStar® CIT. It is assumed that the CIT software has been installed on the PC and the LNW2 system controller is installed and operational to the Alcatel-Lucent 1665 DMXtend shelf per the Software Release Description.

Steps

- 1 Connect the PC serial port to the RS-232 port of the SYSCTL circuit pack with a serial RS-232 cable [[Table 3-23, “CIT Cable Assembly”](#) (p. 3-69)]. Or connect the PC LAN port to the front LAN port of the SYSCTL circuit pack with a RJ45 to RJ45 cross-over cable [Table 3-14, “LAN 10Base-T straight-through cable connections”](#) (p. 3-47).

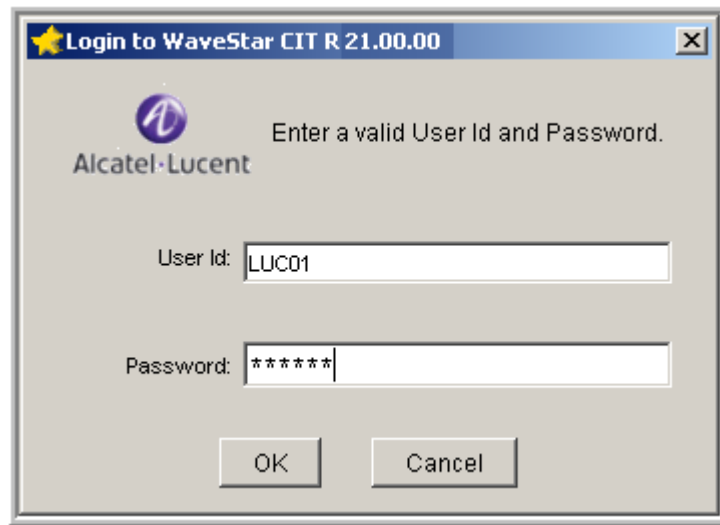
Note: An IP address must be assigned to the NIC card on the PC or laptop. Otherwise, you may experience login problems. To assign an IP address, start the DOS prompt on the computer, and type the command ipconfig/all. The command will show

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:



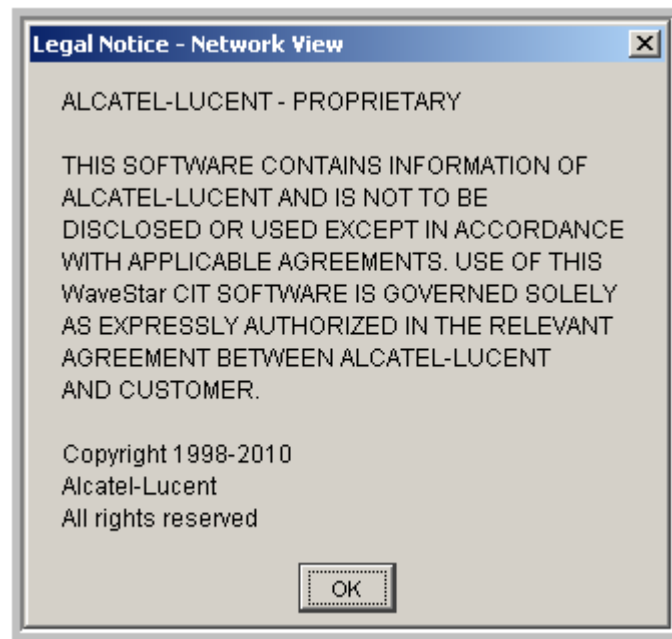


- 3 If necessary, enter the following in the Login window: **Note: User ID and password are case sensitive.**

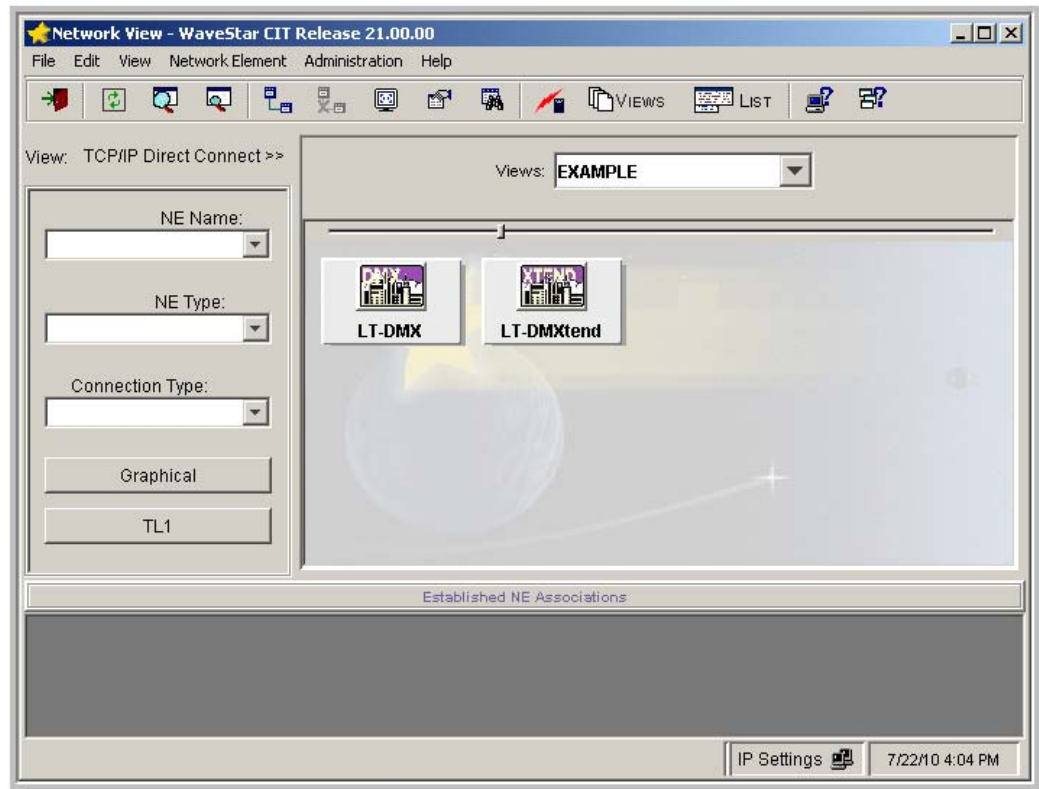
User ID: LUC01
Password: LUC+01

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:



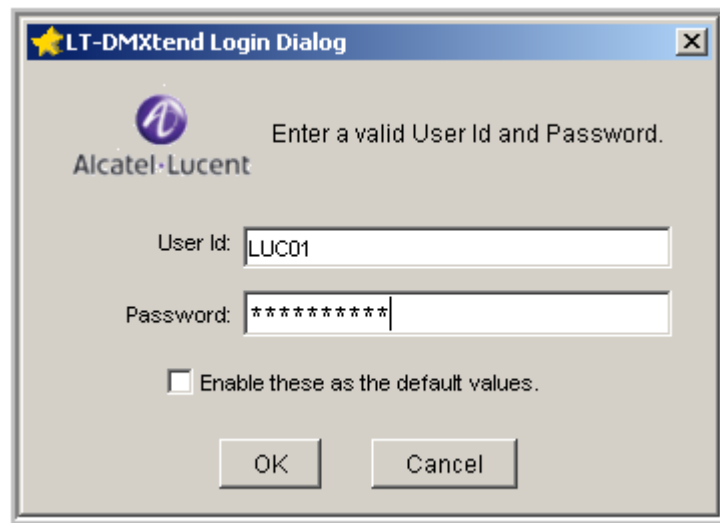
- 5 After reading the Legal Notice, click **OK** and the following window appears.



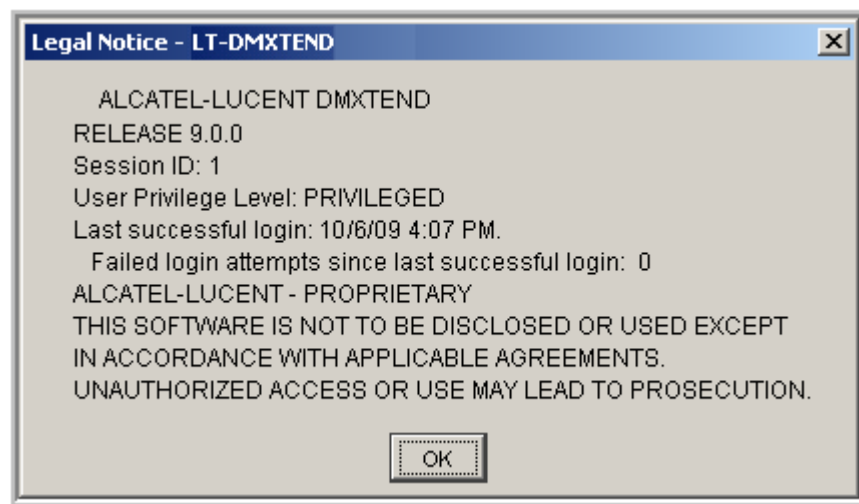
- 6 Under **NE Name**, enter LT-DMXTEND.
- 7 Under **NE Type**, select DMXtend from the drop-down list.
- 8 Under **Connection Type**, click on the drop-down menu arrow and choose Serial, OSI, or TCP/IP depending on the type of connection you are using.

Note: TCP/IP is available when the SYSCTL has a bootcode of 5.1 or higher. The SYSCTL (LNW2) displays the boot code on initial turn up and the 5.1 bootcode is indicated by a flashing M P 5 1 in the display. When the bootcode is 5.1 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.

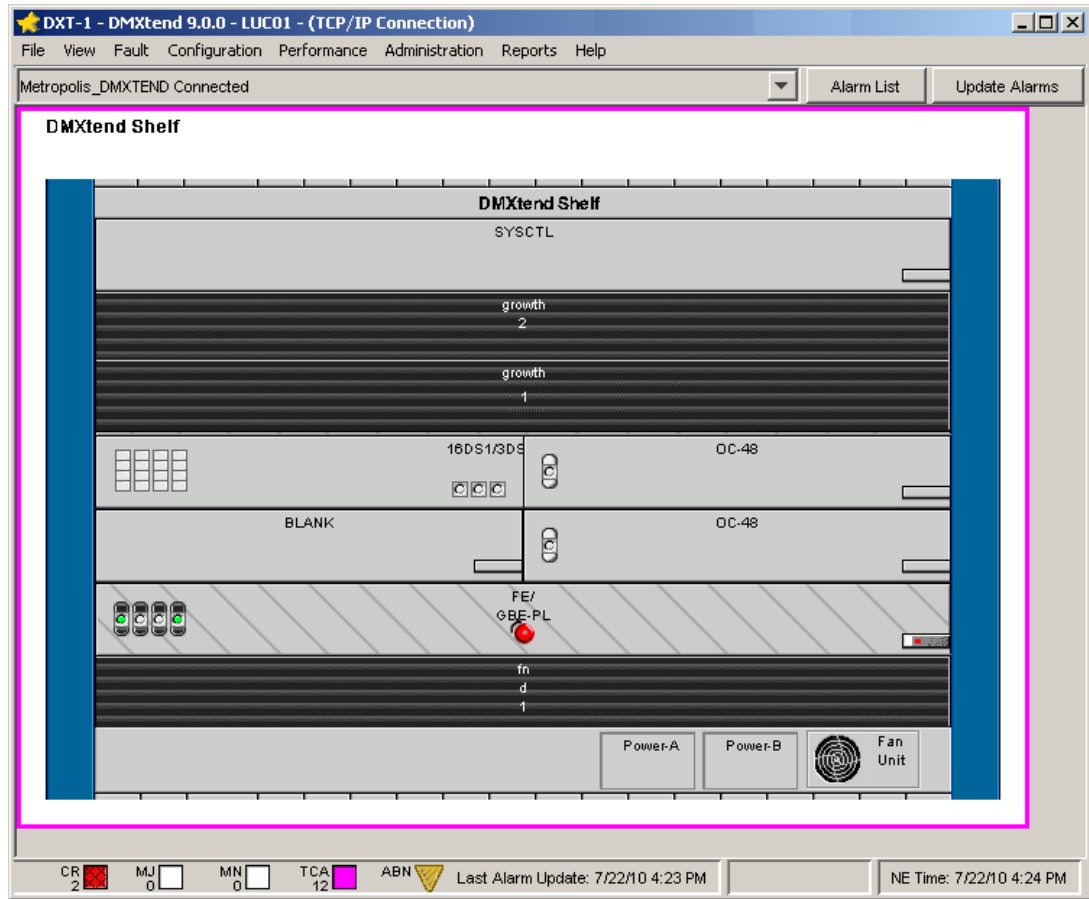
- 9 Click **Graphical** and the NE login screen appears.



- 10 Enter the Login information (case sensitive)for the shelf:
User ID: LUC01
Password: DMXTND2.5G
Click **OK** and the NE legal notice appears.



- 11 Click **OK** and the System View appears.



- 12 Familiarize yourself with different aspects of the Graphical presentation of a shelf including tool bars and menu bars.
- 13 Check off the appropriate box in the [“Installation checklist”](#) (p. II-5).

END OF STEPS

Circuit pack program version verification

Description

This section provides instructions verifying that program versions on the circuit packs in the Alcatel-Lucent 1665 DMXtend shelf. The procedures in this section assume that the SYSCTL is installed 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 DMXtend 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.
Result: The circuit pack information is 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 1665 Data Multiplexer Extend (DMXtend) Release 9.0.0 Software Release Description*.
- 5 Compare the Program Version to the information provided in the *Alcatel-Lucent 1665 Data Multiplexer Extend (DMXtend) 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.
- 6 If the Program Version did not match the version number in the Firmware Version table in the SRD, reseal that circuit pack and wait 15 minutes, and repeat this procedure from [Step 2](#).

- 7 Check off the appropriate box in the “[Installation checklist](#)” (p. II-5).

END OF STEPS

Alcatel-Lucent 1665 DMXtend shelf initialization

Description

This section provides instructions for initializing the Alcatel-Lucent 1665 DMXtend shelf, to ensure 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 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 DMXtend shelf using the CIT software as described in the “[Use of WaveStar® CIT software](#)” (p. 5-6).
- 2 From the System View, select **Fault > Reset > Initialize System**.
Result: Click **OK**.
- 3 Click **Yes** to the Warning Message.
Result: The shelf resets and closes the CIT session.
- 4 Check off the appropriate box in the “[Installation checklist](#)” (p. II-5).

END OF STEPS



6 Stand-alone installation testing

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 Extend (Alcatel-Lucent 1665 DMXtend) shelf.

For end-to-end turn-up and testing procedures, see *Alcatel-Lucent 1665 Data Multiplexer Extend (DMXtend) User Operations Guide 365-372-325*.

Contents

This chapter provides information on the following topics:

LBO software settings	6-4
Clearing alarms	6-7
Local equipment and cross-connect tests	6-8
DS1/E1 testing	6-9
DS3/EC1 testing	6-15
LNW66, LNW74, and LNW87 testing	6-21
OC-3 low-speed testing	6-26
OC-12 low-speed testing	6-30
OC-48 low-speed testing	6-33
LED test	6-37
Office alarm test	6-38
Automatic protection switching and alarm test	6-42
Manual switching tests	6-46

External timing verification	6-49
Miscellaneous (environmental) discrete telemetry test	6-52
Modem connection test	6-54
Final operations	6-56

Tools, test equipment and accessories

Listed below are the required tools, test equipment and accessories. For complete listing, see Part I or Part II:

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	DS1/E1 Error Rate Test Set	A DS1/E1 error rate test set is required for testing of DS1/E1 cabling. A T-BERD 2209 or equivalent is recommended.
1	DS3 Error Rate Test Set	A DS3 error rate test set is required for testing of DS3/EC1 cabling. A T-BERD 2209 or equivalent is recommended.
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 DMXtend 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.
1	15 dB LC-type LBO (108279480)	For shelves containing optical circuit packs in any of the function unit slots (supported starting in release R1.1), a single 15-dB LBO is required for testing of the individual ports
1	Personal Computer (PC)	Required to run the WaveStar [®] CIT software.
1	CIT (RS-232) 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.
2	LAN 10BaseT Straight-through Cable CAT 5 or better	As required to reach from front of Alcatel-Lucent 1665 DMXtend to the RJ45 patch panel

Quantity	Description	Comments
1	Personal Computer (PC)	Required to run the WaveStar® CIT software.
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.
	CIT Cross-Over Cable	This cable is used for IAO LAN (OSI/TCP-IP) Front LAN connection cross over cable should be used if the shelf is directly connected to a PC and LAN 10BASE-T straight through cable should be used if shelf is connected to a hub
1	Software CD-ROM	Verify latest software version is being used.
1	Software Release Description (SRD)	Verify latest the issue of the SRD is being used, for the software that is used.
	LBOs	15-dB, 10-dB and 5-dB LBOs are required when looping back the main OLIUs on themselves.

PC minimum requirements

For PC minimum requirements see [“PC minimum requirements”](#).

LBO software settings

Description

This section provides instructions for setting the software Line Build Out (LBO) for the DS1/E1 and DS3/EC1 cabling. The SYSCTL, DS1/E1 and/or DS3/EC1 circuit packs must be installed and software must be loaded.

Follow this procedure to set the LBOs for the DS1/E1, DS1/DS3/16/3, DS3/EC1, and TMUX circuit packs.

Setting DS1/E1 LBOs

- 1 Log on to the Alcatel-Lucent 1665 DMXtend shelf using the CIT software as described in the “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/E1 cables installed.

LBO value	Distance (feet)
	Cable type 1161A
20	0 - 133 (default)
40	133 - 267
60	267 - 420
80	420 - 550
100	550 - 655

- 3 Use the **GUI** window click on **Configuration:Equipment** command.
- 4 Double-click on a Function Group where the LNW7/LNW8/LNW112/LNW39/LNW140/LNW391/LNW801/LNW84 is located.
- 5 Select **VT Group1** and the first **DS1/E1** in that group.
Result: A provisioning page will be displayed.
- 6 Select **Line Build Out 20 (0,133)** from the drop-down window.
- 7 Select **Apply to: All Ports, This Pack**
- 8 Click **Apply** to issue the command.
Result: All DS1/E1 ports will have a LBO value of 20 for this pack.

Setting DS3/EC1 LBOs

The DS3/EC1 cabling will be tested with all ports provisioned for DS3. Set DS3 LBO values as follows.

- 9 See the following table of cable lengths and LBO values. Determine the LBO value corresponding to the DS3 cables installed:

LBO Value	Distance (Feet)
	Cable Type 735A and 734D
IN	0 - 65 (default)
OUT	> 65

- 10 Use the **GUI** window click on **Configuration:Equipment** command.
-
- 11 Double-click on a Function Group where the LNW16/LNW18/LNW19B/LNW20 or LNW39/LNW111/LNW391/LNW84 is located.
-
- 12 Select **Port 1** and the first **DS3** in that group.
- Result:** A provisioning page will be displayed.
-
- 13 Select **Line Build Out = In** from the drop down window.
-
- 14 Select **Apply to: All Ports, This Pack**
-
- 15 Click **Apply** to issue the command.
- Result:** All DS3 ports will have a LBO value of **In** for this pack.
-
- 16 Check off the appropriate box in the “[Installation checklist](#)” (p. II-5).

END OF STEPS

Clearing alarms

Description

In order to clear standing alarms the Alcatel-Lucent 1665 DMXtend 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 Use t the **GUI** to change the system timing. **Configuration > Timing Sync**

- 2 The **Configure Timing/Sync** window will be displayed.

- 3 Under the **System Timing** tab set the **Timing Mode:** to **Free Running**.

- 4 Click **OK** to issue the command.

- 5 Use the **GUI** to turn off the DCCs. **Configuration > DCC Terminations**

- 6 The **Configure DCC Terminations** window will be displayed.

- 7 For **Port AID:** select **dcc-m1-1**.

- 8 For **OSI Over DCC** select **disabled**.

- 9 Click **Apply** to send the command.

- 10 For **Port AID:** select **dcc-m2-1**.

- 11 For **OSI Over DCC** select **disabled**.

- 12 Click **Apply** to send the command.
- 13 If there are any FAULT LEDs on or flashing, press the UPD/INIT pushbutton on the SYSCTL circuit pack.

Note: LNW16/LNW19B (DS3/EC1), LNW18/LNW20 (48TMUXDS3EC1), LNW111 (3DS3) and LNW39/LNW391/LNW84 (DS1/DS3/16/3) circuit packs require a 75-ohm termination at the DSX-3 on all ports.
- 14 If there are still FAULT LEDs on, replace the respective circuit pack.
- 15 Leave the office alarm cable disconnected until all procedures and testing have been completed.
- 16 Check off the appropriate box in the [“Installation checklist”](#) (p. II-5).

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 DMXtend shelf. It verifies proper cabling from the Alcatel-Lucent 1665 DMXtend 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 DMXtend.

It is assumed that [Chapter 4, “Circuit pack installation”](#) is complete and the Alcatel-Lucent 1665 DMXtend shelf has fiber loopback cables on the Main OLIUs, with Far-End Communication disabled and synchronization set to free-running.

On initial installation/turn-up of Alcatel-Lucent 1665 DMXtend, 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 around 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 failures.



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/E1 testing

DS1/E1 testing procedure

Perform the following steps for all Alcatel-Lucent 1665 DMXtend shelf function unit slots that are cabled to a DSX-1.

Function unit slot A/B must be cabled to the DSX-1 and must contain a DS1/DS3/16/3 (LNW39/LNW391/LNW84), 16/DS1 (LNW112) or OC-3/16DS1 (LNW40) circuit pack in order to perform these tests on the DS1/E1 portion of the cabling. function unit slot D or G must be cabled to the DSX-1 and must contain either a 28DS1 (LNW7) or 56DS1E1 (LNW8/LNW801) circuit pack in order to perform these tests. If the shelf is not fully populated, it may be necessary to move the circuit pack(s) from slot to slot in order to test all DS-1 cabling.

Note: The LNW39/LNW391/LNW84 (DS1/DS3/16/3), LNW112 (16DS1) or the OC-3/16DS1 (LNW140) circuit packs only support the first 16 DS1's of the A function group.

This procedure requires the use of a DS1/E1 test set.

-
- 1 Set the DS1/E1 test set to transmit and receive a Quasi-Random Sequence Signal (QRSS) with B8ZS formatting.

2 Connect a cable from the DS-1 test set **transmit** connection to the IN jack of the DSX-1 associated with the DS-1 tributary to be tested (start with the first).

3 Connect a cable from the DS-1 test set **receive** connection to the OUT jack of the DSX-1 associated with the DS-1 tributary to be tested (start with the first).

Result: The DS-1 test set should indicate a blue (AIS) signal is being received.

4 Use the **GUI** command to enter cross-connects.

5 Click **Configuration: Cross-Connections**.

6 Select **Create a new cross-connection**.

7 Select **Next**.

8 Select **Rate= VT1.5: Type of Cross-connect= UPSR Add/Drop**.

9 Select **Next**.

10 Select **Range= Single VT**.

11 Select **m1-1-1-1-1 to a1-1-1-1** (if using a combo card) or [d,g] if using the function slots.

12 Click **Finish** to issue the command.

Result: The DS-1 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 DS-1 line coding format is set to B8ZS using the **View:equipment:VT Group** command
 - Verify that the LBOs are set according to cable length using the **View:equipment:VT Group** command [see “[Setting DS1/E1 LBOs](#)” (p. 6-5)].
 - Check DS-1 cabling for proper connections.
 - Check the Test set for proper framing.
-

13 Use the **GUI** command to delete the cross-connect.

14 Click **Configuration:Cross-Connections**.

15 Select **Delete legs of an Existing cross-connection**.

16 Select **Next**.

17 Click on the **main (OC-N)**.

18 Double click on **port 1 (OC-N)**.

19 Select **Next**.

20 Select **Next**.

21 Select **Finish**.

22 Click **Yes**.

23 Click **Yes**.

Result: The DS-1 test set should indicate a blue (AIS) signal is being received in place of the QRSS signal.

24 Remove the test set connections from the DSX-1.

25 Use the e GUI to send an **upd-sys** command.

26 Click on **Configuration > Update System > Update All**.

27 Click **Yes** to issue the command.

Result: This command will remove alarms generated by removing the test signals from the DSX-1.

28 Repeat [Step 2](#) through [Step 27](#) to test each of the remaining DS-1 tributaries of the function unit, substituting the following address information.

Tributary @ DSX-1	Cross-connect
2	m1-1-1-1-2,a1-1-1-2
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

Tributary @ DSX-1	Cross-connect
17 ¹	m1-1-1-5-1,d1-1-5-1
18*	m1-1-1-5-2,d1-1-5-2
19*	m1-1-1-5-3,d1-1-5-3
20*	m1-1-1-5-4,d1-1-5-4
21*	m1-1-1-6-1,d1-1-6-1
22*	m1-1-1-6-2,d1-1-6-2
23*	m1-1-1-6-3,d1-1-6-3
24*	m1-1-1-6-4,d1-1-6-4
25*	m1-1-1-7-1,d1-1-7-1
26*	m1-1-1-7-2,d1-1-7-2
27*	m1-1-1-7-3,d1-1-7-3
28*	m1-1-1-7-4,d1-1-7-4

Notes:

1 The LNW39/LNW391/LNW84 (DS1/DS3/16/3), LNW112 (16DS1) or the OC-3/16DS1 (LNW140) circuit packs only supports the first 16 DS1's of the A function group.

When testing cabling for a function unit slot other than A, replace the **a** in each of the above addresses with the letter (**d** or **g**) corresponding to the function unit under test.

Note: Cross-connect m-2-1-1-1 to d-2-1-1 through m-2-1-1-28 to d-2-7-4 when using the second STS1 of the LNW8 circuit pack.

- 29 Repeat this procedure for each function unit cabled to a DSX-1 via DS1/E1 cabling.

- 30 Check off the appropriate box in the [“Installation checklist”](#) (p. II-5).

END OF STEPS

DS1/E1 non-terminating equipment transmission testing (LNW140/LNW84 without optics)

Perform this test when the Alcatel-Lucent 1665 DMXtend is equipped with LNW140/LNW84 without optics in the main slots.

Facility Loopback testing allows the installer to verify the electrical cabling to the Alcatel-Lucent 1665 DMXtend NE. Follow the procedure below to perform a facility loopback test at the Alcatel-Lucent 1665 DMXtend shelf.

To test cabling to the DSX-1, use a DS1/E1 test set to transmit and receive toward the facility loopback.

Perform the following tests for each DS1/E1 circuit cabled to the Alcatel-Lucent 1665 DMXtend.

-
- 1 Select **Fault > Analysis > Loopback...**

 - 2 Choose the DS1/E1 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/E1 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/E1 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/E1 cabled to the DSX-1.

 - 9 Check off the appropriate box in the [“Installation checklist”](#) (p. II-5).

END OF STEPS

DS3/EC1 testing

DS3/EC1 testing procedure

Perform the following steps for all Alcatel-Lucent 1665 DMXtend shelf function unit slots containing the following circuit packs and cabled to the DSX:

- LNW16 (12DS3/EC1)
- LNW18 (12TMUX)
- LNW19B (48DS3/EC1)
- LNW20 (48TMUXDS3EC1)
- LNW39/LNW391 (DS1/DS3/16/3)
- LNW111 (3 DS3)
- LNW84 (3 DS3)

If the Alcatel-Lucent 1665 DMXtend 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 DMXtend 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 cabling.

This procedure requires the use of a DS3 test set.

Note: The LNW16/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.

The LNW39/LMW391/LNW84 (DS1/DS3/16/3) pack’s DS3 portion is only provisionable for DS3.

Verify provisioning

This procedure will verify provisioning.

-
- 1 For the LNW16 or LNW19B, verify that all ports are provisioned for DS3. Use the **GUI View:Equipment** command.

 - 2 Click on each DS3 port

Result: All ports are provisioned as DS3.

- 3 To provision a port to DS3, from the GUI choose **Configuration:Equipment** Select the DS3 port, click **Select**.
- 4 Choose **Electrical Interface Type = DS3:Signal Format = Framed**.
- 5 Click **Apply** to issue the command.
- 6 Repeat [Step 1](#) through [Step 5](#) for each Function Group equipped with LNW16 or LNW19B circuit pack(s).

END OF STEPS

Transmission test

Perform the remaining steps in this procedure for all Function Groups equipped with LNW16 (12DS3/EC1), LNW19B (48DS3/EC1) or LNW39/LNW391/LNW84 (DS1/DS3/16/3) circuit packs.

- 1 Set the DS3 test set to transmit and receive a framed Pseudo Random Bit Stream (PRBS) DS3 test signal CBIT or M13 (M13 is default).
M13 should be used to test LNW39/LNW391/LNW84 (DS1/DS3/16/3).
- 2 Connect a cable from the DS3 test set **transmit** connection to the IN jack of the DSX-3 associated with the first DS3 tributary of the Alcatel-Lucent 1665 DMXtend function unit slot to be tested.
- 3 Connect a cable from the DS3 test set **receive** connection to the OUT jack of the DSX-3 associated with the first DS3 tributary of the Alcatel-Lucent 1665 DMXtend function unit slot to be tested.
Result: The DS3 test set should indicate a blue (AIS) signal is being received for a DS3 pack.
- 4 Use the **GUI** command to enter cross-connects.

5 Click **Configuration:Cross-Connections**.

6 Select **Create a new cross-connection**.

7 Select **Next**.

8 Select **Rate= STS1: Type of Cross-connect= UPSR Add/Drop**.

9 Select **Next**.

10 Select **main1-1-1 to [b,d,g]1-1**.

11 Click **Finish** to issue the command.

Requirement: The DS3 test set should indicate it is receiving an error free PRBS signal. To check that the port on the DS3 pack is receiving the signal, verify that the port has transitioned to an “in service” state with the **View:Equipment** command.

Result: The DS3 provisioning will be displayed, along with the port state (last parameter). A port state of "IS" indicates that the pack is receiving a good signal to the port

12 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 the **View:Equipment** command (see “[Setting DS1/E1 LBOs](#)” (p. 6-5)).
- 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.
- Check the DS3/EC1 cabling for proper connections.

13 Use the **GUI** command to delete the cross-connect.

14 Click **Configuration:Cross-Connections**.

15 Select **Delete legs of an Existing cross-connection**.

16 Select **Next**.

17 Click on the **main (OC-N)**.

18 Double click on **port 1 (OC-N)**.

19 Select **Next**.

20 Select **Next**.

21 Select **Finish**.

22 Click **Yes**.

23 Click **Yes**.

Result: The DS3 test set should indicate a blue (AIS) signal is being received in place of the PRBS signal.

24 Remove the test set connections from the DSX-3.

-
- 25 Use the e GUI to send an **upd-sys** command.
-
- 26 Click on **Configuration > Update System > Update All**.
-
- 27 Repeat [Step 2](#) through [Step 26](#) to test cabling to each of the remaining DS3 tributaries of the function unit. Substitute the following address.

Tributary @ DSX-3	Cross-connect address
2 ¹	m1-1-2,d1-2
3*	m1-1-3,d1-3
4	m1-1-4,d1-4
5	m1-1-5,d1-5
6	m1-1-6,d1-6
7	m1-1-7,d1-7
8	m1-1-8,d1-8
9	m1-1-9,d1-9
10	m1-1-10,d1-10
11	m1-1-11,d1-11
12	m1-1-12,d1-12

Notes:

1 The LNW39/LNW391/LNW84 (DS1/DS3/16/3) circuit pack only supports 3 DS3's from the b function group

When testing cabling for a function unit slot other than **d**, replace the **d** in each of the above addresses with the letter (**b** or **g**) corresponding to the function unit slot under test.

Note: If the mains are equipped with LNW141s, LNW140s or LNW84s and either a LNW19B are equipped in the function slots then m1-1-13, d1-13 through m1-1-48, d1-48 should be tested.

-
- 28 Repeat this procedure for each function unit slot cabled to a DSX-3 via DS3/EC1 cabling.

- 29 Check off the appropriate box in the “Installation checklist” (p. II-5).

END OF STEPS

DS3 terminating equipment loopback testing (LNW84 without optics)

Perform this test when the Alcatel-Lucent 1665 DMXtend is equipped with LNW84 without optics in the main slots.

Facility loopback testing allows the installer to verify the electrical cabling to the Alcatel-Lucent 1665 DMXtend NE. Follow the procedure below to perform a facility loopback test at the Alcatel-Lucent 1665 DMXtend shelf. When the Alcatel-Lucent 1665 DMXtend 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 DMXtend.

- 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 LBOs” \(p. 6-6\)](#)).
- 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 that the port is provisioned for DS3.” \(p. 6-18\)](#).
- 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 the [“Installation checklist” \(p. II-5\)](#).

END OF STEPS

LNW66, LNW74, and LNW87 testing

LNW66 (10/100T), LNW74 (10/100), LNW87 (FE/GBE PL) TX Ethernet cabling testing

This procedure is to test the Ethernet 10/100 TX cabling from function groups D and G to the RJ45 patch panel for use with the LNW66, LNW74, and LNW87.

Note: LNW74 TX Ethernet cabling test is not required. If the shelf is equipped with VLF main packs (LNW141 or LNW84) and the LNW74 and LNW87 are provisioned to be equipped in both function slots (D1 and D2 or G1 and G2). In this configuration

the backplane electrical ports cannot be used, only the SFP-based faceplate ports are used.

The following cables are required to test the Ethernet cabling.

Cable	Length	Quantity
Front CIT(RS-232) Cable (C848748869)	8'-0"	1
LAN 10BaseT Straight-through Cable	As required to reach from front of Alcatel- Lucent 1665 DMXtend to the RJ45 patch panel	2

Ethernet port assignment verification testing

- 1 Connect the Front CIT cable between the PC and the CIT/RS 232 port of the System Controller and login to the shelf using the serial connection and the GUI options on WaveStar® CIT.
- 2 Identify the function groups that contain LNW66, LNW74, or LNW87 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, LNW74, or LNW87 and the GUI will alarm the port under test and display a Critical Alarm inc.FE-LAN LOS in the Alarm List.
- 7 Verify that the port you are connected to matches the one listed in the aid of the FE-LAN LOS alarm output.

- 8 Select **Configuration > Update System > Update All...**
- 9 Click **Yes** to issue the command.
- 10 The flashing fault LED on the LNW66, LNW74, or LNW87 will clear.
- 11 Connect the RJ45 cable to the next jack on the RJ45 patch panel and repeat starting at [Step 4](#) until all connected jacks have been tested.

END OF STEPS

Ethernet port wiring verification testing

Note: Continue with the following section only for LNW66 circuit packs. Testing is complete for LNW74 and LNW87 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 Connect a RJ45 Ethernet cable from the LAN port on the LNW2 SYSCTL to the first position on the RJ45 Ethernet patch panel.

9 Connect a second RJ45 Ethernet cable from the PC Ethernet port to the second position on the RJ45 Ethernet patch panel.

10 Watch for the link LED to light on the PC's Ethernet card or wait for 30 seconds.

11 Login to the shelf using the OSI connection.

Result: Successful login to the Alcatel-Lucent 1665 DMXtend.

12 Log out of the Alcatel-Lucent 1665 DMXtend shelf.

13 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.

14 Ignore the flashing fault LED on the Ethernet circuit pack and any alarms on the shelf.

15 Watch for the link LED to light on the PC's Ethernet card or wait for 30 seconds.

16 Login to the shelf using the OSI connection.

Result: Successful login to the Alcatel-Lucent 1665 DMXtend.

17 Log out of the Alcatel-Lucent 1665 DMXtend shelf.

18 Repeat this procedure starting at [Step 13](#) for the remaining Ethernet connections on the RJ45 patch panel connected to the LNW66 under test, then continue on to [Step 19](#).

- 19 Disconnect the PC from the RJ45 patch panel and the Alcatel-Lucent 1665 DMXtend LAN port from the RJ45 patch panel.

- 20 If not still connected from the previous procedure. 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.

- 21 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 DMXtend shelf will also clear.

- 22 Select **Configuration > Data > Delete Virtual Switch.**

- 23 Choose the LNW66 circuit pack and click Select.

- 24 Select the VRTSW ID and click Apply.

- 25 Log out and disconnect the PC from the Alcatel-Lucent 1665 DMXtend serial port.

- 26 Repeat this procedure for every slot containing and LNW66.

- 27 Check off the appropriate box in the [“Installation checklist”](#) (p. II-5).

END OF STEPS

OC-3 low-speed testing

OC-3 low-speed LNW37 PTM testing procedure

Perform the following steps for all Alcatel-Lucent 1665 DMXtend shelf function unit or growth slots containing LNW37 (OC-3 OLIU) circuit pack.



CAUTION

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”](#).

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.

Note: Equip all ports with PTMs provided. If all ports don't have PTMs, but have associated fibers, then move PTMs to ports that are fibered.

LBOs are installed on the OLIU faceplate IN port.

-
- 1 Beginning from the Top (G) side of the Alcatel-Lucent 1665 DMXtend shelf, locate the first function unit slot position that contains an LNW37 circuit pack.
 - 2 Insert a 15-dB LC-type LBO into the top IN connector (port 1) of the first PTM equipped. See [Appendix C, “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.

Result: 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 If not still connected from the previous procedure. Connect the Front CIT cable between the PC and the CIT/RS 232 port or OSI front LAN port of the System Controller and login to the shelf using the serial/LAN connection and the GUI options on WaveStar® CIT.
-
-

- 6 Use the GUI window to send the **upd-sys** command.
-
-

- 7 Click on the **Configuration > Update System > Update All**

Result: The flashing FAULT LED should extinguish on the OC-3 OLIU. There should be no alarm indications on the Alcatel-Lucent 1665 DMXtend shelf.

- 8 Remove PTM if necessary and the 15-dB LBO from OC-3 OLIU from (port 1) and plug it into the IN connector directly below it (port 2).

Connect the fibers labeled IN and OUT from the LGX to the OLIU (port 2).

- 9 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.

Result: 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.

- 10 Repeat [Step 2](#) to [Step 9](#) for OLIU ports 3 and 4.
-
-

- 11 Repeat this entire procedure for each LNWX37 PTM equipped in the Alcatel-Lucent 1665 DMXtend shelf.
-
-

- 12 Replace all protective dust covers on the LNW37 PTM connectors (OLIU and LGX), that were removed to perform this procedure.
- 13 Check off the appropriate box in the [“Installation checklist”](#) (p. II-5).

END OF STEPS

OC-3 low-speed LNW45 or LNW55 PTM testing procedure

Perform the following steps for all Alcatel-Lucent 1665 DMXtend shelf function unit or growth slots containing LNW45 (OC3) or LNW55 (with 12 OC3 PTMs) OLIU circuit packs.



CAUTION

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”](#).

Note: The LNW55 circuit packs requires the LNW141 or LNW84 installed in the main slots to operate in a Alcatel-Lucent 1665 DMXtend shelf.

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.

Note: Equip all ports with PTMs provided. If all ports don't have PTMs, but have associated fibers, then move PTMs to ports that are fibered.

LBOs are installed on the OLIU faceplate IN port.

- 1 Beginning from the Top (G) of the Alcatel-Lucent 1665 DMXtend shelf, locate the first function unit slot position that contains an LNW45 or LNW55 circuit pack.
- 2 Insert a 15-dB LC-type LBO into the top IN connector (port 1) of the first PTM equipped. See [Appendix C, “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.

Result: 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 If not still connected from the previous procedure. Connect the Front CIT cable between the PC and the CIT/RS 232 port or OSI front LAN port of the System Controller and login to the shelf using the serial/LAN connection and the GUI options on WaveStar® CIT.
-

- 6 Use the GUI window to send the **upd-sys** command.
-

- 7 Click on the **Configuration > Update System > Update All**

Result: The flashing FAULT LED should extinguish on the OC-3 OLIU. There should be no alarm indications on the Alcatel-Lucent 1665 DMXtend shelf.

- 8 Remove PTM if necessary and the 15-dB LBO from OC-3 OLIU from (port 1) and plug it into the IN connector directly below it (port 2).
-

- 9 Connect the fibers labeled IN and OUT from the LGX to the OLIU (port 2).
-

- 10 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.
-

Result: 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.

- 11 Repeat [Step 2](#) to [Step 10](#) for OLIU for the remaining ports on the LNW45 and the LNW55 circuit packs.

- 12 Repeat this entire procedure for each LNW45 and LNW55 equipped in the Alcatel-Lucent 1665 DMXtend shelf.

- 13 Replace all protective dust covers on the LNW45 and LNW55 PTM connectors (OLIU and LGX), that were removed to perform this procedure.

- 14 Check off the appropriate box in the [“Installation checklist”](#) (p. II-5).

END OF STEPS

OC-12 low-speed testing

OC-12 low-speed LNW49 and LNW55 PTM testing procedure

Perform the following steps for all Alcatel-Lucent 1665 DMXtend shelf function unit or growth slots containing OC-12 (LNW49 or LNW55) OLIU circuit packs...



CAUTION **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”](#).

Note: The LNW55 circuit pack requires the LNW141 or LNW84 installed in the main slots to operate in a Alcatel-Lucent 1665 DMXtend shelf.

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.

Note: Equip all ports with PTMs provided. If all ports don't have PTMs, but have associated fibers, then move PTMs to ports that are fibered. LBOs are installed on the OLIU faceplate IN port.

- 1 Beginning from the top (G) of the Alcatel-Lucent 1665 DMXtend shelf, locate the first function unit slot that contains an OC-12 OLIU circuit pack.
-

- 2 Insert a 15-dB LC-type LBO into the top IN connector (port 1) of the OC-12 OLIU. See [Appendix C, "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.

Result: The FAULT LED on the OC-12 OLIU will begin flashing and the MN and IN 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.

- 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 If not still connected from the previous procedure. Connect the Front CIT cable between the PC and the CIT/RS 232 port or OSI front LAN port of the System Controller and login to the shelf using the serial/LAN connection and the GUI options on WaveStar® CIT.
-

- 6 Use the GUI window to send the **upd-sys** command.

- 7 Click on the **Configuration > Update System > Update All**.

Result: The flashing FAULT LED should extinguish on the OC-12 OLIU.
There should be no alarm indications on the Alcatel-Lucent 1665 DMXtend shelf.

- 8 Remove PTM if necessary and the 15-dB LBO from OC-12 OLIU from (port 1) and plug it into the IN connector directly below it (port 2).

Connect the fibers labeled IN and OUT from the LGX to the OLIU (port 2).

- 9 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.

Result: 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.

- 10 Repeat [Step 2](#) to [Step 9](#) for all OLIU ports.
-

- 11 Repeat this entire procedure for each LNW49 or LNW55 PTM equipped in the Alcatel-Lucent 1665 DMXtend shelf.
-

- 12 Replace all protective dust covers on the LNW49 or LNW55 PTM OC-12 OLIU connectors (OLIU and LGX), that were removed to perform this procedure.
-

- 13 Check off the appropriate box in the [“Installation checklist”](#) (p. II-5).

END OF STEPS

OC-48 low-speed testing

OC-48 low-speed testing procedure

Perform the following steps for all Alcatel-Lucent 1665 DMXtend shelf function unit or growth slots containing OC-48 (LNW31) OLIU circuit packs.



CAUTION

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”](#).

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 Beginning from the top (G) of the Alcatel-Lucent 1665 DMXtend shelf, locate the first function unit slot that contains an OC-48 OLIU circuit pack.

 - 2 Insert a 15-dB LC-type LBO into the top IN connector of the OC-48 OLIU. See [Appendix C, “Installing fiber connectors and LBOs”](#).
Connect the fibers labeled IN and OUT from the LGX to the OLIU.

 - 3 Connect the Port 1 IN connector to the Port 1 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.

Result: 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 If not still connected from the previous procedure. Connect the Front CIT cable between the PC and the CIT/RS 232 port or OSI front LAN port of the System Controller and login to the shelf using the serial/LAN connection and the GUI options on WaveStar® CIT.

6 Use the **GUI** window to send the **upd-sys** command.

7 Click on the **Configuration > Update System > Update All**

Result: The flashing FAULT LED should extinguish on the OC-48 OLIU. There should be no alarm indications on the Alcatel-Lucent 1665 DMXtend shelf.

8 Repeat this entire procedure for each low speed OC-48 circuit pack equipped in the Alcatel-Lucent 1665 DMXtend shelf.

9 Remove the 15-dB LBO from the OC-48 OLIU.

10 Replace all protective dust covers on the OC-48 OLIU connectors, that were removed to perform this procedure.

11 Repeat this entire procedure for each LNW31 OC-48 OLIU in the Alcatel-Lucent 1665 DMXtend shelf.

12 Check off the appropriate box in the “[Installation checklist](#)” (p. II-5).

END OF STEPS

OC-48 PTM equipped low-speed testing procedure

Perform the following steps for all Alcatel-Lucent 1665 DMXtend shelf function unit or growth slots containing LNW62, LNW55, LNW402 (OC-48) OLIU circuit packs.



CAUTION

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"](#).

Note: The LNW62, LNW55 and LNW402 circuit packs require the LNW141 or LNW84 be installed in the main slots to operate in a Alcatel-Lucent 1665 DMXtend shelf.

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.

Note: Equip all ports with PTMs provided. If all ports don't have PTMs, but have associated fibers, then move PTMs to ports that are fibered. LBOs are installed on the OLIU faceplate IN port.

-
- 1 Beginning from the top (G) of the Alcatel-Lucent 1665 DMXtend shelf, locate the first function unit slot that contains an OC-48 OLIU circuit pack.
 - 2 Insert a 15-dB LC-type LBO into the top IN connector (port 1) of the OC-48 OLIU. See [Appendix C, "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-48 OLIU, using an optical fiber jumper cable. See [Appendix A, "Fiber cleaning"](#) for proper fiber cleaning instructions.

Result: 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 If not still connected from the previous procedure. Connect the Front CIT cable between the PC and the CIT/RS 232 port or OSI front LAN port of the System Controller and login to the shelf using the serial/LAN connection and the GUI options on WaveStar® CIT.
-

- 6 Use the **GUI** window to send the **upd-sys** command.
-

- 7 Click on the **Configuration > Update System > Update All**.

Result: The flashing FAULT LED should extinguish on the OC-48 OLIU. There should be no alarm indications on the Alcatel-Lucent 1665 DMXtend shelf.

- 8 Remove PTM if necessary and the 15-dB LBO from OC-48 OLIU from (port 1) and plug it into the IN connector directly below it (port 2).

Connect the fibers labeled IN and OUT from the LGX to the OLIU (port 2).

- 9 Connect the Port 2 IN connector to the Port 2 OUT connector (at the LGX) of the OC-48 OLIU, using an optical fiber jumper cable.

Result: 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.

- 10 Repeat [Step 2](#) to [Step 9](#) for OLIU ports 3 and 4.
-

- 11 Repeat this entire procedure for each LNW62, LNW55, LNW402 PTM equipped in the Alcatel-Lucent 1665 DMXtend shelf.
-

- 12 Replace all protective dust covers on the LNW62, LNW55, LNW402 PTM OC-48 OLIU connectors (OLIU and LGX), that were removed to perform this procedure.
- 13 Check off the appropriate box in the “Installation checklist” (p. II-5).

END OF STEPS

LED test

Description

This test verifies proper operation of all LEDs on the Alcatel-Lucent 1665 DMXtend 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.

Steps

- 1 If not still connected from the previous procedure. Connect the Front CIT cable between the PC and the CIT/RS 232 port or OSI front LAN port of the System Controller and login to the shelf using the serial/LAN connection and the GUI options on WaveStar® CIT.
- 2 Use the **GUI** window to send the **Test-LED** command.
- 3 Click on the **Fault > Test > LED**.
- 4 **Select Shelf** (Alcatel-Lucent 1665 DMXtend).
- 5 Click **Select**.
- 6 Click **Number of Iterations = 1**.

7 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.

8 Check off the appropriate box in the “Installation checklist” (p. II-5).

END OF STEPS

Office alarm test

Description

This test verifies proper operation and wiring of the office alarms in a network equipment building system (NEBS) environment.

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 DMXtend Main OLIUs should be optically looped from the previous section. Verify that the Alcatel-Lucent 1665 DMXtend 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 6-1, “Office alarm connections” \(p. 6-39\)](#) lists the office alarms connections.
- It is a requirement that alarms on the Alcatel-Lucent 1665 DMXtend 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 DMXtend 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 DMXtend 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 6-1 Office alarm connections

Conn.	Pin#	Color	Designation	Name
J13-J14	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

Steps

- 1 Connect the office alarm cable to J13 (ALM) on the backplane of the Alcatel-Lucent 1665 DMXtend 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 any of the following circuit packs.
 - LNW7 (28DS1)
 - LNW8 (56DS1E1)
 - LNW16 (12DS3/EC1)
 - LNW18 (12TMUX)
 - LNW19B (48DS3/EC1)
 - LNW20 (48TMUXDS3EC1)
 - LNW39/LNW391 (DS1/DS3/16/3)
 - LNW111 (3 DS3)
 - LNW112 (16/3 DS1/DS3)
 - LNW801 (56 DS1E1)

- 3 Establish a CIT session by following the procedure in [Chapter 5, “Stand-alone node setup”](#), “Use of WaveStar® CIT software” (p. 5-6).
- 4 Use the **GUI** to enter the cross-connect command.
- 5 Click on **Configuration > Cross Connection > Create new cross-connection**.
- 6 Click **Next**.
- 7 Select **UPSR Ring Add/Drop**.
- 8 Select **STS1**.
- 9 Click **Next**.
- 10 Select the **Main Port STS1**.
- 11 Select the **Add/Drop port** on the function group where the LNW7, LNW8, LNW111, LNW16, LNW18, LNW20, LNW19B, LNW112, LNW801 or LNW39/LNW391 circuit pack is installed.

This command creates a cross-connect to map all 28 DS1s of a 28DS1 circuit pack or the first DS-3 of a 12DS3/EC1 for function unit D or G or all 16 DS1s of the LNW39/LNW391 or LNW112 circuit pack in function unit A-1 and/or A-2 slot(s) to the first STS-1 of the Main OLIUs.
- 12 Click **Finish** to issue the command.
- 13 Use the **GUI** to view the cross-connects.

14 Click on **View > Cross-Connections**.

15 Select **Shelf**.

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

Result: The View Cross-Connection window will open displaying the cross-connect that was just entered.

17 Unseat one of the LNW7, LNW8, LNW111, LNW16, LNW18, LNW20, LNW19B, LNW112, LNW801 or LNW39/LMW391 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.

18 Press the ACO pushbutton on the SYSCTL.

Result: Activated office alarm: MN visual. The MN audible alarm clears.

19 Disconnect one of the optical fiber jumpers from the OUT port of the OLIU circuit pack in the M1 slot.

Result: Activated office alarms: MJ visual, MJ audible.

20 Press the ACO pushbutton on the SYSCTL.

Result: Activated office alarm: MJ visual.
The MJ audible alarm should clear.

21 Unseat the second circuit pack from the same function group pair as the circuit pack removed in [Step 17](#).

Result: Activated office alarms: CR visual, CR audible.

- 22 Press the ACO pushbutton on the SYSCTL.

Result: Activated office alarm: CR visual.
The CR audible alarm should clear.

- 23 Reconnect the optical fiber jumper removed in [Step 19](#) and reseal the pair of function units.

Result: After a few minutes, all alarm indications should clear.

- 24 Disconnect the office alarm cable connected in [Step 1](#) for the remainder of the test procedures in this chapter.

Note: Do **NOT** delete the cross-connect that was entered for this test.

- 25 Check off the appropriate box in the “[Installation checklist](#)” (p. II-5).

END OF STEPS

Automatic protection switching and alarm test

Description

This section provides the procedures for verifying the Alcatel-Lucent 1665 DMXtend 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 DMXtend 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).



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.



CAUTION

Laser hazard

*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”](#).*

Main OLIU switching test

Use this procedure to test the following Main OLIU circuit packs:

- LNW40, LNW140, LNW601, LNW38, LNW51, LNW302, LNW380, LNW382, LNW41, LNW141 or LNW84

-
- 1 Establish a CIT session by following the procedure under [“Use of WaveStar® CIT software” \(p. 5-6\)](#).

 - 2 Click on the **View > Cross-Connections**.

 - 3 Select **Shelf**.

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

Result: The cross-connects entered previously should still be in place.

- 5 Verify the active path, with the **View > Protection > Path Protection** command.

Result: Each cross-connect that was entered will have an active path associated with it when selected.

- 6 Disconnect the optical fiber connected to the OUT port of the OLIU that is the active receiver.



CAUTION

Equipment damage

The LNW38, LNW40, LNW51, LNW140, LNW302, LNW380, LNW382, and LNW601 OLIU circuit packs are equipped with optics that do not meet GR-78 R9-3 requirements on ESD susceptibility. Always use proper ESD procedures when handling these OLIU circuit packs to avoid equipment damage.

Result: The MN and then NE alarm LED should light on the SYSCTL and the FAULT LED should flash on the OLIU.

- 7 Verify the active path, with the **View > Protection > Path Protection** command.

Result: The active path has now switched to the other path.

- 8 Reconnect the optical fiber to 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.

- 9 Repeat [Step 6](#) through [Step 8](#) to verify a switch back to the OLIU that was originally active.
-

- 10 Check off the appropriate box in the [“Installation checklist”](#) (p. II-5).

END OF STEPS

Function units, switching test

Use this procedure to test any of the Function Slots occupied by a LNW7, LNW8, LNW112, LNW16, LNW18, LNW19B, LNW20, LNW111, LNW801, LNW402, LNW84, LNW140 or LNW39/LNW391 circuit pack.

This test is performed when the LNW7, LNW8, LNW112, LNW16, LNW18, LNW19B, LNW20, LNW111, LNW84, LNW140 or LNW39/LNW391 circuit packs are in a 1+1 protection arrangement.

-
- 1 Locate the first function group equipped with LNW7, LNW8, LNW112, LNW16, LNW18, LNW19B, LNW20, LNW111, LNW84, LNW140 or LNW39/LNW391 circuit packs.

 - 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 lights. The MN alarm and the NE LED on the SYSCTL should be lit.

 - 3 Unseat the second circuit pack in the pair.
Result: On the SYSCTL, the MN alarm extinguishes and the CR alarm lights.

 - 4 Reseat the first circuit pack that was removed.
Result: The ACTIVE LED on the reseated circuit pack lights. 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.

 - 5 Reseat the second circuit pack.
Result: 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 Repeat this procedure for each equipped function group.

- 7 Swap circuit packs from another function group to test any unequipped function slots.
- 8 Check off the appropriate box in the “[Installation checklist](#)” (p. II-5).

END OF STEPS

Manual switching tests

Description

This test will initiate switching commands from the WaveStar® GUI and verify proper switching and LED indications.

Main OLIU switch test

Note: An STS-1 cross-connect should still exist from the previous tests.

- 1 Use the **GUI** to view the path protection command.
- 2 Verify the active path, with the **View > Protection > Path Protection** command.

Result: Each cross-connect that was entered will have an active path associated with it when selected. The M1 OLIU is associated with Ring 1 and the M2 OLIU is associated with Ring 2.

- 3 Use the **GUI** to enter the manual path protection switch command.
 - 4 Click on the **Fault > Protection Switch > Path Protection**.
 - 5 Double Click on a path; e.g., **Path m1-1-1**.
 - 6 Observe the **Active Path** displayed.
-

7 In the **Protection Switch Mode** pull down window select **Manual**.

8 Click **Apply** to issue the command.

Result: The Response Window should display the command followed by a **COMPLD** indication.

9 Verify the active path, with the **View > Protection > Path Protection** command.

Result: The path selected in the previous steps will have switched to the other path and a ABN condition will be displayed on the GUI.

10 Clear the manual switch.

11 Click on the **Fault > Protection Switch > Path Protection**.

12 Double Click on a path; e.g., **Path m1-1a1-1-1**.

13 Observe the **Active Path** displayed.

14 In the **Protection Switch Mode** pull down window select **Clear**.

15 Check off the appropriate box in the [“Installation checklist”](#) (p. II-5).

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 and/or growth slot pair.

1 Use the **e GUI** to view the equipment state command.

2 Click on the **View > Equipment**.

3 Click on **CP fn-d-1 or fn-g-1** and click **Select**.

Result: The **View Equipment Window** should display information on the selected circuit pack indicating which function unit and/or growth slot circuit pack is active and which is standby.

4 Note which function unit or growth slot circuit pack is the active circuit pack from the previous result.

5 Use the **GUI** to enter equipment protection switch command.

6 Click on the **Fault > Protection Switch > 1+1 Protection**.

7 Double Click on a path; e.g., **CP fn-d-1 or fn-g-1**

8 **Switch Type** select **Manual**.

9 Click **Apply** to issue the command.

10 Click **Yes**.

11 Click on the **View > Equipment**.

12 Click on **CP fn-a-1, fn-b-1, fn-d-1 or fn-g-1**.

Result: The **View Equipment Window** should display information on the selected circuit pack indicating which function unit and/or growth slot circuit pack is active and which is standby.

This information should agree with the ACTIVE LEDS on the LNW7, LNW8, LNW112, LNW16, LNW18, LNW19B, LNW20, LNW111, LNW84, LNW140, LNW39, LNW801 or LNW391 circuit packs.

-
- 13 Repeat [Step 1](#) through [Step 12](#) to verify a switch back to the original function unit or growth slot circuit pack.

 - 14 Repeat this procedure for each function unit and/or growth slot pair.

 - 15 Check off the appropriate box in the “[Installation checklist](#)” (p. II-5).

END OF STEPS

External timing verification

Description

This test should be performed if the Alcatel-Lucent 1665 DMXtend shelf is going to be externally timed. The shelf timing cable must be installed and connected between the Alcatel-Lucent 1665 DMXtend shelf and the office timing source (BITS clock) and the timing source must be active.

Steps

-
- 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 per the work order.

 - 2 Use the **GUI** to set synchronization parameters.

 - 3 Click on the **Configuration > Timing/Sync**.

4 Under the **System Timing** tab of the **Configure Timing/Sync** window.

5 Click on the **Timing Mode = External**.

6 Select The **Timing Input Ports** Tab.

7 Provision the Line Coding and format as determined in [Step 1](#) above.

8 Click **OK**.

9 Click **Yes** to issue the command.

10 Use the **GUI View sync** command.

11 Click on the **View > Timing/Sync**.

12 The **View Timing/Sync** window will display.

Result: The tabs should display:

- Correct line coding and frame format
- Provisioned and active timing mode are both external
- Both references are In Service.
- Which of the two references is active

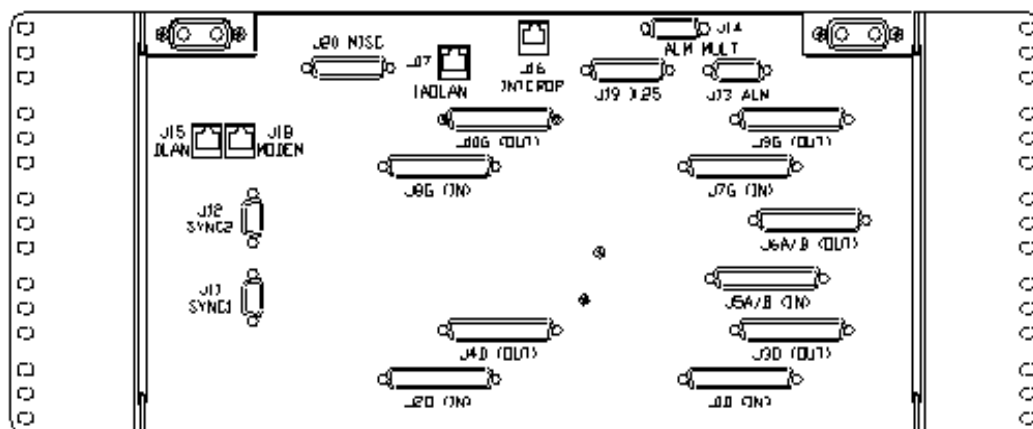
Note: If a reference does not indicate **is**, that input is not receiving a proper timing reference. Verify:

- Cabling between the timing source and the Alcatel-Lucent 1665 DMXtend shelf
- Correct line coding
- Correct frame format

- 13 At the rear of the shelf [see [Figure 6-1, “Alcatel-Lucent 1665 DMXtend shelf backplane”](#) (p. 6-51)], disconnect the input timing cable from the connector associated with the active reference.

Result: The MN LED lights solid 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 6-1 Alcatel-Lucent 1665 DMXtend shelf backplane



- 14 Click on the **View > Timing/Sync**.
- 15 The **View Timing/Sync** window will display.

Result: The **Timing Input Ports** tab should display:

- That the reference that is disconnected is Out of Service.
- The other reference is active.

- 16 Reconnect the timing cable at the rear of the shelf.
- Result:** The MN LED extinguishes on the SYSCTL and the FAULT LED on the OLIU stops flashing.

- 17 Check off the appropriate box in the [“Installation checklist”](#) (p. II-5).

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 DMXtend shelf. See [Figure 6-2, “Miscellaneous \(environmental\) discrete functions” \(p. 6-53\)](#). Perform this procedure for shelves that are cabled for miscellaneous discrete telemetry.

Steps

-
- 1 Determine which environmental inputs are to be monitored via the Alcatel-Lucent 1665 DMXtend shelf.

 - 2 Verify that the miscellaneous discrete cable is connected to the J20 MISC connector on the shelf. See [Figure 6-1, “Alcatel-Lucent 1665 DMXtend shelf backplane” \(p. 6-51\)](#).

 - 3 See [Table 6-2, “Miscellaneous \(environmental\) discrete telemetry connections” \(p. 6-54\)](#) 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 Use the **GUI** to view the miscellaneous discretes command.

 - 7 Click on the **Report > NE Alarm List...**

 - 8 In the **NE Alarm List** window set **Alarm Category:** to **Environment**.

 - 9 Click **OK**.

Result: The NE Alarm List report window is opened and should display the correct environmental alarm has been activated.

- 10 Remove the short and verify that the minor (MN) alarm indication on the SYSCTL clears.
- 11 Repeat [Step 3](#) through [Step 10](#) for each environmental input being used.
- 12 Check off the appropriate box in the “[Installation checklist](#)” (p. II-5).

END OF STEPS

Figure 6-2 Miscellaneous (environmental) discrete functions

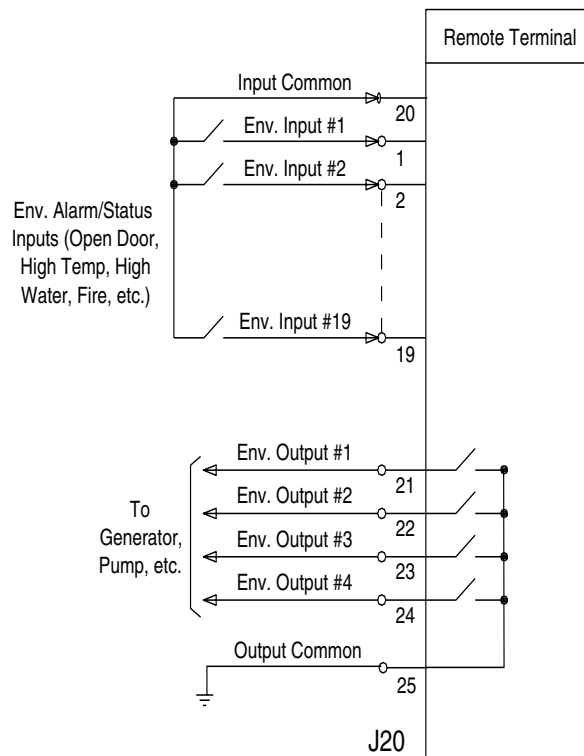


Table 6-2 Miscellaneous (environmental) discrete telemetry connections

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
	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
	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 DMXtend shelf.

This test should only be performed if a modem is required.

Steps

- 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 to be set before using the modem. See manufacturer's manuals for instructions on setting modem parameters.

- 2 Verify that the modem cable is properly connected from the modem to J18 MODEM on the backplane of the Alcatel-Lucent 1665 DMXtend shelf.
 - 3 Use the **GUI** to set the modem command.
 - 4 Click on the **Administration > Data Communications...**
 - 5 The **Data Communications** window opens select the **Serial Port** tab.
 - 6 Choose **cit-2**.
 - 7 Select:
 - **Echo mode Enabled**
 - **baudrate 9600**
-

- **OSI Types TL1Test**

8 Click **Apply** to issue the command.

9 Dial into the modem using an application such as HyperTerminal from a PC with a modem configured to similar parameters.

10 After a connection is established, press the enter key.

Result: /* SYSTEM TID: LT-DMXTEND */

11 Enter the command:

act-user: LT - DMXTEND : LUC01 : **ctag:** : DMXTND2 . 5 G ;

Result: A message indicating that the command completed will be displayed along with the Alcatel-Lucent disclosure.

12 Enter the command:

canc-user: LT - DMXTEND : LUC01 : **ctag;**

Result: A message indicating that the command completed will be displayed.

13 Disconnect the HyperTerminal session.

14 Check off the appropriate box in the “[Installation checklist](#)” (p. II-5).

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 DMXtend shelf is alarm free and ready for network connection procedures.

Steps

- 1 Use the **GUI** to View and Delete any cross-connects that were entered.

- 2 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 Extend (DMXtend) User Operations Guide 365-372-325*.

- 3 If desired, reconnect the office alarm cable at this time.

- 4 Check off the appropriate box in the “[Installation checklist](#)” (p. II-5).

END OF STEPS



Part III: Network turn-up and testing

Overview

Introduction

Part III covers fiber connections between nodes in a ring and used to verify WDMX connectivity between Alcatel-Lucent 1665 Data Multiplexer Extend (Alcatel-Lucent 1665 DMXtend) nodes. It is not intended to replace acceptance test procedures. If problems are encountered, see *Alcatel-Lucent 1665 Data Multiplexer Extend (DMXtend) User Operations Guide 365-372-325* for detailed troubleshooting procedures.

Part III also provides the recommended checklist “[Installation checklist](#)” to follow when installing a Alcatel-Lucent 1665 Data Multiplexer Extend (Alcatel-Lucent 1665 DMXtend) system. 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.

Contents

This part includes the following chapters:

Connecting adjacent network elements	Chapter 7
WDMX setup and testing: integration procedures	Chapter 8

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.

Qty.	Description	Comments
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	DS1/E1 Error Rate Test Set ITE-7113	A DS1/E1 error rate test set is required for testing of DS1/E1 cabling. A T-BERD 2209 or equivalent is recommended.
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	Optical Test Set (Optional)	A Optical test set is required for testing of low speed optics OC3/12/48. An 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 DMXtend 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.
1	15-dB LC-type LBO ITE-7196 (108279480)	LBOs are only required when optically looping the Alcatel-Lucent 1665 DMXtend 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
	Noyes OFS 300-200X Optical Fiber Scope ITE-7129	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 optical fiber scope may not be needed
	2.5mm 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
	Individual presaturated alcohol wipes ITE-7136	99% pure isopropyl alcohol

Qty.	Description	Comments
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"

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 DMXtend.

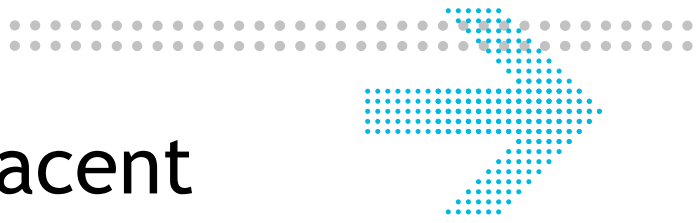
Quantity	Description	Comments
1	Personal Computer (PC)	See PC minimum requirements below.
1	RS-232 Interface Cable	8-ft. long RJ45 to 9-pin D-sub serial cable (Comcode 848748869)
1	RJ45 to RJ45 Cross-over Cable	

PC minimum requirements

For PC minimum requirements see [“PC minimum requirements”](#).

Installation checklist

Section and chapter	Procedure	Required	Completed	
			Yes	No
Part III: "Network turn-up and testing"				
Chapter 7, "Connecting adjacent network elements"	"Fiber installation" (p. 7-3)	Yes		
	"Optical transmission test (OC-192, OC-48, OC-12, OC-3)" (p. 7-10)	See Note 1		
	"Automatic protection switching test" (p. 7-11)	See Note 1		
	"Manual switching tests" (p. 7-13)			
	"Final operations" (p. 7-15)	Yes		
Chapter 8, "WDMX setup and testing: integration procedures"	"Turn-up and test the LNW785 8-channel OMD" (p. 8-4)	See Note 1		
	"Turn up and test the LNW705 muxponder" (p. 8-6)	See Note 1		
	"Removing provisioning and equipage from the LNW785" (p. 8-16)	See Note 1		
<p>Notes:</p> <p>1. Only required if equipped.</p>				



7 Connecting adjacent network elements

Overview

Purpose

This procedure is used to make fiber connections between nodes in a ring. It is not intended to replace acceptance test procedures. If problems are encountered, see *Alcatel-Lucent 1665 Data Multiplexer Extend (DMXtend) User Operations Guide 365-372-325* for detailed troubleshooting procedures.

Contents

This chapter provides information on the following topics: Tools, Test Equipment and Accessories:

Fiber installation	7-3
Optical transmission test (OC-192, OC-48, OC-12, OC-3)	7-10
Automatic protection switching test	7-11
Manual switching tests	7-13
Final operations	7-15

Listed below are the tools, test equipment and accessories necessary to perform the procedures in this section.

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/E1 Error Rate Test Set	A DS1/E1 error rate test set is required for testing of DS1/E1 cabling. A T-BERD 2209 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 2209 or equivalent is recommended.
1	Personal Computer (PC)	
1	CIT Interface Cable	8-ft. long RJ45 to 9-pin D-sub serial cable (Comcode 848748869).
1	Optical Power Meter	

Safety instructions

Note: All precautions should be observed when handling fiber.



Unterminated optical connectors may emit laser radiation. Do not view beam with optical instruments.



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.

Note: If the transmit pluggable transmission 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

Description

This section is used to verify proper fiber connections between Alcatel-Lucent 1665 Data Multiplexer Extend (Alcatel-Lucent 1665 DMXtend) 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 DMXtend Main OLIUs should be optically looped from the previous section. Verify that the Alcatel-Lucent 1665 DMXtend shelf is clear of all alarms (only green LEDs are lighted) prior to and after completing this test.
- WaveStar[®] CIT is still connected to the Alcatel-Lucent 1665 DMXtend and the GUI is running.
- The office alarm cable will remain disconnected during this procedure.

- A properly grounded ESD wrist strap must always be worn while handling circuit packs.



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.

Steps

The following procedures are performed at each end of the optical span being tested.

- 1 Verify that the office alarm cable to J13 (ALM) on the backplane of the Alcatel-Lucent 1665 DMXtend 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 use LT-DMXTEND-1 and LT-DMXTEND-2 as defaults.
- 3 Use the **Graphical User Interface (GUI)** to enable the AGNE at LT-DMXTEND-1 only.
- 4 Click on **Administration > Set NE...**
- 5 In the **Set NE window** click on:
 - **Remote NE Status: Enabled**
 - **AGNE: Enabled**
- 6 Use the **GUI** to enable the Remote NE Status at all nodes.
- 7 In the **GUI** screen for each NE click on **Administration > Set NE...**

8 In the **Set NE window** click on:

- **Remote NE Status: Enabled**

9 Dress optical cables out of the shelf to the left side of the shelf.

Note: Leave enough slack in the fibers to allow them to be moved higher or lower to allow the circuit packs in slots A1/B1 and A2/B2 to be inserted or removed.

10 Route the optical jumpers from the left side of the shelf.

11 Establish communications with the technician at the other end of the optical span.

12 At both ends of the optical span, remove protective covers from receive and transmit optical jumper cables and clean LC connectors.



CAUTION

Equipment damage

The LNW38, LNW40, LNW51, LNW140, LNW302, LNW380, LNW382, and LNW601 OLIU circuit packs are equipped with optics that do not meet GR-78 R9-3 requirements on ESD susceptibility. Always use proper ESD procedures when handling these OLIU circuit packs to avoid equipment damage.

Note: The Alcatel-Lucent 1665 DMXtend OLIUs require single-mode lightguide cable. Single-mode optical fibers connecting this shelf with the far-end shelf should not be connected to the OLIU until at least 45 seconds after an optical loopback is removed. 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 OC-3/OC-12/OC-48/OC-192 signal degrade threshold.

13 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 DMXtend OC-3/OC-12/OC-48/OC-192 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 DMXtend is interfacing with other equipment at low-speeds (OC-3, OC-12 or OC-48) using 0x1 protection, the Function Group slot (D, or G) **1** will connect to **Main 2** on whatever shelf the Alcatel-Lucent 1665 DMXtend is being connected to. The Function Group slot (D, or G) **2** will connect to **Main 1**.

- 14 At each end of the optical span, connect the optical fiber transmit cables to the OLIU OUT connectors.
- 15 At each end of the optical span, measure the optical power of the optical fiber receive cables using an optical power meter.
- 16 Determine the LBO value required based on the received optical power measurement. See the following table and attenuate appropriately.

Table 7-1 Attenuation table

Optics	Circuit pack	Received power (dBm)	LBO (dB)
OC-3 (high speed)	LNW40	-8.0 to -28.0	0
	LNW140	-8.0 to -28.0	0
	LNW601	0.0 to -15.0	10
	LNW302	TBD	0
Low-speed optics (OC-48)	LNW31 (OC-48)	0.0 to -18.0	0
OC-12 (high speed)	LNW38	-8.0 to -28.0	0
	LNW51	-8.0 to -30.5	0
	LNW380	-8.0 to -29.0	0
	LNW382	TBD	0
OC-48 PTM (pluggable transmission module) optics	LNW41/55/62 LR-1 Optics	-9.0 to -27.0	10
	LNW41/55/62 LR-2 Optics	-9.0 to -28.0	10
	LNW41/55/62 SR-1 Optics	-3.0 to -18.0	5

Optics	Circuit pack	Received power (dBm)	LBO (dB)
OC-192 VLF high speed PTM (pluggable transmission module) optics	LNW141, LR-2 Optics	+4.0 to 0.0	15
		0.0 to -7.0	10
		-7.0 to -24.0	0
	LNW141, IR-2 Optics	+2.0 to -1.0	5
		-1.0 to -14	0
	LNW141, SR-1 Optics	-1.0 to -11.0	0
PTM (pluggable transmission module)	LNW37/45/55 OC-3 SR-1	-8.0 to -23.0	0
	LNW37/45/55 OC-3 IR-1	-8.0 to -28.0	0
	LNW37/45/55 OC-3 LR-1	0.0 to -5.0	15
		-5.0 to -10	10
		-10 to -34.0	0
	LNW49/55 OC-12 SR-1	-8.0 to -28.0	0
	LNW49/55 OC-12 IR-1	-8.0 to -28.0	0
	LNW49/55 OC-12 LR-1	+2.0 to -5.0	15
		-5.0 to -15	10
		-15 to -28.0	0

17 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

18 Clean LC LBOs and install LBO assemblies in the OLIU IN connector.

- 19 At the far end, connect the input optical fiber to the proper OLIU IN connector.
Result: The FAULT LED on the OLIU extinguishes.
- 20 At the near end, connect the input optical fiber to the proper OLIU IN connector.
Result: The FAULT LED on the OLIU extinguishes.
- 21 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.
- 22 In order to enable communications with the adjacent Alcatel-Lucent 1665 DMXtend nodes,
- 23 Use the **GUI** to turn off the DCCs. **Configuration > DCC Terminations**
- 24 The **Configure DCC Terminations** window will be displayed.
- 25 For **Port AID:** select **dcc-m1-1**
- 26 For **OSI Over DCC** select **enabled**.
- 27 For **LAPD Roll:** select **user-side**.
- 28 Click **Apply** to send the command.
- 29 For **Port AID:** select **dcc-m2-1**.
- 30 For **OSI Over DCC** select **enabled**.

- 31 For **LAPD Roll**: select **Network-side**.
- 32 Click **Apply** to send the command.
- 33 Set the timing to Free Running at LT-DMXTEND-1 and Line LT-DMXTEND-2.
- 34 Use the **GUI** to change the system timing. **Configuration > Timing Sync**
- 35 The **Configure Timing/Sync** window will be displayed.
- 36 Under the **System Timing** tab set the **Timing Mode**: to **Free Running** at LT-DMXTEND-1 and to **Line** at LT-DMXTEND-2.
- 37 Click **OK** to issue the command.
- 38 In order to verify proper communications with the adjacent Alcatel-Lucent 1665 DMXtend nodes, execute the following command from the **GUI**.
Administration > OSI-Neighbor-Map

Result: The TIDs and NSAPs of adjacent nodes will be displayed along with the OLIU and port they are connected to.
- 39 In order to verify proper network DCC communications, execute the following command from the **GUI**.
Administration > OSI-Routing-Map

Result: The TIDs and NSAPs of all the nodes in the TARP area will be displayed.
- 40 Perform steps in this procedure on all adjacent nodes in the ring.

- 41 After all connections and tests have been made, verify optical fiber cables are placed in the fiber slots on the left side of the shelf and properly routed in bay framework.
- 42 Check off the appropriate box in the “[Installation checklist](#)” (p. III-4).

.....
END OF STEPS

Optical transmission test (OC-192, OC-48, OC-12, OC-3)

Steps

- 1 Use the **GUI** command: **Performance > Initialize PM Registers**.
- 2 Click on the **Both**.
- 3 Click **Yes** to execution command.
- 4 Wait 15 minutes.
- 5 At the test location, enter the following GUI command:
Performance > View PM/Statistics Reports > OCn Line
- 6 Double-click **CP main-1**.
- 7 Select **Port 1 (OC3)**.
- 8 For **Time Period** select **1 Day**.
- 9 For **Monitored Date**, select **Current Date**.

- 10 For **Monitor Level** Select **0-UP**.
- 11 Under the **Near End** tab click on the **Select All** button.
- 12 Click **Apply**.
Result: The **OCn Line PM Report** window indicates no transmission errors.
- 13 Repeat [Step 1](#) through [Step 12](#) for all Alcatel-Lucent 1665 DMXtend shelves at the test location.
- 14 Repeat [Step 1](#) through [Step 12](#) for each node in the ring.
- 15 Check off the appropriate box in the “[Installation checklist](#)” (p. III-4).

END OF STEPS

Automatic protection switching test

Description

This section provides the procedures for verifying the Alcatel-Lucent 1665 DMXtend 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, 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 **View > Protection...**
- 3 Under Path Protection choose **Path m1-1-1** 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 the [“Installation checklist”](#) (p. III-4).

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 m1-1-1** 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 the [“Installation checklist”](#) (p. III-4).

.....
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, d or g 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 the “Installation checklist” (p. III-4).

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 DMXtend shelf is alarm free and ready for network connection procedures.

Steps

- 1 Use the **GUI** command: **View > Cross-Connections**
- 2 Click the **Shelf** (Alcatel-Lucent 1665 DMXtend).
- 3 Click **Select** to send the command.
Result: The **View Cross-Connections** Window should display the cross-connect entered earlier.
- 4 Use the **GUI** command **Configuration > Cross-Connections**.
- 5 In the **Cross-Connection Wizard** click on the **Delete (legs) of an existing cross-connect**.
- 6 Click **Next**.
- 7 Select **Shelf** (Alcatel-Lucent 1665 DMXtend).

- 8 Double click **CP main-1**.
- 9 Select **Port 1 (OCn)**.
- 10 Highlight the Cross-Connect shown.
- 11 Select **Next**.
- 12 Select **Next**.
- 13 Select **Finish**.
- 14 Select **Yes** to the execution warning message.
- 15 Repeat [Step 1](#) through [Step 14](#) to verify no further cross-connects exist.
- 16 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 Extend (DMXtend) User Operations Guide 365-372-325*.

END OF STEPS.....

Clear PM registers

The following steps will clear all the performance monitoring registers:

- 1 Use the **GUI** command. **Performance > Initialize PM Registers > 15-Min**
- 2 Click **Yes** to execution command.

- 3 Reconnect the office alarm cable at this time.
- 4 Check off the appropriate box in the [“Installation checklist”](#) (p. III-4).

END OF STEPS



8 WDMX setup and testing: integration procedures

Overview

Purpose

This chapter is used to verify WDMX connectivity between Alcatel-Lucent 1665 Data Multiplexer Extend (Alcatel-Lucent 1665 DMXtend) nodes. The chapter includes the LNW785 8 channel Optical Multiplexer Demultiplexer (OMD) circuit pack. 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 Extend (DMXtend) User Operations Guide 365-372-325*. For detailed troubleshooting procedures, see *Alcatel-Lucent 1665 Data Multiplexer Extend (DMXtend) Maintenance and Trouble Clearing Guide 365-372-326*.

Contents

This chapter provides information on the following topics

Turn up and test the LNW705 muxponder	8-4
Turn up and test the LNW705 muxponder	8-6
Integrating the LNW705 into the LNW785	8-9
Removing provisioning and equipage from the LNW705 and LNW785	8-11
Connecting the ring (Mains) to the WDMX	8-14
Removing provisioning and equipage from the LNW785	8-16

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

Listed below are the tools, test equipment and accessories necessary to perform the procedures in this section.

Quantity	Description	Comments
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	OC-48 Test Set	An OC-48 test set is required for testing of optical circuit packs. An Agilent OmniBER 718 or equivalent is recommended.
1	Personal Computer (PC)	
1	CIT Interface Cable	8-ft. long RJ45 to 9-pin D-sub serial cable (Comcode 848748869).
1	Optical Power Meter	

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.



Unterminated optical connectors may emit laser radiation. Do not view beam with optical instruments.



CAUTION

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.



CAUTION

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 procedure provides a method to provision and test an optical span using the 8-channel OMD LNW785 circuit pack. The procedure requires a 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 a LNW141 or an OC-192/10Gbps from an alien shelf but the source **MUST** be compatible with the wavelengths on the LNW785. The LNW141 must be equipped with X10G52C5, X10G53C5, X10G54C5, or X10G55C5. If using an alien 10Gbps source, see [Table 8-3, “Channel/port assignments” \(p. 8-19\)](#) for the wavelengths specifications.

- 1 Determine and document the test signal frequency.
- 2 Install the LNW785 into the Alcatel-Lucent 1665 DMXtend 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 Very Large Fabric LNW141 or LNW84 OLIU circuit packs, then the circuit packs in a Function/Growth slot must be the same type.
- 3 Login to the Alcatel-Lucent 1665 DMXtend 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](#) .

- 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.
- 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 2](#) 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 DMXtend as part of a ring, proceed to [Chapter 8, “WDMX setup and testing: integration procedures”](#) and locate the appropriate procedure
- 15 Check off the appropriate box in the [“Installation checklist”](#) (p. III-4).

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 another DWDM 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 an Alcatel-Lucent 1665 DMXtend with one LNW705 in G2. 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 DMXtend shelf by opening both faceplate latches and seating in the slot while closing the latches.

Note: The LNW705 can only be installed in Growth 2 slot.

- 2 Install the appropriate 10G PTM [Table 8-3, “Channel/port assignments” \(p. 8-19\)](#) 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 OC-48 PTM. Other signals listed in [Appendix E, “Pluggable transmission modules \(PTM\)” \(p. E-1\)](#) could be substituted, however use the guidelines set in [“LNW705 XM10G/8 port guidelines” \(p. 9-18\)](#) for the port restrictions.

- 4 Login to the Alcatel-Lucent 1665 DMXtend 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 8-3, “Channel/port assignments”](#) (p. 8-19) 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 8-4, “Attenuation Table”](#) (p. 8-19).
- 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 8-4, "Attenuation Table" \(p. 8-19\)](#). If connecting through the LNW785 go to ["Integrating the LNW705 into the LNW785" \(p. 8-9\)](#), otherwise continue.
- 18 Locate and connect the span fibers to the LNW705 while observing the proper optical levels listed in [Table 8-4, "Attenuation Table" \(p. 8-19\)](#).
- 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 8-4, "Attenuation Table" \(p. 8-19\)](#) 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 “[Check off the appropriate box in the “Installation checklist” \(p. III-4\).” \(p. 8-5\)](#) have been completed.

Steps

- 1 Install the LNW785 into the Alcatel-Lucent 1665 DMXtend 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 DMXtend 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 8-4, "Attenuation Table" \(p. 8-19\)](#) 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

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 DMXtend 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 DMXtend back to the original status.

Deleting the OCH cross-connection

- 1 Login to the Alcatel-Lucent 1665 DMXtend 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 DMXtend shelf.
- 2 Update the Alcatel-Lucent 1665 DMXtend 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 \(p. 8-13\)](#), 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 DMXtend shelf.
- 2 Update the Alcatel-Lucent 1665 DMXtend inventory
Select **Configuration > Update System > Update Inventory**
- 3 Click **Yes** to acknowledge the request.

END OF STEPS

Table 8-1 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 8-2 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

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 LNW785. Only the LNW141 can be integrated directly into the LNW785 providing the circuit pack is equipped with one of the compatible PTMs listed in [Table 8-3, “Channel/port assignments”](#) (p. 8-19).

Important! The procedures in this section make two assumptions, the first is that the span between LNW785s is established while the second is that this is a new turn-up and not on an existing network.

LNW785/OC192

The LNW785 span is established and tested using the [Procedure, “Turn-up and test the LNW785 8-channel OMD”](#) (p. 8-4). 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 8-3, “Channel/port assignments”](#) (p. 8-19).

Note: Only the first 4 wavelengths can be used in the LNW141, PTMs X10G52C5 through X10G55C5.
- 3 Login to the Alcatel-Lucent 1665 DMXtend 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 LNW785 column in [Table 8-3, “Channel/port assignments”](#) (p. 8-19) 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 13](#).
- 16 Check off the appropriate box in the “[Installation checklist](#)” (p. III-4).

END OF STEPS

Removing provisioning and equipage from the LNW785

Description

This section provides procedures on how to properly remove provisioning from the Alcatel-Lucent 1665 DMXtend 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 DMXtend back to the original status.

Deleting the OCH cross-connection

- 1 Login to the Alcatel-Lucent 1665 DMXtend 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**.

- 11 Check off the appropriate box in the “Installation checklist” (p. III-4).

END OF STEPS

Delete LNW785 circuit pack

- 1 Remove the LNW785 circuit pack from the Alcatel-Lucent 1665 DMXtend shelf.
- 2 Update the Alcatel-Lucent 1665 DMXtend inventory
Select **Configuration > Update System > Update Inventory**
- 3 Click **Yes** to acknowledge the request.
- 4 Check off the appropriate box in the “Installation checklist” (p. III-4).

END OF STEPS

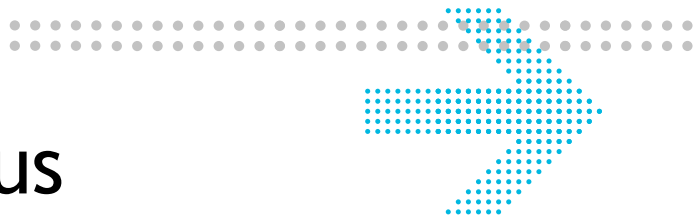
Table 8-3 Channel/port assignments

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

Table 8-4 Attenuation Table

Optics	Circuit pack	Received power (dBm)	LBO (dB)
OC-3 (high speed)	LNW40	-8.0 to -28.0	0
	LNW140	-8.0 to -28.0	0
	LNW601	0.0 to -15.0	10
		-15.0 to -34.0	0
Low-speed optics (OC-48)	LNW31 (OC-48)	0.0 to -18.0	0
OC-12 (high speed)	LNW38	-8.0 to -28.0	0
	LNW51	-8.0 to -30.5	0
	LNW302	TBS	
	LNW380	-8.0 to -29.0	0
	LNW382	TBS	
OC-48 PTM (pluggable transmission module) optics	LNW41/55/62 LR-1 Optics	-9.0 to -27.0	10
	LNW41/55/62 LR-2 Optics	-9.0 to -28.0	10
	LNW41/55/62 SR-1 Optics	-3.0 to -18.0	5

Optics	Circuit pack	Received power (dBm)	LBO (dB)
OC-192 VLF high speed PTM (pluggable transmission module) optics	LNW141, LR-2 Optics	+4.0 to 0.0	15
		0.0 to -7.0	10
		-7.0 to -24.0	0
	LNW141, IR-2 Optics	+2.0 to -1.0	5
		-1.0 to -14	0
	LNW141, SR-1 Optics	-1.0 to -11.0	0
PTM(pluggable transmission module)	LNW37/45/55 OC-3 SR-1	-8.0 to -23.0	0
	LNW37/45/55 OC-3 IR-1	-8.0 to -28.0	0
	LNW37/45/55 OC-3 LR-1	0.0 to -5.0	15
		-5.0 to -10	10
		-10 to -34.0	0
	LNW49/55 OC-12 SR-1	-8.0 to -28.0	0
	LNW49/55 OC-12 IR-1	-8.0 to -28.0	0
	LNW49/55 OC-12 LR-1	+2.0 to -5.0	15
		-5.0 to -15	10
		-15 to -28.0	0
Optics	Circuit pack	Received power (dBm)	LBO (dB)
OC-3 (high speed)	LNW40	-8.0 to -28.0	0
	LNW140	-8.0 to -28.0	0



Part IV: Miscellaneous detailed installation procedure and reference material

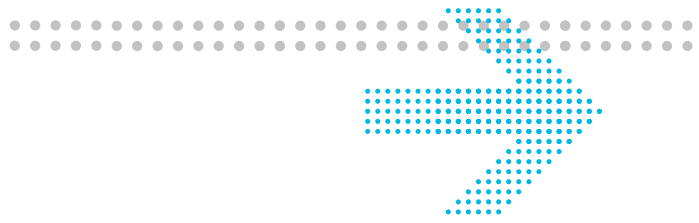
Overview

Purpose

This section provides supplementary information that is useful when installing the Alcatel-Lucent 1665 Data Multiplexer Extend (Alcatel-Lucent 1665 DMXtend) system and using this Installation Manual.

This section is comprised of the following appendices:

Appendix A, “Fiber cleaning”	
Appendix B, “Pluggable Transmission Module (PTM) installation”	
Appendix C, “Installing fiber connectors and LBOs”	
Appendix D, “Backplane pin replacement”	
Appendix E, “Fiber labeling”	



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:

Equipment requirements and recommendations	A-2
Safety instructions	A-3
Cleaning/inspecting optical connectors	A-3
Cleaning pluggable optics module	A-9

Objectives

This chapter provides information to perform the following:

1. Properly clean an optical connector
2. Inspect an optical connector for cleanliness
3. Clean PTM optical modules.

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
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

Product	Model/description	Comcode	ITE #	Installation order #
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

Safety warnings



Never view an energized optical cable with the naked eye or with an optical magnifying instrument. Disconnected or separated optical connectors may emit invisible laser radiation and direct exposure can severely injure the eye. If inspecting the endface of a connector with a fiberscope, be absolutely certain that the system is deactivated.



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.
-

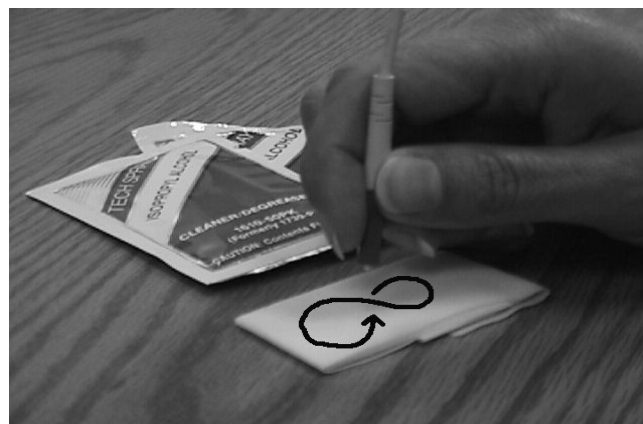
- 2 Open an individual foil packet of pre-saturated isopropyl alcohol (99% pure) wipe.

See [Figure A-1, “Cleaning the ferrule endface”](#) (p. A-4).

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 contaminants.

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-5).

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-7).
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 8](#).
 - 7 Wrap a Luminex cleaning cloth around the ferrule and rotate the connector housing, cleaning the outside periphery of ferrule.
-

Follow this by folding an unused portion of the cloth over the end of the ferrule endface and then with light pressure from the thumb, slightly drag the cloth from the center of the ferrule to the edge while rotating the connector 360 degrees. If the Luminex cleaning cloth is not available, a lint free cleanroom optic wipe can be used. The Luminex cleaning cloth is washable and can be used multiple times, optic wipes are single use and disposable.

- 8 Inspect the connector for cleanliness. If necessary, repeat the cleaning process. See [“Connector inspection”](#) (p. A-6).

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 cleaned, take special precaution to make sure that 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 contaminants. See [Figure A-3, “Acceptability criteria for fiber cleaning”](#) (p. A-7).

Repeat the Cleaning procedure if the fiber endface does not meet the following requirements:

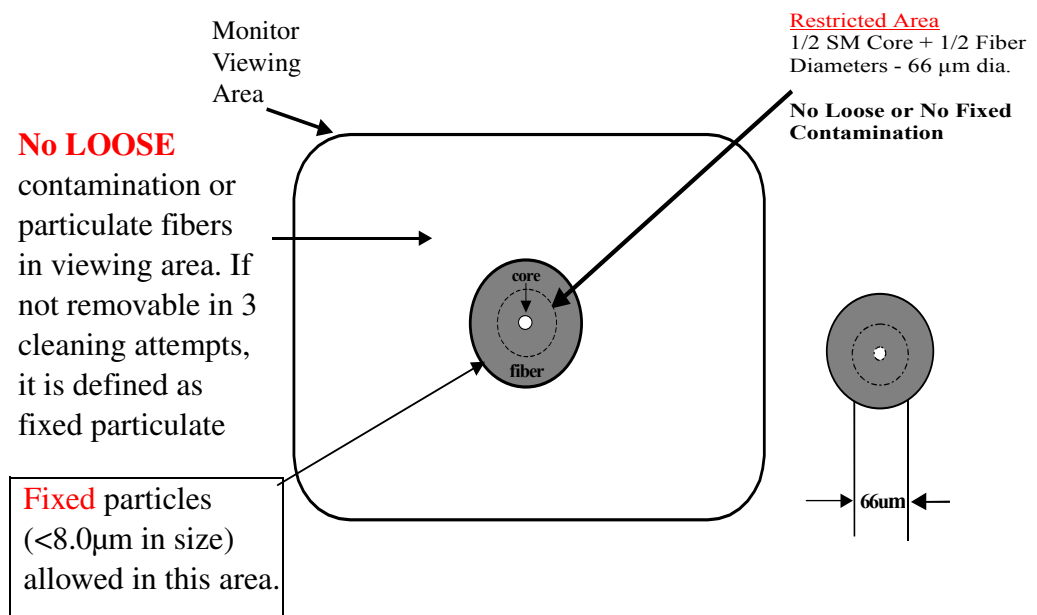
Requirement: No fixed type of contamination (contaminates that remain at the same location after 3 wet-dry cleaning cycles), regardless of size, is allowed in the restricted area of the glass fiber endface.

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 can not 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 rotating 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



CAUTION

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-6).

END OF STEPS

Cleaning pluggable optics module

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 can not 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 [Step 2](#) 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.



CAUTION

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](#).
-



CAUTION

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 Pluggable Transmission Module (PTM) installation

Overview

Purpose

This chapter describes the how to insert a Pluggable Transmission Module (PTM) into a Alcatel-Lucent 1665 Data Multiplexer Extend (Alcatel-Lucent 1665 DMXtend) circuit pack. These PTMs were once referred to as Small Form Programmable (SFP)s.

Contents

This chapter contains the following:

PTM modules	B-2
Install pluggable modules	B-8

PTM modules

Alcatel-Lucent approved Class 1 PTM transceivers

The following table lists all the current approved PTM modules to be used with Alcatel-Lucent 1665 DMXtend.

Table B-1 Alcatel-Lucent approved PTMs

Name	Optical module code/commode	Description	Compatible circuit packs
S15512	OC3SR1-I1 109602599	OC3 PTM TRCVR Short Reach - SR1	LNW37, LNW45 LNW55, LNW84
OC3LR1-I1	OC3LR1-I1 109453886	OC3 PTM TRCVR Long Reach - LR1	LNW37, LNW45 LNW55, LNW84, LNW302
OC3IR1-I1	OC3IR1-I1 109453894	OC3 PTM TRCVR Intermediate Reach IR1	LNW37, LNW45 LNW55, LNW84, LNW302
OC3X12X48-IR1-I1	OC3X12X48-IR1-I1 109708131	OC3/STM1/OC12/STM4/ OC48/STM16 SFP, 15km, 1310nm	LNW55, LNW84
OC3X12X48-LR1-I1	OC3X12X48-LR1-I1 109708149	OC3/STM1/OC12/ STM4/OC48/STM16, 40km, 1310nm	LNW55, LNW84
OC12IR1-I1	OC12IR1-I1 109453902	OC12 PTM TRCVR Intermediate Reach IR1	LNW49, LNW55 LNW84, LNW382
OC12LR1-I1	OC12LR1-I1 109467522	OC12 PTM TRCVR Long Reach LR1	LNW49, LNW55 LNW84, LNW382
OC12LR2-I1	OC12LR2-I1 109604447	OC12 PTM TRCVR Long reach, 1.5 LR-2 (80km), 1510 nm	LNW49, LNW55 LNW84, LNW382
S622C47EL	109664086	OC3/12 622Mb/s Coarse WDM (CDWDM) Ch47 1471nm SM	LNW37, LNW45 LNW55, LNW84, LNW302, LNW382
S622C49EL	109664094	OC3/12 622Mb/s Coarse WDM (CDWDM) Ch49 1491 nm SM	LNW37, LNW45 LNW55, LNW84, LNW302, LNW382

Name	Optical module code/comcode	Description	Compatible circuit packs
S622C51EL	109664102	OC3/12 622Mb/s Coarse WDM (CDWDM) Ch51 1511nm SM	LNW37, LNW45 LNW55, LNW84, LNW302, LNW382
S622C53EL	109664110	OC3/12 622Mb/s Coarse WDM (CDWDM) Ch53 1531nm SM	LNW37, LNW45 LNW55, LNW84, LNW302, LNW382
S622C55EL	109664128	OC3/12 622Mb/s Coarse WDM (CDWDM) Ch55 1551nm SM	LNW37, LNW45 LNW55, LNW84, LNW302, LNW382
S622C57EL	109664136	OC3/12 622Mb/s Coarse WDM (CDWDM) Ch57 1571 nm SM	LNW37, LNW45 LNW55, LNW84, LNW302, LNW382
S622C59EL	109664144	OC3/12 622Mb/s Coarse WDM (CDWDM) Ch59 1691nm SM	LNW37, LNW45 LNW55, LNW84, LNW302, LNW382
S622C61EL	109664151	OC3/12 622Mb/s Coarse WDM (CDWDM) Ch61 1611nm SM	LNW37, LNW45 LNW55, LNW84, LNW302, LNW382
OC48SR1-I1	OC48SR1-I1 109564518	OC48 PTM TRCVR Short Reach, 1.3 SR-1 (2km) 1310 nm	LNW41, LNW55, LNW62, LNW84, LNW402
OM2.5G 1.3LR1 (OC48LR1-I1)	OC48LR1-I1 109493528	OC48 PTM TRCVR 1310 Long Reach LR1	LNW41, LNW55, LNW62, LNW84, LNW402
OC48LR2-I1	OC48LR2-I1 109504431	OC48 PTM TRCVR 1550 Long Reach LR1	LNW41, LNW55, LNW62, LNW84, LNW402
OC192IR2-C1	OC192IR2-C1 109537563	OC192 XFP SM IR2 (40 km) 1550 nm	LNW141
OC192IR2-I1	OC192IR2-I1 109586479	OC192 XFP SM IR2 (40 km) 1550 nm	LNW141
OC192LR2-C1	OC192LR2-C1 109537555	OC192 XFP SM LR2 (80 km) 1550 nm	LNW141
OC192SR1-C1	OC192SR1-C1 109537902	OC192 XFP SM SR1 (2 km) 1310 nm	LNW141

Name	Optical module code/commode	Description	Compatible circuit packs
S2D23C6	OC48 DWDM 109610378	OC48/STM16/OTU1 DWDM 192.3 THz/1558.983 nm	LNW41, LNW55, LNW62, LNW84, LNW402
S2D25C6	OC48 DWDM 109610394	OC48/STM16/OTU1 DWDM 192.5 THz/1557.363 nm	LNW41, LNW55, LNW62, LNW84, LNW402
S2D27C6	OC48 DWDM 109610410	OC48/STM16/OTU1 DWDM 192.7 THz/1555.747 nm	LNW41, LNW55, LNW62, LNW84, LNW402
S2D31C6	OC48 DWDM 109610451	OC48/STM16/OTU1 DWDM 193.1 THz/1552.524 nm	LNW41, LNW55, LNW62, LNW84, LNW402
S2D33C6	OC48 DWDM 109610477	OC48/STM16/OTU1 DWDM 193.3 THz/1550.918 nm	LNW41, LNW55, LNW62, LNW84, LNW402
S2D35C6	OC48 DWDM 109610493	OC48/STM16/OTU1 DWDM 193.5 THz/1549.315 nm	LNW41, LNW55, LNW62, LNW84, LNW402
S2D37C6	OC48 DWDM 109610519	OC48/STM16/OTU1 DWDM 193.7 THz/1547.715 nm	LNW41, LNW55, LNW62, LNW84, LNW402
S2D45C6	OC48 DWDM 109610600	OC48/STM16/OTU1 DWDM 194.5 THz/1541.349 nm	LNW41, LNW55, LNW62, LNW84, LNW402
S2D47C6	OC48 DWDM 109610626	OC48/STM16/OTU1 DWDM 194.7 THz/1539.766 nm	LNW41, LNW55, LNW62, LNW84, LNW402
S2D49C6	OC48 DWDM 109610642	OC48/STM16/OTU1 DWDM 194.9THz/1538.186 nm	LNW41, LNW55, LNW62, LNW84, LNW402
S2D53C6	OC48 DWDM 109610691	OC48/STM16/OTU1 DWDM 195.3 THz/1535.036 nm	LNW41, LNW55, LNW62, LNW84, LNW402
S2D55C6	OC48 DWDM 109610717	OC48/STM16/OTU1 DWDM 195.5 THz/1533.465 nm	LNW41, LNW55, LNW62, LNW84, LNW402

Name	Optical module code/commode	Description	Compatible circuit packs
S2D59C6	OC48 DWDM 1096104766	OC48/STM16/OTU1 DWDM 195.9 THz/1530.334 nm	LNW41, LNW55, LNW62, LNW84, LNW402
X10G21C5	X10G21C5 109615005	OC-192/STM-64/OTU2 DWDM, Long Reach, 1560.606 nm	LNW141
X10G22C5	109615013	OC-192/STM-64/OTU2 DWDM, Long Reach, 1559.794 nm	LNW141
X10G23C5	109615021	OC-192/STM-64/OTU2 DWDM, Long Reach, 1558.983 nm	LNW141
X10G24C5	109615039	OC-192/STM-64/OTU2 DWDM, Long Reach, 1558.173 nm	LNW141
X10G25C5	109615047	OC-192/STM-64/OTU2 DWDM, Long Reach, 1557.173 nm	LNW141
X10G26C5	109615054	OC-192/STM-64/OTU2 DWDM, Long Reach, 1556.555 nm	LNW141
X10G27C5	109615062	OC-192/STM-64/OTU2 DWDM, Long Reach, 1555.747 nm	LNW141
X10G28C5	109615070	OC-192/STM-64/OTU2 DWDM, Long Reach, 1554.940 nm	LNW141
X10G31C5	109615104	OC-192/STM-64/OTU2 DWDM, Long Reach, 1552.524 nm	LNW141, LNW705
X10G33C5	109615120	OC-192/STM-64/OTU2 DWDM, Long Reach, 1550.918 nm	LNW141, LNW705
X10G35C5	109615146	OC-192/STM-64/OTU2 DWDM, Long Reach, 1549.315 nm	LNW141, LNW705

Name	Optical module code/commode	Description	Compatible circuit packs
X10G37C5	109615161	OC-192/STM-64/OTU2 DWDM, Long Reach, 1547.715 nm	LNW141, LNW705
X10G45C5	109615245	OC-192/STM-64/OTU2 DWDM, Long Reach, 1541.349 nm	LNW141, LNW705
X10G47C5	109615260	OC-192/STM-64/OTU2 DWDM, Long Reach, 1539.766 nm	LNW141, LNW705
X10G49C5	109615286	OC-192/STM-64/OTU2 DWDM, Long Reach, 1538.186 nm	LNW141, LNW705
X10G52C5	109615310	OC-192/STM-64/OTU2 DWDM, Long Reach, 1535.822 nm	LNW141
X10G53C5	109615328	OC-192/STM-64/OTU2 DWDM, Long Reach, 1535.036 nm	LNW141
X10G54C5	109615336	OC-192/STM-64/OTU2 DWDM, Long Reach, 1534.250 nm	LNW141
X10G55C5	109615344	OC-192/STM-64/OTU2 DWDM, Long Reach, 1533.465 nm	LNW141
X10G56C5	109615351	OC-192/STM-64/OTU2 DWDM, Long Reach, 1532.681 nm	LNW141
X10G57C5	109615369	OC-192/STM-64/OTU2 DWDM, Long Reach, 1531.898 nm	LNW141
X10G58C5	109615377	OC-192/STM-64/OTU2 DWDM, Long Reach, 1531.116 nm,	LNW141
X10G59C5	109615385	OC-192/STM-64/OTU2 DWDM, Long Reach, 1530.334 nm	LNW141

Name	Optical module code/comcode	Description	Compatible circuit packs
OMFE 100BASE-LX-SM	100BASE-LX-I1 109527812	100 Mb/s Optical FAST Ethernet PTM TRCVR	LNW74, LNW87 LNW170
GE-1X2XFC-LX-C1 (1000BASE-LX, 1Gbps and 2Gbps Fibre-Channel/ FICON)	GE-1X2XFC-LX-C1 109527804	GbE long-reach, Single Mode PTM supports Ethernet, FICON and Fibre-Channel traffic, LC-type connectors (GbE/FC/2FC/-1310)	LNW64, LNW73, LNW73C, LNW170
OM1G//OMFC 1000BASE-SX//100/200-M5/M6-SN-S	GE1X2XFC-SX-C1 109527796	1X FIBRE Channel or 2X FIBRE Channel or Gbe MM PTM TRCVR	LNW64, LNW73, LNW73C, LNW170
OMESCON MMF	ESCON-MM-I1 109523886	ESCON MM PTM TRCVR	LNW73, LNW73C
(1000BASE-SX, 1Gbps)	GE-1X2XFC-SX-I1 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, LNW170
(1000BASE-SX, 1Gbps)	GE-1X2XFC-LX-I1 109568782	GbE long-reach, Single-Mode PTM, supports Ethernet and Fibre-Channel traffic, LC-type connectors, OSP hardened (GbE/FC/2FC-850)	LNW63, LNW64, LNW73, LNW73C, LNW170
(1000BASE-ZX, 1Gbps)	1000BASE-ZX-I1 109541862	GbE Short-reach, Single-Mode PTM, supports Ethernet, LC-type connectors, and is OSP hardened (GbE-1550)	LNW63, LNW64, LNW170
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

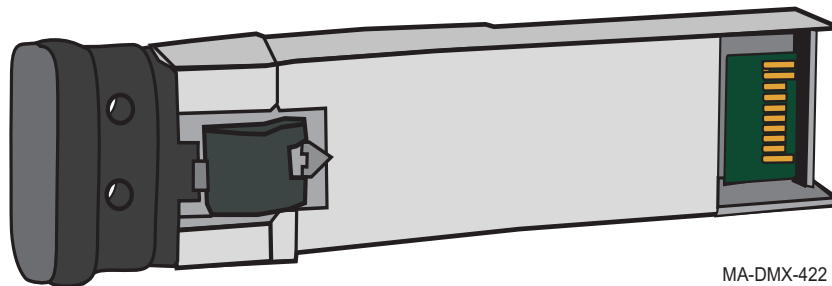
Install pluggable modules

Task

Complete the following steps to install pluggable optical 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 optical module.
 - 2 Hold the optical 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 B-1](#), “Pluggable optics module” (p. B-8).
-

Figure B-1 Pluggable optics module

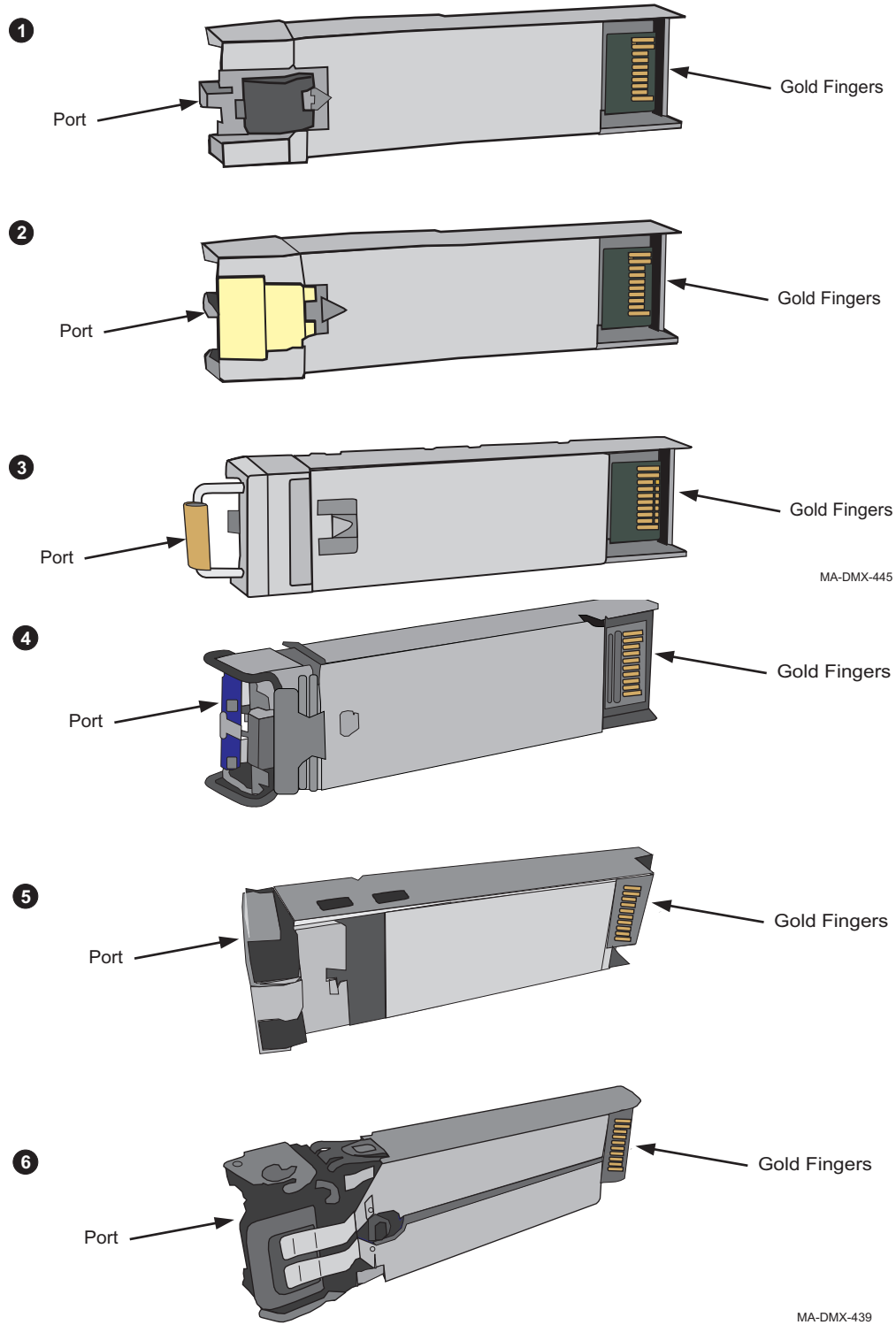


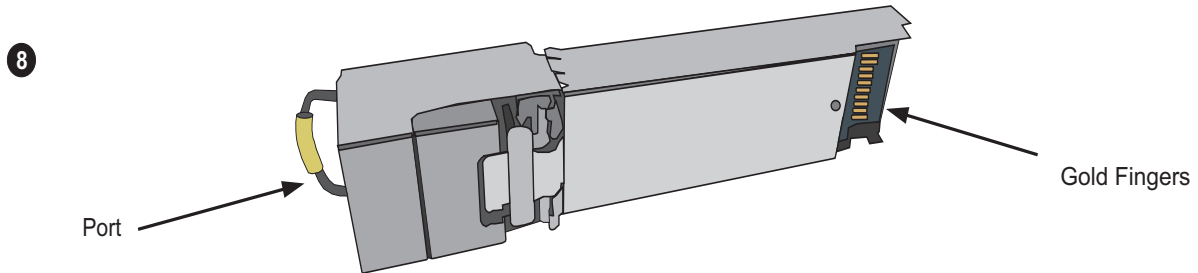
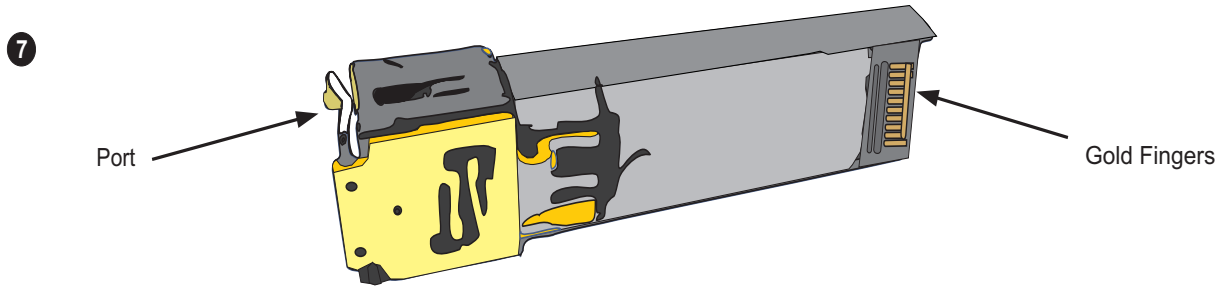
MA-DMX-422

Note: Do not remove the dust plug unless you are ready to connect fibers or if you need to clean the module.

-
- 3 Referring to [Figure B-2](#), “Module types” (p. B-9), determine the type of latching mechanism on the pluggable optical module purchased.

Figure B-2 Module types





MA-DMX-442

- 4 **Important!** Pluggable optical 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 optical fiber is connected. With proper care and handling, cleaning the pluggable optical modules should not be necessary.

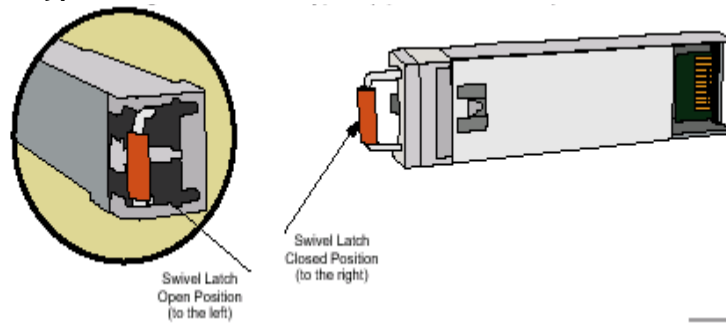
- 5 Referring to [Step 3](#), determine which type of PTM is provided.

if...	Then...
Type 1 or 2	Proceed to Step 9
Type 3	Continue with Step 6
Type 4	Proceed to Step 8

Before inserting the module, the latch must be in the closed position.

- 6 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. Remove the dust plug momentarily to open the latch. Move the latch to the left (away from the gold fingers) to open the latch.

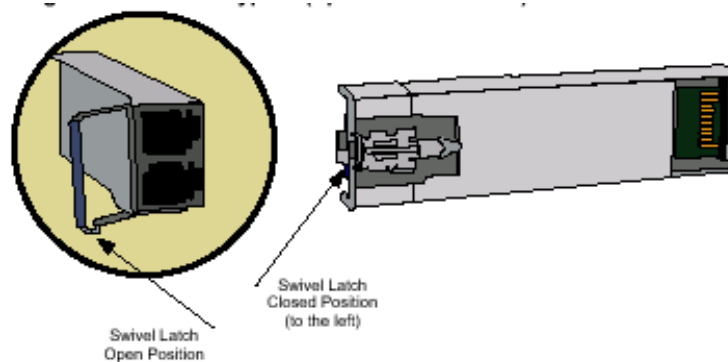
Figure B-3 Latch type 3



- 7 Proceed to [Step 9](#).

- 8 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. Remove the dust plug momentarily to open the latch. Move the latch to the right (towards the gold fingers) to open the latch.

Figure B-4 Latch type 4



- 9 With your left hand, hold the optical module by the dust plug. The optical ports are in your left hand and the gold fingers are visible (facing you). (Do not insert optical module).
- 10 Rotate the optical module 45 degrees counter-clockwise. The dust plug is facing you and the gold fingers are pointed to the right. (Do not insert optical module.)

- 11 Insert the pluggable optical module in the required socket of the circuit pack faceplate. Confirm that the optical module is locked in the socket. Verify that all unused sockets on the circuit pack are equipped with dust covers.

Result: The port appears in the WaveStar® CIT System View indicating successful installation. If response is not correct, replace the optical module. If the optical module fails when inserted, and another optical module in the shelf fails at the same time, replace the newly-installed optical module. Each optical module has unique internal data for warranty purposes. If this data for any reason is not unique, both optical modules with the duplicated information will be declared failed. See the *Alcatel-Lucent 1665 Data Multiplexer Extend (DMXtend) User Operations Guide 365-372-325*.

- 12 Referring to [Step 3](#), what type of latching mechanism does your module have?

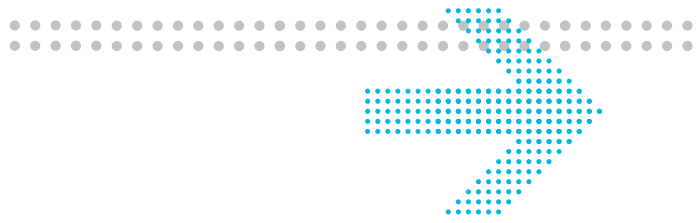
if...	then...
Type 1 or 2	The latch automatically catches when the module is inserted. The module is secure.
Type 3	Move the latch to the right (towards the gold fingers) to close the latch. The Module is secure. See Figure B-3, "Latch type 3" (p. B-11).
Type 4	Move the latch to the left (away from the gold fingers) to close the latch. The module is secure. See Figure B-4, "Latch type 4" (p. B-11).

END OF STEPS

Cable routing for electrical PTMs

This procedure describes how to route electrical PTMs comcode 109565549 cables in a Alcatel-Lucent 1665 DMXtend shelf.

- 1 Insert the PTM module in ports 1 through 4 of the LNW170 card.
- 2 If fiber PTMs are used they will occupy ports 5 through 8.
- 3 Connect the RJ-45 connectors to ports 1 through 4.
- 4 Route the CAT-5 cable in a manner so that two cables connect through the LNW170 slot opening and two are routed into the protection slot opening. See [Figure B-5](#) below.



C 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 Extend (Alcatel-Lucent 1665 DMXtend) optical circuit packs.

Contents

This chapter provides information on the following topics:

LBOs	C-2
Fiber connections	C-4

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

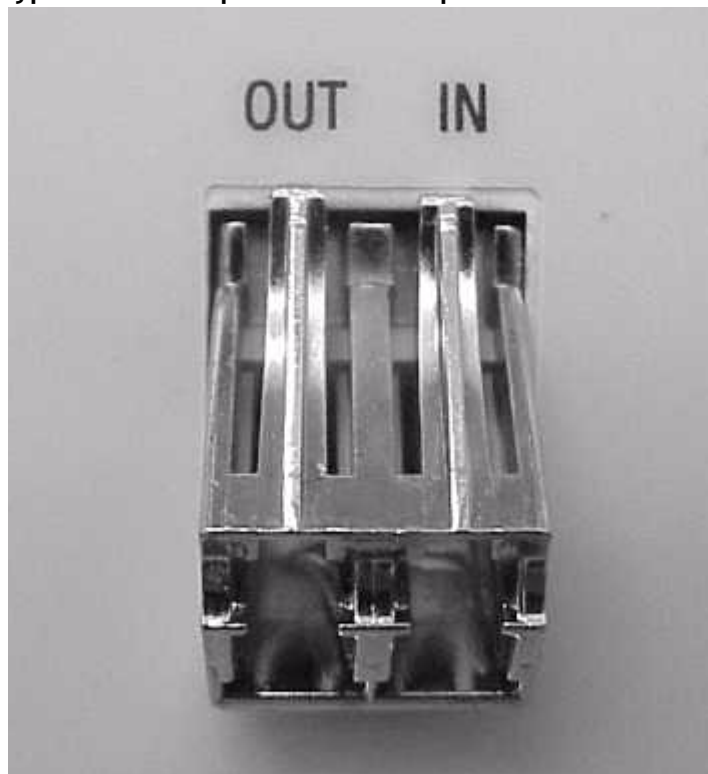
General

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 DMXtend 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 C-1 LC-type connector ports on circuit pack

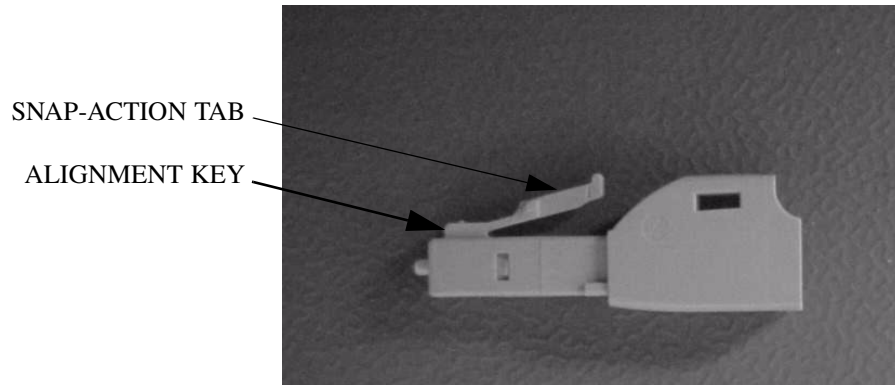


LC-type LBO

Alcatel-Lucent 1665 DMXtend 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.

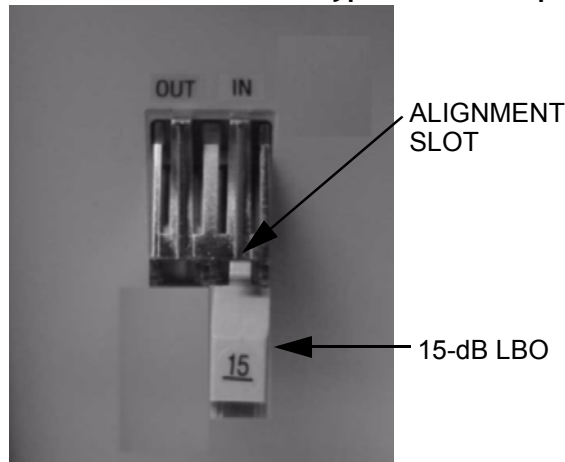
Figure C-2 LC-type LBO



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.

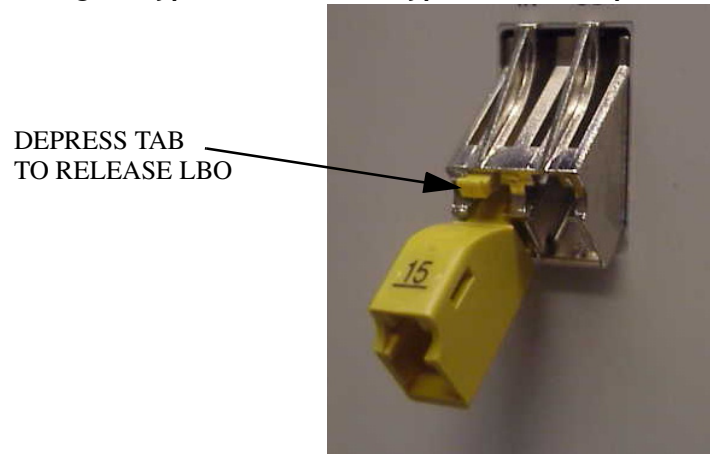
Figure C-3 LC-type LBO inserted into LC-type connector port



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 C-4 Removing LC-type LBO from LC-type connector port



Fiber connections

General

Alcatel-Lucent 1665 DMXtend uses *AllWave ADVANTAGE™* Lightguide Jumpers, part of Alcatel-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.

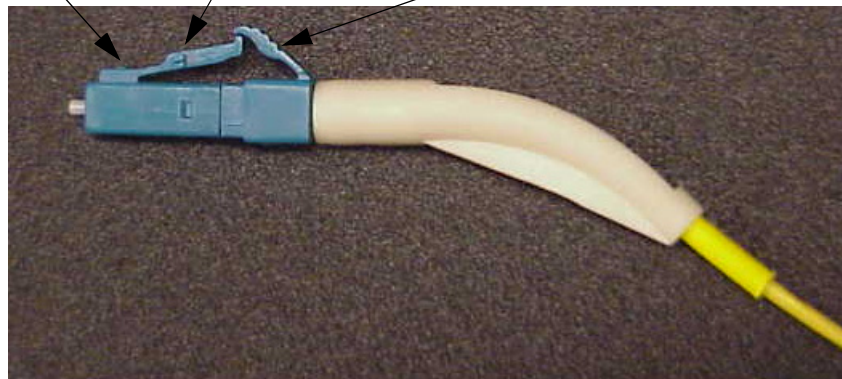
All fiber connectors should be cleaned and inspected before assembling into connector ports. See [Appendix A, "Fiber cleaning"](#). Dust caps should be applied to all fiber connectors when not installed in a connector port.

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 C-5 LC-type fiber connector

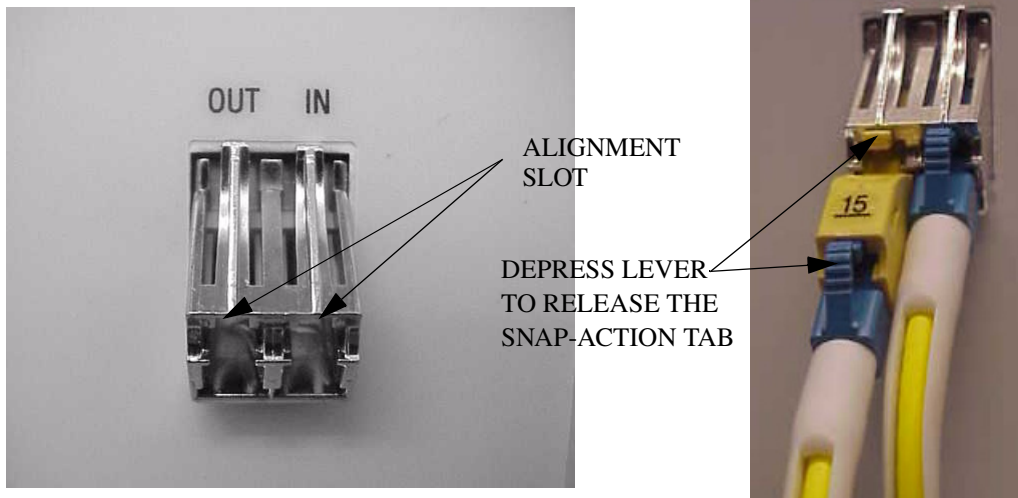
ALIGNMENT KEY SNAP-ACTION TAB SNAP-ACTION LEVER

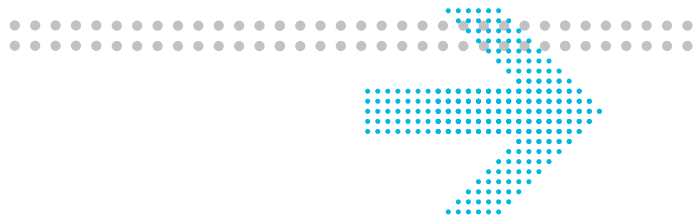


The LC-type fiber connector is assembled onto an LC-type connector port of a circuit pack or LC-type LBO by aligning the alignment key with the slot in the connector port and pushing the connector into the port until it snaps into place.

The LC-type fiber connector is removed from a connector port by depressing the snap-action lever to disengage the fiber connector.

Figure C-6 LC-type fiber connection





D 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 Extend (Alcatel-Lucent 1665 DMXtend) backplane has been bent or broken.

Contents

This appendix provides information on the following topics:

Pin and connector background	D-2
Repair kits and tools	D-3
Simple repair methods	D-4
Replacement methods	D-5

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 DMXtend 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 may be replaced individually if they have been damaged beyond simple repair methods.

D-subminiature connectors

Interface cabling to and from the Alcatel-Lucent 1665 DMXtend 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 DMXtend 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 DMXtend 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 DMXtend shelves have the same tail length of 4.30 mm (0.169 in.).

[Table D-1](#) show the location and type of METRAL™ pins on the Alcatel-Lucent 1665 DMXtend backplane.

Table D-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, d, g	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 includes 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 DMXtend 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 D-2](#), “Metral™ pins” (p. D-3).

Table D-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



CAUTION

Equipment Damage/Personal Injury

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.

METRAL™ backplane pins



CAUTION

Equipment Damage

This is a delicate procedure. Take your time to gently straighten the pin in several small steps. Large movements may damage adjacent 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 DMXtend 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 DMXtend 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 DMXtend 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

-
- 1 Verify that the problem cannot be fixed using a simple repair procedure.
.....
 - 2 Secure the proper tool kit.
.....
 - 3 Read the tool kit instructions before beginning.
.....
 - 4 Plan and write out a “Method of Procedure” specific to your location.
.....
 - 5 Follow the instructions provided to remove the damaged pin.
.....
 - 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

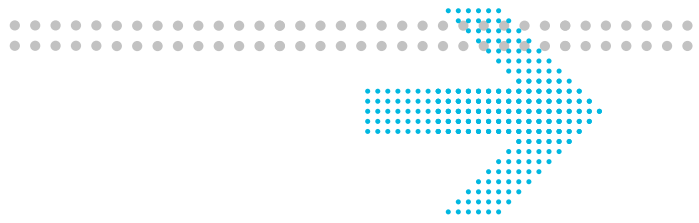
If it becomes necessary to replace Guide or Keying Pins, contact your next level of support for tooling, replacement parts and detailed replacement procedures. The replacements will need to be installed with screws and washers.

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.



E Fiber labeling

Overview

Purpose

This appendix describes the labeling of the fiber.

Contents

This chapter contains the following:

Fiber description	E-1
Fiber labels	E-3

Fiber description

Fibers

There are three different types of single-mode fiber used with the Alcatel-Lucent 1665 Data Multiplexer Extend (Alcatel-Lucent 1665 DMXtend), simplex blue fiber, simplex yellow fiber, and the customer's fiber, and two types of multi-mode fiber used with the Alcatel-Lucent 1665 DMXtend, multi-mode simplex gray fiber and the customer's multi-mode fiber.

Blue fiber

Blue fiber is made up of a single blue colored fiber equipped with LC connectors at both ends. It is referred to as **Simplex LC Blue Fiber**. The Blue Fibers are custom cut to length for their application. The length is given on the protection boot of the LC connector.

Gray fiber

Blue fiber is made up of a multi-gray colored fiber equipped with LC connectors at both ends. It is referred to as **Multi-mode LC Gray Fiber**. The Gray Fibers are custom cut to length for their application. The length is given on the protection boot of the LC connector.

Yellow fiber

Simplex fibers are Yellow in color and come in six different lengths (15, 20, 25, 30, 35 and 50 feet), as well as custom lengths.

Outside fiber

Outside fiber is the fiber connecting the Customer equipment to the Alcatel-Lucent 1665 DMXtend. Depending on the customers specifications, these fibers may be any combination of SC, FC, or ST connectors. The length of these fibers depends on the system interface setup. This fiber is usually referred to as the ***Outside Bay or Plant Fiber***.

Outside Bay Fiber management should be specified by the customer. It is beyond the scope of this document to specify the route or dressings that the fiber should take once it leaves the equipment bays.

Precautions



CAUTION

Fiber 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.

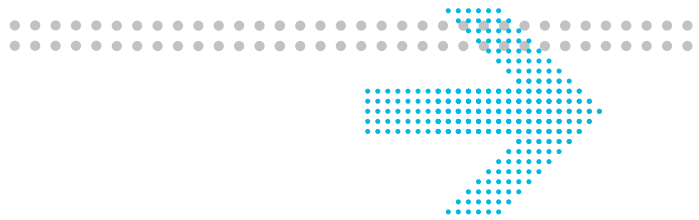
- 1 Remove the appropriate label from the backing sheet or the label maker.

- 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

Glossary



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

Multiplying

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

NARTAC

Lucent North American Regional Technical Assistance Center
call **1-866-LUCENT8** (866-582-3688): *Prompt 1*

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

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 Programmable.

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

Temperature-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

Set up using unswitched cross connections on UPSR Ring Interfaces.

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 DMXtend (it does not cover protection switching of an optical facility; see "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.

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 synonymously 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 DMXtend interfaces: DS1 (1.544 Mb/s) or DS3 (44.736 Mb/s).

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 DMXtends serve as hosts supporting up to 8 OC-3 rings or 4 OC-12 rings. Each OC-3 and OC-12 ring is interconnected between the two separate hosts.

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

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.

FEPRM - 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.

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, D, or G function unit slots on the Alcatel-Lucent 1665 DMXtend.

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 units 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 DMXtend 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 the user 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 receiver without regeneration. See Intermediate Reach.

M

Main

The two slots (M-1 and M-2) on the Alcatel-Lucent 1665 DMXtend shelf in which the OC-3 or OC-12 main 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: one 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 International 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 suppress 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 DMXtend, a protection line is a pair of fibers that terminate an OLIU circuit pack in the Main-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.

PTM

Pluggable Transmission Module optics.

R

Reactive Maintenance

Refers to detecting 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.

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 DMXtend systems from a single location over the DCC.

Service Line

On a Alcatel-Lucent 1665 DMXtend system, 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, D-1, or G-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.

Shelf ID

A switch-settable parameter with values from 1 to 8. Used to log into a selected shelf by using the CIT.

Single 0x1 Cross-Connection

In a dual-homed application, the Alcatel-Lucent 1665 DMXtend 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 DMXtend 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 topology in which a single Alcatel-Lucent 1665 DMXtend serves as a DDM-2000 FiberReach, OC-3 Multiplexer, or OC-12 Multiplexer host supporting up to eight OC-3 or four 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

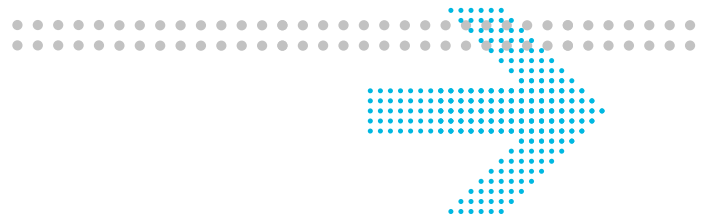
A 9-row by 12-column SONET structure (108 bytes) that carries one or more VTs of the same size. Seven VT groups (756 bytes) are byte-interleaved within the VT-organized STS-1 synchronous payload envelope

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).

Index



-
- 10/100Base-T cables, [3-40](#)
 - 1000Base-T
 - optical fiber cables, [3-66](#), [3-67](#), [3-68](#)
 - 110/RJ45 punch down block, [3-41](#)
 - 110/RJ45® punch down block, [3-40](#)
-
- A** Accessible Emission Limits (AEL), [1-9](#)
 - Alarm Cut-Off (ACO), [6-41](#), [6-42](#)
 - alarm panel, [3-55](#), [3-56](#)
 - alarm reporting, [6-42](#)
 - alarm status indications
 - user settable, [3-58](#)
 - alarm(s)
 - critical (CR), [3-57](#), [6-39](#), [6-41](#), [6-42](#), [6-45](#)
 - default delay time, [6-41](#)
 - environmental, [3-58](#)
 - fan shelf, [6-42](#)
 - LED, [6-42](#)
 - major (MJ), [3-57](#), [6-39](#), [6-41](#)
 - minor (MN), [3-57](#), [6-39](#), [6-41](#), [6-45](#)
 - office, [6-41](#), [7-3](#), [8-3](#)
 - Alternate Mark Inversion (AMI), [6-49](#)
 - Automatic, [7-11](#)
 - automatic protection switch, [6-42](#)
-
- B** battery distribution fuse board (BDFB), [2-13](#), [2-14](#), [2-15](#), [4-4](#)
 - bay frame ground, [1-4](#)
 - bipolar 8 zero substitution (B8ZS), [6-49](#)
 - BITS clock, [6-49](#)
-
- C** cable(s)
 - 10/100Base-T, [3-40](#)
 - 1000Base-T, [3-66](#), [3-67](#)
 - 1000Base-T optical fiber
 - optical fiber
 - 1000Base-T, [3-68](#)
 - CIT, [5-2](#), [6-4](#)
 - CIT interface, [4-2](#), [6-3](#), [7-2](#), [8-2](#)
 - discrete cables, [3-58](#)
 - DS1, [3-6](#), [3-8](#), [3-14](#), [3-32](#), [3-34](#)
 - DS1 color codes, [3-8](#), [3-34](#)
 - DS3/EC-1, [3-13](#), [3-32](#)
 - DS3/EC-1 cable connections, [3-17](#), [3-35](#)
 - environmental, [3-58](#)
 - IAO LAN/TCP-IP, [3-44](#)
 - miscellaneous discrete, [3-58](#)
 - modem, [3-47](#), [3-48](#)
 - OC-3, [3-65](#), [3-66](#)
 - OC-48, [3-64](#)
 - OC-48 optical fiber, [3-62](#)
 - office alarm, [3-53](#), [3-55](#), [3-56](#), [6-8](#)
 - office alarm connections, [3-57](#)
 - optical fiber, [3-64](#), [3-65](#), [3-66](#), [3-67](#)
 - power, [2-14](#)
 - power cable, [4-3](#)
 - SYNC, [3-51](#)
 - cabling
 - checklist, [2-4](#)
 - power, [2-14](#)
 - central office (CO), [3-53](#), [3-58](#)
 - circuit packs
 - 1G SX (LNW67), [3-68](#)
 - CIT
 - interface cable, [6-3](#), [7-2](#), [8-2](#)
 - serial port, [3-69](#)
 - software, [5-6](#)
 - CIT Interface Cable, [I-4](#), [II-4](#), [III-3](#)
 - CIT interface cable, [4-2](#), [7-2](#), [8-2](#)
 - CLETOP cleaning cassette, [I-4](#), [II-3](#), [III-3](#), [A-2](#)
 - coaxial wire stripper, [I-2](#), [3-2](#), [II-2](#)
 - commands, [6-46](#), [6-47](#), [7-13](#), [7-14](#)
 - connectors
 - DB-15 pinouts, [3-5](#)
 - DB-25 pinouts, [3-5](#)
 - DB-62 pinouts, [3-5](#)
 - DB-9 pinouts, [3-5](#)
 - pinouts, [3-5](#)
 - RJ-45 pinouts, [3-5](#)
 - crimping tool, [I-2](#), [3-2](#), [II-2](#)
 - critical alarm (CR), [3-57](#), [6-39](#), [6-41](#), [6-42](#), [6-45](#)
 - cross-connect tests, [6-9](#)
-

- cross-connects, 6-8
VT1.5, 6-8
-
- D** DB-15 connector pinouts, 3-5
DB-25 connector pinouts, 3-5
DB-62 connector pinouts, 3-5
DB-9 connector pinouts, 3-5
discrete, 3-58
DS1
 cable assemblies, 3-6, 3-8, 3-14, 3-32, 3-34
DS1 error rate test set, I-3, II-2, 6-3, III-2, 7-2
DS1 timing reference, 3-52
DS3 error rate test set, I-3, II-2, 6-3, III-2, 7-2
DS3/EC-1
 cables, 3-13, 3-32
DSX, 3-6, 3-8, 3-13, 3-32, 3-34, 6-8
DSX cabling, 6-9
-
- E** EIA-type bay frame
 network bay frame
 EIA-type, 2-3
Electrostatic Discharge (ESD), 1-3
environmental alarm, 3-58
environmental discrete, 3-58, 6-52, 6-53
ESD
 damage, 1-4
 electronic components, 1-4
 jack, I-2, 2-2, 3-3, 4-2, II-2, 6-3, III-2, 7-2, 8-2
 wrist strap, 1-4, 1-5, I-2, 2-2, 3-3, 4-2, II-2, 6-3, 6-38, 6-42, III-2, 7-2, 7-4, 7-11, 8-2
Extended superframe (ESF), 6-49
-
- external buffer relay, 3-53
-
- F** fan alarm, 6-42
FDA/CDRH, 1-1
 21 CFR 1040.10 and 1040.11, 1-1
FDA/CDRH regulations, 1-9
fiber cleaning, A-1
 acceptable criteria, A-7
function group, 6-41
function unit, 6-42, 6-47, 7-14
-
- G** ground, I-3, 2-2, 2-11, 2-13, II-2
 bay frame, 1-4
-
- I** IAO LAN/TCP-IP
 cabling, 3-44
IEC
 60825-1, 1-1
IEC requirements, 1-9
-
- J** jumper(s)
 optical fiber, I-3, II-2, 6-3, 6-26, 6-27, 6-29, 6-31, 6-32, 6-33, 6-35, 6-36, III-2
-
- L** labels
 laser safety, 1-2
Laser, 1-10
laser
 classes, 1-10
 optical specifications, 1-10
 product classifications, 1-9
 radiation, 7-3, 8-3
 safety, 1-1, 6-4, 6-26, 6-28, 6-30, 6-33, 6-35
laser radiation, 3-62, 3-63, 3-65, 3-67, 6-9, 6-43, 7-4, 8-3, A-3
LBO, I-3, II-3, 6-3, III-2, C-2, C-3
LBO Table, 7-6, 8-19
LC Block, C-3
LC-type connector port, C-2
LC-type fiber connectors, C-4
LED, 6-43, 7-11
 ACTIVE, 6-45
 FAULT, 6-45
LGX, 3-62, 3-65, 3-66
line coding, 6-49
LNW42, 4-27
local equipment tests, 6-9
Luminex Stick port cleaners, I-4, II-3, III-3, A-2
-
- M** major alarm (MJ), 3-57, 6-39, 6-41
minor alarm (MN), 3-57, 6-39, 6-41, 6-45
miscellaneous discrete, 6-52, 6-53
modem, 3-47, 6-54
 cable, 6-55
modem cable, 3-48
mult office alarms, 3-56
multimeter, I-2, 2-2, 3-3, 4-2, 7-2
-
- N** network bay frame
 seismic, 2-3
Network Equipment Building System (NEBS), 6-38
-
- O** OC, 3-65
OC-3

-
- optical fiber cables, 3-65, 3-66
 - OC-48
 - optical fiber cables, 3-62, 3-64
 - office alarm, 3-53, 3-56, 6-41, 7-3, 8-3
 - alarm(s)
 - office, 6-38
 - cable, 3-53, 6-38, 7-3, 8-2
 - connections, 3-57, 6-38
 - mult, 3-56
 - relay contacts, 3-53
 - test, 6-38
 - office alarm cable, 3-55, 3-56, 6-8
 - office alarm panel, 3-55, 3-56
 - ohmmeter, I-3, 2-2, II-2
 - optical attenuators, C-2
 - optical fiber scope, I-3, II-3, III-2, A-2
 - out-of-service mode, 7-3, 8-3
-
- P** Personal Computer (PC), 7-2, 8-2
 - CIT requirements, I-4, 4-2, II-4, 5-1, 6-3, 6-4, III-3
 - pinouts
 - connectors, 3-5
 - power
 - cables, 4-3
 - power cable, 2-14
 - protection network, 3-55
 - protection switching
 - automatic, 6-42
-
- R** remote terminal (RT), 3-58
 - RJ-45 connector pinouts, 3-5
-
- S** safety
 - instructions, 1-6, A-3
 - laser, 1-1, 6-4, 6-26, 6-28, 6-30, 6-33, 6-35
 - laser instructions, 1-3
 - laser warning labels, 1-2
 - screwdriver(s), I-2, 4-2, II-2, 6-3, 7-2
 - seismic network bay frame, 2-3
 - serial port, 3-69
 - single-mode fiber, 3-62
 - standards
 - Pacific Bell Equipment Framework Standard PBS-000-102PT, 2-3
 - Superframe (SF), 6-49
 - SYNC cable, 3-51
 - cable(s)
 - SYNC, 3-50
-
- T** telemetry, 3-58, 6-52
 - connections, 6-54
 - telemetry panel, 3-59
 - test equipment, 7-2
 - CIT interface cable, 4-2
 - DS1 error rate test set, I-3, II-2, 6-3, III-2, 7-2
 - DS3 error rate test set, I-3, II-2, 6-3, III-2, 7-2
 - multimeter, I-2, 2-2, 3-3, 4-2
 - ohmmeter, I-3, 2-2, II-2
 - optical fiber scope, I-3, II-3, III-2, A-2
 - Personal Computer (PC), 7-2, 8-2
 - screwdrivers, 4-2
 - video fiber scope, I-3, II-3, III-2, A-2
 - timing
 - external sync, 3-52
 - verification, 6-49
-
- tools
 - CLETOP cleaning cassette, I-4, II-3, III-3, A-2
 - coaxial wire stripper, I-2, 3-2, II-2
 - crimping, I-2, 3-2, II-2
 - Luminex Stick port cleaners, I-4, II-3, III-3, A-2
 - screwdriver(s), I-2, II-2, 7-2
 - screwdrivers, 6-3
 - torque wrench, I-2, 2-2
 - wire-wrap gun, I-2, 3-2, II-2
 - torque wrench, I-2, 2-2
 - transient currents, 3-53
 - transient voltages, 3-53
-
- V** video fiber scope, I-3, II-3, III-2, A-2
 - VT1.5
 - cross-connects, 6-8
-
- W** wire-wrap gun, I-2, 3-2, II-2
 - wrist strap
 - ESD, 1-4, 1-5, I-2, 2-2, 3-3, 4-2, II-2, 6-3, 6-38, 6-42, III-2, 7-2, 7-4, 7-11, 8-2
-

