Lucent Technologies
Bell Labs Innovations
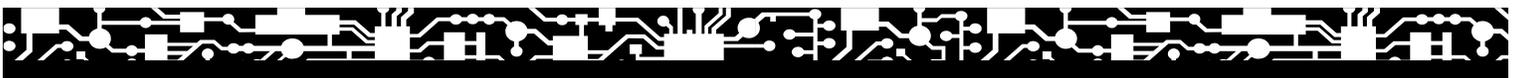
LambdaUnite™ MultiService Switch (MSS)

Release 1

Installation Guide

Notice

Every effort has been made to ensure that the information in this document was complete and accurate at the time of printing. However, information is subject to change.

Mandatory customer information

Always observe the Safety Instructions given in Chapter 1 when operating the system.

Trademarks

These trademarks are used in this manual:

CompactFlash is a trademark of SanDisk Corporation

LambdaUnite is a trademark of Lucent Technologies.

Navis is a trademark of Lucent Technologies.

WaveStar is a registered trademark of Lucent Technologies.

Windows is a registered trademark of Microsoft Corporation

Ordering information

The order number of this document is 365-374-023 (Issue a).

Support

Technical support

Please contact your Lucent Technologies Local Customer Support Team (LCS) for technical questions about the information in this document.

Information product support

On the following page, we provide a comment form for you to report errors or make suggestions about this document.

Lucent Technologies

Lucent Technologies values your comments!

Lucent Technologies
Bell Labs Innovations

LambdaUnite™ MultiService Switch (MSS)
Release 1
Installation Guide
365-374-023   Issue a   October 2001

Lucent Technologies welcomes your comments on this information product. Your opinion is of great value and helps us to improve.

1. Was the information product:

	Yes	No	Not applicable
In the language of your choice?	☐	☐	☐
In the desired media (paper, CD-ROM, etc.)?	☐	☐	☐
Available when you needed it?	☐	☐	☐

Please provide any additional comments:

_____
_____

2. Please rate the effectiveness of this information product:

	Excellent	More than satisfactory	Satisfactory	Less than satisfactory	Unsatisfactory	Not applicable
Ease of use	☐	☐	☐	☐	☐	☐
Level of detail	☐	☐	☐	☐	☐	☐
Readability and clarity	☐	☐	☐	☐	☐	☐
Organization	☐	☐	☐	☐	☐	☐
Completeness	☐	☐	☐	☐	☐	☐
Technical accuracy	☐	☐	☐	☐	☐	☐
Quality of translation	☐	☐	☐	☐	☐	☐
Appearance	☐	☐	☐	☐	☐	☐

If your response to any of the above questions is "*Less than satisfactory*" or "*Unsatisfactory,*" please explain your rating.

_____
_____

3. If you could change one thing about this information product, what would it be?

_____
_____

4. Please write any other comments about this information product:

_____
_____

Please complete the following if we may contact you for clarification or to address your concerns:

Name: _____   Date: _____

Company/organization: _____   Telephone number: _____

Address: _____

Email address: _____   Job function: _____

If you choose to complete this form online, go to http://www.lucent-info.com/comments
Otherwise fax to 407 767 2760 (U.S.) or +1 407 767 2760 (outside the U.S.) or email comments to ctiphotline@lucent.com

Lucent Technologies values your comments!

Lucent Technologies
Bell Labs Innovations

LambdaUnite™ MultiService Switch (MSS)
Release 1
Installation Guide
365-374-023   Issue a   October 2001

Lucent Technologies welcomes your comments on this information product. Your opinion is of great value and helps us to improve.

1.   Was the information product:

	Yes	No	Not applicable
In the language of your choice?	☐	☐	☐
In the desired media (paper, CD-ROM, etc.)?	☐	☐	☐
Available when you needed it?	☐	☐	☐

Please provide any additional comments:

_____
_____

2.   Please rate the effectiveness of this information product:

	Excellent	More than satisfactory	Satisfactory	Less than satisfactory	Unsatisfactory	Not applicable
Ease of use	☐	☐	☐	☐	☐	☐
Level of detail	☐	☐	☐	☐	☐	☐
Readability and clarity	☐	☐	☐	☐	☐	☐
Organization	☐	☐	☐	☐	☐	☐
Completeness	☐	☐	☐	☐	☐	☐
Technical accuracy	☐	☐	☐	☐	☐	☐
Quality of translation	☐	☐	☐	☐	☐	☐
Appearance	☐	☐	☐	☐	☐	☐

If your response to any of the above questions is "*Less than satisfactory*" or "*Unsatisfactory,*" please explain your rating.

_____
_____

3.   If you could change one thing about this information product, what would it be?

_____
_____

4.   Please write any other comments about this information product:

_____
_____

Please complete the following if we may contact you for clarification or to address your concerns:

Name: _____   Date: _____

Company/organization: _____   Telephone number: _____

Address: _____

Email address: _____   Job function: _____

If you choose to complete this form online, go to http://www.lucent-info.com/comments
Otherwise fax to 407 767 2760 (U.S.) or +1 407 767 2760 (outside the U.S.) or email comments to ctiphotline@lucent.com

Contents

2   Overall installation and test planning

3   Equipment installation

---

4   Cable Installation

7   Installation troubleshooting

A   Assembly Instructions   A-1

About this information product

....

Purpose	This manual provides information on the installation and configuration of a *LambdaUnite*™ MultiService Switch (MSS) system. Furthermore, all steps for putting the system into operation are also described.
Reason for reissue	This is the initial version of this manual.
Safety labels	The present manual contains basic safety instructions which have to be strictly observed when handling the equipments and systems described.
	The most important safety instructions and admonishments are collected in the chapter "Safety" in Fascicle 1 of this manual, which must be observed before carrying out work of any kind on the equipments and systems described.
Intended audience	This manual is intended for users who wish to install, configure and cable a *LambdaUnite* MultiService Switch (MSS) rack and/or subrack including all accessories.
	This requires that the installation staff has a basic knowledge of SDH and SONET technology. Working on the complex equipments and

....

systems described in this manual requires also special training of the personnel.

Conventions used

The following conventions are used throughout the manual:

Numbering

The chapters of this document are numbered consecutively. The page numbering restarts at "1" in each chapter. To facilitate identifying pages in different chapters, the page numbers are prefixed with the chapter number. For example, page 2-3 is the third page in chapter 2.

Cross-references

Cross-reference conventions are identical with those used for numbering, i.e. the first number in a reference to a particular page refers to the corresponding chapter.

Keyword-blocks

This document contains so-called keyword blocks to facilitate the location of specific text passages. The keyword blocks are placed to the left of the main text and indicate the contents of a paragraph or group of paragraphs.

Abbreviations

Abbreviations used in this document can be found in the "Glossary" unless it can be assumed that the reader is familiar with the abbreviation.

Symbols

Symbols Listing:

Front View

Rear View

Top View

Bottom View

★6 — Star point, the star in the figures refer to the descriptions in the text or legend.

② —————————— Item, the items mentioned in the figures refer to the text or the list of materials

□ — Washer

■ — Ground Washer

● — Spring Washer

⊙ — Hexagon Nut

◊ — Self Tapping Screw

▽ — Screw Flat Head

762 [30"] — Measurements, all dimensions are in millimeters with corresponding inches in parentheses.

M12x50
□4.2x11
⊙M4 — Notation of fastening materials; the notation is divided into two parts. Above the line, the bolt or screw plus washer(s) if needed and, under the line, the nut plus washer(s) if any.

—————■ — Pin Connector

)——— — Socket Connector

—═— — Optical Fiber Connection

—○— — Coaxial Cable

—Ⓕ— — Shielded Twisted Pair Cable

—Ⓜ— — Optical Cable

▯ — Paddle Board

$\bigotimes$ Alarm Lamp

                                    Fuse

                                    Circuit Breaker

                                    Relay Contacts
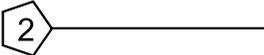
2   Cable Number

$\longrightarrow$S$\rightarrow$ View of the cabling side of the connector

DC codes

The mentioned Design Code (DC) in this manual are used to define a hardware item owned by the Lucent Technologies Development Systems. The code consist of DC followed by a 7 digit number (Example: DC1234567).

Related documentation

This section briefly describes the documents that are included in the *LambdaUnite* MultiService Switch (MSS) documentation set.

- Installation Guide
  The *LambdaUnite* MSS Installation Guide is a step-by-step guide to system installation and setup. It also includes information needed for pre-installation site planning and post-installation acceptance testing.

- Applications and Planning Guide
  The *LambdaUnite* MSS Applications and Planning Guide (APG) is for use by network planners, analysts and managers. It is also for use by the Lucent Account Team. It presents a detailed overview of the system, describes its applications, gives planning requirements, engineering rules, ordering information, and technical specifications.

- User Operations Guide
  The *LambdaUnite* MSS User Operations Guide provides step-by-step information for use in daily system operations. The manual demonstrates how to perform system provisioning, operations, and administrative tasks by use of WaveStar® CIT.

- Alarm Messages and Trouble Clearing Guide
  The *LambdaUnite* MSS Alarm Messages and Trouble Clearing
  Guide gives detailed information on each possible alarm
  message. Furthermore, it provides procedures for routine
  maintenance, troubleshooting, diagnostics, and component
  replacement.

- Operations System Engineering Guide
  The *LambdaUnite* MSS Operations System Engineering Guide
  serves as a reference for all TL1 commands which can be used to
  operate the network element. The manual gives an introduction to
  the concept of the TL1 commands and instructs how to use them.

- *Navis*™ Optical EMS Provisioning Guide (Application
  LambdaUnite MSS)
  The *Navis* Optical EMS Provisioning Guide (Application
  LambdaUnite MSS) gives instructions on how to perform system
  provisioning, operations, and administrative tasks by use of *Navis*
  Optical EMS.

The following table lists the documents included in the *LambdaUnite*
MSS documentation set.

Document Number	Title
109088559 (365-374-020)	*LambdaUnite* MSS Application and Planning Guide
109088567 (365-374-021)	*LambdaUnite* MSS User Operations Guide
109088617 (365-374-022)	*LambdaUnite* MSS Alarm Messages and Trouble Clearing Guide
109088575 (365-374-023)	*LambdaUnite* MSS Installation Guide
109088583 (365-374-024)	*LambdaUnite* MSS Operations System Engineering Guide (TL1 Reference Manual)
109088609 (365-374-025)	*Navis* Optical EMS Provisioning Guide (Application *LambdaUnite* MSS)
109088591	CD-ROM Documentation *LambdaUnite* MSS (all manuals on one CD-ROM)

The following additional documents can be helpful for planning and ordering:

- Ordering & Information Drawings

- Cable Ordering & Information Drawings

How to comment As customer satisfaction is extremely important to Lucent Technologies, every attempt is made to encourage feedback from customers about our information products.

Customer Comment Form

A customer comment form is located immediately after the title page of this document. Please fill out the form and fax it to the number provided on the form.

How to order If the customer comment form is missing, send or fax comments about this document to

Lucent Technologies Network Systems GmbH

Lucent Learning ONG

Thurn-und-Taxis-Str. 10

90411 Nuernberg, Germany

Fax: +49 911 526 3545

1   Safety

Overview

Purpose
The aim of this chapter on safety is to provide users of *LambdaUnite*™ MSS systems with the relevant information and safety guidelines to safeguard against personal injury. Furthermore, this chapter may be useful to prevent material damage to the equipment.

The present chapter on safety ***must*** be read by the responsible technical personnel before carrying out relevant work on the system. The valid version of this document must always be kept close to the equipment.

Potential sources of danger
The *LambdaUnite* MSS equipment has been developed in line with the present state-of-the-art and fulfils the current national and international safety requirements. It is provided with a high degree of operational safety resulting from many years of development experience and continuous stringent quality checks in our company.

The equipment is safe in normal operation. There are, however, some potential sources of danger that cannot be completely eliminated. In particular, these arise during the:

- opening of housings or equipment covers,
- manipulation of any kind within the equipment, even if it has been disconnected from the power supply,
- disconnection of optical or electrical connections,

through possible contact with the following:

- live parts,

- laser light,

- hot surfaces, or

- sharp edges

Contents

General notes on safety

Overview

Purpose   This section provides general information on the structure of safety instructions and summarizes general safety requirements.

Contents

⌐

Structure of safety instructions

General structure   All safety instructions include a ***warning symbol*** and a ***signal word*** that classify the danger, and a ***text block*** that contains descriptions of the type and cause of the danger, the consequences of ignoring the safety instruction and the measures that can be taken to minimise the danger.

Example:

⚠ **DANGER**

Arcing on removing or inserting a live power supply plug.

Arcing can cause burns to the hands and damage to the eyes.

Ensure that the line circuit breaker on the Power Interface (PI) is in the "OFF" position before removing or inserting the power supply plug.

Danger classification   There are three classes of safety instructions: "DANGER", "WARNING" and "CAUTION". Which class is relevant depends on the consequences of ignoring the safety instruction:

DANGER   Serious injury is definite or likely.

WARNING   Serious injury is possible.

CAUTION   Minor injury is definite, likely or possible, or material damage to the product or in the product environment is definite or likely.

Warning symbols   These warning symbols are defined for safety instructions:

1	2	3	4	5	6

7	8	9	10	11	12
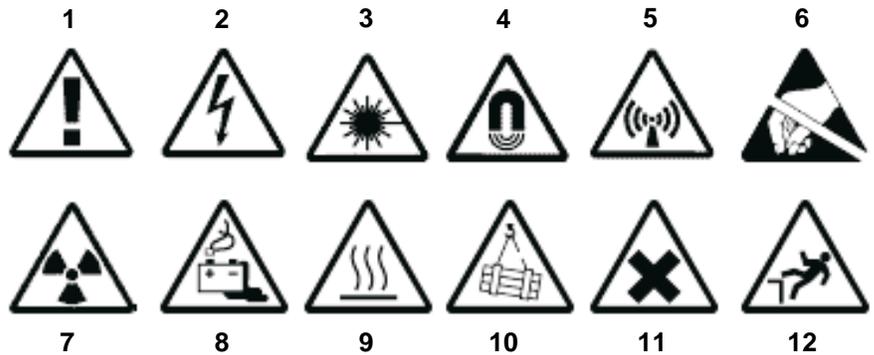
Legend:

1   General warning of danger

2   Electric shock

3   Hazard of laser radiation

4   Magnetic hazard

5   Electromagnetic radiation

6   Components sensitive to electrostatic discharge (ESD)

7   Radioactivity

8   Hazard caused by batteries

9   Hot surface

10   Heavy load

11   Unhealthy, irritating substance

12   Hazard of falling

Basic safety aspects

**General safety
requirements**   In order to keep the technically unavoidable residual risk to a
minimum, it is imperative to observe the following rules:

- Transport, storage and operation of the system must be under the
  permissible conditions only.
  See accompanying documentation and information on the system.

- Installation, configuration and disassembly must be carried out
  only by *expert personnel* and *with reference to the respective
  documentation*.
  Due to the complexity of the system, the personnel requires
  special training.

- The system must be operated by *expert and authorised users
  only*.
  The user must operate the system only after having *read and
  understood* this chapter on safety and the parts of the
  documentation relevant to operation. For complex systems,
  additional training is recommended. Any obligatory training for
  operating and service personnel must be carried out and
  documented.

- The system must not be operated unless it is in perfect working
  order.
  Any faults and errors that might affect safety must be reported
  immediately by the user to a person in responsibility.

- The system must be operated only with the connections and
  under the environmental conditions as described in the
  documentation.

- Any conversions or changes to the system or parts of the system
  (including the software) must be carried out by qualified Lucent
  Technologies personnel or by expert personnel authorised by
  Lucent Technologies.
  All changes carried out by other persons lead to a *complete
  exemption from liability*.
  No components/spare parts must be used other than those
  recommended by the manufacturer and those listed in the
  procurement documents.

- The removal or disabling of safety facilities, the clearing of faults
  and errors, and the maintenance of the equipment must be carried
  out by *specially qualified personnel only*.

The respective parts of the documentation must be strictly observed. The documentation must also be consulted during the selection of measuring and test equipment.

- Calibrations, special tests after repairs and regular safety checks must be carried out, documented and archived.

- Non-system software is used at one's ***own risk***. The use/installation of non-system software can adversely affect the normal functioning of the system.

- Only use ***tested and virus-free*** data carriers (floppy disks, streamer tapes, …).

Summary of important safety instructions

Especially observe the following safety instructions, they are of particular importance for *LambdaUnite*™ MSS systems::

- This equipment is to be installed only in ***Restricted Access Areas*** in 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.

- This product should only be operated from the type of power source indicated on the marking label.

- This equipment must be provided with a readily accessible disconnect device as part of the building installation.

- Disconnect up to four (4) power supply connections when removing power from the system.

- Installation must include an independent frame ground drop to the building ground. Refer to the *LambdaUnite MSS Installation Guide*.

- For information on proper mounting instructions, consult the *LambdaUnite MSS Installation Guide*.

- Install only equipment identified in the *LambdaUnite MSS Installation Guide* provided with this product. Use of other equipment may result in improper connection of circuitry leading to fire or injury to persons.

- To reduce the risk of electrical shock, do not disassemble this product. Installation and 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 re-assembly can cause electrical shock when the unit is subsequently used.

- Slots and openings in this product are provided for ventilation. To protect the product from overheating, these openings must not be blocked or covered. This product should not be placed in a built-in installation unless proper ventilation is provided.

- 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.

- CAUTION: This equipment is designed to permit the connection of the grounded conductor of the DC supply circuit to the grounding conductor at the equipment.

  1. This equipment shall be connected directly to the DC supply system grounding electrode conductor or to a bonding jumper from a grounding terminal bar or bus to which the DC supply system grounding electrode conductor is connected.

  2. This equipment shall be located in the same immediate area (such as, adjacent cabinets) as any other equipment that has a connection between the grounded conductor of the same DC supply circuit and the grounding conductor, and also the point of grounding of the DC system. The DC system shall not be grounded elsewhere.

  3. The DC supply source is to be located within the same premises as this equipment.

  4. There shall be no switching or disconnection devices in the grounded circuit conductor between the DC source and the point of connection of the grounding electrode conductor.

CAUTION

LambdaUnite MSS systems contain optical circuit packs that can emit laser radiation assessed as IEC Hazard Level 3A.

Therefore, LambdaUnite MSS systems may only be installed in restricted access locations! Restricted access locations are controlled environments where there is no ready access to the general public, but only to authorized persons who have received adequate training in laser safety.

Specific safety areas

Overview

....

Purpose   The aspects of "laser safety" and "handling of components sensitive to electrostatic discharge (ESD)" are of vital importance for the *LambdaUnite*™ MSS equipment. Therefore, the key safety instructions for these subjects are summarised in the following.

Contents

⌐

....

Lucent Technologies

Laser safety

System design   The *LambdaUnite*™ MSS system complies with the Food and Drug Administration's Center for Devices and Radiological Health (FDA/CDRH) regulations 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 FDA/CDRH regulations and the international standards IEC 60825 and DIN/EN 60825 respectively are met. Please also refer to "Laser product classification" (1-15).

These laser warning labels (not to scale) are affixed on the *LambdaUnite* MSS equipment. They refer to the system as a whole in normal operation.

⚠ **DANGER**

INVISIBLE LASER RADIATION WHEN OPEN AND FIBER DISCONNECTED.
Avoid direct exposure to beam.
Do not view beam directly with optical instruments.

CAUTION

INVISIBLE LASER RADIATION WHEN OPEN AND FIBER DISCONNECTED.
Do not stare into the beam or view directly with optical instruments.

Class 1 Laser Product

⚠ DANGER

INVISIBLE LASER RADIATION WHEN OPEN AND FIBER
DISCONNECTED
Avoid direct exposure to beam
Do not view beam directly with optical instruments

CAUTION

INVISIBLE LASER RADIATION WHEN OPEN AND FIBER
DISCONNECTED
Do not stare into the beam or view directly with optical instruments.

Class 1 Laser Product

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 classes

The maximum output power of laser radiation depends on the type of laser diode used. The international standards IEC 60825 and DIN/EN 60825 respectively as well as the FDA/CDRH regulations define the maximum output power of laser radiation for each laser class in accordance with the wavelength.

The classification scheme is based on the ability of the laser emission or the reflected laser emission to cause injury to the eye or skin during normal operating conditions.

Please also refer to "Laser product classification" (1-15).

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 may result in hazardous laser radiation exposure.

- 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 or 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.

CAUTION

Use of controls, adjustments and procedures other than those specified herein may result in hazardous laser radiation exposure.

Optical circuit pack specifications

Specifications The following table contains the specifications of the *LambdaUnite*™ MSS optical circuit packs.

Circuit pack	Wavelength [nm]	Fiber type[1] (core/cladding diameter [μm])	Maximum output power [mW / dBm]	Laser class[2] (IEC / FDA)
2.5-Gbit/s optical circuit packs				
OP2G5/1.3IOR4 (KFA12)	1310	SM (9/125)	0.5 / −3	1 / I
10-Gbit/s optical circuit packs				
OP10/1.3IOR1 (KFA7)	1310	SM (9/125)	0.8 / −9.7	1 / I
OP10/1.5IR1 (KFA14)	1550	SM (9/125)	1.6 / +2	1 / I
OP10/1.5LR1 (KFA6)	1550	SM (9/125)	2 / +3	1 / I
OP10/01…80/800G (KFA9, KFA81…159)	1530.72 ... 1562.23	SM (9/125)	1.6 / +2	1 / I
OP10/01…16/PWDM (KFA11, KFA61…75)	1530.33 ... 1560.61	SM (9/125)	2.5 / +4	1 / I
Gigabit-Ethernet circuit pack				
GE1/SX/4 (KFA13)	850	MM (50/125)	0.4 / −4	1 / I

Notes:

1. SM: Single-mode fiber, MM: multi-mode fiber.
2. It is the class of the circuit pack, not that of the telecommunications system as a whole, that is specified.

Connector types All optical circuit packs are equipped with LC-type connectors.

Laser product classification

Standards compliance   The *LambdaUnite*™ MSS product complies with the applicable 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 the 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 (please refer to "FDA/CDRH laser classification" (1-16)):

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

Laser classification is dependent upon operating wavelength, output power and fiber mode field 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 (please refer to "IEC laser classification" (1-16)):

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

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

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.

FDA/CDRH laser classification
The following table provides an overview of laser classes for wavelengths of 1310 nm and 1550 nm in accordance with the FDA/CDRH regulations.

Laser class	Wavelength	Max. output power of laser radiation	
I	1310 nm	1.53 mW	+1.85 dBm
	1550 nm	8.52 mW	+9.3 dBm
IIIb	1310 nm	500 mW	+27 dBm
	1550 nm	500 mW	+27 dBm
IV	1310 nm	> 500 mW	> +27 dBm
	1550 nm	> 500 mW	> +27 dBm

Explanatory note: In the United States, lasers and laser systems are assigned to one of the following classes: Roman numerals I, IIa, II, IIIa, IIIb, and IV. Classes I, IIIb and IV apply to lasers of all wavelengths. Classes IIa, II and IIIa apply only to those lasers operating within the visible wavelength range (400-700 nm). Lucent Technologies laser products typically operate in the infrared wavelength range (greater than 700 nm) and, therefore, are primarily in the class I or class IIIb classifications.

IEC laser classification
The following table provides an overview of laser classes for wavelengths of 1310 nm and 1550 nm in accordance with the IEC 60825 standard.

Laser class	Wavelength	Max. output power of laser radiation	
1	1310 nm	8.85 mW	+9.5 dBm
	1550 nm	10 mW	+10 dBm
3A	1310 nm	24 mW	+13.8 dBm
	1550 nm	50 mW	+17 dBm
3B	1310 nm	500 mW	+27 dBm
	1550 nm	500 mW	+27 dBm

Laser class	Wavelength	Max. output power of laser radiation	
4	1310 nm	> 500 mW	> +27 dBm
	1550 nm	> 500 mW	> +27 dBm

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:

- the actual output power from the connector or fiber cut.

- if automatic power reduction is used, the 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.

Electrostatic discharge

....

Introduction   Electrostatic discharge (ESD), caused by touching with the hand for example, can destroy semiconductor components. The correct operation of the complete system is then no longer assured.

Industry experience has shown that *all* semiconductor components can be damaged by static electricity that builds up on work surfaces and personnel. The electrostatic discharge can also affect the components indirectly via contacts or conductor tracks. The electrostatic 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.

The barred-hand symbol   Circuit packs containing components that are especially sensitive to electrostatic discharge are identified by warning labels bearing the barred-hand symbol.

ESD instructions   Observe the following ESD instructions to avoid damage to electrostatic-sensitive components:

- Wear working garment made of 100% cotton to avoid electrostatic charging.

- Touch the circuit packs at the edges or the insertion and removal facilities only.

- Ensure that the rack is grounded.

- Wear conductively connected wrist straps and connect them to the rack ESP bonding point.

- Work in an area which is protected against electrostatic discharge. Use conducting floor and bench mats which are conductively connected to the rack ESP bonding point.

- Conductively connect all test equipment and trolleys to the rack ESP bonding point.

....

- Store and ship circuit packs and components in their shipping packing. Circuit packs and components must be packed and unpacked only at workplaces suitably protected against build-up of charge.

- Whenever possible, maintain the relative humidity of air above 20%.

Safety requirements in specific deployment phases

Overview

Purpose To enable rapid orientation, safety instructions are given on the following pages, which are assigned to various stages in the life cycle of the *LambdaUnite*™ MSS equipment ("deployment phases").

Deployment phases The instructions are arranged according to the following deployment phases:

- "Transportation" (1-21)
- "Storage" (1-24)
- "Installation" (1-26)
- "Taking into operation" (1-29)
- "Operation and maintenance" (1-31)
- "Taking out of operation" (1-36)

⌐

Lucent Technologies

Transportation

Weight

⚠️ **WARNING**

Risk of injury due to unsecured shelf.

A fully-equipped shelf weighs more than 30 kg and can cause considerable injuries if it is knocked over or dropped. This can also cause serious damage to the shelf.

Use a sturdy vehicle for transportation and secure the shelf against dropping. At least two persons are required for lifting the shelf.

Packaging

⚠️ **CAUTION**

Adverse effect on operation due to incorrect packaging.

Dampness and soiling can cause corrosion or tracking paths. This can cause malfunctioning of the system components. Shocks can cause damage.

Protect the system components against dampness, soiling and shocks. Use the original packaging if possible.

Climatic conditions

⚠ **CAUTION**

Damage to system components under extreme environmental conditions.

Extreme environmental conditions can damage system components and cause malfunctioning.

Ensure that the climatic limits for transportation and storage of LambdaUnite™ MSS equipment are complied with during transportation; please refer to "Climatic limits for transportation and storage" (1-22).

Climatic limits for transportation and storage

These are the climatic limits for transportation and storage of *LambdaUnite* MSS systems:

Temperature range	-40 °C to +70 °C
	(exceptional: +85 °C)
Humidity range	relative humidity: 10% to 100%
	absolute humidity: 0.5 g/m^3 to 29 g/m^3

The following climatogram visualizes these climatic limits:
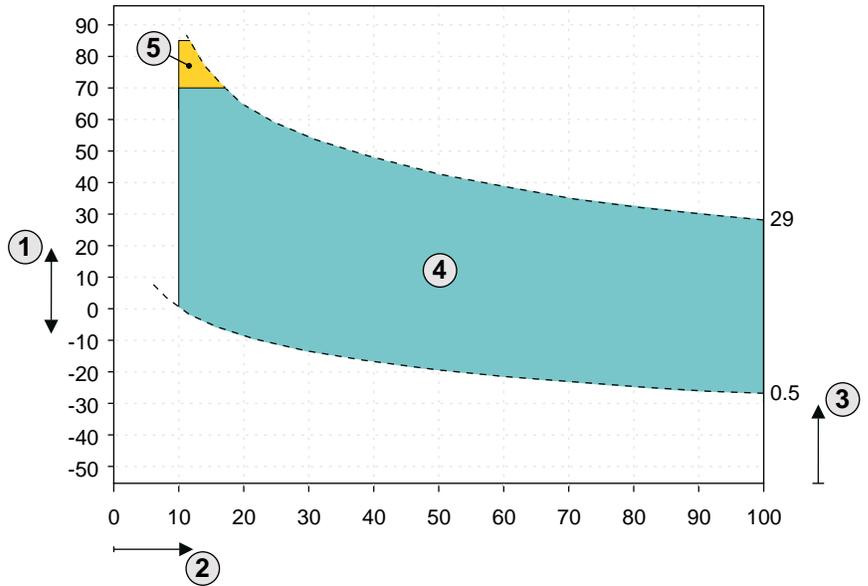
Legend:

1   Air temperature [°C]

2   Relative humidity [%]

3   Absolute humidity [g/m^3]. The dashed curves specify a constant
     absolute humidity of 0.5 g/m^3 or 29 g/m^3, respectively.

4   Permissible range for transportation and storage of *LambdaUnite*
     MSS systems.

5   Exceptional conditions, permissible for a short duration only.

Storage

....

Weight

⚠ **WARNING**

Risk of injury due to unsecured shelf.

A fully-equipped shelf weighs more than 30 kg and can cause considerable injuries if it is knocked over or dropped. This can also cause serious damage to the shelf.

Use only a stable base for storage and secure the shelf against dropping. At least two persons are required for lifting the shelf.

Electrostatic discharge (ESD)

⚠ **CAUTION**

Destruction of components by electrostatic discharge.

Electronic components can be destroyed by electrostatic discharge.

Circuit packs must therefore always be kept in antistatic covers. Use the original packaging if possible. Always observe the ESD instructions (cf. "Electrostatic discharge" (1-18)).

Packaging

....

1 - 2 4   **Lucent Technologies**   365-374-023
Issue a, October 2001

 CAUTION

Adverse effect on operation due to incorrect packaging.

Dampness and soiling can cause corrosion or tracking paths. This can cause malfunctioning of the system components. Shocks can cause damage.

Protect the system components against dampness, soiling and shocks. Use the original packaging if possible.

Climatic conditions

 CAUTION

Damage to system components under extreme environmental conditions.

Extreme environmental conditions can damage system components and cause malfunctioning.

Ensure that the climatic limits for transportation and storage of LambdaUnite™ MSS equipment are complied with during storage; please refer to "Climatic limits for transportation and storage" (1-22).

Installation

....

Weight

⚠️ **WARNING**

Risk of injury due to unsecured shelf.

A fully-equipped shelf weighs more than 30 kg and can cause considerable injuries if it is knocked over or dropped. This can also cause serious damage to the shelf.

At least two persons are required for lifting the shelf.

Laser warning labels

☢️ **WARNING**

Ineffectiveness of laser warning labels if removed or concealed.

Warning labels on the system and especially on the optical components warn of the dangers of invisible laser radiation. Removed, concealed or illegible labels can lead to incorrect action and thus cause serious injuries to the eyes of operating staff.

Ensure that the laser warning labels are not removed or concealed and always clearly legible.

**Electrostatic discharge
(ESD)**

....

CAUTION

**Destruction of components by electrostatic
discharge.**

*Electronic components can be destroyed by electrostatic
discharge.*

*Hold circuit packs only at the edges or on the insertion
and removal facilities. Always observe the ESD
instructions (cf. "Electrostatic discharge" (1-18)).*

Overheating

CAUTION

Risk of fire due to overheating.

*Inadequate heat dissipation can cause heat accumulation or
even a fire in the network element.*

You must therefore ensure that

- *the fan unit is installed,*
- *the individual fans are not obstructed,*
- *the minimum separation is maintained between two
  shelves in a rack (follow the installation instructions
  given in the LambdaUnite™ MSS Installation Guide).*

Detector diodes

....

⚠ **CAUTION**

**Destruction of the detector diodes caused by too
high an input power.**

*Connecting the output and input of optical circuit packs with
a transmit power in excess of -3 dBm over short distances
will cause the destruction of the detector diodes, as the input
power is then too high.*

*Use an optical attenuator pad of approx. 10 to 20 dB
when establishing connections over short distances for
test purposes.*

⌐

Taking into operation

Invisible laser radiation

DANGER

Injury to eyes caused by invisible laser radiation.

LambdaUnite™ MSS systems operate with invisible laser radiation. Laser radiation can cause considerable injuries to the eyes.

Never look into the end of an exposed fiber or into an open optical connector as long as the optical source is switched on. Always observe the laser warning instructions (cf. "Laser safety" (1-11)).

Arcing

DANGER

Arcing on removing or inserting a live power supply plug.

Arcing can cause burns to the hands and damage to the eyes.

Ensure that the line circuit breaker on the Power Interface (PI) is in the "OFF" position before removing or inserting the power supply plug.

Supply voltage

Safety requirements in specific deployment
phases
Taking into operation

Safety

⚠️ **CAUTION**

**Destruction of components due to a supply voltage
of incorrect polarity or too high.**

*LambdaUnite MSS equipment operates at a nominal voltage
of -48 V or -60 V. The permissible tolerance range is
-40.5 V to -60 V.*

*Ensure that the supply voltage has the correct range and
polarity before connecting the voltage.*

Fusing

⚠️ **CAUTION**

Risk of fire in the event of a short-circuit.

A short-circuit can cause a fire in the network element.

*Protect all supply lines with line circuit breakers
matched to the load of the shelf equipment. Note the
relevant guide values in the LambdaUnite MSS
Installation Guide.*

Condensation

⚠️ **CAUTION**

Condensation causes malfunctioning

*Condensation can occur in the network element during
transport, especially on moving from outside to closed
rooms; this can cause malfunctioning of the circuit packs.*

*Ensure that circuit packs and shelves have reached room
temperature and are dry before taking them into
operation.*

⌐

Operation and maintenance

....

Invisible laser radiation

 DANGER

Injury to eyes caused by invisible laser radiation.

LambdaUnite™ MSS systems operate with invisible laser radiation. Laser radiation can cause considerable injuries to the eyes.

Never look into the end of an exposed fiber or into an open optical connector as long as the optical source is switched on. Always observe the laser warning instructions (cf. "Laser safety" (1-11)).

Arcing

 DANGER

Arcing on removing or inserting a live power supply plug.

Arcing can cause burns to the hands and damage to the eyes.

Ensure that the line circuit breaker on the Power Interface (PI) is in the "OFF" position before removing or inserting the power supply plug.

Laser warning labels

....

 WARNING

Ineffectiveness of laser warning labels if removed or concealed.

Warning labels on the system and especially on the optical components warn of the dangers of invisible laser radiation. Removed, concealed or illegible labels can lead to incorrect action and thus cause serious injuries to the eyes of operating staff.

Ensure that the laser warning labels are not removed or concealed and always clearly legible.

Electrostatic discharge (ESD)

 CAUTION

Destruction of components by electrostatic discharge.

Electronic components can be destroyed by electrostatic discharge.

Hold circuit packs only at the edges or on the insertion and removal facilities. Always observe the ESD instructions (cf. "Electrostatic discharge" (1-18)).

Overheating

 CAUTION

Risk of fire due to overheating.

Inadequate heat dissipation can cause heat accumulation or even a fire in the network element.

You must therefore ensure that

- *the fan unit is installed,*

- *the individual fans are not obstructed,*

- *the minimum separation is maintained between two shelves in a rack (follow the installation instructions given in the LambdaUnite MSS Installation Guide).*

Detector diodes

 CAUTION

Destruction of the detector diodes caused by too high an input power.

Connecting the output and input of optical circuit packs with a transmit power in excess of -3 dBm over short distances will cause the destruction of the detector diodes, as the input power is then too high.

Use an optical attenuator pad of approx. 10 to 20 dB when establishing connections over short distances for test purposes.

Short-circuit

⚠ **CAUTION**

Destruction of circuit packs in the event of a short-circuit.

A short-circuit in the network element can cause destruction of electronic components and thus malfunctioning of the complete system.

You must therefore not handle objects such as a screwdriver in the circuit pack area of the shelf.

Test voltage

⚠ **CAUTION**

Destruction of components due to test voltage of incorrect polarity or too high.

The use of test voltages above 6 V DC for measurements on circuit packs can cause destruction of components and thus malfunctioning of the complete system.

Ensure that the test voltage does not exceed 6 V DC and that the test equipment is connected with the correct polarity.

Climatic conditions

⚠ **CAUTION**

Damage to system components under extreme environmental conditions.

Extreme environmental conditions can damage system components and cause malfunctioning.

Ensure that the "Climatic limits for the operation of LambdaUnite MSS equipment" (1-35) are complied with during operation.

Safety requirements in specific deployment
phases
Operation and maintenance

Safety

Climatic limits for the operation of *LambdaUnite* MSS equipment

These are the climatic limits for the operation of *LambdaUnite* MSS systems:

Temperature range	+5 °C to +40 °C (exceptional: +50 °C)
Humidity range	relative humidity: 5% to 85% (exceptional: 90%), absolute humidity: 0 to 24 g water per kg dry air

The following climatogram visualizes these climatic limits:
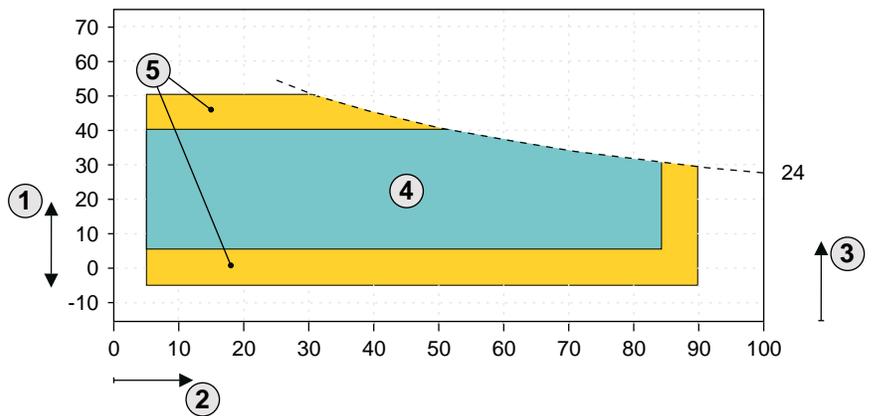
Legend:

1   Air temperature [°C]

2   Relative humidity [%]

3   Absolute humidity [g water/kg dry air]. The dashed curve specifies a constant absolute humidity of 24 g water per kg dry air.

4   Permissible range for the operation of *LambdaUnite* MSS systems.

5   Exceptional conditions, permissible for a short duration only.

Taking out of operation

....

Invisible laser radiation

 DANGER

Injury to eyes caused by invisible laser radiation.

*LambdaUnite™ MSS systems operate with invisible laser
radiation. Laser radiation can cause considerable injuries to
the eyes.*

*Never look into the end of an exposed fiber or into an
open optical connector as long as the optical source is
switched on. Always observe the laser warning
instructions (cf. "Laser safety" (1-11)).*

Arcing

 DANGER

**Arcing on removing or inserting a live power supply
plug.**

*Arcing can cause burns to the hands and damage to the
eyes.*

*Ensure that the line circuit breaker on the Power
Interface (PI) is in the "OFF" position before removing
or inserting the power supply plug.*

Weight

....

Safety requirements in specific deployment
phases
Taking out of operation

Safety

⚠ **WARNING**

Risk of injury due to unsecured shelf.

A fully-equipped shelf weighs more than 30 kg and can cause considerable injuries if it is knocked over or dropped. This can also cause serious damage to the shelf.

At least two persons are required for lifting the shelf.

Electrostatic discharge (ESD)

CAUTION

Destruction of components by electrostatic discharge.

Electronic components can be destroyed by electrostatic discharge.

Hold circuit packs only at the edges or on the insertion and removal facilities. Always observe the ESD instructions (cf. "Electrostatic discharge" (1-18)).

Disposal The equipment in the *LambdaUnite* MSS system series must be disposed of at the end of its lifetime. Please contact us in this case and we will arrange for proper and environment-friendly disposal of your equipment (most parts of the system can be recycled).

⌐

....

2 Overall installation and test planning

Overview

Purpose The purpose of this chapter is to provide the information needed to plan the installation of a *LambdaUnite*™ MultiService Switch (MSS) system.

Contents

Important facts to know

Rack dimensions The racks require an area of 600 mm [23.622"] x 600 mm [23.622"] (width x depth). This area represents the absolute system limits which must not be exceeded in the operating state by protruding elements such as switches or plugs. The standard height is 2.2 m [86.614"] for an ETSI-2 rack and 2.125 m [83.661"] for an NEBS-2000 rack. The racks are designed to accommodate two *LambdaUnite*™ MultiService Switch (MSS) subracks.

Rack weights The ETSI-2 rack has a maximum weight of 120 kg/264.6 lbs (including PDP, cables and doors).

The NEBS-2000 rack has a maximum weight of 116 kg/255.8 lbs (including PDP, cables and doors).

Subrack weight The subracks have a maximum weight of 41 kg/90.41 lbs (including user panel, fan, PIs, CI-CTL, TIs and 12x blanks at the rear).

Power installation The voltage on the PDP must be in the range of -40.5 … -72 DC.

Please pay attention to the following advices:

- *It is strongly recommended to have an office power supply source which is able to provide a short circuit current of at least 10 times the size of the used safety devices (e.g. fuses) in the power feed.*
  This is necessary to make the circuit breakers quickly to trip in case of a short circuit and thus to limit possible damage to the power feed installation and to the equipment. This does most likely require the usage of a battery included in the office power station.

- *It is recommended that the external power feeder wiring (including necessary interconnections and safety devices) shall have sufficient current conductivity to keep the voltage drop from battery to rack entrance below 1.5 V at charging voltage and nominal current. Depending on the distance this may lead to so far not yet used cross sections of power feeders.*

Lucent Technologies   365-374-023
Issue a, October 2001

This is necessary to assure that with decreasing voltage any possibly installed shutdown mechanisms of the power supply plant will act before the system reaches its specified minimal allowed voltage. If decreasing the voltage below its specified allowed voltage range it will switch off itself randomly step by step on a per unit basis to prevent damage by the consequently increasing current.

EMC/ESD information   The system was developed in compliance with the ETSI Mesh Ground requirements.

This means that EMC compliance and personnel safety can be achieved only if the system is connected to a System-Reference Potential Plane (SRPP) at many places as described in ETS 300 253 (see the figure below).

All peripheral equipment to be connected to the system must also be connected to the SRPP by one or more fixed wires.

The protective earth/ground of the peripheral equipment must be connected to the SRPP.
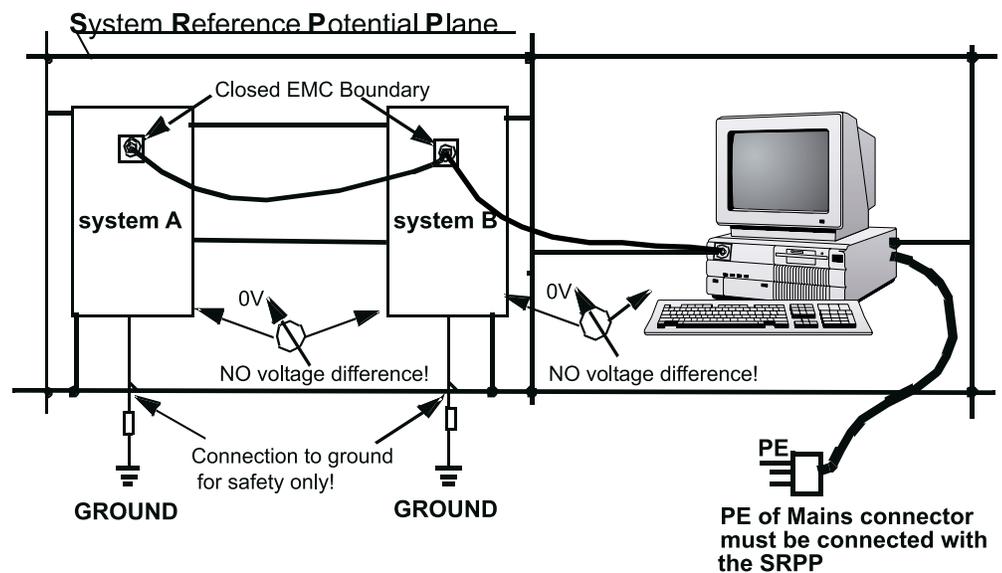
The EMC/ESD boundary is defined at subrack level. The principle is based on the "Faraday Cage" theory. If there are covers, then the covers must be closed.

There is an ESD ground/earth socket on the subrack.

A grounded wrist strap with banana plug must be worn when opening the subrack covers.

This guide describes equipment that contains static sensitive devices.

Circuit pack handling

The following *ESD instructions* must be observed when handling circuit packs:

- Wear working garment made of 100% cotton to avoid electrostatic charging.

- Touch the circuit packs at the edges or the insertion and removal facilities only.

- Ensure that the rack is grounded.

- Wear conductively connected wrist straps and connect them to the rack ESP bonding point.

- Work in an area which is protected against electrostatic discharge. Use conducting floor and bench mats which are conductively connected to the rack ESP bonding point.

- Conductively connect all test equipment and trolleys to the rack ESP bonding point.

- Store and ship circuit packs and components in their shipping packing. Circuit packs and components must be packed and unpacked only at workplaces suitably protected against build-up of charge.

- Whenever possible, maintain the relative humidity of air above 20%.

Required tools and test equipment

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

Tool	Purpose
ESD wrist strap (included in the shelf delivery)	ESD protection
Isopropanol, compressed air and wipes	Fibre cleaning
Microscope with a magnification x 200	Checking the connector face for impurities
LC attenuators	Optical attenuation
LAN cable (unshielded straight Ethernet LAN cable with 4-wire RJ-45 connectors)	Physical connection between NE and PC
PCMCIA CompactFlash card adapter	Initial load of CompactFlash card
PC (Laptop)	Provisioning purposes via WaveStar® CIT

Test equipment   A variety of test equipment is required to carry out the individual tests. The following table provides an overview of the required equipment. The types listed are suggestions only. Equipment of another type or manufacturer can also be used.

Test equipment	Type	Purpose
SDH analyzer (STM1-STM64)	ACTERNA ANT-20E (www.acterna.com) ANRITSU MP 1570A (www.anritsu.com) HP 37718A (www.hp.com)	Testing different interfaces depending on applications
Optical power meter	ACTERNA OLP-15	Optical power measurement

Test equipment	Type	Purpose
Optical spectrum analyzer	ACTERNA OLS-155	Optical wavelength and spectral with test
Ethernet analyzer	IXIA 400 with 1G/SX-2 interfaces	Measuring 1 Gigabit Interfaces
Adjustable optical attenuator	ACTERNA OLA-35	Optical power measurement
Multimeter	FLUKE 8060	Measuring -48V/-60V DC power supplies

WaveStar® CIT requirements

The minimum requirement for a WaveStar® CIT is a personal computer with the following:

- Pentium® 266-MHz processor (Pentium® III 500 MHz or higher recommended) with 128-MB RAM (256 MB of RAM or higher recommended)

- Standard floppy drive for 1.44-MB 3.5" floppy disks

- 150 MB of free hard drive space

- CD-ROM drive (16X recommended)

- PCMCIA (Personal Computer Manufacturer's Card Interface Adapter) slot type II

- SVGA monitor set to 800x600 resolution or higher and 256 colors (1024x768, 16 million colors recommended)

- 10/100 BaseT LAN interface built-in or supplied with a PCMCIA card, installed and working

- Microsoft Windows® NT 4.0 operating system with Service Pack 5 or Microsoft Windows® 2000

- Adobe Acrobat Reader for Windows (version 3.01 or later)

- Removable hard-disk drive (optional; required only for system backup).

Customer Requirements

CE mark The CE mark indicates that the products conform to the relevant European Community (EC) Directives.

This CE-marked subrack is compliant with Directives:

EC89.336/EEC - Electromagnetic Compatibility (EMC).

EC73.23/EEC - Low-Voltage Directive (LVD).
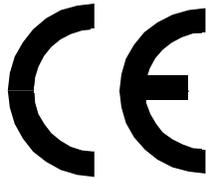
UR The UR mark indicates that the products conform to the relevant American Directives.

CSA The CSA mark indicates that the products conform to the relevant American and Canadian Directives.

Tightening Torque

Mechanical Function This standard specifies the conditions to be met when applying live parts together with screws or nuts.

Screws and Nuts		Torque
Diameter	**Pitch[1]**	**Nominal (Nm)**
M2	0.4	0.24±0.02
M2.5	0.45	0.48±0.03
M3	0.5	0.9±0.1
M4	0.7	2±0.1
M5	0.8	4±0.2
M6	1	7±0.3
M8	1.25	18±0.8
M10	1.5	34±1.5
M12	1.75	58±2.5

Notes:

1.   Intermediate fit (H6/g6 ISO metric screw-thread).

Electrical function This standard specifies the conditions to be met when applying HF live parts or ESD contacts of a PCB of screw joints with an electrical function.

Stainless-Steel Cheese Screw joints on PCBs	Torque (Nm)
M2.5	1
M3	1.5
M3	1.3

3   Equipment installation

Overview

Purpose   The purpose of this chapter is to provide the information needed to install all mechanical parts of a *LambdaUnite*™ MultiService Switch (MSS) system.

Rack types   The following rack types are available:

- ETSI-2 (International Market)
- NEBS-2000 (USA Domestic Market)

Required area   The racks require an area of 600 mm [23.622"] x 600 mm [23.622"] (width x depth). This area represents the absolute system limits which must not be exceeded in the operating state by protruding elements such as switches or plugs. The standard height is 2.2 m [86.614"] for an ETSI-2 rack and 2.125 m [83.661"] for an NEBS-2000 rack.

Contents

365-374-023
Issue a, October 2001
    Lucent Technologies
    3 - 1

⏋

Rack Materials (ETSI–2)

Package Contents Mounted on rack types: Rack ETSI-2 (incl. doors) – 848727095 and Rack ETSI-2 (without doors) – 848775649 .

Qty	Description — Code
1	Power Distribution Panel – 848727129
2	Cable Assy, PDP - LED, Alarm — 848811543/DC1002831 (Rear/front)
2	Cable Assy, Upper shelf - PDP — 848811501/DC1002826 (A or B), 1850mm
2	Cable Assy, Lower shelf - PDP — 848811519/DC1002827 (A or B), 3200mm
1	Cable Assy, CI-CTL - PDP, Upper — 848811527/DC1002828 (1100mm)
1	Cable Assy CI-CTL - PDP Lower — 848811535/DC1001829 (3300mm)
1	Door Support, Top Assy — DC1001933 (includes: Assy, CM-Alarm — RAL UCMI-I)
1	Door Support Bottom Assy — 848302527
1	Indicator Strip — DC1000590
2	Subrack Guide — DC1002905
	(2 per upper subrack)
4	Adjustable Feet — 407890623
2	Assembly, Fiber U-Bracket — DC1001236 (front-top)
2	Cable rod, short — DC1002903
4	Cable rod, long — DC1002904
	Clip, Self-Adhesive — 402185409

Package–bag mounted within the rack type

Qty	Description — Code
4	Bushing for Adapter Kit — 848316279
4	Wash STL ST–70–140HV 4.3x12 – 847174950
4	CH SCR STL ST-70 M4x25 – 847117900
	Nylon Cable-Ties — 407804715
14	Screw, Tapping Thread-Forming, M6x16 — 901331421
3 m.	Velcor — DC1005002

Site Material Optional   Optional list for Rack ETSI-2 (without doors) – 848775649

Qty	Description — Code
1	Assy Doors — 848795001 includes:

- 2x Assy, Door, Left — DC1000585
- 2x Assy, Door, Right — DC1000586

List of contents

Qty	Description — Code
	Nylon Cable-Ties — 407804715
Max. 4	Eye Bolt — DC1001689 (2 per rack) with Nut — 901344184
1	Assy, Sideplates — 848780177 includes

- 2x Side Plate — DC1000577 , Left and Right (2200mm)

Grounding Material

Quantity	Description — Comcode	Remarks
1	Ground Wire (800 m.) — 848828158	PDP
1	Bolt, M5x16	Green
1	Washer M5, tooth lock — 901361949	
1	Hex. Nut M5	

Technical Data (ETSI-2)

Specifications	
Item	**Quantity/ Size**
Weight	120 kg [264.6 lbs] (including PDP, cables and doors)
	80 kg [176.4 lbs] (without doors)
Dimensions (H x W x D)	2200mm [86.614"] x 600mm [23.622"] x 600mm [23.622"]

Layout   This rack is designed to accomodate top and bottom cable-access.

Figure 3-1 Rack Layout
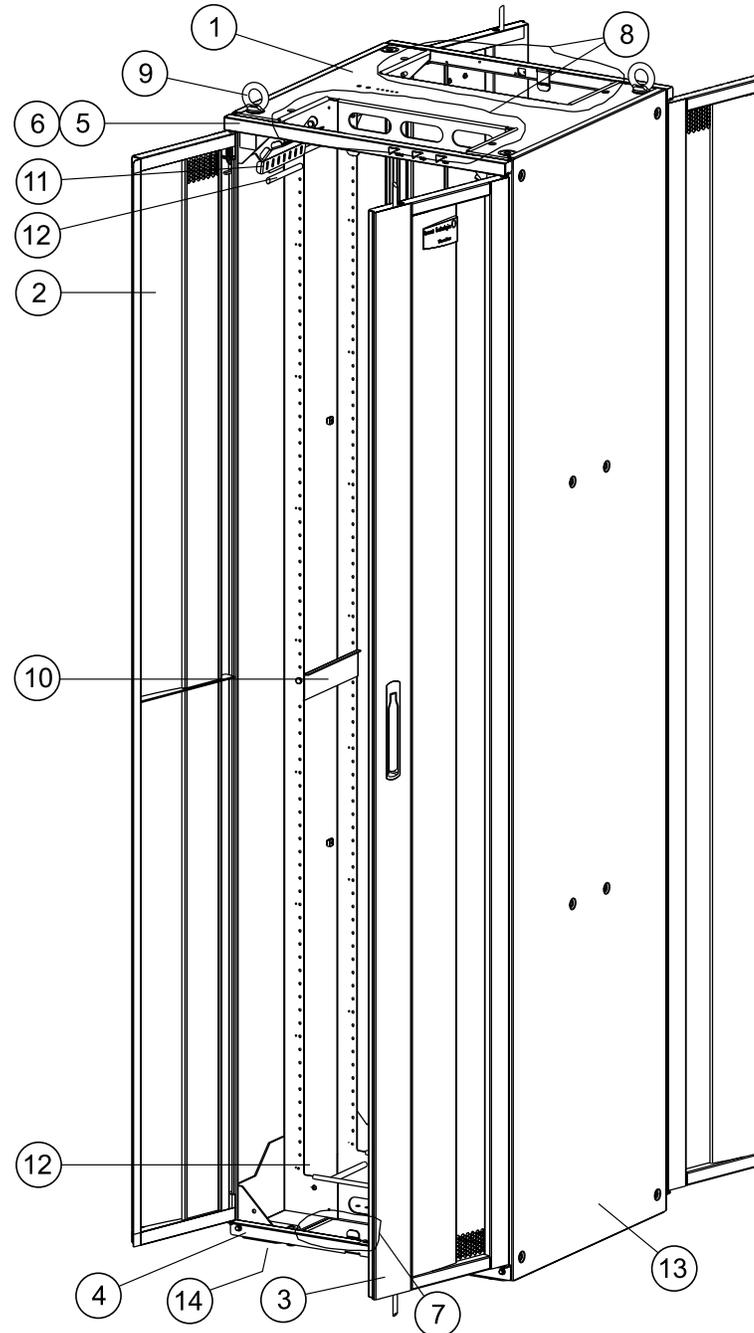
Legend:

1   Rack ETSI-2 (incl. doors) – 848727095 / Rack ETSI-2 (without doors) – 848775649

2   Assy, Door, Left — DC1000585

3   Assy, Door, Right — DC1000586

4   Door Support Bottom Assy — 848302527

5   Door Support, Top Assy — DC1001933

6   Indicator Strip — DC1000590

7   Bottom-Access Entry Hole

8   Top-Access Entry Hole

9   Eye Bolt — DC1001689 (optional)

10   Subrack Guide — DC1002905

11   Assembly, Fiber U-Bracket — DC1001236

12   Cable rod, short — DC1002903 or Cable rod, long — DC1002904

13   Assy, Sideplates — 848780177

14   Adjustable Feet — 407890623

Floor Mounting (ETSI-2)

Dimensions

Figure 3-2 Top/Bottom Layout of Plate

397 [15.630]

175.8 [6.921]

400 [15.748]

474 [18.661]

175.8 [6.921]

★2

★1

397 [15.630]

427 [16.811]

535 [21.063]
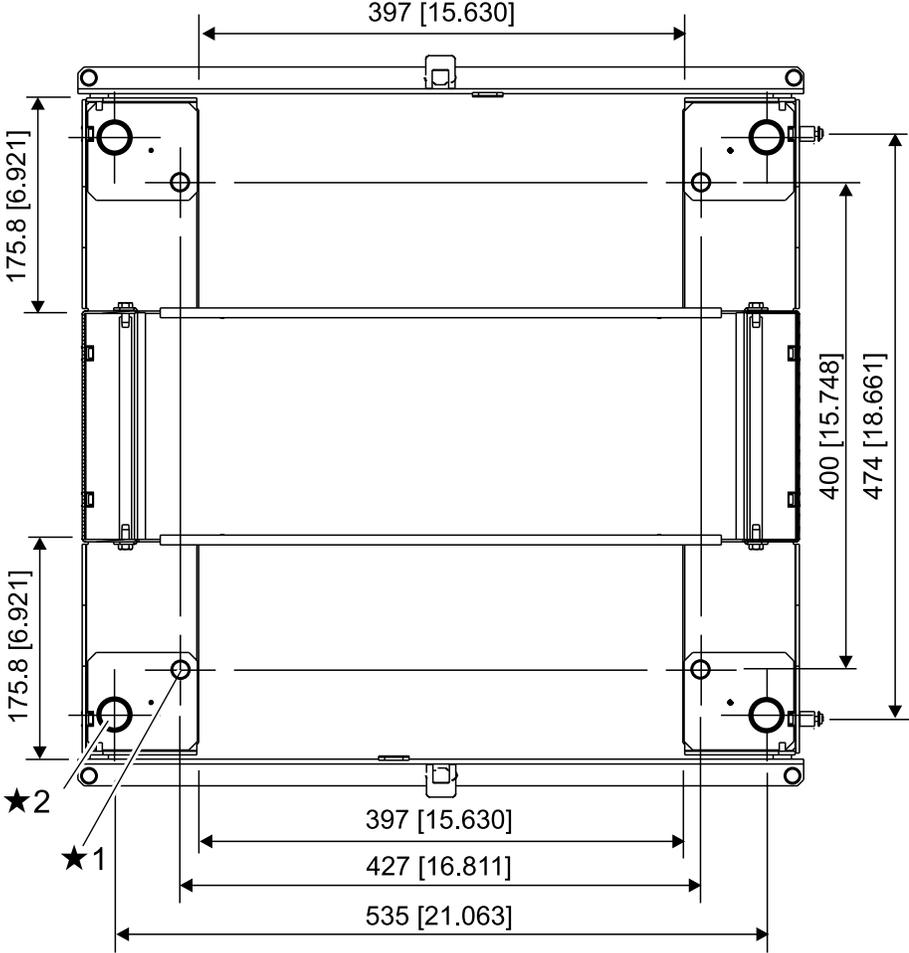
Legend:

*1   Hex. Bolt, STL ST-70, M12x20 — 847191574

*2   Adjustable Feet — 407890623

Important! The front side is identified by the fiber U-brackets (= item 11 in Figure 3-1, "Rack Layout" (3-6)).

Mounting **Important!** If the rack has to be installed on a raised floor, see the customer's specifications and use customer-provided materials.

....

1   Drill the necessary holes (14 mm in diameter) in the floor *1.

....

2   Put the Expanding bolt — 407758200 (Item 2) in place and mount the
        bottom plate of the rack on the surface with the help of the Adjustable
        Feet — 407890623 (*2).

        Important! Adjust the rack's feet so that there are 25 mm between
        the floor and the rack before levelling the rack. This adjustment
        ensures that it is still possible to level the next rack.

        E ND   OF   S TEPS ....

....

365-374-023   **Lucent Technologies**   3 - 9
Issue a, October 2001

Layout

Figure 3-3 Floor-Mounting
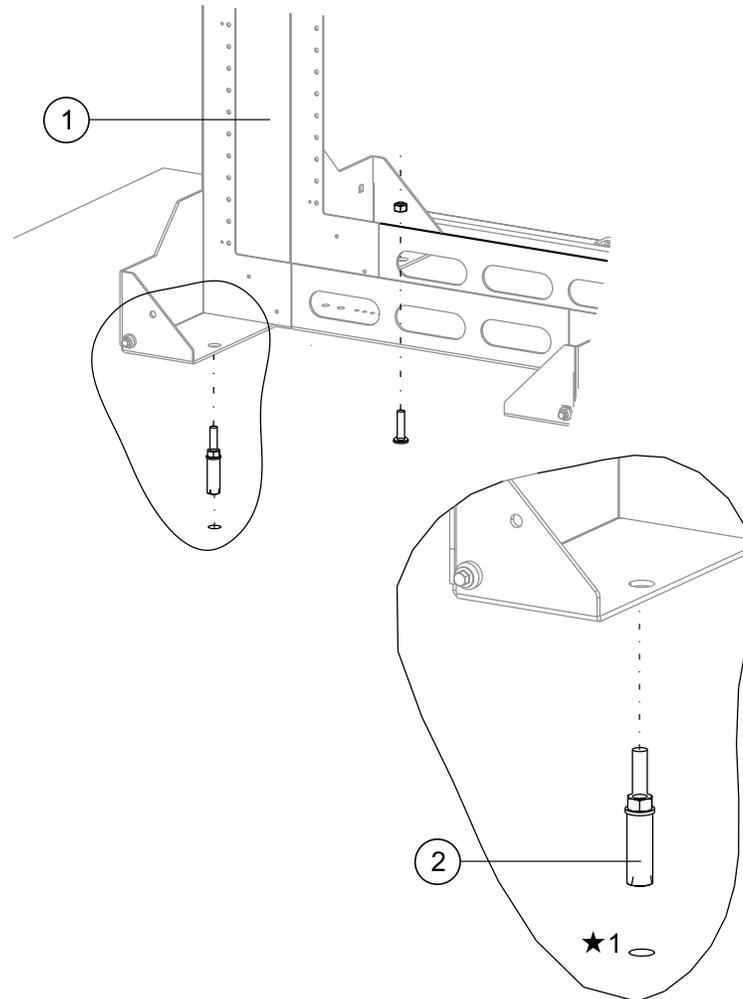
Rack Materials (NEBS-2000)

....

Package Contents Mounted on rack types: Rack NEBS-2000 (incl. doors) – 848727103 and Rack NEBS-2000 (without doors) – 848775631 .

Qty	Description — Code
1	Power Distribution Panel – 848727129
2	Cable Assy, PDP - LED, Alarm — 848811543/DC1002831 (Rear/front)
2	Cable Assy, Upper shelf - PDP — 848811501/DC1002826 (A or B) 1850mm
2	Cable Assy, Lower shelf - PDP — 848811519/DC1002827 (A or B) 3200mm
1	Cable Assy, CI-CTL - PDP, Upper — 848811527/DC1002828 (1100mm)
1	Cable Assy, CI-CTL - PDP, Lower — 848811535/DC1001829 (3300mm)
1	Door Support, Top Assy — DC1001933 (include: Assy, CM-Alarm — RAL UCMI-I)
1	Door Support Bottom Assy — 848302527
1	Indicator Strip — DC1000590
2	Subrack Guide — DC1002905
	(2 per upper subrack)
2	Assembly, Fiber U-Bracket — DC1001236 (front-top)
2	Cable rod, short — DC1002903
4	Cable rod, long — DC1002904
	Clip, Self-Adhesive — 402185409

Package–bag mounted within the rack type

Qty	Description — Code
4	Bushing for Adapter Kit — 848316279
4	Wash STL ST–70–140HV 4.3x12 – 847174950
4	CH SCR STL ST-70 M4x25 – 847117900
	Nylon Cable-Ties — 407804715
14	Screw, Tapping Thread-Forming, M6x16 — 901331421
3 m.	Velcor — DC1005002

Site Material Optional Optional list for Rack NEBS-2000 (without doors) – 848775631

....

Qty	Description — Code
1	Assy, Doors — 848795019 includes: • 2x Assy, Door, Right — DC1002599 • 2x Assy, Door, Left — DC1002598 List of contents

Qty	Description — Code
	Nylon Cable-Ties — 407804715
max. 4	Eye Bolt — DC1001689 (2 per rack) with Nut — 901344184
1	Assy, Sideplate — 848780185 includes: • 2x Side Plate — DC1001939 , Left or Right (2145mm) Grounding Material

Quantity	Description — Comcode	Remarks
1	Ground Wire (800 m.) — 848828158 .	PDP
1	Bolt, M5x16	Green
1	Washer M5, tooth lock — 901361949	
1	Hex. Nut M5	

⌐

Technical Data (NEBS-2000)

Specifications	
Item	**Quantity/ Size**
Weight	116 kg [255.8 lbs] (includes PDP, cables and doors)
	79kg [174.2 lbs] (without doors)
Dimensions (H x W x D)	2125mm [83.661"] x 600mm [23.622"] x 600mm [23.622"]

Layout   This rack is designed to accomodate top- and bottom cable access.

Figure 3-4 Rack Layout
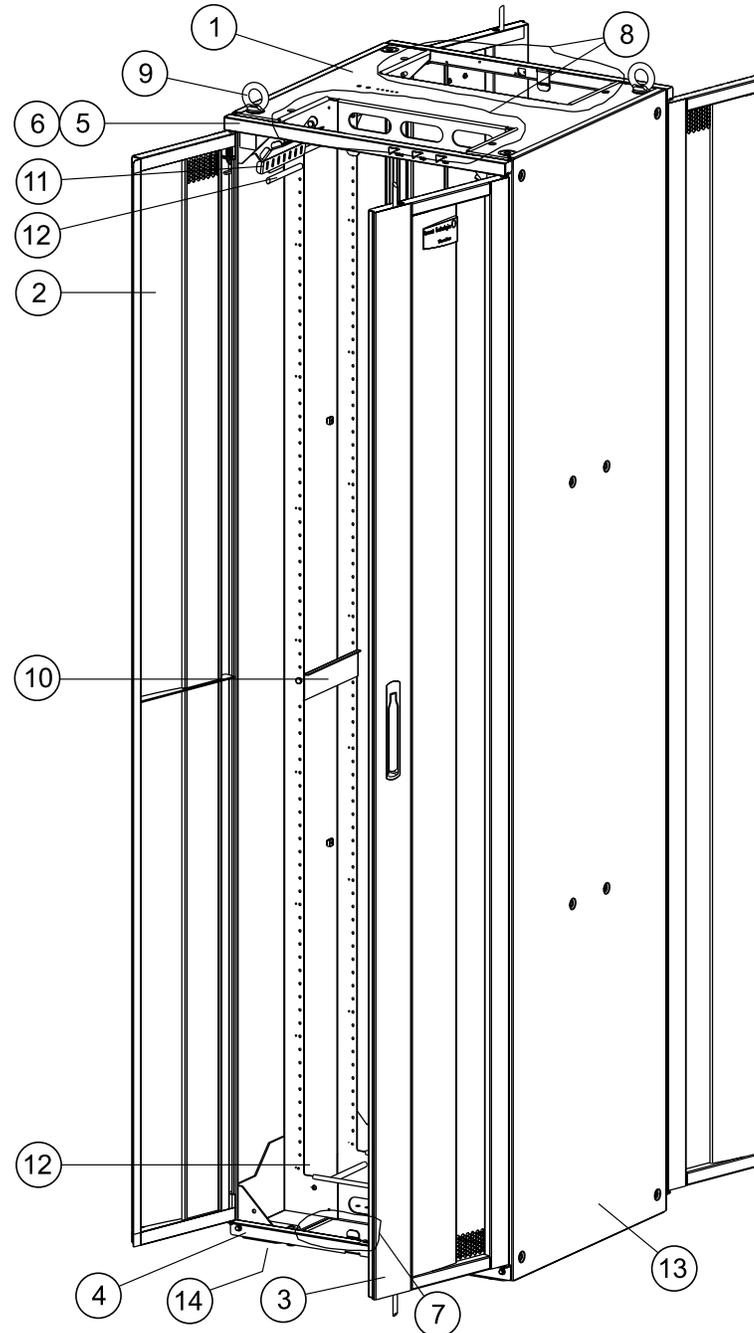
Legend:

1   Rack NEBS-2000 (incl. doors) – 848727103 / Rack NEBS-2000
         (without doors) – 848775631

....

3 - 1 4   **Lucent Technologies**   365-374-023
                                                                                   Issue a, October 2001

2   Assy, Door, Left — DC1002598

3   Assy, Door, Right — DC1002599

4   Door Support Bottom Assy — 848302527

5   Door Support, Top Assy — DC1001933

6   Indicator Strip — DC1000590

7   Bottom-Access Entry Hole

8   Top-Access Entry Hole

9   Eye Bolt — DC1001689 (optional)

10   Subrack Guide — DC1002905

11   Assembly, Fiber U-Bracket — DC1001236

12   Cable rod, short — DC1002903 or Cable rod, long — DC1002904

13   Assy, Sideplate — 848780185

14   No leveling feet available for NEBS-2000 rack frame

⌐

Floor Mounting (NEBS-2000)

Dimensions

Figure 3-5 Plate Top/Bottom Layout
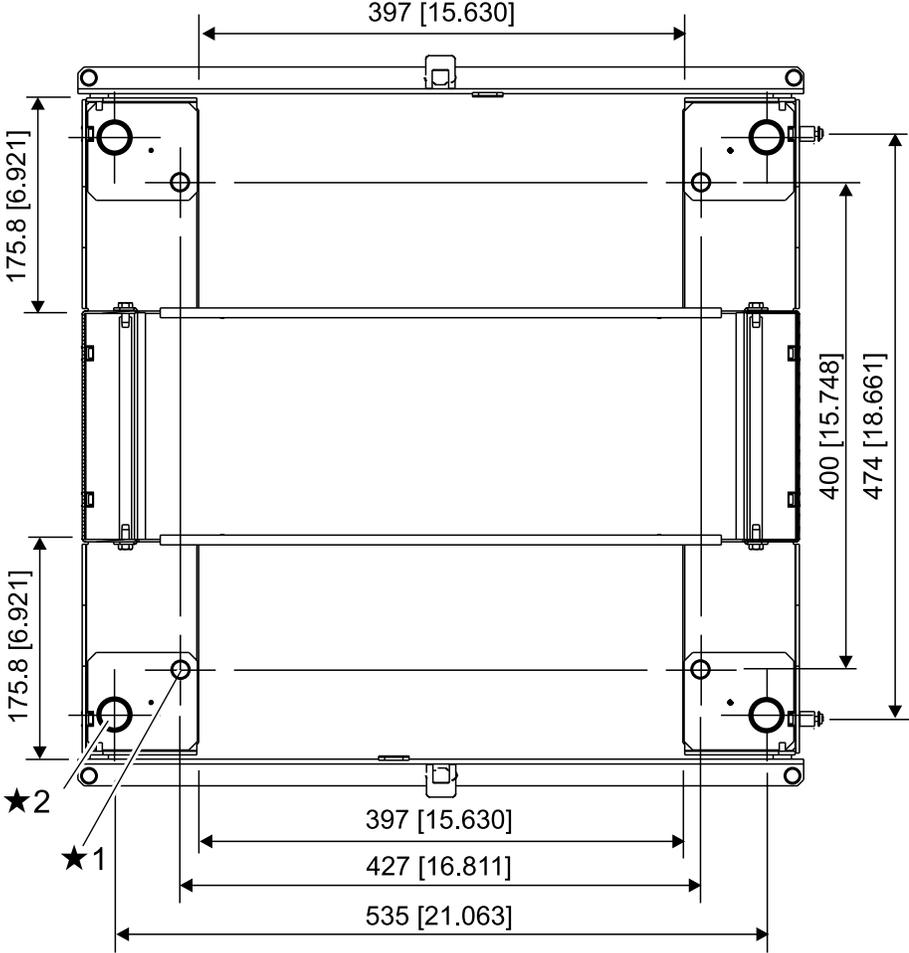
Legend:

*1 or *2   Hex Bolt STL ST-70 M12x20 — 847191574

Important! The front side is identified by the fiber U-bracket (= item 11 in Figure 3-4, "Rack Layout" (3-14)).

Mounting **Important!** If the rack has to be installed on a raised floor, see the customer specifications and use customer provided materials.

....

1   Drill the needed holes (14 mm in diameter) in the floor *1 or *2.

....

2   Put the Expanding bolt — 407758200 (Item 2) in place and mount the
        bottom plate of the rack to the surface.
        E ND   OF   S TEPS
....

layout

Figure 3-6   Floor Mounting

....
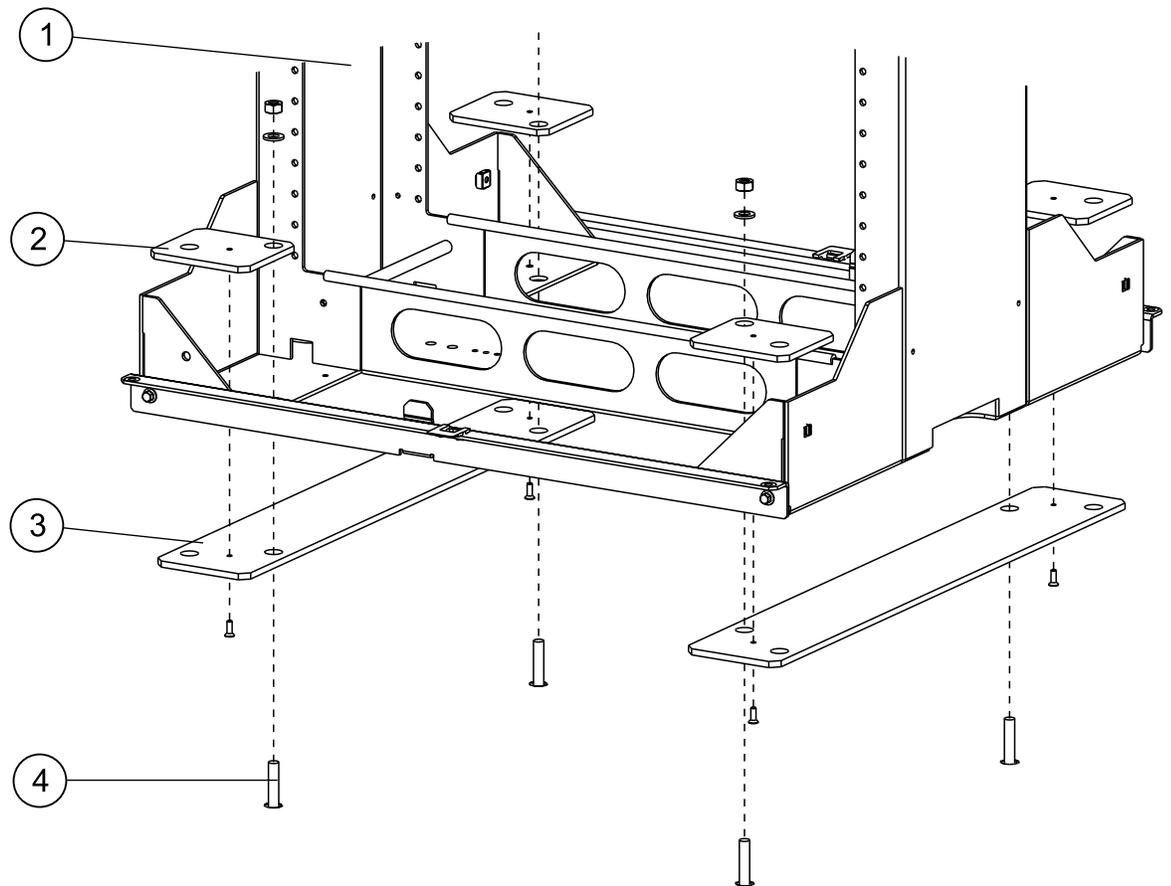
Technical Data for the PDP

Specifications

Item	Quantity/ Size
Power consumption	Maximum 2200 Watt
	(circuit breakers of 68A must be used in the external Battery Distribution and Fuse Bay (BDFB))
Voltage range (all components)	-48 V to -60 V battery voltages
	(-40.5 V minimum, -72 V maximum)
Power feeds	3 power feeders (A, B)
Ground	3 x ground-connection points
Dimensions (H x W x D)	70 mm [2.756"] x 482.6 mm [19"] x 60 mm [2.362"]

Figure 3-7 Layout

Lucent Technologies
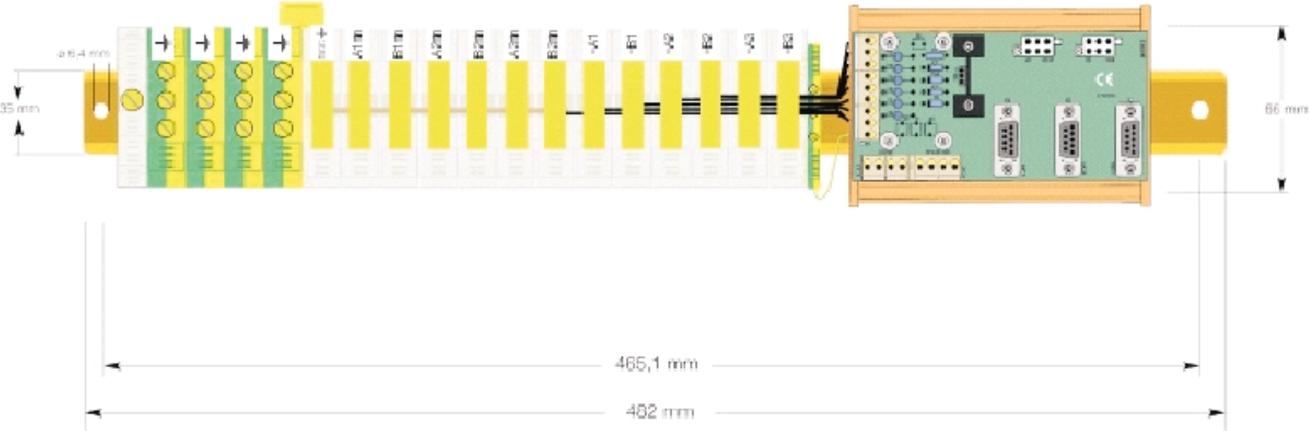
Mounting the PDP

....

Installation of the PDP   **Important!** The PDP is already mounted on the initial frames like;
Rack NEBS-2000 (incl. doors) – 848727103 and Rack NEBS-2000
(without doors) – 848775631 .

....

1   Mount the Plate, upper — DC1005067 (item 1) on the bottom side of
the top of the rack frame with Ch Scr, STL ST 70, M4x8.

Important! Push out the break-out lip of Plate, upper — DC1005067
cables holes on the installation position of the power– or ground
cables.

....

2   Mount the Power Distribution Panel – 848727129 (Item 2) directly
with Screw, Tapping Thread-Forming, M6x16 — 901331421 (Item 3)
and Spacer — 848243325 (item 4) on the top of the rack frame.

Result:
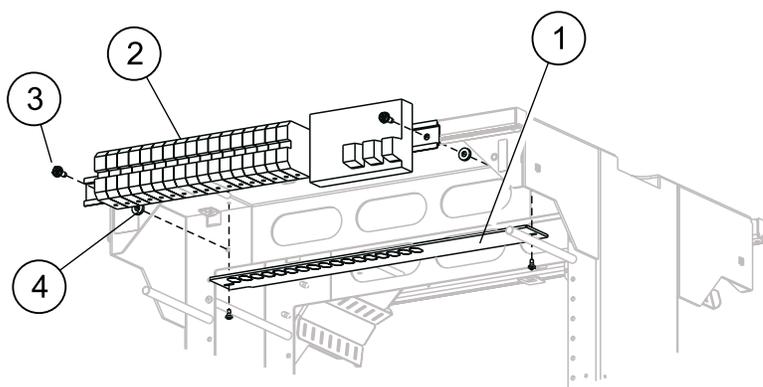
E ND OF S TEPS
....

....

Mounting of Eye Bolts

Procedure

1   Mount the Eye Bolt — DC1001689 (item 1) into the well-nut at the top of the rack frame.

2   Mount the Nut — 901344184 (item 2) at the other end of the eye-bolt to secure it to the rackframe.

E N D   O F   S T E P S

Result

Figure 3-8 Mounting of the Eye Bolt
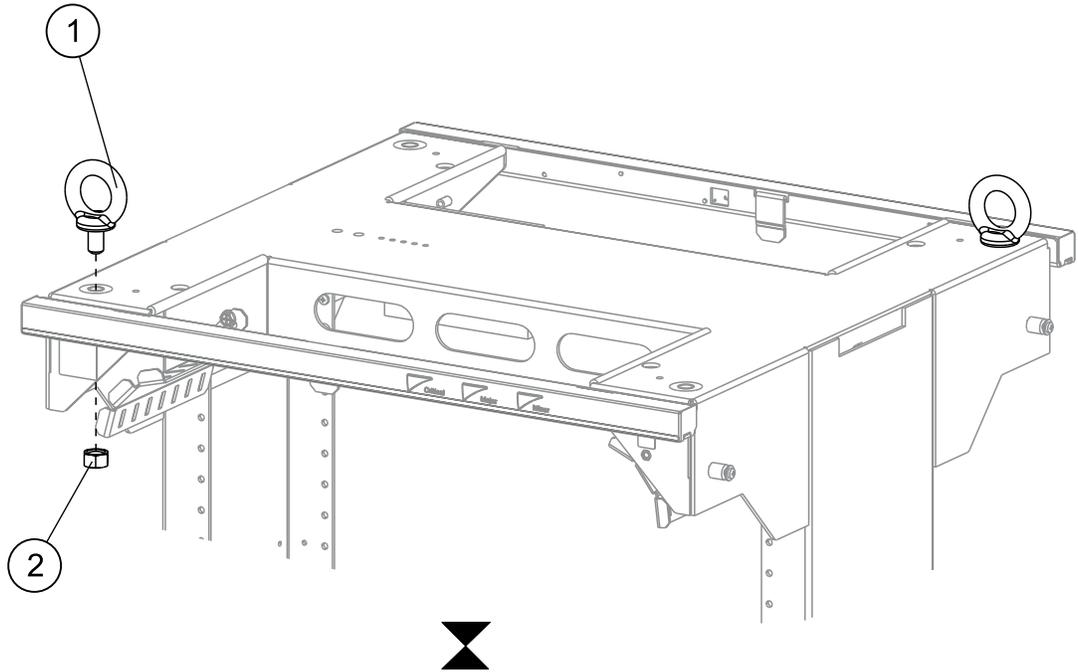
Grounding

Important! These cables are not delivered as standard with the system but are optional, i.e. they can be delivered as office-engineerable kits if a dedicated grounding is needed.

Procedure

1 Connect the ***office-grounding cable*** (item 1) to the top of the rack-frame using two hexagonal M8 bolts and hex. nuts M8 as shown in the figure below.

2 Connect each separate ***shelf-grounding cable*** (item 2) to the top of the rack frame with a hexagonal M5x16 bolt, Washer M5, tooth lock — 901361949 and hex. nut M5as shown in the figure below for Lower/Upper Subrack, Power Distribution Panel and Passive DWDM.

- Ground Wire (800 m.) — 848828158
- Ground Wire (2000 m.) — 848828174
- Ground Wire (3000 m.) — 848828182

E ND OF S TEPS

Result

Figure 3-9 Office Grounding and Shelf Grounding

....
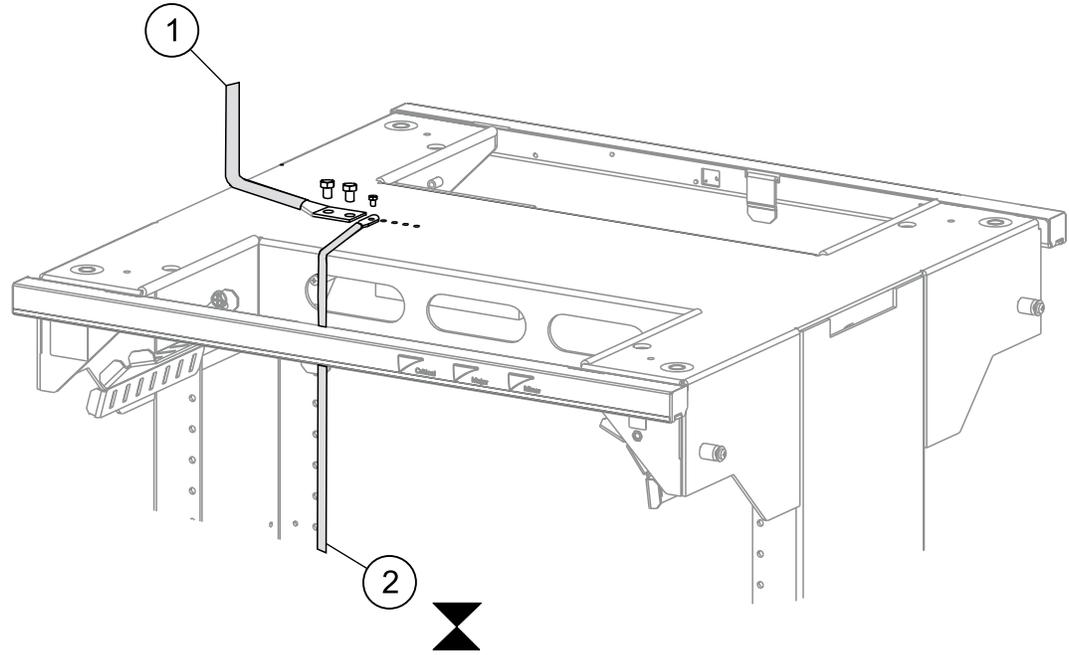
Door Support, Top Assy with Indicator Strip

Before you begin In case of top access temporarily remove the "Rack Doors" (3-66) and the door support top assy before laying the cables in the rack frame.

Procedure

1 Mount the Door Support, Top Assy — DC1001933 (Item 1) at the top of the rack frame using Screw, Tapping Thread-Forming, M6x16 — 901331421 (Item 2) and place Spacer — 848243325 (Item 3) on the screw between the door support and the rack frame.

2 Attach the Indicator Strip — DC1000590 (item 4) to the Door Support, Top Assembly.

3 Connect the prefab Assy, Alarm Cable PDP/LED — DC1002831 from the PDP to the printing wiring board (item 5) that is mounted on the door support top assembly.
 END OF STEPS

Layout

Figure 3-10 Door Support Top Assy with Indicator Strip
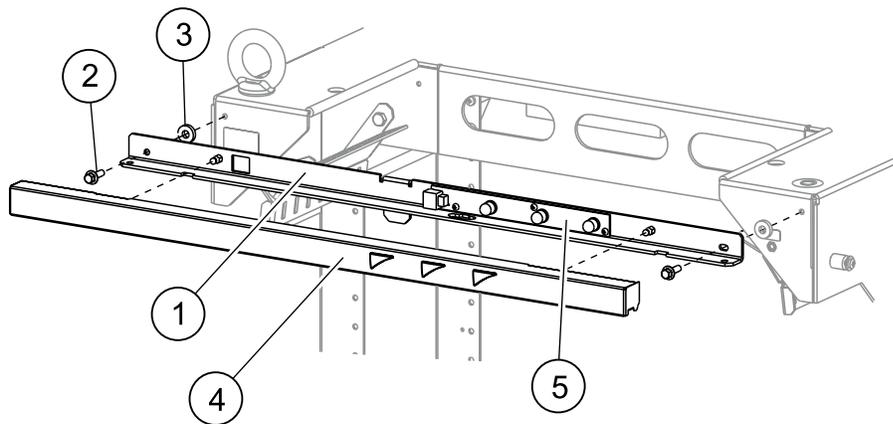
Legend:

Spare set   Assy, CM-Alarm — RALUCM1_1

Cable Rods

Cable rod, short

1 Mount the Cable rod, short — DC1002903 (Item 1) on both uprights at the rear of the rack frame within the guides configuration position which is counted from the bottom by using CH SCR, STL ST–70, M4x16 – 847117884 .

For Unite rack-frames:

- Two positions below the highest hole * 1; (top and bottom access)

E N D   O F   S T E P S

Cable rod, long

1 Mount the Cable rod, long — DC1002904 (Item 2) on both uprights in the center of the rack frame within the guides configuration position which is counted from the bottom by using CH SCR, STL ST–70, M4x16 – 847117884

For Unite rack-frames:

- One position below the highest hole * 2; (top and bottom access)
- One position below the first hole * 3; (top and bottom access)

E N D   O F   S T E P S

Results

Figure 3-11   Mounting of Cable Rods
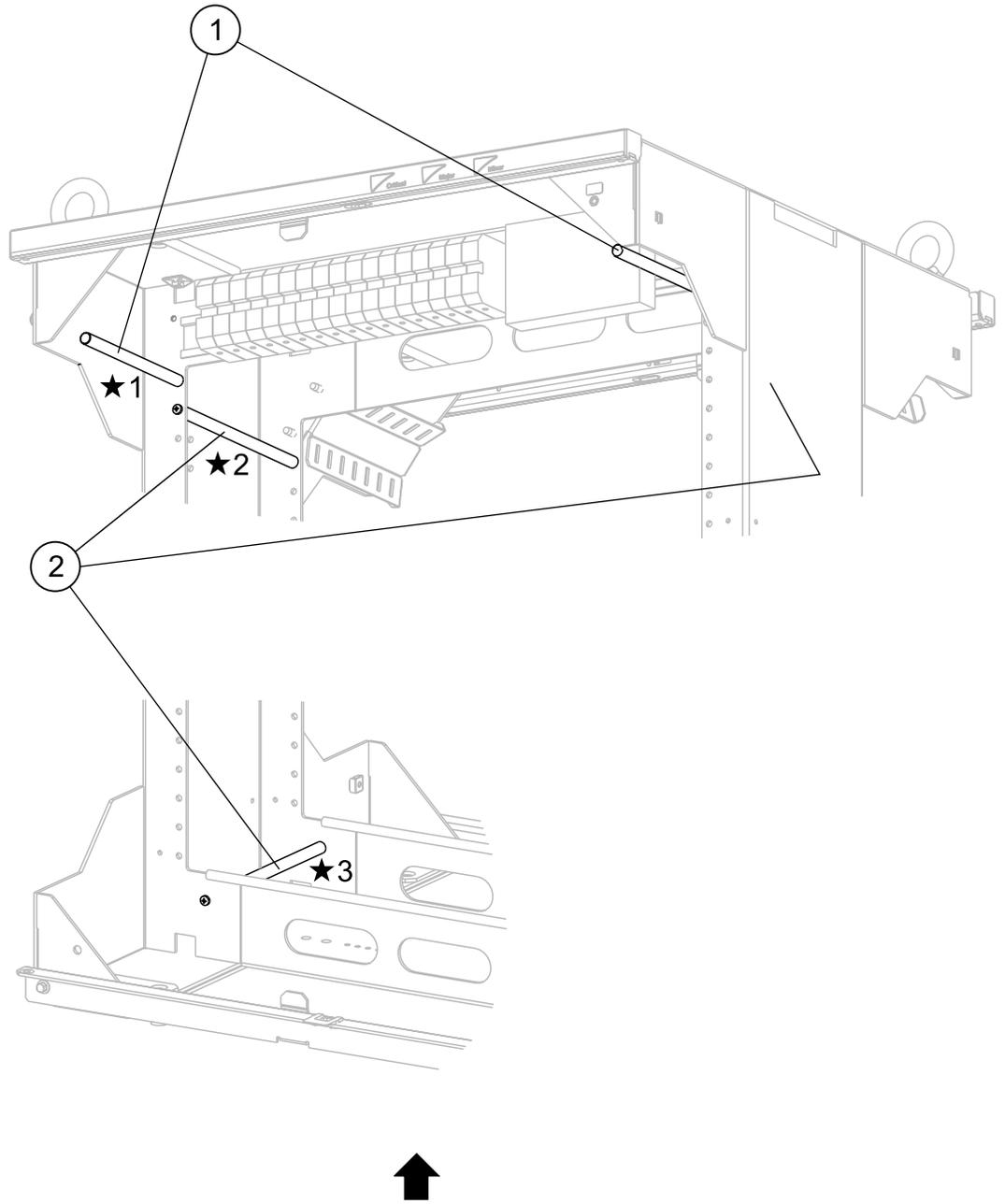
Door Support Bottom Assy

Before you begin In case of bottom access temporarily remove the "Rack Doors" (3-66) and the Door Support Bottom Assy. before laying the cables in the rack frame.

Procedure

1 Mount the Door Support Bottom Assy — 848302527 (Item 1) on the bottom of the rackframe by using Screw, Tapping Thread-Forming, M6x16 — 901331421 (Item 2) and Spacer — 848243325 (Item 3) on the screw between the door support and the rack frame.

E N D   O F   S T E P S

Layout

Figure 3-12 Door Support Bottom Assy
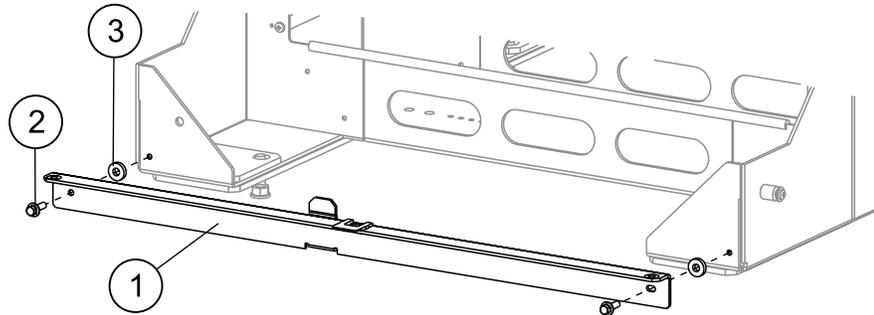
Side Cover Plates

....

Installation Procedure

1   Check if the Assy, Cage nut — DC1002834 (Item 3) is mounted in
the designated gaps of the rack frame.

....

2

If rack frame is a	Then
NEBS-2000 Rack	attach the Assy, Sideplate — 848780185 (Item 1) and fasten with its screws (Item 2).
ETSI-2 Rack	attach the Assy. Sideplates — 848780177 (Item 1) and fasten with screws (Item 2).

E N D   O F   S T E P S

Layout

Figure 3-13 Side Cover Plates Assembly
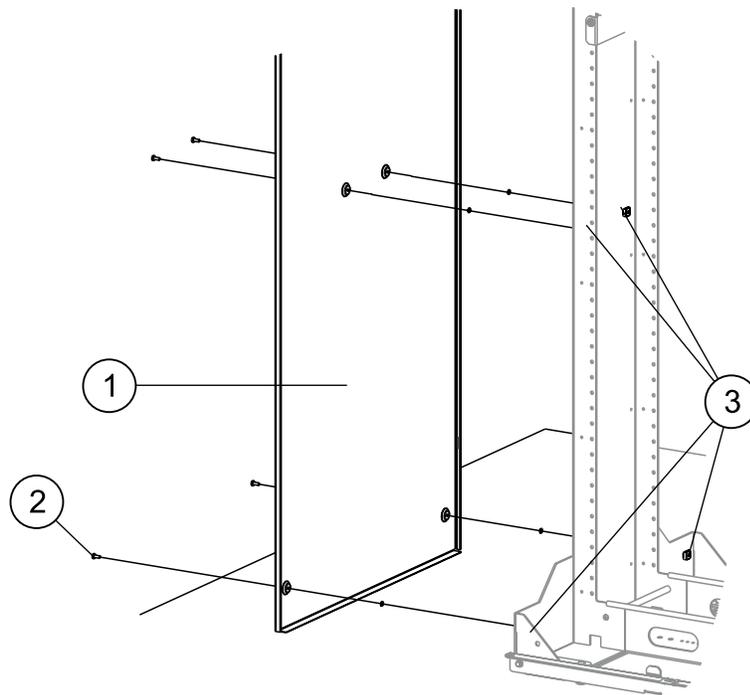
Legend:

....

Assy. Sideplate —   Side Plate — DC1001939 (right and left)
848780785 for
NEBs-2000 consist
of:

Assy. Sideplates —   Side Plate — DC1000577 (right and left)
848780177 for
ETSI-2 consist of:

Rack Adapter Kit

....

Before you begin   In case the existing rack(s) already has side cover plates, remove the cover plate from the side of the existing rack(s) where another rack(s) will be linked. To re-install the side cover plate, see "Side Cover Plates" (3-27)

Installation Procedure   ....

1

Extension side of the existing rack is	Then
at the front to the left	demount the rack adapter kit at the extension rack.
at the front to the right	demount the rack adapter kit at the existing rack.

....

2   Remove the Assy, Cage nut — DC1002834 at the oposite side of the demounted rack adapter kit (see Step 1) located (two at the top and the two at the bottom)

....

3   Place the center style (item 4) of the extension rack next to the existing rack

....

4   Put the Bushing for Adapter Kit — 848316279 (Item 1) between the center style with CH SCR STL ST-70 M4x25 – 847117900 (Item 2) and Wash STL ST–70–140HV 4.3x12 – 847174950 (Item 3) at each nut retainer position.

....

5   Tighten the CH SCR STL ST-70 M4x25 – 847117900 (Item 2) to tie the rack frame together.

E ND OF S TEPS ....

....

Layout

Figure 3-14 Racks Side by Side

Lucent Technologies   365-374-023
                                                             Issue a, October 2001
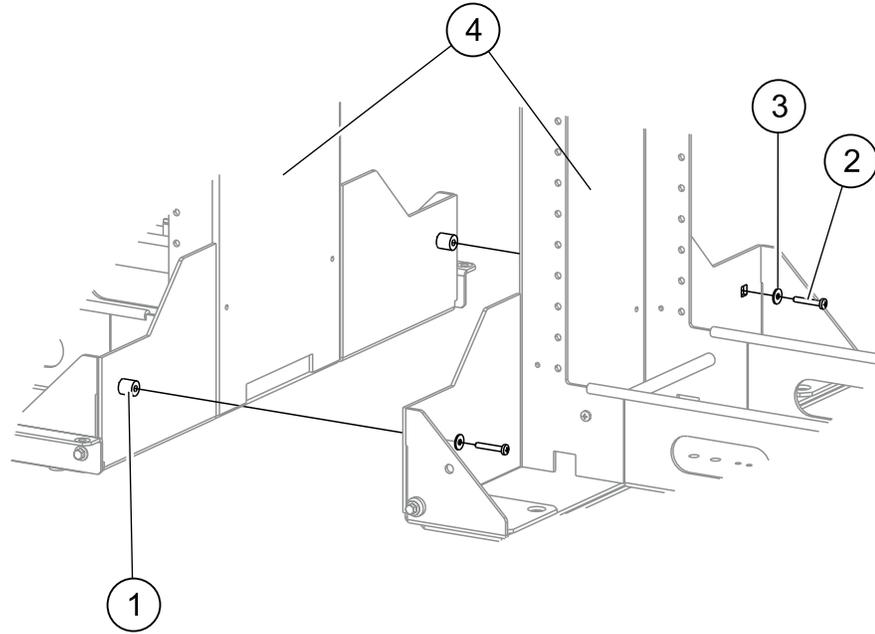
Subrack Layout

....

Front View of Layout

Figure 3-15 Circuit-pack Positions in the Subrack
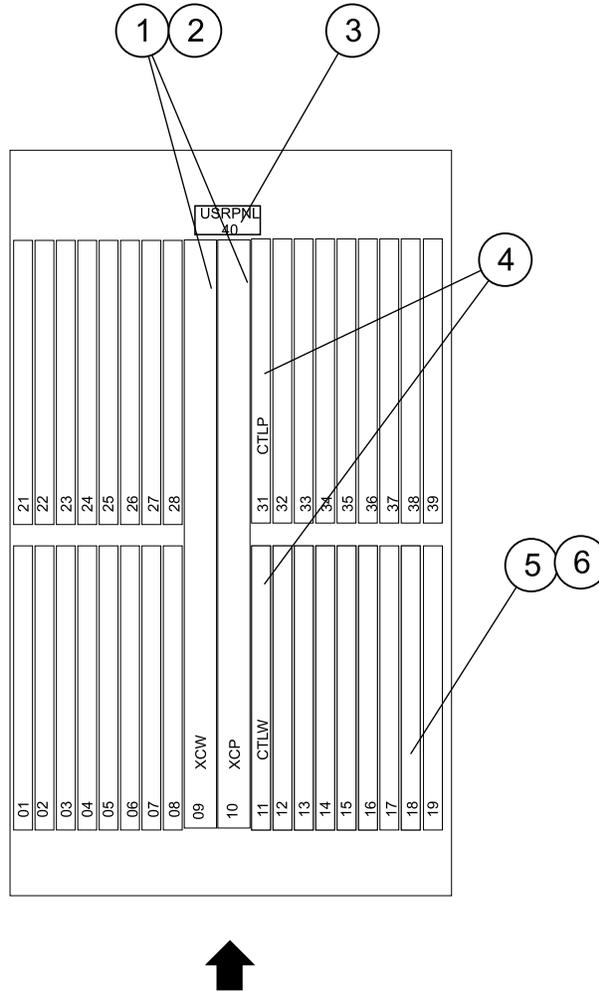
Legend:

1   Switch Pack 320G & Timing — 109000299

2   Blank XC320 (6N) — 848782876

3   User Panel — 848730636

4   Controller — 10900158

5   OP2G5 or OP10G or GE1 Circuit Packs (see " *LambdaUnite*™ MSS Specifications Optical Circuit-Pack" (B-16))

6   Front Blank (3N) — 848782868

....

Back-Plane Layout

Figure 3-16 Paddle Board Positions in the Subrack
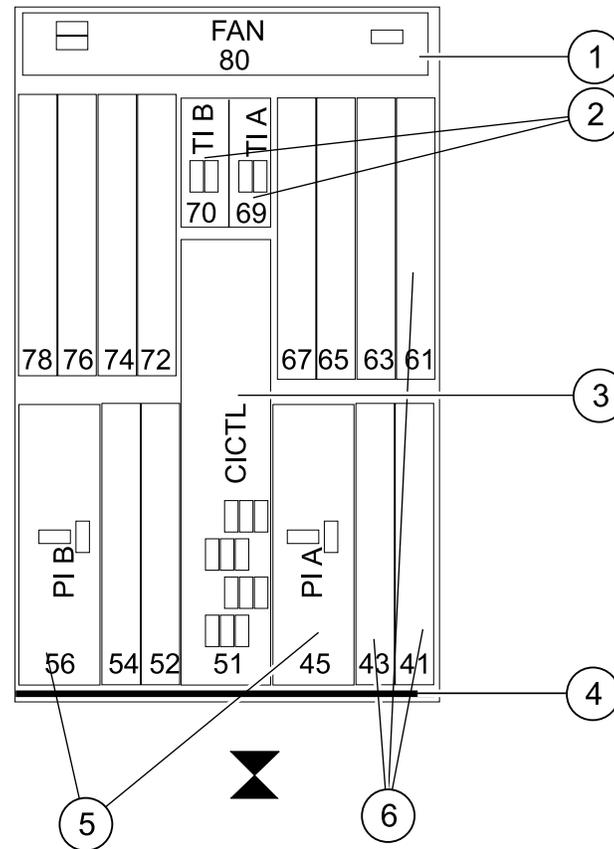
Legend:

1   Fan Unit — 848730644

2   Timing Interface, E1/DS1 — 109001453

3   Controller Interface — 109001461

4   Filter, Washable — 408643005

5   Power Interface — 109001446

6   Paddle Board, Blank — 848780193

CI-CTL

Figure 3-17   CI-CTL Layout
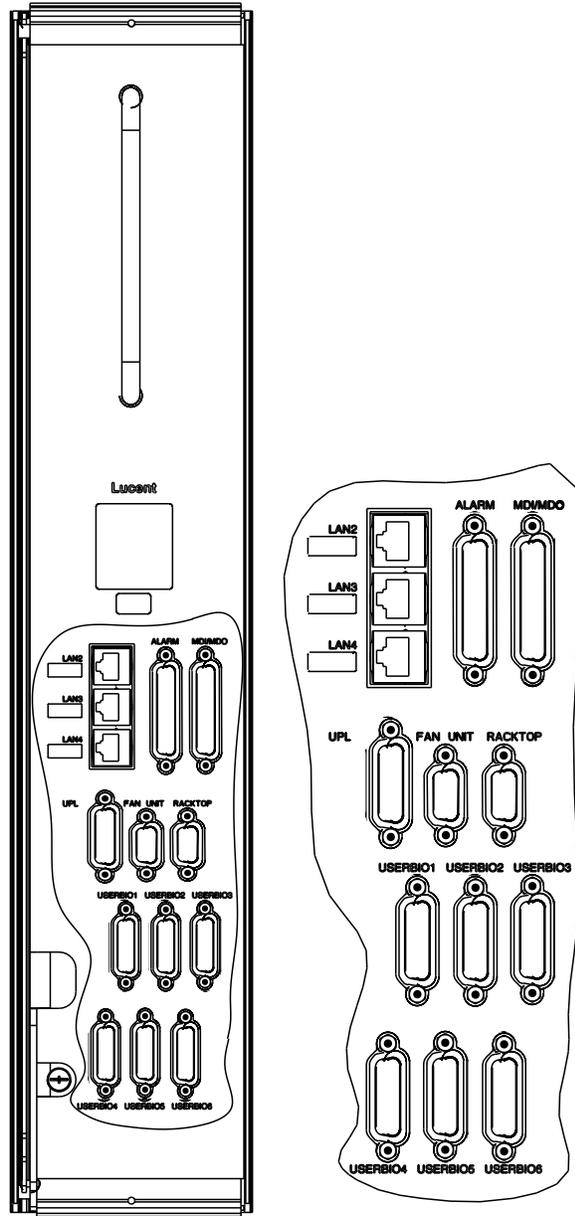
Rear Blanks

Figure 3-18 Blank Rear Faceplate
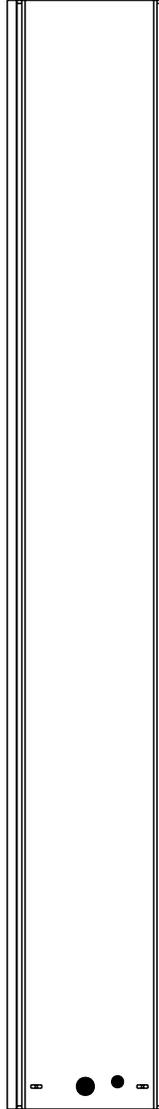
Legend:

1   Paddle Board, Blank — 848780193

Front Blanks

Figure 3-19   Blank Front Faceplate (3N)
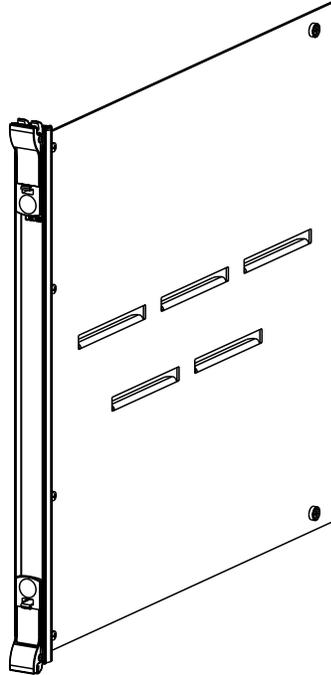
Legend:

1   Front Blank (3N) — 848782868

Figure 3-20 Blank Front Faceplate (6N)
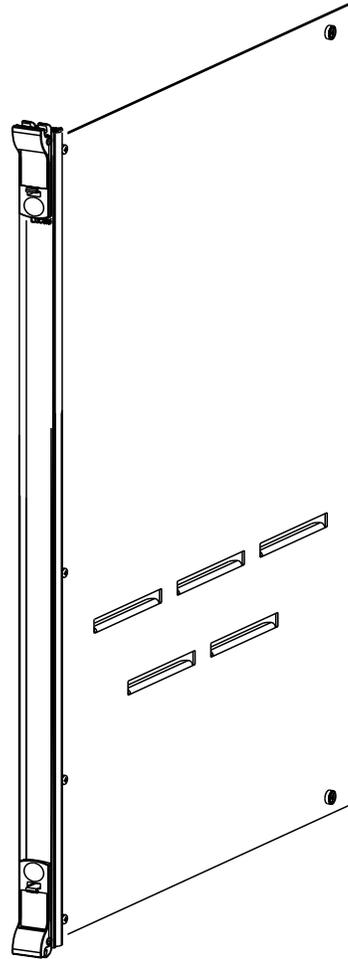
Legend:

1   Blank XC320 (6N) — 848782876

Subrack Accessories

....

Subrack Kit   Mounted on *LambdaUnite*™ MSS Dur-Subrack Core Assembly — 848811865

Quantity	Description — Code
1	*LambdaUnite* MSS Dual Unit Row Subrack — 848727111
1	User Panel — 848730636
1	Fan Unit — 848730644
2	Power Interface — 109001446
1	Controller Interface — 109001461
2	Timing Interface, E1/DS1 — 109001453
12	Paddle Board, Blank — 848780193
1	Filter, Washable — 408643005

Prepacked material

Quantity	Description — Code
1	Bracket, Front-left, Unite — DC1003774
1	Bracket, Front-right,Unite — DC1003775
4	Fiber Clip — DC1000680
2	Fiber-Routing Guides (RT/LB) — DC1001516
2	Fiber-Routing Guides (LT/RB) — DC1001517
4	Fiber-Routing Guides (corner) — DC1001518
8	Self-Tapping Screw — DC1002024
26	Screw, Tapping Thread-Forming, M6x16 — 901331421

Intra Subrack Cables

Quantity	Description — Comcode	Remarks
1	Cable Assy, CI-CTL - UPL — 848811584/DC1003272	Mounted

....

Quantity	Description — Comcode	Remarks
1	Cable Assy, PI - FAN Unit, Power B — 848811576/DC1003270	Prepacked
1	Cable Assy, CI-CTL - FAN Unit — 848811568/DC1003271	Prepacked
1	Cable Assy, PI - FAN Unit Power A — 848811550/DC1003269	Prepacked

Cables   Intra Rack Cables

Quantity	Description — Comcode	Remarks
1	Cable Assy, PDP - LED, Alarm — 848811543/DC1002831	Mounted
1	Cable Assy, CI-CTL - PDP, Lower — 848811535/DC1001829	Prepacked
1	Cable Assy, CI-CTL - PDP, Upper — 848811527/DC1002828	Prepacked
1	Cable Assy, Lower shelf - PDP — 848811519/DC1002827	Mounted
1	Cable Assy, Upper shelf - PDP — 848811501/DC1002826	Mounted

Optional   Grounding Material

Quantity	Description — Comcode	Remarks
1	Ground Wire (2000 m.) — 848828174	Upper Subrack
1	Ground Wire (3000 m.) — 848828182	Lower Subrack
1	Bolt M6x16	green colored
1	Bolt M5x16	
1	Washer M5, tooth lock — 901361949	
1	Washer M6, tooth lock — 901361956	

Technical Data

....

Specifications

Item	Quantity/Value
Voltage Range (all components)	-48V to -60 V battery voltage
	(-40.5 V minimum, -72 V maximum)
Power Feeders	Two power feeders (A, B)
Upstream Fuse or Circuit-Breaker	The fuse must be ≥ 68 A in the external BDFB (depends on cable)
Power Consumption	2200 Watt maximum
	(depends on configuration).
Weight	Maximum 41kg [90.41 lbs]
	(includes: user panel, fan, PIs, CI-CTL TIs and 12x blanks at the rear).
Dimensions (D x W x H)	545mm [21.457"] x 500mm [19.685"] x 950mm [37.402"]
	(includes fan and cabling).
Site Engineering Dimensions	545mm [21.457"] x 500mm [19.685"] x 1100mm [43.307"]
	(includes cabling and fan space)

Subrack Requirements The mounting requirements are:

- Leave a space of ≥ 100 mm above the subrack, when a single subrack is mounted into a rack frame.

- The subrack is designed for mounting in the *LambdaUnite*™ MSS Rack Frames so that the temperature can be controlled and the cables laid properly.

....

Subrack Dimensions

Figure 3-21   Subrack Mounting Dimensions

500 [19.685]

100mm ★1

950 [37.402]

545 [21.457]

★2
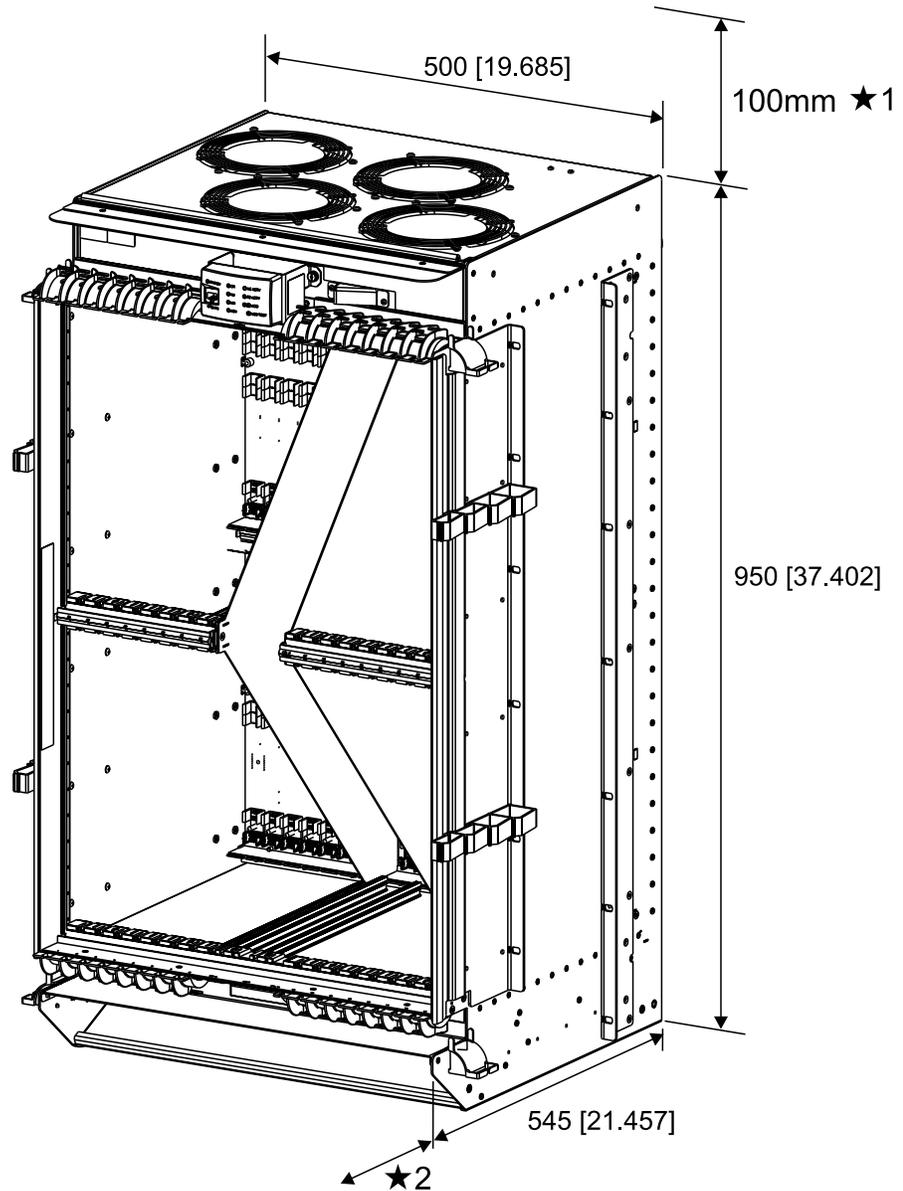
Legend:

*1   Required space for air outlet (≥ 100 mm) when a single subrack
        is mounted into a rack frame.

*2   Bend radius of fiber and external cabling.

Mounting the Subrack

Procedure

1 Unpack the subrack and check the installation materials.

> **Reference:**
>
> "Subrack Accessories" (3-37)

2 Mount the subrack in its position in the rack frame.

> **Reference:**
>
> "ESD and Ground Connections" (4-27)

3 Mount the grounding cable on the subrack.

> **Reference:**
>
> "Subrack Accessories" (3-37)

4 Place "Circuit Packs" (3-49) according to the configuration.

5 Route the fiber cables to the Optical Circuit Packs at the front of the subrack and connect according to the configuration:

- "Gigabit-Ethernet Interfaces" (4-66)
- "Optical Interfaces" (4-63)

6 Route the external cables to the rear of the subrack according to the configuration:

- "Station-Alarm Interface" (4-44)
- "LAN 10/100 Base-T Interface" (4-48)
- Timing Interfaces:
  - "TI-DS1 Station Clock Output/Input Interface 100/110 Ω" (4-51)
  - "TI-E1 Station-Clock Output/Input Interface, 120 Ω" (4-55)
  - "TI-E1 Station-Clock Output/Input Interface, 75 Ω" (4-59)
- "Rack-Top Alarm-Interface Cable, CI-CTL – PDP" (4-41)

....

7 Connect the "Power Cables, PI – PDP" (4-29) at the rear of the subrack. according to the configurations.

E ND OF S TEPS

....

Installation of Subrack

Procedure

1   Temporarily remove the front mounting brackets (Bracket, Front-left, Unite — DC1003774 Item 1) and (Bracket, Front-right,Unite — DC1003775 Item 2); from the subrack.

2   Mount the Fiber Clip — DC1000680 (Item 5) on the front mounting-brackets.

3   When a second subrack is mounted in the configuration of one *WaveStar*™ LambdaUnite rack frame, temporarily remove the Rubber Profile — DC1003971 (Item 6) at the front-top of the bottom subrack and at both front-top sides.

4   Slide the subrack at the rear into its configuration position in the Unite rack.

If subrack is located in the	Then
Upper position in the Unite rack	Use the Subrack Guide — DC1002905 which is mounted at hole 38 on the center style of the Unite rack-frame.
Lower position in the Unite rack	Use the bottom of the Unite rack-frame as guide.

5   Mount the subrack on the center style at the rear by using Screw, Tapping Thread-Forming, M6x16 — 901331421 with 7 Nm±1.0 torque .

6   Where two subracks are mounted in one Unite rack-frame attach the Rubber Profile — DC1003971 (item 6) at the front-top of the bottom subrack and at both front-top sides.

7   Mount the mounting brackets (Bracket, Front-left, Unite — DC1003774 Item 1) and (Bracket, Front-right,Unite — DC1003775

Item 2) on the upright of the Unite rack-frame within its configuration position by using (Screw, Tapping Thread-Forming, M6x16 — 901331421 Item 4), but do not fasten completely.

....

8   Mount the subrack on the mounting brackets at the front from inside the subrack by using Screw Hexagon Socket Button Head M4x8 — DC1002976 (item 7), but do not fasten completely.

....

9   Fasten the front and rear Screw, Tapping Thread-Forming, M6x16 — 901331421 (Item 4) and Screw Hexagon Socket Button Head M4x8 — DC1002976 (item 7).

....

10 Mount the Fiber Routing Guides (corner) — DC1001518 (Item 3) at each corner of the subrack by clicking them into the holes at the top and bottom sides of the subrack.

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

Figure 3-22 Mounting Subrack
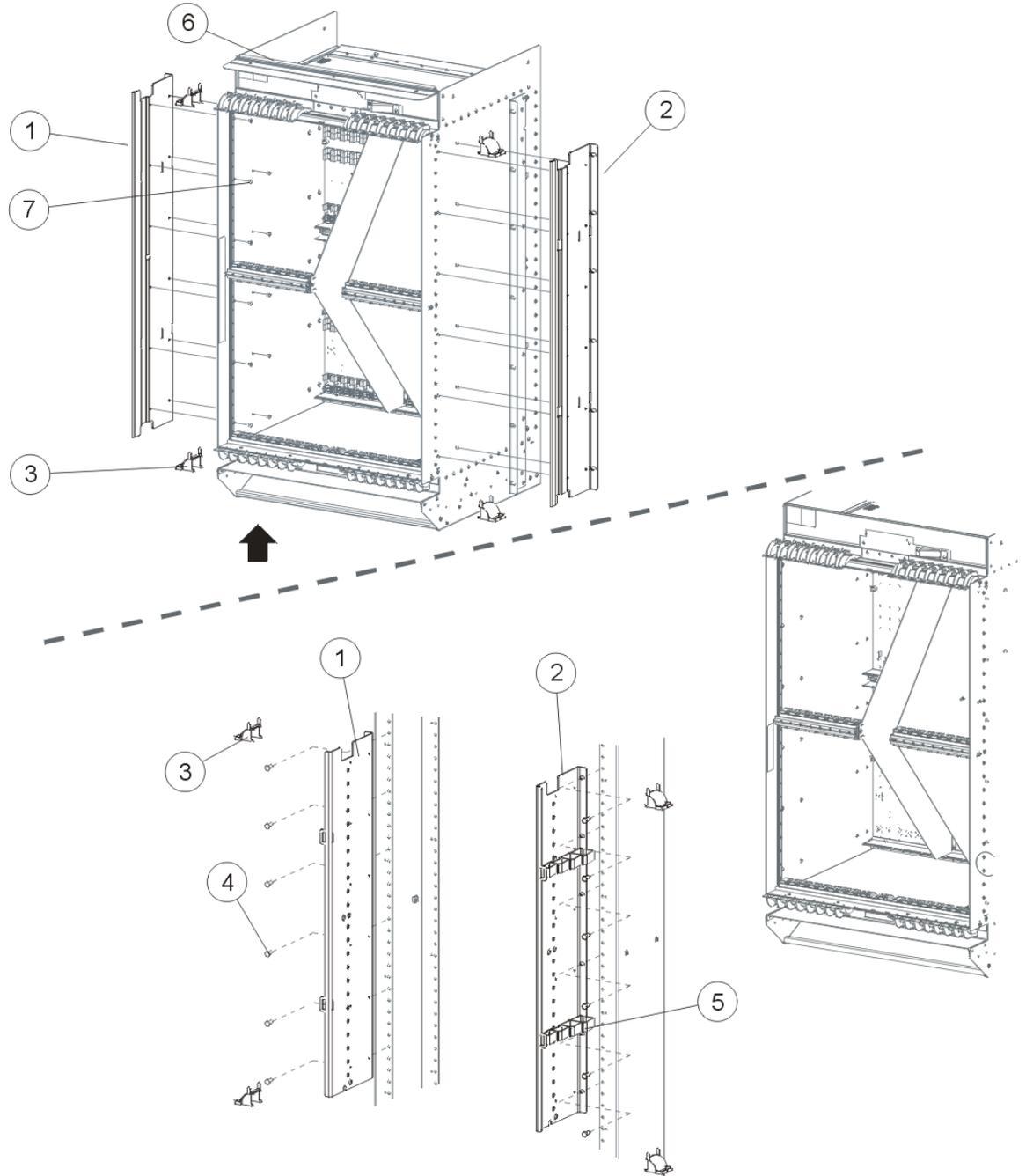
Fan Unit and Filter

Fan Unit

1   Remove the assioated power and alarm cables from the fan unite drawer.

2   Release the srews of the drawer and slide it from its position by using the handles.

3   Exchange the Fan unit — 848730644 .

4   ReInstall the drawer and the associated cables back in its position.
E N D   O F   S T E P S

Result

Figure 3-23 Fan unit assembly
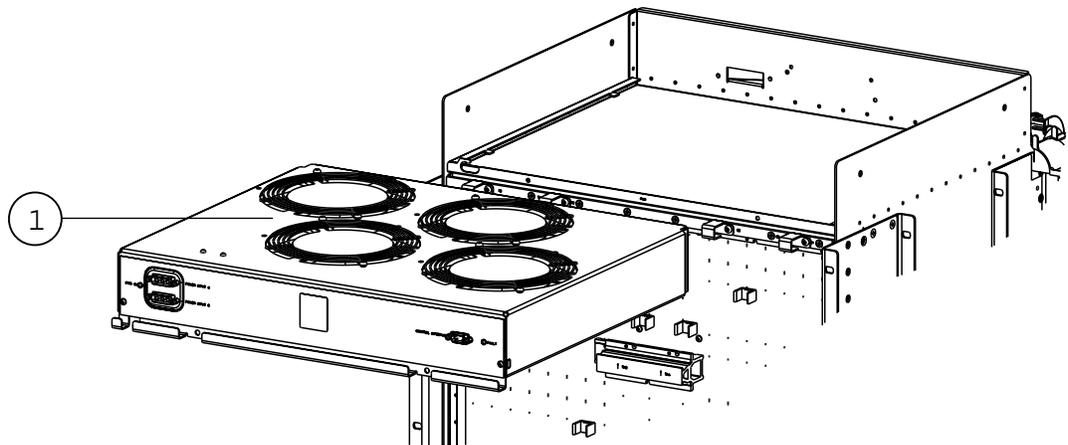
Filter

⚠️ WARNING

Be aware of the airflow direction indicated on the filter.

....

1   At the subrack rear side slide the filter into the subrack as shown in Figure 3-24, "Filter" (3-48).

....

2   Reinstall one of ordered the filters and take care about the the airflow of the filter position.

E ND   OF   S TEPS
....

....

365-374-023
Issue a, October 2001

Lucent Technologies

3 - 4 7

Result

Figure 3-24 Filter
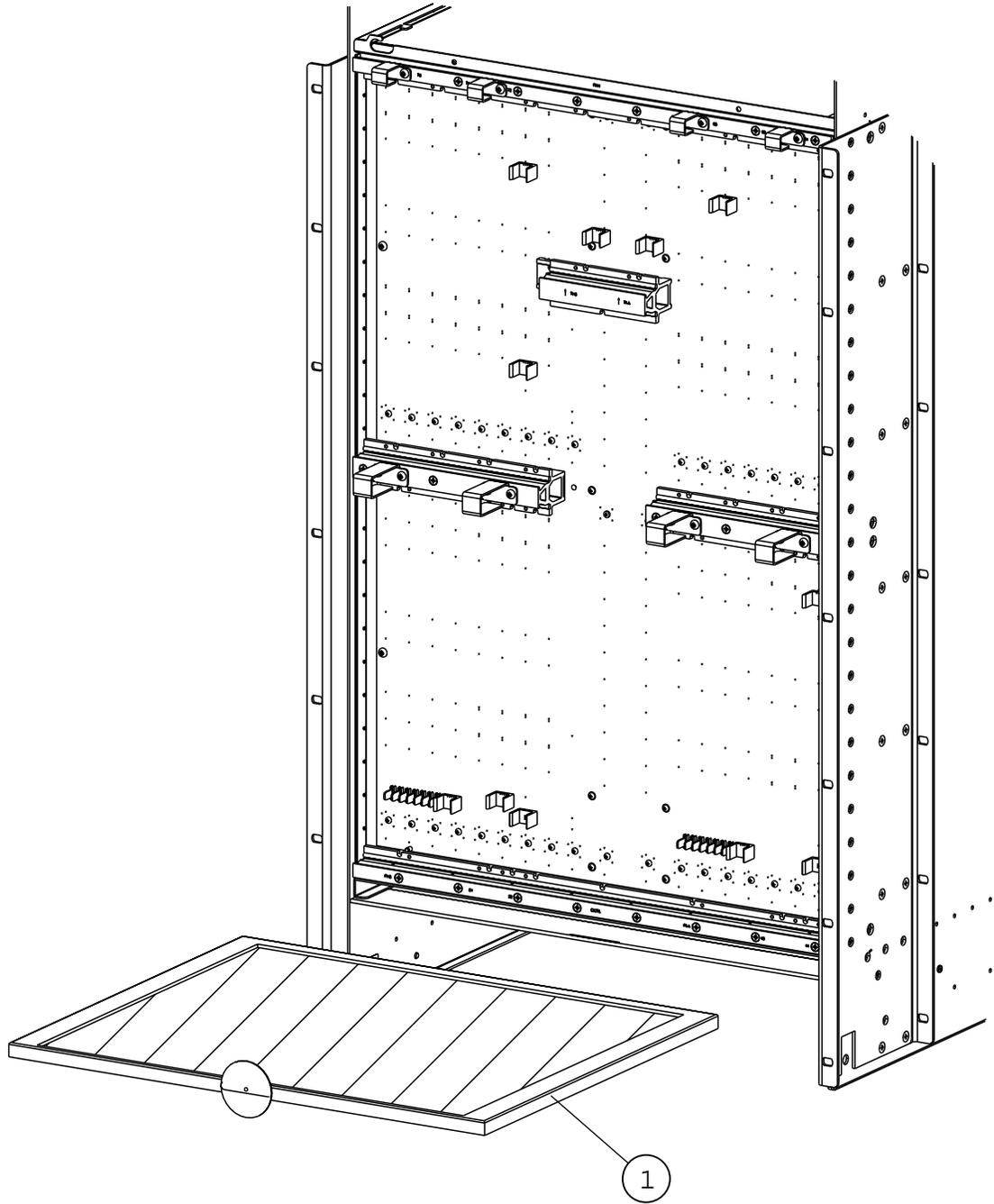
Circuit Packs

![ESD caution symbol] **CAUTION**

ESD-sensitive components, take precautionary measures

Position of Circuit Packs

Important! See "Front View of Layout" (3-31)for slot positions.

IF circuit-pack protection	THEN
OP2G5, OP10G	All possible port circuit-pack slots in the first and second rows (port circuit-pack #1...#8, #12...#19, #21...#28, #32...#39).
XC320G (working and protecting circuit packs)	Position in the middle of the circuit pack that covers both rows, but the protecting circuit pack (port-circuit pack #10) must be inserted into the slot on the right of the working circuit pack (port circuit-pack #9).
CTL (working and protecting circuit packs)	Position in the leftmost slot of the right-hand side of each row. The working circuit pack in the first row (port circuit- pack #11) and the protecting circuit-pack in the second row (port circuit-pack #31).
Gigabit–Ethernet	All possible port circuit-pack slots in the first and second rows (port circuit-pack #1...#8, #12...#19, #21...#28, #32...#39).
User Panel (UPL)	In front of the subrack above the XC320 and mounted on a bracket (port circuit-pack #40).
Blank	Each empty port circuit pack slot in order to close the EMC boundary.

Results

Figure 3-25 Front View of Subrack
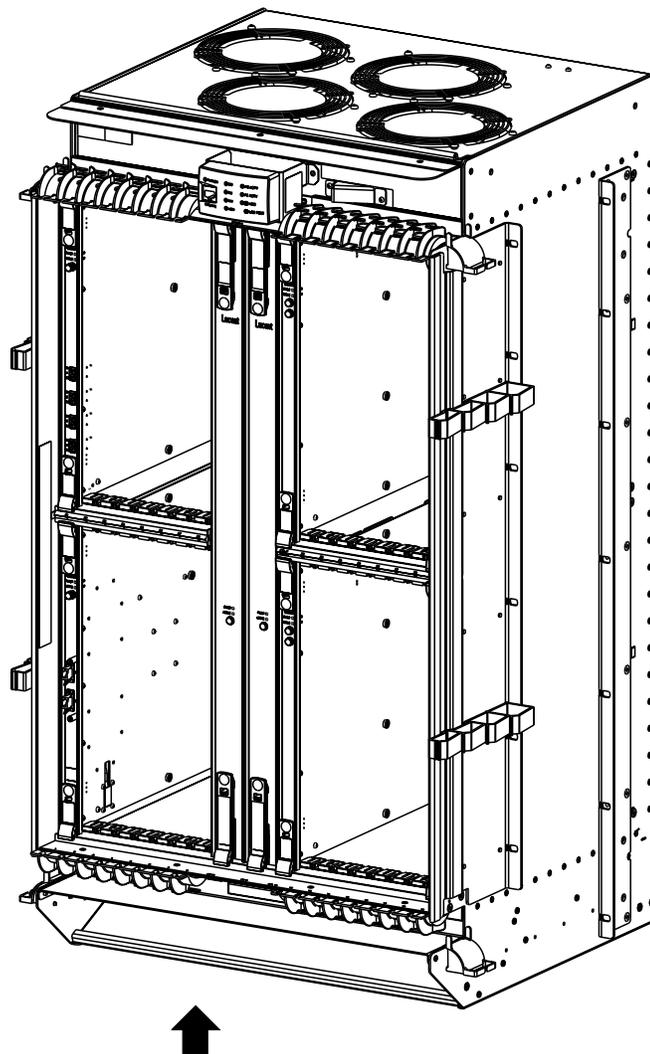
Insertion of Circuit Pack   **Important!** Operate both latches simultaneously during insertion and extraction of a circuit pack.

....

1   Insert the circuit packs as shown in the figure below.

Figure 3-26 Insertion of a Circuit Pack
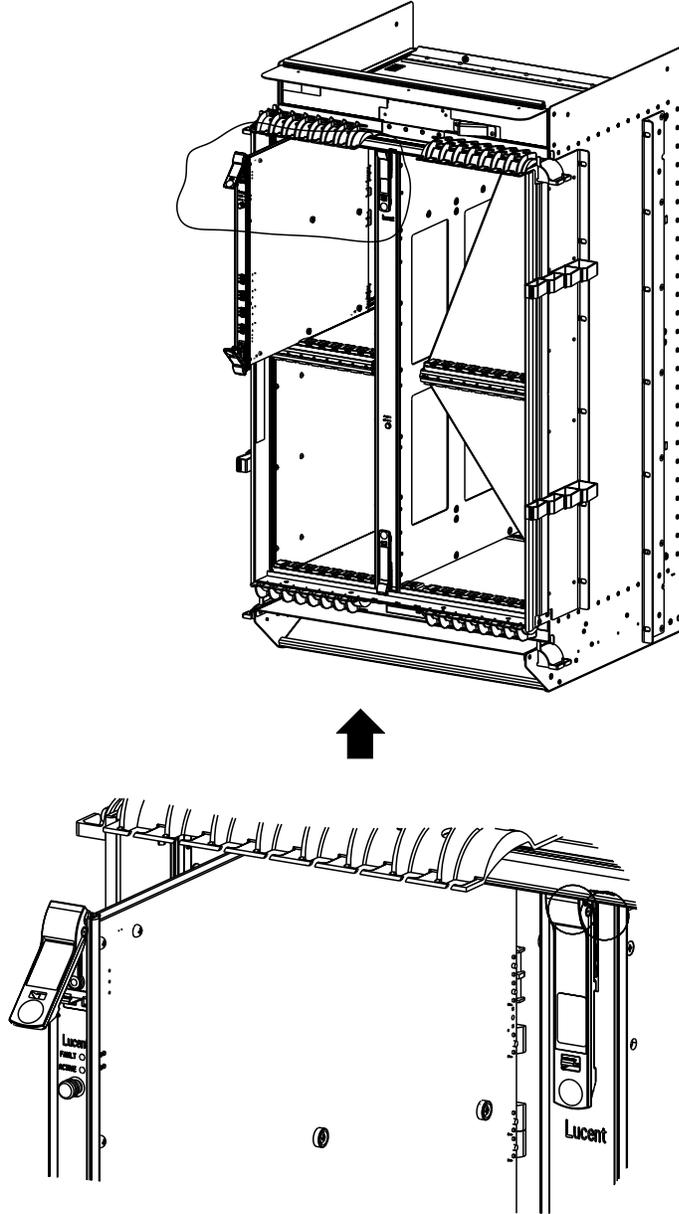
E ND   OF   S TEPS

....

Position of Paddle-Board Interface

Important! See "Back-Plane Layout" (3-32)for slot positions, which are initially mounted into the subrack.

IF	THEN
PI	First right-hand slot position in the lower part of the row (port circuit-pack #45 and #56).
CI-CTL	Position in the middle of the row that covers both rows (port circuit-pack #51). **Important!** Mount the connector as one part by using the locking mechanism.
TI	Position above the CI-CTL (port circuit-pack #69 and #70).
Blank (3N)	In each empty position to close the EMC boundary. The complete first row and the first 2 slots next to the PI.
Blank (6N)	In each empty position of XC320G slot.

Results

Figure 3-27 Rear View of Subrack
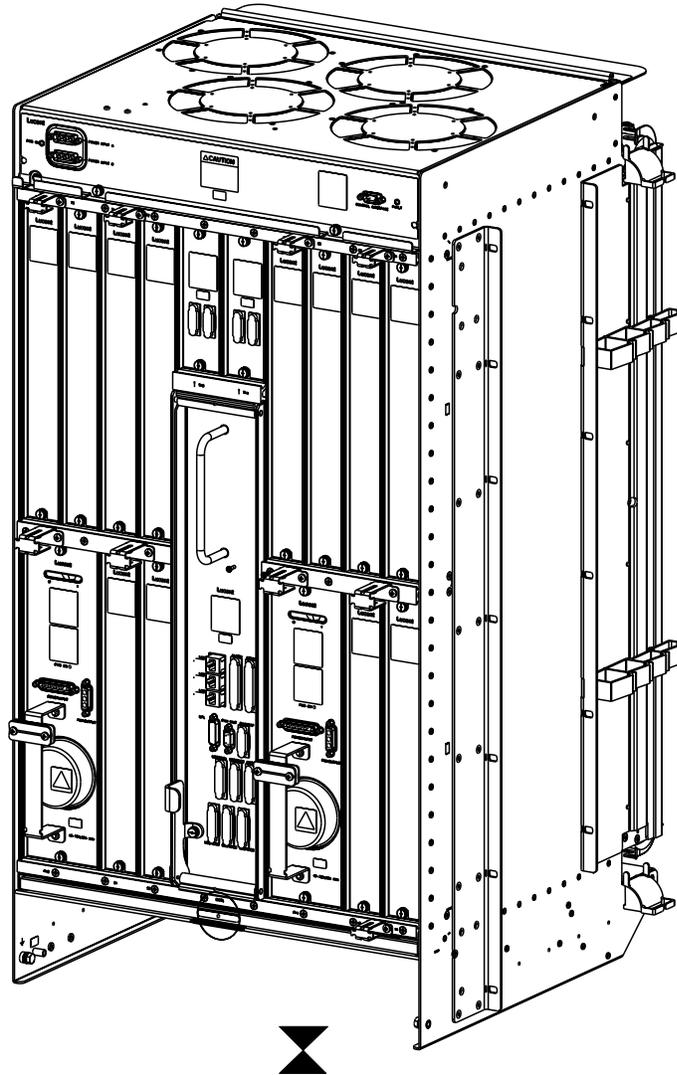
Mounting the Paddle-Board Interface

Important! Always wear a wrist strap that is properly connected to the earth/ground.

....

1

....

If interface paddle is	Then ....
CI-CTL	1. Open the locking mechanism of the board by releasing the screw.
	2. Position the top of the board in its sleeve and then bring the bottom of the board into its position
	3. Pull the locking mechanism upwards and fix it in place with the screw.
TI/PI/Blank	Lock the interface paddle boards by tightening the screws.

END OF STEPS

Results

Figure 3-28 Insertion of Paddle Board for TI/PI/blank
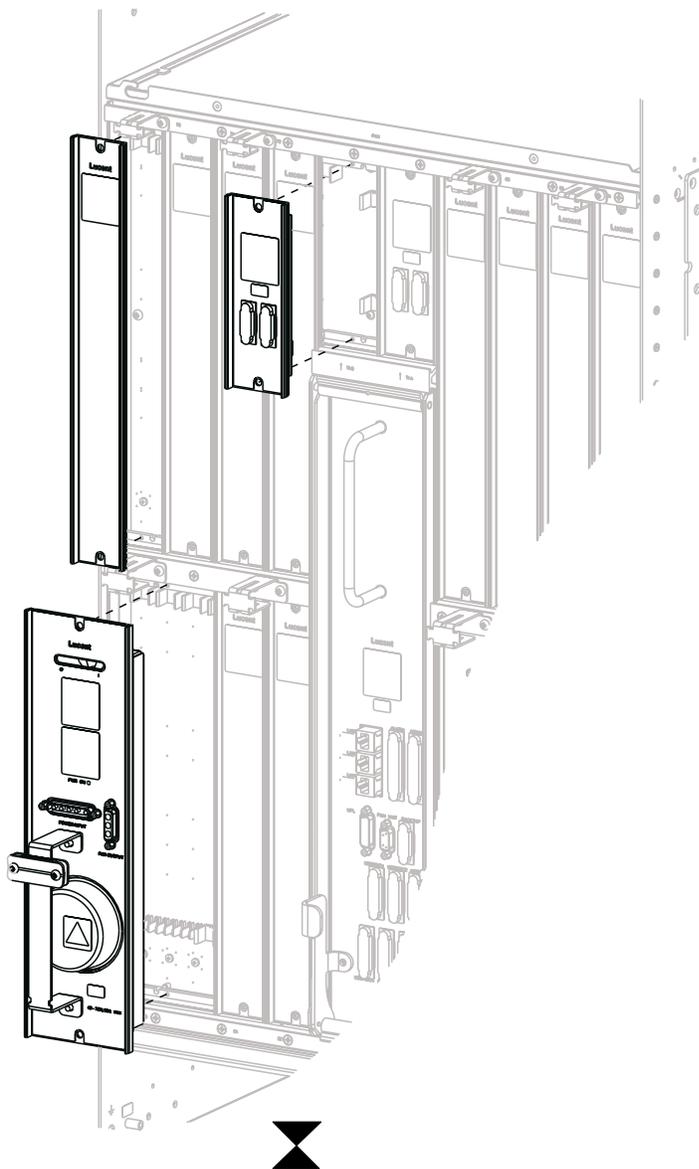
Figure 3-29 Insertion of a Paddle Board for CI-CTL
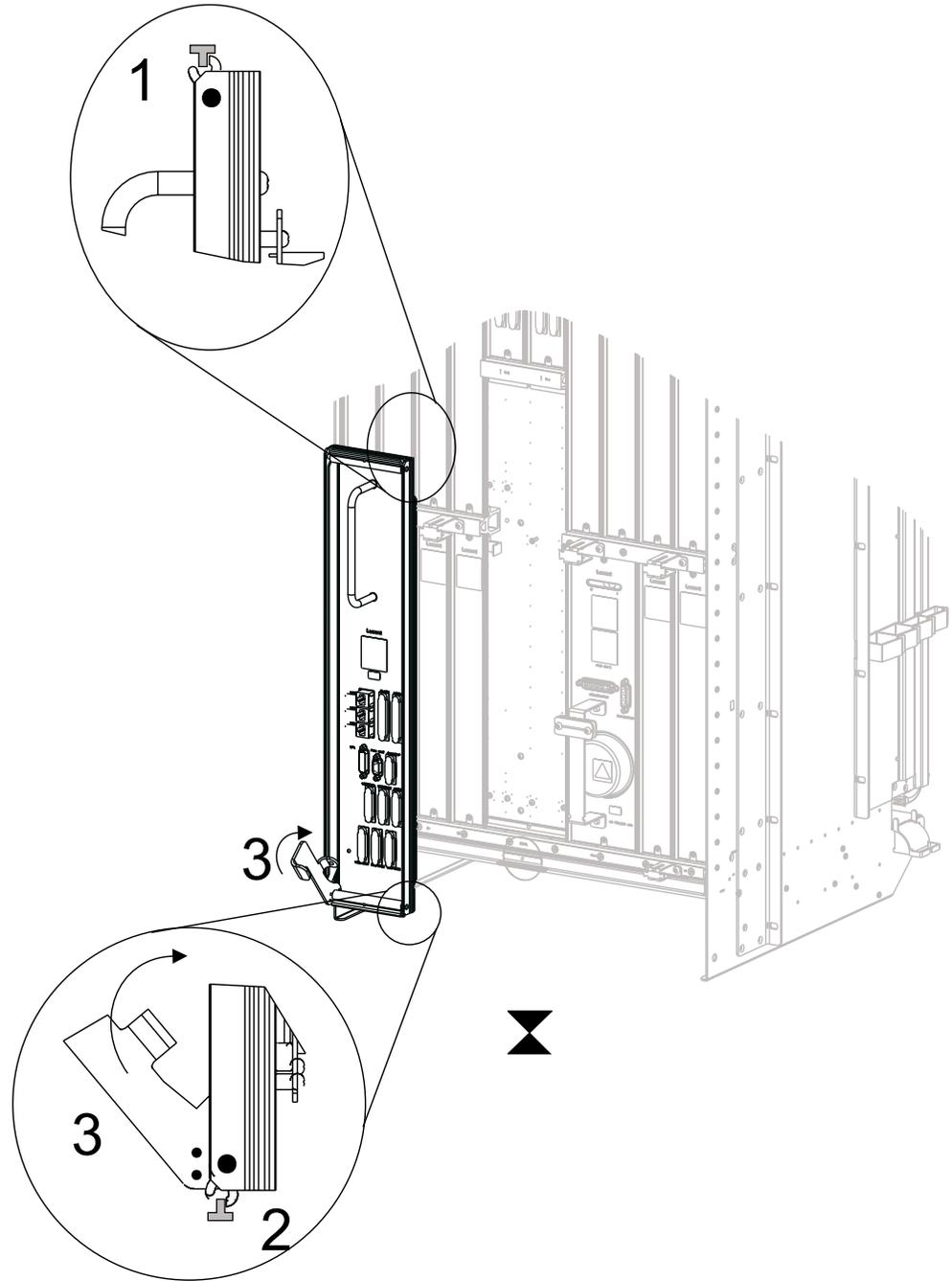
User panel

Procedure

1 Mount the User Panel — 848730636 on the configuration position at the top font of the subrack.

E ND OF S TEPS

Accessories Passive DWDM

Material   Passive DWDM kits

Quantity	Description — Comcode
1	16 Channel MUX unit — 109164665 inclusive: • Shell Holder Unite • MUX unit • Mounting bracket 19" and 23"
1	16 channel DMUX unit — 109164673 inclusive: • Shell Holder Unite • DMUX unit • Mounting bracket 19" and 23"

Additional installation material

Quantity	Description — Comcode
4	Bracket — DC1005065
4	Fiber Clip — DC1000680
2	Fiber Routing Guides (corner) — DC1001518
2	Guide bracket — DC1005064
6	Screw Tapping Thread Forming M6x16 — 901331421

Optional Grounding Material

Quantity	Description — Comcode	Remarks
1	Ground Wire (2000 m.) — 848828174	Installed in the upper part of the rack
	Ground Wire (3000 m.) — 848828182	Installed in the lower part of the rack
1	Bolt M6x8 — t.b.d.	green colored

Lucent Technologies

Quantity	Description — Comcode	Remarks
1	Bolt M5x16 — t.b.d.	green colored
1	Washer M6, tooth lock — 901361956	
1	Washer M5, tooth lock — 901361949	

⌐

Technical Data Passive DWDM

Specifications

Item	Quantity/Value
Operating temperature	–5°C to -60°C
Max. Dimensions D x W x H	3784 mm [14.907 "] x 498 mm [19.606 "] x 74 mm [2.913 "]

Mounting Passive DWDM

Before you begin   Check materials before installation

Installation Procedure

1   Mount the mounting bracket (item 2) 19"or 23" on the Shell Holder Unit (item 1) dependent on Rack frame type.

2   Mount the Guide bracket — DC1005064 (item 6) with the above assembled Shell Holder unit to the rack frame with Screw Tapping Thread Forming M6x16 — 901331421 .

3

IF	THEN ...
Top access	Click the Fiber Routing Guides (corner) — DC1001518 (item 7) to Guide bracket — DC1005064 (item 6) as shown in the next figure.
Bottom access	Click the Fiber Routing Guides (corner) — DC1001518 (item 7) turned 180° relative to the position shown in the next figure to Guide bracket — DC1005064 (item 6) .

4   Connect the grounding cables if applicable from the Shell Holder unit at the rear side with Screw Tapping Thread Forming M6x16 — 901331421 to the grounding point of the rack frame.

IF the Passive DWDM is positioned	THEN ....
above the the middle of the rack (*Upper part*).	uses the Ground Wire (2000 m.) — 848828174
below the the middle of the rack (*Bottom part*).	uses the Ground Wire (3000 m.) — 848828182

5   Open the Shell Holder Unit by pushing simultaneously at both sides the buttons on the front door.

....

6 Slide the Passive DWDM (item 3) into the Shell Holder Unit till it locks. It can be released by pushing the buttons on each side simultaneously.

....

7 Mount the Bracket — DC1005065 (item 4) and Fiber Clip — DC1000680 (item 5) on a position close to the passive DWDM to lay the cables properly within the racks.

IF the configuration (*1) is	THEN .....
Top Access	Mount the brackets above the Shell Holder Unit
Bottom Access	Mount the brackets below the Shell Holder Unit

....

8 Connect the fiber cables according the configuration.

....

9 Close the door of Shell Holder Unit

E N D   O F   S T E P S

....

....

3 - 6 2   **Lucent Technologies**   365-374-023
                                                                        Issue a, October 2001

results

Figure 3-30 Mounting Passive DWDM
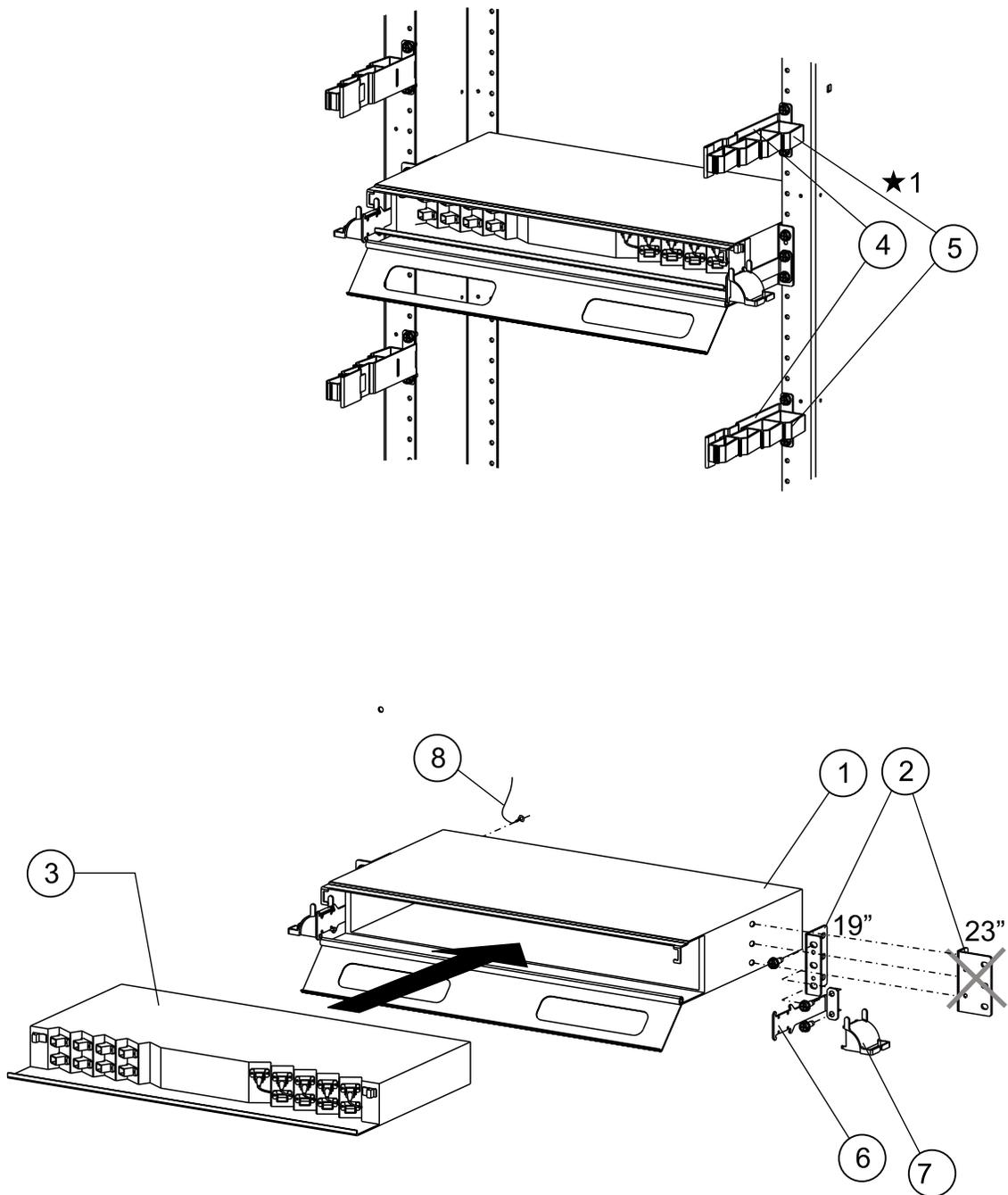
Legend:

1   Shell Holder Unit (Avanex)

---

2   Bracket 19" or Bracket 23"(Avanex)

3   DMUX *or* MUX (Avanex)

4   Bracket — DC1005065

5   Fiber Clip — DC1000680

6   Guide bracket — DC1005064

7   Fiber Routing Guides (corner) — DC1001518

8   Ground Wire (2000 m.) — 848828174 or Ground Wire (3000
         m.) — 848828182

⌐

Arrangements Passive DWDM

Layout

Figure 3-31 Layout Front Panel Passive DWDM

| CH 59 | CH 57 | CH 55 | CH 53 | | | common | CH 37 | CH 35 | CH 33 | CH 31 |
| CH 49 | CH 47 | CH 45 | CH 43 | | | | CH 27 | CH 25 | CH 23 | CH 21 |
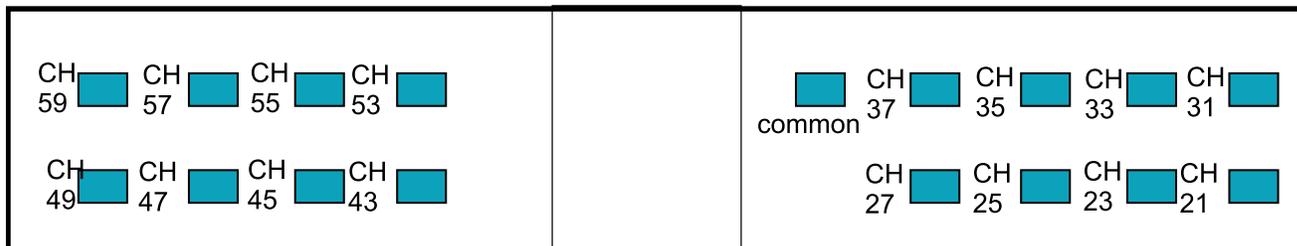
Optical Channel allocations

Freq. [THz]	Wavelength in vacuum [nm]	Channel port [-]
195.900	1530.334	CH 59
195.700	1531.898	CH 57
195.500	1533.465	CH 55
195.300	1535.036	CH 53
194.900	1538.186	CH 49
194.700	1539.766	CH 47
194.500	1541.349	CH 45
194.300	1542.936	CH 43
193.700	1547.715	CH 37
193.500	1549.315	CH 35
193.300	1550.918	CH 33
193.100	1552.524	CH 31
192.700	1555.747	CH 27
192.500	1557.363	CH 25
192.300	1558.983	CH 23
192.100	1560.606	CH 21

Rack Doors

Positioning

1 Place the lower hinge pin of the door into the hole of the doorsupport bottom assy.

2 Pull down the locking mechanism at the top of the door.

3 Lock the door by relasing the Locking Mechanism of the upper hinge pin into the hole of the Doorsupport Top Assy.

E N D   O F   S T E P S

Result

Figure 3-32 Positioning Rack Door
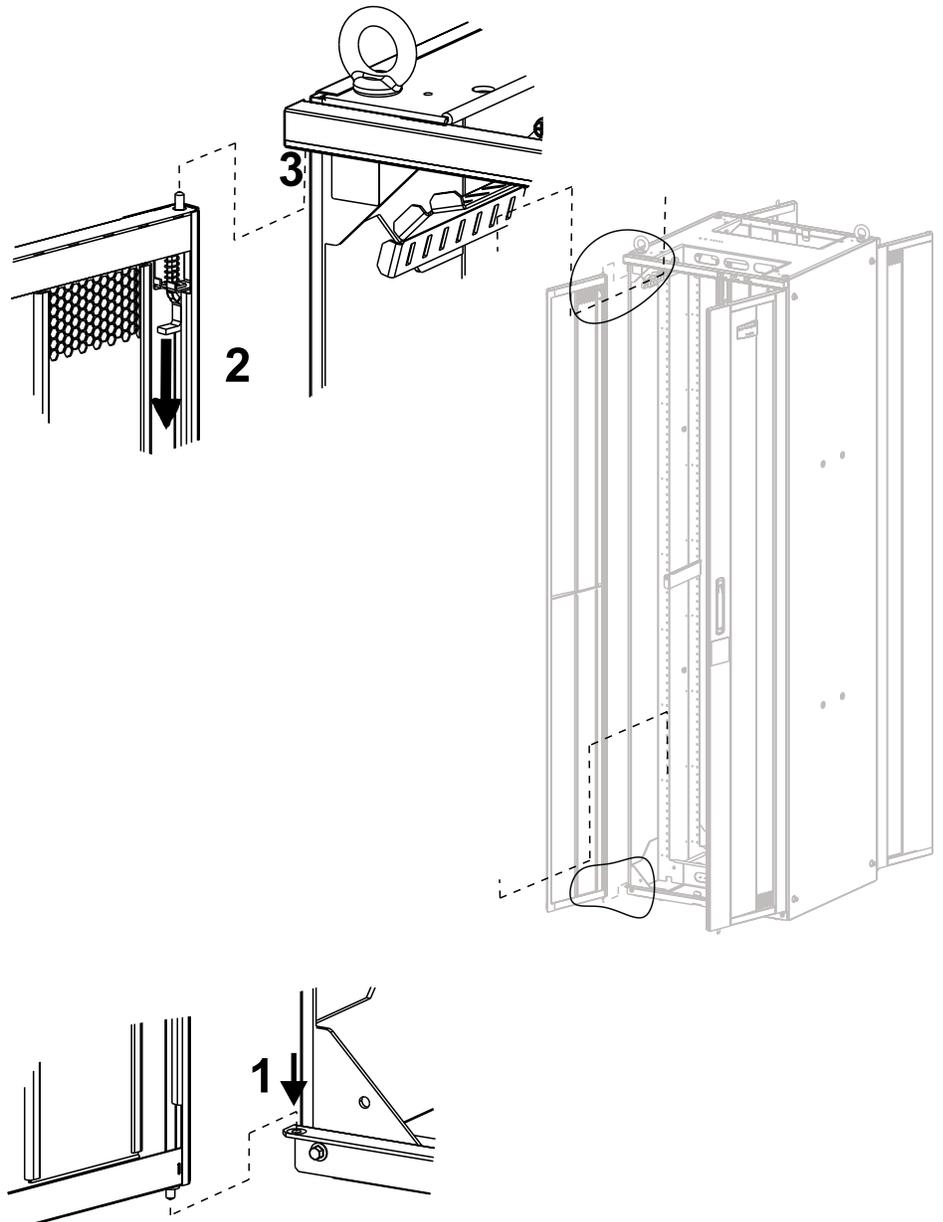
Legend:

ETSI-2; Assy Doors — 848795001	Assy, Door, Left — DC1000585 and Assy, Door, Right — DC1000586
NEBS–2000; Assy, Doors — 848795019	Assy, Door, Left — DC1002598 and Assy, Door, Right — DC1002599

Opening door

1 Put a finger in the hole below the door latch to lift it (see next figure).

2 Pull out the latch to open the door.
   E N D   O F   S T E P S

result

Figure 3-33 Opening Rack Door
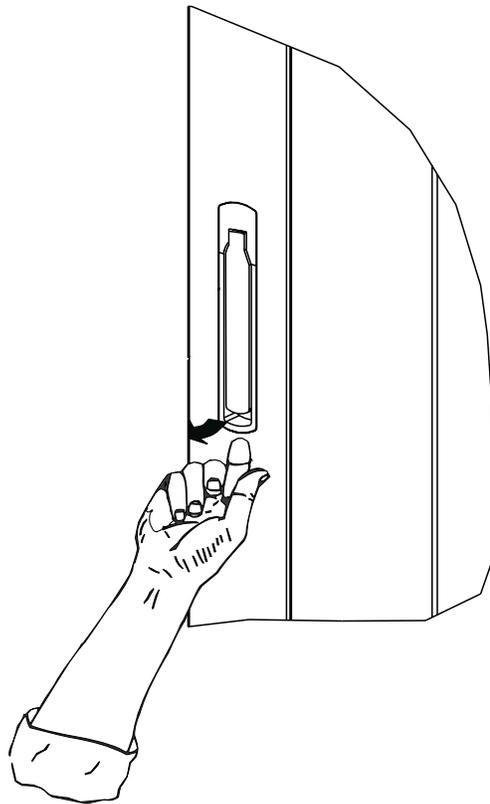
4   Cable Installation

Overview

Purpose   This chapter covers the connection of cables between subracks and/or from subrack(s) to the rack frame and/or to other external equipments.

Pre-cautions

⚠ CAUTION

Unterminated optical connectors may emit laser radiation

Avoid direct exposure to the beam. Do not view this beam with optical instruments.

⚠ WARNING

Components damage

ESD Sensitive components, take precautionary measures (see Chapter 1, Safety).

Contents

⌐

PDP Block diagram

Layout   The connection points of this product are shown as a cable number in the figure below.

Figure 4-1   Cable Links Block Diagram

365-374-023
Issue a, October 2001

Lucent Technologies

4 - 3
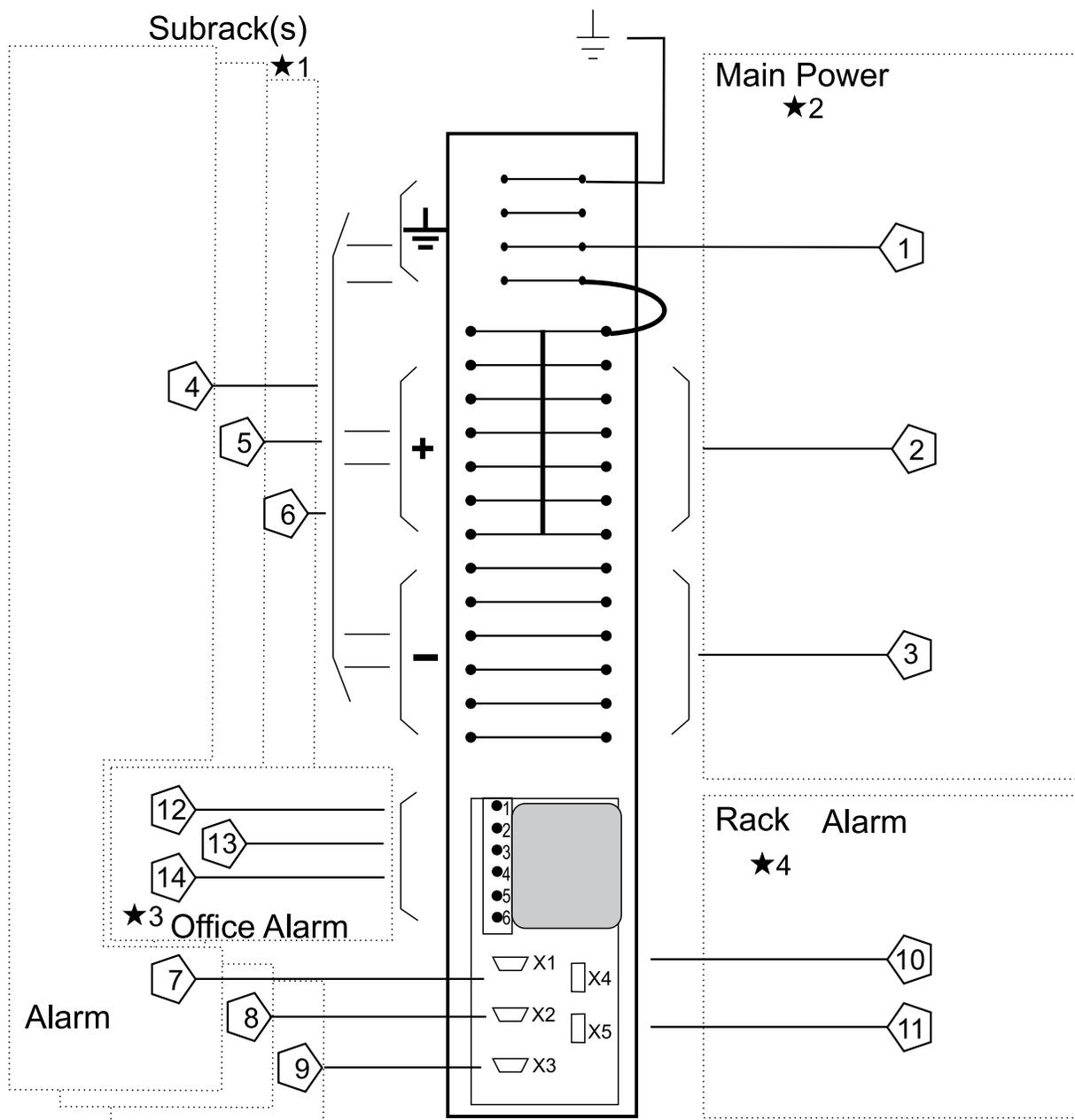
Cable Numbers List

Cable No.	Type of cable — Comcode	Color	Remarks
1	Ground Cable	Yellow / Green	
2	Power Cable	Red (return)	Max. 35 mm^2 *2 (customer dependent)
3	Power Cable .	Blue (-48V)	
4	Cable Assy, Upper shelf - PDP — 848811501/DC1002826 (1850mm)	Yellow / Green, Blue, Red.	16mm^2 *1
5	Cable Assy, Lower shelf - PDP — 848811519/DC1002827 (3200mm)		
6	3rd Subrack power cable — t.b.d		
7	Cable Assy, CI-CTL - PDP, Upper — 848811527/DC1002828 (1100mm)		
8	Cable Assy, CI-CTL - PDP, Lower — 848811535/DC1001829 (3300mm		
9	3rd Subrack alarm cable — t.b.d.		
10, 11	Cable Assy, PDP - LED, Alarm — 848811543/DC1002831 (1300mm) front/rear		Unite Rack frames, *4
12	External Alarm Critical		
13	External Alarm Major		*3 (customer dependent)
14	External Alarm Minor		

Alarm Lamp Cable Routing

Routing Procedure   **Important!** These cables are prefabricated and mounted in the Unite rack frame

....

1   Stick the Clip, Self-Adhesive — 402185409 (Item 1) to the rack.

....

2   Insert the Nylon Cable-Ties — 407804715 (Item 2) in the Clip Self Adhesive gaps to bind these Assy, Alarm Cable PDP/LED — DC1002831 (Item 3) cables together.

E N D   O F   S T E P S

Layout

Figure 4-2 Routing the alarm lamp cable
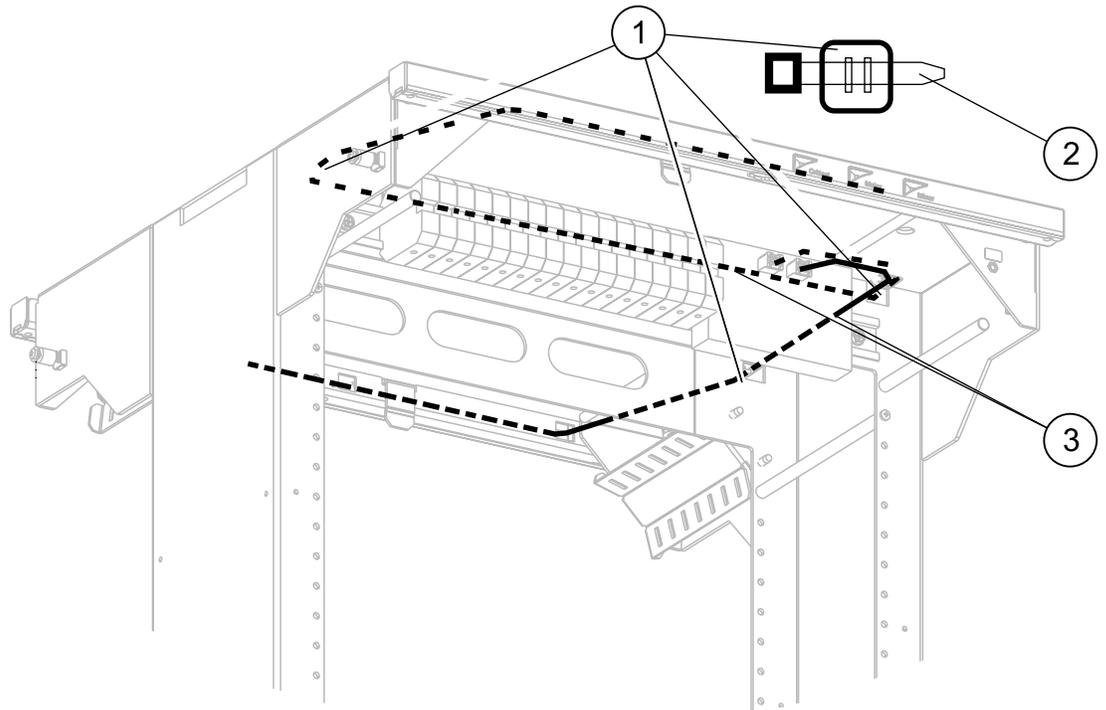
Power Wiring (Unite)

Customer Cables Routing

1

In case of ...	Then ...
Top access	The cables (item 1) are rouited directly the the PDP.
Bottom Access	The cables (item 1) are routed via the right-rear side of the rack frame to the top of the rack frame.

END OF STEPS

Subrack Cables Routing

Important! These cables are mounted within the unite rack frames

In case of ...	Then ...
Upper Subrack	The Cable Assy, Upper shelf - PDP — 848811501/DC1002826 (item 3) of the upper DUR subrack are routed at the rear side of the center styles of the frame. The B side to the left "center style" and the A side to the right "center style".
Lower Subrack	The Cable Assy, Lower shelf - PDP — 848811519/DC1002827 (item 2) of the lower DUR subrack are routed through the center styles of the frame. The B side to the left "center style" and the A side to the right "center style".

Result

Figure 4-3 Front/Top View on PDP (rack rear view)
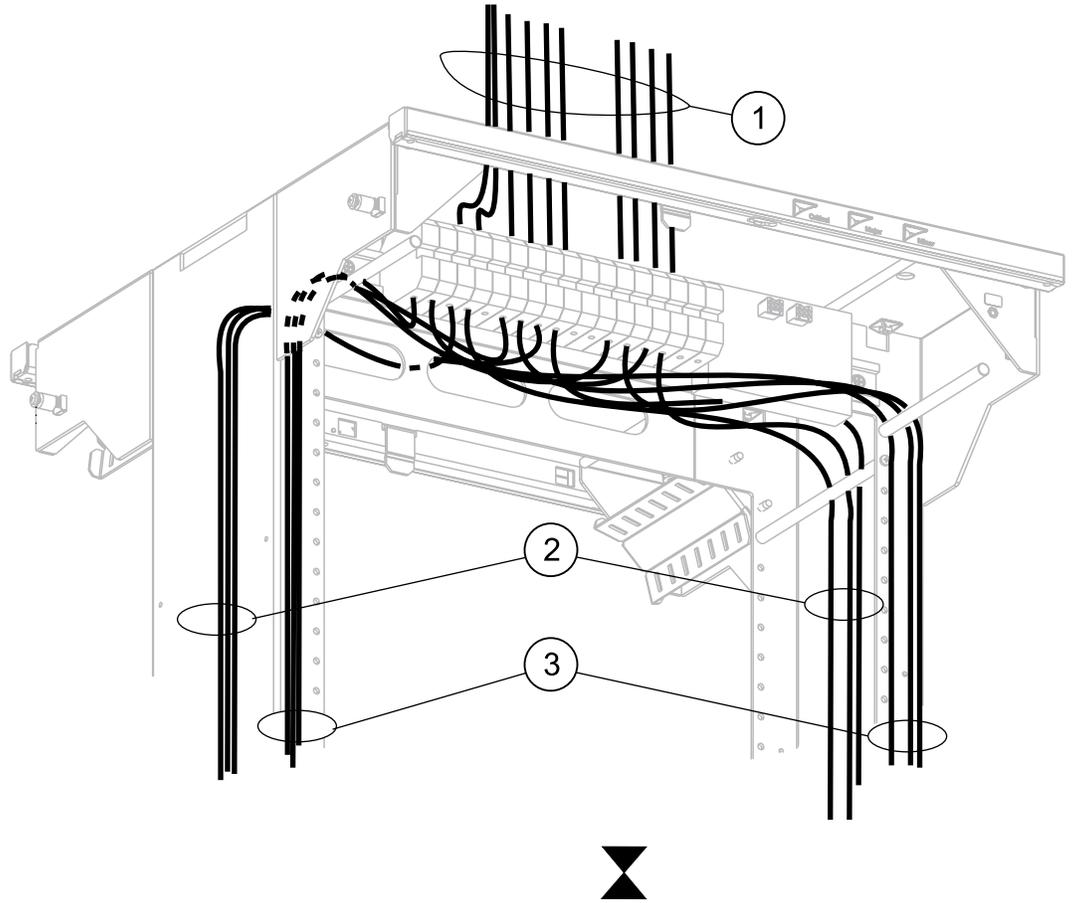
Subrack Alarm Wiring (UNITE)

Subrack cables routing   **Important!** These cables are mounted within the unite rack frames

In case of ...	Then ...
Upper Subrack	The Cable Assy, CI-CTL - PDP, Upper — 848811527/DC1002828 (item 1) located into the top of the frame are routed at the rear right-side of the center style of the frame.
Lower Subrack	The Cable Assy CI-CTL - PDP Lower — 848811535/DC1001829 (item 2) of the lower DUR subrack located at the bottom of the frame are routed through the right center style of the frame.

Result

Figure 4-4 Front/Top View on PDP
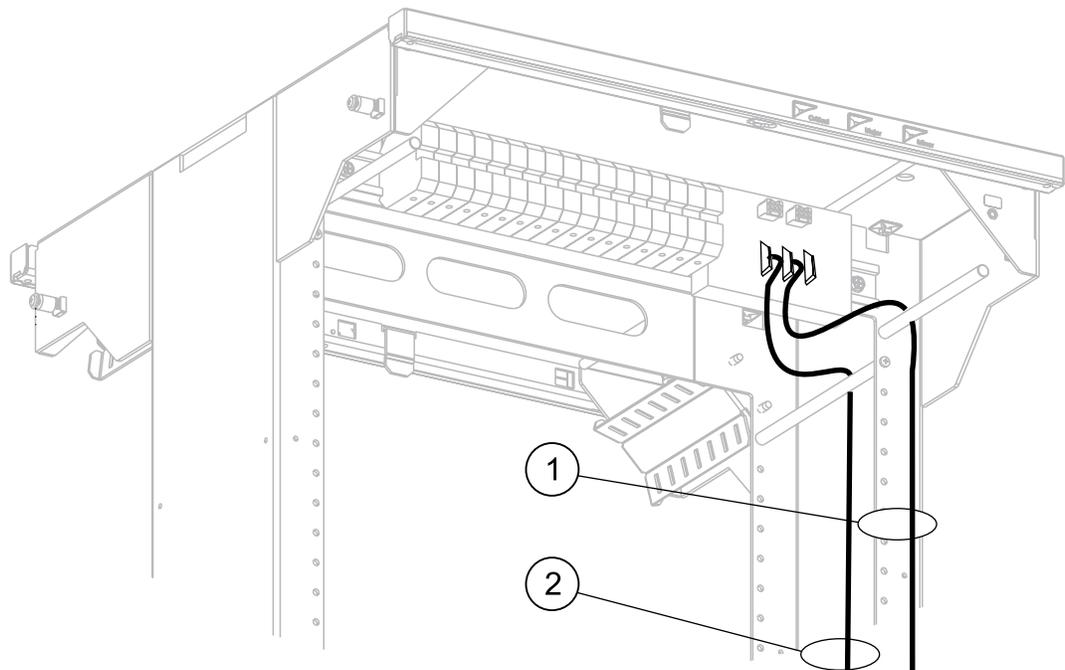
Ground, Power and Alarms

Power input

Figure 4-5 PDP Power Input
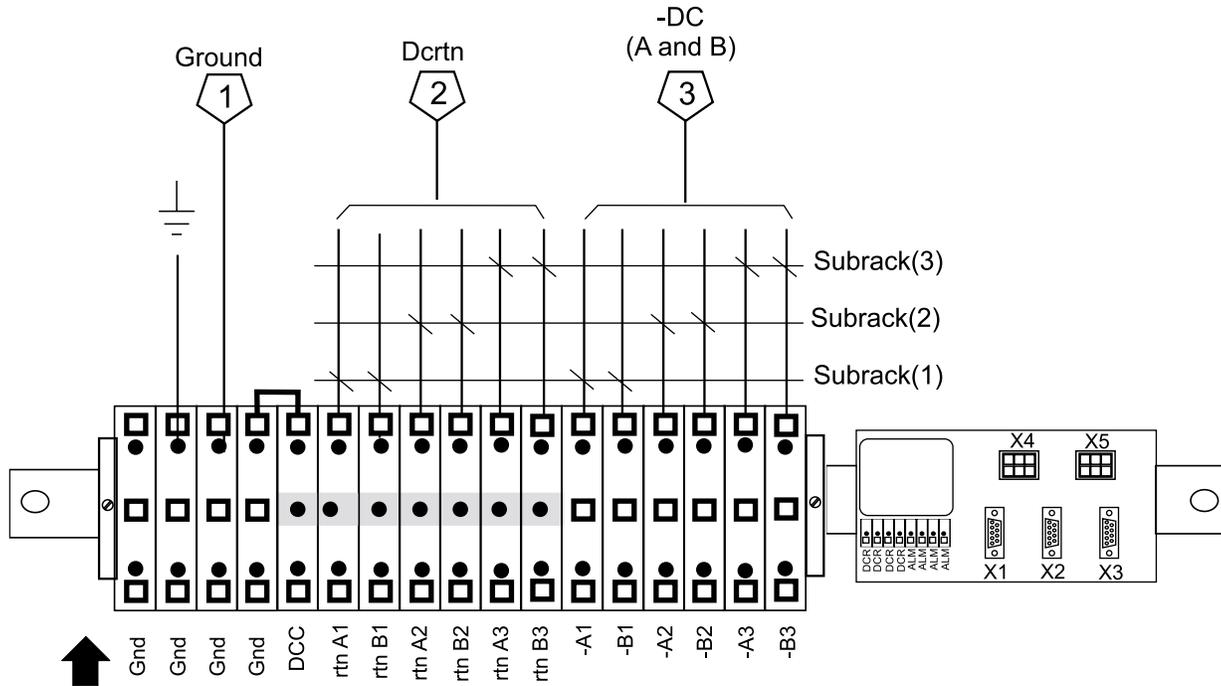
Legend:

1   Yellow/Green (ground)

2   Red (DCrtn)

3   Blue (-DC)

Power output

Figure 4-6 PDP Power Output
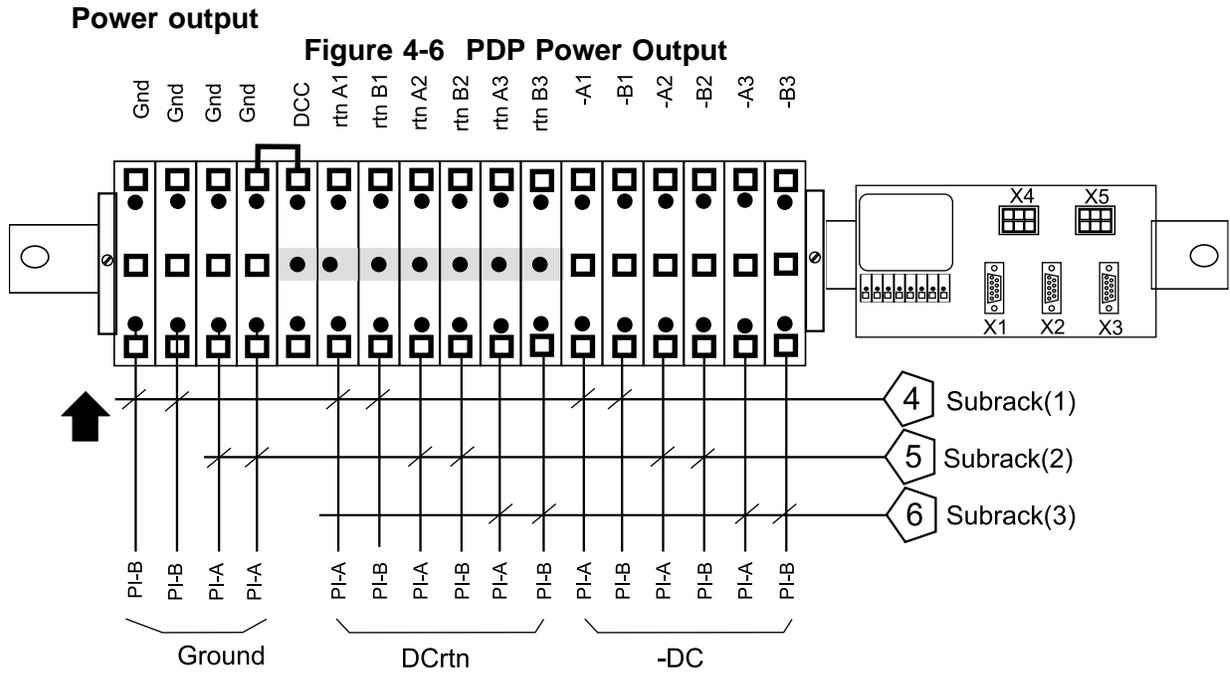
Legend:

4, 5, 6	Subrack # power cables (combined:Yellow/Green, Red, Blue)
Ground Color	Yellow/Green
DCrtn Color	Red
–DC Color	Blue

Subrack Alarms

Figure 4-7 PDP Subrack Alarms

Subrack(3)
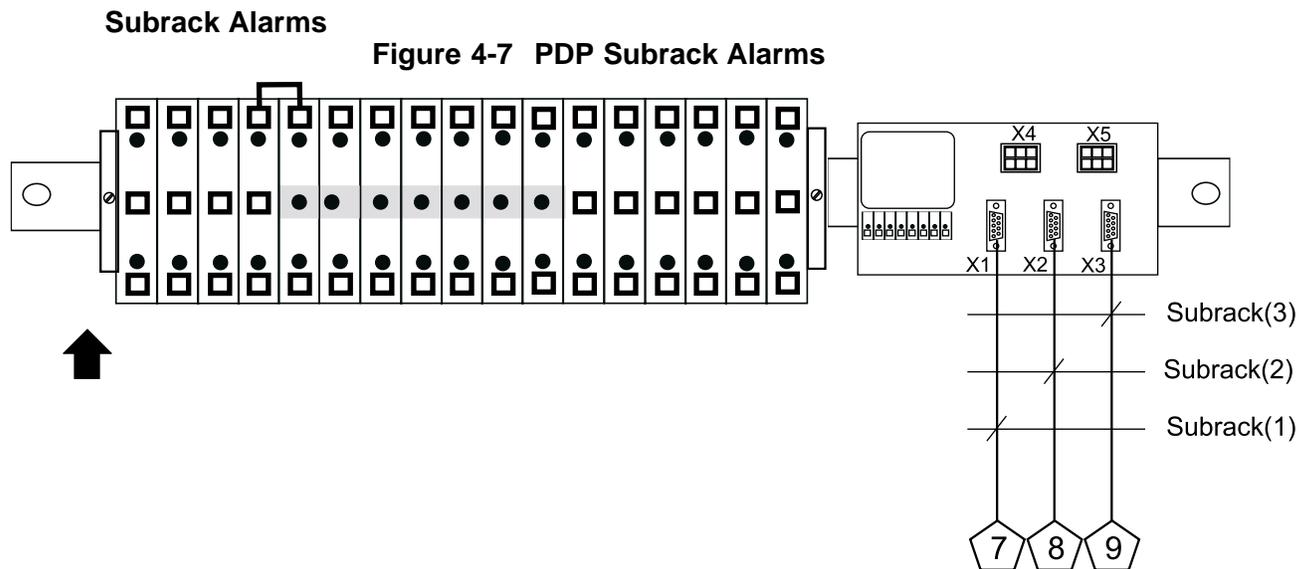
Subrack(2)

Subrack(1)

Legend:

7   1st Subrack Alarms (X1)

8   2nd Subrack Alarms (X2)

9   3de Subrack Alarms (X3), for future use

Figure 4-8 PDP Subrack Alarm Connector
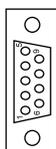
Legend:

1   Ground

2   Major Rack Top Return

3   Ground

4   Critical Rack Top Output

5   Minor Rack Top Output

6   Critical Rack Top Return

7   Minor rack Top return

8   Ground

9   Major Rack Top Output

Rack Alarm Lamps

Figure 4-9 PDP Rack Alarm Lamps
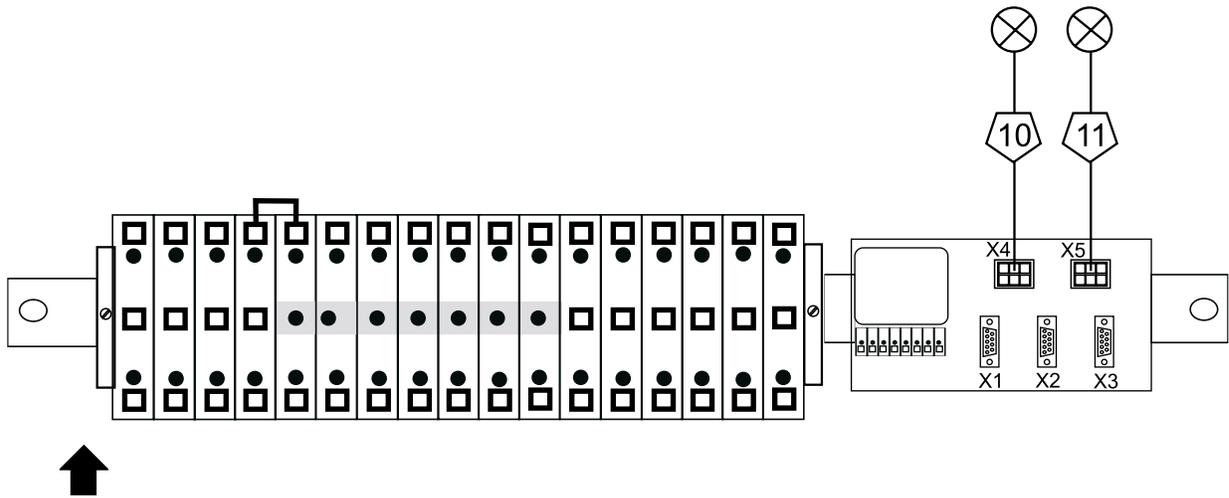
Legend:

10   Front Rack Frame Alarm Lamps (X4)

11   Rear Rack Frame Alarm Lamps (X5)

Figure 4-10 PDP Rack Alarm Connector
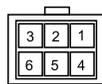
Legend:

1, 4   Critical Alarm

2, 5   Major Alarm

3, 6   Minor Alarm

External Alarms

Figure 4-11 PDP External Alarms
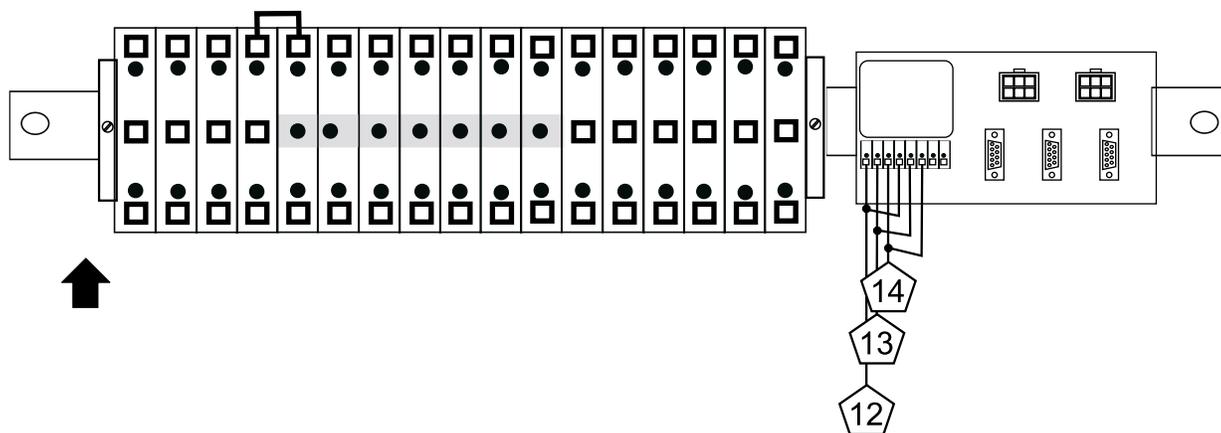
Legend:

12   External Cirtical Alarm

13   External Major Alarm

14   External Minor Alarm

Figure 4-12 PDP External Alarm connector
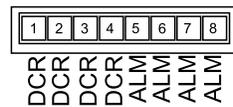
Legend:

1, 5   Critical Alarm

2, 6   Major Alarm

3, 7   Minor Alarm

Cable Block Diagram

The connection points of this product are shown as cable number symbols.

Layout Part1   Part 1
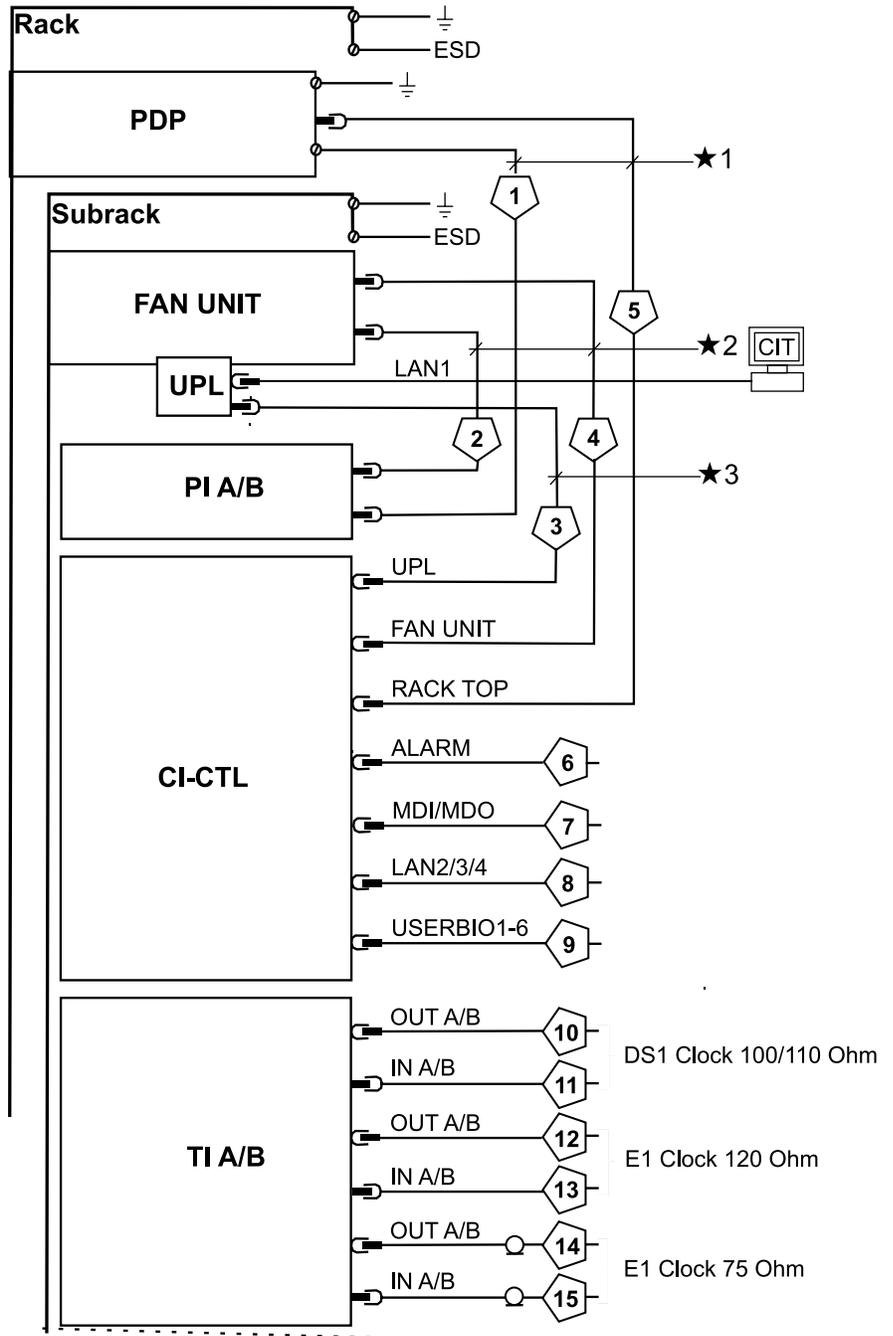
Layout Part2   Part 2
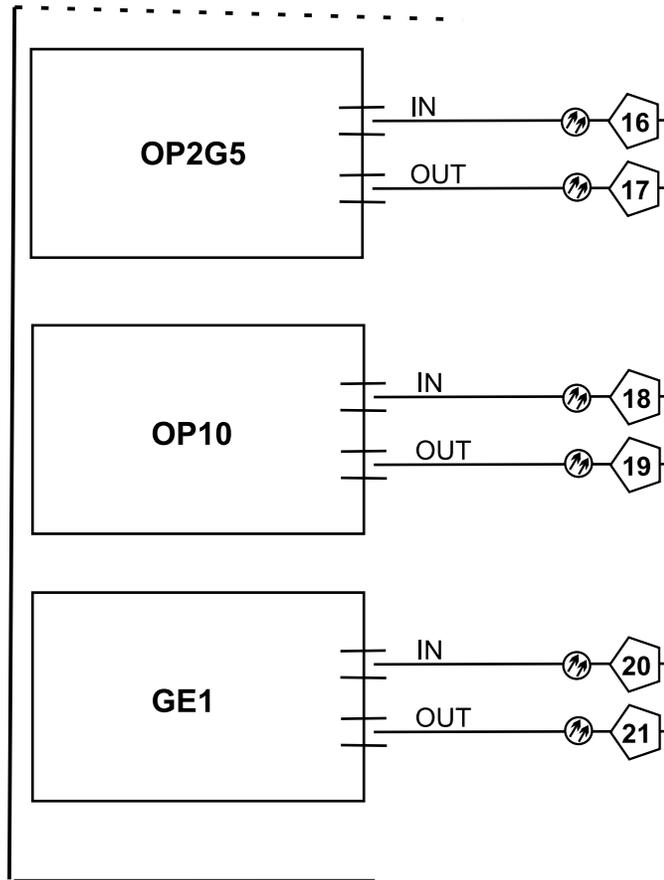
Legend:

* 1   This prefabricated cables are to be connected to
                             the PDP (see the configuration – and related
                             documentation.

* 2   This prefabricated cables are to be connected.

* 3   This prefabricated cable is installed on the
                             subrack.

Fiber Management in the Rack frame (UNITE)

Top Access

Figure 4-13 Top Access for Fiber Management (Side View Rack)
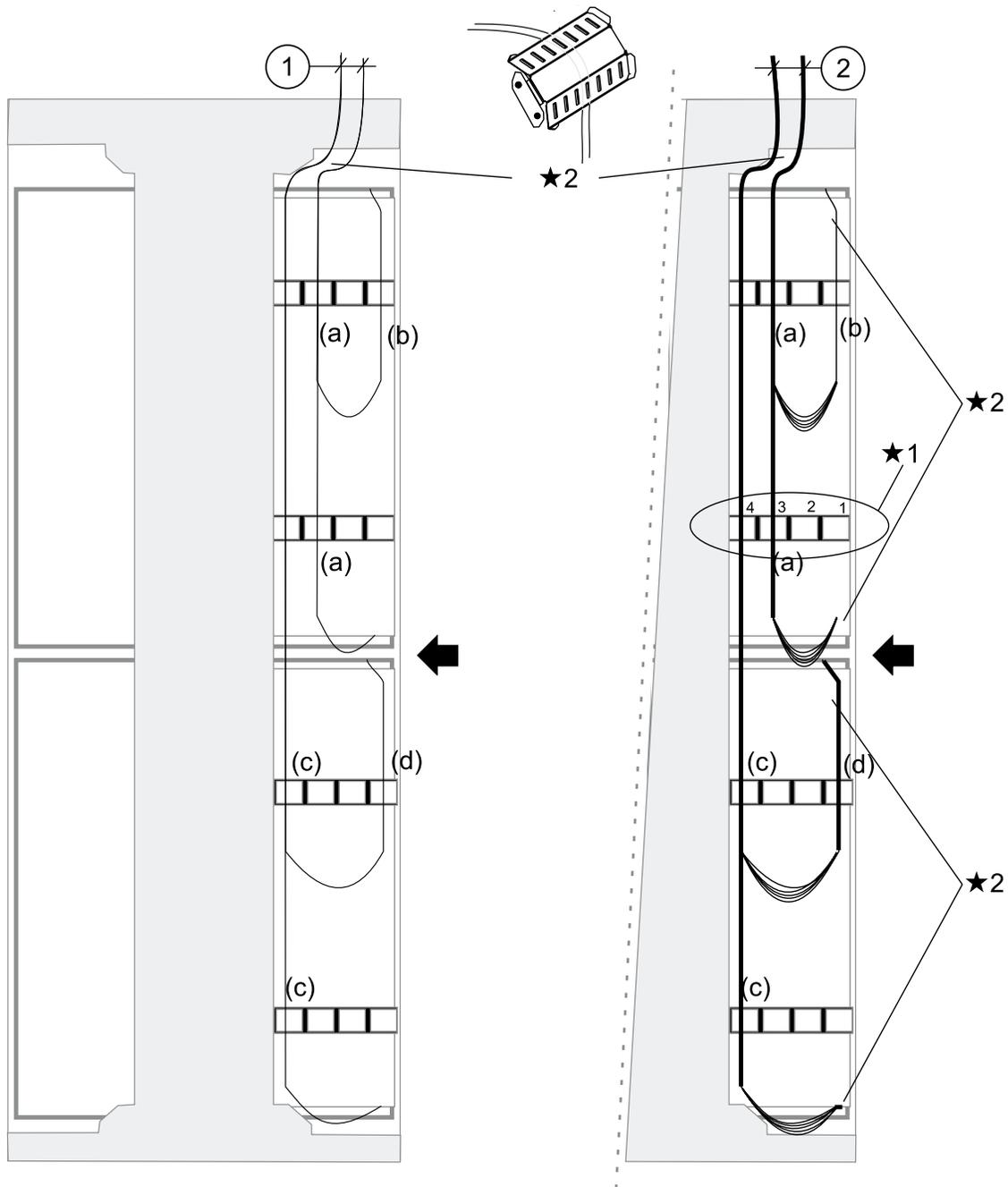
Important! The entries (*1) in the fiber guides are counted from the front (first entry) to the back of the bracket (fourth entry). The cables are tied together with velcro at the entries (*2) of the rack frame and subrack

Upper Subrack

The upper subrack cables are using the third entry of the fiber guide (a) to route down first and then upwards to:

- The upper row via the first entry (b)

- The bottom row directly

Bottom Subrack

The bottom subrack cables are using the fourth entry of the fiber guide (c) to route down first and then upwards to:

- The upper row via the first entry (d)

- The bottom row directly

Bottom Access

Figure 4-14 Bottom Access Fiber Management (Side View Rack)
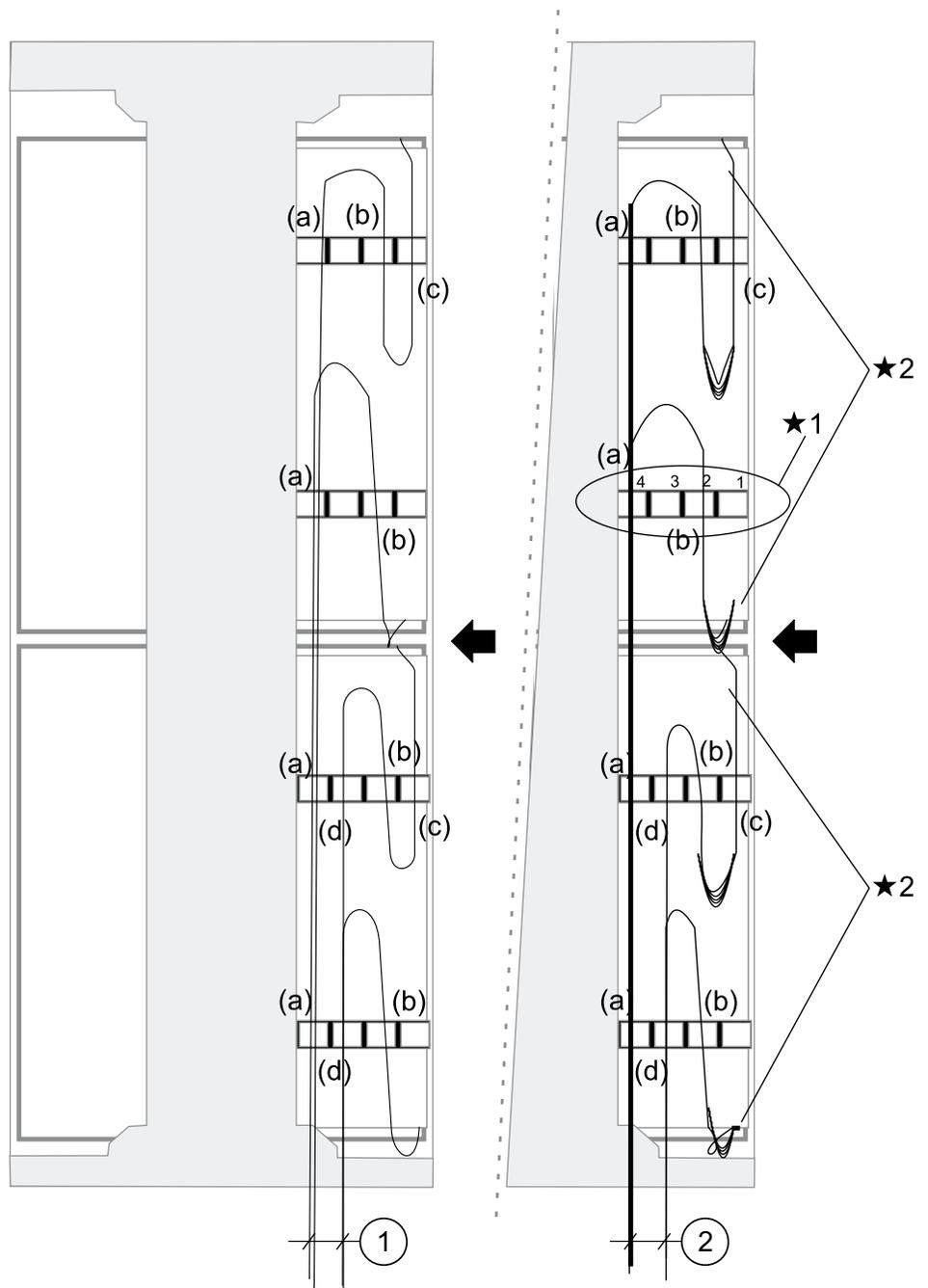
Important! The entries (*1) in the fiber guides are counted from the front (first entry) to the end of the bracket (fourth entry). The cables are tight together with velcro at the entries (*2) of the rack frame and subrack

Upper Subrack

The upper subrack cables are using the fourth entry of the fiber guide (a) to route up first and then upwards to:

- The upper row down via the second entry (b) and up via the first entry (c)

- The bottom row down via the second entry (b) and directly to the row

Bottom Subrack

The bottom subrack cables are using the third entry (d) of the fiber guide to route up first and then upwards to:

- The upper row down via the second entry (b) and up via the first entry (c)

- The bottom row down via the second entry (b) and directly to the row

┒

Fiber Management Subrack

Optical cables   The "Fiber Optic Cables" (B-2) are:

- "Single Mode 9/125" (B-2) cables for circuit-pack 2.5 and 10 Gigabits

- "Multi Mode 62.5/125" (B-8) cables for circuit-pack Gigabit Ethernet.

The above optical cables are routed on both sides from the top or bottom of the Unite rack-frame to the subrack via the fiber guides that are on the subrack's mounting brackets at the right-front and left-front sides of the subrack.

The break-out cables will be stripped to the halfway point of the subracks's height.

Important! When dressing the optical cables (break-out or simplex) use a bending radius of of a minimum of 25mm for stripped break-out or single fibers and a minimum of 77 mm for an unstripped break-out cable.

Fiber Routing in a Subrack   The fiber cables are routed from both sides of the subrack to the top or bottom via the Fiber-Routing Guides (corner) — DC1001518 (item 2) which are mounted at each corner position of the subrack. The cables are tightened with Velcor — DC1005002 (item 3) before they enter the subrack.

Cables are lead to the slot position via the Fiber-Routing Guides (RT/LB) — DC1001516 (item 1) or the Fiber-Routing Guides

(LT/RB) — DC1001517 (item 4) which are mounted on the top/bottom of the subrack.

Figure 4-15 Fiber Management in the Subrack (Top Access)

Upper Subrack

Lower Subrack

★1
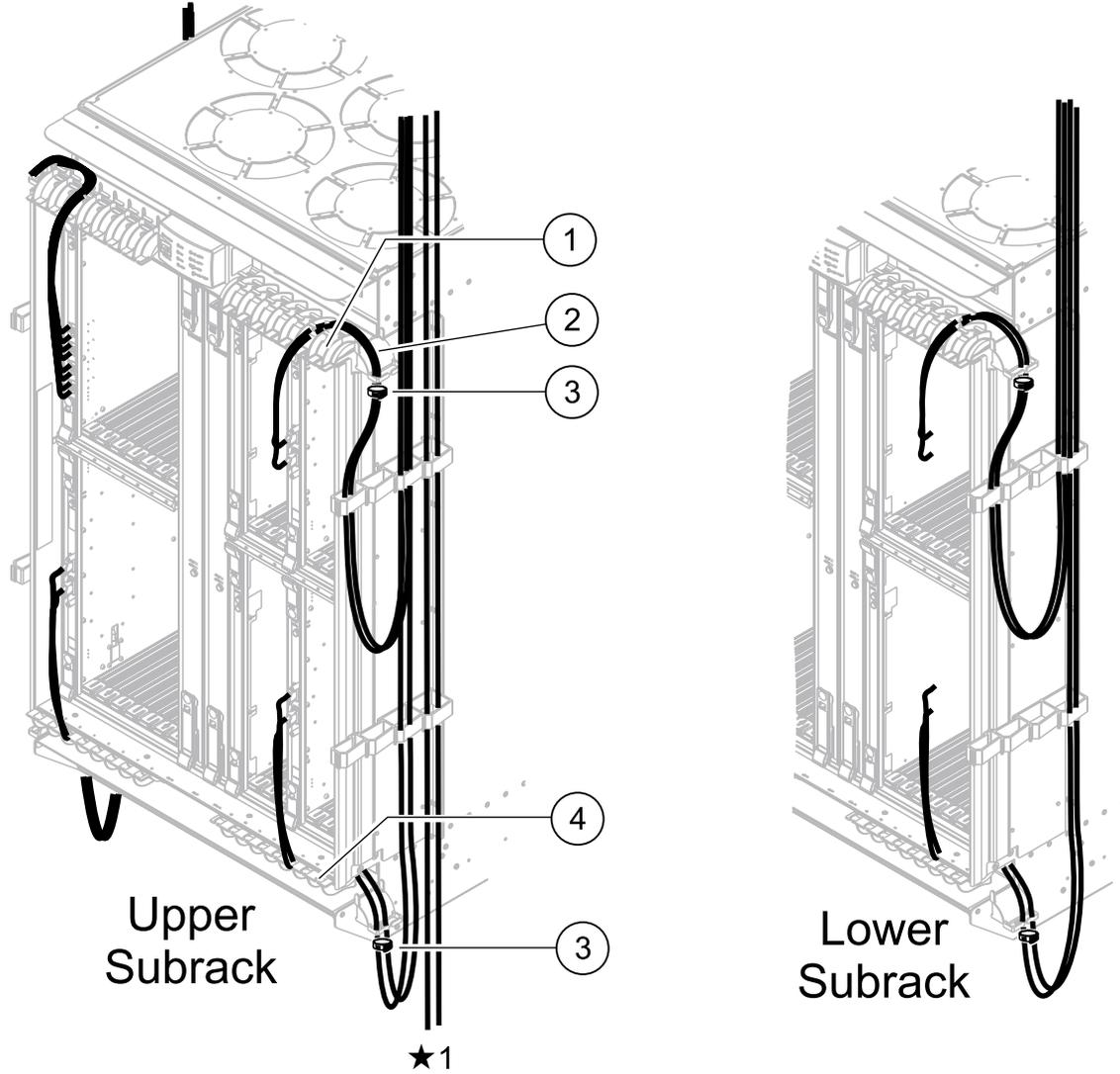
Legend:

*1   Cable routed to the lower subrack

....

4 - 2 2   **Lucent Technologies**   365-374-023
                                                                        Issue a, October 2001

Figure 4-16 Fiber Management in the Subrack (Bottom Access)

Upper
Subrack

Lower
Subrack
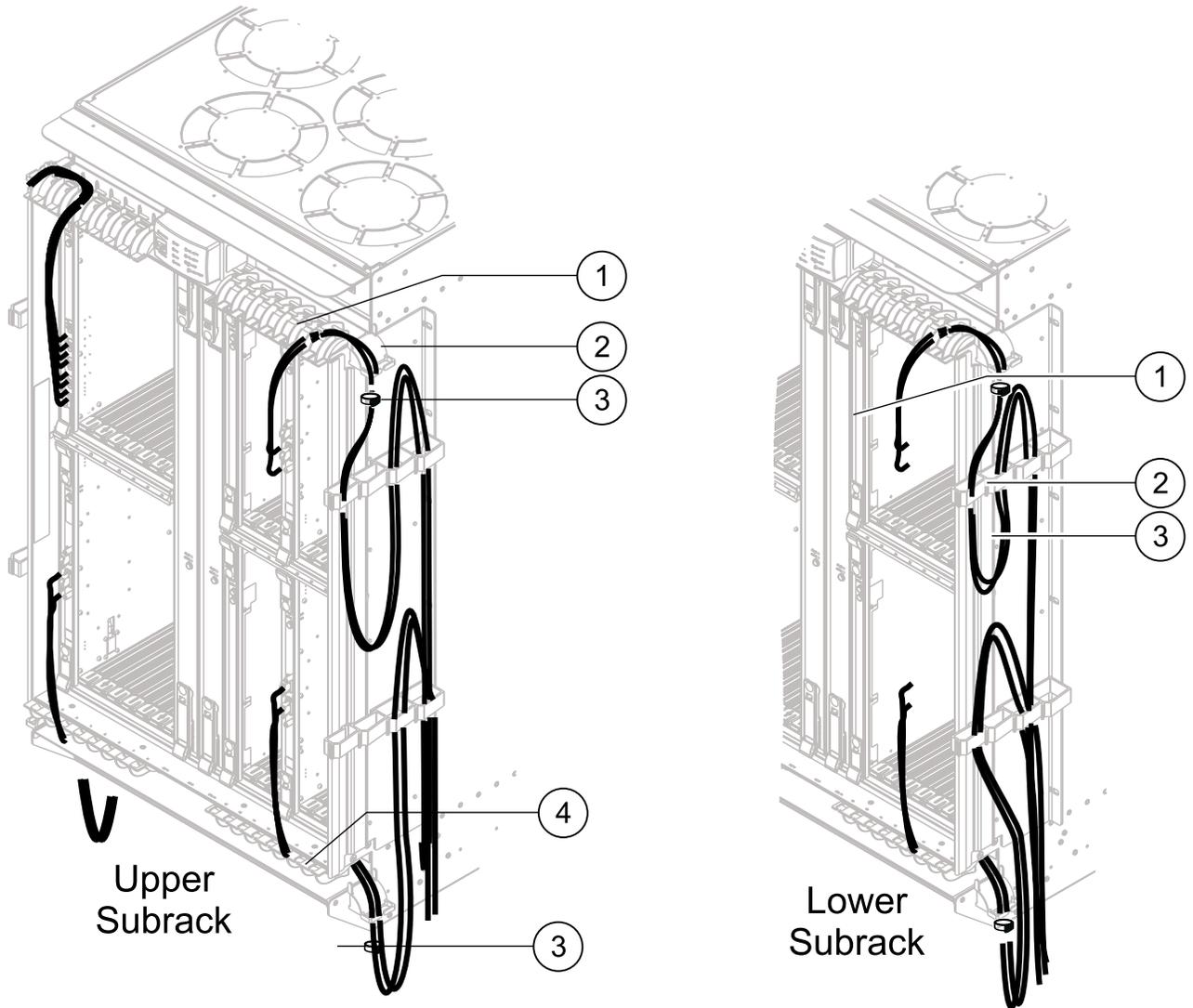
Legend:

*1   Cable routed to the upper subrack

Electrical Cable Management

Electrical cables Electrical cables are:

- TI-E1/DS1 (75100/120)

- PI-FAN

- PI-PDP

- Alarm-PDP

- User bytes

- MDI/MDO

- LAN

The above electrical cables are routed on both sides from the top or bottom of the Unite rack-frame to the subrack via the guides that are mounted on the rear of the subrack.

Important! When dressing the cables attach them to the guides by using tie wraps (item 1). See the following figures.

Top Access

Figure 4-17 Electrical-Cable Management (Top Access)
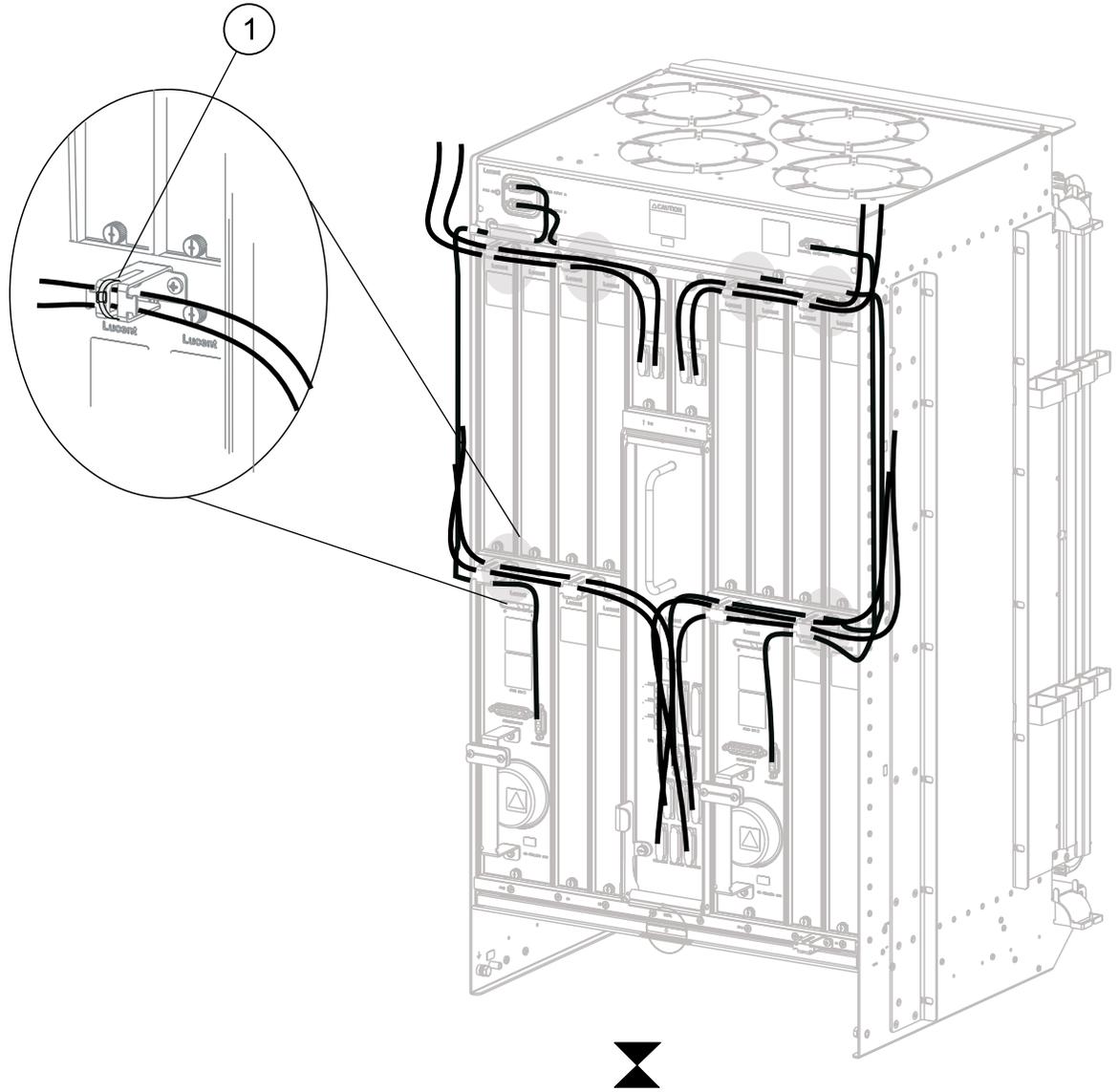
Bottom Access

Figure 4-18 Electrical-Cable Management (Bottom Access)
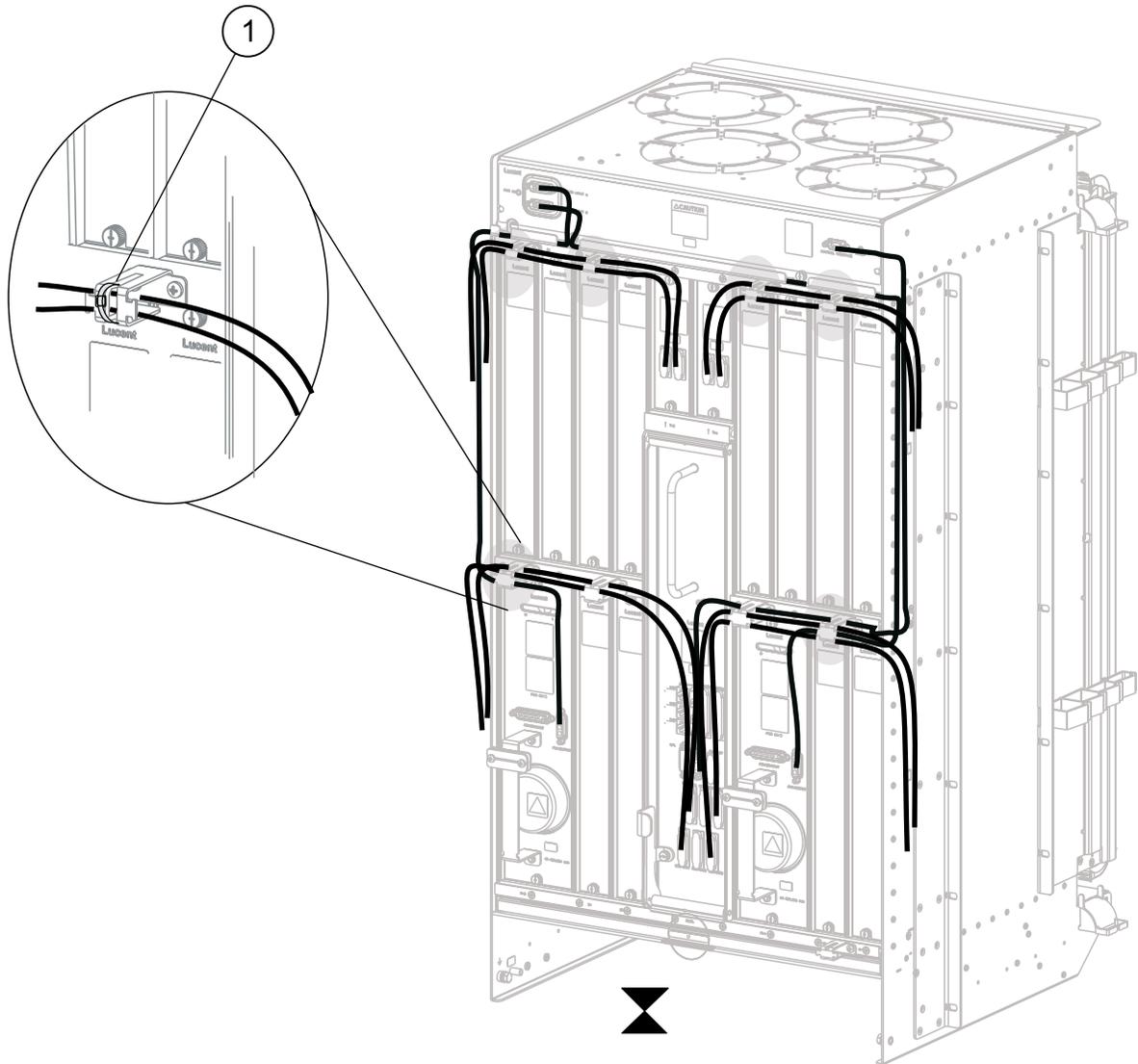
ESD and Ground Connections

....

Ground Cable   Cable Data

Cable	Description
Type	DC1003200
Diameter	AWG 8 / 8mm^2
Code	Ground Wire (2000 m.) — 848828174 (Upper Subrack)
	Ground Wire (3000 m.) — 848828182 (Lower Subrack)

Positions

Figure 4-19 Position of the ESD-Connection and Ground-Connection Points (1 of 2)

ESD

....

365-374-023
Issue a, October 2001

Lucent Technologies

4 - 2 7
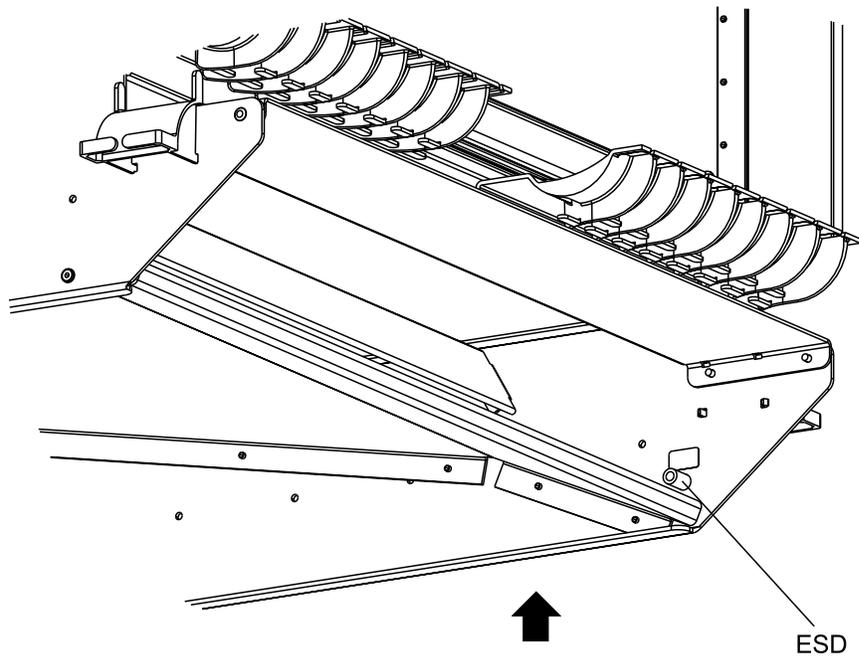
**Figure 4-19 Position of the ESD-Connection and Ground-
Connection Points (2 of 2)**

ESD
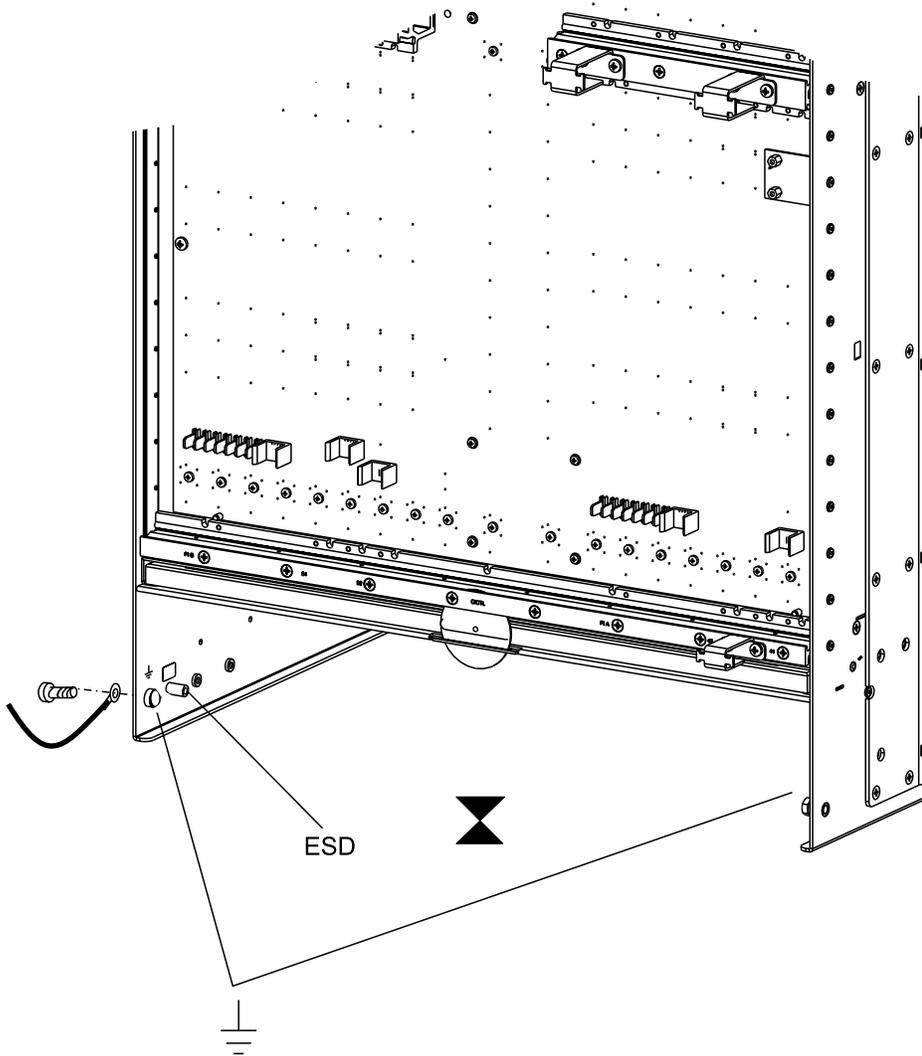
Power Cables, PI – PDP

....

DC Power Cables	**Important!** These cables are prefabricated and mounted within the Unite rack- frames.

Cable Data

Description — Code	Remarks
Cable Assy, Upper shelf - PDP — 848811501/DC1002826	2x for Upper Subrack, A and B feeder
Cable Assy, Lower shelf - PDP — 848811519/DC1002827	2x for Lower Subrack, A and B feeder

Layout and Routing	**Important!** The surface of an operating PI may be hot.

When the power connector is connected to the PI, tie the cable to the handle of the PI by using tie-wraps.

Routing from Power Interface to PDP:

- Upper subrack — keep the power cabling at the rear side of the center style (B to the left and A to the right).

....

- Lower subrack — the power cabling is routed within the center style to the bottom of the rack and then up to the subrack (B to the left and A to the right).

Figure 4-20 DC Power Cables
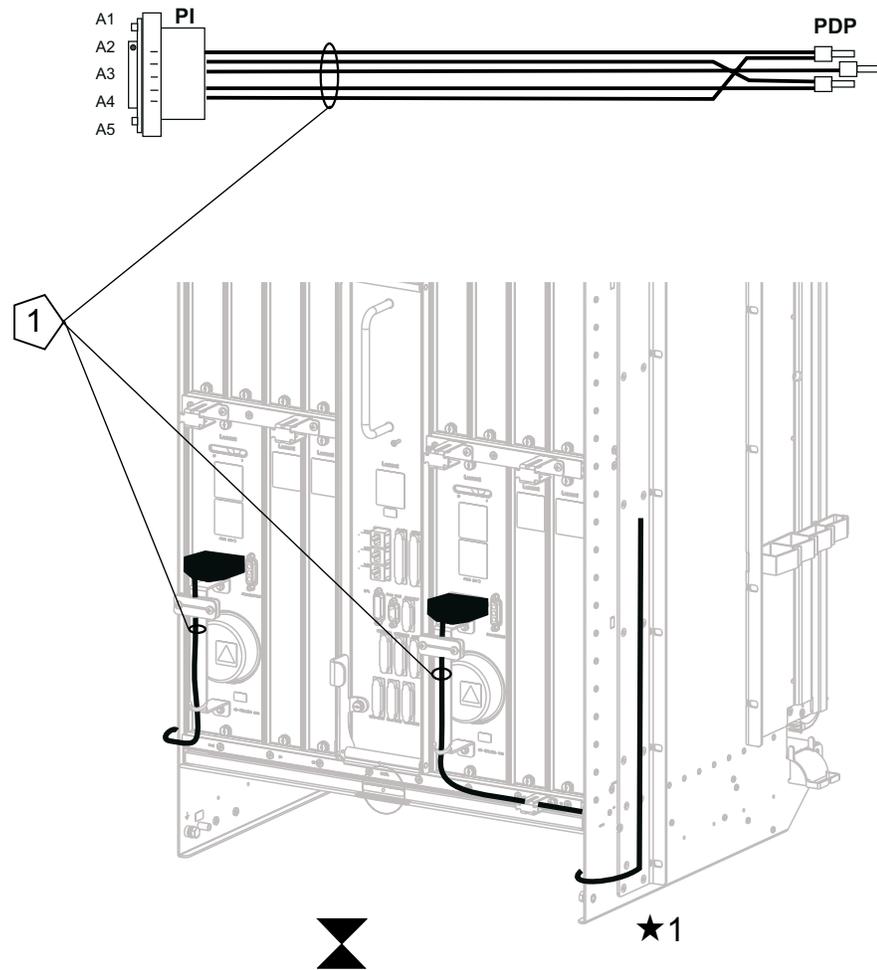
Pin Arrangement

Point on Connector	Signal Name	Color
A1	–DC	Blue
A2	Return	Red
A3	Ground	Yellow/Green
A4	Return	Red
A5	–DC	Blue

⌐

Power Cables, PI – FAN Unit

Power Cable, FAN Unit   **Important!** These cables are prefabricated and already installed with the subrack.

Cable Data

Description — Code	Remarks
Cable Assy, PI - FAN Unit Power A — 848811550/DC1003269	PI-A
Cable Assy, PI - FAN Unit, Power B — 848811576/DC1003270	PI-B

Routing and Layout

Figure 4-21 Power Cable FAN Unit
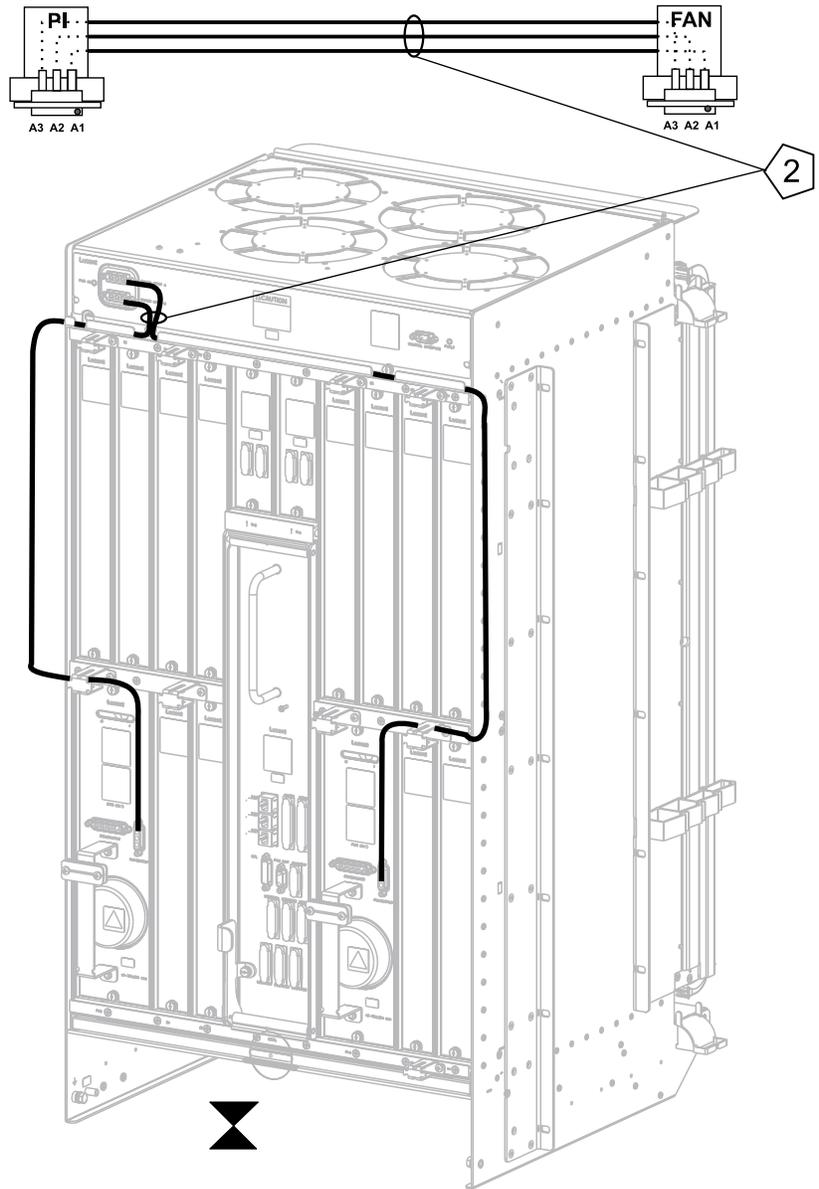
Pin Arrangement

PI		FAN	
Point on Connector	**Signal Name**	**Point on Connector**	**Signal Name**
A1	Ground	A1	Ground

PI		FAN	
Point on Connector	**Signal Name**	**Point on Connector**	**Signal Name**
A2	–DCA/-DCB	A2	–DCA/-DCB
A3	Return	A3	Return

Cable, CI-CTL – UPL

UPL Cable   **Important!** This cable is prefabricated and mounted on the subrack.

Cable Data

Description — Code	Remarks
Cable Assy, CI-CTL - UPL — 848811584/ DC1003272	

Routing and Layout

Figure 4-22 Cable, CI-CTL – UPL
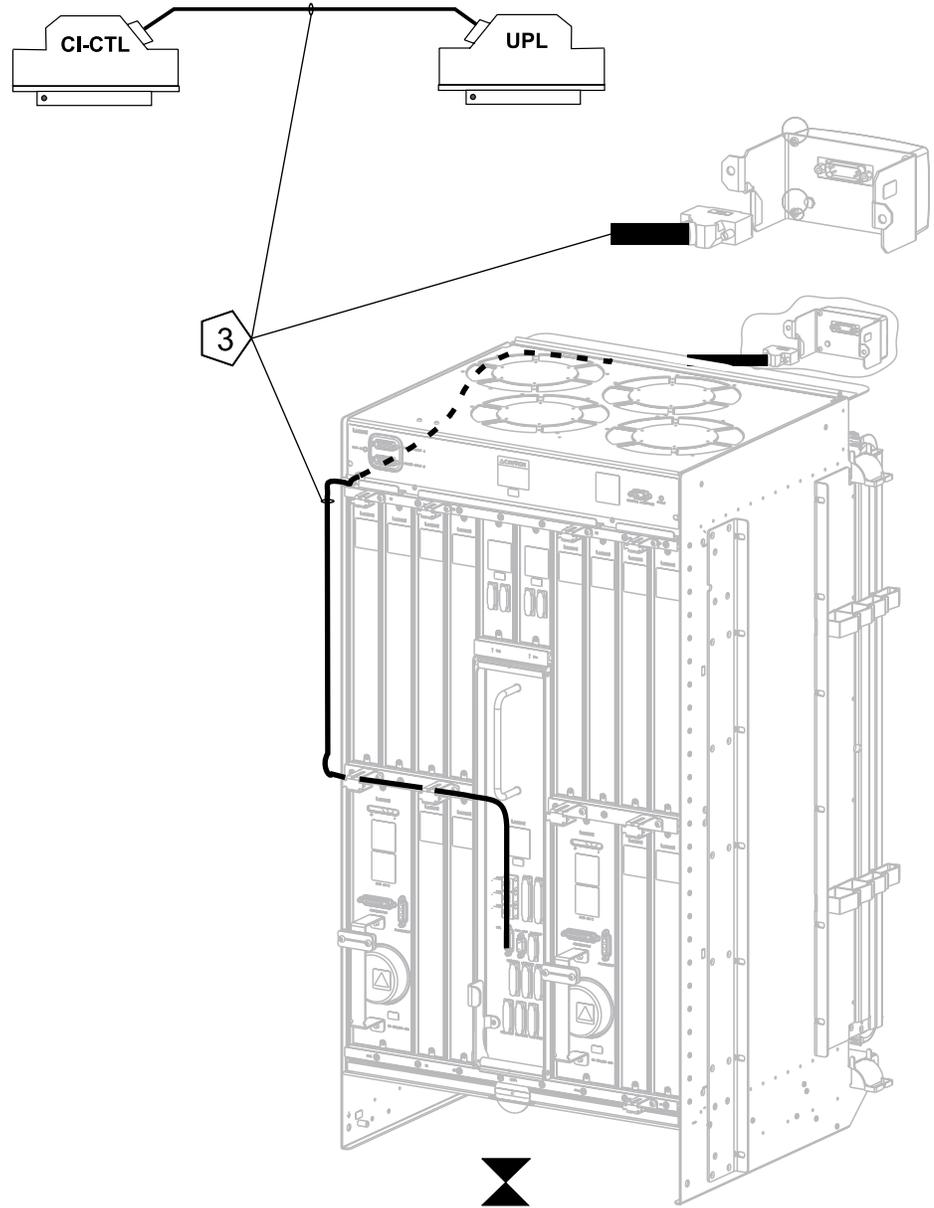
Pin Arrangement

CI-CTL		UPL	
Point on Connector	**Signal Name**	**Point on Connector**	**Signal Name**
1	Ground	1	Ground
2	TDP of CIT	2	Ethernet-Transmitter Positive
3	TDN of CIT	3	Ethernet-Receiver Positive
4	Equipment Sense	4	Equipment Sense
5	1^2C Clock Line	5	1^2C Serial Clock line
6	1^2C Data Line	6	1^2C Serial Data line
7	Not Connect	7	Ground
8	Ground	8	Ground
9	Ground	9	Ground
10	RDP of CIT	10	Ethernet-Transmitter Negative
11	RDN of CIT	11	Ethernet-Receiver Negative
12	Test Point	12	Test Point
13	Alarm-Cut Off Button	13	Alarm Cut-Off Button
14	LED-Test Button	14	LED-Test Button
15	+4V	15	Power Line

⌐

Controller Cable, CI-CTL – FAN Unit

Controller Cable FAN Unit   **Important!** This cable is prefabricated and mounted with the subrack.

Prefab-Cable Data

Description — Code	Remarks
Cable Assy, CI-CTL - FAN Unit — 848811568/ DC1003271	

Routing and Layout   **Important!** If that cable isn't connected correctly the circuits on the CI-CTL panel can be damaged. Therefore make sure that the cable is connected to the right connectors.

Figure 4-23   Controller Cable, CI-CTL – FAN Unit
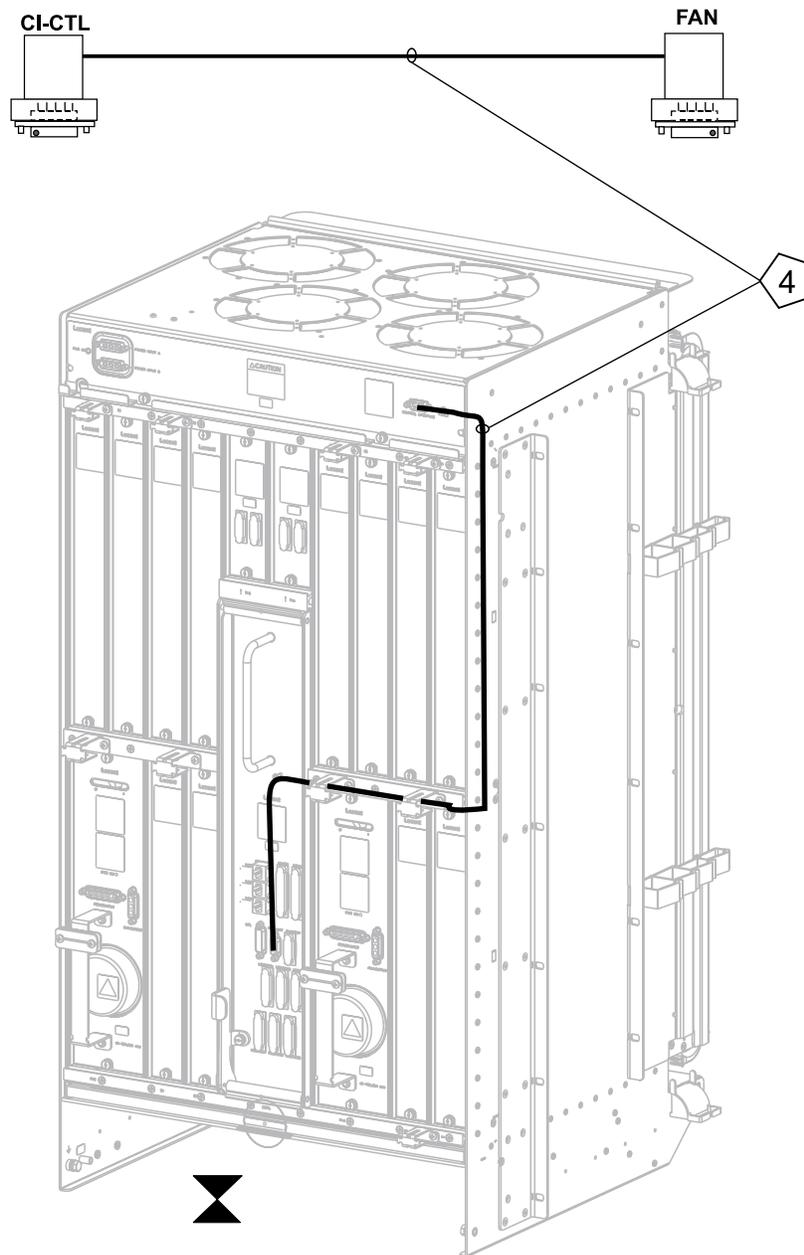
Pin Arrangement

CI-CTL		FAN	
Point on Connector	**Signal Name**	**Point on Connector**	**Signal Name**
1	1^2C Clock line	1	1^2C Clock line
2	1^2C Data line	2	1^2C Data line
3	Not Connected	3	Not Connected
4	Equipment Sense	4	Equipment Sense
5	+4V	5	+4V
6	FAN Alarm	6	FAN Alarm
7	Feeder A Alarm	7	Feeder-A Alarm
8	Feeder B Alarm	8	Feeder-B Alarm
9	Ground	9	Ground

Rack-Top Alarm-Interface Cable, CI-CTL – PDP

Rack-Top Alarm Cable, CI-CTL – PDP

Important! These cables are prefabricated. They are mounted in the rack frame and connect on the side of the subrack.

Cable Data

Description — Code	Remarks
Cable Assy, CI-CTL - PDP, Upper — 848811527/DC1002828	
Cable Assy, CI-CTL - PDP, Lower — 848811535/DC1001829	

Layout and Routing   **Important!** If that cable isn't connected correctly the circuits on the
CI-CTL panel can be damaged. Therefore make sure that the cable is
connected to the right connectors.

Figure 4-24   Rack-Top Alarm Cable, CI-CTL – PDP
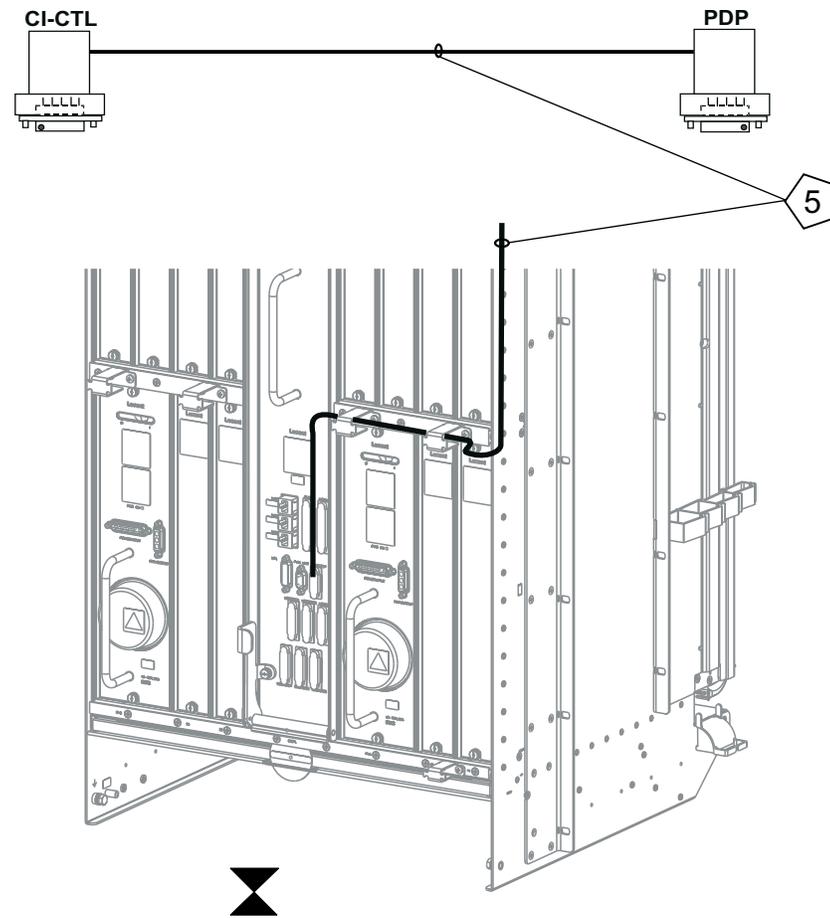
Pin Arrangement

CI-CTL		PDP	
Point on Connector	**Signal Name**	**Point on Connector**	**Signal Name**
1	Ground	1	Ground
2	Major Rack-Top Return	2	Major Rack-Top Return
3	Ground	3	Ground
4	Critical Rack-Top Output	4	Critical Rack-Top Output
5	Minor Rack-Top Output	5	Minor Rack-Top Output
6	Critical Rack-Top Return	6	Critical Rack-Top Return
7	Minor Rack-Top Return	7	Minor Rack-Top Return
8	Ground	8	Ground
9	Major Rack-Top Output	9	Major Rack-Top Output

Station-Alarm Interface

Station Alarms   This interface consists of 6 isolated output-pairs. The ports can switch both 0.5A at 72V and 2.0A at 30V. Critical contacts (visual and audible) can be configured to be active without system power. These contacts are closed if there is loss of control or of power.

Technical Data   Length of pre-fabricated cables:

- 10 m [33 ft.]. Cable Assy, Station Alarm — 109155788
- 25 m [82 ft.] Cable Assy, Station Alarm — 109155796
- 50 m[164 ft.]. Cable Assy, Station Alarm — 109155804
- 75 m [246 ft.]. Cable Assy, Station Alarm — 109164186
- 100 m [328 ft.]. Cable Assy, Station Alarm — 109164194

Cable Data

Type	16 wires x 0.5mm / AWG24 + overall screen	
Code	DC1003600	
	MS100–4397	Madison
	43160 3300 240	Belden
DC Resistance	91 Ω/1000 meters	Madison
	103 Ω/1000 meters	Belden
Diameter	6.85 mm	Madison
	6.5 mm	Belden
Color Code	"Multicore Low Current Cables" (A-9)	

Connector Data

Type of Connector	D-SUB pin, 25p solder	Remarks
Code no. of Connector	407362730 / DC1003598	
	DA25P065T	FCI
Code no. of Hood	DC1003599	
	17DVZK25K	Amphenol
	MHD45ZK25–K(MH)	MH

Mounting Instructions   "D-Sub Metallic Hoods" (A-2)

Figure 4-25 Station Alarm Interface
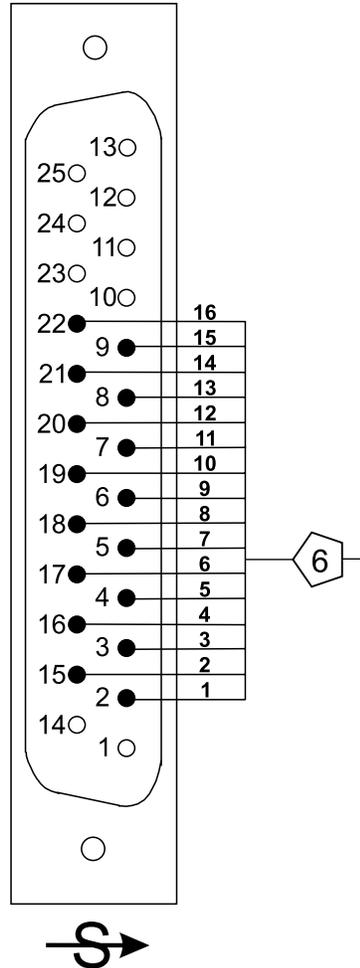
Pin Arrangement

Point on Connector	Signal Name
2	Critical Audio Output
3	Critical Visual Output
4	Major Audio-Output Return
5	Major Visual Output

Point on Connector	Signal Name
6	Minor Audio Output
7	Minor Visual Output
8	Ground
9	Ground
15	Critical Audio-Output Return
16	Critical Visual-Output Return
17	Major Audio Output
18	Major Visual-Output Return
19	Minor Audio-Output Return
20	Minor Visual-Output Return
21	Ground
22	Ground

Layout and Routing   **Important!** If that cable isn't connected correctly the circuits on the CI-CTL panel can be damaged. Therefore make sure that the cable is connected to the right connectors.

Figure 4-26 Station-Alarm Layout and Routing
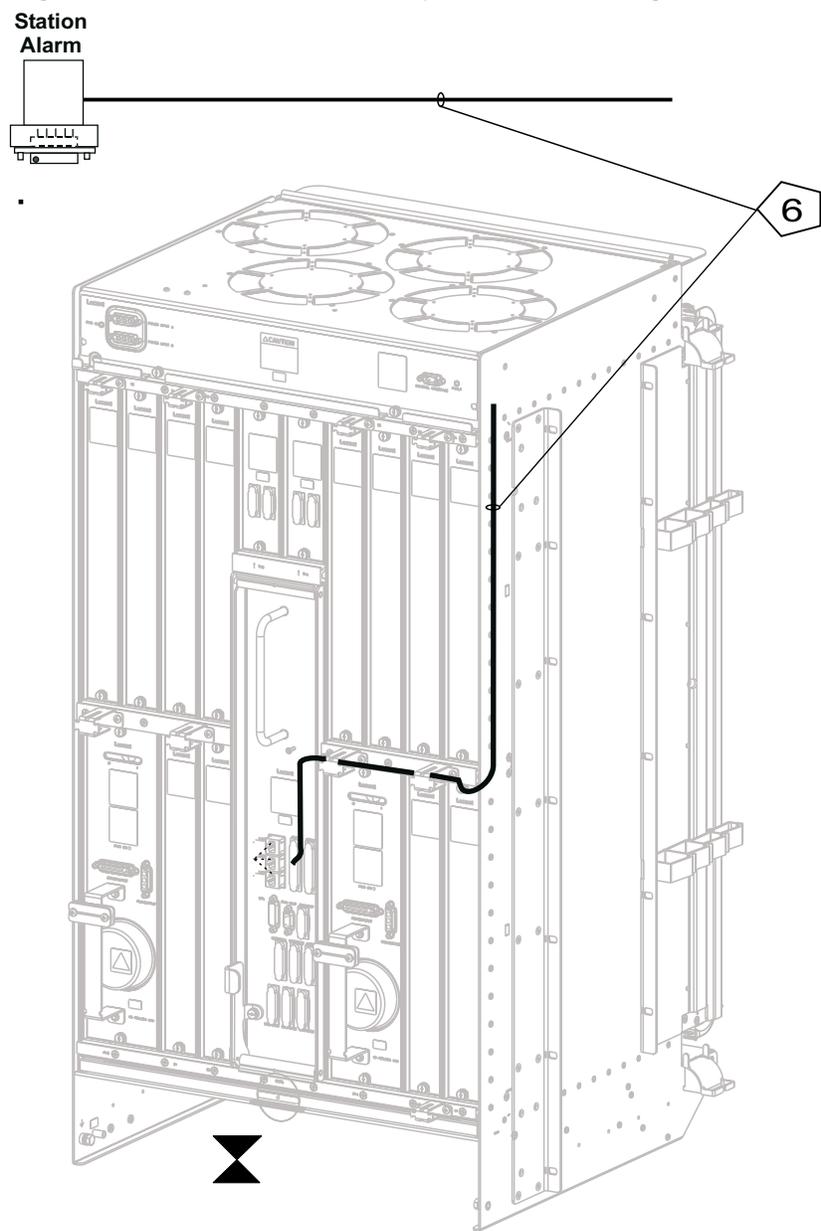
LAN 10/100 Base-T Interface

Locations   The LAN ports are positioned at:

- LAN1 – CIT Interface
- CI-CTL:
    - LAN2, LAN3 – Local EMS Interfaces
    - LAN4 – XTreme Interface

LAN 10/100 Base-T   Length of pre-fabricated cables:

- 10 m [33 ft.]. Cable Assy, LAN — 109155929
- 25 m [82 ft.]. Cable Assy, LAN— 109155945
- 50 m [64 ft.]. Cable Assy, LAN— 109155952
- 75 m [246 ft.]. Cable Assy, LAN — 109164368
- 91 m [300 ft.]. Cable Assy, LAN — 109164376

Cable Data

Type	CAT5 cable (4 pairs) with overall shield	
Code	DC1003605	
	MS100–4445	Madison
	43167 3307 079	Belden
DC Resistance	76 Ω/1000 m	Madison
Diameter	6.0 mm	Madison
	5.6 mm	Belden

Connector Data

Type of Connector	Modular Plug / RJ45 8p shielded	Remarks
Code no. of Connector	407890193 / DC1003604	
	336 330–1	Tyco/AMP
Mounting Instructions	"Modulair Plug Connector" (A-4)	

Figure 4-27 LAN 10/100 Base-T Interface
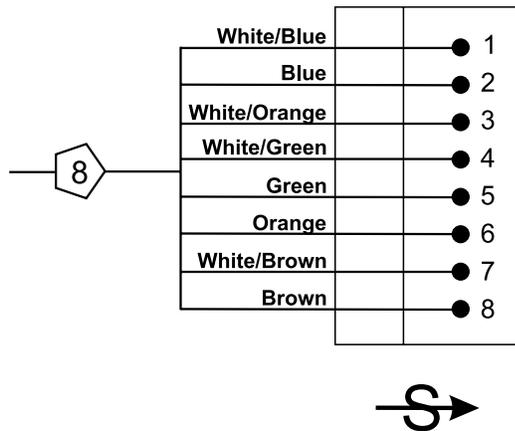
Pin Arrangement

Point on Connector	Signal Name
1	Transmit-Data Positive
2	Transmit-Data Negative
3	Receive-Data Positive
6	Receive-Data Negative

LAN Layout and Routing on CI-CTL

Figure 4-28 Layout
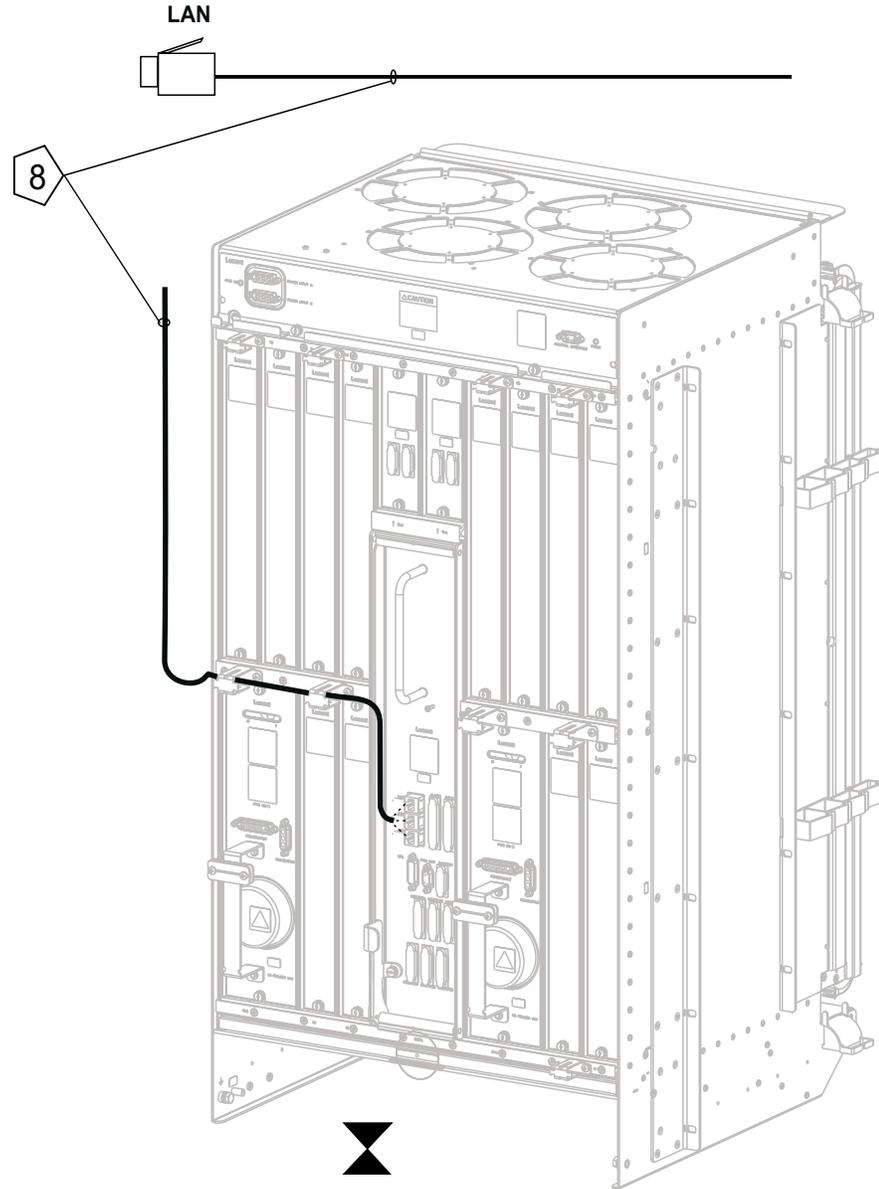
TI-DS1 Station Clock Output/Input Interface 100/110 Ω

TI-DS1 Output/Input 100 Ω Cable

Cable Data

Type	Shielded Twisted Pair 100 Ω + overall screen	Remark
Code	DC1003607	
	43162 3302 028	Belden
DC Resistance	<154 Ω/1000 m	Belden
Attenuation	4.5 dB/100 m at 1 Mhz	Belden
Diameter	4.05 mm	Belden

TI-DS1 Output 100 Ω

Length of pre-fabricated cables:

- 10 m [33 ft.]. Cable Assy, TI–DS1 — 109155580
- 25 m [82 ft.] Cable Assy, TI–DS1 — 109155598
- 50 m [164 ft.]. Cable Assy, TI–DS1 — 109155606
- 75 m [246 ft.] Cable Assy, TI–DS1 — 109164269
- 100 m [328 ft.]. Cable Assy, TI–DS1 — 109164277

Connector Data

Type of Connector	D-SUB pin, 9p solder	Remarks
Code no. of Connector	407362748 / DC1003660	FCI
Code no. of Hood	DC1003609	
	17DVZK09K	Amphenol
Mounting Instructions	"D-Sub Metallic Hoods" (A-2)	

Figure 4-29 DS1 – Station Clock Output Interface, 100 Ω
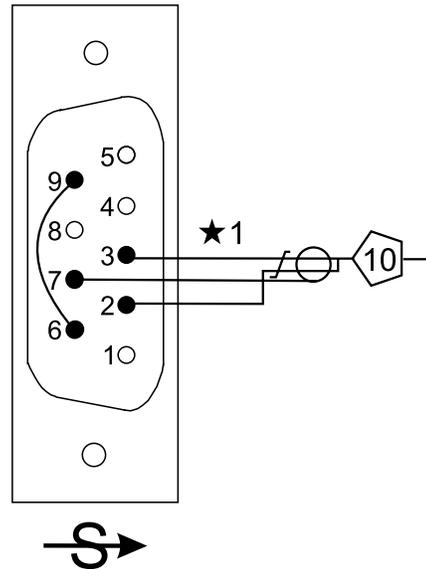
Pin Arrangement

Point on Connector	Signal Name	Wire Color *1	
		DIN	**US**
2	Station-Clock Output Positive	White	White
3	Station-Clock Output Negative	Brown	Blue
7	Ground	Screen	Screen
6, 9	Strap		

TI-DS1 Input, 100 Ω   Length of Pre-fabricated cables :

- 10 m [33 ft.]. Cable Assy, TI–DS1 — 109155846
- 25 m [82 ft.]. Cable Assy, TI–DS1 — 109155853
- 50 m. [164 ft.] Cable Assy. TI–DS1 — 109155861
- 75 m [246 ft.]. Cable Assy, TI–DS1 — 109164327
- 100 m [328 ft]. Cable Assy, TI–DS1 — 109164335

Connector Data

Type of Connector	D-SUB Socket, 9p Solder	Remarks
Code no. of Connector	407362797 / DC1003661	FCI
Code no. of Hood	DC1003609	
	17DVZK09K	Amphenol
Mounting Instructions	"D-Sub Metallic Hoods" (A-2)	

Figure 4-30 DS1 – Station-Clock Input Interface, 100 Ω
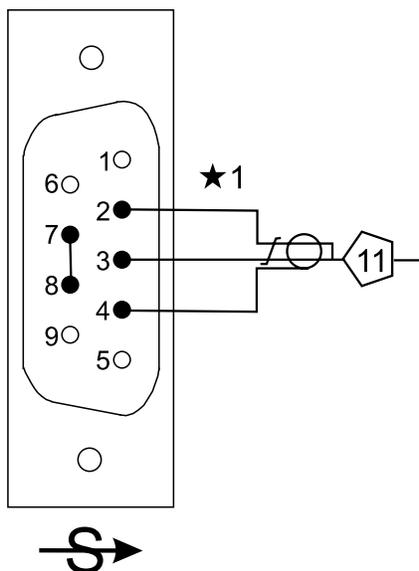
Pin arrangement

Point on Connector	Signal Name	Wire Color *1	
		DIN	**US**
2	Station-Clock Input Positive	White	White
3	Station-Clock Input Negative	Brown	Blue
4	Ground	Screen	Screen
7, 8	Strap		

TI Layout and Routing   The upper and lower subracks have the cabling at the rear side: the B
(IN/OUT) to the left and the A (IN/OUT) to the right.

Figure 4-31   TI
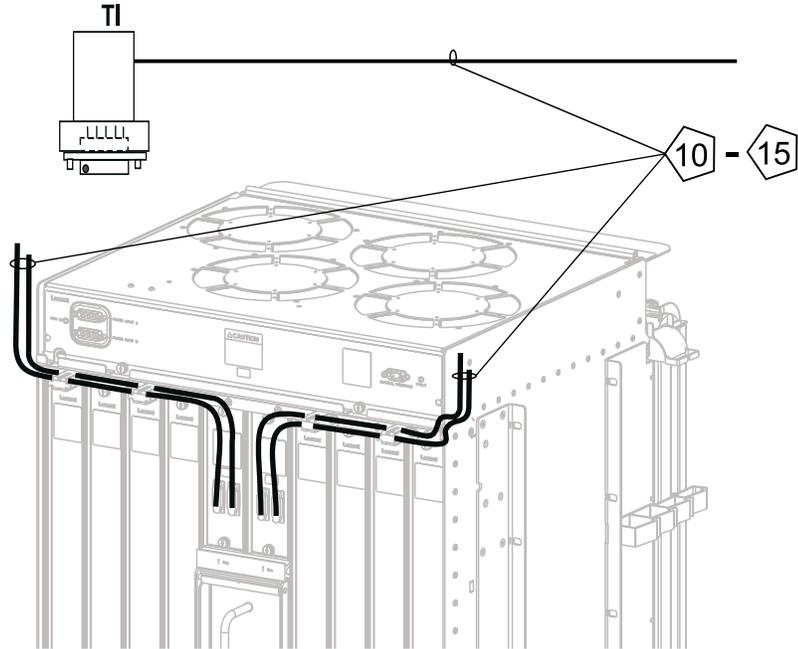
TI-E1 Station-Clock Output/Input Interface, 120 Ω

TI-E1 Output/Input Cable, 120 Ω

Cable Data

Type	Shielded Twisted Pair, 100 Ω + overall screen	
Code	DC1003606	
	MS100–4276	Madison
DC Resistance	<154 Ω/1000 m	Belden
Attenuation	4.5 dB/100 m at 1 Mhz	Belden
Diameter	4.05 mm	Belden

TI-E1 Output, 120 Ω

Length of pre-fabricated cables:

- 10 m [33']. Cable Assy, TI–E1 (120Ω) — 109155556
- 25 m [82']. Cable Assy, TI–E1 (120Ω) — 109155564
- 50 m [164']. Cable Assy, TI–E1 (120Ω) — 109155572
- 75 m [246 ft.]. Cable Assy, TI–E1 (120Ω) — 109164244
- 100 m [328 ft.]. Cable Assy, TI–E1 (120Ω) — 109164251

Connector Data

Type of Connector	D-SUB pin, 9p solder	Remarks
Code no. of Connector	407362748 / DC1003660	FCI
Code no. of Hood	DC1003609	
	17DVZK09K	Amphenol
Mounting Instructions	"D-Sub Metallic Hoods" (A-2)	

Figure 4-32 E1 – Station Clock Output Interface, 120 Ω
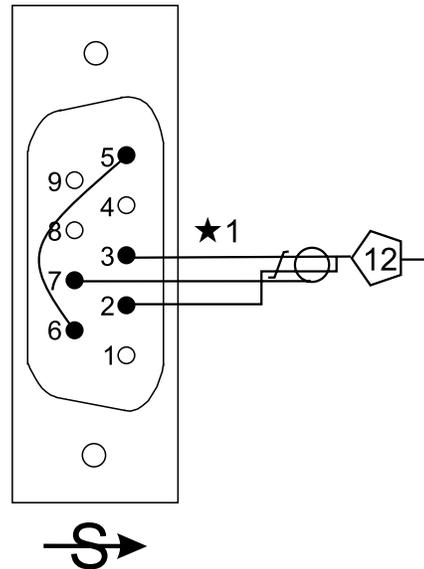
Pin Arrangement

Point on Connector	Signal Name	Wire Color *1	
		DIN	US
2	Station-Clock Output Positive	White	White
3	Station-Clock Output Negative	Brown	Blue
7	Ground	Screen	Screen
5, 6	Strap		

TI-E1 Input 120Ω Length of pre-fabricated cables:

- 10 m [33 ft.]. Cable Assy, TI–E1 (120Ω) — 109155812
- 25 m [82 ft.]. Cable Assy, TI–E1 (120Ω)— 109155820
- 50 m [164 ft.]. Cable Assy, TI–E1 (120Ω)— 109155838
- 75 m [246 ft.]. Cable Assy, TI–E1 (120Ω) — 109164301
- 100 m [328 ft.]. Cable Assy, TI–E1 (120Ω) — 109164331

Connector Data

Type of Connector	D-SUB Socket, 9p Solder	Remarks
Code no. of Connector	407362797 / DC1003661	FCI
Code no. of Hood	DC1003609	
	17DVZK09K	Amphenol
Mounting Instructions	"D-Sub Metallic Hoods" (A-2)	

Figure 4-33 E1 – Station Clock Input Interface, 120 Ω
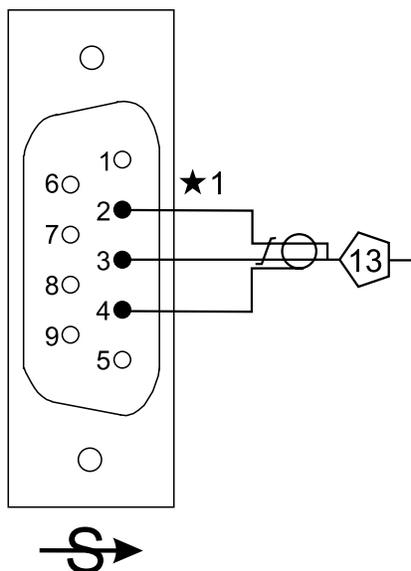
Pin arrangement

		Wire Color *1	
Point on Connector	Signal Name	DIN	US
2	Station-Clock Input Positive	White	White
3	Station-Clock Input Negative	Brown	Blue
4	Ground	Screen	Screen

TI Layout and Routing   The upper and lower subracks have the cabling at the rear side: the B (IN/OUT) to the left and the A (IN/OUT) to the right.

Figure 4-34 TI
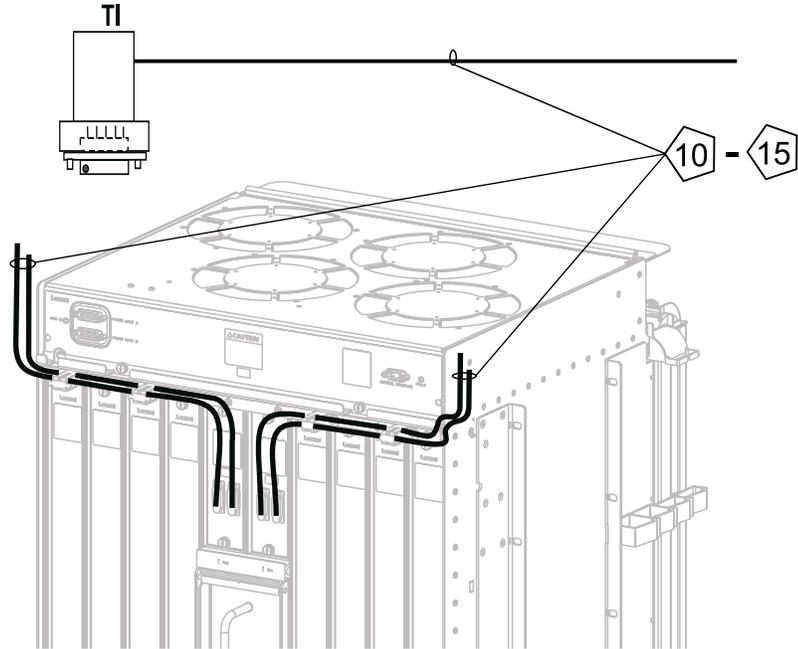
TI-E1 Station-Clock Output/Input Interface, 75 Ω

TI-E1 Output/Input Cable, 75 Ω

Cable Data

Cable	Description	Remarks
Type	Coaxial Cable, 75 Ω	
Code	DC1003610	
	735A1	Belden
	MS100–4486	Madison
Diameter	4.1 mm	Belden
	3.9 mm	Madison
Cable Loss	3.3 dB/100 m at 1 Mhz	Maximum 6dB, Belden
	5.2 dB/100 m at 10 Mhz	Maximum 6dB, Madison
Length of External Cable	180 m	Maximum

TI-E1 Output 75 Ω

Length of pre-fabricated cables:

- 10 m [33 ft.]. Cable Assy, TI–E1 (75Ω) — 109155614
- 25 m [82 ft.]. Cable Assy, TI–E1 (75Ω)— 109155622
- 50 m [164 ft.]. Cable Assy, TI–E1 (75Ω)— 109155630
- 75 m [246 ft.]. Cable Assy, TI–E1 (75Ω) — 109164285
- 100 m [328 ft.]. Cable Assy, TI–E1 (75Ω) — 109164293

Connector Data

Type of Connector	D-SUB pin, 9p solder	Remarks
Code no. of Connector	407362748 / DC1003660	FCI
Code no. of Hood	DC1003609	
	17DVZK09K	Amphenol
Mounting Instructions	"D-Sub Metallic Hoods" (A-2)	

Figure 4-35 TI-E1 Station-Clock Output Interface, 75 Ω
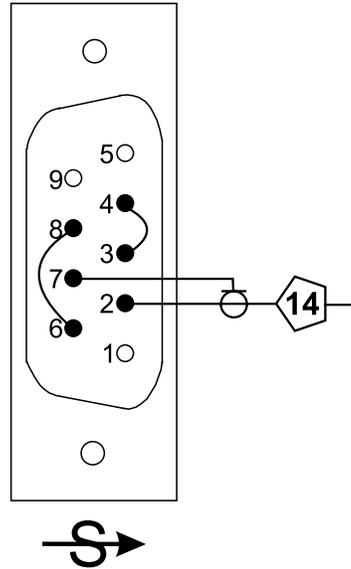
Pin Arrangement

Point on Connectors	Signal Name	Wire Color	
		DIN	US
2	Station-Clock Output	Inner wire	Inner wire
7	Ground	Screen	Screen
3, 4	Strap		
6, 8	Strap		

TI-E1 Input, 75 Ω   Length of pre-fabricated cables:

- 10 m [33 ft.]. Cable Assy, TI–E1 (75Ω) — 109155879
- 25 m [82 ft.]. Cable Assy, TI–E1 (75Ω) — 109155887
- 50 m [164 ft.]. Cable Assy, TI–E1 (75Ω) — 109155895
- 75 m [246 ft.]. Cable Assy, TI–E1 (75Ω) — 109164343
- 100 m [328 ft.]. Cable Assy, TI–E1 (75Ω) — 109164350

Connector Data

Type of Connector	D-SUB Socket, 9p Solder	Remarks
Code no. of Connector	407362797 / DC1003661	FCI
Code no. of Hood	DC1003609	
	17DVZK09K	Amphenol
Mounting Instructions	"D-Sub Metallic Hoods" (A-2)	

Figure 4-36 TI-E1 Station Clock Input Interface, 75 Ω
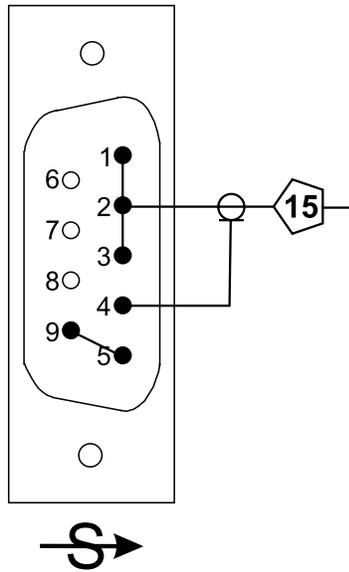
Pin Arrangement

Point on Connectors	Signal Name	Wire Color	
		DIN	**US**
1, 2, 3	Station-Clock Input	Inner wire	Inner wire
4	Ground	Screen	Screen
5, 9	Strap		

TI Layout and Routing   The upper and lower subracks have the cabling at the rear side: the B
(IN/OUT) to the left and the A (IN/OUT) to the right.

Figure 4-37   TI
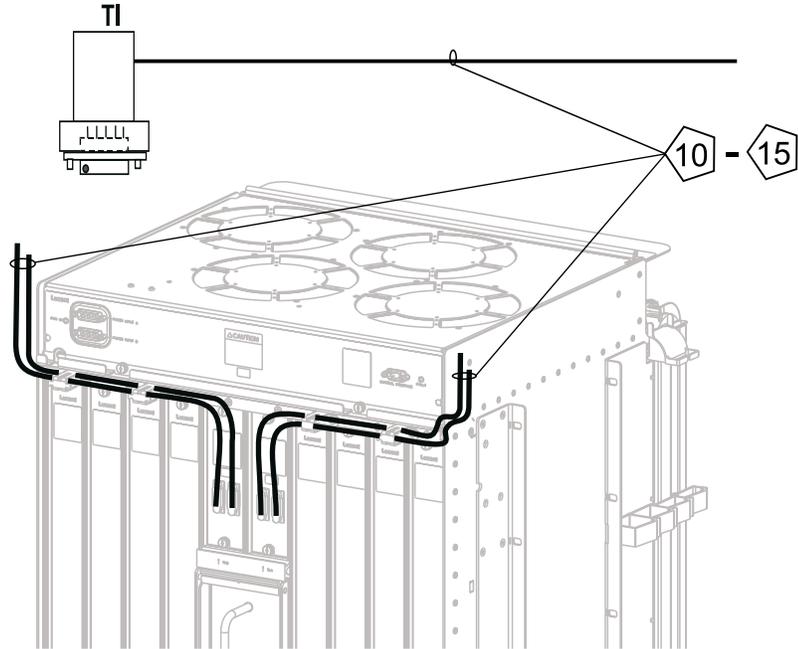
Optical Interfaces

Application Packs The pack types are:

- OP2G5 — KFA 12
- OP10 — KFA 6, 7, 14, 9 and 81/159, 11 and 61/75

See " *LambdaUnite*™ MSS Specifications Optical Circuit-Pack" (B-16)for order codes and specifications.

Cables **Important!** Use cables of approved vendors only! Otherwise the installation and performance of the system is at risk.

The "Single Mode 9/125" (B-2) fiber types are:

- SM-minicord BreakOut cable
- SM-Simplex Cable

Connector Type LC Connector

OP2G5

Figure 4-38   OP2G5

Legend:

1   Richco Twist Lock TL250 — DC1004336

....

4 - 6 4   **Lucent Technologies**   365-374-023
                                                                                                                       Issue a, October 2001
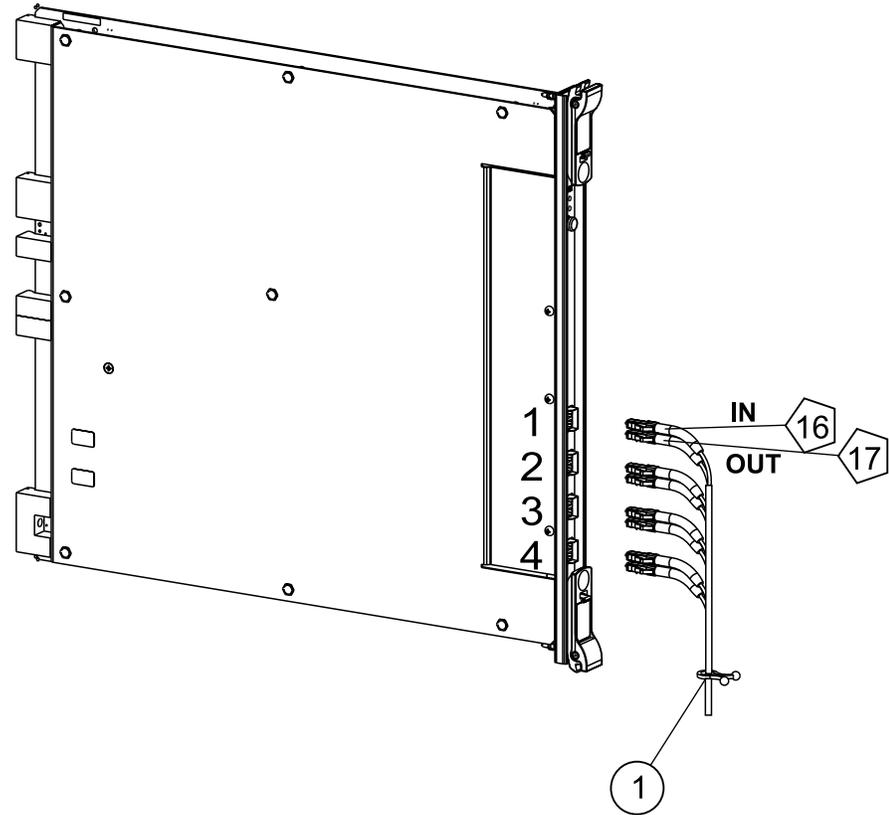
OP10G

Figure 4-39   OP10G
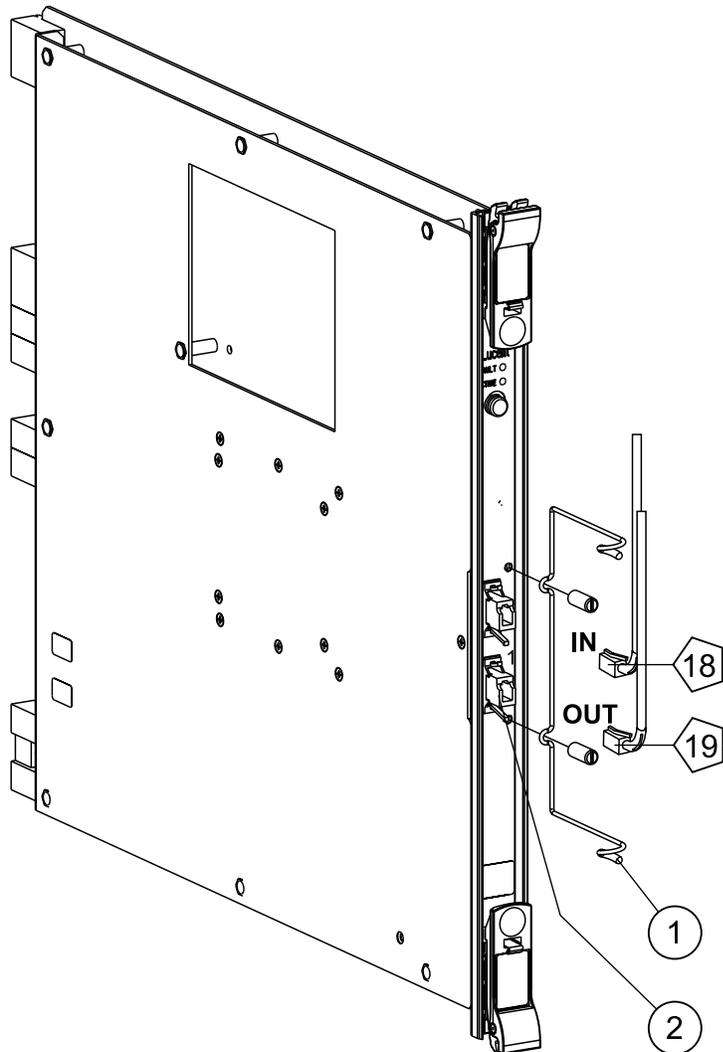
Legend:

Item 1   DC

Item 2   ASSY-A1LC-BASE (BLACK) B* — 108265950

                          See"LC Attenuators" (B-14)for a list of varoius
                          attenuators

Gigabit-Ethernet Interfaces

Application Packs   The pack types are:

- GE1 / SX / 4 — KFA13

See " *LambdaUnite*™ MSS Specifications Optical Circuit-Pack"
(B-16)for order codes and specifications.

Cables   **Important!** Use cables of approved vendors only! Otherwise the
installation and performance of the system is at risk.

The "Multi Mode 62.5/125" (B-8) fiber types are:

- MM-minicord Break-Out Cable
- MM-Simplex Cable

Connector Type   LC Connector

GE1

Figure 4-40   GE1
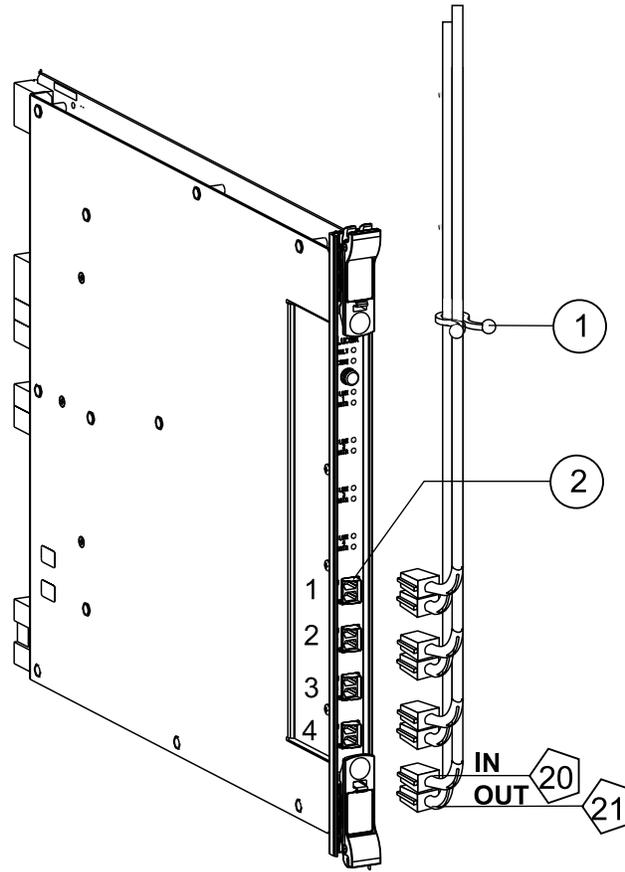
Legend:

1   Richco Twist Lock TL250 — DC1004336

         See for a list of various attenuators "LC Attenuators" (B-14)

365-374-023   **Lucent Technologies**   4 - 6 7
Issue a, October 2001

Cabeling Passive DWDM

Cables   The "Fiber Optic Cables" (B-2) used for the passive DWDM should have on the DMUX/MUX connector plate a:

- SC connector with a 45° cable entry booth
- SC connector with a short straight booth.

Routing   The cables can be routed on both sides to the front of the unit see
next figure.

Figure 4-41 Cable Routing of Passive DWDM
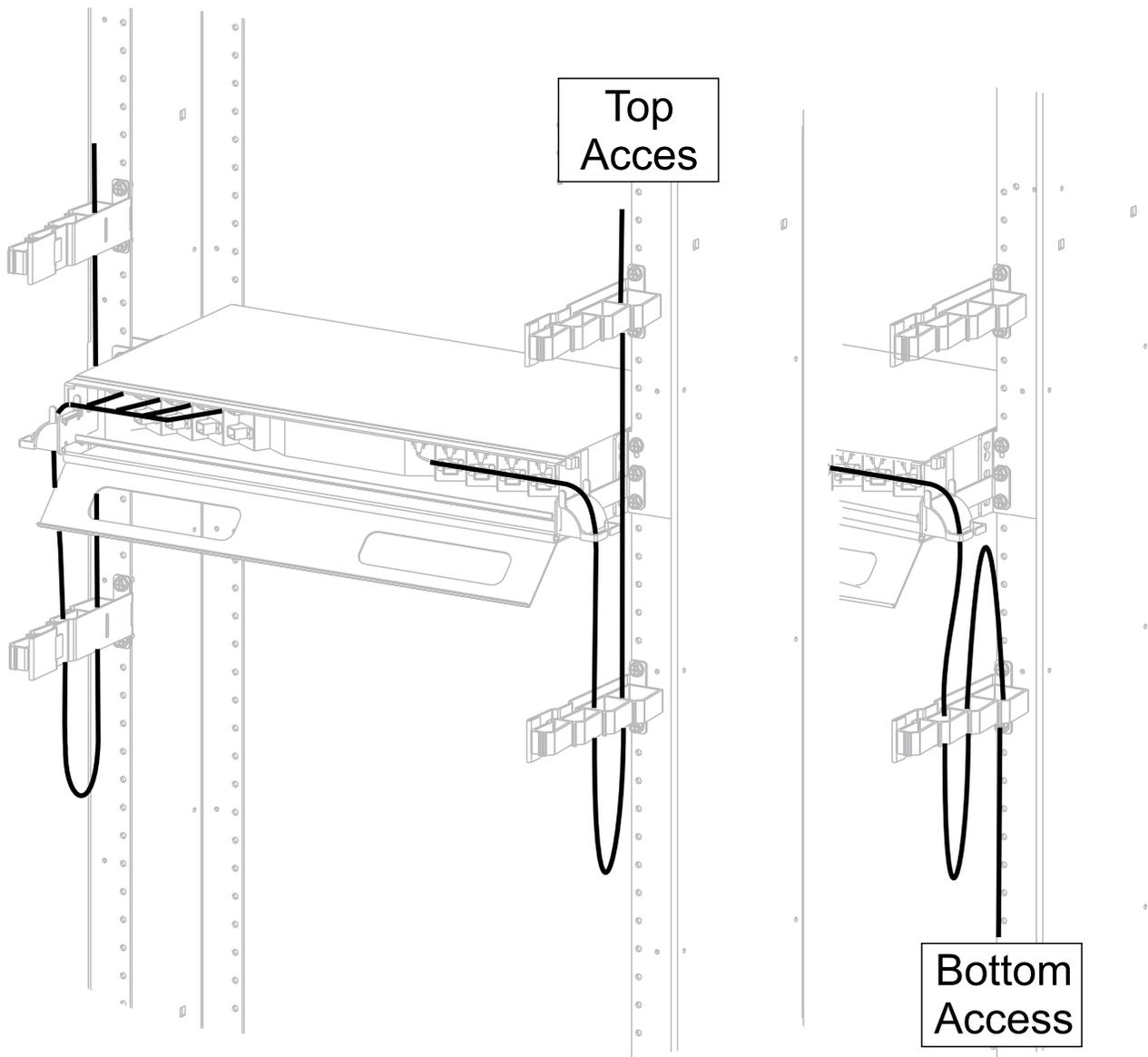
Block Diagram Passive DWDM

Layout

Figure 4-42 Block diagram 16 Channel Uni-Directional

MUX

DMUX

Lucent Technologies
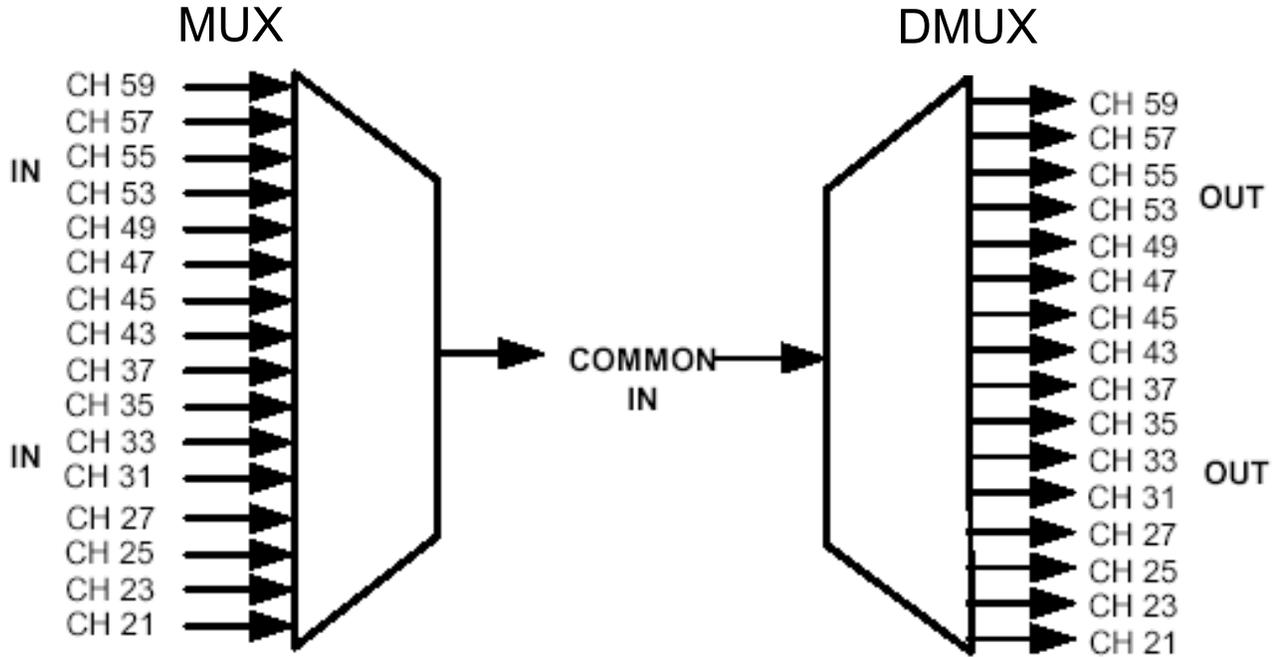
Figure 4-43 Block diagram 8 + 8 Channel Bi-Directional

MUX/DMUX   DMUX/MUX
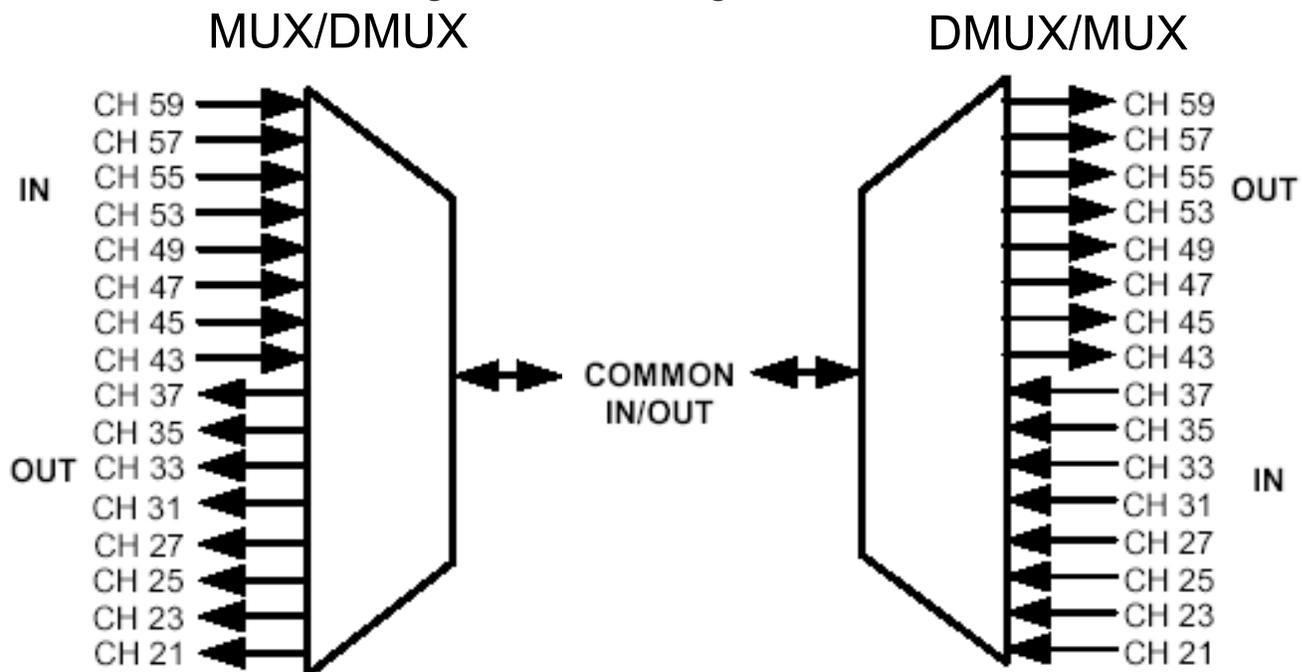
5 Commissioning

Overview

Purpose This chapter describes all steps, which are necessary to put the *LambdaUnite*™ MultiService Switch (MSS) system into operation.

Assumptions Be sure all listed assumptions described below are fulfilled before performing the described steps:

- All NEs must be mounted and cabled correctly (see Chapters 3 and 4).

- The persons setting up the system should be familiar with the SDH functionality and WaveStar® CIT.

Related information An overview about all WaveStar® CIT related tasks is given in the "*LambdaUnite* MultiService Switch (MSS) User Operation Guide".

Contents

Switching on and testing the voltage supply lines

Procedure   Proceed as follows to switch on and test the voltage supply lines:

1   Insert a 68 A fuse for each supply line into the external Battery Distribution and Fuse Bay (BDFB). If circuit breakers are being used (in BDFB), put both of them in the *ON* position.

2   Use the voltage meter to check the primary voltage at the Power Distribution Panel (PDP) for both power supply feeders.

   Result:

   The voltage on the PDP must be in the range of -40.5 … -72 DC.

   NOTE: Do not power up the system if the voltage is outside the range!

3   Operate the right circuit breaker of the subrack (located on the rear) to the *ON* position.

   Requirement: The PWR ON LEDs on the user panel and fan unit must be lit.

   User Panel

● PWR ON	● CR	◯ NE ACTY
	● MJ	◯ FE ACTY
	◯ MN	◯ ◎ ACO
CIT (LAN)	◯ ABN	◎ LED TEST
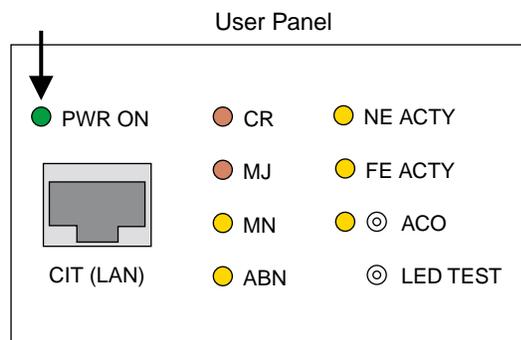
4   Operate the right circuit breaker of the subrack to the *OFF* position.

   Requirement: The PWR ON LEDs on the user panel and fan unit are extinguished.

....

5   Repeat Steps 3 and 4 with the left circuit breaker of the subrack.

....

6   Operate both circuit breakers of the subrack to the *ON* position.

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

....

5 - 4   **Lucent Technologies**   365-374-023
                                                                                 Issue a, October 2001

WaveStar® CIT Installation

....

Purpose   Use this procedure to:

- Install the WaveStar® CIT software onto a new system.

- Upgrade/change an existing WaveStar® CIT to a new software version.

Required equipment   The minimum requirement for a WaveStar® CIT is a personal computer with the following:

- Pentium® 266-MHz processor (Pentium® III 500 MHz or higher recommended) with 128-MB RAM (256 MB of RAM or higher recommended)

- Standard floppy drive for 1.44-MB 3.5" floppy disks

- 150 MB of free hard drive space

- CD-ROM drive (16X recommended)

- PCMCIA (Personal Computer Manufacturer's Card Interface Adapter) slot type II

- SVGA monitor set to 800x600 resolution or higher and 256 colors (1024x768, 16 million colors recommended)

- 10/100 BaseT LAN interface built-in or supplied with a PCMCIA card, installed and working

- Microsoft Windows® NT 4.0 operating system with Service Pack 5 or Microsoft Windows® 2000

- Adobe Acrobat Reader for Windows (version 3.01 or later)

- Removable hard-disk drive (optional; required only for system backup).

Before you begin   A user who has Windows NT / Windows 2000 System Administration privileges must install the software. That same user, then, becomes the WaveStar® CIT System Administrator. The WaveStar® CIT System Administrator sets up the operating environment for other users. Some of these administration functions include:

- Assigning login IDs

- Assigning an initial password for each login ID

- Customizing the access privileges and security attributes for each login ID, and so forth.

....

The installation program cannot install system files or update shared files if they are in use by other programs. For this reason you should stop as many Windows® NT applications as possible, before starting with the installation procedure.

Installation   Complete the following steps to install the WaveStar® CIT software on your PC:

....

1   Insert the WaveStar® CIT CD-ROM (ComCode: 109088708) into the appropriate drive of your PC.

   Result:

   Autorun will start the install process.

   ....

2

IF	THEN
autorun does not start	manually start the program by clicking **Start** → **Run**, click on **Browse**, select the CD-ROM drive, and select **setup.exe**, click **Open** and click **ok**. **Result:** The WaveStar® CIT **CD Browser** appears.
autorun starts	no action is required. **Result:** The WaveStar® CIT **CD Browser** appears.

   ....

3   Click on **continue.**

   ....

4   Choose the entry **CIT Software.**

   ....

5   Select the **WaveStar CIT** area on the right.

   ....

6   Follow the on-screen instructions. Select **Full Install** when prompted.

....

....

7   If there are 2 or more LAN cards on the PC, select the LAN card
          with the IP Address that corresponds to the OSI LAN, otherwise if
          there is only 1 LAN card, WaveStar® CIT will select it automatically.

....

8   If not yet available on your PC, install the **Acrobat Reader** by
          selecting the respective area below the entry **CIT Software**.

....

9   The PC will have to be rebooted if the OSILLC driver is installed.
          This is installed on the initial WaveStar® CIT installation. Subsequent
          upgrades do not require OSILLC driver installation.

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

....

365-374-023   **Lucent Technologies**   5 - 7
Issue a, October 2001

WaveStar® CIT login/logout procedure

....

Overview	Some procedures throughout this document require the user to login to and logout of the WaveStar® CIT. The following procedure describes how this is accomplished. This procedure requires the WaveStar® CIT to be already loaded on the PC (see section "WaveStar® CIT Installation" (5-5)).

Login procedure	Complete the following steps to log into the WaveStar® CIT GUI:

....

1   Start the WaveStar® CIT software by double clicking on the *LambdaUnite*™ icon.

....

2

IF ...	THEN ...
it is the first WaveStar® CIT installation on the respective PC,	log into WaveStar® CIT with **User Id**: "LUC01" or "LUC02" and **Password**: "LUC+01" or "LUC+02".
a previous WaveStar® CIT version has already been installed on the respective PC,	log into WaveStar® CIT with **User Id**: "LUC01" or "LUC02" and the last used **Password**.

....

3   Click **OK** to connect. WaveStar® CIT will be "initializing views" for about 3 minutes. Click **OK** and read the legal notice.

....

4

IF ...	THEN ...
it is the first WaveStar® CIT session,	proceed to Step 5.
it is not the first WaveStar® CIT session,	**Stop! End of Task.**

....

5   In the WaveStar® CIT Main Window, choose the option **Administration** → **Data Communications...** .

....

....

6   Make sure that the **Auto-Learn NSAP** box is not checked.

....

7   Change your user password on the WaveStar® CIT (see section "Changing the user password on the WaveStar® CIT" (5-10)).

E N D   O F   S T E P S

....

Logout from WaveStar® CIT   Complete the following steps to log out from WaveStar® CIT:

....

1   In the WaveStar® CIT main window, click **File → Exit**.

> **Result:**
>
> If there are still connections to NEs established from this CIT session, an alert window appears which shows the currently established connections.

....

2

IF	THEN
you are sure you want to exit	click **Yes** in the alert window.
you do not want to exit,	press the **No** pushbutton.

E N D   O F   S T E P S

....

Changing the user password on the WaveStar® CIT

Overview   This section provides a procedure for changing the user password on the WaveStar® CIT.

Before you begin   Prior to performing this task, you must be logged into the WaveStar® CIT. Only a superuser is permitted to change a super user id.

Required privilege code

You must have a user privilege code of S5 to perform this task.

Required equipment

The following equipment is required to perform this task:

- WaveStar® CIT.

Instructions   Complete the following steps to change your password:

1   From the **WaveStar® CIT Window** main menu, select **Administration → Security → Change Superuser Login ID...**

    Result:

    The **Change Super User ID** form is displayed.

2   Select the super user Login ID you want to change. Click on the respective radio button.

3   Key in the new Login ID.

    NOTE: Login IDs are case sensitive and must start with a letter.

4   Click **OK**.

    Result:

    The super user Login ID is updated and the **Change Super User ID** form is dismissed.

    The changed super user Login ID will take effect the next time you log into the WaveStar® CIT.

E N D   O F   S T E P S

NE software installation

....

Overview	The NE software is initially delivered via CD-ROM (Comcode 109088708). The software generic has to be copied from the CD-ROM to the WaveStar® CIT PC and then to the empty *CompactFlash*™ card via WaveStar® CIT. Afterwards, the *CompactFlash* card is being inserted into the NE.

Before you begin Prior to performing this task, you must:

1. Have a valid login on the WaveStar® CIT.

2. Acquire the CD-ROM that contains the generic/version of the NE software (Comcode 109088708).

Required privilege code

You must have at least a privilege code of S4.

Required equipment

The following equipment is required to perform this task:

*   Empty 256 MB *CompactFlash* card (as delivered from manufacturer)

*   CD-ROM that contains the generic/version of the NE software

*   PC with *CompactFlash* or PCMCIA slot. For the second case an adapter is required.

Safety precaution Please observe the following safety precaution:

CAUTION

Electrostatic discharge damage to sensitive components

Handling circuit packs or working on a WaveStar® CIT can cause electrostatic discharge damage to sensitive components.

Use a static ground wrist strap whenever handling circuit packs or working on a WaveStar® CIT, to prevent electrostatic discharge damage to sensitive components.

....

SW installation   To install the NE software (delivered on a CD-ROM), proceed as
follows:

....

1   Power up the WaveStar® CIT PC and log into Windows® NT /
Windows® 2000 as administrator. If you are already logged into
Windows® NT / Windows® 2000, close any open window.

....

2   Install the NE software onto your PC. To do this, use one of the
following two methods (automatic or manual installation):

Automatic Installation:

- Insert the *LambdaUnite*™ CD-ROM with the new NE software
  and wait for the welcoming screen to appear. If your PC does not
  start the CD-ROM automatically, perform the following:

    - Double-click **My Computer** on your desktop

    - Right click on your CD-ROM drive's icon

    - Click **Auto Play**.
    If **Auto Play** is not available in this menu list, you have to start
    the *setup.exe* file in the root directory of your CD-ROM.

- Click the **Next** button.

- Wait for the software transfer to complete. You will notice that
  the "Decompressing Files In …" message and also the
  InstallShield Wizard disappears when this operation has
  completed.

Manual Installation:

- Insert the *LambdaUnite* CD-ROM with the new NE software. If
  the welcoming screen appears, select **Cancel** to exit from the
  automatic installation procedure.

- Open the Windows® NT / Windows® 2000 Explorer on your
  desktop.

- Select the harddisk drive where the WaveStar® CIT is installed
  and click through to **Program Files** → **Lucent Technologies** →
  WaveStar CIT → **generics**.
  NOTE: If the subdirectory **generics** does not exist, you must
  create it!

- In the **generics** directory, create a new folder, preferrably stating
  the new software version in its name.

- In the Windows® NT / Windows® 2000 Explorer, right click the CD-ROM drive of your computer and select **Explore**. Go to the **generics** directory. This directory contains two subdirectories: **p** and **up**.

- Select the complete **up** and **p** directories and copy them to the folder you created two steps before.

- To install *Acrobat Reader* on your system, go to the *AcrobatReader* subdirectory on your CD-ROM drive and double click the *AcrobatReader40.exe* file.

- The Software Release Description (SRD) is located in the **Documentation** subdirectory of the CD. You can read it by double clicking the **pdf** file in this subdirectory.

....

3   Insert the empty *CompactFlash* card into the *CompactFlash* slot (or PCMCIA slot with adapter) of the WaveStar® CIT PC.

....

4   Format the *CompactFlash* card by performing the following:

- Double click the **My Computer** icon on your desktop.
- Select **Cards** → **Format...** in the PC card control window.
- Select **FAT** in the **File System** selection box.
- Select **Quick Format**
- Click **Start**.

....

5   Start the Windows Explorer.

....

6   Copy all files in the directory ..*Program Files\Lucent Technologies\WaveStar CIT\generics\xx.xx.xx\up* to the *CompactFlash* card.

> **Result:**
>
> The file copy function begins and you see a "Copying files..." message.

....

7   After copying, *power off* the flash disk slot.

....

....

8   Eject the *CompactFlash* card from the *CompactFlash* slot of the PC.

....

9   Insert the *CompactFlash* card with the new software version into the CTL circuit pack (red arrow on card down and facing left). Make sure that it is firmly seated in the CTL.
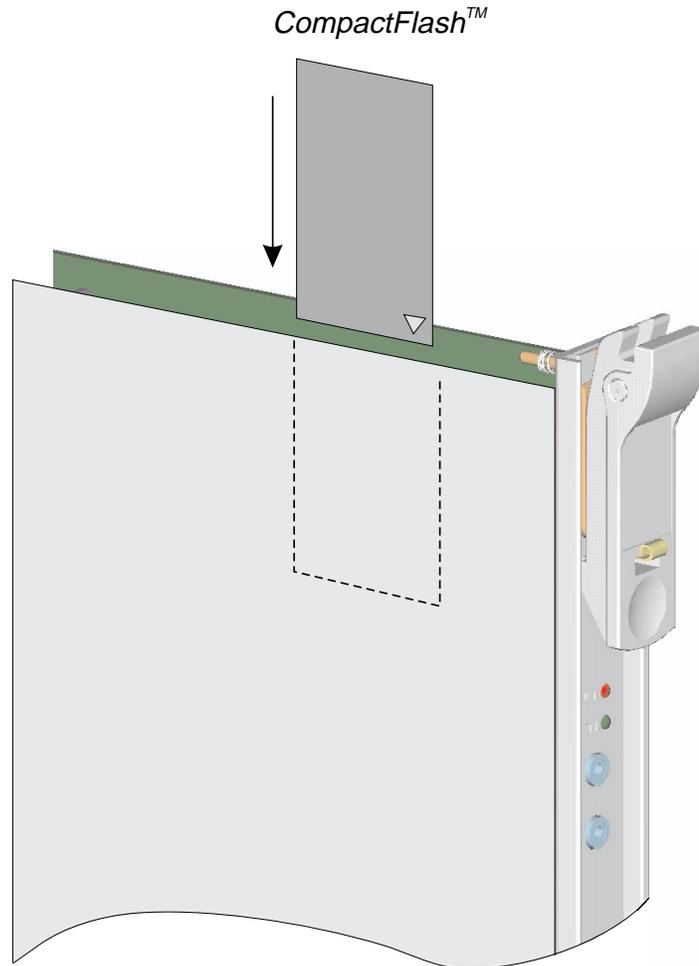
CompactFlash^{TM}

Result:

The system automatically starts the download.

NOTE: The *CompactFlash* card has to remain in the CTL circuit pack during normal operation!

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

....

Download failure In the case of a download failure (red LEDs are still lit), please refer to Chapter 7, section "SW download failure" (7-7).

⌐

Connecting the WaveStar® CIT to the NE

Overview   The WaveStar® CIT can be connected to a network element in 3 different ways:

- Direct LAN Access (point-to-point)

- LAN Access (network)

- Remote Access via DCC.

Direct LAN access (point-to-point)   The WaveStar® CIT (LAN card) is connected to the *LambdaUnite*™ MultiService Switch (MSS) via the "CIT" port of the user panel or through a backplane connector (LAN I/O Panel). An Ethernet LAN cable (10BaseT) with 4-wire RJ-45 connectors is used for this connection.

The usage of *shielded* 10BaseT LAN cables is only allowed if the applicable national safety requirements have been met by the user. Otherwise, there is a *risk of electrical shock and/or serious injury*.

The following figure illustrates the Direct LAN Access (Point-to-Point).
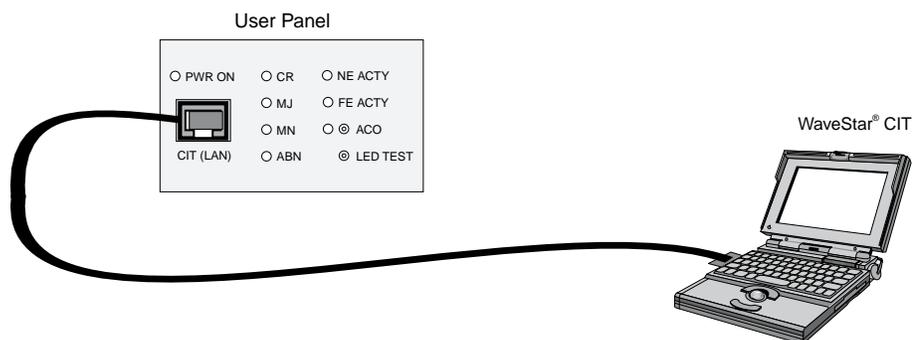
WaveStar® CIT LAN access (network)   WaveStar® CIT access to more than one NE, e.g. within one site, can be done via a Local Area Network (LAN). The LAN is connected to the NEs by means of 10-BaseT Ethernet interfaces on 4-wire RJ-45 connectors (a cross-over cable must be used).

The following figure illustrates the WaveStar® CIT LAN Access (Network).
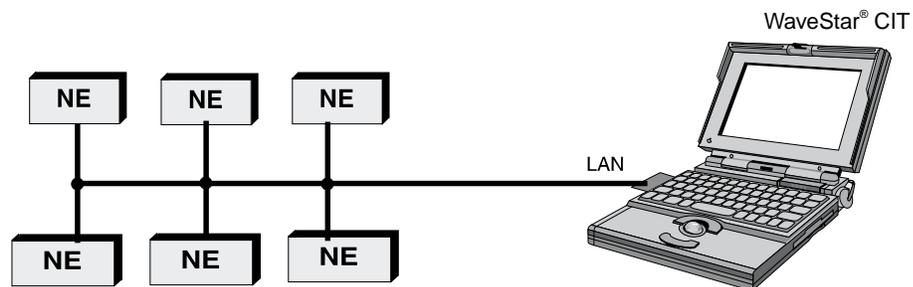
LAN Local Area Network

Important! The usage of *shielded* 10BaseT LAN cables is only allowed if the applicable national safety requirements have been met by the user. Otherwise, there is a *risk of electrical shock and/or serious injury*.

WaveStar® CIT access via Data Communications Channel (DCC)

WaveStar® CIT access to remote NEs can easily be done via the Data Communications Channel (DCC) which are part of the SDH aggregate or tributary signals. The CIT is connected via a point-to-point connection to one NE of the network (cf. "Direct Access"), which is then called the Gateway NE. All other NEs can be reached by the DCC. Thus, no additional management network is needed to connect the CIT to each individual NE.

The following figure shows an example of the access via the Data Communications Channel.

DCC Data Communication Channel
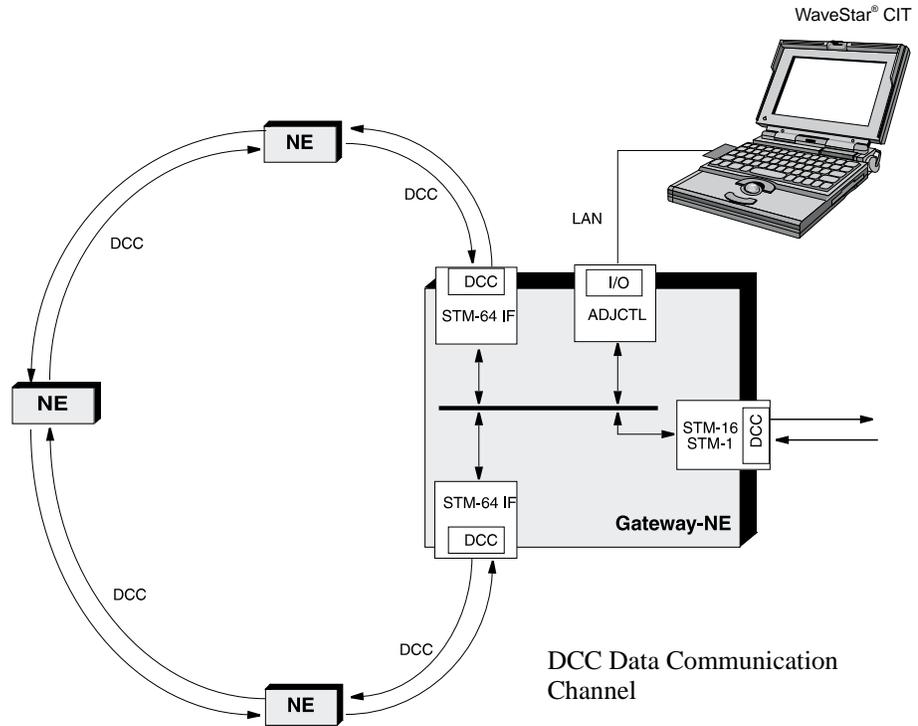
NE login/logout procedure

Overview This section describes the login and logout procedures to/from an NE. It is necessary that the WaveStar® CIT is already connected to the NE (see section "Connecting the WaveStar® CIT to the NE" (5-16)).

Initial login procedure Complete the following steps to login to an NE:

1 Login to WaveStar® CIT as described in section "WaveStar® CIT login/logout procedure" (5-8).

2 Enter the target identifier (TID) in the **NE Name** box. The default TID (= default name of the NE) is: "LUCENT-UNITE-NE".

3 Select the used **NE Type** and the preferred **Connection Type** and click on **Graphical**.
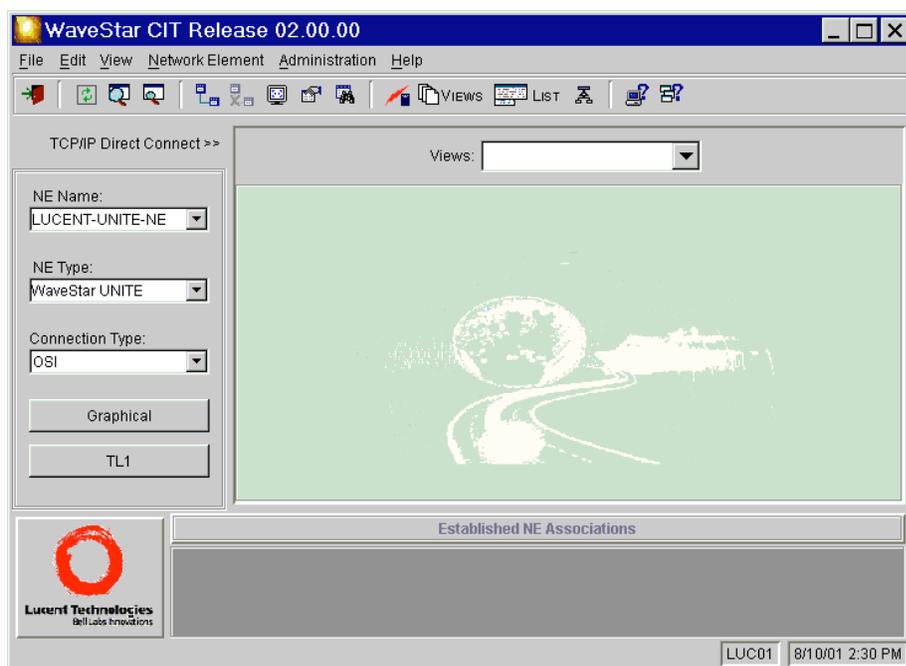
4 Login with **UserId** "LUC01" or "LUC02" and the associated **Password** "UNITE+01" or "UNITE+02".

5 Click **OK** to confirm, then **OK** to the legal notice.

> **Result:**
>
> The **WaveStar® CIT Window** window appears for the selected NE.

6 Change your user password on the NE (see section "Changing the user password on the NE" (5-21)).

7 Change the NE name (see section "Changing the NE name (TID)" (5-22)).

E N D   O F   S T E P S

Logout procedure Complete the following steps to logout from an NE:

1 Click **File → NE Disconnect**.

2 Click **Yes** in the confirmation window.

E N D   O F   S T E P S

Changing the user password on the NE

Overview This section provides a procedure for changing the user password on the network element.

Before you begin Prior to performing this task, you must be logged into the WaveStar® CIT and the respective network element.

Required privilege code

You must have a user privilege code of S5 to perform this task.

Required equipment

The following equipment is required to perform this task:

- WaveStar® CIT.

Procedure Complete the following steps to change your password.

1   From the **WaveStar® CIT Window** main menu, select **Administration** → **Security** → **Change Superuser Login ID...**

   Result:

   The **Change Super User ID** form is displayed.

2   Select the super user Login ID you want to change. Click on the respective radio button.

3   Key in the new Login ID.

   NOTE: Login IDs are case sensitive and must start with a letter.

4   Click **OK**.

   Result:

   The super user Login ID is updated and the **Change Super User ID** form is dismissed.

   The changed super user Login ID will take effect the next time you log into the NE.

   E ND OF S TEPS

Changing the NE name (TID)

Overview This section provides a procedure for changing the NE name (TID).

Before you begin Prior to performing this task, you must:

- have a valid user login and password,
- be connected to the subject NE, and
- have proper access privileges to perform this task.

Required privilege codes

You must have at least privilege codes of S4 and M4 and P1 to perform this task.

Required equipment

The following equipment is required to perform this task:

- WaveStar® CIT.

Procedure Complete the following steps to change a network element's name:

1 From the **WaveStar® CIT Window** main menu, select **Fault** → **Enter/Exit Maintenance Condition...** → **Enter Maintenance Condition ...**

2 Confirm the resulting system message by clicking **Yes**.

3 Invoke the **Provision TID/NE Name** window from the **WaveStar® CIT Window** main menu via **Administration** → **Set TID...**

4 Place the cursor in the **New TID/NE Name** text box and key in the new TID observing the following configuration rules:

- Each NE name must be unique within the network.
- The following characters are allowed in an NE name:
    - Upper-case letters ("A" .. "Z"),
    - Lower-case letters ("a" .. "z"),

Lucent Technologies

- Special characters("-", "+", "_", ".", "/"),
- Digits ("0" .. "9").

- An NE name must not end and begin with an special character.
- Each NE name must be maximally 20 characters in length.
- The NE name may contain segments separated by hyphens ("-") or slashes ("/"), but each segment must begin with a letter.

Please note that NE names are case-insensitive.

....

5   Make sure that the new TID is correct.

IF …	THEN …
the new TID is correct,	continue with Step 6.
the new TID is not correct,	correct the entry in the **New TID/NE Name** text box and continue with Step 6.

....

6   Place the cursor in the **Confirm TID/NE Name** text box and key in the new TID again.

Important! Take a note of the TID you are going to assign to the NE!

....

7   Click **OK** to assign the new TID and to dismiss the window.

....

8   From the **WaveStar® CIT Window** main menu, select **Fault →
Enter/Exit Maintenance Condition... → Exit Maintenance
Condition...**.

....

9   Confirm the resulting system message by clicking **OK**.

Result:

The *LambdaUnite*™ MultiService Switch (MSS) NE will now perform a system reset. As a consequence, the management association between the WaveStar® CIT and the NE will be lost.

After the system reset has finished, you can re-establish the management association by again connecting the WaveStar® CIT to the NE, now using the new TID.

Make sure that the *LambdaUnite* CIT's static routing table
(Address List) always reflects the correct assignment of NE
names to NSAP addresses.

E N D   O F   S T E P S

⅂

Setting of the NE date and time

Overview   This section provides a procedure for setting up the NE date and time.

NOTE: The NE clock must be set again after each power on or reboot!

Before you begin   Prior to performing this task, you must be logged into the WaveStar®
CIT and the respective NE.

Required privilege code(s)

You must have at least a privilege code of P3, Provisioning, or M3,
Maintenance, to set the system parameters.

Required equipment

The following equipment is required to perform this task:

- WaveStar® CIT.

Procedure   Complete the following steps to set the date and time of the
system:

1   From the **WaveStar® CIT Window** main menu, select **Configuration**
$\rightarrow$ **Provision**.

   Result:

   The window **Provision Parameters for Protection Groups or
   Equipment** opens. The **Equipment** selection tab appears on the
   left side of the window.

2   Select the system in the **Equipment** selection tab and click on
Provision.

Result:

The selection window for time and date appears on the right side of the window.

....
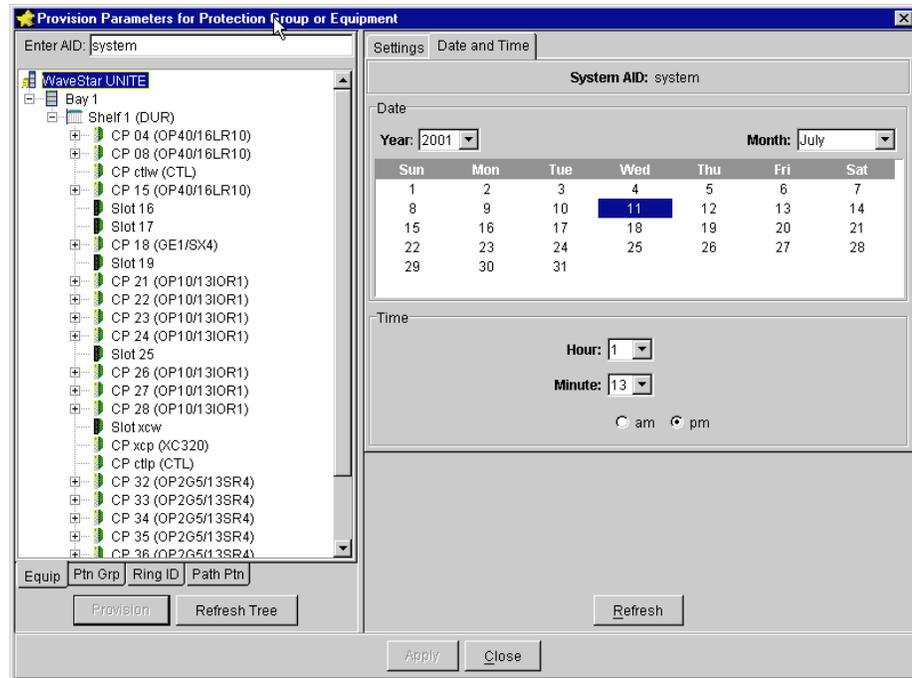
3 Select the day (by clicking on the respective date), month (via the drop-down list box) and year (via the spin-box) in the group box **Date**.

....

4 Set the time in the group box **Time**.

....

5 Click the **Apply** pushbutton.

Important! The settings made in this window come into effect and will be shown after re-opening the window.

E N D   O F   S T E P S

....

....

5 - 2 6   **Lucent Technologies**   365-374-023
                                                                          Issue a, October 2001

Provisioning of the timing references

Overview This section provides a procedure for configuring the timimg references.

Before you begin Prior to performing this task, you must be logged into the WaveStar® CIT and the respective network element.

Required privilege code

You must have at least a privilege code of P3 to configure the timing references.

Required equipment

The following equipment is required to perform this task:

- WaveStar® CIT.

Procedure Complete the following steps to configure the timing references:

....

1 Select **Configuration → Timing/Sync** in the **WaveStar® CIT Window**.

> **Result:**
>
> The window **Provision Timing/Sync** appears.

....

2 Select the **Timing Reference** tab.

....

3 Select the timing reference source which you wish to configure in the drop-down list box **Timing Reference.** You can select the external timing signals **extref1** or **extref2** or an internal **SDH/SONET** signal via **line1** ... **line6** for STM-N/OC-N line ports.

....

4 Select the port AID in the drop-down-list box **Port AID**.

IF	THEN
the selected timing reference shall not be used,	select **NOT-CONNECTED**
the selected timing reference is **extref1**	select **exttmg0**

IF	THEN
the selected timing reference is **extref2**	select **exttmg1**
the selected timing reference is **line1** ... **line6** and the corresponding **SDH/SONET** port is not yet assigned,	click on **Browse**... and select the **SDH/SONET** port which shall be used as timing reference. You can either select one STM-16/OC48, one STM-1o/OC3, one STM-4/OC12 or one STM-64/OC192 signal. **Result:** The window **Select Line Timing Port AID** opens.
the selected timing reference is **line1** ... **line6** and the corresponding **SDH/SONET** port is already assigned,	- **Result:** the respective port AID is displayed in the drop-down list box **Port AID**.
the selected timing reference is **line1**, **line2**, **line3**, **line4**, **line5** or **line6** and you want to assign a new **SDH/SONET** signal as timing reference,	select **NOT-CONNECTED** first in order to disable the currently assigned **SDH/SONET** port, and then select the new **SDH/SONET** port via **Browse...**

5   Select the timing quality belonging to the timing reference in the drop-down list box **QL Provisioned**. For **line1** ... **line6** select **AUTO**. This means that the timing marker is evaluated. For **extref1** and **extref2** assign the actual quality level of the external timing source.

> **Result:**
>
> The timing references are now used in the order of their quality level.

6   Select in the drop-down list box **System Timing Reference Priority** the priority of the selected timing reference. The values can be

- **Disable** (initial value)
- **1**, **2, 3, 4, 5, 6, 7,** or **8**

Lucent Technologies

Make sure that all configured timing references have different priorities assigned.

> **Result:**
>
> A priority list is created for the configured timing reference signals. Initially the signal with the highest quality level is used as timing reference signal. If it fails, the system switches to the signal with the next lower quality level. If there are several timing references with the same quality level, they are used according to the priority list. If all possible timing reference signals fail, the timing generator enters the holdover mode.

....

7 Select the priority of the selected derived output timing reference in the list box **Derived Output Timing Reference Priority**. The values can be

- **Disable** (unused reference)

- **1**, **2**, **3**, **4**, **5**, or **6**

....

8 Apply the changes by clicking on **Apply**. If you wish to discard the changes click on **Cancel**.

....

9 Repeat Step 3 to Step 8 until all timing references are configured. Click on **OK** to close the window.

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

⌐

....

365-374-023   **Lucent Technologies**   5 - 2 9
Issue a, October 2001

Provisioning of the system timing

Overview   This section provides a procedure for configuring the system timimg.

Before you begin   Prior to performing this task, you must be logged into the WaveStar®
CIT and the respective network element.

Required privilege code

You must have at least a privilege code of P3 to configure the system
timing.

Required equipment

The following equipment is required to perform this task:

- WaveStar® CIT.

Procedure   Complete the following steps to configure the system timing:

....

1   Select **Configuration** → **Timing/Sync** in the **WaveStar® CIT
Window**.

Result:

The window **Provision Timing/Sync** appears.

....

2   Select the **System Timing** tab.

....

3   The **Synchronization System Mode** is displayed in the respective
group box. The value is either **SDH** or **SONET**.

NOTE: This parameter can only be changed in the maintenance
condition mode.

....

4   Select the clock mode in the group box **Provisioned Clock Mode.**
Click on the respective radio button. You can select the following
values:

- **Free Running** (The system is synchronized to the internal
oscillator.)

- **Locked** (The system is synchronized to a timing reference
signal.)

During normal operation in a network, the timing generator should be locked to a timing reference signal as far as available. Normally the free-running mode is used directly after the system start.

....

5   Enable or disable the use of **System SSM Mode** by selecting **QL Disable** or **QL Enable**. This means that the selection of timing reference for the system timing is either determined only by the provisioned priority list or by the quality level given by the timing marker (SSM, Synchronization Status Message) and secondly by the priority list. Click on the respective radio button.

....

6   Select the quality level mode applying to the Output Timing in the **Output SSM Mode** group box. Select **QL Enable** to use the incoming QL messages and enable synchronization in the optical interface. If you select **Threshold AIS** the message "**do not use**" will be transmitted from the optical interface.

....

7   Select the wait-to-restore time in the group box **Timing Reference Wait To Restore.** Click on the respective radio button. The values can be:

- **0** (initial value)

- **20 SEC**(**SONET** mode only)

- **1 Minutes** ... **60 Minutes** (selectable via a spin box)

- **Infinite** (**SONET** mode only).

The wait-to-restore time is the wait which is made before every single switching from one timing reference to another.

....

8   Select the alarm severity in the group box **System Timing Alarm Severity Assignment Profile**.

Click on the respective radio button.

....

9   Apply the changes by clicking on **OK**. If you wish to discard the changes, click on **Cancel**.

E N D   O F   S T E P S

....

....

Setting up the DCC channels

Overview   This section provides a procedure for setting up the DCC channels.

The DCC works according the master/slave principle. That means the LAPD role (Link Access Procedure - D channel) of two connected SDH ports must be set in different modes. For *LambdaUnite*™ MultiService Switch (MSS) these modes are named "User Side" and "Network Side". The default setting for all SDH ports is "User Side".

NOTE: A remote login is only possible if the LAPD mode setting (see procedure below) is different at both ends of a DCC link. One end of the DCC link must be configured as "User Side", the other end as "Network Side".

Preconditions for enabling a DCC   You are permitted to enable a DCC if all of the following preconditions are fulfilled:

- The corresponding optical interface port is provisioned (configured) or at least pre-provisioned.

- The DCC is not yet enabled.

- There are LAPD channels available. Please refer to "Max. number of active DCC links" (5-32) below.

Max. number of active DCC links   The maximum number of simultaneously supported LAPD channels per DCC controller is 64. Each DCC controller thus can support up to 64 active DCC links. Upon circuit pack insertion, DCCs will automatically be enabled and a LAPD channel assigned as long as LAPD channels are available.

Before you begin   Prior to performing this task, you must be logged into the WaveStar® CIT and the respective network element.

Required privilege codes

You must have at least a privilege code of S3 to create new DCC terminations.

Required equipment

The following equipment is required to perform this task:

- WaveStar® CIT.

Procedure   Complete the following steps to create a new DCC termination:

....

1   Select **Configuration → DCC Terminations...** in the **WaveStar® CIT Window**.

....

2   Select **New Termination** in the parameter part.

....

3   In the **Select a port for New Termination** group box, select the working optical interface port.

....

4   In the **DCC Channel Parameters** group box, choose the LAPD mode in the **LAPD:** drop down list box.

Important! The LAPD mode setting must be different at both ends of a DCC link. Otherwise, an alarm (either "User-Network Side RSect Failure" or "User-Network Side MSect Failure") will be generated.

....

5   Enable the DCC termination by selecting the **Enabled** option in the **DCC Channel Parameters** group box.

....

6   Repeat Steps 1 to 5 for the NE at the opposite end of the DCC link (remote NE).

E N D   O F   S T E P S

....

Setting up a cross-connection

Overview	This section provides a procedure for setting up a cross-connection.
Before you begin	Prior to performing this task, you must be logged into the WaveStar® CIT and the respective network element.

Required privilege code

You must have at least a privilege code of P3 to create new cross-connections. For some fields privilege code M1 is required.

Required equipment

The following equipment is required to perform this task:

- WaveStar® CIT.

Procedure	Complete the following steps to create a new cross-connection:

....

1 Call up the **Cross-Connection Wizard** via **Configuration** → **Cross-Connections...** in the **WaveStar® CIT Window**.

....

2 Click on the radio button **Create a new cross-connection** and click on **Next>**.

> **Result:**
>
> **Screen 1** appears.

....

3 Define the cross-connection rate in the drop-down list box **Enter Rate:**. The following values are possible:

- **VC-3**(default value)
- **VC-4**
- **VC-4-4c**
- **VC-4-16c**
- **VC-4-64c**
- **STS-1**
- **STS-3**
- **STS-12**

- **STS-48**

- **STS-192**

Please note that it is not possible to proceed to the next window before selecting the cross-connection rate.

....

4 Select **2 Way Point-to-Point** in the group box **Type of cross-connection**.

....

5 Click on **Next>** to proceed to the next window.

> **Result:**

> **Screen 2 of 3** appears.

....

6 Click on the left **Select...** button to select the source tributary.

> **Result:**

> The **Ptn Grp** selection tab appears. In the list box of the **Ptn Grp** selection tab the system is displayed. The displays can be expanded. Thus a tree of systems, bays, shelves, circuit packs, and ports is depicted.

....

7 Select one port in the list or enter the AID in the text box **Enter AID:** above.

> **Result:**

> In the list box **Tributary** on the right, the AIDs of all VCs/STSs belonging to the respective port are displayed.

....

8 Select the VC/STS which shall be used as the source and click on the **Select...** button.

....

9 Click on the right **Select...** button to select the destination tributary.

> **Result:**

> The **Ptn Grp** selection tab appears. In the list box of the **Ptn Grp** selection tab the system is displayed. The displays can be

....

expanded. Thus a tree of systems, bays, shelves, circuit packs, and ports is depicted.

....

10   Select the VC/STS which shall be used as the destination and click on the **Select...** button.

Result:

On **Screen 2 of 3** both, the source and destination tributary, are displayed.

....

11   Click on the **Next>** button.

Result:

Screen 3 of 3 appears.

The current data of the cross-connection are displayed.

....

12   Click on the **Finish** button to apply your settings.

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

⌐

Network commissioning

Overview This chapter describes how to establish a network with optical fibre connections. It provides procedures for directly connecting the *LambdaUnite*™ MultiService Switch (MSS) NEs and should be used for high-level network connection.

Assumptions Be sure all listed assumptions described below are fulfilled before establishing the network:

- Each NE is provisioned as described in that chapter.

- The persons setting up the network should be familiar with the SDH functionality.

Related information In this chapter all procedures are described for a protected ring topology. In the "*LambdaUnite* MultiService Switch (MSS) Application, Planning and Ordering Guide" also other possible topologies are described.

Procedure

⚠ DANGER

Never look into the end of an exposed fiber or into an open optical connector as long as the optical source is switched on. This applies particularly to the connections of the optical plug-in units.

⚠ CAUTION

Use a static ground wrist strap whenever handling circuit packs or working on a WaveStar® CIT, to prevent electrostatic discharge damage to sensitive components.

⚠ CAUTION

To avoid cable break ensure that the bending radius of optical fibre cables is not less than 30 mm.

Perform the following procedure to establish a protected ring connection:

....

1 At the first node, clean and connect the fibre to the OUT port of one OP10 circuit pack.

Reference:

Chapter 7, section "Fibre cleaning" (7-14)

....

2 Move to the next adjacent node in the east.

....

3 Follow the LC attenuator selection procedure to determine the correct attenuation value for the IN port of the OP10 circuit pack.

Reference:

Section "LC attenuator selection" (5-40)

....

4 Clean and connect the fibre to this IN port.

Reference:

Chapter 7, section "Fibre cleaning" (7-14)

....

5 Repeat steps 1-4 until you have gone all the way around the ring.

....

6 Repeat steps 1-5 with other OP10 circuit packs used for protection.

....

7 Setup far-end communications.

Reference:

Section "Setting up the DCC channels" (5-32)

....

8 Setup cross-connections.

Reference:

Section "Setting up a cross-connection" (5-34)

E ND   OF   S TEPS
....

....

5 - 3 8   **Lucent Technologies**   365-374-023
Issue a, October 2001

Result
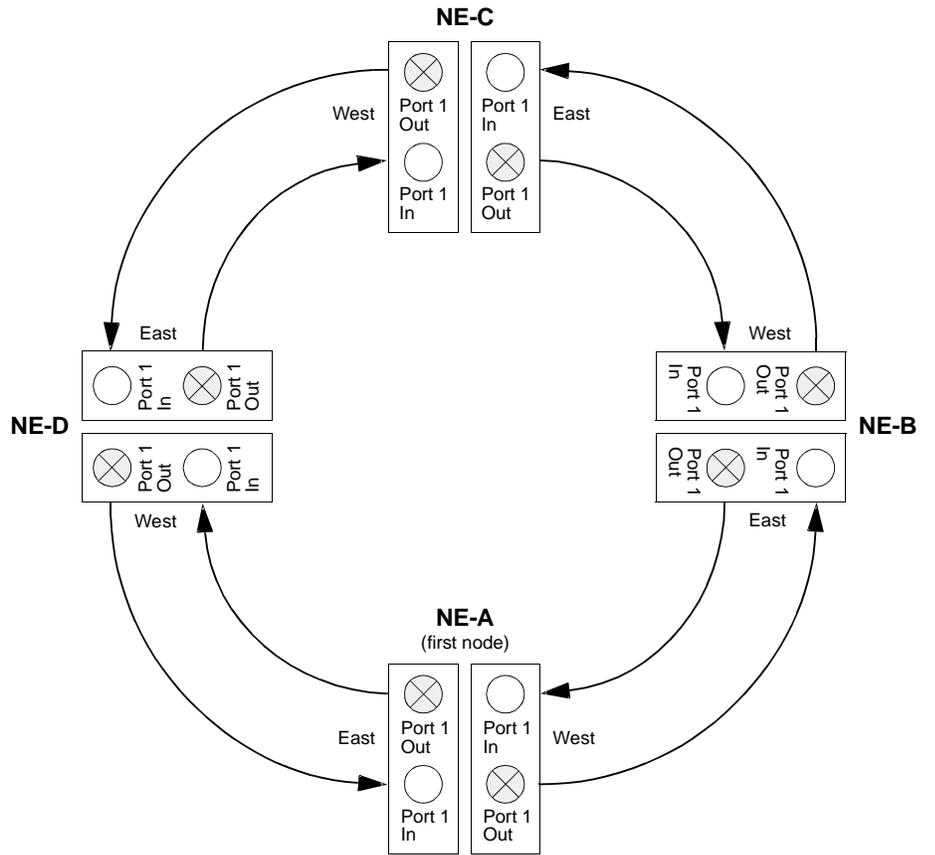
LC attenuator selection

....

Ordering   See Appendix B, "LC Attenuators" (B-14).

Selection procedure   This section covers the selection of LC attenuators to be used on the input to the long reach 10G based on the received optical power. It is recommended that the LC attenuator be placed on the INPUT port since this is the furthest physical point on the fibre line from the OUTPUT port and takes all connector losses into account. Perform the steps as described below to choose and install the appropriate LC attenuator for all port units:

....

1   At the input of the receiver measure the received optical power from the far-end transmitter. Be sure to set the optical power meter for the wavelength of the light to be measured (i.e. 1310 nm or 1550 nm).

....

2   Check that the measured value is within the range shown below "LC attenuator value range" (5-41)).

IF...	THEN...
the measured value is within the range,	END OF STEPS
the measured value is not within the range,	choose the appropriate LC attenuator value.

....

3   Remove the 0-dB LC attenuator in the faceplate IN port of the optical circuit pack.

....

4   Install the chosen LC attenuator.
E N D   O F   S T E P S
....

LC attenuator value range

The following table helps you to check the LC attenuation value.

Circuit pack	Range (dBm)
OP10/1.3IOR1	−11.0 ... −1.0
OP10/1.5IR1	−14.0 ... −1.0
OP10/1.5LR1	−14.0 ... −1.0
OP10/01-16/PWDM	−22.5 ... −13.0
OP10/01-40/OLS400	−13.0 ... −5.0
OP10/01-80/OLS800	−20.0 ... −13.0

⌐

6   Test Procedures

Overview

Purpose   This chapter describes all the tests that should be carried out to check the functionality of the system.

Assumptions   Be sure all listed assumptions described below are fulfilled before carrying out any tests:

- All NEs must be mounted and cabled correctly (see Chapters 3 and 4).

- The persons carrying out the tests are familiar with the SDH functionality, the WaveStar® CIT software and the handling of the test equipment.

Related information   An overview about all WaveStar® CIT related tasks is given in the " *LambdaUnite*™ MultiService Switch (MSS) User Operations Guide".

Contents

Lucent Technologies

Physical installation check

Overview   Each component must undergo a visual check by a qualified person to ensure that all components are complete and the cables are connected correctly.

Checks   Check that

- there are no visible defects
- the mechanical parts are secured
- all cables are assembled correctly
- all optical cables have a bending radius of minimal 25 mm
- the optical couplings are affixed to the optical circuit packs
- all circuit packs are situated in the slots according to the guidelines described in Chapter 3.

Voltage supply test of the circuit packs

Overview The current operating state of the circuit packs is displayed by means of the following 3 diagnostic LEDs:

- ACTIVE
  ON in case of active status. In standby mode the LED is dark.

- FAULT
  ON or FLASHING in case of hardware failure or wrong detection in the system.

Check Check that on each circuit pack only the ACTIVE LED is lit up. This is the case if there are no alarms present on the circuit packs. Otherwise, the FAULT LED is lit up or flashing.

Important! The LEDs of the protection cards are off as long as they are in the standby mode.

⌐

Fan unit test

Overview This test clarifies the correct working of the Fan Unit in the *LambdaUnite*™ MultiService Switch (MSS) subrack. Check if the fan unit is running.

Procedure Proceed as follows to test the correct functionality of the fan unit:

1 Control the correct installation of the fan unit and fan filter.

Check that

- the air flow direction is from bottom to top
- the unit is fixed correctly.

2 Control the status indication on the faceplate of the fan unit.

Result:

On the fan unit only the PWR ON LED should be lit.

E N D   O F   S T E P S

LED test

....

Overview   This test ensures the functionality of the LEDs on all circuit packs as well as on the user panel. The PWR ON LED on the user panel and the fan unit LEDs are not affected by the LED test.

Test procedure   ....

1   Push the LED TEST button on the user panel to test the circuit pack and user panel LEDs.

User Panel

○ PWR ON	○ CR	○ NE ACTY
	○ MJ	○ FE ACTY
	○ MN	○ ○ ACO
CIT (LAN)	○ ABN	○ LED TEST
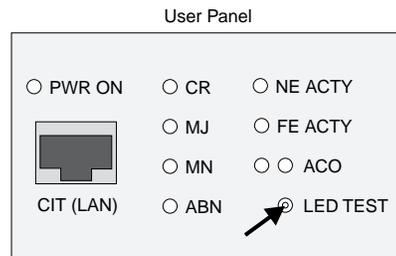
Result:

The following should happen:

1.   The LEDs on the user panel (except the PWR ON LED) turn on for 2 seconds and then off for 2 seconds three times in sequence.

2.   The LEDs on the circuit packs turn on for 2 seconds and then off for 2 seconds three times in sequence.

END OF STEPS
....

LED test failure   In the case of a LED test failure (LEDs are not lit), please refer to Chapter 7, section "LED test failure" (7-8).

⌐

Office alarm test

Overview   The office alarm test verifies the connection of the alarming
equipment, including external office alarm equipment.

Procedure   Proceed as follows to complete the alarm test:

1   Login to the NE as described in Chapter 5, section "NE login/logout
procedure" (5-19).

2   Select *Fault → Test → Office Alarm...* in the System View.

3   Double click on *Shelf 1 (DUR)*.

Select the *Number Of Iterations*. A suggested number of iterations is
2. Click on the arrow and select the correct number of iterations.
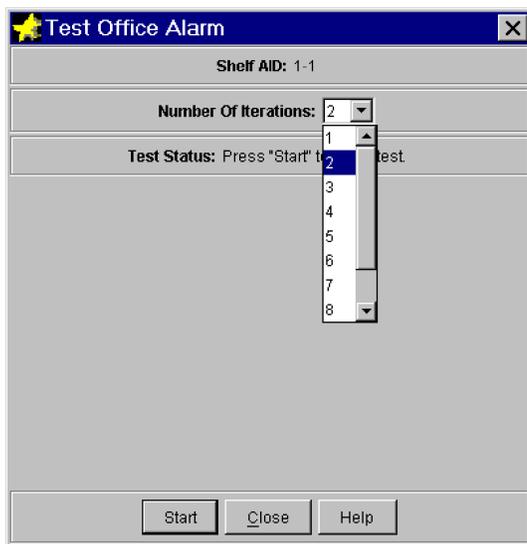
4   Click *Start*, then *Yes* in the confirmation window.

Result:

The office alarm LEDs (rack alarm lamps) turn on for five
seconds in the following order: Critical, Major, Minor (SONET)

or Prompt, Deferred (SDH). This sequence will repeat for the number of iterations.

Please note that before as well as at the end of the alarm test, no office alarm LEDs/rack alarm lamps turn on for 5 seconds.

The *Test Office Alarm* window will automatically be closed when the test has finished.

E ND   OF   S TEPS

Office alarm test failure   In the case of an office alarm test failure (rack alarm lamps are not lit), please refer to Chapter 7, section "Office alarm test failure" (7-9).

⌐

Alarm reporting test

Overview   This test verifies that currently active alarms of the system are reported to the WaveStar® CIT. The test includes raise and clear behaviour of the alarms created.

Procedure   Proceed as follows to complete the alarm test:

1   Login to the NE as described in Chapter 5, section "NE login/logout procedure" (5-19).

2   Create the different alarms in sequence as shown in the table below.

Example:

Create the following alarms separately:

Created alarm	Alarm level	Example for creation of the alarm
Loss Of Signal (LOS)	Prompt, Critical	Setting an unused port to monitored
Circuit Pack Unequipped/ Missing alarm	Prompt, Major	Removing a provisioned circuit pack
Remote Defect Indication (RDI)	Deferred (*)	Insert a RDI to the optical circuit pack with the analyzer

NOTE(*): For testing of Deferred alarm level, the ASAP profile must be changed for a short time (menu: **Configuration →
Alarms → Alarm Severity Assignment Profile …**). Example: Change the Remote Defect Indication (RDI) signal in the ASAP type port group to SA alarm level deferred.

3   Check whether alarms are reported to the WaveStar® CIT (via **Fault → NE Alarm List...**). Check also the correct behaviour of the LEDs on the circuit pack, which generates the produced failure.

....

4   Clear alarms created at step 2.

....

5   Check the WaveStar® CIT alarm list for correct clearing of the
reported alarm.

....

6   Repeat step 2 to 5 for all alarm levels.
E ND   OF   S TEPS
....

⌐|

NE synchronisation test

Overview   This test ensures protected synchronisation of the NE to external clock sources.

Procedure   Proceed as follows to complete the NE synchronisation test:

1   Connect an external clock source (2.048 MHz signal, 2.048 Mbit/s framed signal or a 1.544 Mbit/s framed signal (SONET)) to both external timing input ports located on the rear side of the subrack.

2   Login to the NE as described in Chapter 5, section "NE login/logout procedure" (5-19).

3   Assign the clock sources.

To do this, select **Configuration** → **Timing/Sync** in the System view, then the tab **Timing Reference**.

- Set the priority of the first clock source (EXTREF1) to "1."
- Set the priority of the second clock source (EXTREF2) to "2."
- Select for both clock sources "AUTO" in the **QL Provisioned** field.

Select the tab **System Timing**.

- Disable the **System SSM Mode** and all other timing sources.
- Set the Wait To Restore (WTR) time to "1 Minute".
- Set the **Provisioned Clock Mode** to "Locked".

4   Verify that the NE is synchronising onto the first external clock source for at least 3 minutes. To do this, select **View** → **Timing/Sync...**, then the tab **Timing Reference**.

5   Disconnect the connection of the first clock source and click **Close**.

Select **View** → **Timing/Sync...**, then the tab **Timing Reference**.

     Result:

     The second clock source should become active.

....

6   Reconnect the first clock source.

> **Result:**
>
> The first clock source should become active again after WTR
> time has expired.

E ND OF S TEPS

....

NE synchronisation failure   In the case of an NE synchronisation failure (NE cannot synchronise
to an external clock source), please refer to Chapter 7, section "NE
synchronisation failure" (7-5).

⌐

....

Line timing test

Overview This test ensures the correct line timing functionality.

Procedure Proceed as follows to complete the line timing test:

1 Connect an error free signal to a SDH/SONET port of the subrack.

2 Login to the NE as described in Chapter 5, section "NE login/logout procedure" (5-19).

3 Select that port of the optical circuit pack for line timing reference. To do this, select **Configuration** → **Timing/Sync** in the System view, then the tab **Timing Reference**.

   Additionally, perform the following:

   • Set the selected system timing reference to priority "1."

   Select the tab **System Timing**.

   • Disable the **System SSM Mode** and all other timing sources.

   • Set the Wait To Restore (WTR) time to "1 Minute".

   • Set the **Provisioned Clock Mode** to "Locked".

4 Verify that the NE is synchronizing onto the external input for at least 3 minutes. To do this, select **View** → **Timing/Sync...**, then the tab **Timing Reference**.

5 Produce a Loss of Signal (LOS) Failure on the correspond line signal (e.g. remove the optical fibre), wait 30 seconds and reconnect the cable while observing the switching process.

   Result:

   After interruption of the line signal the NE must switch to "Holdover" because no second priority has been configured. The NE must resynchronize to the priority 1 after the signal reconnected and the WTR has expired.

   E N D   O F   S T E P S

Power on recovery test

....

Overview   This test ensures the proper recovery of the NE after a power failure.

Test setup
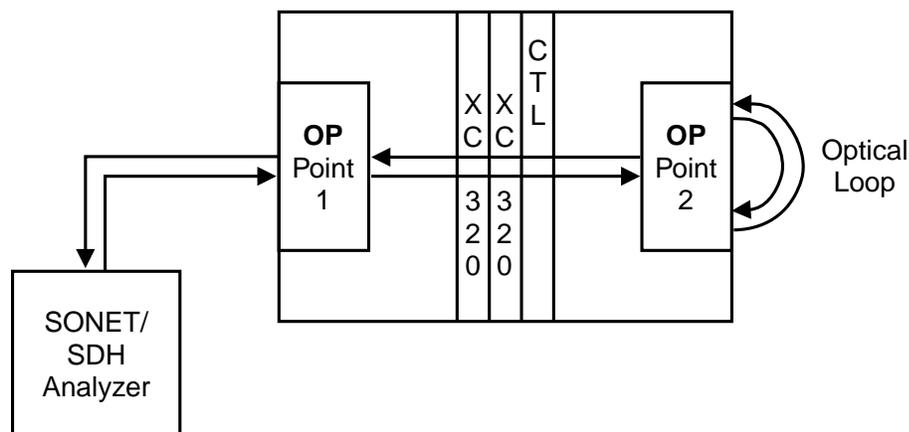
Procedure

 DANGER

Never look into the end of an exposed fibre or plug-in optical connectors as long as the optical source is switched on. This applies particulary to the connections of the optical plug-in units.

 CAUTION

Use a static ground wrist strap whenever handling circuit packs or working on a LambdaUnite™ CIT, to prevent electrostatic discharge damage to sensitive components.

 CAUTION

Use an optical attenuator pad of approx. 15 dB when establishing connections over short distances for test purposes.

....

⚠ **CAUTION**

To avoid cable break ensure that the bending radius of optical fibre cables is not less than 30 mm.

Complete the following steps to perform the power on recovery test:

....

1 Connect the SDH/SONET analyzer to any port of any optical pack (point 1), which is provided by the NE.

....

2 Loop back a optical fibre at any port of the optical pack (point 2), which is involved.

Important! Make sure sufficient optical attenuation (15dB) is provided when looping optical interfaces.

....

3 Login to the correct NE and configure a bi-directional cross connection between the both selected optical packs/ports (see Chapter 5, section "Setting up a cross-connection" (5-34)).

....

4 Start the transmission measurement at the analyzer and control the connection for no bit errors.

....

5 Control the correctness from all settings. The WaveStar® CIT alarm window should be error free (can be opened via **Fault → NE Alarm List...**).

....

6 Switch off the power of the NE on both power feeders. Wait about 2 minutes before switching on the system again.

....

....

7 Control the correct recovery with WaveStar® CIT and visual alarms:

- LED status of circuit packs (only the green LEDs should light up)

- External clock synchronisation (see section "NE synchronisation test" (6-12))

- The WaveStar® CIT alarm window should be error free

- Test traffic for no bit errors.

E ND OF S TEPS ....

Result After finished NE recovery the system must return into the normal operating mode and the traffic must be restored. No bit errors at the SDH/SONET analyzer should be observed after the recovery process.

⌐

....

Network test: Remote login

Overview   **Important!** This test can only be done after the DCC channels have been configured correctly (see Chapter 7, section "Setting up the DCC channels" (5-32)).

The test ensures the accessibility to all NEs via remote login. In the test procedure a protected ring configuration will be used as example. However, the described procedure is in principle also valid for other network topologies.

Test setup
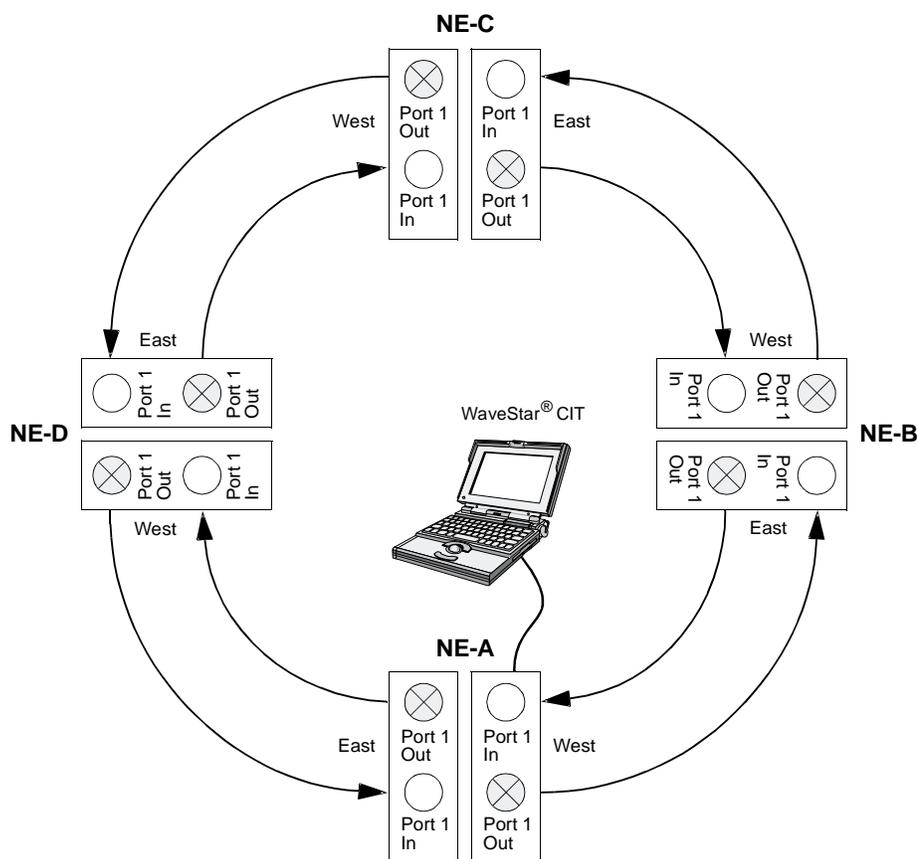
Procedure   Perform the following procedure to test the NE control and supervision functionality via remote login:

1   Login to the NE-A as described in Chapter 5, section "NE login/logout procedure" (5-19).

....

2   Set the NE-A time to the actual value (see Chapter 5, section "Setting
          of the NE date and time" (5-25)).

....

3   Start a remote login to NE-B.

          Result:

          All units of the NE-B will be displayed.

....

4   Read out the inventory data by double clicking on a unit.

          Result:

          The inventory data window (Pack Data) for the selected board
          will be opened.

Tab **Pack Data**   Tab **Status**

....

5   Set the NE-B time to the actual value.

....

6   Repeat Steps 3 to 5 for NE-C and NE-D.
          E N D   O F   S T E P S

....

Remote login failure   In the case of a remote login failure, please refer to Chapter 7, section "Remote login failure" (7-11).

⌐

Network test: Line timing functionality

....

Overview   This test checks that all NEs can be synchronized using the line timing function. In the test procedure a protected ring configuration will be used as example. However, the described procedure is in principle also valid for other network topologies.

Test setup
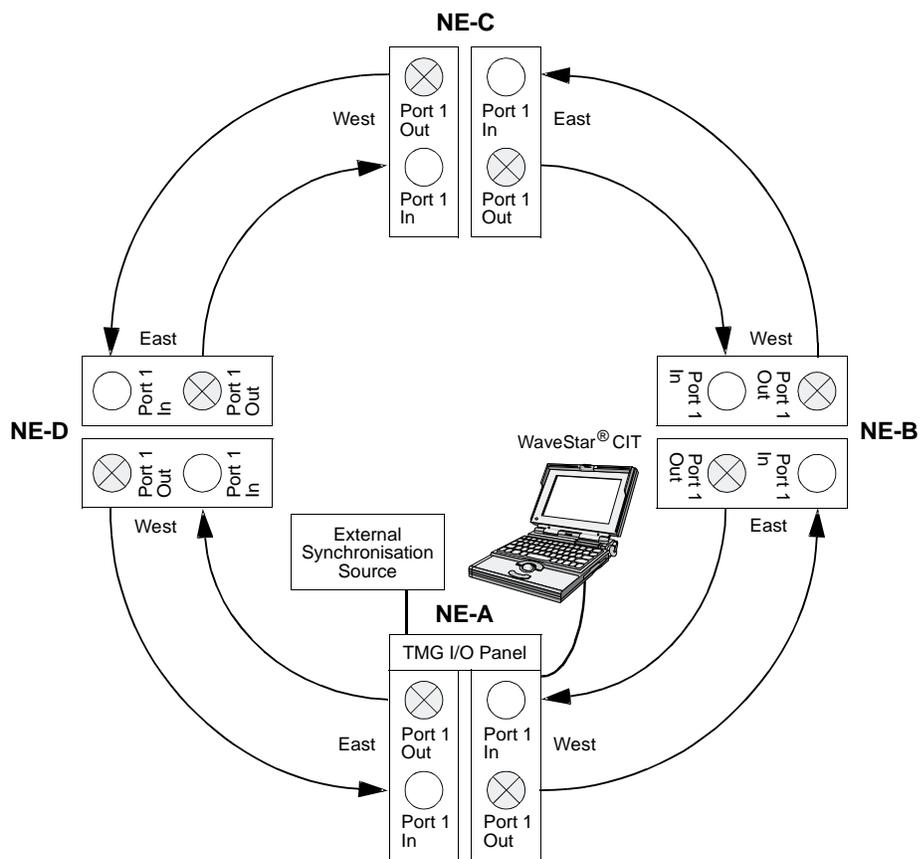
Procedure   Perform the following procedure to test the network line timing functionality:

....

1   Connect an external clock source to an external timing input port.

....

2   Login to the NE-A as described in Chapter 5, section "NE login/logout procedure" (5-19).

....

....

3 Check that NE-A is synchronized onto the external synchronisation source (see section "NE synchronisation test" (6-12)).

....

4 Start a remote login to NE-B.

....

5 Check that NE-B is synchronized onto the internal line clock source.

....

6 Repeat Steps 4 and 5 for NE-C and NE-D.

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

❐

....

6 - 2 2

Lucent Technologies

365-374-023
Issue a, October 2001

7   Installation troubleshooting

Overview

Purpose   This chapter provides basic installation troubleshooting information for the *LambdaUnite*™ MultiService Switch (MSS) system.

Contents

Power failure

....

Overview   The procedures described below should be performed if the subrack powering procedure (see Chapter 4, section) was unsuccessful.

Procedure 1 should be used if the measured voltage at the termination blocks of the PDP does not lie between -40.5 and -72 V.

Procedure 2 should be used if the PWR ON LEDs do not light up on the user panels.

Procedure 3 should be used if the PWR ON LEDs do not light up on the fan units.

Procedure 1   Follow the steps below if the measured voltage at the termination blocks of the PDP does not lie between -40.5 and -72 V:
....

1   Switch off the external battery.

....

2   Replace all affected power supply lines between the external battery and the termination blocks of the PDP. Make sure the cables are tight afterwards.

....

3   Switch on the external battery.

IF ...	THEN ...
the measured voltage does not lie between -40.5 and -72 V,	check the external battery.
the measured voltage lies between -40.5 and -72 V,	END OF STEPS

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

....

Lucent Technologies

Procedure 2   Follow the steps below if the PWR ON LEDs do not light up on the user panels:

....

1   Operate all circuit breakers on the subrack backplanes to the *OFF* position.

....

2   Replace all affected shelf power cables between the PDP and the power connectors of the Power Interface Units (PIUs). Make sure that the cables are tight afterwards.

....

3   Operate all circuit breakers on the subrack backplanes to the *ON* position.

IF ...	THEN ...
the PWR ON LEDs do not light up on the user panels,	operate all circuit breakers on the subrack backplanes to the *OFF* position and replace all affected PIUs.
the PWR ON LEDs light up on the user panels,	END OF STEPS

E ND   OF   S TEPS

Procedure 3   Follow the steps below if the PWR ON LEDs do not light up on the fan units:

....

1   Operate all circuit breakers on the subrack backplanes to the *OFF* position.

....

2   Replace all affected fan power cables between the PIUs and the Fan Units. Make sure that the cables are tight afterwards.

....

3   Operate all circuit breakers on the subrack backplanes to the *ON* position.

....

365-374-023   **Lucent Technologies**   7 - 3
Issue a, October 2001

IF ...	THEN ...
the PWR ON LEDs do not light up on the Fan Units,	operate all circuit breakers on the subrack backplanes to the ***OFF*** position and replace all affected Fan Units.
the PWR ON LEDs light up on the Fan Units,	END OF STEPS

E ND OF S TEPS

NE synchronisation failure

Overview   The procedure described below should be performed if no valid timing reference signal is received at the respective external synchronization input (see Chapter 6, section "NE synchronisation test" (6-12)).

Procedure   Follow the steps below in the case of an NE synchronization failure:

1   Check for correct cabling and change as necessary.

IF ...	THEN ...
the NE does not synchronize to the external clock source,	proceed to step 2.
the NE synchronizes to the external clock source,	END OF STEPS

2   Check for correct input impedance (75 Ω, 100/110 Ω, 120 Ω) and change as necessary.

IF ...	THEN ...
the NE does not synchronize to the external clock source,	proceed to step 3.
the NE synchronizes to the external clock source,	END OF STEPS

3   Check for an external fault: input/output reversed or exchange supply defect.

IF ...	THEN ...
the NE does not synchronize to the external clock source,	proceed to step 4.

IF ...	THEN ...
the NE synchronizes to the external clock source,	END OF STEPS

....

4 Replace the currently active Timing Generator Unit.

IF ...	THEN ...
the NE does not synchronize to the external clock source,	proceed to step 5.
the NE synchronizes to the external clock source,	END OF STEPS

....

5 Replace the timing interfaces E1/DS1.

E N D   O F   S T E P S

SW download failure

Overview   The procedure described below should be performed if the circuit packs have the red LEDs illuminated (instead of the green LEDs) after the reset of the CTL circuit pack. This indicates a software download failure (see Chapter 6, section "NE software installation" (5-11)).

Procedure   Follow the steps below in the case of a software download failure:

1   Replace the PCMCIA card.

IF ...	THEN ...
the circuit packs do not have the green LEDs illuminated,	proceed to step 2.
the circuit packs have the green LEDs illuminated,	END OF STEPS

2   Replace the CTL circuit pack.

E N D   O F   S T E P S

LED test failure

Overview The procedure described below should be performed if some LEDs do not light up during an LED test (see Chapter 6, section "LED test" (6-6)).

Procedure Follow the steps below in the case of an LED test failure:

1 Check that the circuit packs are plugged in correctly and the power supply is on.

IF ...	THEN ...
circuit pack LEDs do not light up,	replace the respective circuit packs.
LEDs of the User Panel do not light up,	replace the User Panel.
all LEDs light up,	END OF STEPS

E N D   O F   S T E P S

Office alarm test failure

Overview   The procedure described below should be performed if the rack alarm lamps do not light up during an office alarm test via *LambdaUnite*™ CIT (see Chapter 5, section "Office alarm test" (6-8)).

Procedure   Follow the steps below in the case of an office alarm test failure:

1   Check for correct power cabling and change as necessary.

IF ...	THEN ...
the rack alarm lamps do not light up during an office alarm test,	proceed to step 2.
the rack alarm lamps light up during an office alarm test,	END OF STEPS

2   Check for correct signal cabling (rack-top alarm interface cable) and change as necessary.

IF ...	THEN ...
the rack alarm lamps do not light up during an office alarm test,	proceed to step 3.
the rack alarm lamps light up during an office alarm test,	END OF STEPS

3   Replace the rack-top alarm interface cables.

IF ...	THEN ...
the rack alarm lamps do not light up during an office alarm test,	proceed to step 4.
the rack alarm lamps light up during an office alarm test,	END OF STEPS

....

4   Replace the rack alarm lamps.

IF ...	THEN ...
the rack alarm lamps do not light up during an office alarm test,	proceed to step 5.
the rack alarm lamps light up during an office alarm test,	END OF STEPS

....

5   Replace the alarm panel of the PDP.

E ND OF S TEPS

Remote login failure

Overview   The procedure described below should be performed if no remote login is possible (see Chapter 6, section "Network test: Remote login" (6-18)).

Procedure   Follow the steps below in the case of a remote login failure:

1   Check that the DCC channels are configured correctly (see Chapter 5, section "Setting up the DCC channels" (5-32)).

IF ...	THEN ...
a remote login is not possible,	proceed to step 2.
a remote login is possible,	END OF STEPS

2   Replace the CTL circuit pack of the near-end NE.

IF ...	THEN ...
a remote login is not possible,	proceed to step 3.
a remote login is possible,	END OF STEPS

3   Replace the CTL circuit pack of the far-end NE.

IF ...	THEN ...
a remote login is not possible,	proceed to step 4.
a remote login is possible,	END OF STEPS

4   Replace the OP10 transmitter in the near-end NE.

IF ...	THEN ...
a remote login is not possible,	proceed to step 5.
a remote login is possible,	END OF STEPS

....

5   Replace the OP10 receiver in the far-end NE.

E ND   O F   S TEPS

....

⌐

....

7 - 1 2   **Lucent Technologies**   365-374-023
                                                                                    Issue a, October 2001

Alarm handling

Overview The procedure described below should be performed if there are active alarms after an alarm test via WaveStar® CIT (see Chapter 6, section "Alarm reporting test" (6-10)).

Procedure Follow the steps below in the case of active alarms:

1 Note all active alarms.

2 Follow the trouble clearing tasks described in the " *LambdaUnite*™ MultiService Switch (MSS) Alarm Messages and Trouble Clearing Guide".

E N D   O F   S T E P S

Fibre cleaning

Overview This procedure describes the Lucent recommended method for the cleaning and inspection of optical connectors using specific tools and materials that have been proven to be effective in the assembly and testing of optical transmission equipment. It is critical that the connector endfaces are clean and free from particular contamination to assure proper performance and reliability of lightwave systems. With the modern high-speed, high-power and wider bandwidth optical transmission systems, clean connectors along the optical path are absolutely essential for successful operation.

Before working with optical fibre cables please observe the following safety warnings:

⚠ DANGER

Never look into the end of an exposed fibre or plug-in optical connectors as long as the optical source is switched on. This applies particularly to the connections of the optical plug-in units.

⚠ CAUTION

To avoid cable break ensure that the bending radius of optical fibre cables is not less than 30 mm.

Cleaning of Optical Connectors Optical connectors are only to be cleaned in accordance with the cleaning instructions listed below.

If impurities are assumed, the use of a microscope is recommended in order to check the connector face for impurities (e.g. fluff, dust particles). A microscope with a magnification x 200 is preferred.

Connectors If impurities are discovered, the optical connector must be cleaned in accordance with the following rules:

1 Wipe off the connector face **lengthwise** (not with a circular motion!) using a **smooth** tissue (**moistened** with isopropanol).

2 Wipe off the connector face *lengthwise* (not with a circular motion!) using a *dry and smooth* tissue.

3 Then let the connector face air-dry (the isopropanol must evaporate completely!). As an option, purified compressed air can also be used for drying.

4 If necessary, the connector face can additionally be dabbed on the tape dispenser.

5 Finally check the connector face for cleanliness using the microscope.

If the connector impurities were not removed completely during the first cleaning procedure, repeat steps 1-5 until the result is satisfactory.

E ND   OF   S TEPS

Note:

Do not connect the optical connectors without checking them for impurities under the microscope!

Coupling Impurities caused by dust particles or fluff etc. can also occur on the optical coupling. To clean the coupling follow the instructions below:

1 Soak the coupling cleaner in isopropanol and move it back and forth in the coupling several times.

2 Blow purified compressed air through the coupling and visually check for residual impurities by holding it to the light.

Important! Lightguide Build-Outs (LBOs) may be damaged when compressed air is used for drying. Therefore, do not use compressed air for drying LBOs.

E ND   OF   S TEPS

Appendix A: Assembly Instructions

Overview

Purpose   This appendix describes the general assembly instructions.

Contents

D-Sub Metallic Hoods

....

Description	The Amphenol metail hoods series for D-Sub connectors offers protection from magnetic and radio interferencies to cable assemblies.
	Easily assembled these hoods are suitable for all industrial and telecom applications.

Assembly Instructions

....

Important! Be aware to protect the braid by stripping.

1 Strip the cable according the following dimensions.

   Result:

   Cable stripping dimensions:

Connector type	A	B
9 pole	30mm [1.181"]	20mm [.787"]
15 pole		
25 pole	45mm [1.772"]	20mm [.787"]
37 pole		

....

2 Prepare the braid as shown in the figure.

....

3 Solder the wires to the pin contact.

....

4 Put the ferrules around the braid on the cable.

   Important! Shape the strands of braid into two pigtails and bend these back over the ferrule in a shape of 180 degrees.

....

5 Insert the cable with the ferrule in the D-Sub connector.

....

6 Close the connector by tighting the screws.
   E ND OF S TEPS

....

Assembled connector
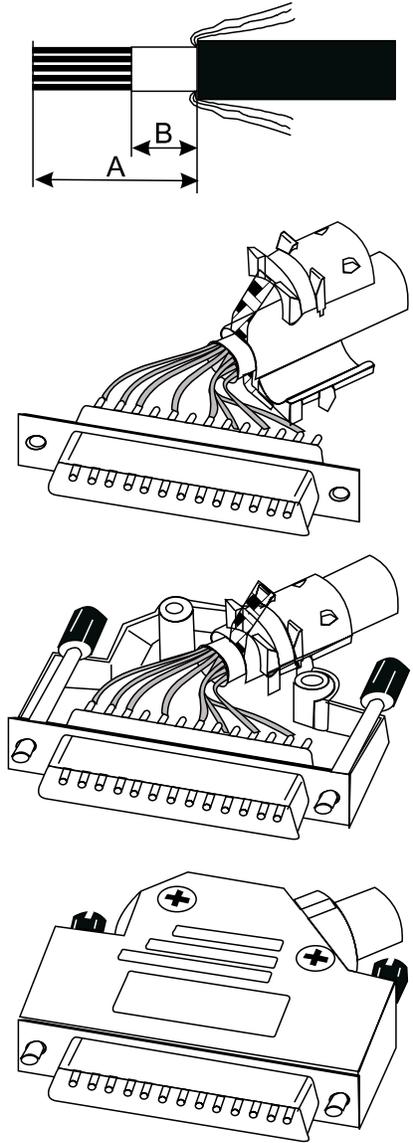
Modulair Plug Connector

1   Strip the cable jacket 35 mm.

   Important! Make sure not to cut the cable shield.

2   Fold the cable shield back over the cable jacket. Bend the drain wire back across center of the cable shield on external conductive side.

   Strip the shield for each pair maintaining 5.0 mm shield from the jacket end.

3   Slide the connector shield onto the cable shield. If the cable diameter is close to 6.0 mm it may be necessary to rotate the connector shield as it passes over the cable shield. Cut and remove the plastic wrap if any.

   Important! Make sure not to exceed the cable shield length.

4   Arrange the conductors.
   - Untwist conductors and orient them according to the next table (cross conductor 6 over conductors 4 & 5).
   - Trim the conductor ends. This makes insertion into the wire holder easy.

   Slide the conductors into the wire holder. Use the floor of the wire holder to bring the conductor ends into the same plane.

   Important! The wire holder should be fully slid down onto the twisted conductors until the conductors resistance impede to continue.

5   Turn the subassembly (housing + contacts) over to aid trimming.

6   Trim the conductors using the front edge of the wire holder as a guide.

7   Turn the subassembly over to aid insertion.

8 Slide the plug subassembly onto the wire holder.

9 Make sure that you have completely finished the insertion.

Visual aid : lateral protruberance back edge of the wire holder has to be at the same plane with the back plane of the plug subassembly.

10 Hold tightly the plug subassembly and slide the connector shield onto the plug subassembly.

11 Insert the connector into the tooling and crimp it. Trim back the remainder of the cable shield and drain wire.

Important! Press the plug against the tooling when crimping to ensure the correct position of the conductors.

12 Slide the boot onto the crimped plug.
E ND   OF   S TEPS

Conductor Arrangement

Pair	Wire	Color	Contact
1	1a	white-blue	1
	1b	blue	2
2	2a	white-orange	3
	2b	orange	6
3	3a	white-green	4
	3b	green	5
4	4a	white-brown	7
	4b	brown	8

LAN Cable (CAT5) Assembly — Part 1

LAN Cable (CAT5) Assembly — Part 2

8

9   L   L=0

10

11   crimping

trimming
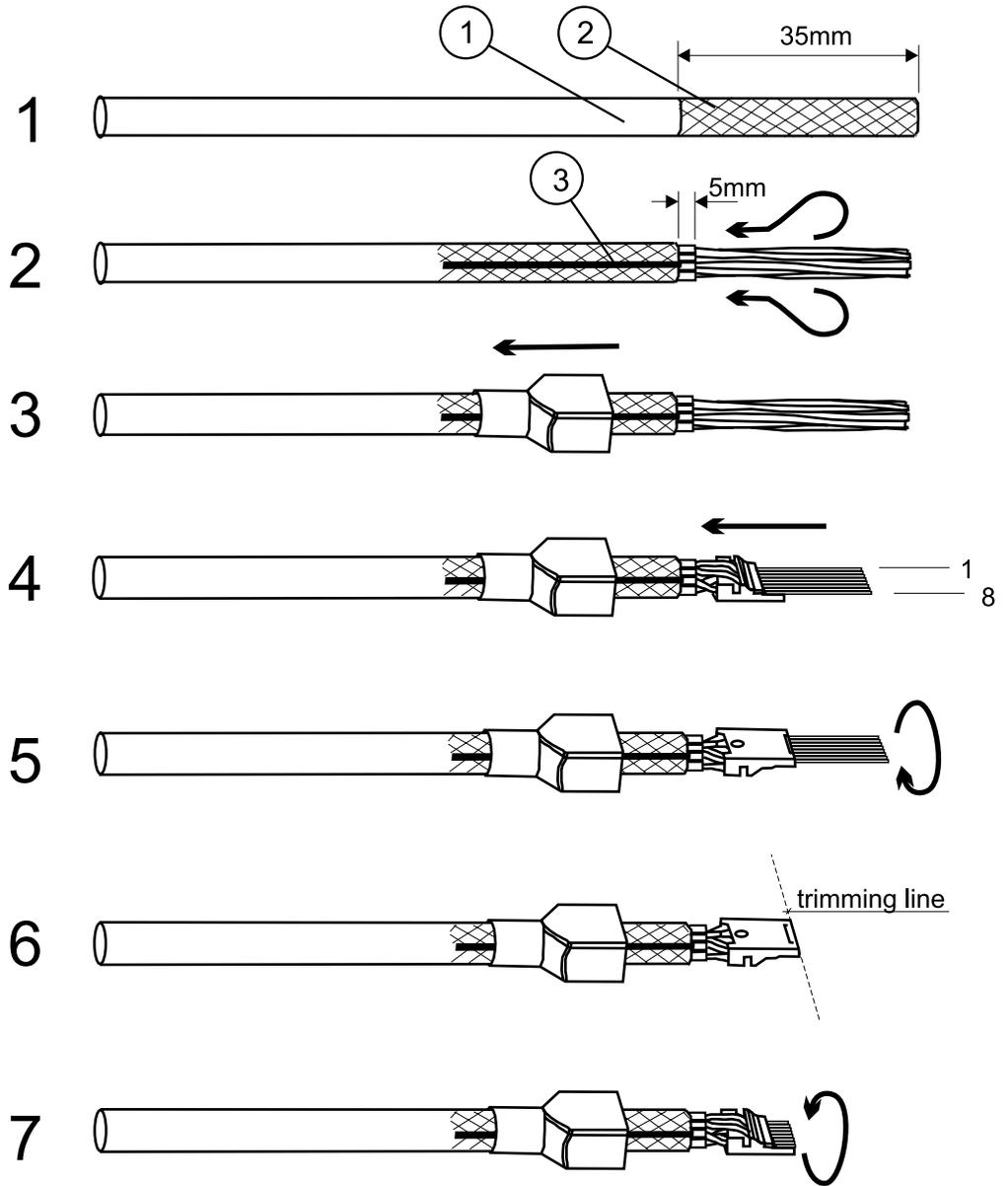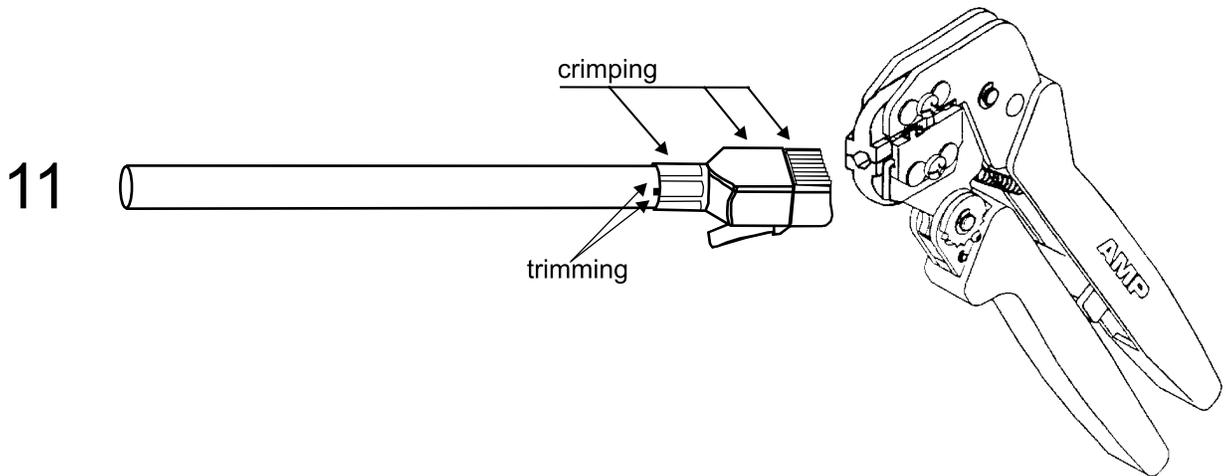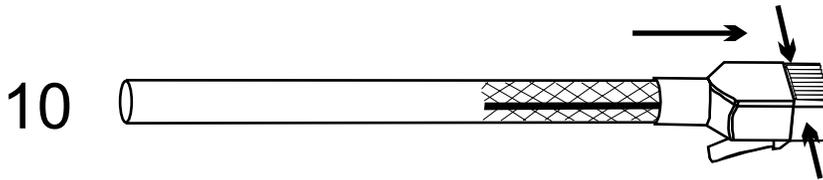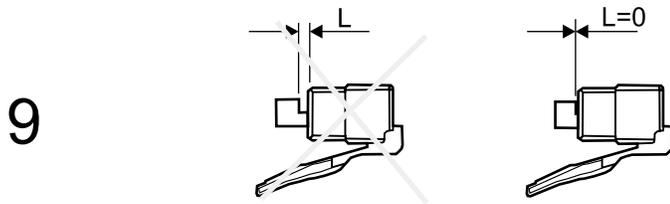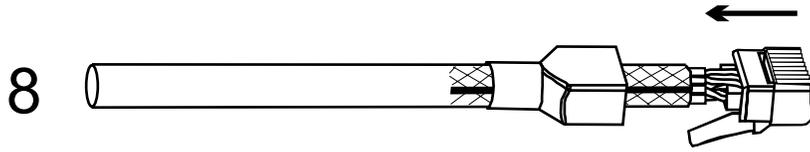
Legend:

1   Cable Jacket

2   Cable Shield

3   Drain Wire

Material LAN Cable CAT 5

QTY	Description	Comcode
1	Modular Plug 8p — 407890193	(AMP 336330–1)
1	Belden 1869ENH CAT 5 patch STP FRNC (43067 2651 011) — 408386175	Lucent
	4 pair CAT 5 STP FRNC — TDD21951	Capable
	4 pair CAT 5 STP FRNC — 43167 3307 079	Belden
	4 pair CAT 5 STP FRNC — MS100–4445	Madison
1	Crimp Tool (AMP 790163–1)	

⌐

Multicore Low Current Cables

Color Code Multi-Pair Cable	Color Code	
Pair	**Color a Conductor**	**Color b Conductor**
1	White	Brown
2	Green	Yellow
3	Gray	Pink
4	Blue	Red
5	Black	Violet
6	Gray-Pink	Red-Blue
7	White-Green	Brown-Green
8	White-Yellow	Yellow-Brown
9	White-Gray	Gray-Brown
10	White-Pink	Pink-Brown
11	White-Blue	Brown-Blue
12	White-Red	Brown-Red
13	White-Black	Brown-Black
14	Gray-Green	Yellow-Gray
15	Pink-Green	Yellow-Pink
16	Green-Blue	Yellow-Blue

Color Code Multi-Conductor Cable	Color Code	
conductor	**Insulation Color**	**Tracer**
1	White	
2	Brown	
3	Green	
4	Yellow	
5	Grey	
6	Pink	
7	Blue	
8	Red	

conductor	Insulation Color	Tracer
9	Black	
10	Violet	
11	Grey	Pink
12	Red	Blue
13	White	Green
14	Brown	Green
15	White	Yellow
16	Yellow	Brown
17	White	Grey
18	Grey	Brown
19	White	Pink
20	Pink	Brown
21	White	Blue
22	Brown	Blue
23	White	Red
24	Brown	Red
25	White	Black

Multicore Fiber Cables

Breakout cables

Fiber	Fiber Color
1	Blue
2	Orange
3	Green
4	Brown
5	Slate
6	White
7	Red
8	Black
9	Yellow
10	Violet
11	Rose
12	Aqua

Appendix B: Ordering Codes and Specifications

Overview

Purpose   This appendix describes the ordering codes and specifications of this product.

Contents

Fiber Optic Cables

Important! Use cables of approved vendors only! Otherwise the installation and performance of the system is at risk.

Single Mode 9/125

Break-Out Cables, LC 45° (12x) to *x* 180° (12x)

Important! *x* = connector types (LC, SC, FC, ST, DIN, E-2000)

Cable Data

Type	SM-minicord BreakOut cable, 12 Fibers/CDGL-012B-SRX 12 8	Remarks
Diameter Cable	7.7 mm	Lucent
Diameter Fiber	1.6 mm	Lucent
Cable Code	LGMC-012B-SRX — 107843641	Lucent
	49391 3308 042	Belden
Connector	LC (45°) to LC, SC, FC, ST, DIN (180°)	Blue

SM LC to LC (12 to 12)

Length	Comcode	Length	Comcode	Length	Comcode	Length	Comcode
5	109158451	30	109158519	55	109158568	80	109158618
10	109158477	35	109158527	60	109158576	85	109158626
15	109158485	40	109158535	65	109158584	90	109158634
20	109158493	45	109158543	70	109158592	95	109158642
25	109158501	50	109158550	75	109158600	100	109158659

SM LC to SC (12 to 12)

Length	Comcode	Length	Comcode	Length	Comcode	Length	Comcode
5	109158667	30	109158717	55	109158766	80	109158816
10	109158675	35	109158725	60	109158774	85	109158824
15	109158683	40	109158733	65	109158782	90	109158832

| 20 | 109158691 | 45 | 109158741 | 70 | 109158790 | 95 | 109158840 |
| 25 | 109158709 | 50 | 109158758 | 75 | 109158808 | 100 | 109158857 |

SM LC to FC (12 to 12)

Length	Comcode	Length	Comcode	Length	Comcode	Length	Comcode
5	109158865	30	109158915	55	109158964	80	109159012
10	109158873	35	109158923	60	109158972	85	109159020
15	109158881	40	109158931	65	109158980	90	109159038
20	109158899	45	109158949	70	109158998	95	109159046
25	109158907	50	109158956	75	109159004	100	109159053

SM LC to ST (12 to 12)

Length	Comcode	Length	Comcode	Length	Comcode	Length	Comcode
5	109159061	30	109159111	55	109159160	80	109159210
10	109159079	35	109159129	60	109159178	85	109159228
15	109159087	40	109159137	65	109159186	90	109159236
20	109159095	45	109159145	70	109159194	95	109159244
25	109159103	50	109159152	75	109159202	100	109159251

SM LC to DIN (12 to 12)

Length	Comcode	Length	Comcode	Length	Comcode	Length	Comcode
5	109159269	30	109159319	55	109159368	80	109159418
10	109159277	35	109159327	60	109159376	85	109159426
15	109159285	40	109159335	65	109159384	90	109159434
20	109159293	45	109159343	70	109159392	95	109159442
25	109159301	50	109159350	75	109159400	100	109159459

Simplex Cables, LC 45° (1x) to *x* 180° (1x)

Important! x = connector types (LC, SC, FC, ST, DIN, E-2000)

Cable Data

Type	SM-Simplex cable 9/125
Diameter	2.2 mm

Diameter Fiber	2.0 mm
Code	46990 3309 240	Belden
Connectors	LC (45°) to LC, SC, FC, ST, DIN (180°)	Blue

SM LC to LC (1 to 1)

Length	Comcode	Length	Comcode	Length	Comcode	Length	Comcode
3	t.b.d.						
5	109159467	30	109159517	55	109159566	80	109159624
10	109159475	35	109159525	60	109159574	85	109159632
15	109159483	40	109159533	65	109159590	90	109159640
20	109159491	45	109159541	70	109159608	95	109159657
25	109159509	50	109159558	75	109159616	100	109159665

SM LC to SC (1 to 1)

Length	Comcode	Length	Comcode	Length	Comcode	Length	Comcode
5	109159673	30	109159723	55	109159772	80	109159822
10	109159681	35	109159731	60	109159780	85	109159830
15	109159699	40	109159749	65	109159798	90	109159848
20	109159707	45	109159756	70	109159806	95	109159855
25	109159715	50	109159764	75	109159814	100	109159863

SM LC to FC (1 to 1)

Length	Comcode	Length	Comcode	Length	Comcode	Length	Comcode
5	109159871	30	109159921	55	109159970	80	109160028
10	109159889	35	109159939	60	109159988	85	109160036
15	109159897	40	109159947	65	109159996	90	109160044
20	109159905	45	109159954	70	109160002	95	109160051
25	109159913	50	109159962	75	109160010	100	109160069

SM LC to ST (1 to 1)

Length	Comcode	Length	Comcode	Length	Comcode	Length	Comcode

5	109160077	30	109160127	55	109160176	80	109160226
10	109160085	35	109160135	60	109160184	85	109160234
15	109160093	40	109160143	65	109160192	90	109160242
20	109160101	45	109160150	70	109160200	95	109160259
25	109160119	50	109160168	75	109160218	100	109160267

SM LC to DIN (1 to 1)

Length	Comcode	Length	Comcode	Length	Comcode	Length	Comcode
5	109160275	30	109160325	55	109160374	80	109160424
10	109160283	35	109160333	60	109160382	85	109160432
15	109160291	40	109160341	65	109160390	90	109160440
20	109160309	45	109160358	70	109160408	95	109160457
25	109160317	50	109160366	75	109160416	100	109160465

Simplex Cables, SC 45° (1x) to *x* 180° (1x)

Important! *x* = connector types (LC, SC, FC, ST, DIN, E-2000)

Cable Data

Type	SM-Simplex cable 9/125
Diameter	2.2 mm
Diameter Fiber	2.0 mm
Length Code	see next tables
Connectors	SC(45°) to LC, SC, FC, ST, DIN (180°)

SM SC to LC (1 to 1)

Length	Comcode	Length	Comcode	Length	Comcode	Length	Comcode
3	t.b.d.						
5	109172338	30	109172387	55	109172437	80	109172486
10	109172346	35	109172395	60	109172445	85	109172494
15	109172353	40	109172403	65	109172452	90	109172502
20	109172361	45	109172411	70	109172460	95	109172510

| 25 | 109172379 | 50 | 109172429 | 75 | 109172478 | 100 | 109172528 |

SM SC to SC (1 to 1)

Length	Comcode	Length	Comcode	Length	Comcode	Length	Comcode
5	109172767	30	109172817	55	109172866	80	109172916
10	109172775	35	109172825	60	109172874	85	109172924
15	109172783	40	109172833	65	109172882	90	109172932
20	109172791	45	109172841	70	109172890	95	109172940
25	109172809	50	109172858	75	109172908	100	109172965

SM SC to FC (1 to 1)

Length	Comcode	Length	Comcode	Length	Comcode	Length	Comcode
5	109172973	30	109172021	55	109172070	80	109172120
10	109172981	35	109172039	60	109172088	85	109172138
15	109172999	40	109172047	65	109172096	90	109172146
20	109172005	45	109172054	70	109172104	95	109172153
25	109172013	50	109172062	75	109172112	100	109172161

SM SC to ST (1 to 1)

Length	Comcode	Length	Comcode	Length	Comcode	Length	Comcode
5	109173575	30	109173625	55	109173674	80	109173724
10	109173583	35	109173633	60	109173682	85	109173732
15	109173591	40	109173641	65	109173690	90	109173740
20	109173609	45	109173658	70	109173708	95	109173757
25	109173617	50	109173666	75	109173716	100	109173765

SM SC to DIN (1 to 1)

Length	Comcode	Length	Comcode	Length	Comcode	Length	Comcode
5	109172536	30	109172585	55	109172635	80	109172684
10	109172544	35	109172593	60	109172643	85	109172692
15	109172551	40	109172601	65	109172650	90	109172700
20	109172569	45	109172619	70	109172668	95	109172718
25	109172577	50	109172627	75	109172676	100	109172726

Simplex Cables, SC 45° (1x) to *x* 45° (1x)

Important! *x* = connector types (LC, SC, FC, ST, DIN, E-2000)

Cable Data

Type	SM-Simplex cable 9/125
Diameter	2.2 mm
Diameter Fiber	2.0 mm
Length Code	see next tables
Connectors	SC(45°) to LC, SC, FC, ST, DIN (45°)

SM SC to LC (1 to 1)

Length	Comcode	Length	Comcode	Length	Comcode	Length	Comcode
3	109174169						
5	109174177	30	109174227	55	109174276	80	109174326
10	109174185	35	109174235	60	109174284	85	109174334
15	109174193	40	109174243	65	109174292	90	109174342
20	109174201	45	109174250	70	109174300	95	109174359
25	109174219	50	109174268	75	109174318	100	109174367

SM SC to SC (1 to 1)

Length	Comcode	Length	Comcode	Length	Comcode	Length	Comcode
3	109174383						
5	109174391	30	109174441	55	109174490	80	109174540
10	109174409	35	109174458	60	109174508	85	109174557
15	109174417	40	109174466	65	109174516	90	109174565
20	109174425	45	109174474	70	109174524	95	109174573
25	109174433	50	109174482	75	109174532	100	109174581

SM SC to FC (1 to 1)

Length	Comcode	Length	Comcode	Length	Comcode	Length	Comcode
3	109174599						

5	10917407	30	109174656	55	109174706	80	109174755
10	109174615	35	109174664	60	109174714	85	109174763
15	109174623	40	109174672	65	109174722	90	109174771
20	109174631	45	109174680	70	109174730	95	109174789
25	109174649	50	109174698	75	109174748	100	109174797

<div align="center">SM SC to ST (1 to 1)</div>

Length	Comcode	Length	Comcode	Length	Comcode	Length	Comcode
3	109174805						
5	109174813	30	109174862	55	109174912	80	109174961
10	109174821	35	109174870	60	109174920	85	109174979
15	109174839	40	109174888	65	109174938	90	109174987
20	109174847	45	109174896	70	109174946	95	109174995
25	109174854	50	109174904	75	109174953	100	109175000

<div align="center">SM SC to DIN (1 to 1)</div>

Length	Comcode	Length	Comcode	Length	Comcode	Length	Comcode
3	109175018						
5	109175026	30	109175075	55	109175125	80	109175174
10	109175034	35	109175083	60	109175133	85	109175182
15	109175042	40	109175091	65	109175141	90	109175190
20	109175059	45	109175109	70	109175158	95	109175208
25	109175067	50	109175117	75	109175166	100	109175216

Multi Mode 62.5/125

Break-out cables, LC 45° (12x) to *x* 180° (12x)

Important! *x* = connector types (LC, SC, FC, ST, DIN, E-2000)

Cable Data

Type	MM-minicord BreakOut cable 62.5/125, 12 Fibers /CDGL-LGMC-012B-LRX 12 62	Remarks
Diameter Cable	7.7 mm	Lucent

Diameter Fiber	1.6 mm		Lucent
Code	LGMC-012B-LRX — 107843658		Lucent
Connectors	LC (45°) to LC, SC, FC, ST, DIN (180°)		

MM LC to LC (12 to 12)

Length	Comcode	Length	Comcode	Length	Comcode	Length	Comcode
3	109165779						
5	109161422	30	109161471	55	109161521	80	109161570
10	109161430	35	109161489	60	109161539	85	109161588
15	109161448	40	109161497	65	109161547	90	109161596
20	109161455	45	109161505	70	109161554	95	109161604
25	109161463	50	109161513	75	109161562	100	109161612

MM LC to SC (12 to 12)

Length	Comcode	Length	Comcode	Length	Comcode	Length	Comcode
5	109161620	30	109161679	55	109161729	80	109161786
10	109161638	35	109161687	60	109161737	85	109161794
15	109161646	40	109161695	65	109161752	90	109161802
20	109161653	45	109161703	70	109161760	95	109161810
25	109161661	50	109161711	75	109161778	100	109161828

MM LC to FC (12 to 12)

Length	Comcode	Length	Comcode	Length	Comcode	Length	Comcode
5	109161836	30	109161885	55	109161935	80	109161984
10	109161844	35	109161893	60	109161943	85	109161992
15	109161851	40	109161901	65	109161950	90	109162008
20	109161869	45	109161919	70	109161968	95	109162016
25	109161877	50	109161927	75	109161976	100	109162024

MM LC to ST (12 to 12)

Length	Comcode	Length	Comcode	Length	Comcode	Length	Comcode

5	109162032	30	109162081	55	109162131	80	109162180
10	109162040	35	109162099	60	109162149	85	109162198
15	109162057	40	109162107	65	109162156	90	109162206
20	109162065	45	109162115	70	109162164	95	109162214
25	109162073	50	109162123	75	109162172	100	109162222

MM LC to DIN (12 to 12)

Length	Comcode	Length	Comcode	Length	Comcode	Length	Comcode
5	109162230	30	109162289	55	109162339	80	109162388
10	109162248	35	109162297	60	109162347	85	109162396
15	109162255	40	109162305	65	109162354	90	109162404
20	109162263	45	109162313	70	109162362	95	109162412
25	109162271	50	109162321	75	109162370	100	109162420

Break-out cables, LC 45° (12x) to *x* 45° (12x)

Cable Data

Type	MM-minicord BreakOut cable 62.5/125, 12 Fibers /CDGL-LGMC-012B-LRX 12 62	Remarks
Diameter Cable	7.7 mm	Lucent
Diameter Fiber	1.6 mm	Lucent
Code	LGMC-012B-LRX — 107843658	Lucent
Connectors	LC (45°) to LC (45°)	

MM LC to LC (1 to 1)

Length	Comcode	Length	Comcode	Length	Comcode	Length	Comcode
3	109165746						

Simplex Cables, 45° (1x) to *x* 180° (1x)

Important! *x* = connector types (LC, SC, FC, ST, DIN, E-2000)

Cable Data

Type	MM-Simplex cable 62.5/125
Diam-eter	2.2 mm
Diam-eter fiber	2.0 mm
Code	see next tables
Con-nec-tors	LC (45°) to LC, SC, FC, ST, Beige DIN (180°)

MM LC to LC (1 to 1)

Length	Comcode	Length	Comcode	Length	Comcode	Length	Comcode
3	109165761						
5	109162438	30	109162487	55	109162537	80	109162586
10	109162446	35	109162495	60	109162545	85	109162594
15	109162453	40	109162503	65	109162552	90	109162602
20	109162461	45	109162511	70	109162560	95	109162610
25	109162479	50	109162529	75	109162578	100	109161628

MM LC to SC (1 to 1)

Length	Comcode	Length	Comcode	Length	Comcode	Length	Comcode
5	109162636	30	109162693	55	109162750	80	109162800
10	109162651	35	109162701	60	109162768	85	109162818
15	109162669	40	109162719	65	109162776	90	109162826
20	109162677	45	109162727	70	109162784	95	109162842
25	109162685	50	109162743	75	109162792	100	109162859

MM LC to FC (1 to 1)

Length	Comcode	Length	Comcode	Length	Comcode	Length	Comcode
5	109162883	30	109162933	55	109162982	80	109163030
10	109162891	35	109162941	60	109162990	85	109163048
15	109162909	40	109162958	65	109163006	90	109163055

| 20 | 109162917 | 45 | 109162966 | 70 | 109163014 | 95 | 109163063 |
| 25 | 109162925 | 50 | 109162974 | 75 | 109163022 | 100 | 109163089 |

MM LC to ST (1 to 1)

Length	Comcode	Length	Comcode	Length	Comcode	Length	Comcode
5	109163097	30	109163147	55	109163196	80	109163253
10	109163105	35	109163154	60	109163204	85	109163261
15	109163113	40	109163162	65	109163212	90	109163279
20	109163121	45	109163170	70	109163238	95	109163287
25	109163139	50	109163188	75	109163246	100	109163295

MM LC to DIN (1 to 1)

Length	Comcode	Length	Comcode	Length	Comcode	Length	Comcode
5	109163303	30	109163352	55	109163402	80	109163451
10	109163311	35	109163360	60	109163410	85	109163469
15	109163329	40	109163378	65	109163428	90	109163477
20	109163337	45	109163386	70	109163436	95	109163485
25	109163345	50	109163394	75	109163444	100	109163493

Simplex Cables, 45°(1x) to *x* 45° (1x)

Cable Data

Type	MM-Simplex cable 62.5/125	
Diameter	2.2 mm	
Diameter fiber	2.0 mm	
Code	see next table	
Connectors	LC (45°) to LC (45	Beige

MM LC to LC (1 to 1)

Length	Comcode	Length	Comcode	Length	Comcode	Length	Comcode

3   109165753

LC Attenuators

Fiber Type	SM
Attenuator Type	LC Modular Adapter used with A1LC-BASE — 108265950
Tolerance at 1550 nm	AALCS-00.5 – AALCS-10.0 — ±0.25 dB AALCS-11.0 – AALCS-20.0 — ±0.50 dB
List of Attenuators	List

Product Code	Nominal Loss dB	COMCODE
AALCS-00.5	0.5	108355363
AALCS-01.0	1	108355371
AALCS-01.5	1.5	108355389
AALCS-02.0	2	108349457
AALCS-02.5	2.5	108349440
AALCS-03.0	3	108288481
AALCS-03.5	3.5	108288440
AALCS-04.0	4	108357963
AALCS-04.5	4.5	108357971
AALCS-05.0	5	108288473
AALCS-05.5	5.5	108357989
AALCS-06.0	6	108349432
AALCS-06.5	6.5	108357997
AALCS-07.0	7	108288465
AALCS-07.5	7.5	108358003
AALCS-08.0	8	108358011
AALCS-08.5	8.5	108358029
AALCS-09.0	9	108358037
AALCS-09.5	9.5	108358045
AALCS-10.0	10	108288457
AALCS-11.0	11	108358078

Product Code	Nominal Loss dB	COMCODE
AALCS-12.0	12	108358094
AALCS-13.0	13	108358128
AALCS-14.0	14	108358144
AALCS-15.0	15	108358169
AALCS-18.0	18	108358193
AALCS-19.0	19	108358201
AALCS-20.0	20	108358219

LambdaUnite™ MSS Specifications Optical Circuit-Pack

OP2G5   *The following OP2G5 Optical Circuit Packs are:*

Optical Circuit Packs	Wavelength (nanometers)	Fiber Type Core diameter (microns)	Output Power (milliwatts)	Laser Class (FDA/IEC)
OP2G5 / 1.3SR4 (KFA 12), 2km — 109000265	1310	SM (9.0/125)	0.5 (max)	1/1

OP10   *The following OP10 Optical Circuit Packs are:*

Optical Circuit Packs	Wavelength (nanometers)	Fiber Type Core diameter (microns)	Output Power (milliwatts)	Laser Class (FDA/IEC)
OP10 / 1.5LR1 (KFA 6), 80 km — 109000208	1550	SM (9.0/125)	2	I/1
OP10 / 1.3IOR1 (KFA 7), 600 m — 109000216	1310	SM (9.0/125)	0.794	I/1
OP10 / 1.5IR1 (KFA14) — 109077073	1550	SM(9.0/125)	1.585	I/1

The following OP10 – 800G Optical Circuit Packs (80x)s are:

Optical Circuit Packs	Wavelength (nanometers)	Fiber Type Core diameter (microns)	Output Power (milliwatts)	Laser Class (FDA/IEC)
OP10 / 01 / 800G (KFA9) — 109000232	1530.72	SM (9.0/125)	1.585	I/1
OP10 / 02 / 800G (KFA81) — 109006155	1531.12	SM (9.0/125)	1.585	I/1
OP10 / 03 / 800G (KFA82) — 109006163	1531.51	SM (9.0/125)	1.585	I/1
OP10 / 04 / 800G (KFA83) — 109006171	1531.90	SM (9.0/125)	1.585	I/1
OP10 / 05 / 800G (KFA84) — 109006189	1532.29	SM (9.0/125)	1.585	I/1
OP10 / 06 / 800G (KFA85) — 109006197	1532.68	SM (9.0/125)	1.585	I/1

Optical Circuit Packs	Wavelength (nanometers)	Fiber Type Core diameter (microns)	Output Power (milliwatts)	Laser Class (FDA/IEC)
OP10 / 07 / 800G (KFA86) — 109006205	1533.07	SM (9.0/125)	1.585	I/1
OP10 / 08 / 800G (KFA87) — 109006213	1533.47	SM (9.0/125)	1.585	I/1
OP10 / 09 / 800G (KFA88) — 109006221	1533.86	SM (9.0/125)	1.585	I/1
OP10 / 10 / 800G (KFA89) — 109006247	1534.25	SM (9.0/125)	1.585	I/1
OP10 / 11 / 800G (KFA90) — 109006262	1534.64	SM (9.0/125)	1.585	I/1
OP10 / 12 / 800G (KFA91) — 109006270	1535.04	SM (9.0/125)	1.585	I/1
OP10 / 13 / 800G (KFA92) — 109006288	1535.43	SM (9.0/125)	1.585	I/1
OP10 / 14 / 800G (KFA93) — 109006296	1535.82	SM (9.0/125)	1.585	I/1
OP10 / 15 / 800G (KFA94) — 109006304	1536.22	SM (9.0/125)	1.585	I/1
OP10 / 16 / 800G (KFA95) — 109006312	1536.61	SM (9.0/125)	1.585	I/1
OP10 / 17 / 800G (KFA96) — 109006320	1537.00	SM (9.0/125)	1.585	I/1
OP10 / 18 / 800G (KFA97) — 109006338	1537.40	SM (9.0/125)	1.585	I/1
OP10 / 19 / 800G (KFA98) — 109006346	1537.79	SM (9.0/125)	1.585	I/1
OP10 / 20 / 800G (KFA99) — 109006353	1538.19	SM (9.0/125)	1.585	I/1
OP10 / 21 / 800G (KFA100) — 109006361	1538.58	SM (9.0/125)	1.585	I/1
OP10 / 22 / 800G (KFA 101) — 109006379	1539.98	SM (9.0/125)	1.585	I/1
OP10 / 23 / 800G (KFA 102) — 109006387	1539.37	SM (9.0/125)	1.585	I/1

Optical Circuit Packs	Wavelength (nanometers)	Fiber Type Core diameter (microns)	Output Power (milliwatts)	Laser Class (FDA/IEC)
OP10 / 24 / 800G (KFA 103) — 109006395	1539.77	SM (9.0/125)	1.585	I/1
OP10 / 25 / 800G (KFA 104) — 109006403	1540.16	SM (9.0/125)	1.585	I/1
OP10 / 26 / 800G (KFA 105) — 109006411	1540.56	SM (9.0/125)	1.585	I/1
OP10 / 27 / 800G (KFA 106) — 109006429	1540.95	SM (9.0/125)	1.585	I/1
OP10 / 28 / 800G (KFA 107) — 109006437	1541.35	SM (9.0/125)	1.585	I/1
OP10 / 29 / 800G (KFA 108) — 109006445	1541.75	SM (9.0/125)	1.585	I/1
OP10 / 30 / 800G (KFA 109) — 109006452	1542.14	SM (9.0/125)	1.585	I/1
OP10 / 31 / 800G (KFA 110) — 109006460	1542.54	SM (9.0/125)	1.585	I/1
OP10 / 32 / 800G (KFA 111) — 109006478	1542.94	SM (9.0/125)	1.585	I/1
OP10 / 33 / 800G (KFA 112) — 109006486	1543.33	SM (9.0/125)	1.585	I/1
OP10 / 34 / 800G (KFA 113) — 109006494	1543.73	SM (9.0/125)	1.585	I/1
OP10 / 35 / 800G (KFA 114) — 109006502	1544.13	SM (9.0/125)	1.585	I/1
OP10 / 36 / 800G (KFA 115) — 109006510	1544.53	SM (9.0/125)	1.585	I/1
OP10 / 37 / 800G (KFA 116) — 109006528	1544.92	SM (9.0/125)	1.585	I/1
OP10 / 38 / 800G (KFA 117) — 109006536	1545.32	SM (9.0/125)	1.585	I/1
OP10 / 39 / 800G (KFA 118) — 109006544	1545.72	SM (9.0/125)	1.585	I/1
OP10 / 40 / 800G (KFA 119) — 109006551	1546.12	SM (9.0/125)	1.585	I/1

Optical Circuit Packs	Wavelength (nanometers)	Fiber Type Core diameter (microns)	Output Power (milliwatts)	Laser Class (FDA/IEC)
OP10 / 41 / 800G (KFA 120) — 109006569	1546.52	SM (9.0/125)	1.585	I/1
OP10 / 42 / 800G (KFA121) — 109006585	1546.92	SM (9.0/125)	1.585	I/1
OP10 / 43 / 800G (KFA122) — 109006593	1547.32	SM (9.0/125)	1.585	I/1
OP10 / 44 / 800G (KFA123) — 109006601	1547.72	SM (9.0/125)	1.585	I/1
OP10 / 45 / 800G (KFA124) — 109006619	1548.11	SM (9.0/125)	1.585	I/1
OP10 / 46 / 800G (KFA125) — 109006627	1548.50	SM (9.0/125)	1.585	I/1
OP10 / 47 / 800G (KFA126) — 109006635	1548.91	SM (9.0/125)	1.585	I/1
OP10 / 48 / 800G (KFA127) — 109006643	1549.32	SM (9.0/125)	1.585	I/1
OP10 / 49 / 800G (KFA128) — 109006650	1549.72	SM (9.0/125)	1.585	I/1
OP10 / 50 / 800G (KFA129) — 109008540	1550.12	SM (9.0/125)	1.585	I/1
OP10 / 51 / 800G (KFA130) — 109008557	1550.52	SM (9.0/125)	1.585	I/1
OP10 / 52 / 800G (KFA131) — 109008565	1550.92	SM (9.0/125)	1.585	I/1
OP10 / 53 / 800G (KFA132) — 109008573	1551.32	SM (9.0/125)	1.585	I/1
OP10 / 54 / 800G (KFA133) — 109008581	1551.72	SM (9.0/125)	1.585	I/1
OP10 / 55 / 800G (KFA134) — 109008599	1552.12	SM (9.0/125)	1.585	I/1
OP10 / 56 / 800G (KFA135) — 109008607	1552.52	SM (9.0/125)	1.585	I/1
OP10 / 57 / 800G (KFA136) — 109008615	1552.93	SM (9.0/125)	1.585	I/1

Optical Circuit Packs	Wavelength (nanometers)	Fiber Type Core diameter (microns)	Output Power (milliwatts)	Laser Class (FDA/IEC)
OP10 / 58 / 800G (KFA137) — 109008623	1553.33	SM (9.0/125)	1.585	I/1
OP10 / 59 / 800G (KFA138) — 109008631	1553.73	SM (9.0/125)	1.585	I/1
OP10 / 60 / 800G (KFA139) — 109008649	1554.13	SM (9.0/125)	1.585	I/1
OP10 / 61 / 800G (KFA140) — 109008656	1554.54	SM (9.0/125)	1.585	I/1
OP10 / 62 / 800G (KFA 141) — 109008672	1554.94	SM (9.0/125)	1.585	I/1
OP10 / 63 / 800G (KFA 142) — 109008680	1555.34	SM (9.0/125)	1.585	I/1
OP10 / 64 / 800G (KFA 143) — 109008698	1555.75	SM (9.0/125)	1.585	I/1
OP10 / 65 / 800G (KFA 144) — 109008706	1556.15	SM (9.0/125)	1.585	I/1
OP10 / 66 / 800G (KFA 145) — 109008714	1556.56	SM (9.0/125)	1.585	I/1
OP10 / 67 / 800G (KFA 146) — 109008722	1556.96	SM (9.0/125)	1.585	I/1
OP10 / 68 / 800G (KFA 147) — 109008730	1557.36	SM (9.0/125)	1.585	I/1
OP10 / 69 / 800G (KFA 148) — 109008748	1557.77	SM (9.0/125)	1.585	I/1
OP10 / 70 / 800G (KFA 149) — 109008755	1558.17	SM (9.0/125)	1.585	I/1
OP10 / 71 / 800G (KFA 150) — 109008763	1558.58	SM (9.0/125)	1.585	I/1
OP10 / 72 / 800G (KFA 151) — 109008771	1558.98	SM (9.0/125)	1.585	I/1
OP10 / 73 / 800G (KFA 152) — 109008789	1559.39	SM (9.0/125)	1.585	I/1
OP10 / 74 / 800G (KFA 153) — 109008797	1559.79	SM (9.0/125)	1.585	I/1

Optical Circuit Packs	Wavelength (nanometers)	Fiber Type Core diameter (microns)	Output Power (milliwatts)	Laser Class (FDA/IEC)
OP10 / 75 / 800G (KFA 154) — 109008805	1560.20	SM (9.0/125)	1.585	I/1
OP10 / 76 / 800G (KFA 155) — 109008813	1560.61	SM (9.0/125)	1.585	I/1
OP10 / 77 / 800G (KFA 156) — 109008821	1561.01	SM (9.0/125)	1.585	I/1
OP10 / 78 / 800G (KFA 157) — 109008839	1561.42	SM (9.0/125)	1.585	I/1
OP10 / 79 / 800G (KFA 158) — 109008847	1561.83	SM (9.0/125)	1.585	I/1
OP10 / 80 / 800G (KFA 159) — 109008854	1562.23	SM (9.0/125)	1.585	I/1

The following OP10 – DWDM Optical Circuit Packs (16x) are:

Optical Circuit Packs	Wavelength (nanometers)	Fiber Type Core diameter (microns)	Output Power (milliwatts)	Laser Class (FDA/IEC)
OP10 / 01 / DWDM (KFA11) — 109000257	1530.33	SM (9.0/125)	2.512	I/1
OP10 / 02 / DWDM (KFA61) — 109005892	1531.90	SM (9.0/125)	2.512	I/1
OP10 / 03 / DWDM (KFA62) — 109005900	1533.47	SM (9.0/125)	2.512	I/1
OP10 / 04 / DWDM (KFA63) — 109005918	1535.04	SM (9.0/125)	2.512	I/1
OP10 / 05 / DWDM (KFA64) — 109005926	1538.19	SM (9.0/125)	2.512	I/1
OP10 / 06 / DWDM (KFA65) — 109005934	1539.77	SM (9.0/125)	2.512	I/1
OP10 / 07 / DWDM (KFA66) — 109005942	1541.35	SM (9.0/125)	2.512	I/1
OP10 / 08 / DWDM (KFA67) — 109005959	1542.94	SM (9.0/125)	2.512	I/1
OP10 / 09 / DWDM (KFA68) — 109005967	1547.72	SM (9.0/125)	2.512	I/1

Optical Circuit Packs	Wavelength (nanometers)	Fiber Type Core diameter (microns)	Output Power (milliwatts)	Laser Class (FDA/IEC)
OP10 / 10 / DWDM (KFA69) — 109005975	1549.43	SM (9.0/125)	2.512	I/1
OP10 / 11 / DWDM (KFA70) — 109005983	1550.92	SM (9.0/125)	2.512	I/1
OP10 / 12 / DWDM (KFA71) — 109005991	1552.52	SM (9.0/125)	2.512	I/1
OP10 / 13 / DWDM (KFA72) — 109006007	1555.75	SM (9.0/125)	2.512	I/1
OP10 / 14 / DWDM (KFA73) — 109006015	1557.36	SM (9.0/125)	2.512	I/1
OP10 / 15 / DWDM (KFA74) — 109006023	1558.98	SM (9.0/125)	2.512	I/1
OP10 / 16 / DWDM (KFA75) — 109006031	1560.61	SM (9.0/125)	2.512	I/1

GE 1   *The following GE1 Optical Circuit Packs are:*

Optical Circuit Packs	Wavelength (nanometers)	Fiber Type Core diameter (microns)	Output Power (milliwatts)	Laser Class (FDA/IEC)
GE1 (KFA 13) — 109000273	850	MM (62.5/125)	0.4	I/1

Glossary

μ
Microns

NUMERICS

0x1 Line Operation

0x1 means unprotected operation. The connection between network elements has one bidirectional line (no protection line).

1+1 Line Protection

A protection architecture in which the transmitting equipment transmits a valid signal on both the working and protection lines. The receiving equipment monitors both lines. Based on performance criteria and OS control, the receiving equipment chooses one line as the active line and designates the other as the standby line.

1xN Equipment Protection

1xN protection pertains to N number of circuit pack/port units protected by one circuit pack or port unit. When a protection switch occurs, the working signals are routed from the failed pack to the protection pack. When the fault clears, the signals revert to the working port unit.

12NC (12-digit Numerical Code)

Used to uniquely identify an item or product. The first ten digits uniquely identify an item. The eleventh digit is used to specify the particular variant of an item. The twelfth digit is used for the revision issue. Items with the first eleven digits the same, are functionally equal and may be exchanged.

A   ABN

Abnormal (condition)

ABS (Absent)

Used to indicate that a given circuit pack is not installed.

AC

Alternating Current

ACO (Alarm Cut-Off)

A button on the user panel used to silence audible alarms.

ACT (Active)

Used to indicate that a circuit pack or module is in-service and currently providing service functions.

Adaptive-rate tributary operation of a port (Pipe mode)

Mode of operation of a port in which tributaries are *not* explicitly provisioned for the expected signal rates. The signal rates are automatically identified.

ADM (Add/Drop Multiplexer)

The term for a synchronous network element capable of combining signals of different rates and having those signals added to or dropped from the stream.

AEL

Accessible Emission Limits

Agent

Performs operations on managed objects and issues events on behalf of these managed objects. All SDH managed objects will support at least an agent. Control of distant agents is possible via local "Managers".

AGNE

Alarm Gateway Network Element

AID (Access Identifier)

A technical specification for explicitly naming entities (both physical and logical) of an NE using a grammar comprised of ASCII text, keywords, and grammar rules.

AIS (Alarm Indication Signal)

A code transmitted downstream in a digital network that indicates that an upstream failure has been detected and alarmed if the upstream alarm has not been suppressed.

AITS

Acknowledged Information Transfer Service: Confirmed mode of operation of the LAPD protocol.

Alarm

Visible or audible signal indicating that an equipment failure or significant event/condition has occurred.

Alarm Correlation

The search for a directly-reported alarm that can account for a given symptomatic condition.

Alarm Severity

An attribute defining the priority of the alarm message. The way alarms are processed depends on the severity.

Alarm Suppression

Selective removal of alarm messages from being forwarded to the GUI or to network management layer OSs.

Alarm Throttling

A feature that automatically or manually suppresses autonomous messages that are not priority alarms.

Aligning

Indicating the head of a virtual container by means of a pointer, for example, creating an Administrative Unit (AU) or a Tributary Unit (TU).

AMI (Alternate Mark Inversion)

A line code that employs a ternary signal to convert binary digits, in which successive binary ones are represented by signal elements that are normally of alternative positive and negative polarity but equal in amplitude and in which binary zeros are represented by signal elements that have zero amplitude.

Anomaly

A difference between the actual and desired operation of a function.

ANSI

American National Standard Institute

APD

Avalanche Photo Diode

APS (Automatic Protection Switch)

A protection switch that occurs automatically in response to an automatically detected fault condition.

ASCII (American Standard Code for Information Interchange)

A standard 7-bit code that represents letters, numbers, punctuation marks, and special characters in the interchange of data among computing and communications equipment.

ASN.1

Abstract Syntax Notation 1

Assembly

Gathering together of payload data with overhead and pointer information (an indication of the direction of the signal).

Association

A logical connection between manager and agent through which management information can be exchanged.

Assy

Assembly

Asynchronous

The essential characteristic of time-scales or signals such that their corresponding significant instants do not necessarily occur at the same average rate.

ATM (Asynchronous Transfer Mode)

A high-speed transmission technology characterized by high bandwidth and low delay. It utilizes a packet switching and multiplexing technique which allocates bandwidth on demand.

Attribute

Alarm indication level: critical, major, minor, or no alarm.

AU (Administrative Unit)

Carrier for TUs.

AU PTR (Administrative Unit Pointer)

Indicates the phase alignment of the VC-N with respect to the STM-N frame. The pointer position is fixed with respect to the STM-N frame.

AUG

Administrative Unit Group

AUTO (Automatic)

One possible state of a port or slot. When a port is in the AUTO state and a good signal is detected, the port automatically enters the IS (in-service) state. When a slot is in the AUTO state and a circuit pack is detected, the slot automatically enters the EQ (equipped) state.

Autolock

Action taken by the system in the event of circuit pack failure/trouble. System switches to protection and prevents a return to the working circuit pack even if the trouble clears. Multiple protection switches on a circuit pack during a short period of time cause the system to autolock the pack.

AVAIL

Available

....

AWG

American Wire Gauge

B **Bandwidth**

The difference in Hz between the highest and lowest frequencies in a transmission channel. The data rate that can be carried by a given communications circuit.

Baud Rate

Transmission rate of data (bits per second) on a network link.

BDFB

Battery Distribution and Fuse Bay

BER (Bit Error Rate)

The ratio of error bits received to the total number of bits transmitted.

Bidirectional Line

A transmission path consisting of two fibers that handle traffic in both the transmit and receive directions.

Bidirectional Ring

A ring in which both directions of traffic between any two nodes travel through the same network elements (although in opposite directions).

Bidirectional Switch

Protection switching performed in both the transmit and receive directions.

BIP-N (Bit Interleaved Parity-N)

A method of error monitoring over a specified number of bits (BIP-3 or BIP-8).

Bit

The smallest unit of information in a computer, with a value of either 0 or 1.

Bit Error Rate Threshold

The point at which an alarm is issued for bit errors.

BLD OUT LG

Build-Out Lightguide

Bridge Cross-Connection

The setting up of a cross-connection leg with the same input tributary as that of an existing cross-connection leg. Thus, forming a 1:2 bridge from an input tributary to two output tributaries.

Broadband Communications
Voice, data, and/or video communications at greater than 2 Mbit/s rates.

Broadband Service Transport
STM-1 concatenation transport over the *LambdaUnite*™ MSS for ATM applications.

Byte
Refers to a group of eight consecutive binary digits.

C **C**
Container

CAT5
Category 5 cable

CC
Cross Connect

CE
The CE marking indicates that the products conform to relevant European Community (EC)
Directives

Cell Relay
Fixed-length cells. For example, ATM with 53 octets.

CEPT
Conférence Européenne des Administrations des Postes et des Télécommunications

Channel
A sub-unit of transmission capacity within a defined higher level of transmission capacity.

CI-CTL
Customer Interface of the Controller

Circuit
A set of transmission channels through one or more network elements that provides transmission
of signals between two points, to support a single communications path.

CIT or *LambdaUnite* CIT (Craft Interface Terminal)
The user interface terminal used by craft personnel to communicate with a network element.

CL
Clear

CLEI

Common Language Equipment Identifier

Client

Computer in a computer network that generally offers a user interface to a server.

CLLI

Common Language Location Identifier

Closed Ring Network

A network formed of a ring-shaped configuration of network elements. Each network element connects to two others, one on each side.

CM (Configuration Management)

Subsystem that configures the network and processes messages from the network.

CMI

Coded Mark Inversion

CMIP

Common Management Information Protocol. OSI standard protocol for OAM&P information exchange.

CMISE

Common Management Information Service Element

CO (Central Office)

A building where common carriers terminate customer circuits.

Co-Resident

A hardware configuration where two applications can be active at the same time independently on the same hardware and software platform without interfering with each others functioning.

Collocated

System elements that are located in the same location.

Command Group

An administrator-defined group that defines commands to which a user has access.

Concatenation

A procedure whereby multiple virtual containers are associated one with each other resulting in a combined capacity that can be used as a single container across which bit sequence integrity is maintained.

Correlation

A process where related hard failure alarms are identified.

CP

Circuit Pack

CPE

Customer Premises Equipment

CPU

Central Processing Unit

CR (Critical (alarm))

Alarm that indicates a severe, service-affecting condition.

CRC

Cyclical Redundancy Check

Cross-Connect Map

Connection map for an SDH Network Element; contains information about how signals are connected between high speed time slots and low speed tributaries.

Crosstalk

An unwanted signal introduced into one transmission line from another.

CSA

CSA marking indicates that the poducts conform to relevant America and Canadian Directives.

CSMA/CD

Carrier Sense Multiple Access with Collision Detection

CTL

System Controller

CTS

Customer Technical Support within Lucent Technologies

Current Value

The value currently assigned to a provisionable parameter.

D **D-SUB**

D-Subminiature

DACS/DCS

Digital Access Cross-Connect System

Data

A collection of system parameters and their associated values.

Database Administrator

A user who administers the database of the application.

dB

Decibels

DC

Direct Current

DCC (Data Communications Channel)

The embedded overhead communications channel in the synchronous line, used for end-to-end communications and maintenance. The DCC carries alarm, control, and status information between network elements in a synchronous network.

DCE (Data Communications Equipment)

The equipment that provides signal conversion and coding between the data terminating 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.

DCF

Data Communications Function; Dispersion Compensation Fiber

DCM (Dispersion Compensation Module)

A device used to compensate the dispersion, the pulse spreading properties of an optical fiber. DCMs are necessary for very-long-haul applications and high bit rates.

DCN

Data Communications Network

DCR

Direct Current Return

DCrtn

Direct Current return

Default

An operation or value that the system or application assumes, unless a user makes an explicit choice.

Default Provisioning

The parameter values that are pre-programmed as shipped from the factory.

Defect
A limited interruption of the ability of an item to perform a required function. It may or may not lead to maintenance action depending on the results of additional analysis.

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)
A device that splits a combined signal into individual signals at the receiver end of transmission.

Deprovisioning
The inverse order of provisioning. To manually remove/delete a parameter that has (or parameters that have) previously been provisioned.

Digital Link
A transmission span such as a point-to-point 2 Mbit/s, 34 Mbit/s, 140 Mbit/s, VC12, VC3 or VC4 link between controlled network elements.

Digital Multiplexer
Equipment that combines by time-division multiplexing several digital signals into a single composite digital signal.

Digital Section
A transmission span such as an STM-N signal. A digital section may contain multiple digital channels.

Disassembly
Splitting up a signal into its constituents as payload data and overhead (an indication of the direction of a signal).

Dispersion
Time-broadening of a transmitted light pulse.

Dispersion Shifted Optical Fiber
1330/1550 nm minimum dispersion wavelength.

Divergence
When there is unequal amplification of incoming wavelengths, the result is a power divergence between wavelengths.

DNI (Dual Node Ring Interworking)
A topology in which two rings are interconnected at two nodes on each ring and operate so that inter-ring traffic is not lost in the event of a node or link failure at an interconnecting point.

Doping

The addition of impurities to a substance in order to attain desired properties.

Downstream

At or towards the destination of the considered transmission stream, for example, looking in the same direction of transmission.

DPLL

Digital Phase Locked Loop

DRAM

Dynamic Random Access Memory

Drop and Continue

A circuit configuration that provides redundant signal appearances at the outputs of two network elements in a ring. Can be used for Dual Node Ring Interworking (DNI) and for video distribution applications.

Drop-Down Menu

A menu that is displayed from a menu bar.

DS1

1.5 Mbps interface

DSNE (Directory Service Network Element)

A designated Network Element that is responsible for administering a database that maps Network Elements names (node names) to addresses (node Id). There can be one DSNE per (sub)network.

DTE (Data Terminating Equipment)

The equipment that originates data for transmission and accepts transmitted data.

DTMF

Dual Tone Multifrequency

DUR

Dual Unit Row

DUS

Do not Use for Synchronization

DWDM

Dense Wavelength Division Multiplexing

E   E1

2 Mbps interface

EBER (Excessive Bit Error Rate)

The calculated average bit error rate over a data stream.

EC

European Community

ECC

Embedded Control Channel

EEPROM

Electrically Erasable and Programmable Read-Only Memory

EIA (Electronic Industries Association)

A trade association of the electronic industry that establishes electrical and functional standards.

EM (Event Management)

Subsystem of *Navis*™ Optical EMS that processes and logs event reports of the network.

EMC

Electro-Magnetic Compatibility

EMI (Electromagnetic Interference)

High-energy, electrically induced magnetic fields that cause data corruption in cables passing through the fields.

EMS

Element Management System

Entity

A specific piece of hardware (usually a circuit pack, slot, or module) that has been assigned a name recognized by the system.

Entity Identifier

The name used by the system to refer to a circuit pack, memory device, or communications link.

EPROM

Erasable Programmable Read-Only Memory

EQ (Equipped)

Status of a circuit pack or interface module that is in the system database and physically in the

frame, but not yet provisioned.

ES (Errored Seconds)
A performance monitoring parameter. ES "type A" is a second with exactly one error; ES "type B" is a second with more than one and less than the number of errors in a severely errored second for the given signal. ES by itself means the sum of the type A and type B ESs.

ESD
Electrostatic Discharge

ESP
Electrostatic Protection

Establish
A user initiated command, at the *LambdaUnite* CIT, to create an entity and its associated attributes in the absence of certain hardware.

ETSI
European Telecommunications Standards Institute

Event
A significant change. Events in controlled Network Elements include signal failures, equipment failures, signals exceeding thresholds, and protection switch activity. When an event occurs in a controlled Network Element, the controlled Network Element will generate an alarm or status message and send it to the management system.

Event Driven
A required characteristic of network element software system: NEs are reactive systems, primarily viewed as systems that wait for and then handle events. Events are provided by the external interface packages, the hardware resource packages, and also by the software itself.

Externally Timed
An operating condition of a clock in which it is locked to an external reference and is using time constants that are altered to quickly bring the local oscillator's frequency into approximate agreement with the synchronization reference frequency.

Extra traffic
Unprotected traffic that is carried over protection channels when their capacity is not used for the protection of working traffic.

F   Fault
Term used when a circuit pack has a hard (not temporary) fault and cannot perform its normal function.

Fault Management

Collecting, processing, and forwarding of autonomous messages from network elements.

FCC

Federal Communications Commission

FDA/CDRH

The Food and Drug Administration's Center for Devices and Radiological Health.

FDDI (Fiber Distributed Data Interface)

Fiber interface that connects computers and distributes data among them.

FE (Far End)

Any other network element in a maintenance subnetwork other than the one the user is at or working on. Also called remote.

FEBE (Far-End Block Error)

An indication returned to the transmitting node that an errored block has been detected at the receiving node. A block is a specified grouping of bits.

FEC (Forward Error Correction)

An error correction technique in which redundant bits are added to the payload signal enabling the receiving station to detect and correct bit errors that unavoidably occur when an optical line signal is transmitted over longer distances over an optical fiber. FEC is used to increase the transmission span length.

FEPROM (Flash EPROM)

A technology that combines the non-volatility of EPROM with the in-circuit re-programmability of EEPROM.

FERF (Far-End Receive Failure)

An indication returned to a transmitting Network Element that the receiving Network Element has detected an incoming section failure. Also known as RDI.

FIT (Failures in Time)

Circuit pack failure rates per 10^9 hours as calculated using the method described in Reliability Prediction Procedure for Electronic Equipment, BellCore Method I, Issue 6, December 1997.

Fixed-rate tributary operation of a port

Mode of operation of a port in which tributaries are provisioned for the expected signal rates. This provisioning information is used for cross-connection rate validation and for alarm handling (for example "Loss of Pointer").

Folded Rings

Folded (collapsed) rings are rings without fiber diversity. The terminology derives from the image of folding a ring into a linear segment.

Forced

Term used when a circuit pack (either working or protection) has been locked into a service-providing state by user command.

FR (Frame Relay)

A form of packet switching that relies on high-quality phone lines to minimize errors. It is very good at handling high-speed, bursty data over wide area networks. The frames are variable lengths and error checking is done at the end points.

Frame

The smallest block of digital data being transmitted.

Framework

An assembly of equipment units capable of housing shelves, such as a bay framework.

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.

G   GB

Gigabytes

Gbit/s

Gigabits per second

GE

Gigabit Ethernet

GHz

Gigahertz

Global Wait to Restore Time

Corresponds to the time to wait before switching back to the timing reference. It occurs after a timing link failure has cleared. This time applies for all timing sources in a system hence the name global. This can be between 0 and 60 minutes, in increments of one minute.

GND

Ground

GNE (Gateway Network Element)

A network element that passes information between other network elements and management systems through a data communication network.

Grooming

In telecommunications, the process of separating and segregating channels, as by combing, such that the broadest channel possible can be assembled and sent across the longest practical link. The aim is to minimize de-multiplexing traffic and reshuffling it electrically.

H   Hard Failure

An unrecoverable non-symptomatic (primary) failure that causes signal impairment or interferes with critical network functions, such as DCC operation.

HDB3 (High Density Bipolar 3 Code)

Line code for 2 Mbit/s transmission systems.

HDLC (High Level Data Link Control)

OSI reference model datalink layer protocol.

HMI

Human Machine Interface

HML (Human Machine Language)

A standard language developed by the ITU for describing the interaction between humans and dumb terminals.

HO

High Order

Holdover

An operating condition of a clock in which its local oscillator is not locked to an external reference but is using storage techniques to maintain its accuracy with respect to the last known frequency comparison with a synchronization reference.

Hot Standby

A circuit pack ready for fast, automatic placement into operation to replace an active circuit pack. It has the same signal as the service going through it, so that choice is all that is required.

HPA (Higher Order Path Adaptation)

Function that adapts a lower order Virtual Container to a higher order Virtual Container by processing the Tributary Unit pointer which indicates the phase of the lower order Virtual Container Path Overhead relative to the higher order Virtual Container Path Overhead and assembling/disassembling the complete higher order Virtual Container.

HPC (Higher Order Path Connection)

Function that provides for flexible assignment of higher order Virtual Containers within an STM-N signal.

HPT (Higher Order Path Termination)

Function that terminates a higher order path by generating and adding the appropriate Virtual Container Path Overhead to the relevant container at the path source and removing the Virtual Container Path Overhead and reading it at the path sink.

HS
High Speed

HW
Hardware

Hz
Hertz

I **I/O**
Input/Output

IAO LAN
Intraoffice Local Area Network

ID
Identifier

IEC
International Electrotechnical Commission

IEEE
Institute of Electrical and Electronics Engineers

IMF
Infant Mortality Factor

IN
Receive

Insert
To physically insert a circuit pack into a slot, thus causing a system initiated restore of an entity into service and/or creation of an entity and associated attributes.

Interface Capacity
The total number of STM-1 equivalents (bidirectional) tributaries in all transmission interfaces with which a given transmission interface shelf can be equipped at one time. The interface capacity varies with equipage.

Intermediate System (IS)

A system which routes/relays management information. An SDH Network Element may be a combined intermediate and end system.

IS (In-Service)

A memory administrative state for ports. IS refers to a port that is fully monitored and alarmed.

IS-IS Routing

The Network Elements in a management network, route packets (data) between each other using an IS-IS level protocol. The size of a network running IS-IS Level 1 is limited, and therefore certain mechanisms are employed to facilitate the management of larger networks.
For STATIC ROUTING, the capability exists for disabling the protocol over the LAN connections, effectively causing the management network to be partitioned into separate IS-IS Level 1 areas. In order for the network management system to communicate with a specific Network Element in one of these areas, the network management system must identify through which so-called Gateway Network Element this specific Network Element is connected to the LAN. All packets to this specific Network Element are routed directly to the Gateway Network Element by the network management system, before being re-routed (if necessary) within the Level 1 area.
For DYNAMIC ROUTING an IS-IS Level 2 routing protocol is used allowing a number of Level 1 areas to interwork. The Network Elements which connect an IS-IS area to another area are set to run the IS-IS Level 2 protocol within the Network Element and on the connection between other Network Elements. Packets can now be routed between IS-IS areas and the network management system does not have to identify the Gateway Network Elements.

ISDN

Integrated Services Digital Network

ITM

Integrated Transport Management

ITM-NM

Integrated Transport Management Network Module

ITU

International Telecommunication Union (formally known as CCITT)

J   Jitter

Short term variations of amplitude and frequency components of a digital signal from their ideal position in time.

K   kbit/s

Kilobits per second

KFA XX

Apparatus code of circuit packs

L   *LambdaUnite* **OLS 1.6T (400G/800G)**

LambdaUnite Optical Line System 1.6 Terabit/s (400Gbit/s/800Gbit/s)

LAN (Local Area Network)

A communications network that covers a limited geographic area, is privately owned and user administered, is mostly used for internal transfer of information within a business, is normally contained within a single building or adjacent group of buildings, and transmits data at a very rapid speed.

LAPD (Link Access Procedure D-bytes)

Protocol used on Data Link Layer (OSI layer two) according to ITU-T Q.921.

LBC

Laser Bias Current

LBFC

Laser Backface Currents

LBO (Lightguide Build-Out)

An attenuating (signal-reducing) element used to keep an optical output signal strength within desired limits.

LCN

Local Communications Network

LCS

Local Customer Support

LED

Light-Emitting Diode

LH

Long Haul

Line

A transmission medium, together with the associated equipment, required to provide the means of transporting information between two consecutive network elements. One network element originates the line signal; the other terminates it.

Line Protection

The optical interfaces can be protected by line protection. Line protection switching protects against failures of line facilities, including the interfaces at both ends of a line, the optical fibers, and any equipment between the two ends. Line protection includes protection of equipment failures.

Line Timing

Refers to a network element that derives its timing from an incoming STM-N signal.

Link

The mapping between in-ports and out-ports. It specifies how components are connected to one another.

LL

Lucent Learning (former CTIP)

LO

Low Order

Location

An identifier for a specific circuit pack, interface module, interface port, or communications link.

Lockout of Protection

The *LambdaUnite* CIT command that prevents the system from switching traffic to the protection line from a working line. If the protection line is active when a "Lockout of Protection" is entered – this command causes the working line to be selected. The protection line is then locked from any Automatic, Manual, or Forced protection switches.

Lockout State

The Lockout State shall be defined for each working or protection circuit pack. The two permitted states are: None – meaning no lockout is set for the circuit pack, set meaning the circuit pack has been locked out. The values (None & Set) shall be taken independently for each working or protection circuit pack.

LOF (Loss of Frame)

A failure to synchronize an incoming signal.

LOM

Loss Of Multiframe

Loop Timing

A special case of line timing. It applies to network elements that have only one OC-N/STM-N interface. For example, terminating nodes in a linear network are loop timed.

Loopback

Type of diagnostic test used to compare an original transmitted signal with the resulting received signal. A loopback is established when the received optical or electrical external transmission signal is sent from a port or tributary input directly back toward the output.

LOP (Loss of Pointer)

A failure to extract good data from a signal payload.

LOS (Loss of Signal)

The complete absence of an incoming signal.

Loss Budget

Loss (in dB) of optical power due to the span transmission medium (includes fiber loss and splice losses).

LPA (Lower order Path Adaptation)

Function that adapts a PDH signal to a synchronous network by mapping the signal into or de-mapping the signal out of a synchronous container.

LPC (Lower Order Path Connection)

Function that provides for flexible assignment of lower order VCs in a higher order VC.

LPT (Lower Order Path Termination)

Function that terminates a lower order path by generating and adding the appropriate VC POH to the relevant container at the path source and removing the VC POH and reading it at the path sink.

LS

Low Speed

LT/RB

Left Top/Right Bottom

LTE

Line Terminating Equipment

M   µm

Micrometer

MAF

Management Application Function

Maintenance Condition

An equipment state in which some normal service functions are suspended, either because of a problem or to perform special functions (copy memory) that can not be performed while normal

service is being provided.

Management Connection
Identifies the type of routing used (STATIC or DYNAMIC), and if STATIC is selected allows the gateway network element to be identified.

Manager
Capable of issuing network management operations and receiving events. The manager communicates with the agent in the controlled network element.

Manual Switch State
A protection group shall enter the Manual Switch State upon the initiation and successful completion of the Manual Switch command. The protection group leaves the Manual Switch state by means of the Clear or Forced Switch commands. While in the Manual Switch state the system may switch the active unit automatically if required for protection switching.

Mapping
The logical association of one set of values, such as addresses on one network, with quantities or values of another set, such as devices or addresses on another network.

MB
Megabytes

Mbit/s
Megabits per second

MCF (Message Communications Function)
Function that provides facilities for the transport and routing of Telecommunications Management Network messages to and from the Network Manager.

MD (Mediation Device)
Allows for exchange of management information between Operations System and Network Elements.

MDI
Miscellaneous Discrete Input

MDO
Miscellaneous Discrete Output

MEC (Manufacturer Executable Code)
Network Element system software in binary format that after being downloaded to one of the stores can be executed by the system controller of the network element.

MEM
Memory

Mid-Span Meet
The capability to interface between two lightwave network elements of different vendors. This applies to high-speed optical interfaces.

MIPS
Millions of Instructions Per Second

Miscellaneous Discrete Interface
Allows an operations system to control and monitor equipment collocated within a set of input and output contact closures.

MJ (Major (alarm))
Indicates a service-affecting failure, main or unit controller failure, or power supply failure.

MM
Multi Mode

MMF
Multi-Mode Fiber

MMI
Man-Machine Interface

MML
Human-Machine Language

MN (Minor (alarm))
Indicates a non-service-affecting failure of equipment or facility.

MO
Managed Object

MS
Multiplexer Section

ms
Millisecond

MS-SPRING (Multiplexer Section Shared Protection Ring)
A protection method used in Add-Drop Multiplexer Network Elements.

MSOH (Multiplexer Section OverHead)
Part of the Section Overhead. Is accessible only at line terminals and multiplexers.

MSP (Multiplexer Section Protection)
Provides capability for switching a signal from a working to a protection section.

MST (Multiplexer Section Termination)

Function that generates the Multiplexer Section OverHead in the transmit direction and terminates the part of the Multiplexer Section overhead that is acceptable in the receive direction.

MTBF

Mean Time Between Failures

MTBMA

Mean Time Between Maintenance Activities

MTIE

Maximum Time Interval Error

MTPI

Multiplexer Timing Physical Interface

MTS (Multiplexer Timing Source)

Function that provides timing reference to the relevant component parts of the multiplex equipment and represents the SDH Network Element clock.

MTTR

Mean Time To Repair

Multiplexer

A device (circuit pack) that combines two or more transmission signals into a combined signal on a shared medium.

Multiplexing

A procedure by which multiple lower order path layer signals are adapted into a higher order path, or the multiple higher order path layer signals are adapted into a multiplex section.

N   NA

Not Applicable

Navis Optical NMS

Optical Network Management System

NE (Network Element)

A node in a telecommunication network that supports network transport services and is directly manageable by a management system.

NEBS

Network Equipment-Building System requirements, U.S. Telecom Requirements dealing with EMC/EMI, Environmental, Electrical safety.

nm

Nanometer (10^{-9} meters)

NMON (Not Monitored)

A provisioning state for equipment that is not monitored or alarmed.

No Request State

This is the routine-operation quiet state in which no external command activities are occurring.

Node

A network element in a ring or, more generally, in any type of network. In a network element supporting interfaces to more than one ring, node refers to an interface that is in a particular ring. Node is also defined as all equipment that is controlled by one system controller. A node is not always directly manageable by a management system.

Non-Revertive Switching

In non-revertive switching, an active and stand-by line exist on the network. When a protection switch occurs, the standby line is selected to support traffic, thereby becoming the active line. The original active line then becomes the stand-by line. This status remains in effect even when the fault clears. That is, there is no automatic switch back to the original status.

Non-Synchronous

The essential characteristic of time-scales or signals such that their corresponding significant instants do not necessarily occur at the same average rate.

NORM

Normal

NPI

Null Pointer Indication

NPPA (Non-Preemptible Protection Access)

Non-preemptible protection access increases the available span capacity for traffic which does not require protection by a ring, but which cannot be preempted.

NRZ

Nonreturn to Zero

NSA

Non-Service Affecting

NSAP Address (Network Service Access Point Address)

Network Service Access Point Address (used in the OSI network layer 3). An automatically assigned number that uniquely identifies a Network Element for the purposes of routing DCC messages.

NVM (Non-Volatile Memory)
Memory that retains its stored data after power has been removed. An example of NVM would be a hard disk.

O   O&M
Operation and Maintenance

OA
Optical Amplifier

OAM&P
Operations, Administration, Maintenance, and Provisioning

OC, OC-n
Optical Carrier

OC-12
Optical Carrier, Level 12 Signal (622.08 Mbit/s)

OC-192
Optical Carrier, Level 192 (9953.28 Mbit/s) (10 Gbit/s)

OC-3
Optical Carrier, Level 3 Signal (155 Mbit/s)

OC-48
Optical Carrier, Level 48 (2488.32 Mbit/s) (2.5 Gbit/s)

OC-768
Optical Carrier, Level 768 (39813.12 Mbit/s) (40 Gbit/s)

ODM
Office Data Manual

OI (Operations Interworking)
The capability to access, operate, provision, and administer remote systems through craft interface access from any site in an SDH network or from a centralized operations system.

OLS
Optical Line System

OOF

Out-of-Frame

OOS (Out-of-Service)

The circuit pack is not providing its normal service function (removed from either the working or protection state) either because of a system problem or because the pack has been removed from service.

OP

Optical

Open Ring Network

A network formed of a linear chain-shaped configuration of network elements. Each network element connects to two others, one on each side, except for two network elements at the ends which are connected on only one side. A closed ring can be formed by adding a connection between the two end nodes.

Operations Interface

Any interface providing you with information on the system behavior or control. These include the equipment LEDs, user panel,*LambdaUnite* CIT, office alarms, and all telemetry interfaces.

Operator

A user of the system with operator-level user privileges.

Optical Channel

A STM-N wavelength within an optical line signal. Multiple channels, differing by 1.5 μm in wavelength, are multiplexed into one signal.

Optical Line Signal

A multiplexed optical signal containing multiple wavelengths or channels.

Original Value Provisioning

Preprogramming of a system's original values at the factory. These values can be overridden using local or remote provisioning.

OS (Operations System)

A central computer-based system used to provide operations, administration, and maintenance functions.

OSF

Open Software Foundation; Operations System Function

OSI (Open Systems Interconnection)

Referring to the OSI reference model, a logical structure for network operations standardized by the International Standards Organization (ISO).

OTDR

Optical Time-Domain Reflectometer

OUT

Transmit

Outage

A disruption of service that lasts for more than 1 second.

OW (Orderwire)

A dedicated voice-grade line for communications between maintenance and repair personnel.

P   **Parameter**

A variable that is given a value for a specified application. A constant, variable, or expression that is used to pass values between components.

Parity Check

Tests whether the number of ones (or zeros) in an array of binary bits is odd or even; used to determine that the received signal is the same as the transmitted signal.

Pass-Through

Paths that are cross-connected directly across an intermediate node in a network.

Path

A logical connection between the point at which a standard frame format for the signal at the given rate is assembled, and the point at which the standard frame format for the signal is disassembled.

Path Terminating Equipment

Network elements in which the path overhead is terminated.

PCB

Printed Circuit Board

PCM

Pulse Code Modulation

PDH

Plesiochronous Digital Hierarchy

PDP

Power Distribution Panel

PI

Power Interface

Pipe mode (Adaptive-rate tributary operation of a port)

Mode of operation of a port in which tributaries are *not* explicitly provisioned for the expected signal rates. The signal rates are automatically identified.

Platform

A family of equipment and software configurations designed to support a particular application.

Plesiochronous Network

A network that contains multiple subnetworks, each internally synchronous and all operating at the same nominal frequency, but whose timing may be slightly different at any particular instant.

PM (Performance Monitoring)

Measures the quality of service and identifies degrading or marginally operating systems (before an alarm would be generated).

PMD (Polarization Mode Dispersion)

Output pulse broadening due to random coupling of the two polarization modes in an optical fiber.

POH (Path Overhead)

Informational bytes assigned to, and transported with the payload until the payload is de-multiplexed. It provides for integrity of communication between the point of assembly of a virtual container and its point of disassembly.

Pointer

An indicator whose value defines the frame offset of a virtual container with respect to the frame reference of the transport entity on which it is supported.

POP

Point of Presence

Port (also called Line)

The physical interface, consisting of both an input and output, where an electrical or optical transmission interface is connected to the system and may be used to carry traffic between network elements. The words "port" and "line" may often be used synonymously. "Port" emphasizes the physical interface, and "line" emphasizes the interconnection. Either may be used to identify the signal being carried.

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.

POTS

Plain Old Telephone Service

PP

Pointer Processing

PRC (Primary Reference Clock)

The main timing clock reference in SDH equipment.

Preprovisioning

The process by which the user specifies parameter values for an entity in advance of some of the equipment being present. These parameters are maintained only in NVM. These modifications are initiated locally or remotely by either *LambdaUnite* CIT or *Navis* Optical EMS. Preprovisioning provides for the decoupling of manual intervention tasks (for example, install circuit packs) from those tasks associated with configuring the node to provide services (for example, specifying the entities to be cross-connected).

PRI

Primary

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.

Protection Access

To provision traffic to be carried by protection tributaries when the port tributaries are not being used to carry the protected working traffic.

Protection Group Configuration

The members of a group and their roles, for example, working protection, line number, etc.

Protection Path

One of two signals entering a path selector used for path protection switching or dual ring interworking. The other is the working path. The designations working and protection are provisioned by the user, whereas the terms active path and standby path indicate the current protection state.

Protection State

When the working unit is currently considered active by the system and that it is carrying traffic. The "active unit state" specifically refers to the receive direction of operation — since protection switching is unidirectional.

PROTN (Protection)

Extra capacity (channels, circuit packs) in transmission equipment that is not intended to be used for service, but rather to serve as backup against equipment failures.

PROV (Provisioned)

Indicating that a circuit pack is ready to perform its intended function. A provisioned circuit pack can be active (ACT), in-service (IS), standby (STBY), provisioned out-of-service (POS), or out-of-service (OOS).

PSDN

Public Switched Data Network

PSTN

Public Switched Telephone Network

PTE

Path Terminating Equipment

PTR

Pointer

PWR

Power

PWR ON

Power On

Q **Q-LAN**

Thin Ethernet LAN which connects the manager to Gateway Network Elements so that management information between Network Elements and management systems can be exchanged.

QL (Quality Level)

The quality of the timing signal(s) provided to synchronize a Network Element. In case of optical line timing the level can be provided by the Synchronization Status Message (S-1 byte). If the System and Output Timing Quality Level mode is "Enabled", and if the signal selected for the Station Clock Output has a quality level below the Acceptance Quality Level, the Network Element "squelches" the Station Clock Output Signal, which means that no signal is forwarded at all.

QOS

Quality of Service

R **RAM**

Random Access Memory

RDI (Remote Defect Indication)

An indication returned to a transmitting terminal that the receiving terminal has detected an incoming section failure. [Previously called far-end-receive failure (FERF).]

Reactive Maintenance
Refers to detecting defects/failures and clearing them.

Receive-Direction
The direction towards the Network Element.

Regeneration
The process of reconstructing a digital signal to eliminate the effects of noise and distortion.

Regenerator Loop
Loop in a Network Element between the Station Clock Output(s) and one or both Station Clock Inputs, which can be used to de-jitterize the selected timing reference in network applications.

Regenerator Section Termination (RST)
Function that generates the Regenerator Section Overhead (RSOH) in the transmit direction and terminates the RSOH in the receive direction.

Reliability
The ability of a software system performing its required functions under stated conditions for a stated period of time. The probability for an equipment to fulfill its function. Some of the ways in which reliability is measured are: MTBF (Mean Time Between Failures) expressed in hours; Availability = (MTBF)/(MTBF+MTTR)(%) [where MTTR = mean time to restore]; outage in minutes per year; failures per hour; percentage of failures per 1,000 hours.

Remote Network Element
Any Network Element that is connected to the referenced Network Element through either an electrical or optical link. It may be the adjacent node on a ring, or N nodes away from the reference. It also may be at the same physical location but is usually at another (remote) site.

Restore Timer
Counts down the time (in minutes) during which the switch waits to let the worker line recover before switching back to it. This option can be set to prevent the protection switch continually switching if a line has a continual transient fault.

Revertive
A protection switching mode in which, after a protection switch occurs, the equipment returns to the nominal configuration (that is, the working equipment is active, and the protection equipment is standby) after any failure conditions that caused a protection switch to occur, clear, or after any external switch commands are reset. (See "Non-Revertive".)

Revertive Switching

In revertive switching, there is a working and protection high-speed line, circuit pack, etc. When a protection switch occurs, the protection line, circuit pack, etc. is selected. When the fault clears, service "reverts" to the working line.

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 the protection capacity.

Route

A series of contiguous digital sections.

Router

An interface between two networks. While routers are like bridges, they work differently. Routers provide more functionality than bridges. For example, they can find the best route between any two networks, even if there are several different networks in between. Routers also provide network management capabilities such as load balancing, partitioning of the network, and trouble-shooting.

RSOH

Regenerator Section OverHead; part of SOH

RST

Regenerator Section Termination

RT

Remote Terminal

RT/LB

Right Top/Left Bottom

RTRV

Retrieve

Rx

Receive/IN

RZ (Return to Zero)

A code form having two information states (termed zero and one) and having a third state or an at-rest condition to which the signal returns during each period.

S **SA**
Service Affecting

SA
Section Adaptation

SD
Signal Degrade

SDH (Synchronous Digital Hierarchy)
A hierarchical set of digital transport structures, standardized for the transport of suitable adapted payloads over transmission networks.

SDS
Standard Directory Service based on ANSI recommendation T1.245

SEC
Secondary

SEC
SDH Equipment Clock

Section
The portion of a transmission facility, including terminating points, between a terminal network element and a line-terminating network element, or two line-terminating network elements.

Section Adaptation
Function that processes the AU-pointer to indicate the phase of the VC-3/4 POH relative to the STM-N SOH and assembles/disassembles the complete STM-N frame.

Self-Healing
A network's ability to automatically recover from the failure of one or more of its components.

SEMF (Synchronous Equipment Management Function)
Function that converts performance data and implementation specific hardware alarms into object-oriented messages for transmission over the DCC and/or Q-interface. It also converts object-oriented messages related to other management functions for passing across the S reference points.

Server
Computer in a computer network that performs dedicated main tasks which generally require sufficient performance.

....

G L O S S A R Y   **Lucent Technologies**   365-374-023
G L - 3 4   Issue a, October 2001

Service

The operational mode of a physical entity that indicates that the entity is providing service. This designation will change with each switch action.

SES (Severely Errored Seconds)

This performance monitoring parameter is a second in which a signal failure occurs, or more than a preset amount of coding violations (dependent on the type of signal) occurs.

SH

Short Haul

Single-Ended Operations

Provides operations support from a single location to remote Network Elements in the same SDH subnetwork. With this capability you can perform operations, administration, maintenance, and provisioning on a centralized basis. The remote Network Elements can be those that are specified for the current release.

Site Address

The unique address for a Network Element.

Slot

A physical position in a shelf designed for holding a circuit pack and connecting it to the backplane. This term is also used loosely to refer to the collection of ports or tributaries connected to a physical circuit pack placed in a slot.

SM or SMF (Single-Mode Fiber)

A low-loss, long-span optical fiber typically operating at either 1310 nm, 1550 nm, or both.

SMN

SDH Management Network

SNC/I

SubNetwork Connection (protection) / Inherent monitoring

SNC/N

SubNetwork Connection (protection) / Non-Intrusive Monitoring

SNR (Signal-to-Noise Ratio)

The relative strength of signal compared to noise.

Software Backup

The process of saving an image of the current network element's databases, which are contained in its NVM, to a remote location. The remote location could be the *LambdaUnite* CIT or *Navis* Optical EMS.

Software Download

The process of transferring a generic (full or partial) or provisioned database from a remote entity to the target network element's memory. The remote entity may be the *LambdaUnite* CIT or *Navis* Optical EMS. The download procedure uses bulk transfer to move an un-interpreted binary file into the network element.

Software ID

Number that provides the software version information for the system.

SOH (Section Overhead)

Capacity added to either an AU-4 or assembly of AU-3s to create an STM-1. Contains always STM-1 framing and optionally maintenance and operational functions. SOH can be subdivided in MSOH (multiplex section overhead) and RSOH (regenerator section overhead).

SONET (Synchronous Optical Network)

The North American standard for the rates and formats that defines optical signals and their constituents.

Span

An uninterrupted bidirectional fiber section between two network elements.

Span Growth

A type of growth in which one wavelength is added to all lines before the next wavelength is added.

SPARE WIRES

Ensure that spare wires have sufficient length to reach all contacts on the connector

SPE

Synchronous Payload Envelope

SPF (Single point of failure)

A single failure in the OSI-network (DCC, LAN or node), that causes isolation of more than one node in the OSI-network. The use of IS-IS areas, without obeying all rules & guidelines, increases the risk of a single point of failure in the network.

SPI

SDH Physical Interface

Squelch Map

This map contains information for each cross-connection in a ring and indicates the source and destination nodes for the low-speed circuit that is part of the cross-connection. This information is used to prevent traffic misconnection in rings with isolated nodes or segments.

SRPP

System Reference Potential Plane

SSM

Synchronization Status Marker

SSU_L

Synchronization Supply Unit — Local

SSU_T

Synchronization Supply Unit — Transit

Standby Path

One of two signals entering a constituent path selector, the standby path is the path not currently being selected.

State

The state of a circuit pack indicates whether it is defective or normal (ready for normal use).

Station Clock Input

An external clock may be connected to a Station Clock Input.

Status

The indication of a short-term change in the system.

STBY (Standby)

The circuit pack is in service but is not providing service functions. It is ready to be used to replace a similar circuit pack either by protection or by duplex switching.

STM

Synchronous Transport Module (SDH)

STM-N (Synchronous Transport Module, Level N)

A building block information structure that supports SDH section layer connections, where N represents a multiple of 155.52 Mbit/s. Normally N = 1, 4, 16, 64 or 256.

STP

Shielded Twisted Pair

Stream (Line; aggregate)

A synchronous high rate connection between multiplexers, typically 10 or 40 Gbit/s.

STS

Synchronous Transport Signal (SONET)

Subnetwork

A group of interconnected/interrelated Network Elements. The most common connotation is a synchronous network in which the Network Elements have data communications channel (DCC) connectivity.

Supervisor

A user of the application with supervisor user privileges.

Suppression

A process where service-affecting alarms that have been identified as an "effect" are not displayed to a user.

SYNC

Synchronizer

Synchronization Messaging

Synchronization messaging is used to communicate the quality of network timing, internal timing status, and timing states throughout a subnetwork.

Synchronous

The essential characteristic of time scales or signals such that their corresponding significant instances occur at precisely the same average rate, generally traceable to a single Stratum 1 source.

Synchronous Network

The synchronization of transmission systems with synchronous payloads to a master (network) clock that can be traced to a reference clock.

Synchronous Payload

Payloads that can be derived from a network transmission signal by removing integral numbers of bits from every frame. Therefore, no variable bit-stuffing rate adjustments are required to fit the payload in the transmission signal.

SYSCTL

System Controller circuit pack

System Administrator

A user of the computer system on which the system's OS software application can be installed.

T   **TARP**

Target Identifiers Address Resolution Protocol

TBD

To Be Determined

TCA (Threshold-Crossing Alert)

A message type sent from a Network Element that indicates that a certain performance monitoring parameter has exceeded a specified threshold.

TDM (Time Division Multiplexing)
A technique for transmitting a number of separate data, voice, and/or video signals simultaneously over one communications medium by interleaving a portion of each signal one after another.

TEN
Telecommunications Management Network

Through (or Continue) Cross-Connection
A cross-connection within a ring, where the input and output tributaries have the same tributary number but are in lines opposite each other.

Through Timing
Refers to a network element that derives its transmit timing in the east direction from a received line signal in the east direction and its transmit timing in the west direction from a received line signal in the west direction.

THz
Terahertz (10^{12} Hz)

TI
Timing Interface

TID (Target Identifier)
A provisionable parameter that is used to identify a particular Network Element within a network. It is a character string of up 20 characters where the characters are letters, digits, or hyphens (-).

TL1 (Transaction Language One)
A subset of ITU's human-machine language.

TM (Terminal Multiplexer)
An Add/Drop Multiplexer with only one stream interface.

Transmit-Direction
The direction outwards from the Network Element.

Tributary
A signal of a specific rate (2 Mbit/s, 34 Mbit/s, 140 Mbit/s, VC12, VC3, VC4, STM-1 or STM-4) that may be added to or dropped from a line signal.

Tributary
A path-level unit of bandwidth within a port, or the constituent signal(s) being carried in this unit of bandwidth, for example, an STM-1 tributary within an STM-N port.

Tributary Unit Pointer
Indicates the phase alignment of the VC with respect to the TU in which it resides. The pointer position is fixed with respect to the TU frame.

True Wave™ Optical Fiber
Lucent Technologies' fiber generally called non-zero dispersion-shift fiber, with a controlled amount of chromatic dispersion designed for amplified systems in the 1550/1310 nm range.

TRY
Technical Requirement

TSA (Time Slot Assignment)
A capability that allows any tributary in a ring to be cross-connected to any tributary in any lower-rate, non-ring interface or to the same-numbered tributary in the opposite side of the ring.

TSI (Time Slot Interchange)
The ability of the user to assign cross-connections between any tributaries of any lines within a Network Element. Three types of TSI can be defined: Hairpin TSI, Interring TSI (between rings), and intra-ring TSI (within rings).

TSO
Technical Support Organization

TTP
Trail Termination Point

TU (Tributary Unit)
An information structure which provides adaptation between the lower order path layer and the higher path layer. Consists of a VC-n plus a tributary unit pointer (TU PTR).

TUG
Tributary Unit Group

Two-Way Point-to-Point Cross-Connection
A two-legged interconnection, that supports two-way transmission, between two and only two tributaries.

Two-Way Roll
The operation which moves a two-way cross-connection between tributary i and tributary j to a two-way cross-connection between the same tributary i and a new tributary k with a single user command.

Tx
Transmit/OUT

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.

UITS (Unacknowledged Information Transfer Service)

Unconfirmed mode of LAPD operation.

UL

UL marking indicates that the products conform to relevant American Directives.

UNEQ

Path Unequipped

UPL

User PaneL

Upstream

At or towards the source of the considered transmission stream, for example, looking in the opposite direction of transmission.

UR

UR marking indicates that the products conform to relevant American Directives.

User Privilege

Permissions a user must perform on the computer system on which the system software runs.

UTC (Universal Time Coordinated)

A time-zone independent indication of an event. The local time can be calculated from the Universal Coordinated Time.

UTP

Unshielded Twisted Pair cable 120 Ohm

V **V**

Volts

VAC

Volts Alternating Current

Value

A number, text string, or other menu selection associated with a parameter.

Variable

An item of data named by an identifier. Each variable has a type, such as int or Object, and a scope.

VC (Virtual Container)

Container with path overhead.

VDC

Volts Direct Current

VF

Voice frequency

Virtual

Refers to artificial objects created by a computer to help the system control shared resources.

Virtual Circuit

A logical connection through a data communication (for example, X.25) network.

Voice Frequency (VF) Circuit

A 64 kilobit per second digitized signal.

Volatile Memory

Type of memory that is lost if electrical power is interrupted.

W   WAD

Wavelength Add/Drop

WAN (Wide Area Network)

A communication network that uses common-carrier provided lines and covers an extended geographical area.

Wander

Long term variations of amplitude frequency components (below 10 Hz) of a digital signal from their ideal position in time possibly resulting in buffer problems at a receiver.

Wavelength Interchange

The ability to change the wavelength associated with an STM-N signal into another wavelength.

WDCS

Wideband Digital Cross-Connect System

WDM (Wavelength Division Multiplexing)

A means of increasing the information-carrying capacity of an optical fiber by simultaneously

---

transmitting signals at different wavelengths.

Wideband Communications

Voice, data, and/or video communication at digital rates from 64 kbit/s to 2 Mbit/s.

Working

Label attached to a physical entity. In case of revertive switching the working line or unit is the entity that is carrying service under normal operation. In case of nonrevertive switching the label has no particular meaning.

Working State

The working unit is currently considered active by the system and that it is carrying traffic.

WRT (Wait to Restore Time)

Corresponds to the time to wait before switching back after a failure has cleared, in a revertive protection scheme. This can be between 0 and 15 minutes, in increments of one minute.

WS

Work Station

WTR (Wait to Restore)

Applies to revertive switching operation. The protection group enters the WTR state when all Equipment Fail (EF) conditions are cleared, but the system has not yet reverted back to its working line. The protection group remains in the WTR state until the Wait-to-Restore timer completes the WTR time interval.

X   X.25

An ITU standard defining the connection between a terminal and a public packet-switched network

X.25 Interface/Protocol

The ITU packet-switched interface standard for terminal access that specifies three protocol layers: physical, link, and packet for connection to a packet-switched data network.

XC

Cross Connect

Z   Zero Code Suppression

A technique used to reduce the number of consecutive zeros in a line-coded signal (B3ZS, B8ZS).

Index