



Metropolis[®] DMXpress Access Multiplexer

Release 2.0

User Operations Guide

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About this Information Product

Purpose This User Operations Guide (UOG) provides the following information about the Metropolis[®] DMXpress Access Multiplexer (Metropolis[®] DMXpress), Release 2.0:

- Detailed descriptive information to the circuit pack level
- Acceptance, operation, and provisioning tasks

Reason for reissue This document, *Metropolis[®] DMXpress Access Multiplexer User Operations Guide, 365-372-314*, Issue 3 is reissued to update existing information and provide information about Release 2.0 features.

Significant changes in this issue are noted by bars (|) in the left margin.

Safety labels This document may contain safety labels in the form of **DANGER**, **WARNING**, and **CAUTION**. These admonishments have the following definitions:



DANGER

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



WARNING

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



CAUTION

Indicates the presence of a hazard that will or can cause minor personal injury or property damage if the hazard is not avoided. Caution is also used for property-damage-only accidents, including equipment damage, loss of software, or service interruption.

Intended audience

This User Operations Guide is intended primarily for technicians in the field of telecommunications and communications network providers.

Descriptive material in this document may be used by anyone desiring specific information or knowledge on the operational functions and features of Metropolis® DMXpress.

Procedural material (tasks) in this document is written primarily for maintenance, operation, and provisioning personnel responsible for the operation and maintenance of the Metropolis® DMXpress.

How to use this information product

This *User Operations Guide* includes both descriptive, reference chapters and procedural, task chapters.

Assumptions

This document assumes that its readers have an understanding of the following:

- Basic principles of telecommunication transmission
- Common telecommunication and system terminology (a glossary is provided in this manual to assist you)
- Test sets and tools used in the telecommunication industry
- Local operations and functional procedures of your company
- Personal computer (PC) operation, common PC terminology, and navigational procedures in a windows-style user interface

Chapter contents

The following table provides a brief description of each chapter in this document.

Chapter	Contents
Chapter 1, “Product Description”	This chapter provides an overview of Metropolis® DMXpress, including: • physical equipment • synchronization features • power features
Chapter 2, “Operations Interfaces”	This chapter describes the various operations interfaces available in Metropolis® DMXpress including: • craft interface terminal (CIT) • OS interfaces • circuit pack faceplates • office alarms interfaces
Chapter 3, “Provisioning, Security, & Administration”	This chapter describes Metropolis® DMXpress provisioning and issues concerning: • network element (NE) login administration and security • AIDs overview and parameter tables • cross-connection management • fault management

Chapter	Contents
Chapter 4, “Performance Monitoring”	This chapter describes performance monitoring for Metropolis® DMXpress.
Chapter 5, “Ethernet”	This chapter describes the ethernet implementation for Metropolis® DMXpress.
Chapter 6, “Technical Specifications”	This chapter provides the technical specifications for Metropolis® DMXpress.
Chapter 7, “Acceptance Tasks”	This chapter provides procedures for performing acceptance tasks.
Chapter 8, “Operations Tasks”	This chapter provides procedures for performing operations tasks including: - logins - passwords - loopbacks
Chapter 9, “Circuit Order/Provisioning Tasks”	This chapter provides procedures for performing circuit order and provisioning tasks including: - timing - add/delete/modify cross-connections - install and provision circuit packs - create/modify/delete optical protection groups - maintaining TCA profiles - PM registers
Chapter 10, “Supporting Tasks”	This chapter provides procedures for performing supporting tasks including: - cleaning fibers and connectors - removing and inserting circuit packs - selecting LBOs
Appendix A, WaveStar® CIT Tutorial	This appendix contains a brief tutorial on the WaveStar® CIT.
Glossary	Defines terms used throughout the Metropolis® DMXpress documentation.
Index	Provides detailed access to the contents of this document.

Conventions used The following conventions are used in this document.

- **Commands** and *Parameters*
- *Document References*, 123-456-789
- Cross-Reference/page number:
[“Overview of Metropolis® DMXpress Access Multiplexer” \(1-3\)](#)
- A **MONOSPACE** font identifies the lettering designations on panels, shelves, and circuit packs.

Related documentation The following table lists the documents included in the Metropolis® DMXpress documentation set.

Table 1 Metropolis® DMXpress Documentation Set

Comcode	Document Number	Title
NA	365-372-311 R2.0	<i>Metropolis® DMXpress Access Multiplexer Installation Manual</i>
109 164 134	365-372-312 R2.0	<i>Metropolis® DMXpress Access Multiplexer Applications and Planning Guide</i>
NA	365-372-313 R2.0	<i>Metropolis® DMXpress Access Multiplexer TL1 Command Manual</i>
109 210 344	365-372-314 R2.0	<i>Metropolis® DMXpress Access Multiplexer User Operations Guide</i>
109 210 351	365-372-315 R2.0	<i>Metropolis® DMXpress Access Multiplexer Alarm Messages and Trouble Clearing Guide</i>
109 204 073	NA	<i>Metropolis® DMXpress Access Multiplexer Release 2.0 Documents</i>

Laser Safety Information

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

Conventional lasers can produce an intense beam of monochromatic light. The term monochromatic light means a single wavelength output of pure color that may be visible or invisible to the eye. A conventional laser produces a small-size beam of light, and because the beam size is small the power density (also called irradiance) is very high.

Consequently, lasers and laser products are subject to federal and applicable state regulations as well as international standards for their safe operation.

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

Lasers and eye damage

The optical energy emitted by laser and high-radiance LEDs in the 400-1400 nm range may cause eye damage if absorbed by the retina. When a beam of light enters the eye, the eye magnifies and focuses the energy on the retina magnifying the irradiance. The irradiance of the energy that reaches the retina is approximately 105 or 100,000 times more than at the cornea and, if sufficiently intense, may cause a retinal burn.

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

Classification of lasers

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

Laser safety precautions for optical fiber telecommunications systems

In its normal operating mode, an optical fiber telecommunication system is totally enclosed and presents no risk of eye injury. It is a Class I/1 system under the FDA/CDRH and IEC classifications.

The fiber optic cables that interconnect various components of an optical fiber telecommunication system can disconnect or break, and may expose people to lightwave emission. Also, certain measures and maintenance procedures may expose the technician to emission from the semiconductor laser during installation and servicing. Unlike more familiar laser devices, such as solid-state and gas lasers, the emission pattern of a semiconductor laser results in a highly divergent beam. In a divergent beam, the irradiance (power density) decreases rapidly with distance. The greater the distance, the less energy will enter the eye and the less potential risk for eye injury. Inadvertently viewing an unterminated fiber or damaged fiber with the unaided eye at distances greater than 5 to 6 inches normally will not cause eye injury provided the power in the fiber is less than a few milliwatts at the near IR wavelengths and a few tens of milliwatts at the far IR wavelengths. However, damage may occur if an optical instrument such as a microscope, magnifying glass, or eye loupe is used to stare at the energized fiber end.

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

Laser safety precautions for enclosed systems

Under normal operating conditions, optical fiber telecommunication systems are completely enclosed; nonetheless, the following precautions shall be observed:

- Because of the potential for eye damage, technicians should not stare into optical connectors or broken fibers.
- Under no circumstance shall laser/fiber optic operations be performed by a technician before satisfactorily completing an approved training course.
- Since viewing lightwave emission directly in excess of Class I/1 limits with an optical instrument such as an eye loupe greatly increases the risk of eye damage, appropriate labels must appear in plain view, in close proximity to the optical port on the protective housing/access panel of the terminal equipment.

Figure 1 illustrates the FDA Class IIIb non-interlocked protective housing label.

Figure 1 Protective Housing Label



NC-USM-111

Laser safety precautions for unenclosed systems

During service, maintenance, or restoration, an optical fiber telecommunication system is considered unenclosed. Under these conditions, follow these practices:

- Only authorized, trained personnel shall be permitted to do service, maintenance, and restoration. Avoid exposing the eye to emissions from unterminated, energized optical connectors at close distances. Laser modules associated with the optical ports of laser circuit packs are typically recessed, which limits the exposure distance. Optical port shutters and automatic power reduction (APR), and automatic power shut down (APSD) are engineering controls that are also used to limit the emissions. However, technicians removing or replacing laser circuit packs should not stare or look directly into the optical port with optical instruments or magnifying lenses. (Normal eye wear or indirect viewing instruments, such as a Find-R-Scopes, are not considered magnifying lenses or optical instruments.)
- Only authorized, trained personnel shall use the optical test equipment during installation or servicing since this equipment contains semiconductor lasers. (Some examples of optical test equipment are Optical Time Domain Reflectometers [OTDRs], Hand-Held Loss Test Sets, and Feature Finders.)
- Under no circumstances shall any personnel scan a fiber with an optical test set without verifying that all laser sources on the fiber are turned off.
- All unauthorized personnel shall be excluded from the immediate area of the optical fiber telecommunication systems during installation and service.

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

Electrostatic Discharge (ESD) Considerations

This section describes the precautions required because of ESD.

Circuit pack handling precautions

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

Observe the following precautions when handling circuit packs/units to prevent damage by electrostatic discharge:

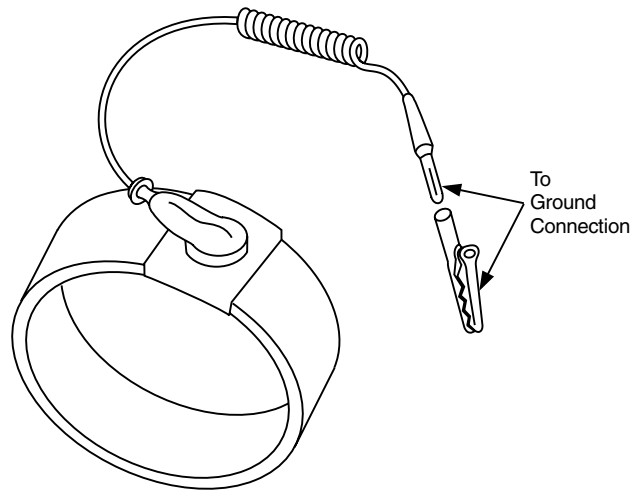
- Assume all circuit packs contain solid-state electronic components that can be damaged by ESD.
- When handling circuit packs (storing, installing, removing, etc.) or when working on the backplane, always wear a grounded wrist strap or wear a heel strap and stand on a grounded, static-dissipating floor mat.
- Handle all circuit packs by the faceplate or latch and by the top and bottom outermost edges. Never touch the components, conductors, or connector pins.
- Observe all warning labels on bags and cartons. Whenever possible, do not remove circuit packs from antistatic packaging until ready to insert them into slots.
- If possible, open all circuit packs at a static-safe work position, using properly grounded wrist straps and static-dissipating table mats.
- Always store and transport circuit packs in static-safe packaging. Shielding is not required unless specified.
- Keep all static-generating materials such as food wrappers, plastics, and *Styrofoam*® containers away from all circuit packs. When removing circuit packs from a shelf, immediately place the circuit packs in static-safe packages.
- Whenever possible, maintain relative humidity above 20 percent.

Important! Any connectors on the shelf interconnection panel that are not cabled should be fitted with a plastic dust cap to provide ESD protection.

Static control wrist straps

To reduce the possibility of ESD damage, the Metropolis® DMXpress shelf is equipped with an ESD grounding jack to enable personnel to ground themselves using wrist straps (Figure 2), while handling circuit packs or working on the shelf. The wrist straps should be checked periodically with a wrist strap tester to ensure that they are working properly.

Figure 2 Static Control Wrist Strap



NC-USM-110

Important! The grounding jack is located on the front of the shelf, on the lower right-hand corner.

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**Important safety
instructions**

READ AND UNDERSTAND ALL INSTRUCTIONS.

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

1. Follow all warnings and instructions marked on the product.
2. Slots and openings in this product at the back or bottom are provided for ventilation. To protect it from overheating, these openings must not be blocked or covered.
3. Opening or removing rear covers or sheet-metal parts may present exposure to high current or electrical energy levels, or to other risks.
4. Never push objects of any kind into this product through slots as they may touch dangerous voltage points or short out parts that could result in a risk of fire or electrical shock. Never spill liquid of any kind on the product.
5. Refer servicing to qualified service personnel.
6. Use caution when installing and modifying telecommunications lines.
7. Never install telecommunication wiring during a lightning storm.
8. Never install telecommunication jacks in wet locations unless the jack is specifically designed for wet locations.
9. Never touch uninsulated telecommunication wires or terminals unless the telecommunication line has been disconnected at the network interface.
10. Installation must include an independent frame ground conductor to building ground. Grounding/bonding circuit continuity is vital for safe operation of this equipment. Never operate with grounding/bonding conductor disconnected.
11. This product may be equipped with either a single -110 V AC input feeder or two -48 V DC input power feeders. Disconnecting one -48 V DC power feeder will not de-energize the product. To reduce the risk of injury, disconnect both power supply cables when removing power from the system.
12. Metallic telecommunication interfaces should not leave the building premises unless connected to telecommunication devices providing primary and secondary protection, as applicable.
13. For continued protection against risk of fire, replace only with same type and rating of fuse.

14. Use only Lucent Technologies manufactured, recognized circuit packs.
15. This equipment is intended for installation in Restricted Access Locations where access is controlled or where access can only be gained by service personnel with a key or tool. Access to this equipment is restricted to qualified service personnel only.
16. Power the unit only from -48 V DC sources providing Safety Extra Low Voltage (SELV) outputs.
17. This equipment must be provided with a readily accessible input power disconnect device as part of the building installation (such as a main power disconnect switch or external circuit breaker).

SAVE THESE INSTRUCTIONS.

User interface to system

Users interact with the Metropolis[®] DMXpress Access Multiplexer system using a PC and a windows-like graphical user interface (GUI). The GUI is called the WaveStar[®] Craft Interface Terminal (WaveStar[®] CIT), which permits you to perform system operations such as administration, provisioning, fault management, and more.

Using the WaveStar[®] CIT

Procedures or tasks presented in this document expect users to be familiar with operating the WaveStar[®] CIT and navigating through the screens of information relating to a particular operation. The screens are designed to be straightforward and to contain all information relating to a particular operation. The tasks presented in this document rely heavily on the information provided in the screen displays. Therefore, it is imperative that a user read all the information provided in a particular screen before continuing an operational function.

Appendix A, WaveStar[®] CIT Tutorial provides the introductory information about using the WaveStar[®] CIT.

Important! Use the WaveStar[®] CIT tutorial only with a network element that is out of service.

Using the tasks

To find instructions for performing a specific job, first determine the task category (for example acceptance, operations, or circuit order/provisioning). After determining the task category, go to the corresponding chapter and find the task in the chapter table of contents.

Using task elements

Task elements contain step-by-step instructions to accomplish a distinct user task. Task elements are provided in the following task chapters:

- [Chapter 7, “Acceptance Tasks”](#)
- [Chapter 8, “Operations Tasks”](#)
- [Chapter 9, “Circuit Order/Provisioning Tasks”](#)

All task elements in each task category are numbered and listed in numerical order. However, do not perform any of the tasks in numerical order unless directed to by a task element.

Important! Perform all steps in a task element sequentially, unless that step sends you to another step, task element, supporting element (SE), or a supporting task.

Unless otherwise instructed, if one task element sends you to another task element or supporting task, you must return to the first task element after you complete the second. After you have completed the first task element, you have finished the task.

Using supporting tasks

The tasks in [Chapter 10, “Supporting Tasks”](#) are referenced from multiple task elements to support a job function you are performing.

Go to a supporting task only when it is referred to by a main task element. Supporting tasks are not to be accessed directly except by very experienced personnel.

Important! Perform all steps in a supporting task in numeric order unless a step sends you to another task element, or supporting task.

Unless otherwise instructed, if one task element sends you to another task element or supporting task, you must return to the first task element after you complete the second. After you have completed the first main task element, you have finished the task.

If/Then statements in a task or supporting element

If .../Then ... columns in a task element contain only one condition that is true in a table cell under the If ... column. You perform the action in the related table cell under the Then ... column. You then continue to the next sequential step or as directed by the action under the Then ... column.

Verifying actions

Sometimes you will be asked to verify that actions have occurred. This may take the form of a formal statement of the expected response. At other times, the instructions will merely state verify that... If the expected response is not observed and a specific trouble-clearing reference is not made, you should reference the chapter entitled “Trouble-Clearing Tasks” in the *Metropolis® DMXpress Access Multiplexer Alarm Messages and Trouble Clearing Guide*, 365-372-315 to start trouble clearing.

Documentation ordering information

This section describes how to order

- Additional copies of this document
- Electronic documentation (CD-ROMs)

ILEC/CLEC Customers

ILEC/CLEC customers should process orders through your Company Documentation Coordinator.

Commercial Customers

The following table provides the information necessary for commercial customers to order standard documentation or request placement on the standing order list (for reissues of any document) by mail, telephone, or fax.

Table 2 Placing an Order (Mail, Email, Phone, or Fax)

Addresses	Telephone Numbers	Fax Numbers
Mailing Address: Lucent Learning Organization Attention: Order Entry 2855 N. Franklin Road P.O. Box 19901 Indianapolis, IN 46219 Email: intlorders@lucent.com	From USA: 1-888-LUCENT-8 (1-888-582-3688)	1-800-566-9568
	From Canada, North American Region: +1-317-322-6615	+1-317-322-6699
	From Europe, the Middle East, and Africa (EMEA), Asia, Pacific Region, and China; Caribbean, Latin America (CALA): +1-317-322-6416	+1-317-322-6699

The following table provides the information necessary for customers to order standard documentation or request placement on the standing order list (for reissues of any document) via the internet.

Table 3 Placing an Order via the Internet

Customer	Web-Site
Commercial Customers	http://www.lucentdocs.com
	http://www.lucent8.com
Lucent Associates	http://www.cic.lucent.com

Methods of payment Lucent Associates are billed using an FML organization number/cost center and location code.

Commercial customers may use one of the following methods of payment:

- Check (payable to Lucent Technologies)
- Money order (payable to Lucent Technologies)
- Invoice upon receipt of a purchase order.
(Purchase orders may be faxed or mailed using the information provided above.)
- Credit card:
 - Visa
 - MasterCard
 - American Express

Important! For orders totaling \$1000 or less, either a credit card or prepayment by check/money order is required.

Worldwide Services Lucent Worldwide Services provides a full life-cycle of services and solutions to help you plan, design, implement, and operate your network in today's rapidly changing and complex environment.

Engineering Services

Engineering Services provide information and technical support to customers during the planning, implementation, and placement of equipment into new or existing networks. We determine the best, most economical equipment solution for a customer and help ensure equipment is configured correctly for the customer's network needs, works as specified, and is ready for installation on delivery. These services consist of the following:

- Equipment engineering
- Software engineering
- Site records
- Engineering consulting
- Additional engineering services (for example, Network Realignment, System Capacity Planning, System Health Assessment)

Installation Services

Lucent Technologies offers Installation Services focused on providing the technical support and resources customers need to efficiently and cost-effectively install their network equipment. We offer a variety of options that provide extensive support and deliver superior execution to help ensure the system hardware is installed, tested, and functioning as engineered and specified. Installation Services provides a complete flexible solution tailored to meet customers' specific needs. These services consist of the following:

- Equipment installation
- Specialized equipment installation
- Network connectivity services
- Installation support services

Technical Support

Lucent Technologies provides the following Technical Support Services:

- Remote Technical Support (RTS) - remote technical support to troubleshoot and resolve system problems.
- On-site Technical Support (OTS) - on-site assistance with operational issues and remedial maintenance.
- Repair and Replacement (R&R) - technical support services for device repair/return or parts replacement.
- Lucent OnLine Customer Support - online access to information and services that can help resolve technical support requests.

Important! Technical Support Services are available 24 hours a day, 7 days a week.

Customers inside the United States and Canada

Technical Support Services can be reached at **1-866-LUCENT8** (866-582-3688): *Prompt 1.*

Customers outside the United States

Technical Support Services can be reached at **+1-630-224-4672**: *Prompt 2.*

Web-Site

For additional information regarding Worldwide Services, refer to the Lucent Technologies' web-site at <http://www.lucent.com/products>

1. Click on **Browse the catalog**
2. Click on **Worldwide Services Solutions**
3. Select the desired service to display:
 - Engineering and Installation
 - Technical Support Services

Training This document expects a user to be familiar with the basic functions of the system before performing tasks that could damage the system, affect system operations, or impede communication traffic within the system. Understanding the descriptive material provided in this manual and attending the recommended training courses should allow you to perform the tasks necessary to operate and maintain Metropolis[®] DMXpress.

Refer to <https://www.lucent-product-training.com> for descriptions of the training courses available for Metropolis[®] DMXpress.

Registering for a course

To review the available courses or to enroll in a training course at one of Lucent's corporate training centers,

- Within the United States,
 - Visit <https://www.lucent-product-training.com>
 - Call **1-888-LUCENT8** (888-582-3688): *Prompt 2.*
- Outside the continental United States,
 - Visit <https://www.lucent-product-training.com>
 - Contact your in-country training representative
 - Call: **+1-407-767-2798**
 - Fax: **+1-407-767-2677**

Suitcasing

To arrange for a suitcase session at your facility,

- Within the United States, call **1-888-LUCENT8** (888-582-3688):
Prompt 2.
- Outside the continental United States,
 - Contact your in-country training representative
 - Call: **+1-407-767-2798**
 - Fax: **+1-407-767-2677**

How to comment

Because 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.

Is the form missing?

If the customer comment form is missing, you may submit comments by fax, email, or on-line.

Fax: 1-407-767-2760

Email: ctiphotline@lucent.com

URL: <http://www.lucent-info.com/comments>





1 Product Description

| Overview

Purpose This chapter provides detailed descriptions and illustrations of the Metropolis[®] DMX*press* equipment.

Contents

The following topics are discussed in this chapter:

Overview of Metropolis® DMXpress Access Multiplexer	1 - 3
Feature Descriptions (Release 1.1)	1 - 6
Feature Descriptions (Release 2.0)	1 - 7
OC48/1.3I2 Main Circuit Pack (A1AA005)	1 - 9
OC-48 DWDM Main Circuit Pack (A1AA121-159)	1 - 11
OC12/1.3I2 Main Circuit Pack (A1AA016)	1 - 13
DS1/DS3/16/1 TDM Circuit Pack (A1AA006)	1 - 15
DS3/12 TDM Circuit Pack (A1AA015)	1 - 18
OC-3 Low Speed Circuit Pack (A1AA017)	1 - 20
OC-12 Low Speed Circuit Pack (A1AA018)	1 - 22
FASTE/16 Ethernet Circuit Pack (A1AA007)	1 - 24
GbE/2 Ethernet Circuit Pack (A1AA008)	1 - 26
GbE/SX/2 Ethernet Circuit Pack (A1AA019)	1 - 28
Mounting Configurations	1 - 32
Synchronization	1 - 38
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Overview of Metropolis[®] DMXpress Access Multiplexer

Overview The Metropolis[®] DMXpress Access Multiplexer (Metropolis[®] DMXpress) is a single-shelf, compact multiplexer designed to provide customers with “last mile” fiber reach access. Metropolis[®] DMXpress supports OC-48 and OC-12 unidirectional path-switch rings (UPSRs), Ethernet circuit packs, DS1 and DS3 interfaces, OC-3 and OC-12 interfaces, and provides integrated VT1.5 and STS-N switch fabrics.

Customer needs Metropolis[®] DMXpress is designed to be a low cost, physically smaller client of Lucent Technologies’ Metropolis[®] DMX Access Multiplexer. Metropolis[®] DMXpress may be integrated into a variety of physical environments within the ILEC/CLEC market, including

- Central office (CO) locations
- Co-located central office locations
- Customer premise equipment (CPE) sites

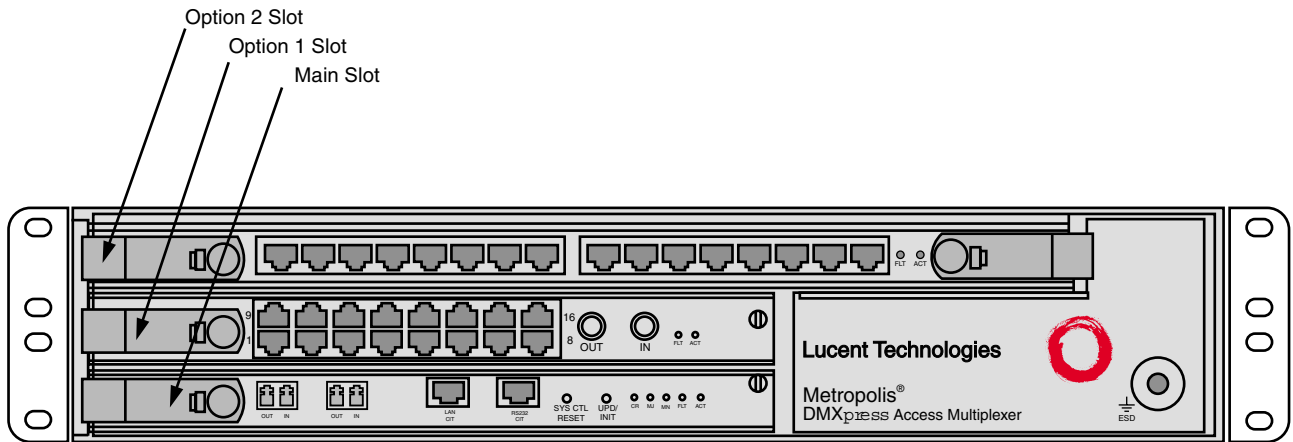
Important! ILEC/CLEC refers to Incumbent/Independent Local Exchange Carrier and Competitive Local Exchange Carrier.

Metropolis[®] DMXpress Metropolis[®] DMXpress is a compact shelf with the following three circuit pack slots:

- Main Slot (bottom slot): equipped with either:
 - an OC48/1.3I2 Main circuit pack
 - an OC12/1.3I2 Main circuit pack
 - Or an OC48 CHx/CHy (DWDM) OLIU Main circuit pack.
- Option 1 Slot (middle slot): either
 - unequipped
 - equipped with a DS1/DS3/16/1 circuit pack
 - equipped with a DS3/12 circuit pack
 - equipped with an OC3LS/4 circuit pack
 - equipped with an OC12LS/2 circuit pack
- Option 2 Slot (top slot): either
 - unequipped
 - equipped with a FASTE/16 Ethernet circuit pack
 - equipped with a GbE/2 Ethernet circuit pack

- equipped with a GbE/SX/2 Ethernet circuit pack

Figure 1-1 Metropolis® DMXpress Shelf



NC-Xpress-029

Shelf dimensions

The dimensions of the Metropolis® DMXpress shelf are

- 3.5 in./88.9 mm high (two rack units [2RU])
- 17.3 in./439.4 mm wide
- 15.0 in./381.0 mm deep

Virtual slots

Because a single Metropolis® DMXpress slot, and therefore, a single circuit pack, can encompass the functionality of numerous circuit packs, these unique functionalities are identified in the system infrastructure by virtual slots (vslot).

- Main Slot (OC48/1.3I2 circuit pack) includes the following three vslots:
 - SYSCTL: the system control functions
 - M1: one OC-48 interface and the timing functions
 - M2: one OC-48 interface
- Main Slot (OC12/1.3I2 circuit pack) includes the following three vslots:
 - SYSCTL: the system control functions
 - M1: one OC-12 interface and the timing functions
 - M2: one OC-12 interface
- Main Slot (OC48 PWDM OLIU circuit pack) includes the following three vslots:
 - SYSCTL: the system control functions

- M1: one Passive OC-48 interface and the timing functions
- M2: one Passive OC-48 interface
- Option 1 Slot, when equipped with a DS1/DS3/16/1 circuit pack, includes the following two vslots:
 - A1: sixteen DS1 interfaces
 - B1: one DS3 interface
- Option 1 Slot, when equipped with a DS3/12 circuit pack, includes one vslot, G2, for twelve DS3 interfaces.
- Option 1 Slot, when equipped with an OC3LS/4 circuit pack, includes one Vslot, G2, for 4 OC-3 ports
- Option 1 Slot, when equipped with an OC12LS/2 circuit pack, includes one Vslot, G2, for 2 OC-12 ports
- Option 2 Slot (FASTE/16, GbE/SX/2, or GbE/2 circuit pack) includes a single vslot, D1. The functionality of vslot D1 depends of the type of Ethernet circuit pack that is installed in the Option 2 Slot:
 - D1: sixteen 10/100BaseT Ethernet interfaces if the FASTE/16 circuit pack is installed
 - D1: two 1000BaseLX gigabit Ethernet interfaces, if the GbE/2 circuit pack is installed
 - D1: two 1000BaseSX gigabit Ethernet interfaces, if the GbE/SX/2 circuit pack is installed

**Product interworking
(transmission and
communication)**

Metropolis® DMXpress supports transmission and communication (via DCC) interworking between Metropolis® DMXpress and Metropolis® DMX Access Multiplexer over OC-48 or OC-12 UPSRs.

Reference

For more information about Metropolis® DMXpress network application solutions, refer to the *Metropolis® DMXpress Access Multiplexer Applications and Planning Guide, 365-372-312*.



Feature Descriptions (Release 1.1)

Overview This section briefly describes the major new features of Metropolis[®] DMXpress, Release 1.1.

Ethernet enhancements The Metropolis[®] DMXpress Ethernet interfaces support Virtual Local Area Network (VLAN) transparency and the rapid spanning tree protocol. VLAN transparency eliminates the requirement to coordinate VLAN assignments between customers and service providers, simplifies network administration, and effectively increases the VLAN space from 4K to 16 million.

Rapid spanning tree protocol reduces packet-layer restoration times from tens of seconds to a few hundred milliseconds. (Restoration time is a function of network size and configuration, and location of failure.)

End-to-end flow control Metropolis[®] DMXpress supports end-to-end flow control interoperability. In private line mode, Metropolis[®] DMXpress supports optional propagation of flow control (PAUSE) frames across the SONET network when congestion occurs.

Metropolis[®] DMXpress also supports local flow control for sub-rate applications.

VLAN tagging Support of 4093 Virtual Local Area Networks (VLANs) and stacked VLANs for customer identification and isolation.

Non service affecting software upgrades The Ethernet circuit packs support non service affecting software upgrades. After a software upgrade, the Ethernet circuit packs perform a warm boot to restart with the new software. The warm boot completes the software upgrade without affecting the service (no transmission hits).

Enhanced TCP/IP Enhanced TCP/IP enables software downloads and copy using FTP.

Battery backup Metropolis[®] DMXpress is compatible with battery backup systems that provide uninterruptible power. If AC power is interrupted, batteries are automatically switched on to provide continuous power.



Feature Descriptions (Release 2.0)

Overview	This section briefly describes the major new features of Metropolis® DMXpress, Release 2.0.	
New Circuit Packs	Release 2.0 introduces the following circuit packs:	
	OC12/1.3I2	A new Main circuit pack with an OC-12 interface
	OC48/DWDM series	A new Main circuit pack with an OC-48 interface coming from a Passive DWDM shelf
	OC-3 Low Speed Interface	An OC-3 Low Speed interface circuit pack with 4 ports
	OC-12 Low Speed Interface	An OC-12 Low Speed interface circuit pack with 2 ports
	GbE/SX/2	A short reach Gigabit Ethernet circuit pack
Passive Wavelength Division Multiplexing	Release 2 will add the Passive DWDM shelf to allow 32 wavelengths to be translated into any particular wavelength.	
Intra-function group hairpin cross-connects	Release 2.0 supports cross-connections between OC-N ports on the same LS circuit pack. These cross-connections do not utilize bandwidth on the high speed UPSR ring. For more details, look in Chapter 5.	



Circuit Packs

Overview This section provides a quick reference of the different circuit packs used in Metropolis® DMXpress and their release compatibility.

Supported circuit packs The following table lists each circuit pack supported by Metropolis® DMXpress.

Circuit Pack	Apparatus Code	Slot(s)	Release	Comments
OC48/1.3I2 Main	AA1A005	Main	1.0	OC-48 Main circuit pack with 2 ports
OC48 CHx/CHy Main series	AA1A121-AA1A159	Main	2.0	OC-48 Main circuit pack with 2 ports to interface with passive DWDM shelf
OC12/1.3I2 Main	AA1A016	Main	2.0	OC-12 Main circuit pack with 2 ports
DS1/DS3/16/1 TDM	AA1A006	Option Slot 1 DS1 Vslot A1 DS3 Vslot B1	1.0	16 DS1 ports and 1 DS3 port
DS3/12 TDM	AA1A015	Option Slot 1 Vslot G2	1.0	12 DS3 ports
OC3LS/4 OLIU	A1AA017	Option Slot 1 Vslot G2	2.0	4 OC-3 ports on the low speed side
OC12LS/2 OLIU	A1AA018	Option Slot 1 Vslot G2	2.0	2 OC-12 ports on the low speed side
FASTE/16 Ethernet	A1AA007	Option Slot 2 Vslot D1	1.0	16 10/100 BaseT interface ports
GbE/2 Ethernet	A1AA008	Option Slot 2 Vslot D1	1.0	2 Gigabit (1000BaseT) Ethernet ports Long Reach
GbE/SX/2 Ethernet	AA1A019	Option Slot 2 Vslot D1	2.0	2 Gigabit (1000BaseT) Ethernet ports Short Reach



OC48/1.3I2 Main Circuit Pack (A1AA005)

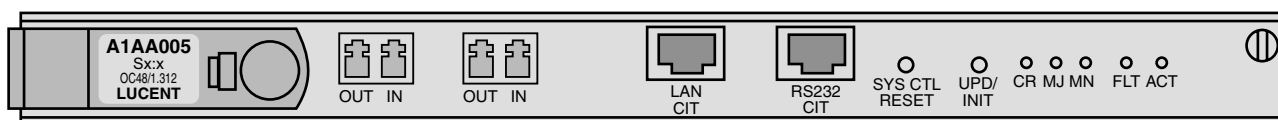
Overview The main slot of the Metropolis® DMXpress shelf is always equipped with the OC48/1.3I2 main circuit pack.

Definition The OC48/1.3I2 main circuit pack provides high-speed, optical transmission interfaces, system control, and system timing functions to Metropolis® DMXpress.

The abbreviated name (OC48/1.3I2) that appears of the faceplate of the circuit pack represents the following:

- **OC48:** OC-48 interfaces
- **1.3:** 1.3 μm wavelength range
- **I:** Intermediate reach (15 km)
- **2:** two (OC-48) ports

Figure 1-2 OC48/1.3I2 Main Circuit Pack



NC-Xpress-031

Optical ports The OC48/1.3I2 circuit packs provides two bidirectional, OC-48 optical ports (Main 1 and Main 2). The Main 1 **OUT** and **IN** connectors are on the left, and the Main 2 OUT and IN connectors on the right. These optical interfaces use LC-type connectors. The receiver sensitivity for these OC-48 interfaces is 0 to -18.0 dBm.

LAN ports The OC48/1.3I2 circuit packs provides two ports that can provide WaveStar® CIT access to Metropolis® DMXpress:

- **LAN CIT** port: 10/100BaseT intraoffice local area network interface
- **RS232 CIT** port: serial interface

Both ports use RJ-45 connectors.

LEDs Although Metropolis® DMXpress does not have a traditional user panel, the OC48/1.3I2 main circuit pack provides similar light emitting diodes (LEDs) and CIT/LAN connectors usually found on a user panel.

Reference

Refer to [Figure 1-2](#) for location of the LEDs and to [Chapter 2, “Operations Interfaces”](#) in this manual for details about the LEDs.



OC-48 DWDM Main Circuit Pack (A1AA121-159)

Overview The main slot of the Metropolis® DMXpress shelf can be equipped with the OC12/1.3I2, the OC48/1.3I2, or one of the OC-48 PWDM main circuit packs.

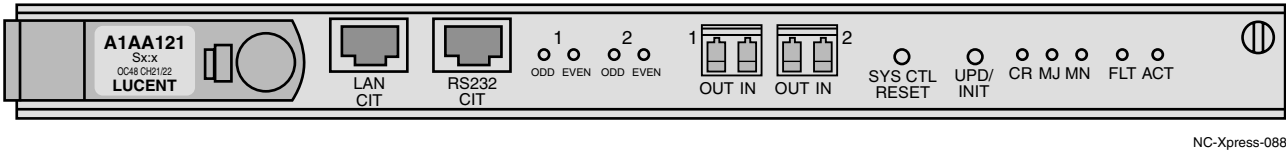
Definition The Metropolis® DMXpress OC48 PWDM OLIUs are optical port units designed for use with passive MUX/DMUX and optical add/drop shelves. These are available in 32 different wavelengths. Each port unit supports two wavelengths via a special hardware configuration. These units are compatible with the SONET and SDH standards.

Table 1-1 OC48 PWDM Circuit Packs

Circuit Pack Name	Channels
A1AA121	CH21/22
A1AA123	CH23/24
A1AA125	CH25/26
A1AA127	CH27/28
A1AA131	CH31/32
A1AA133	CH33/34
A1AA135	CH35/36
A1AA137	CH37/38
A1AA143	CH42/43
A1AA145	CH44/45
A1AA147	CH46/47
A1AA149	CH48/49
A1AA153	CH52/53
A1AA155	CH54/55
A1AA157	CH56/57
A1AA159	CH58/59

The passive optical port units are designed to be used with the Lucent Passive Optics Shelves. By using the DWDM passive optical port units and the Passive Optic Shelves, you are able to increase fiber capacity by a factor of 2, 4, 16, or 32.

Figure 1-3 OC48 PWDM Main Circuit Pack



Optical ports The OC48 PWDM circuit packs provide two bidirectional, OC-48 optical ports (Main 1 and Main 2). The Main 1 **OUT** and **IN** connectors are on the left, and the Main 2 OUT and IN connectors on the right. These optical interfaces use LC-type connectors. The receiver sensitivity for these OC-48 interfaces is -31 to -28.0 dBm.

LAN ports The OC48 PWDM circuit packs provides two ports that can provide WaveStar® CIT access to Metropolis® DMXpress:

- **LAN CIT** port: 10/100BaseT intraoffice local area network interface
- **RS232 CIT** port: serial interface

Both ports use RJ-45 connectors.

LEDs Although Metropolis® DMXpress does not have a traditional user panel, the OC48 PWDM main circuit pack provides similar light emitting diodes (LEDs) and CIT/LAN connectors usually found on a user panel.

Reference

Refer to [Figure 1-2](#) for location of the LEDs and to [Chapter 2, “Operations Interfaces”](#) in this manual for details about the LEDs.



OC12/1.3I2 Main Circuit Pack (A1AA016)

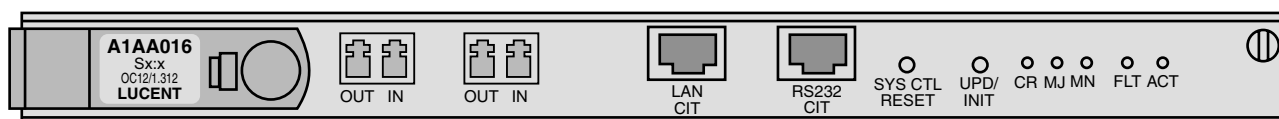
Overview The main slot of the Metropolis® DMXpress shelf can be equipped with the OC12/1.3I2, OC48/1.3I2 or the OC48 PWDM main circuit pack.

Definition The OC12/1.3I2 main circuit pack provides high-speed, optical transmission interfaces, system control, and system timing functions to Metropolis® DMXpress.

The abbreviated name (OC12/1.3I2) that appears of the faceplate of the circuit pack represents the following:

- **OC12:** OC-12 interfaces
- **1.3:** 1.3 μ m wavelength range
- **I:** Intermediate reach (15 km)
- **2:** two (OC-12) ports

Figure 1-4 OC12/1.3I2 Main Circuit Pack



NC-Xpress-085

Optical ports The OC12/1.3I2 circuit packs provides two bidirectional, OC-12 optical ports (Main 1 and Main 2). The Main 1 **OUT** and **IN** connectors are on the left, and the Main 2 OUT and IN connectors on the right. These optical interfaces use LC-type connectors. The receiver sensitivity for these OC-12 interfaces is -31 to -28.0 dBm.

LAN ports The OC12/1.3I2 circuit packs provides two ports that can provide WaveStar® CIT access to Metropolis® DMXpress:

- **LAN CIT** port: 10/100BaseT intraoffice local area network interface
- **RS232 CIT** port: serial interface

Both ports use RJ-45 connectors.

LEDs Although Metropolis[®] DMXpress does not have a traditional user panel, the OC12/1.3I2 main circuit pack provides similar light emitting diodes (LEDs) and CIT/LAN connectors usually found on a user panel.

Reference

Refer to [Figure 1-4](#) for location of the LEDs and to [Chapter 2, “Operations Interfaces”](#) in this manual for details about the LEDs.



DS1/DS3/16/1 TDM Circuit Pack (A1AA006)

Overview The Option 1 Slot of the Metropolis® DMXpress shelf can be unequipped, or equipped with either a DS3/12 time division multiplex (TDM) circuit pack, a DS1/DS3/16/1 TDM circuit pack, an OC-3 Low Speed Optical interface circuit pack, or an OC-12 Low Speed Optical interface circuit pack.

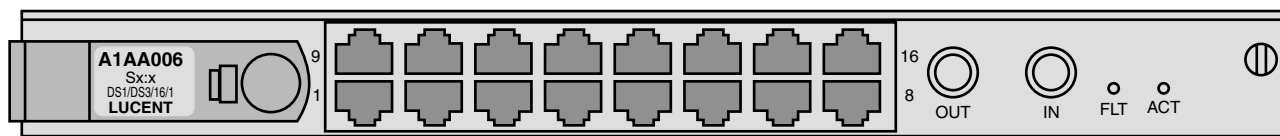
Definition The DS1/DS3/16/1 TDM circuit pack provides bidirectional interfaces for:

- 16 DS1 (1.544 MHz) signals (vslot: A1)
- 1 DS3 (44.736 MHz) signal (vslot: B1)

The abbreviated name (DS1/DS3/16/1) that appears on the faceplate of the circuit pack represents the following:

- **DS1**: DS1 interfaces
- **DS3**: DS3 interface
- **16**: sixteen DS1 interfaces
- **1**: one DS3 interface

Figure 1-5 DS1/DS3/16/1 TDM Circuit Pack



NC-Xpress-032

DS1 ports The DS1 ports (vslot A1) use RJ-45 connectors and are labeled **1-16** on the faceplate. Vslot A1 in the DS1/DS3/16/1 circuit pack performs:

- DS1 to STS-1 mapping
- STS-1 to DS1 mapping

STS-1 to DS1 mapping

In the receive direction, the DS1/DS3/16/1 circuit pack receives STS-1 data, via the backplane, from the main circuit pack. The circuit pack performs STS-1 pointer interpretation, checks the parity and signal label, removes and processes the path overhead, and byte disinterleaves the STS-1 payload into four VT-G formatted streams. The four VT-G

formatted streams are then de-multiplexed into 16 VT1.5 formatted streams that are mapped into 16 DS1 signals.

DS1 to STS-1 mapping

In the transmit direction, the DS1/DS3/16/1 circuit pack maps 16 DS1 signals into 16 VT1.5 formatted streams. The 16 VT1.5 signals are then multiplexed into four VT-Gs formatted streams. The four VT-G signals along with STS-1 path overhead, a valid STS-1 pointer, signal label and parity, are byte interleaved into a single STS-1 formatted stream. The STS-1 formatted stream is directed through the backplane to the Main circuit pack.

DS3 ports The DS3 interface (vslot B1) uses two BNC connectors and are labeled 1 (OUT) and 2 (IN) on the faceplate. Each port provides unidirectional (either transmit or receive) transmission for a single DS3 signal. Vslot B1 in the DS1/DS3/16/1 circuit pack performs:

- STS-1 to DS3 mapping
- DS3 to STS-1 mapping

STS-1 to DS3 mapping

In the receive direction, the DS1/DS3/16/1 circuit pack receives STS-1 data, via the backplane, from the Main circuit pack. The DS1/DS3/16/1 circuit pack performs pointer interpretation, desynchronizes the embedded DS3, violation monitoring and removal (VMR), and then B3ZS encodes the signal for DS3 transmission. A line build-out network can be inserted to provide the required signal level and shape

DS3 to STS-1 mapping

In the transmit direction, the DS1/DS3/16/1 circuit pack receives incoming B3ZS encoded DS3 signal. The circuit pack performs equalization, clock recovery, B3ZS decoding, VMR, and automatic AIS insertion. The circuit pack synchronizes the DS3 signal to the STS-1 payload rate and adds STS-1 transport bytes to form an STS-1 rate signal. The circuit pack then synchronizes the STS-1 signal to the system clock and delivers it to the Main circuit pack.

LEDs The DS1/DS3/16/1 TDM circuit pack is equipped with two light emitting diodes (LEDs):

- **FLT LED:** red Fault LED
 - Lights autonomously upon pack insertion
 - Lights when Metropolis® DMXpress detects a failure with the DS1/DS3/16/1 circuit pack

- Flashes when Metropolis[®] DMXpress detects either an LOS, LOF, LOP, AIS, or SF (DS1 signals) or an LOS (DS3 signal) on the DS1/DS3/16/1 circuit pack
- Off when the DS1/DS3/16/1 circuit pack is receiving power and operating normally
- **ACT LED:** green Active LED
 - Lights when the DS1/DS3/16/1 circuit pack is receiving power and operating normally
 - Off when the **FLT LED** is illuminated



DS3/12 TDM Circuit Pack (A1AA015)

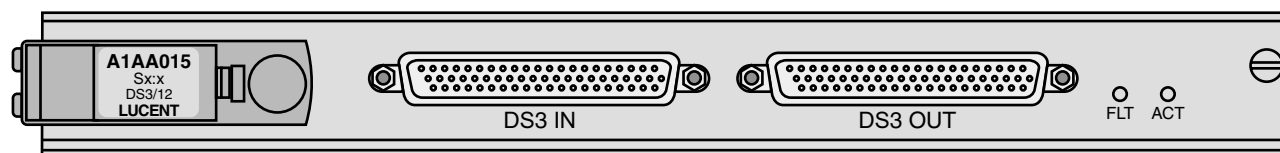
Overview The Option 1 Slot of the Metropolis® DMXpress shelf can be unequipped, or equipped with either a DS3/12 time division multiplex (TDM) circuit pack, a DS1/DS3/16/1 TDM circuit pack, an OC-3 Low Speed Optical interface circuit pack, or an OC-12 Low Speed Optical interface circuit pack.

Definition The DS3/12 TDM circuit pack provides bidirectional interfaces for 12 DS3 (44.736 MHz) signals (vslot: G2).

The abbreviated name (DS3/12) that appears of the faceplate of the circuit pack represents the following:

- **DS3:** DS3 interfaces
- **12:** twelve DS3 interfaces

Figure 1-6 DS3/12 TDM Circuit Pack



NC-Xpress-055

DS3 ports The DS3 connections (vslot G2) use two 62-pin D-sub connectors labeled **DS3 IN** and **DS3 OUT** on the faceplate. Each connection provides unidirectional (transmit or receive) transmission for twelve DS3 signals. Vslot G2 in the DS3/12 circuit pack performs:

- STS-1 to DS3 mapping
- DS3 to STS-1 mapping

STS-1 to DS3 mapping

In the receive direction, the DS3/12 circuit pack receives STS-1 data, via the backplane, from the main circuit pack. The DS3/12 circuit pack performs pointer interpretation, desynchronizes the embedded DS3, violation monitoring and removal (VMR), and then B3ZS encodes the signals for DS3 transmission. A line build-out network can be inserted to provide the required signal level and shape

DS3 to STS-1 mapping

In the transmit direction, the DS3/12 circuit pack receives incoming B3ZS encoded DS3 signals. The circuit pack performs equalization,

clock recovery, B3ZS decoding, VMR, and automatic AIS insertion. The circuit pack synchronizes the DS3 signals to the STS-1 payload rate and adds STS-1 transport bytes to form an STS-1 rate signal. The circuit pack then synchronizes the STS-1 signal to the system clock and delivers it to the main circuit pack.

LEDs The DS3/12 TDM circuit pack is equipped with two light emitting diodes (LEDs):

- **FLT LED:** red Fault LED
 - Lights autonomously upon pack insertion
 - Lights when Metropolis® DMXpress detects a failure with the DS3/12 circuit pack
 - Flashes when Metropolis® DMXpress detects an LOS on the DS3/12 circuit pack
 - Off when the DS3/12 circuit pack is receiving power and operating normally
- **ACT LED:** green Active LED
 - Lights when the DS1/DS3/16/1 circuit pack is receiving power and operating normally
 - Off when the **FLT** LED is illuminated



OC-3 Low Speed Circuit Pack (A1AA017)

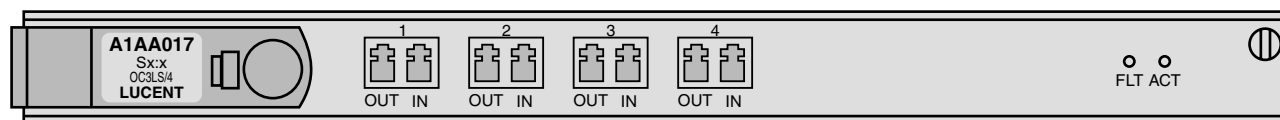
Overview The Option 1 Slot of the Metropolis® DMXpress shelf can be unequipped, or equipped with either a DS3/12 time division multiplex (TDM) circuit pack, a DS1/DS3/16/1 TDM circuit pack, an OC-3 Low Speed Optical interface circuit pack, or an OC-12 Low Speed Optical interface circuit pack.

Definition The OC3LS/4 optical circuit pack provides interfaces for 4 OC-3 signals (vslot: G2).

The abbreviated name (OC3LS/4) that appears of the faceplate of the circuit pack represents the following:

- **OC3:** OC-3 interfaces
- **LS:** Low Speed side
- **4:** 4 ports

Figure 1-7 OC3LS/4 TDM Circuit Pack



NC-Xpress-086

OC-3 ports The OC-3 connections (vslot G2) use LC type connectors labeled *IN* and *OUT 1, 2, 3, and 4* on the faceplate.

LEDs The OC3LS/4 circuit pack is equipped with two light emitting diodes (LEDs):

- **FLT LED:** red Fault LED
 - Lights autonomously upon pack insertion
 - Lights when Metropolis® DMXpress detects a failure with the OC3LS/4 circuit pack
 - Flashes when Metropolis® DMXpress detects an LOS on the OC3LS/4 circuit pack
 - Off when the OC3LS/4 circuit pack is receiving power and operating normally
- **ACT LED:** green Active LED

- Lights when the OC3LS/4 circuit pack is receiving power and operating normally
- Off when the **FLT** LED is illuminated



OC-12 Low Speed Circuit Pack (A1AA018)

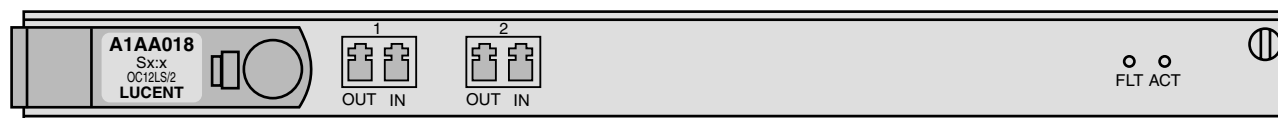
Overview The Option 1 Slot of the Metropolis® DMXpress shelf can be unequipped, or equipped with either a DS3/12 time division multiplex (TDM) circuit pack, a DS1/DS3/16/1 TDM circuit pack, an OC-3 Low Speed Optical interface circuit pack, or and OC-12 Low Speed Optical interface circuit pack

Definition The OC12LS/2 circuit pack provides optical interfaces for Dual OC-12 signals (vslot: G2).

The abbreviated name (OC12LS/2) that appears of the faceplate of the circuit pack represents the following:

- **OC-12:** OC-12 interfaces
- **LS:** Low Speed side
- **2:** 2 ports

Figure 1-8 OC12LS/2 Optical Circuit Pack



NC-Xpress-087

OC-12 ports The OC-12 connections (vslot G2) use two LC-type connectors labeled *1 OUT* and *IN* and *2 OUT* and *IN* on the faceplate.

LEDs The OC12LS/2 circuit pack is equipped with two light emitting diodes (LEDs):

- **FLT LED:** red Fault LED
 - Lights autonomously upon pack insertion
 - Lights when Metropolis® DMXpress detects a failure with the OC12LS/2 circuit pack
 - Flashes when Metropolis® DMXpress detects an LOS on the OC12LS/2 circuit pack
 - Off when the OC12LS/2 circuit pack is receiving power and operating normally
- **ACT LED:** green Active LED

- Lights when the OC12LS/2 circuit pack is receiving power and operating normally
- Off when the **FLT** LED is illuminated



FASTE/16 Ethernet Circuit Pack (A1AA007)

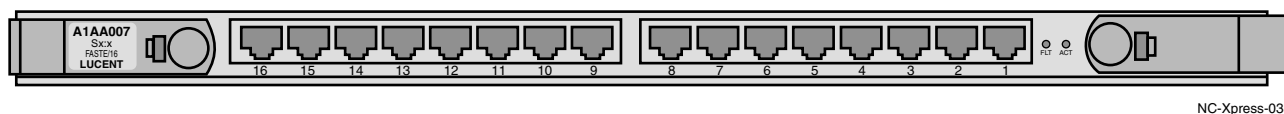
Overview The Option 2 Slot of the Metropolis® DMXpress shelf can be unequipped, or equipped with either a FASTE/16 Ethernet circuit pack, a GbE/2, or the GbE/SX/2 Ethernet circuit pack.

Definition The FASTE/16 circuit pack transports data at the rate of 10/100 Mb/s using standard Ethernet switching (IEEE 802.1), standard encapsulation (T1X1.5/2000-147), and standard virtual concatenation (ITUG.707). The circuit pack can accept data in either the 10BaseT or 100BaseT format.

The abbreviated name (FASTE/16) that appears of the faceplate of the circuit pack represents the following:

- **FAST:** Fast (10/100BaseT)
- **E:** Ethernet
- **16:** sixteen 10/100BaseT interface ports

Figure 1-9 FASTE/16 Ethernet Circuit Pack



Ethernet ports The FASTE/16 circuit pack is equipped with sixteen 10/100BaseT data ports (vslot D1). The FASTE/16 circuit pack uses RJ-45 connectors.

LEDs The FASTE/16 Ethernet circuit pack is equipped with two light emitting diodes (LEDs):

- **FLT LED:** red Fault LED
 - Lights autonomously upon pack insertion
 - Lights when Metropolis® DMXpress detects a failure with the FASTE/16 circuit pack
 - Flashes when Metropolis® DMXpress detects an LOS on the FASTE/16 circuit pack
 - Off when the FASTE/16 circuit pack is receiving power and operating normally
- **ACT LED:** green Active LED

- Lights when the FASTE/16 circuit pack is receiving power and operating normally
- Off when the **FLT** LED is illuminated



GbE/2 Ethernet Circuit Pack (A1AA008)

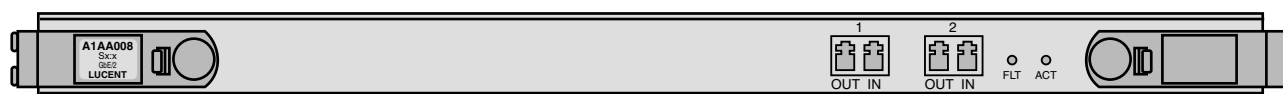
Overview The Option 2 Slot of the Metropolis® DMXpress shelf can be unoccupied, or equipped with either a GbE/2, GbE/SX/2 Ethernet circuit pack or a FASTE/16 Ethernet circuit pack. The GbE/2 is the Long reach version of the Gigabit Ethernet circuit pack.

Definition The GbE/2 Ethernet circuit pack provides data transport for 1000BaseLX signals via two optical ports.

The abbreviated name (GbE/2) that appears on the faceplate of the circuit pack represents the following:

- **Gb**: gigabit (1000BaseLX)
- **E**: Ethernet
- **2**: two (Gb) ports

Figure 1-10 GbE/2 Ethernet Circuit Pack



NC-Xpress-039

Optical ports The GbE/2 circuit pack is equipped with two optical ports (vslot D1), labeled 1 and 2. Each port is equipped with two LC-type connectors labeled **OUT** and **IN**. This GbE/2 circuit pack uses optical fibers with long-wavelength optical transmission and single mode fiber to transport its data.

- LEDs** The GbE/2 Ethernet circuit pack is equipped with two light emitting diodes (LEDs):
- **FLT LED:** red Fault LED
 - Lights autonomously upon pack insertion
 - Lights when Metropolis® DMXpress detects a failure with the GbE/2 circuit pack
 - Flashes when Metropolis® DMXpress detects an LOS on the GbE/2 circuit pack
 - Off when the GbE/2 circuit pack is receiving power and operating normally
 - **ACT LED:** green Active LED
 - Lights when the GbE/2 circuit pack is receiving power and operating normally
 - Off when the **FLT LED** is illuminated



GbE/SX/2 Ethernet Circuit Pack (A1AA019)

Overview The Option 2 Slot of the Metropolis® DMXpress shelf can be unoccupied, or equipped with either a GbE/2 Ethernet circuit pack, a GbE/SX/2 Ethernet circuit pack, or a FASTE/16 Ethernet circuit pack.

Definition The GbE/SX/2 Ethernet circuit pack provides data transport for 1000BaseSX signals via two optical ports.

The abbreviated name (GbE/SX/2) that appears on the faceplate of the circuit pack represents the following:

- **Gb**: gigabit (1000BaseSX)
- **E**: Ethernet
- **SX**: Short Reach
- **2**: two (Gb) ports

Figure 1-11 GbE/SX/2 Ethernet Circuit Pack



NC-Xpress-039

Optical ports The GbE/SX/2 circuit pack is equipped with two optical ports (vslot D1), labeled 1 and 2. Each port is equipped with two LC-type connectors labeled **OUT** and **IN**. This GbE/SX/2 circuit pack uses optical fibers with short-wavelength optical transmission and multimode fiber to transport its data.

LEDs The GbE/SX/2 Ethernet circuit pack is equipped with two light emitting diodes (LEDs):

- **FLT LED**: red Fault LED
 - Lights autonomously upon pack insertion
 - Lights when Metropolis® DMXpress detects a failure with the GbE/SX/2 circuit pack
 - Flashes when Metropolis® DMXpress detects an LOS on the GbE/SX/2 circuit pack
 - Off when the GbE/SX/2 circuit pack is receiving power and operating normally
- **ACT LED**: green Active LED

- Lights when the GbE/SX/2 circuit pack is receiving power and operating normally
- Off when the **FLT** LED is illuminated

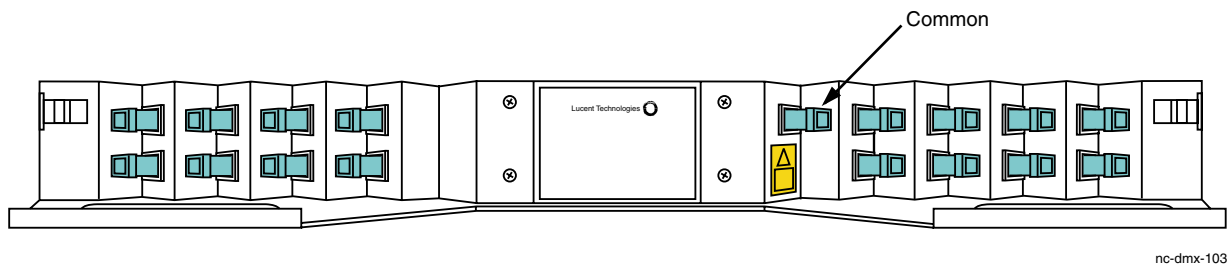


Passive Optics Shelf

Overview The Passive Optics shelf is a lower-cost solution in using DWDM for transmitting large amounts of traffic on one fiber. The shelf fits in a bay frame with Metropolis® DMXpress. The Passive Optics shelf does not require any power supply or management system. The Passive Optics shelf interfaces with the Metropolis® DMXpress shelf via the OC48 PWDW circuit packs.

The following figure shows an example of a Passive Optics shelf.

Figure 1-12 Passive Optics Shelf



- Dimensions** The Passive Optics shelf is:
- 74.00 mm (2.913 in.) high, Max.
 - 498.00 mm (19.606 in.) wide, Max. (without mounting flange)
 - 378.64 mm (14.907 in.) deep, Max.

Configurations

The Passive Optics shelf is available in the following configurations:

- 16 Channel MUX: This configuration supports unidirectional and bidirectional transmission systems.
- 16 Channel DMUX: This configuration supports unidirectional and bidirectional transmission systems. The filters are cascaded in reverse order of the 16 Channel MUX module.
- 16 Channel MUX with Interleaver: This configuration supports unidirectional and bidirectional transmission systems, and includes an interleaver to support 16 additional channels.
- 16 Channel DMUX with Interleaver: This configuration supports unidirectional and bidirectional transmission systems, and includes an interleaver to support 16 additional channels.
- 1 Channel Dual Optical Add Drop Module (OADM): This configuration supports unidirectional transmission systems only and can add/drop one channel. (Two OADMs are provided with each shelf.)
- 2 Channel Dual Optical Add Drop Module (OADM): This configuration supports unidirectional transmission systems only and can add/drop one channel.
- 4 Channel Dual Optical Add Drop Module (OADM): This configuration supports unidirectional transmission systems only and can add/drop one channel.

Applications

The Passive Optics shelf supports the following applications:

- 1, 2, or 4 unidirectional wavelengths (optical add drop only)
- 16 unidirectional/bidirectional wavelengths
- 32 unidirectional/bidirectional wavelengths.



Mounting Configurations

Overview Metropolis® DMXpress may be mounted in different manners.

Hardware Metropolis® DMXpress is always shipped with

- the brackets necessary to mount the shelf in a 19-inch bay frame
- the adhesive-back rubber feet necessary to mount the shelf on a desk/table-top

However, additional mounting equipment may be required to mount Metropolis® DMXpress in the additional manners:

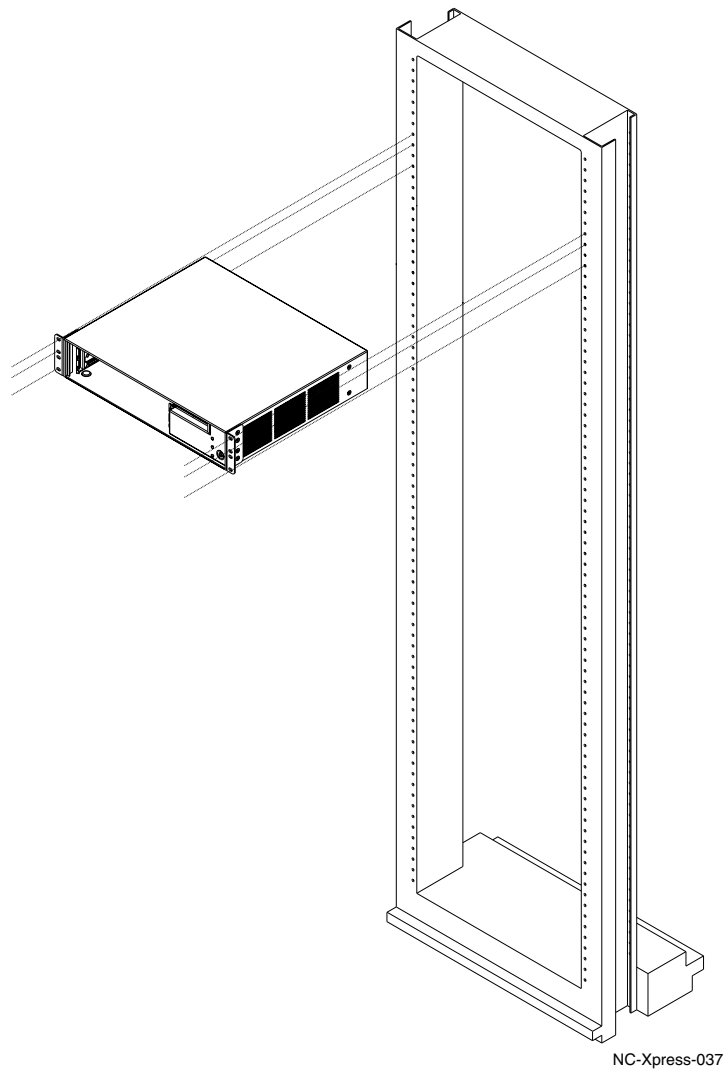
- 23-inch bay frame
- wall-mount

Mounting options This section provides illustrations of the various mounting options.

19-inch bay frame

[Figure 1-13](#) illustrates the option of mounting Metropolis® DMXpress in a 19-inch bay frame.

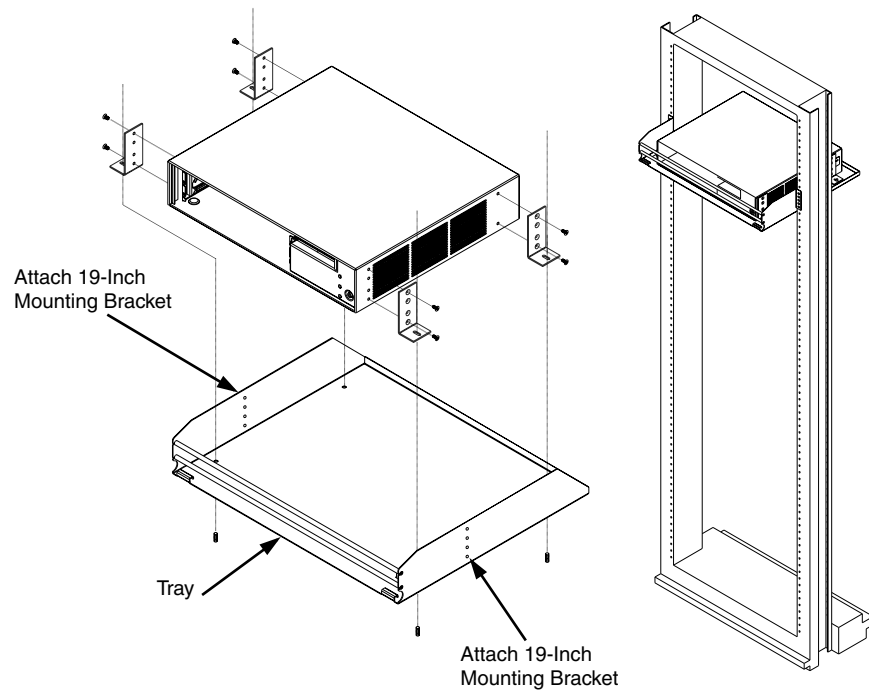
Figure 1-13 19-Inch Bay Mounting



Important! The hardware required to mount the shelf in a 19-inch bay frame always ships with the product.

23-inch bay frame [Figure 1-14](#) illustrates the option of mounting Metropolis® DMXpress in a 23-inch bay frame.

Figure 1-14 23-Inch Bay Mounting

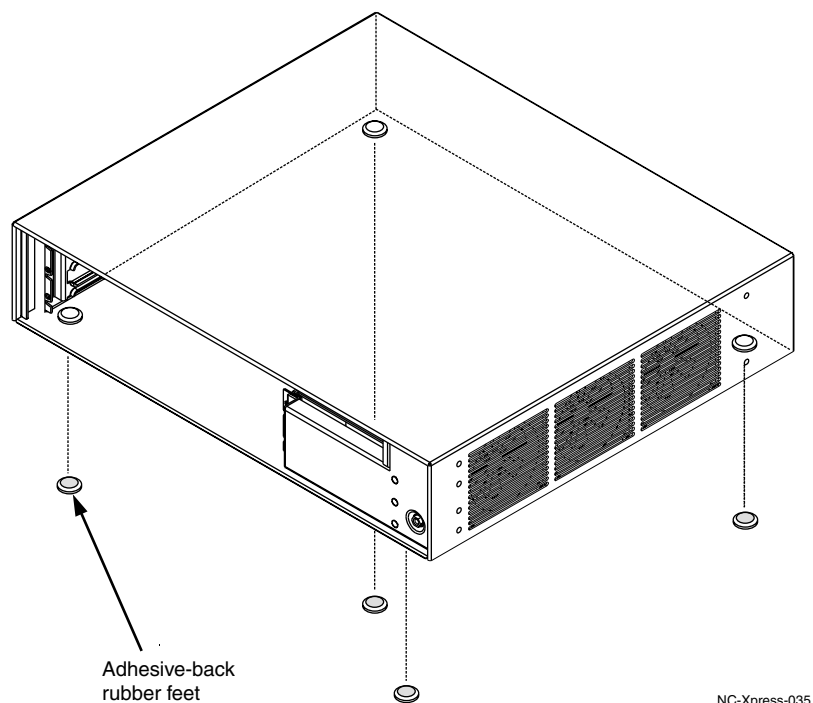


NC-Xpress-038

Important! The hardware required to mount the shelf in a 23-inch bay frame must be ordered separately. The standard 19-inch mounting brackets must be removed from the shelf and then attached to the 23-inch tray (as illustrated in [Figure 1-14](#)).

Desk-top Figure 1-15 illustrates the option of mounting Metropolis® DMXpress on a desk or table.

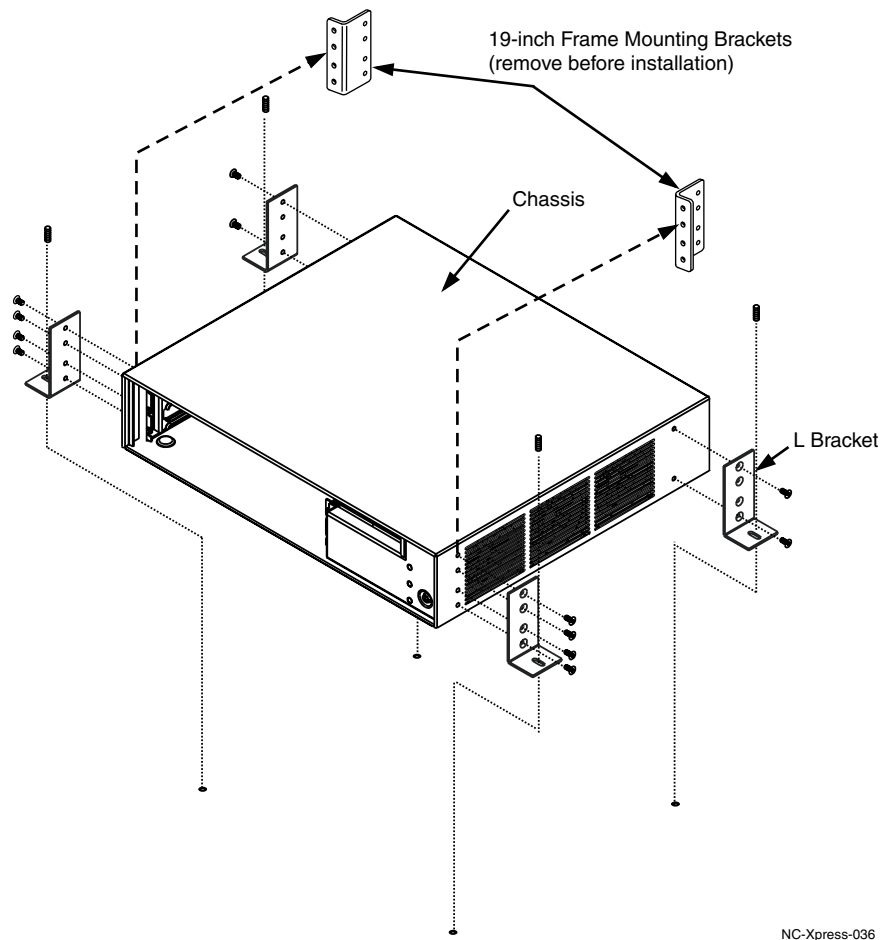
Figure 1-15 Desk-Top Mounting



Important! The hardware (four adhesive-back rubber feet) required to mount the shelf on a desk or table ships with the product. The standard 19-inch mounting brackets should be removed before Metropolis® DMXpress can be installed in a desk-top environment.

Wall mounting Figure 1-16 illustrates the hardware required to mount Metropolis® DMXpress to a wall.

Figure 1-16 Wall Mounting Equipment

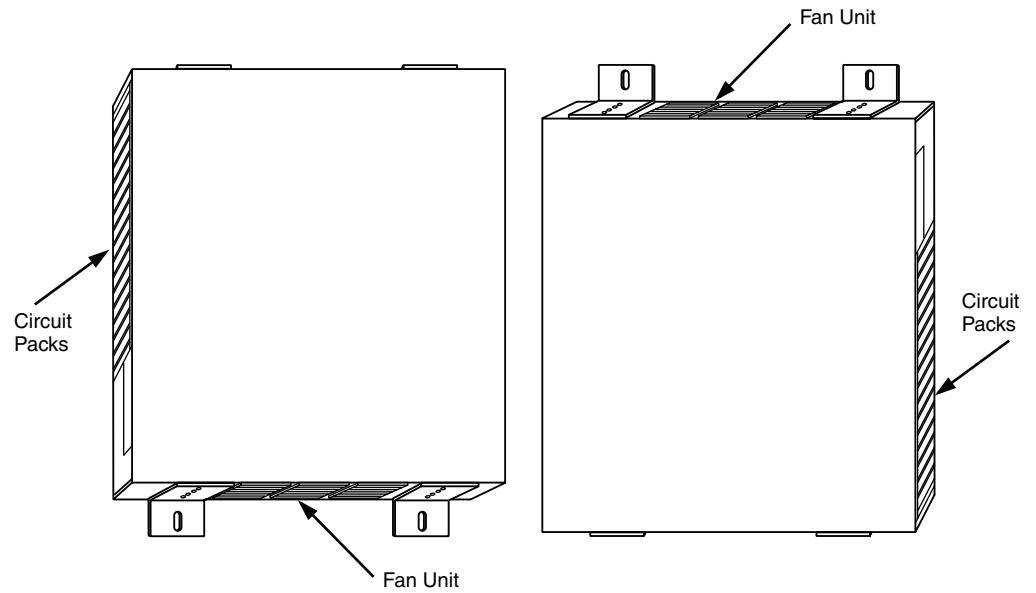


Important! The hardware required to mount the shelf on a wall must be ordered separately. The standard 19-inch mounting brackets must be removed before the wall-mounting brackets can be installed.

Wall mounting positions

Figure 1-17 illustrates the two positions that Metropolis® DMXpress can be mounted on a wall.

Figure 1-17 Wall Mounting Positioning



NC-Xpress-077



Synchronization

Overview This section describes the SONET synchronization and timing features available in Metropolis® DMXpress.

Hardware All of the timing functionality is provided by the timing components within the vslot M1 in the Main circuit pack. Failures associated with the timing components of the main circuit pack are alarmed and communicated via the faceplate LEDs on the pack and reported via the WaveStar® CIT.

Synchronization characteristics The following Metropolis® DMXpress synchronization characteristics are provisionable:

- Revertive or nonrevertive mode switching
- Synchronization autoreconfiguration
- Timing source (free running or line)

SONET Minimum Clock Metropolis® DMXpress uses SMC timing generator and synchronization (TGS) functionality in the Main circuit pack as the core of the system timing.

The TGS is a SONET Minimum Clock (SMC) that complies with GR-253-CORE, Part 5.4.1. The SMC has an accuracy of +/-20 ppm and supports limited holdover capability. The timing can be synchronized to one of the two OC-48 or OC-12 input references (line timing) or it can be provisioned to operate in free running mode.

If the active line reference fails, Metropolis® DMXpress enters the Holdover mode. Entry into Holdover mode is controlled entirely by hardware, not software.

Timing modes Metropolis® DMXpress supports the following timing modes:

- Free running (default)
- Line timing

Timing distribution Timing is distributed from the Main circuit pack and then to the TDM, Optical, and Ethernet circuit packs for synchronization of the transport interfaces.

Line timing Metropolis® DMXpress derives line timing reference signals from the received OC-48/OC-12 ring interfaces on the Main circuit packs. These two interfaces (vslot M1 and M2) are the only available line timing references.

System resets and power down/power up cycles do not alter the provisioned states for timing.

Metropolis® DMXpress supports reference reconfiguration for the two line timing references (in both directions), depending on the incoming Synchronization Status Messages (SSMs).

If other network elements in the subnetwork (for example, Metropolis® DMX access multiplexer) are externally timed, Metropolis® DMXpress must be line timed.

Holdover mode Metropolis® DMXpress continuously monitors the SSMs that notify the system if a reference signal is acceptable or unacceptable. If a reference signal is unacceptable, the system reconfigures itself to use the next assigned reference source. If no other sources are available, the system enters holdover mode.

In holdover mode, the system clock holds the internal oscillator at the last good timing reference while the references are repaired.

Free running mode (default) When Metropolis® DMXpress is powered up for the first time, or whenever it is initialized, the default timing mode is free running. Metropolis® DMXpress is designed to operate without a line timing reference in the free running mode. In the free running mode, the system derives its timing from the highly stable internal oscillator located in the vslot M1 of the Main circuit pack. Only one Metropolis® DMXpress in a subnetwork can be provisioned in the free running mode. The other networks elements in the subnetwork must be line timed to the free running system to avoid performance degradation.

Network synchronization considerations Careful consideration should be given to proper design of the SONET network's synchronization environment. Proper synchronization engineering minimizes timing instabilities, maintains quality transmission network performance, and limits network degradation due to unwanted propagation of synchronization network faults. The synchronization features of the Metropolis® DMXpress are designed to complement the existing and future synchronization network and allow it not only to make use of network timing but also to take on an active role in facilitating network synchronization.

Incoming/Outgoing SSMs

Standard synchronization status messages (SSMs) are transported on the S1 Byte. The transmission of SSMs on the S1 Byte is required on all OC-48/OC-12 lines. Incoming SSMs are used to monitor the acceptability of timing references. SSMs are determined according to SONET (ANSI, Telcordia) standards.

Important! Synchronization messaging is enabled by default.

Outgoing synchronization messaging

Metropolis[®] DMXpress supports outgoing OC-48/OC-12/OC-3 S1 byte synchronization messaging. Synchronization messaging allows Metropolis[®] DMXpress to communicate its synchronization status to other nodes in the network. The synchronization messages are transported via bits 5, 6, 7, and 8 of the S1 byte of the OC-48/OC12 signals for system synchronization and interworking. Metropolis[®] DMXpress complies with all ANSI and Telcordia synchronization messaging standards.

Incoming synchronization messaging

Metropolis[®] DMXpress supports incoming OC-48/OC-12 S1 byte synchronization messaging. Synchronization messaging allows Metropolis[®] DMXpress to receive synchronization status from other nodes in the network. The synchronization messages are transported via bits 5, 6, 7, and 8 of the S1 byte of the OC-48/OC-12 signals for system synchronization and interworking. Metropolis[®] DMXpress complies with all ANSI and Telcordia synchronization messaging standards.

Autoconfiguration of synchronization mode

Metropolis[®] DMXpress supports the automatic reconfiguration of the synchronization mode based on incoming SSMs. When an incoming SSM is deemed to be unacceptable, the system reconfigures itself to use the other assigned reference signal source. If no other sources are available, or those signals are not an acceptable quality, Metropolis[®] DMXpress enters holdover mode. Metropolis[®] DMXpress supports the automatic reconfiguration of two line references.

Important! Autoconfiguration of synchronization is disabled by default.

Synchronization commands

In Metropolis[®] DMXpress, the following TL1 commands are related to the synchronization and timing functionality:

- SET-SYCN: used for provisioning:
 - Timing source (Line or Free Running)

- Mode switching (revertive or nonrevertive)
- Synchronization Autoreconfiguration (disabled or enabled)
- OPR-SYNCNSW: used to protection switch timing sources. In addition to switching line timing sources, the user can manually switch to holdover.
- RTRV-SYCN: retrieves the status of all the timing attributes.
- ENT-RR: enters or provisions the signal (DS-1, DS-3, OC-N, etc.).

For more information about the WaveStar® CIT **Configuration > Timing/Sync** command, refer to the WaveStar® CIT help.



Power

Overview This section describes the power features of Metropolis® DMXpress.

Power options Metropolis® DMXpress may be powered by:

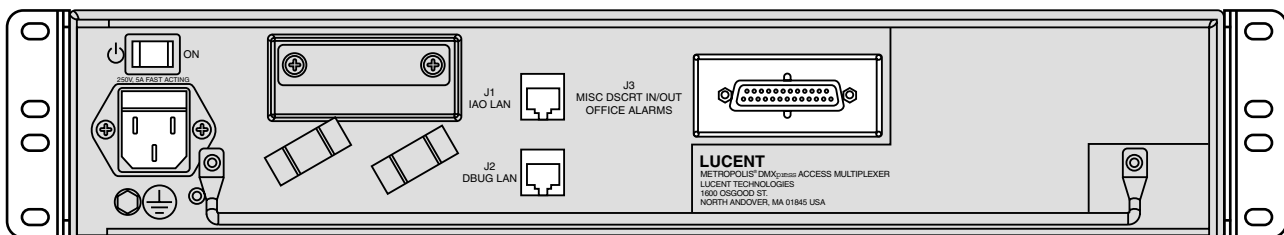
- A single 110 V AC source
- Duplicated -48 V DC sources.

Important! The type of power source is determined when the product is ordered by ordering either the AC enclosure or the DC enclosure.

For detailed AC and DC power specifications, refer to [Chapter 6, “Technical Specifications”](#).

AC enclosure [Figure 1-18](#) illustrates the backplane of the AC enclosure. The AC power source is on the left-hand side of the backplane, just below the on/off switch.

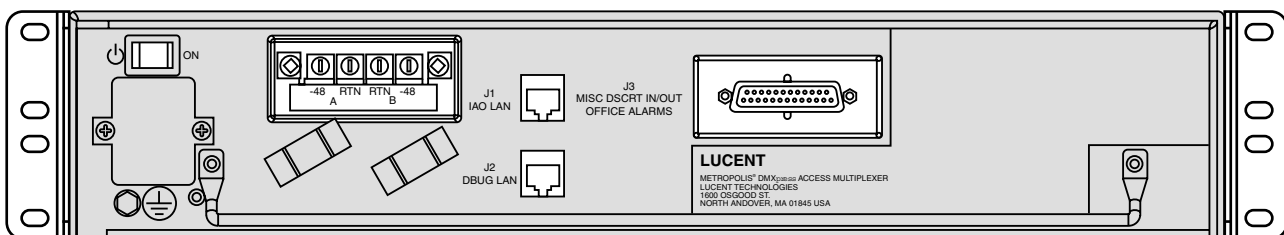
Figure 1-18 AC Enclosure Option



NC-Xpress-041

DC enclosure [Figure 1-19](#) illustrates the backplane of the DC enclosure. The duplicated DC power connectors are directly to the right of the on/off switch.

Figure 1-19 DC Enclosure Option



NC-Xpress-040

Battery backup Metropolis® DMXpress is compatible with AC/DC power converters and battery backup systems that provide uninterruptible power. If AC power is interrupted, batteries are automatically switched on to provide continuous power.

Backplane connectors Both enclosure options provide the following connectors on the backplane:

- Ethernet 10/100BaseT intraoffice local area network (IAO LAN)
J1 IAO LAN port
- **J2 DBUG LAN** port for future use
- **J3 MISC DSCRT IN/OUT OFFICE ALARMS** (25-pin connector)
 - User-definable miscellaneous discretes (14 inputs and 4 outputs) for environmental alarms and controls
 - One critical office alarm (visible)

For detailed cable and pin information, refer to the *Metropolis® DMXpress Access Multiplexer, Installation Manual, 365-372-311*.





2 Operations Interfaces

Overview

Purpose This chapter describes the operations interfaces available in Metropolis® DMXpress.

Contents The following topics are covered in this chapter:

Introduction to Operations Interfaces	2 - 2
WaveStar® Craft Interface Terminal (WaveStar® CIT)	2 - 5
Data Communications Channel (DCC)	2 - 7
IAO LAN Ports	2 - 9
Operations Systems (OS)	2 - 11
Level 2 Routing	2 - 15
Software Download	2 - 16
Office Alarms Interface	2 - 18
Circuit Pack Faceplate LEDs	2 - 19
User-Settable Miscellaneous Discrete Interfaces	2 - 20



Introduction to Operations Interfaces

Overview This section provides a brief introduction to operations interfaces.

Definition of operations interfaces Operations interfaces provide access to a network element and/or communicate alarm and status information pertaining to service and/or equipment.

Local operations interfaces include the light-emitting diodes (LEDs), controls on the circuit pack faceplates, and the office alarms.

Operations interfaces provide communication both locally or remotely. Remote access to the Metropolis® DMXpress is typically obtained through the use of the WaveStar® craft interface terminal (WaveStar® CIT).

Metropolis® DMXpress operations interfaces The following operation interfaces that are available from the front of the shelf on the circuit packs:

- Ethernet 10/100BaseT intraoffice local area network (IAO LAN) **LAN CIT** port on the main circuit packs for either
 - WaveStar® CIT access (OSI or TCP/IP)
 - Operations system (OS) access
- RS-232 serial interface **RS232 CIT** port on the main circuit packs for either
 - WaveStar® CIT access (direct or via modem)
 - Terminal access for TL1 command entry (HyperTerminal)
 - Software download
- Light-emitting diodes (LEDs)
 - System alarm and status LEDs on the main circuit packs faceplate (**CR**, **MJ**, and **MN**)
 - Circuit pack status LEDs (**FLT** and **ACT**) on all individual circuit pack faceplates
- Two data communications channels (DCCs) interfaces provided by the main circuit packs

Important! The front **LAN CIT** port is recommended for convenient, temporary local WaveStar® CIT access.

The following operation interfaces are available from the rear of the shelf via the backplane:

- Ethernet 10/100BaseT intraoffice local area network (IAO LAN)
J1 IAO LAN port for:
 - WaveStar® CIT access (OSI or TCP/IP)
 - Operations system (OS) access
- **J2 DBUG LAN** port for future use
- **J3 MISC DSCRT IN/OUT OFFICE ALARMS** (25-pin connector)
 - User-definable miscellaneous discretes (14 inputs and 4 outputs) for environmental alarms and controls
 - One critical office alarm (visible)

Important! The rear **IAO LAN** (J1) port is recommended for permanent local WaveStar® CIT access and all remote WaveStar® CIT access via TCP/IP as well as for OS access.

IAO LAN interface

The IAO LAN ports support 10/100BaseT Ethernet (per Telcordia Technologies GR-253, ANSI/IEEE 802.2 and 802.3, and ISO 8802.2 and 8802.3) over four-wire twisted pair using RJ-45 male connectors. Each IAO LAN port automatically adapts its rate to 10 Mb/s (default) or 100 Mb/s to match the capability of the other nodes on the same IAO LAN.

RS-232 interface

The RS-232 serial port allows the user an additional method of logging onto the system and entering raw ASCII TL1 commands from an ASCII terminal or a PC that is running an application like HyperTerminal, software download, and WaveStar® CIT access.

Data communications channel (DCC)

The SONET data communications channel (DCC) is used as an embedded operations channels to communicate between network elements. Metropolis® DMXpress supports simultaneous access to two DCCs per shelf. Metropolis® DMXpress supports operations interworking (communication) via the standard 7-layer OSI protocol over DCC.

The craft and operations interface features extend beyond the local Metropolis® DMXpress to cover remote sites. Craft interface dialogues and operations interface messages travel in the DCC bytes.

OC-N Main cards

The OC-N (OC-48/OC-12) main circuit packs provide access to the DCCs that are contained within the section overhead for SONET signals. Section DCC bytes are available in the D1-D3 overhead bytes of the OC-48/OC-12 signals.



WaveStar® Craft Interface Terminal (WaveStar® CIT)

Introduction This section provides information about the WaveStar® CIT which is the primary tool used to interface with Metropolis® DMXpress.

WaveStar® CIT definition The WaveStar® CIT is a personal computer (PC) with WaveStar® CIT software installed. The WaveStar® CIT provides full graphical user interface (GUI) access to the administrative, maintenance, and provisioning capabilities of Metropolis® DMXpress. The GUI includes pull-down menus and a wizard to guide performance of tasks.

For additional information about the WaveStar® CIT, refer to [Appendix A, WaveStar® CIT Tutorial](#).

WaveStar® CIT features/uses The WaveStar® CIT provides a fully-functional GUI through which all Metropolis® DMXpress tasks can be performed. The WaveStar® CIT provides an easy-to-use interface and security features to prevent unauthorized access. The WaveStar® CIT can be used to perform the following functions:

- Provisioning
- Retrieve reports
- Cross-connections
- Software management (for example, copy and apply software)
- Database management (for example, remote backup and restore)

Security

The Metropolis® DMXpress is protected against unauthorized access to the WaveStar® CIT system functions (such as provisioning). Security is controlled through logins, passwords, and multiple authorization levels.

WaveStar® CIT direct access Direct access to the Metropolis® DMXpress is accomplished through the WaveStar® CIT. The WaveStar® CIT is connected to the Metropolis® DMXpress via either the **LAN CIT** port or the **RS-232 CIT** port on the Main circuit pack faceplate, or via the **J1 IAO LAN** port on the shelf backplane. The WaveStar® CIT interface is a 10/100BaseT Ethernet LAN connection (10 or 100 Mb/s, 4-wire twisted pair with an RJ-45 connector) or an RS-232 serial cable.

Remote access Remote access requires DCC, and either OSI LAN, TCP/IP, or RS-232 connectivity. This network operations capability uses the section DCC bytes in the SONET overhead of the OC-48/OC-12 optical signals. WaveStar® CIT dialogues and OS messages are transmitted in these DCC bytes. The WaveStar® CIT and OS support capabilities are equivalent for both local and remote Metropolis® DMXpress systems.



Data Communications Channel (DCC)

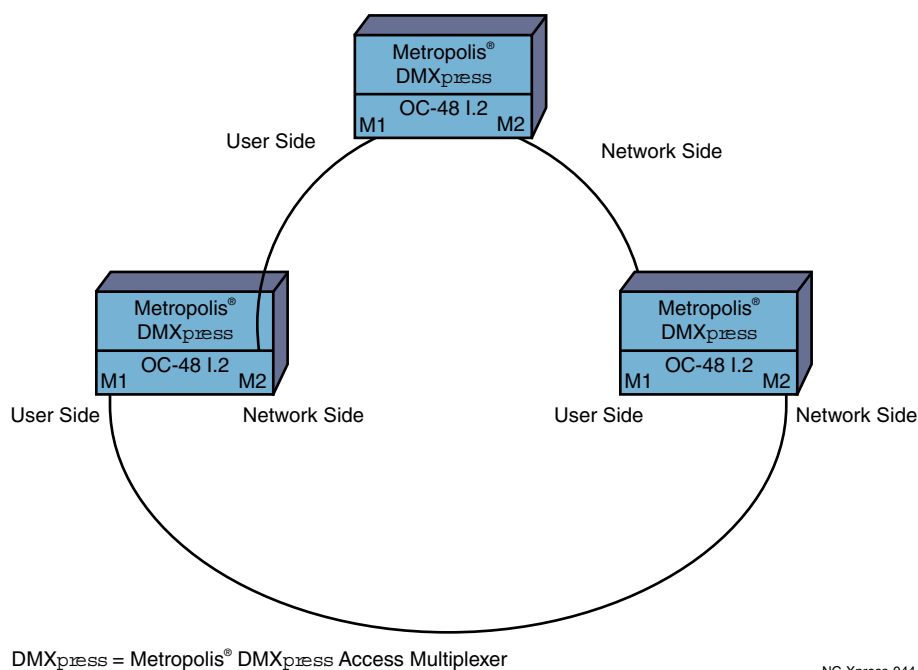
Overview The OC-48 and OC-12 main circuit packs provide access to the data communications channels (DCCs) that are contained within the section overhead for SONET signals.

Section DCC The Section Data Communication Channel (SDCC) uses the section overhead (SOH) bytes D1-D3 thus providing a transmission channel with a capacity of 192 kbit/s.

DCC enable/disable By default, the section DCC is enabled on the optical ports. DCC communications can be enabled or disabled on each port independently.

User side and network side The operation of each DCC span also depends on one end of the span being designated the “User” side and the other end being designated the “Network” side. DCC User/Network side assignments are provisionable. The following figure shows the default User/Network side designations.

Figure 2-1 Default User/Network Side Designation on an OC-48 (shown) or OC-12 UPSR



By default, the high-speed OC-48 UPSR dcc-m1-1 is designated “User” side and dcc-m2-1 is designated “Network” Side. If each Metropolis® DMXpress on a high-speed OC-48 UPSR is connected to its neighbor with a fiber-pair between ports main-1 and main-2, the default DCC User side/Network side assignments are sufficient.

For more information about provisioning DCC terminations and the **Configuration > DCC Terminations...** command, refer to the WaveStar® CIT help.



IAO LAN Ports

Overview Metropolis® DMXpress supports a front and rear IAO LAN port. Each IAO LAN port operates independently.

10/100BaseT The Metropolis® DMXpress IAO LAN ports support 10/100 BaseT Ethernet (per Telcordia Technologies GR-253, ANSI/IEEE 802.2 and 802.3, and ISO 8802.2 and 8802.3) over four-wire twisted pair using an RJ-45 connector. Each IAO LAN port automatically adapts its rate to 10 Mb/s or 100 Mb/s to match the capability of the other nodes on the same IAO LAN, with 10 Mb/s as the default rate.

LAN CIT port (front) Accessible via the front of the main circuit packs, the **LAN CIT** port is recommended for convenient, temporary local WaveStar® CIT access. A LAN crossover cable is required (connect the transmit wire-pair at one end to the receive wire-pair at the other end, and vice versa) for connecting a WaveStar® CIT directly to the **LAN CIT** port. A LAN straight-through cable is required for connecting a WaveStar® CIT to the **LAN CIT** port via a hub or switch.

IAO LAN port (rear) Accessible from the shelf backplane, the **IAO LAN** (J1) port is recommended for permanent local WaveStar® CIT access and all remote WaveStar® CIT access via TCP/IP as well as for OS access. Generally, the rear IAO LAN port is connected to an Ethernet LAN hub in central office applications, and unused at remote sites. A LAN crossover cable is required (connect the transmit wire-pair at one end to the receive wire-pair at the other end, and vice versa) for connecting a WaveStar® CIT directly to the **IAO LAN** port. A LAN straight-through cable is required for connecting a WaveStar® CIT to the **IAO LAN** port via a hub or switch.

OSI on the IAO LAN When the OSI protocol stack is used on an IAO LAN port, the term “OSI LAN” is sometimes used. The OSI LAN is effectively an extension of the DCC. All remote operations supported over the DCC are also supported over the OSI LAN. The term “DCC connectivity” is used throughout this document to mean DCC and/or OSI LAN connectivity.

OSI communications on the IAO LAN ports can be enabled or disabled. By default, OSI is enabled on the IAO LAN ports.

TCP/IP on the IAO LAN

The TCP/IP protocol stack is also supported on the IAO LAN ports. TCP/IP communications on the IAO LAN ports can be enabled or disabled (default).

Important! When the TCP/IP protocol stack is used on an IAO LAN port, the term “TCP/IP LAN” is sometimes used.



Operations Systems (OS)

Overview Operation systems (OSs) are accessed through the 10/100BaseT Ethernet IAO LAN connectors on either the backplane or the main circuit packs (OC48/1.3I2 , OC48 Chx/Chy, or OC12/1.3I2).

Metropolis® DMXpress supports Transaction Language 1 (TL1) for commands/messages. This interface is compatible with Telcordia's Network Monitoring and Analysis (NMA), Telcordia's Transport Element Management System (T-EMS), and Lucent's Navis™ Optical Element Management System (Navis™ Optical EMS).

The Metropolis® DMXpress OS interfaces supported include the following:

- OSI LAN/WAN (to Navis™ Optical EMS or other compatible OS)
- TCP/IP (to Navis™ Optical EMS)
- TL1 (via protocol converter to NMA, T-EMS, or other compatible OS)
- TL1 TCP/IP (to NMA, T-EMS, or other compatible OS)

The example scenarios provided here are based on common (typical) installations and may not reflect the exact manner in which the system is configured. The focus is on how communications work through the operations interfaces, not on the specifics of a particular installation.

IAO LAN access This section explains how the 10/100BaseT Ethernet IAO LAN is used by Metropolis® DMXpress to communicate with Navis™ Optical EMS or another compatible OS using the Open Systems Interconnect (OSI) protocol stack.

IAO LAN function

The two purposes of an IAO LAN are to provide:

- A standard means of connecting a network element to a central office (CO) data communications network (DCN) to provide OS access
- An alternate path for data communications channel (DCC) communications to travel within a subnetwork.

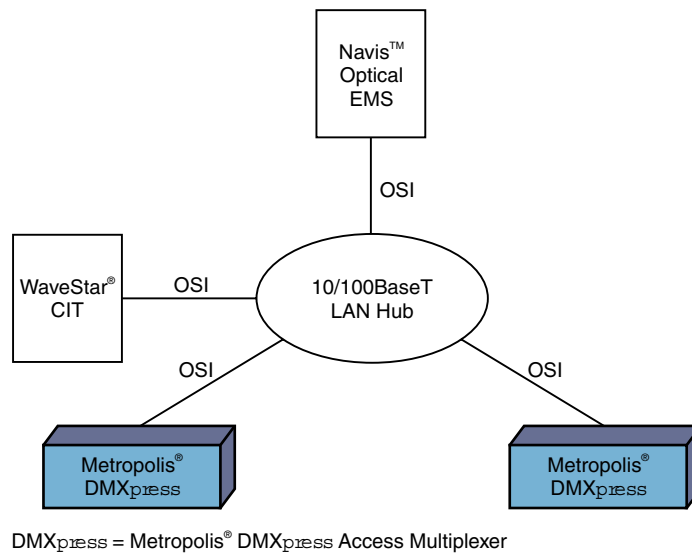
The Metropolis® DMXpress IAO LAN is internally connected to the DCC subnetwork so that operations messages on the IAO LAN can be

seamlessly delivered to a remote network element by the DCC and vice-versa (DCC to IAO LAN).

IAO LAN access with OSI protocol

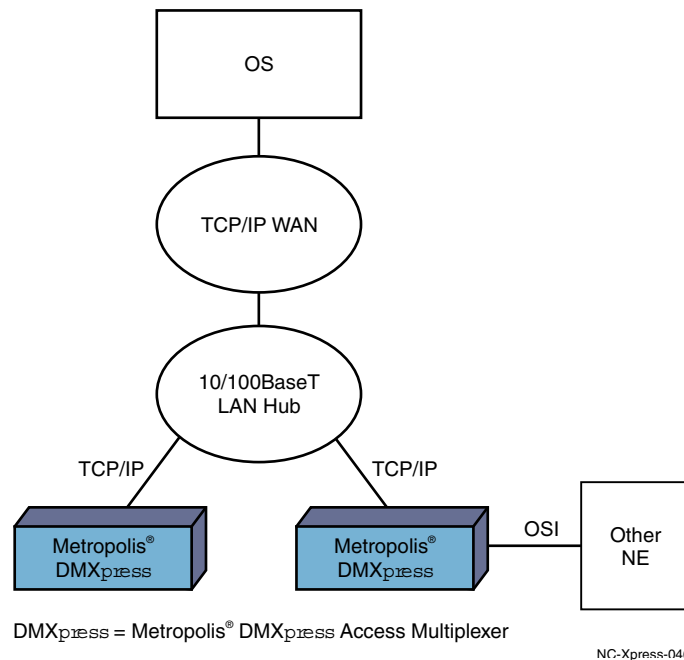
Figure 2-2 illustrates multiple Metropolis[®] DMXpress systems communicating with a local Navis[™] Optical EMS. The operation of the Metropolis[®] DMXpress within this scenario is similar to the operation described in WaveStar[®] CIT Direct Access, with one exception: Navis[™] Optical EMS and WaveStar[®] CIT are connected to the Metropolis[®] DMXpress systems through an external LAN hub.

Figure 2-2 OS Access with OSI Protocol



TCP/IP

Figure 2-3 illustrates Metropolis[®] DMXpress communicating through a TCP/IP WAN directly, while providing a gateway for other network elements.

Figure 2-3 OS Access with TCP/IP**OS access alternatives**

The following OS access alternatives are available:

- OSI LAN to subnetwork
- TCP/IP Gateway to subnetwork

Navis™ Optical Element Management System

Navis™ Optical Element Management System (Navis™ Optical EMS), a separate and optional Lucent Technologies product, can be used as an end-user management system and as an element management layer within a multi-level TMN-based management architecture.

End-user system

When used as an end-user system, Navis™ Optical EMS provides a Java-based GUI for users to access and manage Metropolis® DMXpress with visibility down to the circuit pack, port, and tributary levels.

Element manager

As an element manager, Navis™ Optical EMS forwards messages (commands) from a network management OS (for example, Navis™ Optical Network Management System) to the network elements in the network and performs fault correlation. Navis™ Optical EMS then collects and forwards the responses and autonomous messages from the network elements to itself. The information it receives is then used to perform fault correlation and diagnose problems in the network.

Navis™ Optical EMS concentrates the data links to/from NEs onto a single link back to a network management OS, thus reducing costs.

TL1 autonomous messages

The Metropolis® DMXpress OS interface supports Transaction Language 1 (TL1) autonomous messages. An active TL1 login to the NE is required in order to receive autonomous messages from the NE.

For additional details on TL1 autonomous messages, refer to *Metropolis® DMXpress Access Multiplexer TL1 Command Manual, 365-372-313*.

TL1 commands

The Metropolis® DMXpress OS interface supports TL1 commands. An active TL1 login to the NE is required in order to send commands to the NE and receive responses from the NE.

For additional details on TL1 commands, refer to *Metropolis® DMXpress Access Multiplexer TL1 Command Manual, 365-372-313*.

IS-IS Level 2 Routing Guidelines

The following guidelines are provided for IS-IS level 2 routing

- All nodes in an area must have the same area address in the NSAP. The area address is the first 26 characters in each Metropolis® DMXpress NSAP.
- All nodes in an area must have DCC (or OSI LAN) connectivity within the area to all other nodes in the same area.
- At least one Level 2 IS is required in each area (two Level 2 ISs are recommended in each area, when practical, for DCC communications redundancy to and from each area).
- All Level 2 ISs must have DCC connectivity, either directly or indirectly via other Level 2 ISs, to all other Level 2 ISs in the subnetwork to form a single Level 2 sub-domain that provides connectivity to all areas.
- To distribute the load of OSI network layer routing messages and processing in a subnetwork, it is recommended, when feasible, but not required that; 1) all area sizes be approximately the same and, 2) the number of Level 2 ISs be approximately the same as the average area size.



Level 2 Routing

Overview	A subnetwork consists of a group of network elements connected by DCC and/or OSI LAN.
Maximum number of OSI nodes	The maximum number of OSI nodes supported is 50, unless IS-IS Level 2 Routing is used, in which case, up to 256 OSI nodes are supported. Important! Each Metropolis[®] DMXpress shelf counts as one OSI node.
IS-IS Level 2 Routing	IS-IS Level 2 Routing involves the division of subnetworks into multiple areas. Areas are connected by Level 2 Intermediate Systems (ISs) or routers which maintain DCC connectivity throughout the subnetwork. The assignment of nodes to areas or to serve as Level 2 ISs is accomplished by provisioning.
Advantages of IS-IS Level 2 Routing	IS-IS Level 2 Routing limits the DCC routing information that must be maintained by each node in a subnetwork. Each node within an area maintains routing tables to route DCC messages to other nodes in the same area. If a node needs to route a DCC message to a node in a different area, the node relies on a Level 2 IS in its own area to route the message to a Level 2 IS in the target area and to route from that Level 2 IS to the target node within that area. The Level 2 ISs route DCC messages between nodes in different areas. The DCC messages include all of the NE-NE (and OS-NE) communications necessary to support the OI applications, for example, a TL1 login message from a TL1-GNE to a TL1-RNE. In addition to maintaining a routing table to route DCC messages to other nodes in the same area, Level 2 ISs need to maintain routing information for the Level 2 ISs in all other areas (but not for all nodes within each of these other areas).



Software Download

- Overview** The Metropolis® DMXpress supports these software download features:
1. **Initial** local software installation from a PC connected to the front serial port of a Metropolis® DMXpress without an active software generic.
 2. Local software download from a PC connected to the front serial port of a Metropolis® DMXpress with an active software generic.
 3. Local software download via File Transfer Protocol (FTP) from a PC connected to the front LAN CIT port of a Metropolis® DMXpress with an active software generic. Software installation via FTP requires that:
 - FTP client software is enabled on the network element
 - IP parameters are provisioned on the network element
 4. Remote software download from a PC connected to the front serial port of a Metropolis® DMXpress to a remote Metropolis® DMXpress (or DDM-2000). Both the local and remote NEs must have an active software generic.
 5. Remote software copy from a Metropolis® DMX or Metropolis® DMXpress (with a dormant copy) to another Metropolis® DMXpress. Both the local and remote NEs must have an active software generic.

**Impact of software
download and activation**

Initial local software installation is equivalent to a *forced* local software download and temporarily disrupts operations communications because the pack is reset to activate the software immediately.

Other local software downloads temporarily disrupt operations communications, too, because a system controller reset is involved, but the dormant software is not activated immediately.

Remote software download or copy of compressed dormant software is accomplished without any disruption of operations communications (no system controller resets), because the dormant software is not activated immediately.

The dormant software may be applied at any time the user specifies, (for example, at the same time for all NEs to be upgraded). Activation of the dormant NE software generic requires the Metropolis[®] DMXpress system controller to reset, thus temporarily disrupting operations communications.



Office Alarms Interface

Overview The office alarm interface is a single relay that controls the critical office alarm.

Steady state current The steady state current for office alarm connections must not exceed 1.0 Amp at 60 Volts or 1.8 Amps at 30 Volts. The maximum transient currents (20 msec duration) during initial contact closure must not exceed 9 Amps at 60 Volts or 18 Amps at 30 Volts.

Provisionable alarm delay and alarm clear delay Metropolis® DMXpress provides provisionable incoming signal alarm delay and alarm clear delay. The office alarms are not activated unless an incoming signal condition of greater duration than the alarm delay occurs. When a failure clears, a provisionable alarm clear delay prevents premature clearing of the alarm. The incoming signal alarm delay and alarm clear delay values can be provisioned. For more information about the **Configuration > Alarms > Alarm Configuration** command, refer to the WaveStar® CIT help.



Circuit Pack Faceplate LEDs

Overview The circuit pack faceplates provide visible communication of alarm and status information through the use of light-emitting diodes (LEDs).

Main circuit pack faceplate (OC48/1.3I2, OC48 CHx/CHy, or OC12/1.3I2)

The highest level alarm LED (red CR, red MJ, or yellow MN) of all active alarm/status conditions at the local NE is lit. At most, one alarm LED is lit at any time.

The main circuit pack faceplate provides system-level information and control functions, in addition to the red FAULT LED which indicates the status of the main circuit pack itself (including DCC alarm status).

The main circuit pack faceplate has the following push-button switches and LEDs:

- System Control Reset (SYS CTL RESET) recessed push-button
- Update/Initialize (UPD/INIT) recessed push-button
- Critical (CR) LED: Red
- Major (MJ) LED: Red
- Minor (MN) LED: Yellow
- Fault (FLT) LED: Red (only applies to the individual pack)
- Active/Power on (ACT) LED: Green

Individual circuit pack LEDs

Each circuit pack has two faceplate LEDs (**FLT** and **ACT**) which communicate the status of that individual circuit pack.

The FLT LED (red) illuminates when Metropolis[®] DMXpress detects an error associated with the circuit pack and flashes when Metropolis[®] DMXpress detects a line-type failure on the circuit pack. The ACT LED (green) illuminates when the circuit pack is active (normal operation).



User-Settable Miscellaneous Discrete Interfaces

Overview This section describes the features of the Metropolis® DMXpress miscellaneous discrete environmental alarm/status input points and (external) control output points.

Description The user-settable miscellaneous discrete interface allows a user to monitor and control equipment collocated with Metropolis® DMXpress through a set of discrete input and output points. There are 14 miscellaneous discrete inputs to monitor environmental conditions such as open doors or high temperature, and 4 miscellaneous discrete outputs to control equipment such as fans and generators.

Miscellaneous discrete input alarm level The alarm level to be associated with each miscellaneous discrete input point is provisionable. By default, each miscellaneous discrete input is a minor (MN) alarm.

If a miscellaneous discrete input point is provisioned as an alarm (MN, MJ, or CR), TL1 autonomous message **REPT ALM ENV** is used to report the alarm occurrence, thus identifying the remote NE to further query.

If a miscellaneous discrete input point is provisioned as not alarmed, TL1 autonomous message **REPT EVT COM** is used to report the condition, thus identifying the need to retrieve any active miscellaneous discrete status conditions.

For more information about provisioning miscellaneous discrete input/outputs and the **Configuration > Misc. Discretes...** command, refer to the WaveStar® CIT help.

Miscellaneous discrete input description The description associated with each miscellaneous discrete input may be provisioned. The provisioned description appears as the *almmmsg* or *conddescr* parameter value in applicable TL1 messages. The default description for each miscellaneous discrete input point is *environment1*, *environment2*, and so forth.

Miscellaneous discrete output description The description associated with each miscellaneous discrete output may be provisioned. The default description for each miscellaneous discrete output point is *control1*, *control2*, and so forth. Control points for miscellaneous discrete outputs may be operated and then released. The control outputs are not reported in autonomous TL1 messages.





3 Provisioning, Security, & Administration

Overview

Purpose This section describes the provisioning, security, and administration features and functions for the Metropolis® DMXpress Access Multiplexer.

Contents The following topics are discussed in this section:

Provisioning	3 - 3
Cross-Connection Provisioning	3 - 6
Allowable Cross-Connections	3 - 9
Security	3 - 15
Administration	3 - 17



Provisioning

Provisioning Provisioning is the modification of certain programmable parameters that define how the node functions with various installed entities. Provisioning requests may alter auto-provisioned values of an entity that already exists. Parameter modifications may be initiated locally or remotely with a WaveStar® CIT or an OS. Parameter modifications may be applied to the node via the intraoffice local area network (IAO LAN), serial port, or any data communications channel (DCC). The provisioned data is maintained in NVM and/or hardware registers. The provisionable parameters and values (current and original) are maintained in the nonvolatile memory.

Types of provisioning There are three types of provisioning:

- Auto-provisioning allows the NE to discover the NE hardware configuration and to create the associated entities automatically using original or preprovisioned parameters
- Provisioning affects changes to entities known by the NE, therefore impact the configuration of an NE.
- Deprovisioning is the removal of provisioned parameters.

Auto-provisioning Auto-provisioning is the ability of an NE to detect the presence of equipment, validate it, and then assign default original values or preprovisioned parameter values to new equipment. Nonvolatile memory (NVM) and/or hardware registers maintain the parameter values. If you have predefined or preprovisioned some or all of the parameters, the auto-provisioning function validates the request and assigns the preprovisioned values or default values as required. Auto-provisioning allows an NE to be set up initially with minimal user intervention. Auto-provisioning also supports a self inventory function which allows operations center personnel to learn about and track activities at a remotely located NE.

Automatic provisioning on circuit pack replacement

Replacement of a failed circuit pack is simplified by automatic provisioning of the original circuit pack values. The OC-N main circuit pack maintains a provisioning map of the entire shelf, so when a Low Speed circuit pack is replaced, the OC-N main circuit pack automatically downloads the correct values to the new circuit pack.

Items auto-provisioned

Some items that are auto-provisioned include the following:

- System target identifier (TID) (which can be changed at initial start-up)
- Default threshold-crossing alert (TCA) profiles
- Circuit packs
- Synchronization default mode

Important! Cross-connections are NOT auto-provisioned.

Original value provisioning

Installation provisioning is minimized with original default values. Each provisionable parameter is assigned an original value at the factory. A parameter is a characteristic of the system that affects its operation. The parameter value may be a number, text string, or other menu selection. The provisionable parameters and original values are set during installation. The current original or default values can be overridden through local or remote provisioning.

Equipment removal

The NE detects and reports the removal of equipment. The removal of equipment does not cause the NE to delete any entities. Removal of a piece of equipment may result in equipment alarms and insertion of maintenance signals when the state related data is updated. However, removal of equipment does not necessarily mean that the provisioning of the shelf slot has changed. The user must execute specific commands to remove an entity from the system database.

Automatic channel state provisioning

Automatic channel state provisioning is a capability provided on Metropolis® DMXpress NEs that suppresses reporting of transient alarms and events during provisioning by supporting multiple states (automatic, in-service, and not-monitored) for VT1.5, STS-1, STS-3c, and STS-12c channels.

While an end-to-end circuit is being set up, particularly during VT1.5, STS-1, STS-3c, and STS-12c cross-connect provisioning several transient maintenance signals result. Without automatic channel state provisioning, these are reported as alarms and events. The technicians are expected to ignore these transient alarms and initiate corrective action only if the alarms persist after the provisioning is completed. To avoid the confusion created by this, Metropolis® DMXpress provides automatic channel state provisioning.

Channel states

A VT1.5, STS-1, STS-3c, or STS-12c channel is kept in the default *OOS-MA-AS* [automatic (AUTO)] state until the reception of a valid signal (a framed non-AIS or non-LOP) in that channel. While in AUTO state, no alarms or events are reported on the channel. On receiving a valid signal, which occurs when the end-to-end circuit is completely provisioned, the channel automatically changes to the in-service (IS) state, where it resumes normal alarm and event reporting. An additional state, *OOS* [not-monitored (NMON)], is also supported in which alarm and event reporting is suppressed regardless of the validity of the signal being received on the channel. The user can submit commands to manually change a channel from IS or AUTO to NMON, and from NMON to AUTO. A direct change from NMON to IS is not allowed.



Cross-Connection Provisioning

Overview Metropolis® DMXpress provides cross-connections that offer users flexibility in directing traffic flow through systems to support a wide variety of customer applications using “two-way” and “mltpt” (multi-point [data specific]) cross-connections.

Making cross-connections Cross-connections are made by specifying the SONET rate (VT1.5 or STS-N), the end point addresses (AIDs), and the cross-connection type (for example, two-way). Each single cross-connection command establishes a two-way cross-connection.

Cross-connection rates Metropolis® DMXpress supports the following cross-connection rates:

- VT1.5
- STS1
- STS3
- STS12

The cross-connection rate is a measure of the cross-connected bandwidth. It is not an indication of the constituent rate structure of the cross-connection. For example, an STS12 rate cross-connection can carry one STS-12c signal, four STS-3c signals, twelve STS-1 signals, or a combination of STS-3c and STS-1 signals.

Cross-connection types Metropolis® DMXpress supports the following cross-connection types:

- 2-Way Point-to-Point, Pass-Through
- UPSR Ring Add/Drop
- Multipoint

Typical cross-connections STS-N and VT1.5 signals may be cross-connected in several ways. For bidirectional drop services, the default “two-way” cross-connection is used to connect a like signal in the high-speed Main slot to any available time slot in either option slot equipped with low-speed circuit packs.

The bidirectional pass-through service is used to connect the high-speed signal from one side of the ring to the other side. Both directions of transmission are connected using a single “two-way” command.

Multipoint cross-connections can be made between the Ethernet ports and the Main OC-48/OC-12 OLIU ports.

Considerations

Any STS-1, STS-3c, STS-12c, STS-48c, or VT1.5 signal may be cross-connected to a like signal with an available time slot.

Any 12 STS-1 signals in the OC-48 interfaces (OC48/1.3I2 main circuit pack) can be selected for VT1.5 access. The corresponding VT1.5 signals may be cross-connected as pass-through cross-connections on the main OLIUs or as add/drop cross-connections to any DS1/DS3/16/1, OC3LS/4 or OC12LS/2 circuit packs. (VT1.5 cross-connections to the DS3/12 circuit pack are not supported).

2-way point-to-point, through cross-connections

The 2-way point-to-point, pass through cross-connections (VT1.5, STS-1, STS-3c, STS-12c, or STS-48c) allow signals to be “passed through” a high-speed ring node. This cross-connection is utilized in all path switched ring applications at nodes where traffic is not dropped.

UPSR ring add/drop cross-connections

The UPSR ring add/drop cross-connections are used to connect a low-speed port or channel to a channel in the high-speed UPSR ring. Two-way cross-connections are used in all path switched ring applications where VT1.5, STS-1, STS-3c, and STS-12c signals on high-speed channels are cross-connected to low-speed DS1, DS3, 10/100BASET, 1000BASELX, OC-3 LS and OC-12 LS ports. In the transmit direction, all added signals are bridged onto both rotations of the ring. In the receive direction, the better of the two received signals is selected and dropped.

2-way hairpin cross-connections

Intra-function 2-way hairpin cross-connections are supported.

Intra-function group hairpin

In an intra-function group hairpin cross-connection, traffic entering the system on a channel of a port in one low-speed (function or growth) group is cross-connected (through the switch fabric on the main ports) to a channel of a different port in the same low-speed (function or growth) group. This capability enables the user to bring in traffic from one remote site and cross-connect it at the STS-1, STS-3c, or STS-12c rate back out to other remote sites without consuming any capacity on the high speed UPSRs.

**Multipoint (data specific)
cross-connections**

The data specific multipoint cross-connection is a bidirectional cross-connection between two STS-1 Virtual Concatenation Groups (VCGs) on 10/100BASET or 1000BASE LX/SX ports to two different ring interfaces. All multipoint cross-connections are done at the STS-1 level. See [“Multipoint \(data specific\) cross-connections” \(3-8\)](#) in [Chapter 3, “Provisioning, Security, & Administration”](#)



Allowable Cross-Connections

Allowable VT1.5 add/drop cross-connections

The following table shows the allowable VT1.5 add/drop cross-connections.

Table 3-1 Allowable VT1.5 Add/Drop Cross-Connections

From		To			
Address1	Port Type (application)	Address2	Port Type (application)	CCT Value	Type
a-1-{1-4, all}-{1-4, all}	DS1	m-1-{1-48}-{1-7,all}-{1-4,all}	OC-48 HS (UPSR)	2waypr	add-drop
		m-1-{1-12}-{1-7,all}-{1-4,all}	OC-12 HS (UPSR)		
g-{1-4}-{1-3}-{1-7, all}- {1-4,all}	OC-3LS	m-1-{1-48}-{1-7,all}-{1-4,all}	OC-48 HS (UPSR)		
		m-1-{1-12}-{1-7,all}-{1-4,all}	OC-12 HS (UPSR)		
g-{1-2}-{1-12}-{1-7, all}- {1-4,all}	OC-12LS	m-1-{1-48}-{1-7,all}-{1-4,all}	OC-48 HS (UPSR)		
		m-1-{1-12}-{1-7,all}-{1-4,all}	OC-12 HS (UPSR)		

Allowable STS-1 add/drop cross-connections

The following table shows the allowable STS-1 add/drop cross-connections.

Table 3-2 Allowable STS-1 Add/Drop Cross-Connections

From		To			
Address1	Port Type (application)	Address2	Port Type (application)	CCT Value	Type
a-1	DS1	m-1-{1-48}	OC-48 HS (UPSR)	2waypr	add-drop
		m-1-{1-12}	OC-12 HS (UPSR)		
b-1, g-{1-12}	DS3	m-1-{1-48}	OC-48 HS (UPSR)		
		m-1-{1-12}	OC-12 HS (UPSR)		
g-{1-4}-{1-3}	OC-3 LS	m-1-{1-48}	OC-48 HS (UPSR)		
		m-1-{1-12}	OC-12 HS (UPSR)		
g-{1-2}-{1-12}	OC-12 LS	m-1-{1-48}	OC-48 HS (UPSR)		
		m-1-{1-12}	OC-12 HS (UPSR)		

Allowable STS-3c add/drop cross-connections

The following table shows the allowable STS-3c add/drop cross-connections.

Table 3-3 Allowable STS-3c Add/Drop Cross-Connections

From		To			
Address1	Port Type (application)	Address2	Port Type (application)	CCT Value	Type
g-{1-4}-1	OC-3 LS	m-1-{1,4,7,10,13,16,19,22,25,28,31,34,37,40,43,46}	OC-48 HS (UPSR)	2waypr	add-drop
		m-1-{1,4,7,10}	OC-12 HS (UPSR)		
g-{1-2}-{1,4,7,10}	OC-12 LS	m-1-{1,4,7,10,13,16,19,22,25,28,31,34,37,40,43,46}	OC-48 HS (UPSR)		
		m-1-{1,4,7,10}	OC-12 HS (UPSR)		

Allowable STS-12c add/drop cross-connections

The following table shows the allowable STS-12c add/drop cross-connections.

Table 3-4 Allowable STS-12c Add/Drop Cross-Connections

From			
Address1	Port Type (application)	CCT Value	Type
g-{1-2}-1	OC-12 LS	2waypr	add-drop

Allowable STS-1 Hairpin cross-connections

The following table shows the allowable STS-1 Hairpin cross-connections.

Table 3-5 Allowable STS-1 Hairpin Cross-Connections

From		To			
Address1	Port Type (application)	Address2	Port Type (application)	CCT Value	Type
g-{1-2}-{1-12}	OC-12 LS	g-{1-2}-{1-12}	OC-12 LS	2waypr	intra-FN
g-{1-4}-{1-3}	OC-3 LS	g-(1-4)-{1-3}	OC-3 LS		

Allowable STS-3c Hairpin cross-connections

The following table shows the allowable STS-3c Hairpin cross-connections.

Table 3-6 Allowable STS-3c Hairpin Cross-Connections

From		To			
Address1	Port Type (application)	Address2	Port Type (application)	CCT Value	Type
g-{1-2}-{1,4,7,10}	OC-12 LS	g-{1-2}-{1,4,7,10}	OC-12 LS	2waypr	intra-FN
g-{1-4}-1	OC-3 LS	g-(1-4)-1	OC-3 LS		

Allowable STS-12c Hairpin cross-connections

The following table shows the allowable STS-12c Hairpin cross-connections.

Table 3-7 Allowable STS-12c Hairpin Cross-Connections

From		To			
Address1	Port Type (application)	Address2	Port Type (application)	CCT Value	Type
g-{1-2}-1	OC-12 LS	m-1-1	OC-12 LS	2waypr	intra-FN

Allowable STS-VT1.5 main pass-through cross-connections

The following table shows the allowable STS-VT1.5 main pass-through cross-connections.

Table 3-8 Allowable STS-VT1.5 Main Pass-Through Cross-Connections

From		To			
Address1	Port Type (application)	Address2	Port Type (application)	CCT Value	Type
m-1-{1-48}-{1-7, all}-{1-4, all}	OC-48 HS (UPSR)	m-1-{1-48}-{1-7, all}-{1-4, all}	OC-48 HS (UPSR)	2waypr	pass-through
m-1-{1-12}-{1-7, all}-{1-4, all}	OC-12 HS (UPSR)	m-1-{1-12}-{1-7, all}-{1-4, all}	OC-12 HS (UPSR)		

**Allowable STS-1 main
pass-through
cross-connections**

The following table shows the allowable STS-1 main pass-through cross-connections.

Table 3-9 Allowable STS-1 Main Pass-Through Cross-Connections

From		To		CCT Value	Type
Address1	Port Type (application)	Address2	Port Type (application)		
m-1-{1-48}	OC-48 HS (UPSR)	m-1-{1-48}	OC-48 HS (UPSR)	2waypr	pass-through
m-1-{1-12}	OC-12 HS (UPSR)	m-1-{1-12}	OC-12 HS (UPSR)		

**Allowable STS-3c main
pass-through
cross-connections**

The following table shows the allowable STS-3c main pass-through cross-connections.

Table 3-10 Allowable STS-3c Main Pass-Through Cross-Connections

From		To		CCT Value	Type
Address1	Port Type (application)	Address2	Port Type (application)		
m-1-{1,4,7,10,13,16,19,22,25,28,31,34,37,40,43,46}	OC-48 HS (UPSR)	m-1-{1,4,7,10,13,16,19,22,25,28,31,34,37,40,43,46}	OC-48 HS (UPSR)	2waypr	pass-through
m-1-{1,4,7,10}	OC-12 HS (UPSR)	m-1-{1,4,7,10}	OC-12 HS (UPSR)		

**Allowable STS-12c main
pass-through
cross-connections**

The following table shows the allowable STS-12c main pass-through cross-connections.

Table 3-11 Allowable STS-12c Main Pass-Through Cross-Connections

From		To		CCT Value	Type
Address1	Port Type (application)	Address2	Port Type (application)		
m-1-{1,13,25,37}	OC-48 HS (UPSR)	m-1-{1,13,25,37}	OC-48 HS (UPSR)	2waypr	pass-through
m-1-1	OC-12 HS (UPSR)	m-1-1	OC-12 HS (UPSR)		

**Allowable STS-48c main
pass-through
cross-connections**

The following table shows the allowable STS-48c main pass-through cross-connections.

Table 3-12 Allowable STS-48c Main Pass-Through Cross-Connections

From		To			
Address1	Port Type (application)	Address2	Port Type (application)	CCT Value	Type
m-1-1	OC-48 HS (UPSR)	m-1-1	OC-48 HS (UPSR)	2waypr	pass-through

**Allowable Ethernet STS-1
Add/Drop
cross-connections**

The following table shows the allowable Ethernet STS-1 Add/Drop cross-connections.

Table 3-13 Allowable Ethernet STS-1 Add/Drop Cross-Connections

From		To			
Address1	Port Type (application)	Address2	Port Type (application)	CCT Value	Type
d-v{1,3}-{1-21}	GbE	m-1-{1-48}	OC-48 HS (UPSR)	2waypr	add-drop
				mltpt	
		m-1-{1-12}	OC-12 HS (UPSR)	2waypr	add-drop
				mltpt	
d-v1-{1-21}	FE	m-1-{1-48}	OC-48 HS (UPSR)	2waypr	add-drop
				mltpt	
		m-1-{1-12}	OC-12 HS (UPSR)	2waypr	
				mltpt	

**Allowable Ethernet STS-1
Hairpin cross-connections**

The following table shows the allowable Ethernet STS-1 Hairpin cross-connections.

Table 3-14 Allowable Ethernet STS-1 Hairpin Cross-Connections

From		To			
Address1	Port Type (application)	Address2	Port Type (application)	CCT Value	Type
d-v{1,3}-{1-21}	GbE	g-{1-2}-{1-12}	OC-12 LS (UPSR)	2waypr	add-drop
		g-{1-4}-{1-3}	OC-3 LS (UPSR)		
d-v1-{1-21}	FE	g-{1-2}-{1-12}	OC-12 LS (UPSR)		
		g-{1-4}-{1-3}	OC-3 LS (UPSR)		



Security

Overview Metropolis® DMXpress provides security capabilities to protect against unauthorized access to the system.

User types Four types of users (with tiered restriction levels) are allowed access to the system with a valid login and password:

- Privileged users can execute all commands
A privileged login has access to all the system functional capabilities. Only the privileged logins have access to the security and access functions. These functions include assigning/changing login/passwords for other users, setting target identifier (TID) names, resetting the system, and system initialization functions.
- General users have access to all the system functional capabilities except security, access, system initialization and software installation functions.
- Maintenance users can only execute commands that access the system, extract reports and execute maintenance functions through a specific set of commands.
- Reports-only users can only execute commands that retrieve reports from the system. For example, opr-lpbk.

Security can be set to a “lockout” state, which blocks non-privileged users from logging into the system. Only privileged users can lockout or enable logins. For more information on the the **Administration > Security > Lockout Logins** and **Administration > Security > Enable Logins** commands refer to the WaveStar® CIT help.

System initialization When the system is first initialized, three privileged default logins and passwords are provided. Replacement of the OC-N main circuit pack causes the system to return to the default logins and passwords. Up to 147 logins and passwords can be added, deleted, and/or changed by any of the privileged users. For more information about provisioning security, refer to [Chapter 9, “Circuit Order/Provisioning Tasks”](#).

- User logins and passwords** The WaveStar® CIT always tries to connect to a selected NE using the same login and password you have for the WaveStar® CIT. If your login and password are different for the selected NE and WaveStar® CIT, then you must enter the correct login and password to connect to the selected NE. Login and password parameters must be administered on a per-NE basis. You may have a different login and/or password on one NE than you have on other NEs. For more information about provisioning user security and the **Administration > Security > User Provisioning** command refer to the WaveStar® CIT help.
- Password aging** The password aging interval is the number of days allowed before a user's password expires. When a user's password expires, the user is prompted to select a new password prior to login. The values for the password aging interval are zero (0) or a range from 7 to 999 days. A value of zero (0) disables password aging. The default value is 0. Password aging does not apply to privileged users' passwords. For more information about provisioning password aging and the **Administration > Security > User Provisioning** command refer to the WaveStar® CIT help.
- CIT default logins and passwords** Two default Privileged logins and passwords are initially installed in the WaveStar® CIT are LUC01 and LUC02 (LUC-zero-one, and LUC-zero-two). Their associated passwords are LUC+01, LUC+02, (LUC-plus sign-zero-one, LUC-plus sign-zero-two), respectively.
- NE default logins and passwords** Three default Privileged logins and passwords are initially installed in the NE is LUC01, LUC02, or LUC03 (LUC-zero-one, LUC-zero-two, and LUC-zero-three). Their associated password is DMXPRS2.5G.



Administration

Overview System administration includes performing the following:

- Changing passwords
- Changing notifications
- Performing security administration
- Viewing NE administration
- Setting TIDs
- Setting NE defaults
- Performing a LAN reset
- Provisioning data communications
- Viewing OSI routing map

WaveStar® CIT login/password administration

The **Administration > Security > User Provisioning** command on the WaveStar® CIT View menu allows a privileged user to create, change, or delete another login or password.

Important! Any changes made to a user's provisioning takes place the next time the user logs in. If the user is currently logged in, no changes take place until that user logs off and logs back in.

Valid logins

A valid user login must be a minimum of one character to a maximum of ten characters (no character restrictions).

Valid passwords

A valid password must comply with the following conditions:

- Length must be a minimum of six characters to a maximum of ten characters
- Must begin with a letter
- Must contain at least three non-alphabetic characters (symbol or number)
- At least one of the non-alphabetic characters must be a symbol
- When changing a password, the new password must be different than the previous password by at least one character.

Important! User passwords are case-sensitive.

Characters NOT allowed in a password

The following table lists the ten characters that are not allowed in a password.

Table 3-15 Characters NOT Allowed in a Password

Character	Description	Character	Description
	Space	“	Quotation mark
@	Commercial at	&	Ampersand
,	Comma	;	Semicolon
:	Colon	—	horizontal bar (underscore)
=	Equals sign	?	Question mark

Characters allowed in a password

The following table lists the characters that are allowed in a password.

Table 3-16 Characters Allowed in a Password

Character	Description	Character	Description
A... Z	Uppercase letters	*	Asterisk
a... z	Lowercase letters	[	Left square bracket
0... 9	Digits	]	Right square bracket
'	Apostrophe	^	Caret
-	Hyphen	`	Grave accent
(	Left parenthesis	{	Left curly brace
)	Right parenthesis	}	Right curly brace
.	Period (full stop)		Vertical bar
/	Slash (Solidus)	<	Less than
+	Plus sign	>	Greater than
!	Exclamation mark	~	Tilde
%	Percent sign	#	Number sign

Changing your own password

The **Administration > Change Password** command allows any user to change his or her own password. Only a user with the proper security authorization level can change another user's login or password.

The user can change his or her own password at any time. The user must enter their original (old) password, their new password, and then their new password again. The two new password entries must match for the new password to be accepted. The Change Password screen is also automatically invoked immediately after the login screen if a user's password has expired. The user is prevented from performing any other function until the password is successfully changed. This screen is also invoked the first time a login is attempted for a new user ID.

Metropolis® DMXpress login/password administration

The **Administration > Security > User Provisioning** command on the network element System View menu allows a privileged user to create, change, or delete another network element login or password.

Important! Any changes made to a user's provisioning takes place the next time the user logs in. If the user is currently logged in, no changes take place until that user logs off and logs back in.

Valid logins

A valid user login must be a minimum of one allowed character to a maximum of ten allowed characters.

Valid passwords

A valid password must comply with the following conditions:

- Length must be a minimum of six characters to a maximum of ten characters
- Must contain at least one alphabetic character and at least three non-alphabetic characters (symbol or number)
- At least one of the non-alphabetic characters must be number and at least one must be a symbol
- When changing a password, the new password must be different than the previous password by at least one character.

Important! User passwords are case-sensitive.

Characters NOT allowed in a password and login

The following table lists the ten characters that are not allowed in a password and login.

Table 3-17 Characters NOT Allowed in a Password and Login

Character	Description	Character	Description
	Space	“	Quotation mark
@	Commercial at	;	Semicolon
,	Comma	*	Asterisk
:	Colon	!	Exclamation Mark
=	Equals sign	?	Question mark
\	Back slash		

Characters allowed in a password and login

The following table lists the characters that are allowed in a password and login.

Table 3-18 Characters Allowed in a Password and Login

Character	Description	Character	Description
A... Z	Uppercase letters	^	Caret
a... z	Lowercase letters	`	Grave accent
0... 9	Digits	{	Left curly brace
'	Apostrophe	}	Right curly brace
-	Hyphen		Vertical bar
(	Left parenthesis	<	Less than
)	Right parenthesis	>	Greater than
.	Period (full stop)	~	Tilde
/	Slash (Solidus)	%	Percent sign
+	Plus sign	#	Number sign
[	Left square bracket	&	Ampersand
]	Right square bracket	—	Horizontal bar (underscore)

Changing your own password

From the network element System View, the **Administration > Change Password** command allows any user to change his or her own password. Only a user with the proper security authorization level can change another user's login or password.





4 Performance Monitoring

Overview

Purpose This section lists and describes performance monitoring parameters, data storage, thresholds, and TCA transmission.

Contents The following performance monitoring information is included in this section:

Introduction to Performance Monitoring	4 - 3
OC-N Performance Parameters	4 - 8
STS-N Performance Parameters	4 - 10
VT1.5 Performance Parameters	4 - 12
DS3 Performance Parameters	4 - 13
Ethernet Performance Parameters	4 - 18



Introduction to Performance Monitoring

Definition Performance monitoring (PM) is the in-service, non-intrusive monitoring and reporting of transmission quality.

PM helps proactive maintenance detect and correct degrading signal conditions that are not yet severe enough to initiate protection switching or alarming.

Proactive maintenance

Proactive maintenance is the process of detecting degrading conditions that are indicative of an impending hard or soft failure, but not severe enough to initiate alarming.

Reactive maintenance

Hard and soft failures result in reactive maintenance.

Data registers The following table lists the data registers that are provided for all performance monitoring parameters.

Table 4-1 Data Registers

15-Minute Registers	1-Day (24-Hour) Registers
One current	One current
One previous	One previous
31 recent	NA

Metropolis[®] DMXpress retrieves and reports the contents of any parameter storage register. The WaveStar[®] CIT may be used to initialize (set to zero) the current 15-minute and/or current 1-day registers locally or remotely. This capability enables the user to verify that a repair to a failed facility was successful.

How registers are updated The two registers are updated in the following manners:

15-minute registers

The registers are updated with a push-down methodology. At 0, 15, 30, and 45 minutes on the system clock, the contents of the 30th recent register is moved to the 31st recent register. The contents of each of the other recent registers are moved to the next higher register. The contents of the previous register are moved to the first recent register. The contents of the current register are moved to the previous register. The new measured value is placed in the current register.

Day registers

At day boundaries (midnight as defined by the local time/date function), the current day register is written to the previous day storage register and the current day register is set to zero. The day boundary is midnight by default, but may be provisioned to a different time.

PM scheduling Performance monitoring can be scheduled to provide quarter hour and daily reports beginning at different time intervals. In order to schedule PM reports, PM messaging must be enabled and you must use the WaveStar® CIT TL1 cut-through mode or the TL1 Command Builder. PM cannot be scheduled via the WaveStar® CIT Graphical interface.

Enabling/disabling performance monitoring Performance monitoring can be enabled/disabled for DS3 ports, STS-n paths, VT1.5 paths, and OC-N lines.

DS3 ports

Performance monitoring is enabled on a DS3 port by provisioning the Performance Monitoring Mode (PMMD) and the Primary State (PST) parameters using the WaveStar® CIT **Configuration > Provision** command. Performance monitoring is enabled when the PMMD parameter is provisioned ON, there is a cross-connection, and the PST parameter is provisioned IS (in service) or NMON (not monitored).

Performance monitoring is disabled when the PMMD parameter is provisioned OFF or the PST parameter provisioned AUTO (no valid input signal).

STS-n paths

Performance monitoring is enabled on a terminated STS-n path by provisioning the Primary State (PST) parameter using the WaveStar® CIT **Configuration > Provision** command. Performance monitoring is enabled when the PST parameter is provisioned IS (in service).

Performance monitoring is disabled when the PST parameter is provisioned AUTO (no valid input signal) or NMON.

On pass through cross-connections, intermediate path performance monitoring is always enabled.

VT1.5 paths

VT 1.5 performance monitoring is only available on terminated cross-connections. Performance monitoring is enabled on a terminated VT1.5 path by provisioning the Primary State (PST) parameter using the WaveStar® CIT **Configuration > Provision** command. Performance monitoring is enabled when the PST parameter is provisioned IS (in service).

Performance monitoring is disabled when the PST parameter is provisioned AUTO (no valid input signal) or NMON.

OC-n lines

Performance monitoring is enabled on an OC-n line by provisioning the Primary State (PST) parameter using the WaveStar® CIT **Configuration > Provision** command. Performance monitoring is enabled when the PST parameter is provisioned IS (in service).

Performance monitoring is disabled when the PST parameter is provisioned AUTO (no valid input signal) or NMON.

For more information about the **Configuration > Provision** command, refer to the WaveStar® CIT on-line help.

PM during failed conditions

When a trouble condition is detected, Metropolis® DMXpress stops accumulating PM parameters affected by that failure. PM parameters are inhibited during unavailable time per GR-253-CORE. All unaffected performance parameters continue to accumulate during a trouble condition.

Threshold crossing alerts (TCAs)

Whenever the current quarter-hour or the current day threshold for a given parameter is exceeded, Metropolis® DMXpress generates a threshold-crossing alert (TCA) that is entered into the performance monitoring exception report and reported to the OS through the TL1 interface.

In order to view autonomous TCAs, Event Messaging must be enabled.

TL1 access

The TL1 interfaces should be used to derive full benefit from Metropolis® DMXpress's performance monitoring capabilities. The full set of PM data stored by Metropolis® DMXpress (TCAs and the contents of PM registers) is provided through the TL1 interface.

Enabling/Disabling TCA reporting

TCA reporting can be enabled or disabled on individual parameters.

Individual parameters

Threshold Crossing Alert (TCA) reporting may be enabled or disabled on a parameter basis. When the threshold value of a parameter is set to zero, no quality of service (QOS) alarm message is generated.

Enabling/disabling the TCA reporting of an individual parameter is independent of any other parameter.

Parameter groups

Metropolis® DMXpress does not support enabling/disabling TCA reporting at a group level for a parameter grouping such as line.

Reporting on such a parameter group can be disabled by setting all parameters for the parameter group to zeros. For example, setting the threshold values of all line PM parameters to zero will disable the TCA reporting on the line level.

**Provisioning TCA
parameter thresholds**

The current quarter-hour and current day thresholds for each parameter type are provisionable, on a per-shelf basis. If values other than the defaults are used, only one value for each parameter type needs to be set for each signal.

The following commands are used to provision performance monitoring parameter thresholds.

- **Performance > Prov PM Threshold > DS3 (Near End)**
- **Performance > Prov PM Threshold > DS3 (Far End)**
- **Performance > Prov PM Threshold > OC3**
- **Performance > Prov PM Threshold > OC12**
- **Performance > Prov PM Threshold > OC48**
- **Performance > Prov PM Threshold > STS1**
- **Performance > Prov PM Threshold > STS3c**
- **Performance > Prov PM Threshold > STS12c**
- **Performance > Prov PM Threshold > VT1**

For more information about provision performance monitoring thresholds refer to the WaveStar® CIT on-line help.

Retrieving TCAs

All TCAs are retrievable either locally or remotely via the WaveStar® CIT. If provisioned for autonomous TCA reporting, the message-based operations system interface can communicate TCA reports to the operations centers.



OC-N Performance Parameters

Overview This section describes the performance monitoring parameters that are applicable to OC-48 and OC-12 high speed signals.

Monitored parameters The following table lists the OC-N section and line performance parameters that Metropolis[®] DMXpress monitors, including the default and ranges for the 15-minute and 1-day (24-hour) registers.

Table 4-2 OC-N Performance Parameters

Facility	Measured Provisionable Parameter	15-Min		1-Day	
		Default	Range	Default	Range
OC-N Section	SE Frame Seconds (SEFS/OOF)	10	1-63	30	1-4095
OC-48 Line	Coding Violations (CV-L)	2240	1-16383	21504	1-1048575
OC-12 Line	Coding Violations (CV-L)	560	1-16383	5376	1-1048575
OC-N	Errored Seconds (ES-L)	40	1-900	900	1-65535
	Errored Seconds Type A (ESA-L)	30	1-900	90	1-65535
	Errored Seconds Type B (ESB-L)	30	1-900	90	1-65535
	Severely Errored Seconds (SES-L)	30	1-900	90	1-65535
	Unavailable Seconds (UAS-L)	30	1-900	90	1-65535
	Pointer Justification Counts (PJC)	60	1-900	5760	1-65535
OC-12 Line (1+1)	Line Protection Switch Counts (PSC-L)	2	1-63	4	1-255
OC-48 Line (1+1)					

OC-N section parameters Metropolis[®] DMXpress monitors a single OC-N section parameter.

Severely errored frame seconds (SEFS/OOF)

The SEFS/OOF parameter increments once for each second during which Metropolis[®] DMXpress detects one or more severely errored frames.

OC-N line parameters

Metropolis[®] DMXpress monitors several OC-N line parameters.

Coding violations (CV-L)

Line layer bit interleaved parity (BIP) errors are reflected in the B2 byte of the line overhead. Metropolis[®] DMXpress calculates the errors in the received frame and compares that value to the errors received in the following frames. Metropolis[®] DMXpress can detect up to 8 times N (8xN) BIP errors per STS-N frame. Each error is then reflected in the CV-L count.

Errored seconds (ES-L)

The ES-L parameter increments once for every second during which Metropolis[®] DMXpress detects either one or more B2 parity violations or an OC-N line AIS.

Errored seconds Type A (ESA-L)

The ESA-L parameter increments once for every second during which Metropolis[®] DMXpress detects exactly one B2 parity violation.

Errored seconds Type B (ESB-L)

The ESA-L parameter increments once for every second during which Metropolis[®] DMXpress detects more than one, but less than 32, B2 parity violations.

Severely errored seconds (SES-L)

The SES-L parameter increments once for every second during which Metropolis[®] DMXpress detects either one or more SEF defects or LOS defects, K Line layer BIP errors where K is equal to or greater than 2459 BIP errors for OC-48 signals or 615 BIP errors for OC-12.

Unavailable seconds (UAS-L)

The UAS-L parameter increments once each second during which a line is unavailable. A line is considered unavailable from the beginning of 10 consecutive severely errored seconds until the beginning of 10 consecutive seconds, none of which are severely errored.

Pointer justifications counts (PJC)

Metropolis[®] DMXpress monitors line Pointer Justifications that are detected and generated on at least one SONET non-terminated path.



STS-N Performance Parameters

Overview This section describes the performance monitoring parameters on terminated (STS-1) and intermediate STS-N (STS-1, STS-3c, STS-12c, and STS-48c) paths that are cross-connected through the system. For example, DS3 interfaces terminate STS-1 paths.

Monitored parameters The following table lists the STS-N path performance parameters that Metropolis[®] DMXpress monitors, including the default and ranges for the 15-minute and 1-day (24-hour) registers.

Table 4-3 STS-N Performance Parameters

Facility	Measured Provisionable Parameter	15-Min		1-Day	
		Default	Range	Default	Range
STS-48c Path	Coding Violations (CV-P)	300	1-16383	3000	1-1048575
STS-12c Path	Coding Violations (CV-P)	75	1-16383	750	1-1048575
STS-3c Path	Coding Violations (CV-P)	25	1-16383	250	1-1048575
STS-1 Path	Coding Violations (CV-P)	15	1-16383	125	1-1048575
STS-N Path	Errored Seconds (ES-P)	40	1-900	900	1-65535
	Errored Seconds Type A (ESA-P)	30	1-900	90	1-65535
	Errored Seconds Type B (ESB-P)	30	1-900	90	1-65535
	Severely Errored Seconds (SES-P)	30	1-900	90	1-65535
	Unavailable Seconds (UAS-P)	30	1-900	90	1-65535

STS-N path parameters Metropolis[®] DMXpress monitors several STS path parameters.

Coding violations (CV-P)

Path layer bit interleaved parity (BIP) errors are reflected in the B3 byte of the incoming STS-N path overhead. Metropolis[®] DMXpress calculates the errors in the received frame and compares that value to the errors received in the following frames. Metropolis[®] DMXpress can detect up to 8 BIP errors per frame.

Errored seconds (ES-P)

The ES-P parameter increments once for each second during which Metropolis[®] DMXpress detects either one or more B3 parity violations, an AIS-P defect, or an LOP-P defect.

Errored seconds Type A (ESA-P)

The ESA-P parameter increments once for every second during which Metropolis[®] DMXpress detects exactly one B3 parity violation.

Errored seconds Type B (ESB-P)

The ESB-P parameter increments once for every second during which Metropolis[®] DMXpress detects more than one, but less than 9, B3 parity violations.

Severely errored seconds (SES-P)

The SES-P parameter increments once for each second during which Metropolis[®] DMXpress detects either an AIS-P defect, or an LOP-P defect, or 2400 or more B3 parity violations.

Unavailable seconds (UAS-P)

A UAS-P is a second during which the path is unavailable. A path is considered unavailable from the beginning of 10 consecutive severely errored seconds until the beginning of 10 consecutive seconds, none of which are severely errored.



VT1.5 Performance Parameters

Overview This section describes the performance monitoring parameters relevant to VT1.5 paths that are cross-connected through the system.

Monitored parameters The following table lists the VT1.5 path performance parameters that Metropolis[®] DMXpress monitors, including the default and ranges for the 15-minute and 1-day (24-hour) registers.

Table 4-4 VT1.5 Performance Parameters

Facility	Measured Provisionable Parameter	15-Min		1-Day	
		Default	Range	Default	Range
VT1.5 Path	V5 Errored Seconds (ES-P)	40	1-900	900	1-65535
	Severely Errored Seconds (SES-P)	40	1-900	900	1-65535
	Unavailable Seconds (UAS-P)	40	1-900	900	1-65535

VT1.5 path parameters Metropolis[®] DMXpress monitors several VT1.5 path parameters.

Errored seconds (ES-P)

The ES-P parameter increments once for each second during which Metropolis[®] DMXpress detects either one or more V5 parity violations, an AIS-P defect, or an LOP-P defect.

Severely errored seconds (SES-P)

The SES-P parameter increments once for each second during which Metropolis[®] DMXpress detects either an AIS-P defect, or an LOP-P defect, or 15 or more V5 parity violations.

Unavailable seconds (UAS-P)

A UAS-P is a second during which the path is unavailable. A path is considered unavailable from the beginning of 10 consecutive severely errored seconds, until the beginning of 10 consecutive seconds, none of which are severely errored.



DS3 Performance Parameters

Overview This section describes the performance monitoring parameters relevant to DS3 signals incoming from the fiber and from the internal cross-connect.

Important! In order to generate valid DS3 PM reports, the port primary state must be either IS (in service) or NMON (not monitored), the PM mode must be ON, and the P-bit must be OFF. (The P-bit must be OFF because P-bits can be corrected at nodes provisioned for VMR along a DS3 path, and the DS3 P-bit PM data may not provide a complete report of the end-to-end DS3 path errors.)

Monitored parameters The following table lists the DS3 line and path performance parameters that Metropolis[®] DMXpress monitors, including the default and ranges for the 15-minute and 1-day (24-hour) registers.

Table 4-5 DS3 Performance Parameters

Facility	Measured Provisionable Parameter	15-Min		1-Day	
		Default	Range	Default	Range
DS3 Line	Coding Violations (CV-L)	40	1-16383	3865	1-1048575
	Errored Seconds (ES-L)	25	1-900	250	1-65535
	Severely Errored Seconds (SES-L)	25	1-900	250	1-65535
DS3 Path	P-Bit Coding Violations (CV-P)	403	1-4026	38650	1-386500
	Coding Violations (CV-P)	40	1-16383	3820	1-1048575
	Coding Violations Far End (CV-PFE)				
	Errored Seconds (ES-P)	25	1-900	250	1-65535
	Errored Seconds Far End (ES-PFE)				
	Severely Errored Seconds (SES-P)	25	1-900	250	1-65535
	Severely Errored Seconds Far End (SES-PFE)				
	Unavailable Seconds (UAS-P)	25	1-900	250	1-65535
	Unavailable Seconds Far End (UAS-PFE)				
	SE Frame Seconds (SEFS/OOF)	2	1-63	8	1-4095

DS3 line parameters Metropolis[®] DMXpress monitors several DS3 line parameters.

Coding violations (CV-L)

The CV-L parameter increments once for each bipolar violation (BPV) detected at the DS3 line layer.

Errored seconds (ES-L)

The ES-L parameter increments once for each second during which Metropolis[®] DMXpress detects either one or more bipolar violations (BPVs), or one or more LOS defects.

Severely errored seconds (SES-L)

The SES-L parameter increments once for each second during which Metropolis[®] DMXpress detects either one or more LOS defects, 2444 or more BPVs at a minimum BER of 7.5×10^{-5} , or 44 or more BPVs at a minimum BER of 1×10^{-6} .

Modes of DS3 path parameters

Metropolis[®] DMXpress monitors several modes of DS3 path parameters.

Metropolis[®] DMXpress provides P-bit, Adjusted F&M Bit, and CP-bit monitoring modes for DS3 signals and DSX-3.

The different modes supports P-bit correction (violation monitoring and removal [VMR]) on the outgoing DS3 signal toward the DS3 facility.

Important! C-Bit errors are never corrected.

P-Bit

When provisioned for P-bit, Metropolis[®] DMXpress calculates and provides counts of the following DS3 path parameters incoming from the fiber or DSX-3:

- Coding violations (CV-P)
- Errored seconds (ES-P)
- Severely errored seconds (SES-P)
- Unavailable seconds (UAS-P)
- Severely errored frames seconds (SEFS/OOF)

Important! Because P-bits can be corrected at nodes provisioned for VMR along a DS3 path, the DS3 P-bit PM data may not provide a complete report of the end-to-end DS3 path errors.

Adjusted F&M Bit

Adjusted F&M bit performance monitoring provides an alternative method for determining and accumulating DS3 path performance data based on an error estimation technique using errors on the F&M framing bits to approximate the actual error counts in the DS3 path payload.

Adjusted F&M bit performance monitoring estimates the following DS3 path parameters on incoming from the fiber or DSX-3:

- Coding violations (CV-P)
- Errored seconds (ES-P)
- Severely errored seconds (SES-P)
- Severely errored frames seconds (SEFS-P)
- Unavailable seconds (UAS-P)

Important! F&M bits are not corrected at nodes that are provisioned for VMR.

CP-Bit (Near End)

When provisioned for CP-bit, Metropolis[®] DMXpress calculates and provides counts of the following DS3 near end path parameters incoming from the fiber or DSX-3:

- Coding violations (CV-P)
- Errored seconds (ES-P)
- Severely errored seconds (SES-P)
- Unavailable seconds (UAS-P)
- Severely errored frames seconds (SEFS/OOF)

For C-bit PM, the DS3 service can be provisioned in either violation monitor (VM) or violation monitor and removal (VMR) mode.

Important! Although the P-Bit errors may be corrected when provisioned in VMR mode, C-Bit errors are never corrected.

CP-Bit (Near and Far End)

When the frame is provisioned for C-Bit and the format is provisioned for CP-Bit, Metropolis® DMXpress calculates and provides counts of the following DS3 near end and far end path parameters incoming from the fiber or DSX-3:

- Coding violations (CV-P)
- Coding violations Far End (CV-PFE)
- Errored seconds (ES-P)
- Errored seconds Far End (ES-PFE)
- Severely errored seconds (SES-P)
- Severely errored seconds Far End (SES-PFE)
- Unavailable seconds (UAS-P)
- Unavailable seconds Far End (UAS-PFE)
- Severely errored frames seconds (SEFS/OOF)

DS3 path parameters

Metropolis® DMXpress monitors several DS3 path parameters.

Important! The frame must be provisioned for C-Bit and the format must be provisioned for CP-Bit to monitor the far-end parameters.

Coding violations (CV-P)**Coding violations Far End (CV-PFE)**

The CV-P parameter increments once for each parity error detected at the path level. Unidentical P-bits corresponding to the same DS3 M-frame also increment the CV-P parameter in P-bit mode. For C-bit mode, the three C-bits in subframe 3 of a C-bit formatted DS3 frame carry the DS3 path-parity information. At the DS3 transmitter, the CP bits in the DS3 C-bit frame are set equal to the two P-bits in frame “n”. These CP bits are then inserted into frame “n+1”. Since the CP bits are not modified in any way while passing through the network, the DS3 high-speed receiver can determine if errors occurred in the DS3 path. The DS3 receiver computes the parity of frame “n” and compares that parity with the value received in the CP bits in frame “n+1”. If the values do not match, DS3 path parity violations are counted

Errored seconds (ES-P)**Errored seconds Far End (ES-PFE)**

The ES-P parameter increments once for each second during which Metropolis[®] DMXpress detects either one or more parity errors, one or more SEF defects, or one or more AIS defects.

Severely errored seconds (SES-P)**Severely errored seconds Far End (SES-PFE)**

The SES-P parameter increments once for each second during which Metropolis[®] DMXpress detects either one or more AIS or SEF defects, 2444 or more BPVs at a minimum BER of 7.5×10^{-5} , or 44 or more BPVs at a minimum BER of 1×10^{-6} .

Unavailable seconds (UAS-P)**Unavailable seconds Far End (UAS-PFE)**

A UAS-P is a second during which the path is unavailable. A path is considered unavailable from the beginning of 10 consecutive severely errored seconds until the beginning of 10 consecutive seconds, none of which are severely errored.

Important! The UAS-P parameter is not monitored when the facility is provisioned for the C-Bit mode.

Severely errored frame seconds (SESF/OOF)

The SESF-P parameter increments once for each second during which Metropolis[®] DMXpress detects either one or more severely errored frames, or one more AIS defects.

Ethernet Performance Parameters

Overview Metropolis® DMXpress provides PM capabilities for the Fast Ethernet and Gigabit Ethernet interfaces. PM data is collected at each LAN and WAN interface in the network for both incoming and outgoing directions and is stored in quarter-hour and day bins. The WAN interface provides a connection to a SONET Virtual Concatenation Group (VCG).

TCAs Provisionable threshold crossing alerts (TCAs) are not supported on the Ethernet interfaces.

Monitored parameters The following table lists the Ethernet performance parameters that Metropolis® DMXpress monitors, including the ranges for the 15-minute and 1-day (24-hour) registers.

Table 4-6 Ethernet Performance Parameters

Facility	Monitored Parameter	15-Min	1-Day
		Range	Range
Ethernet	Ethernet dropped frames (congestion) (EDFC) (See Note 1)	0-72862694	0-6994818653
	Ethernet dropped frames (errors) (EDFE) (See Note 1)	0-72862694	0-6994818653
	Ethernet incoming number of bytes (EINB)	0-112500000000	0-10800000000000
	Ethernet incoming number of frames (EINF) (See Note 1)	0-72862694	0-6994818653
	Ethernet outgoing number of bytes (EONB)	0-112500000000	0-10800000000000
	Ethernet outgoing number of frames (EONF) (See Note 1)	0-72862694	0-6994818653

Notes:

1. Counter can overflow.

Enabling/disabling

Performance monitoring is enabled/disabled via the WaveStar® CIT. From the System View menu, select **Performance > Prov PM Ports**, then navigate to the port.

Ethernet parameters

Metropolis® DMXpress monitors several Ethernet parameters.

Ethernet dropped frames (congestion) (EDFC)

The EDFC parameter counts the number of incoming Ethernet frames dropped at a specific LAN/WAN port due to buffer overflow. Buffer overflow occurs when the network is congested.

Ethernet dropped frames (errors) (EDFE)

The EDFE parameter counts the number of incoming Ethernet frames dropped at a LAN/WAN port due to a frame check sequence (FCS) error or another defect in the frame.

Ethernet incoming number of bytes (EINB)

The EINB parameter counts the total number of non errored (good) bytes incoming to a LAN/WAN port.

Ethernet incoming number of frames (EINF)

The EINF parameter counts the total number of non errored (good) Ethernet frames incoming to a LAN/WAN port.

Ethernet outgoing number of bytes (EONB)

The EONB parameter counts the total number of outgoing bytes transmitted by a specified LAN/WAN port.

Ethernet outgoing number of frames (EONF)

The EONF parameter counts the total number of outgoing frames transmitted by a specified LAN/WAN port.





5 Ethernet

Overview

Purpose This section describes the Ethernet implementation for the Metropolis[®] DMXpress Access Multiplexer (Metropolis[®] DMXpress).

Contents The following topics are covered:

Applications	5 - 3
Ethernet Circuit Packs	5 - 5
Tagging Modes	5 - 8
Ethernet Topologies	5 - 11
Rapid Spanning Tree Protocol	5 - 17
Port Default Priority	5 - 20



Applications

Virtual private networks	Virtual private networks allow communications services providers to extend their customers' private networks across the public telecommunications network while maintaining the integrity and security of a private network. The VPN is established by allocating Ethernet ports to an individual customer and then controlling access through the SONET network by the use of virtual LANs (VLANs). Metropolis® DMXpress supports up to 4093 VLANs for customer identification and isolation. Any number of VLANs in the range 1-4093 can be assigned to any number of ports with complete flexibility.
Dedicated bandwidth	Specific Ethernet ports and specific Virtual Concatenation Group ports (VCG ports) may be dedicated to a single customer, thereby providing an Ethernet "private line" within the network.
Shared bandwidth	With shared bandwidth, traffic from multiple customers (and from multiple Ethernet ports) is multiplexed together at the packet layer into the same VCG ports. This provides the opportunity of statistical multiplexing: customers can have the opportunity for burst traffic at a rate greater than can be guaranteed to each customer.
Non service affecting software upgrades	The Ethernet circuit packs (FASTE/16 and GbE/2 LX and SX) support non service affecting software upgrades. After a software upgrade, the FASTE/16 and GbE/2 circuit packs perform a warm boot to restart with the new software. The warm boot completes the software upgrade without affecting the service (no transmission hits). During a warm boot, the Ethernet circuit packs ignore any command received from the Main circuit packs. The Main circuit packs reject all the new provisioning commands destined for Ethernet circuit packs while a boot is in progress. The network element outputs a denial message for all the Ethernet provisioning commands during the restart. However, the following conditions may occur during an Ethernet circuit pack software upgrade that initiate a cold boot. A cold boot requires a circuit pack reset, which could be service affecting. • Point release upgrade affecting circuit pack database • Data over SONET (DOS) Field Programmable Gate Array (FPGA) needs to be reloaded

End-to-end flow control Metropolis® DMXpress supports end-to-end flow control interoperability. In full rate private line mode, Metropolis® DMXpress supports optional propagation of flow control (PAUSE) frames across the SONET network when congestion occurs at the customer's equipment.

Metropolis® DMXpress also supports local flow control for sub-rate applications.

Local flow control Metropolis® DMXpress also supports local flow control at the near end port or VCG level. When the near end device transmits too much data to the local Metropolis® DMXpress and congestion occurs, Metropolis® DMXpress transmits flow control (PAUSE) frames at the VCG or port level to the local device to temporarily stop transmission. This prevents the local buffers from overfilling and losing data frames. After Metropolis® DMXpress recovers from the congestion state, normal transmission resumes.

Auto-negotiation disable Metropolis® DMXpress supports provisionable auto-negotiation disable on Ethernet ports.

Auto-negotiation is disabled for a 10/100T Ethernet port when the duplex mode, flow control mode, and line rate are all provisioned non-auto values. If duplex mode, flow control mode, or line rate are provisioned to auto then Auto-negotiate is enabled. In this state the Metropolis® DMXpress advertises the statically provisioned capabilities to the link partner.

Auto-negotiation is disabled for a 1GSX/1GLX Ethernet port when the flow control mode is provisioned a non-auto value. When the flow control is provisioned to auto, Auto-negotiation is enabled for the port.

STS-1 cross-connections Metropolis® DMXpress supports STS-1 cross-connections between Ethernet circuit packs and the Main circuit packs.



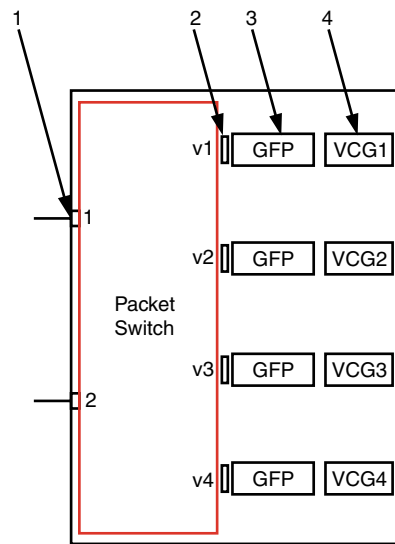
Ethernet Circuit Packs

GbE/2 Ethernet circuit pack

Starting with Release 2.0, a Short Reach GbE/2 card is introduced. It is functionally identical to the original LX version except for its reach.

The GbE/2 (SX/LX) Ethernet circuit pack provides two external 1-gigabit Ethernet ports and four 1-gigabit VCG ports.

Figure 5-1 GbE/2 Ethernet Circuit Pack



nc-dmx-094

Legend:

- 1 External Ethernet Port
- 2 Virtual Concatenation Group Port
- 3 Generic Framing Procedure
- 4 Virtual Concatenation Group

External Ethernet port

Each of the two external Ethernet ports provides a one-gigabit Ethernet interface. The optical interface is 1000Base-LX/SX (long/short-reach laser).

Ethernet packet switch

The Ethernet packet switch routes Ethernet packets based on the destination address and the VLAN assignment. In order for a packet to be routed to a port (external Ethernet port or VCG port), that EPORT or VCG must be enabled for the VLAN of the Ethernet frame. The system allows a default VLAN to be assigned for each external Ethernet port. The default VLAN tag can be added to any frame which does not have a VLAN tag.

Virtual concatenation group port

The virtual concatenation group port (VCG port) is a one gigabit internal Ethernet port that passes packets to the generic framing procedure and VCG operations.

Generic framing procedure

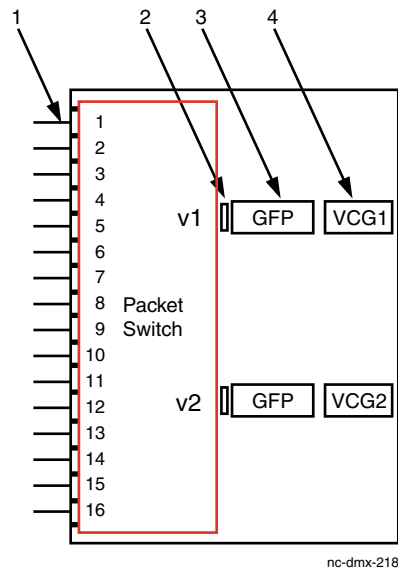
The generic framing procedure (GFP) is a draft standard (ANSI T1X1.5/2001-024R4 and ITU-T G.GFP). The procedure encapsulates the Ethernet packet in a standard frame for transmission over the SONET/SDH network.

Virtual concatenation group

The virtual concatenation group (VCG) processing assembles packets into SONET STS-1 tributary groups that can then be sent through the SONET/SDH network. Virtual concatenation allows STS-1 tributary to be routed individually and reassembled at the receiving end of the transmission. Up to 21 STS-1 tributaries can be concatenated in a group. A group of 21 STS-1 tributaries provides full wire-speed transport for a 1-gigabit Ethernet signal through the SONET network.

FASTE/16 Ethernet circuit pack

The FASTE/16 Ethernet circuit pack provides 16 external 10/100Base-TX Ethernet ports and two 1-gigabit VCG ports.

Figure 5-2 FASTE/16 Ethernet Circuit Pack**Legend:**

- 1 External Ethernet Port
- 2 Virtual Concatenation Group Port
- 3 Generic Framing Procedure
- 4 Virtual Concatenation Group

Important! The elements on the FASTE/16 Ethernet circuit pack function in the same manner as the elements on the gigabit Ethernet circuit packs. See the discussion on the previous page.



Tagging Modes

Overview The Metropolis[®] DMXpress supports three tagging modes.

Private line mode (no tag) The private line mode (no tag) is the default mode for the external gigabit Ethernet ports on the. The private line mode is used for point-to-point protected UPSRs. In private line mode, no additional Ethernet provisioning is required after the cross-connection is established.

In private line mode, Metropolis[®] DMXpress supports optional propagation of end-to-end flow control (PAUSE) frames across the SONET network when congestion occurs.

Important! The FASTE/16 Ethernet circuit packs do not support the private line mode.

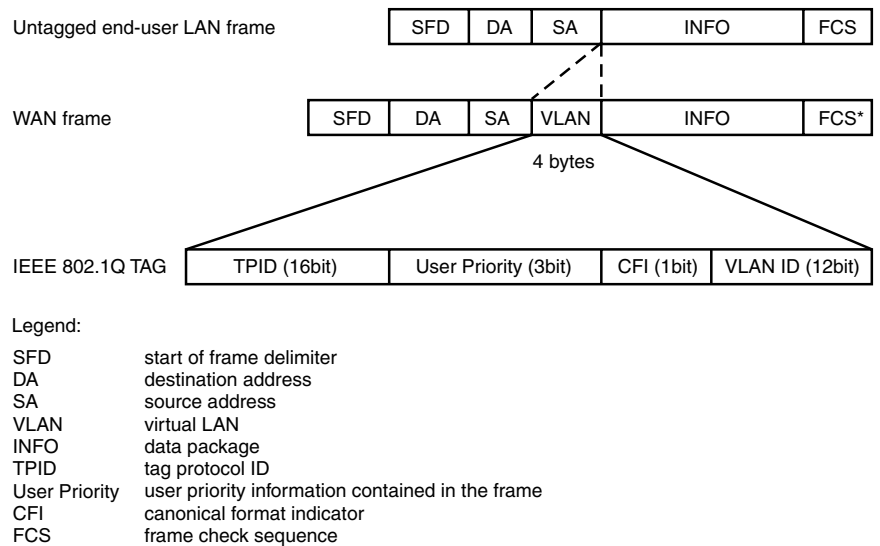
802.1q VLAN mode In 802.1q Virtual LAN (VLAN) mode, the Ethernet ports (EPORT) are assigned one or more VLAN IDs and/or a default VLAN tag. VCG ports are assigned a VLAN ID and/or a default VLAN tag to support add/drop traffic to/from the EPORTs of the corresponding virtual switch. VLANs allow large bandwidth networks to carry multiple LANs and maintain the identity of each. Therefore, VLANs can extend a LAN across the wide-area network while maintaining the identity and operational integrity of the LAN.

The 802.1q VLAN mode is the default mode for the 10/100T Fast Ethernet ports on the FASTE/16 circuit pack. The Gigabit Ethernet ports on the GbE/2 circuit packs may also be tagged with the 802.1q VLAN mode.

VLAN tagging

Figure 5-3 illustrates how the VLAN tag appears in the Ethernet frame.

Figure 5-3 VLAN Tag



nc-dmx-187

VLAN ID

In Metropolis[®] DMXpress, the VLAN ID may be a numerical value in the range 1-4093. A default VLAN ID may be provisioned for each Ethernet port (EPORT). The default VLAN ID, when provisioned, will be assigned to any frame, which does not have a VLAN tag.

The VLAN ID is assigned to the Ethernet port (EPORT) and to the VCG port (VCG). The VLAN ID must be active for the port in order for the packet to be routed to that port. Ports are assigned/unassigned to a VLAN ID using the **ent-vlan** or **ed-vlan** commands, respectively. The VLAN ID is examined within the Ethernet packet switch. The switch will route a packet to the port appropriate for the destination address only if the VLAN ID of the packet is enabled for that port. If the VLAN ID is not enabled for the port, the Ethernet packet is discarded.

TL1 commands

The following TL1 commands support VLAN tag provisioning:

- **ed-vlan**
- **rtrv-vlan**
- **ent-vlan**
- **dlt-vlan**

Transparent mode Transparent mode may be provisioned for 10/100T Fast Ethernet and/or Gigabit Ethernet ports provisioned for point-to-point or multi-point. In the transparent mode, Metropolis® DMXpress processes Ethernet traffic independent of the 802.1q VLAN tag that may be present on the packets received on LAN ports. This method eliminates the need for coordination of VLAN assignments between the service provider and customer and simplifies network administration.

TL1 commands

The following TL1 commands support port tag provisioning:

- **ed-eport**
- **rtrv-eport**
- **ed-vcg**
- **rtrv-vcg**

Virtual switch A virtual switch (VRTSW) is a logical grouping of Ethernet ports (EPORTs) and VCG ports that share interconnect and share a common set of properties. A virtual switch may support one or more spanning trees; a spanning tree can only belong to one virtual switch.

Restrictions

A port (EPORT or VCG) can only be assigned to one virtual switch at a time. VLANS (802.1q VLAN mode) and port tags (transparent mode) that are assigned to a virtual switch cannot be assigned to another virtual switch on the same circuit pack.

TL1 commands

The following TL1 commands support virtual switch provisioning:

- **ed-vrtsw**
- **rtrv-vrtsw**
- **ent-vrtsw**
- **dlt-vrtsw**



Ethernet Topologies

Overview Ethernet can be configured in the following major configurations:

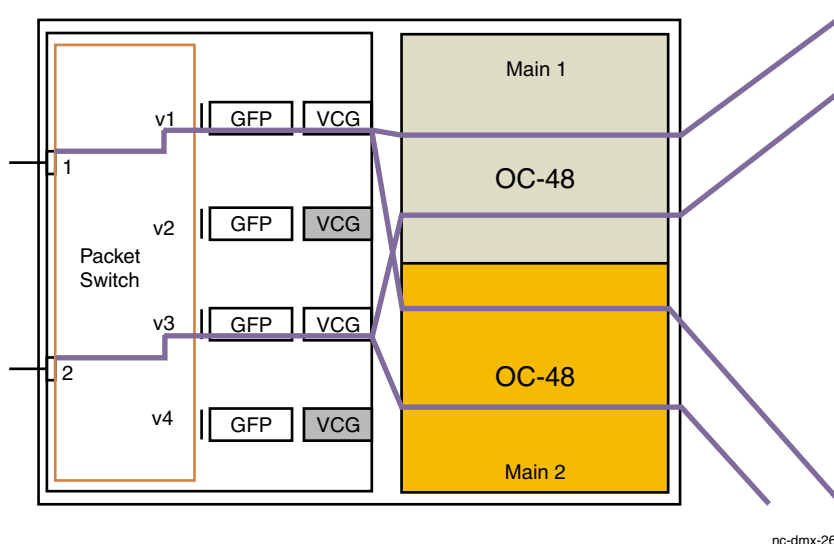
- Point-to-point (private line mode)
- Point-to-point
- Multipoint

Point-to-point private line mode

In a point-to-point configuration SONET UPSR can be used for network protection. When a circuit pack is configured for a point-to-point configuration in private line mode (no tag), the gigabit Ethernet port 1 connects to VCG V1 and gigabit Ethernet port 2 connects to VCG V3.

Important! This configuration only applies to the GbE/2 Ethernet circuit packs.

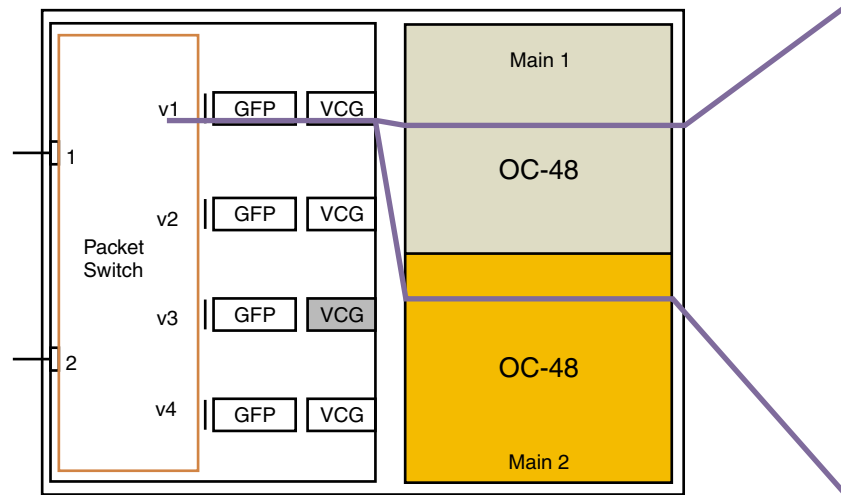
Figure 5-4 Point-to-Point Private Line Mode Example with Gigabit Ethernet and OC-48 Main



Point-to-point

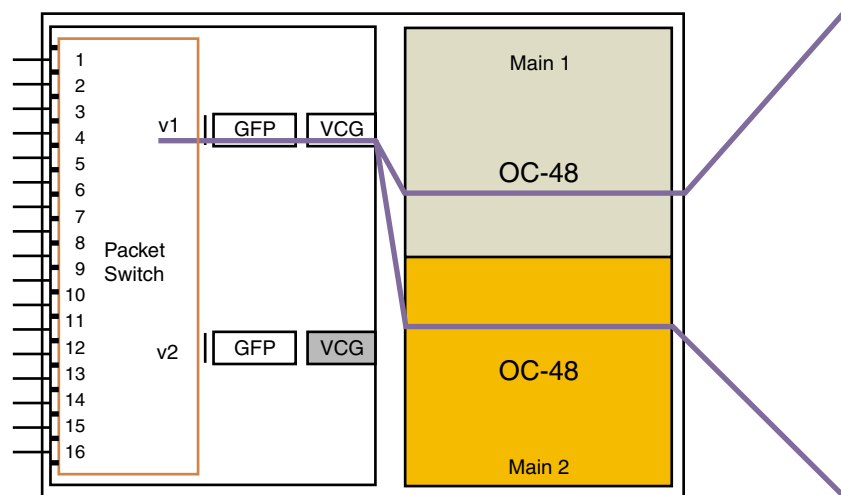
In a point-to-point configuration, a SONET UPSR can be used for network protection. When a circuit pack is configured for a point-to-point configuration the even-numbered VCG port of the pair is unavailable.

Figure 5-5 Point-to-Point Example with Gigabit Ethernet and OC-48 Main



nc-dmx-267

Figure 5-6 Point-to-Point Example with Fast Ethernet



nc-dmx-268

Point-to-point in a network

The point-to-point configuration allow two Ethernet interfaces to be configured as though they were adjacent points on a LAN.

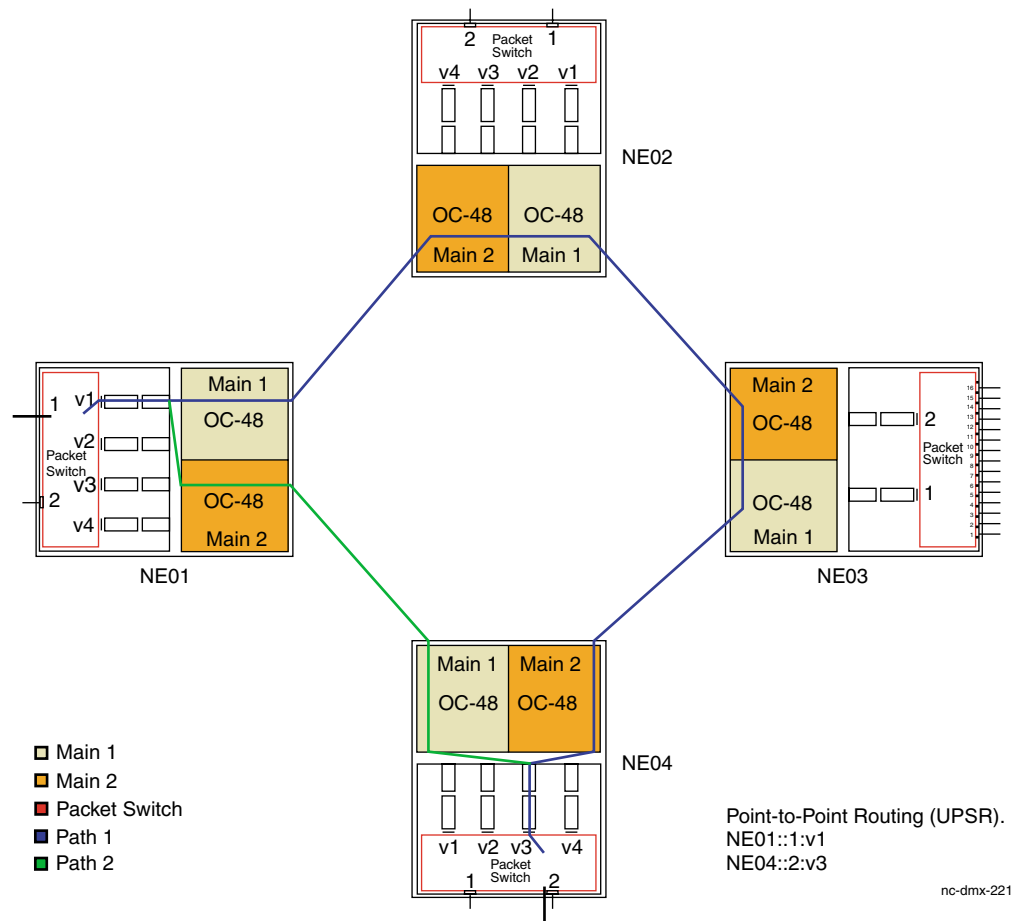
The system works as follows:

1. The Ethernet packets are received by the card.
2. The packet switch routes the packet to the appropriate VCG port.
3. The packet is framed and included in a VCG STS-1 packet

4. The packet is routed through the SONET/SDH network to the other Ethernet circuit pack.
5. The VCG group is disassembled; the framing is removed; and the packet is delivered to the packet switch.
6. The packet switch routes the packet to the appropriate Ethernet port.

Figure 5-7 illustrates the path for a point-to-point configuration which routes the traffic over a UPSR.

Figure 5-7 Point-to-Point Example over a UPSR with OC-48 Main



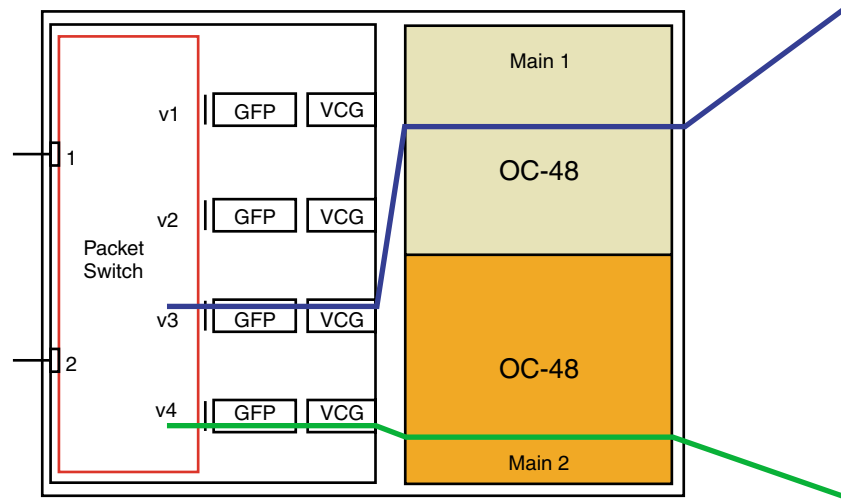
Multipoint

Multipoint configurations are used for LANs that have multiple drops from a SONET/SDH network. The configuration affects the way the card functions and the available network topologies. When a circuit pack is configured for a multipoint configuration, only the odd-numbered VCG ports are provisioned for cross-connections. The even-numbered port of the pair (VCG=n+1) mirrors the provisioned cross-

connect settings of the odd-numbered port (VCG=n). One port is routed to Main 1, the other to Main 2.

Figure 5-8 illustrates a gigabit Ethernet circuit pack configured for multipoint communications.

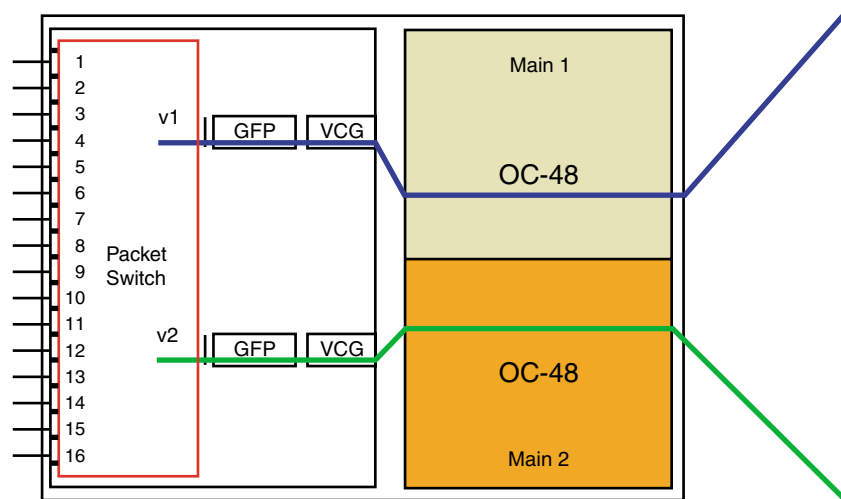
Figure 5-8 Multipoint Example with Gigabit Ethernet and OC-48 Main



nc-dmx-090

Figure 5-9 illustrates a FASTE/16 Ethernet circuit pack configured for multipoint communications.

Figure 5-9 Multipoint Example with Fast Ethernet and OC-48 Main



nc-dmx-220

Multipoint in a network

Multipoint configurations allow a LAN to have multiple drops from the SONET/SDH network. Also, multiple LANs can be configured through the network.

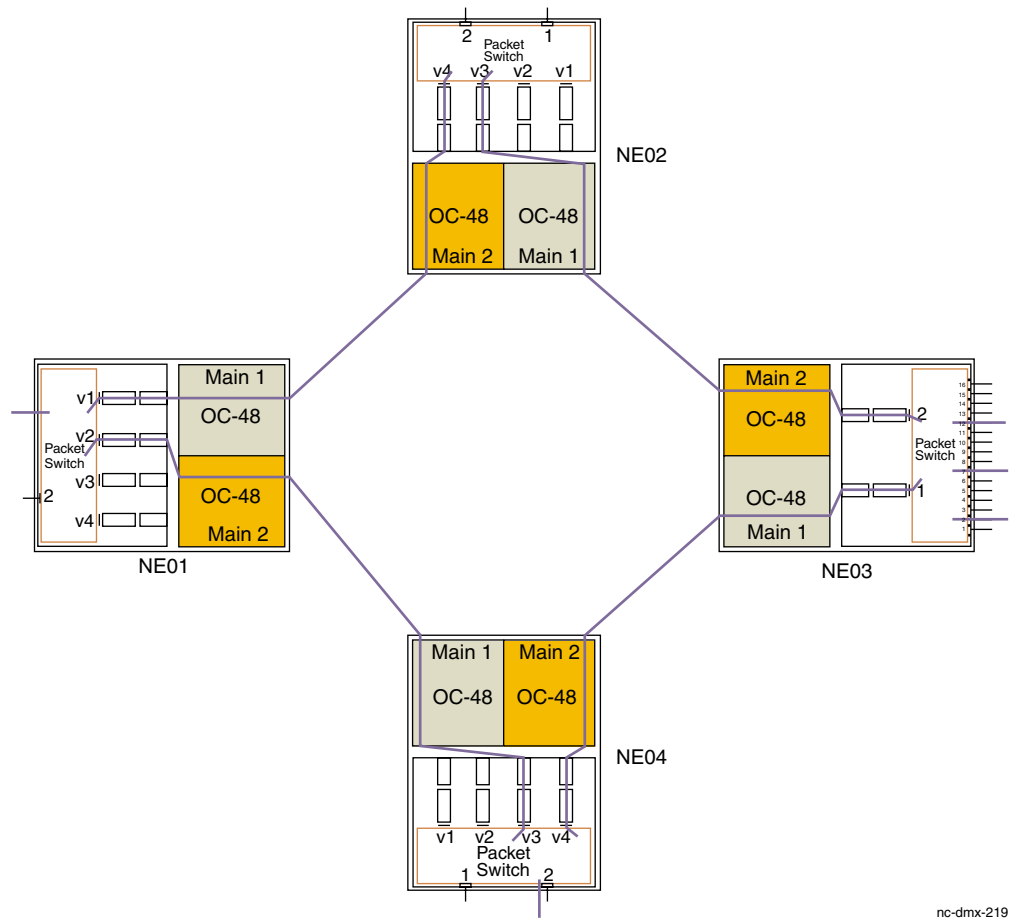
The system works as follows:

1. The Ethernet packets are received by the card.
2. The packet switch routes the packet to the appropriate VCG port or ports.
3. The packet is framed and included in a VCG STS-1 packet
4. The packet is routed through the SONET/SDH network to the other Ethernet circuit packs.
5. The VCG group is disassembled; the framing is removed; and the packet is delivered to the packet switch.
6. The packet switch routes the packet to the appropriate Ethernet ports, based on VLAN tagging.
7. If no port is enabled for the VLAN tag on the packet, the packet is discarded.

The following figure shows the path for a multipoint configuration which routes LANs to multiple drops over the network.

Figure 5-10 illustrates the path for a multipoint configuration which routes LANs to multiple drops over the network.

Figure 5-10 Multipoint Example over the Network with OC-48 Main



For detailed information about establishing point-to-point and multipoint Ethernet services refer to [Chapter 9, “Circuit Order/Provisioning Tasks”](#).



Rapid Spanning Tree Protocol

Overview This section provides information on the configuration of rapid spanning tree protocol (RSTP).

Function of spanning tree Spanning tree is a protection scheme for Ethernet transmission at the Ethernet packet level, as opposed to protection at the SONET level (UPSR). Using rapid spanning tree protocol

- Eliminates loops in the network
- Restores transmission in the event of a broken link

Ethernet bridges and routers build tables that define the routes to specific devices. A MAC bridge, for example, has a filtering database that defines where to route any packets addressed to a specific MAC within the network. The tables are built based on input from devices within the network.

If there is a loop in the network, that is, if there is more than one way to get to a destination device, two problems can result:

Frames may be duplicated in the network. That is, the same frame may be sent to a node via two different paths.

The routing information will be changed as configuration BPDUs from that device are received across different paths. In a meshed network, the reconfiguration of the filtering database tables can begin to use up all the network resources, so that little bandwidth is left for data traffic.

Release 1.1 enhancements In Release 1.1, Metropolis[®] DMXpress supports several significant improvements to its packet-layer restoration capabilities:

With these enhancements, packet-layer restoration times are reduced from tens of seconds to a few hundred milliseconds. (Restoration time is a function of network size and configuration, location of the failure.)

- **Faster Failure Detection** - The system uses SONET-layer failure detection to trigger packet-layer (spanning tree) reconfiguration, so packet-layer reconfiguration starts within a few milliseconds after a failure rather than several seconds later.
- **IEEE 802.1W Rapid Reconfiguration** - The system supports this new standard packet-layer restoration protocol, which uses new messages to significantly reduce convergence time.

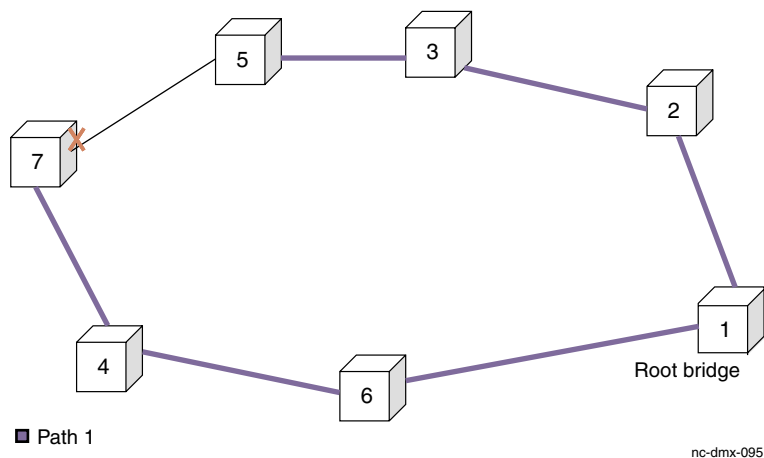
- Enhanced STP configuration reports and controls which, together with 802.1W, enable support for much larger networks than are supported with IEEE 802.1D Spanning Tree Protocol.

How it works

Spanning tree works as follows:

- Initially, every node in the group thinks it is the root node.
- Configuration BPDUs are sent from each node to determine the most economical route from each node to the root node.
- As information about the network becomes clear, one node is designated the root node; from this node, the distance to any point in the network may be measured.
- Once the network has become clear, some ports are blocked so that there are no loops in the network and so that the network provides the most efficient paths from the root to the nodes. This effectively creates a tree structure for the network.
- If an active link fails, the network is reconfigured so that previously blocked links can be used for traffic.

Figure 5-11 Spanning Tree

**Legend:**

Active Links 1 to 2; 2 to 3; 3 to 5; 1 to 6; 6 to 4; 4 to 7
 Inactive Links 5 to 7
 X Indicates a blocked port (frame relay is disabled)

Important! The configuration provides the shortest (most efficient) path from each node to the root. The configuration also provides only one path from among any two nodes.

Reconfiguration

If one of the active links is broken, the network reconfigures to activate the inactive link. For example, if the link between 2 and 3 is broken, the link between 5 and 7 would be enabled.

Spanning tree limitations

When running 802.1D Spanning Tree Protocol, there is a nine node network limitation. In order for spanning tree to reconfigure properly, the network cannot have more than nine nodes with spanning tree enabled. For example in a network with 30 nodes, only nine nodes can have spanning tree enabled. This limits the packet ring (multi-point) network size to nine nodes.

The maximum age timer also impacts performance and is recommended not to be increased for spanning tree.

Enhanced rapid spanning tree limitations

When running 802.1W Enhanced Rapid Spanning Tree Protocol with the *default* value settings, there is a nine node limitation in order for spanning tree to reconfigure properly. To increase the number of nodes running Enhanced Rapid Spanning Tree, the maximum age timer must be increased to support the desired spanning tree size. The default maximum age timer for both Spanning Tree and Enhanced Rapid Spanning Tree is 20. However, as the spanning tree size increases, the performance decreases. Use the following formula to determine the spanning tree size and the recommended setting of the maximum age timer:

$$2 * (nodes + 1) \leq maximum\ age\ timer$$

For example, in a network with 20 nodes, the Maximum age timer should be provisioned as 42.

Administering spanning tree configurations

For information about creating a spanning tree configuration, refer to [“Task 332: Determine Preferred Spanning Tree Configuration” \(9-211\)](#). For information about changing an existing spanning Tree configuration, refer to [“Task 333: Change an Existing Spanning Tree Configuration” \(9-219\)](#)

The **Configuration > Data > Create a Spanning Tree Group**, **Configuration > Data > Provision a Spanning Tree**, and **Configuration > Data > Delete a Spanning Tree Group** WaveStar® CIT commands are used to administer spanning trees. For more information about these commands and provisioning spanning trees, refer to the WaveStar® CIT on-line help.



Port Default Priority

Overview Ethernet port default priority is used to determine the priority by which packets from a port are processed.

Priority levels The following three levels or provisioning are available:

- High
- Low
- NA (Not Applicable): no priority assigned to this port

High or low priority If an EPORT is provisioned for either high or low priority, frame processing depends on the tagging mode and whether or not the frame arrives with a VLAN tag and user priority.

Frame with a VLAN tag

In the 802.1q VLAN tagging mode, if a frame arrives at an EPORT with a VLAN tag, the frame is sent to the high or low priority queue based on the provisioned default priority of the port.

Frame without a VLAN tag

In the 802.1q VLAN tagging mode, if a frame arrives at an EPORT without a VLAN tag, a default VLAN tag is added with the user priority bits set according to the provisioned default priority of the port.

In the transparent tagging mode, all frames arriving at an EPORT are transparently tagged with a port tag with the user priority bits set according to the provisioned default priority of the port.

In both modes, if the port default priority is HIGH, then the priority tag is set to 0x7. If the port default priority is LOW, then the priority tag is set to 0x0. The frame is then sent to the high or low priority queue of the destination port according to the assigned priority value.

NA priority If an EPORT is provisioned with a default priority of NA, no port default priority is assigned, and the frame processing depends upon the tagging mode and whether or not the the frame arrives with a VLAN tag and user priority.

Frame with a VLAN tag

In the 802.1q VLAN tagging mode, if a frame arrives at a EPORT with a VLAN tag, the frame is sent to the high or low priority queue based on the priority bits in the VLAN tag. If the tag value is 0x4 to 0x7, the

frame is sent to the high priority queue. If the tag value is 0x0 to 0x3, the frame is sent to the low priority queue.

Frame without a VLAN tag

In the 802.1q VLAN tagging mode, if a frame arrives at a EPORT without a VLAN tag, a default VLAN tag is added with the user priority bits set to 0x0. The frame is then sent to the low priority queue of the destination port.

In the transparent tagging mode, all frames arriving at an EPORT are transparently tagged with a port tag with the user priority bits set to 0x0. The frame is then sent to the low priority queue of the destination port.

Priority at a VCG port

If a frame arrives at a VCG port, the frame is sent to the high or low priority queue based on the priority tag. If the tag value is 0x4 to 0x7, the frame is sent to the high priority queue. If the tag value is 0x0 to 0x3, the frame is sent to the low priority queue.

Queue processing

The high and low priority queues are served using a weighted round robin with an 8:1 ratio. The system processes eight high priority frame, then one low priority frame, then eight high priority frame, then one low priority frame, and so on.

Priority provisioning

The EPORT default priority can be preprovisioned from the System View menu, by selecting **Configuration > Provision**, and then selecting the EPORT. Under the Admitted Frame Types tab, the Untagged VLAN Frames sections has a box for Default Priority selection.

Priority reporting

The priority can be reported from the System View menu, by selecting **View > View Equipment Details**, and then selecting the EPORT.





6 Technical Specifications

Overview

- Purpose** This section contains the technical specifications for the Metropolis[®] DMXpress Access Multiplexer (Metropolis[®] DMXpress), including the following:
- Transmission Interface Standards
 - Electrical Interfaces
 - Optical Interfaces
 - System Performance
 - Operations Interfaces
 - Physical Specifications

Contents This chapter contains the following sections:

Metropolis® DMXpress Component Specifications	6 - 3
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Metropolis[®] DMXpress Component Specifications

- Chassis** The chassis consists of the following:
- Dimensions: Approximately 17.3" W, 15" D, 3.5 H (2RU)
 - Card guides for three horizontally oriented circuit packs
 - Three cooling fans located on the right side of the chassis
 - One power supply rated for 300W maximum output
 - AC input connector
 - DC input terminal strip (four positions) for two redundant DC feeds (-48V nominal)
 - Air flow direction is from left to right
 - Power on/standby switch

- OC48/1.312 (Main) Circuit Pack** The 2 port OC-48 Main circuit pack (A1AA005) consists of the following:
- Dimensions: 250 mm wide, 320 mm deep, 25mm overall height.
 - Power Dissipation: 92 W estimated.
 - Optical Interfaces: Two sets of LC connectors for OC48 intermediate reach 1310nm (nominal) SONET optical signals using single mode fiber.
 - Metallic Interfaces: Three RJ45 interfaces, one for RS-232 Craft Interface and two for LAN Craft Interface (front/rear LAN).

- OC48 CHx/CHy DWDM (Main) Circuit Pack** The OC48 CHx/CHy Main circuit pack (A1AA121-159) consists of the following:
- Dimensions: 250 mm wide, 320 mm deep, 25mm overall height.
 - Power Dissipation: 121 W
 - Optical Interfaces: Two sets of LC connectors for OC-48 intermediate reach 1310nm (nominal) SONET optical signals using single mode fiber.
 - Metallic Interfaces: Three RJ45 interfaces, one for RS-232 Craft Interface and two for LAN Craft Interface (front/rear LAN).

OC12/1.312 (Main) Circuit Pack

The OC-12 Main circuit pack (A1AA016) consists of the following:

- Dimensions: 250 mm wide, 320 mm deep, 25mm overall height.
- Power Dissipation: 85 W estimated.
- Optical Interfaces: Two sets of LC connectors for OC12 intermediate reach 1310nm (nominal) SONET optical signals using single mode fiber.
- Metallic Interfaces: Three RJ45 interfaces, one for RS-232 Craft Interface and two for LAN Craft Interface (front/rear LAN).

DS1/DS3/16/1 (TDM) Circuit Pack

This TDM circuit pack (A1AA006) consists of the following:

- Dimensions: 250 mm wide, 320 mm deep, 30 mm overall height
- Power Dissipation: 10 W estimated
- Interfaces:
2 BNC connectors for DS3 interfaces
16 RJ45 connectors for DS1 interfaces

DS3/12 (TDM) Circuit Pack

This TDM circuit pack (A1AA015) consists of the following:

- Dimensions: 250 mm wide, 320 mm deep, 30 mm overall height
- Power Dissipation: 29 W estimated
- Interfaces:
2 62-pin D-sub connectors for DS3 interfaces

OC-12 Low Speed (Optical) Circuit Pack

This optical circuit pack (A1AA018) consists of the following:

- Dimensions: 250 mm wide, 320 mm deep, 30 mm overall height
- Power Dissipation: 40 W estimated
- Interfaces
 - Optical: 2 sets of LC-type connectors for OC-12 interfaces (1310 nm) using single mode fiber
 - Metallic: Three RJ45 (one for RS-232 CIT and two for LAN CIT)

**OC-3 Low Speed (Optical)
Circuit Pack**

This optical circuit pack (A1AA017) consists of the following:

- Dimensions: 250 mm wide, 320 mm deep, 30 mm overall height
- Power Dissipation: 36 W estimated
- Interfaces
 - Optical: 4 sets of LC-type connectors for OC-3 interfaces (1310 nm) using single mode fiber
 - Metallic: Three RJ45 (one for RS-232 CIT and two for LAN CIT)

**FASTE/16 10/100 Ethernet
Circuit Pack**

The 10/100 Ethernet circuit pack (A1AA007) consists of the following:

- Dimensions: 370 mm wide, 320 mm deep, 25 mm overall height
- Power Dissipation: 46W estimated
- Interfaces: 16 (sixteen) RJ45 connectors for 10/100BaseT

**GbE/2 (1000BASE-LX
Gigabit Ethernet) Circuit
Pack**

The GbE/2 circuit pack (A1AA008) consists of the following:

- Dimensions: 370 mm wide, 320 mm deep, 25 mm overall height
- Power Dissipation: 66W estimated
- Interfaces: 2 dual LC optical connectors for 1000BASE-LX based on IEEE 802.3 (1310 nm) using single mode fibers.

**GbE/SX/2 (1000BASE-SX
Gigabit Ethernet) Circuit
Pack**

The GbE/SX/2 circuit pack (A1AA019) consists of the following:

- Dimensions: 370 mm wide, 320 mm deep, 25 mm overall height
- Power Dissipation: 66W estimated
- Interfaces: 2 dual LC optical connectors for 1000BASE-SX based on IEEE 802.3 (850 nm) using multimode fibers.

□

Metropolis® DMXpress Operating Conditions

Overview The Metropolis® DMXpress system is intended for indoor controlled environment applications.

NOTE: The GbE/2, GbE/SX/2, and FASTE/16 cards are not rated for outdoor installations because of component operating temperature limitations.

Current drain The table below provides the maximum and average current drain requirements for a Metropolis® DMXpress shelf equipped with a MAIN OC-48/OC-12, TDM, Optical, and Data card.

Table 6-1 Metropolis® DMXpress Current Drains

Shelf	Current Drains per Feeder in Amperes	
	Average @ -48V	Average @ -40V
Shelf	4.4	5.3

Environmental Specifications The following table lists the environmental specifications for the individual Metropolis® DMXpress components.

Table 6-2 Environmental Specifications

Item	Operating Ambient Temperature Range° Celsius	Humidity Range% R.H.	Altitude Range, referred to Sea Level in Meters
Chassis, Power Supply	-40 to +65	5 - 95	-60 - +1,800
OC48/1.3I2	-5 to +55	5 - 90	-60 - +1,800
OC12/1.3I2	-40 to +85	5 - 95	-60 - +1,800
OC48 CHx/CHy	-5 to +55	5 - 90	-60 - +1,800
DS1/DS3/16/1	-40 to +65	5 - 95	-60 - +1,800
DS3/12	-40 to +65	5 - 95	-60 - +1,800
OC3LS/4	-40 to +65	5 - 95	-60 - +1,800
OC12LS/2	-5 to +55	5 - 90	-60 - +1,800
GbE/2	-5 to +55	5-90	-60 - +1,800

Item	Operating Ambient Temperature Range° Celsius	Humidity Range% R.H.	Altitude Range, referred to Sea Level in Meters
GbE/SX/2	-5 to +55	5-90	-60 - +1,800
FASTE/16	-5 to +55	5-90	-60 - +1,800

System Power Specifications

The following table lists the system power specifications for the Metropolis® DMXpress.

Table 6-3 System Power

Item	Minimum	Maximum	Nominal
DC Power, A and B Feeds	-40 VDC	-57 VDC	-48 VDC
AC Power	90 VAC	265 VAC	120 VAC
System Power Dissipation	To be supplied.	300 W	NA

Transmission interface standards

The following table lists the transmission interface standards for electrical, optical, and Ethernet interfaces for the Metropolis® DMXpress circuit packs.

Table 6-4 Transmission Interface Standards

Interface	Standard	Comments
DS1/DS3/16/1	ANSI T1.231-1997, GR-499-CORE, Issue 2, 1998	B8ZS/AMI option, SF/ESF (DS1) VMR, VM, or clear channel (DS3)
DS3/12	ANSI T1.231-1997 GR-499-CORE, Issue 2, 1998	B8ZS/AMI option, SF/ESF (DS1) VMR, VM, or clear channel (DS3)
OC48/1.3I2 OC12/1.3I2 OC48 CHx/CHy	GR-253-CORE, Issue 2, 1995 GR-496-CORE, Issue 1, 1998 GR-1400-CORE, Issue 2, 1999 ANSI T1.231-1997	

Interface	Standard	Comments
OC3LS/4 OC12LS/2	GR-253-CORE, Issue 2, 1995 GR-496-CORE, Issue 1, 1998 GR-1400-CORE, Issue 2, 1999 ANSI T1.231-1997	
FASTE/16 GbE/2 GbE/SX/2	IEEE 802.3 IEEE802.1	



OC48/1.3I2 OLIU (A1AA005)

Optical specification The OC48/1.3I2 OLIU photonics meet or exceed SONET intermediate-reach specifications (SONET IR-1 DFB category). The distributed feedback laser (DFB) supplies a 1310 nm, scrambled NRZ-coded signal (2.488 Gb/s).

This OC48/1.3I2 interface supports span lengths up to 20 km. Refer to the [“SONET Optical Specifications” \(6-14\)](#) section in this chapter for detailed system, transmitter, receiver, and link budget specifications.

Alarm thresholding The following parameters are monitored on the OC48/1.3I2 interface:

- LOS
- LOF
- LOP
- AIS-L
- RDI-L (FERF)
- Line AIS
- Path Unequipped
- Signal Degrade (BER)
- Signal Fail (BER).

Performance monitoring SONET line and path performance monitoring complies with the standards outlined in GR-253-CORE. For detailed information about PM parameters and thresholds, refer to [Chapter 4, “Performance Monitoring”](#).



OC48 Passive PWDM OLIU (A1AA121-159)

Optical specification The OC48 OLIU photonics meet or exceed SONET intermediate-reach specifications (SONET IR-1 DFB category). The distributed feedback laser (DFB) supplies a 1310 nm, scrambled NRZ-coded signal (2.488 Gb/s).

This OC48 interface supports span lengths up to 85 km (assumes that no passive optical unit is used). Refer to the [“SONET Optical Specifications” \(6-14\)](#) section in this chapter for detailed system, transmitter, receiver, and link budget specifications.

Alarm thresholding The following parameters are monitored on the OC48/1.312 interface:

- LOS
- LOF
- LOP
- AIS-L
- RDI-L (FERF)
- Line AIS
- Path Unequipped
- Signal Degrade (BER)
- Signal Fail (BER).

Performance monitoring SONET line and path performance monitoring complies with the standards outlined in GR-253-CORE. For detailed information about PM parameters and thresholds, refer to [Chapter 4, “Performance Monitoring”](#).



OC12/1.3I2 Main OLIU (A1AA016)

Optical specification

The two port OC-12 Main OLIU photonics meet or exceed SONET intermediate-reach specifications (SONET IR-1 DFB category). The distributed feedback laser (DFB) supplies a 1310 nm, scrambled NRZ-coded signal (622.08 Mb/s).

This OC12 interface supports span lengths up to 20 km. Refer to the [“SONET Optical Specifications” \(6-14\)](#) section in this chapter for detailed system, transmitter, receiver, and link budget specifications.

Alarm thresholding

The following parameters are monitored on the OC12/1.3I2 interface:

- LOS
- LOF
- LOP
- AIS-L
- RDI-L (FERF)
- Line AIS
- Path Unequipped
- Signal Degrade (BER)
- Signal Fail (BER).

Performance monitoring

SONET line and path performance monitoring complies with the standards outlined in GR-253-CORE. For detailed information about PM parameters and thresholds, refer to [Chapter 4, “Performance Monitoring”](#).



OC3LS/4 (A1AA017)

Optical specification The four port OC-3 photonics meet or exceed SONET intermediate-reach specifications (SONET IR-1 FP category). The FP laser supplies a 1310 nm, scrambled NRZ-coded signal (155.52 Mb/s).

This OC-3 interface supports span lengths up to 20 km. Refer to the [“SONET Optical Specifications” \(6-14\)](#) section in this chapter for detailed system, transmitter, receiver, and link budget specifications.

Alarm thresholding The following parameters are monitored on the OC3LS/4 interface:

- LOS
- LOF
- LOP
- AIS-L
- RDI-L (FERF)
- Line AIS
- Path Unequipped
- Signal Degrade (BER)
- Signal Fail (BER).

Performance monitoring SONET line and path performance monitoring complies with the standards outlined in GR-253-CORE. For detailed information about PM parameters and thresholds, refer to [Chapter 4, “Performance Monitoring”](#).



OC12LS/2 (A1AA018)

Optical specification

The two port OC-12 low speed photonics meet or exceed SONET intermediate-reach specifications (SONET IR-1 FP category). The distributed FP LASER supplies a 1310 nm, scrambled NRZ-coded signal (622.08 Mb/s).

This OC-12 interface supports span lengths up to 20 km. Refer to the [“SONET Optical Specifications” \(6-14\)](#) section in this chapter for detailed system, transmitter, receiver, and link budget specifications.

Alarm thresholding

The following parameters are monitored on the OC12LS/2 interface:

- LOS
- LOF
- LOP
- AIS-L
- RDI-L (FERF)
- Line AIS
- Path Unequipped
- Signal Degrade (BER)
- Signal Fail (BER).

Performance monitoring

SONET line and path performance monitoring complies with the standards outlined in GR-253-CORE. For detailed information about PM parameters and thresholds, refer to [Chapter 4, “Performance Monitoring”](#).



SONET Optical Specifications

Overview The following tables present the optical specifications for the optical cards.

System specifications The following table lists the optical card OLIU system specifications.

Table 6-5 SONET Optical System Specifications

System Information	A1AA005 (OC-48)	A1AA016 (OC-12)	A1AA121-159 (OC48 CHx/CHy)	A1AA017 (OC-3 LS)	A1AA018 (OC-12 LS)
Optical Line Rate	2.488 Gb/s	622.08 Mb/s	2.488 Gb/s	155.52 Mb/s	622.08 Mb/s
Optical Line Coding	Scrambled NRZ	Scrambled NRZ	Scrambled NRZ	Scrambled NRZ	Scrambled NRZ
Optical Wavelength	1310nm	1310 nm	1530-1560 nm	1310 nm	1310 nm
Performance	SONET IR-1 (Intermediate Reach)	SONET IR-1	Customized LR-2 (for PWDM)	SONET IR-1	SONET IR-1
Temperature Range (ambient)	-5 to +55C	-40 to +65C	CO	-40 to +65C	-5 to +55C

Transmitter specifications The following table lists the OLIU transmitter information.

Table 6-6 SONET Optical Transmitter Information

Transmitter Info.	A1AA005	A1AA016	A1AA121-159	A1AA017	AA1A018
Optical Device Temperature Controller	None	None	TEC	None	None
FDA Classification	Class I	Class I	Class I	Class I	Class I
Optical Source	Distributed Feedback (DFB) LASER	Fabry Perot (FP)	DFB or Externally Modulated LASER (EML)	FP	FP
Faceplate Optical Connector	LC	LC	LC	LC	LC

Receiver specifications The following table lists the OLIU receiver information.

Table 6-7 SONET Optical Receiver Information

Receiver Information	A1AA005	A1AA016	AA1A121-159	A1AA017	AA1A018
Optical Detector	PIN	PIN	APD	PIN	PIN
Faceplate Optical Connector	LC	LC	LC	LC	LC

Link budgets The following table lists the link budgets for the Main cards.

Table 6-8 SONET Optical Link Budgets

Parameter	A1AA005	A1AA016	AA1A121-159	A1AA017	A1AA018
Interface Type	OC-48 IR-1	OC-12 IR-1	OC-48 Custom LR-2 for PWDM	OC-3 IR-1	OC-12 IR-1
PWDM Wavelength Range (100 GHz spacing)	NA	NA	1530.334-1560.606 nm	NA	NA
Minimum Wavelength	1260 nm	1293 (1274)	NA	1360	1356 (1334)
Maximum Wavelength	1360 nm	1334 (1356)	NA	1334 (1356)	1334 (1356)
Maximum Spectral Width ($\Delta\lambda_{20}$)	1.0 nm	NA	.5 nm	NA	NA
Maximum RMS Spectral Width (σ)	NA	2.5 nm (4.0)	NA	7.7 nm	2.5 nm (4.0)
Maximum Transmitter Power	0.0 dBm	-8.0 dBm	+2.0 dBm	-8.0 dBm	-8.0 dBm
Minimum Transmitter Power	-5.0 dBm	-15.0 dBm	-1.0 dBm	-15.0 dBm	-15.0 dBm
Maximum Received Power (1×10^{-12} BER)	-0.0 dBm	-8.0 dBm	-8.0 dBm (1×10^{-10} BER)	-8.0 dBm	-8.0 dBm
Minimum Received Power (1×10^{-12} BER)	-18.0 dBm	-28.0 dBm	-29.0 dBm (1×10^{-10} BER)	-28.0 dBm	-28.0 dBm
Minimum System Gain (Note 2)	13.0 dB	13.0 dB	28 dB	13.0 dB	13.0 dB
Optical Path Penalty (Note 3)	1.0 dB	1.0 dB	2.0 dB	1.0 dB	1.0 dB

Parameter	A1AA005	A1AA016	AA1A121-159	A1AA017	A1AA018
Additional Connector Loss Margin (Note 4)	1.5 dB	1.5 dB	1.5 dB	1.5 dB	1.5 dB
Additional Unallocated Margin (Note 5)	1.5 dB	1.5 dB	1.5 dB	1.5 dB	1.5 dB
Minimum Loss Budget	0.0 dB	0.0 dB	10.0 dB (Note 6)	0.0 dB	0.0 dB
Maximum Loss Budget (Note 7)	9.0 dB	9.0 dB	23.0 dB	9.0 dB	9.0 dB
Approximate Span Length (Note 8)	20 km	20 km	85 km (assumes no POU is used)	20 km	20 km

Notes:

1. All terminology is consistent with GR-253-CORE, Issue 3. All values are worst-case end of life.
2. The System Gain includes connector loss at the transmitter and receiver points S and R in GR-253-CORE, Issue 3.32. Optical path penalty includes effects of dispersion, reflection, and jitter that occur on the optical path. The optical path penalty for 1310 nm is normally a maximum of 1.0 dB and for 1550 is normally 2.0 dB.
3. One additional connector (0.75 dB) on each end is assumed to connect station cable to outside plant.
4. Budget available for both station and transmission cable and splices.
5. Additional unallocated margin, or safety margin, can be 0-3 dB. Typically, a 1.5 dB value is assumed.
6. The LNW 121B-159B, and LNW 221-259, and LNW 421-459 series all require an external lightguide build-out (optical attenuator) as part of the connector assembly for optical loopbacks and for loss budgets less than 10 dB to avoid overloading the optical receiver.
7. The stated maximum loss budget equals the System Gain, less the Optical Path Penalty, the Additional Connector Loss margin, and the Additional Unallocated Margin. The resultant Maximum Loss Budget is available for station cable loss, transmission cable loss, and splice loss. The stated maximum loss budget is conservative.
8. The Approximate Span Length values are calculated per an attenuation assumption. As a general rule, for attenuation-limited systems, an attenuation of 0.45 dB/km is used for 1310 nm optics. This estimate includes typical cable loss (0.40 dB/km) and up to 11 splice losses (0.2 dB per splice). For 1310 nm OC-48 systems, dispersion is not a limiting factor, and the applications are attenuation-limited. Appropriate Span Lengths can be calculated more precisely based on particular fiber and splice characteristics and local engineering rules.



GbE/2(1000BASE-LX) Ethernet Circuit Pack (A1AA008)

Optical specification

The GbE/2 circuit pack provides a long-reach, 2-port, 1000BASE-LX, IEEE 802.3-compliant interface. The GbE/2 circuit pack performs protocol transparent filtering and bridging of incoming media access control (MAC) frames. MAC frames with a destination address on the local bus are filtered by the GbE/2 to prevent unnecessary transmission of frames over the wide area network (WAN). The GbE/2 must be housed in Option Slot 2 and is not equipment protected. However, protection is provided via SONET UPSR or through the IEEE 802.1D spanning tree algorithm.

The GbE/2 Ethernet interface complies with the following transmission standards:

- standard IEEE 802.1D for transparent bridging and spanning tree protection
- standard IEEE 802.3 auto negotiation (for flow control).

System specifications

The following are the GbE/2 system specifications:

- Optical Line Rate: 1.25 Gb/s +/- 100 ppm
- Optical Line Coding: 8B/10B
- Performance: Long-reach.
- Transmitter Type: LX-long wavelength (long-reach)

Operating range

The table below shows the operating range for the GbE/2 optical Ethernet interface. A 1000BASE-LX compliant transceiver supports 10 μ m fiber media types. A transceiver that exceeds the operational range requirement while meeting all other optical specifications is considered compliant (e.g., a 10 μ m solution operating at 5500 m meets the minimum range requirement of 2 to 5000 m).

Table 6-9 GbE/2 Operating Range Over Each Optical Fiber Type

Fiber Type	Modal Bandwidth @ 1300 nm (minimum overfilled launch) (MHz-km)	Minimum Range (meters)
10 μ m SMF	N/A	2 to 5000

Transmitter specifications

The table below describes the transmit specifications for GbE/LX/2. The 1000BASE-LX transmitter meets these specifications per measurement techniques define in IEEE 802.3, Section 38, Clause 6.

Table 6-10 GbE/2 Transmit Specifications

Description	10 μ m SMF	Unit
Transmitter type	Longwave Laser	
Signaling speed (range)	1.25 +/- 100 ppm	GBd
Wavelength (l, range)	1270 to 1335	nm
$T_{\text{rise}}/T_{\text{fall}}$ (max; 20%-80% response time)	0.26	ns
RMS spectral width (max)	4	nm
Average launch power (max)	-3	dBm
Average launch power (min)	-11.0	dBm
Average launch power of OFF transmitter (max)	-30	dBm
Extinction ratio (min)	9	dB
RIN (max)	-120	dB/Hz
Coupled Power Ratio (CPR) (min) (Note 1)	N/A	dB

Receiver specifications

The GbE/2 LX receiver meets the specifications defined in the table below, per measurement techniques defined in IEEE 802.3, Section 38.6. The sampling instant is defined to occur at the eye center. The receive sensitivity includes the extinction ratio penalty.

Table 6-11 GbE/2 Receive Specifications

Description	10 μ m SMF	Unit
Signaling speed (range)	1.25 +/- 100 ppm	GBd
Wavelength (range)	1270 to 1355	nm
Average receive power (max)	-3	dBm
Receive sensitivity	-19	dBm
Return loss (min)	12	dB
Stressed receive sensitivity (Notes 1 and 2)	-14.4	dBm
Vertical eye-closure penalty (Note 3)	2.60	dB
Receive electrical 3 dB upper cutoff frequency (max)	1500	MHz

Notes:

1. Measured with conformance test signal at TP3 (see IEEE 802.3, Section 38.6.11) for BER at the eye center.
2. Measured with a transmit signal having a 9 dB extinction ratio. If another extinction ratio is used, the stressed receive sensitivity should be corrected for the extinction ratio penalty.
3. Vertical eye-closure penalty is a test condition for measuring stressed receive sensitivity. It is not a required characteristic of the receiver.

Link budgets The worst-case power budget and link penalties for a GbE/2 LX channel are shown in the table below.

Table 6-12 GbE/2 Link Budgets and Penalties

Parameter	10 μ m SMF	Unit
Modal bandwidth as measured at 850 nm (minimum, overfilled launch)	N/A	MHz-km
Link power budget	8.0	dB
Operating distance	5000	m
Channel insertion loss (Notes 1 and 2)	4.57	dB
Link power penalties (Note 2)	3.27	dB
Unallocated margin in link power budget (Note 2)	0.16	dB

Notes:

1. Operating distances used to calculate the channel insertion loss are the maximum values specified in Table 10-10.
2. A wavelength of 1270 nm is used to calculate the channel insertion loss, link power penalties, and unallocated margin.

Format specification The GbE/2 LX Ethernet interface complies with the following formatting standards:

- standard IEEE 802.1Q VLAN encapsulation (user assigned or network assigned)
- standard ANSI T1X1.5/2000-147 generic framing procedure (encapsulating Ethernet frames and mapping them into SONET format)
- standard ITU G.707 STS-1 virtual concatenation.

Performance monitoring For detailed information about PM parameters, refer to [Chapter 4, “Performance Monitoring”](#).



GbE/SX/2 (1000BASE-SX) Ethernet Circuit Pack (A1AA019)

Optical specification The GbE/SX/2 circuit pack provides a short-reach, 2-port, 1000BASE-SX, IEEE 802.3-compliant interface. The GbE/SX/2 circuit pack performs protocol transparent filtering and bridging of incoming media access control (MAC) frames. MAC frames with a destination address on the local bus are filtered by the GbE/SX/2 to prevent unnecessary transmission of frames over the wide area network (WAN). The GbE/SX/2 must be housed in Option Slot 2 and is not equipment protected. However, protection is provided via SONET UPSR or through the IEEE 802.1D spanning tree algorithm.

The GbE/SX/2 Ethernet interface complies with the following transmission standards:

- standard IEEE 802.1D for transparent bridging and spanning tree protection
- standard IEEE 802.3 auto negotiation (for flow control).

System specifications The following are the GbE/SX/2 system specifications:

- Optical Line Rate: 1.25 Gb/s +/- 100 ppm
- Optical Line Coding: 8B/10B
- Performance: Short-reach.

Operating range The table below shows the operating range for the GbE/SX/2 optical Ethernet interface. A 1000BASE-SX compliant transceiver supports both 50 μ m and 62.5 μ m multimode fiber (MMF) media types. A transceiver that exceeds the operational range requirement while meeting all other optical specifications is considered compliant (e.g., a 50 μ m solution operating at 600 m meets the minimum range requirement of 2 to 550 m).

Table 6-13 GbE/SX/2 Operating Range Over Each Optical Fiber Type

Fiber Type	Modal Bandwidth @ 850 nm (minimum overfilled launch) (MHz-km)	Minimum Range (meters)
62.5 μ m MMF	160	2 to 220
62.5 μ m MMF	200	2 to 275
50 μ m MMF	400	2 to 500

Fiber Type	Modal Bandwidth @ 850 nm (minimum overfilled launch) (MHz-km)	Minimum Range (meters)
50 μ m MMF	500	2 to 550
10 μ m MMF	Not supported	Not supported

Transmitter specifications

The table below describes the transmit specifications for GbE/SX/2. The 1000BASE-SX transmitter meets these specifications per measurement techniques defined in IEEE 802.3, Section 38, Clause 6.

Table 6-14 GbE/SX/2 Transmit Specifications

Description	62.5/50 μ m MMF	Unit
Transmitter type	Shortwave Laser	
Signaling speed (range)	1.25 +/- 100 ppm	GBd
Wavelength (l, range)	770 to 860	nm
$T_{\text{rise}}/T_{\text{fall}}$ (max; 20%-80%; $\lambda > 830$ nm)	0.26	ns
$T_{\text{rise}}/T_{\text{fall}}$ (max; 20%-80%; $\lambda < 830$ nm)	0.21	ns
RMS spectral width (max)	0.85	nm
Average launch power (max)	Note 1	dBm
Average launch power (min)	-9.5	dBm
Average launch power of OFF transmitter (max) (Note 2)	-30	dBm
Extinction ratio (min)	9	dB
RIN (max)	-117	dB/Hz
Coupled Power Ratio (CPR) (min) (Note 3)	$9 < \text{CPR}$	dB

Notes:

- The 1000BASE-SX launch power shall be the lesser of the class 1 safety limit as defined by IEEE 802.3, Section 38, Clause 7.2 or the average receiver power (maximum).
- Examples of an OFF transmitter are as follows: no power supplied to the Physical Medium Dependent (PMD), laser shutdown for safety conditions, and activation of a "transmit disable" or other optional module laser shutdown conditions. During all conditions when the

Physical Medium Attachment (PMA) is powered, the AC signal (data) into the transmit port will be valid encoded 8B/10B patterns (this is a requirement of the Physical Coding Sublayer [PCS]) except for short durations during system power-on-reset or diagnostics when the PMA is placed in a loopback mode.

3. Radial overfilled launches (described in IEEE 802.3, Section 38A, Clause 2) should be avoided even if they meet CPR ranges.

Receiver specifications

The GbE/SX/2 receiver meets the specifications defined in the table below, per measurement techniques defined in IEEE 802.3, Section 38.6. The sampling instant is defined to occur at the eye center. The receive sensitivity includes the extinction ratio penalty.

Table 6-15 GbE/SX/2 Receive Specifications

Description	62.5 μ m MMF	50 μ m MMF	Unit
Signaling speed (range)	1.25 +/- 100 ppm	1.25 +/- 100 ppm	GBd
Wavelength (range)	770 to 860	770 to 860	nm
Average receive power (max)	0	0	dBm
Receive sensitivity	-17	-17	dBm
Return loss (min)	12	12	dB
Stressed receive sensitivity (Notes 1 and 2)	-12.5	-13.5	dBm
Vertical eye-closure penalty (Note 3)	2.60	2.20	dB
Receive electrical 3 dB upper cutoff frequency (max)	1500	1500	MHz

Notes:

1. Measured with conformance test signal at TP3 (see IEEE 802.3, Section 38.6.11) for BER at the eye center.
2. Measured with a transmit signal having a 9 dB extinction ratio. If another extinction ratio is used, the stressed receive sensitivity should be corrected for the extinction ratio penalty.
3. Vertical eye-closure penalty is a test condition for measuring stressed receive sensitivity. It is not a required characteristic of the receiver.

Link budgets The worst-case power budget and link penalties for a GbE/SX/2 channel are shown in the table below.

Table 6-16 GbE/SX/2 Link Budgets and Penalties

Parameter	62.5 μ m MMF		50 μ m MMF		Unit
Modal bandwidth as measured at 850 nm (minimum, overfilled launch)	160	200	400	500	MHz-km
Link power budget	7.5	7.5	7.5	7.5	dB
Operating distance	220	275	500	550	m
Channel insertion loss (Notes 1 and 2)	2.38	2.60	3.37	3.56	dB
Link power penalties (Note 2)	4.27	4.29	4.07	3.57	dB
Unallocated margin in link power budget (Note 2)	0.84	0.60	0.05	0.37	dB

Notes:

1. Operating distances used to calculate the channel insertion loss are the maximum values specified in Table 10-10.
2. A wavelength of 1270 nm is used to calculate the channel insertion loss, link power penalties, and unallocated margin.

Format specification The GbE/SX/2 Ethernet interface complies with the following formatting standards:

- standard IEEE 802.1Q VLAN encapsulation (user assigned or network assigned)
- standard ANSI T1X1.5/2000-147 generic framing procedure (encapsulating Ethernet frames and mapping them into SONET format)
- standard ITU G.707 STS-1 virtual concatenation.

Performance monitoring For detailed information about PM parameters, refer to [Chapter 4, “Performance Monitoring”](#).



Electrical Interfaces

Overview This section contains the technical specifications for the low-speed electrical interfaces.

Metropolis® DMXpress Electrical Interfaces This section describes the following electrical interfaces supported by the Metropolis® DMXpress:

- DS1/DS3/16/1 TDM Circuit Pack
- DS3/12 TDM Circuit Pack
- FASTE/16 (10/100 Mb/S) Ethernet Circuit Pack



DS1/DS3/16/1 TDM Circuit Pack (A1AA006)

Electrical specification The DS1/DS3/16/1 circuit pack transmits and receives a standard electrical DS1 or DS3 signal as specified in GR-499-CORE (44.736 or 1.544 Mb/s nominal rate, DSX-1 and DSX-3 interconnect specification). Line coding is provisionable per DS1 port to alternate mark inversion (AMI) or AMI with bipolar 8-zero substitution (B8ZS).

Format specification The DS1/DS3/16/1 circuit pack provides clear channel transport of any DSX-1 and/or DSX-3 compatible signal. There are no format constraints on this interface. The DS1/DS3/16/1 circuit pack can be provisioned for the following DS1/DS3 formats: clear channel (default), superframe (SF), or extended superframe (ESF) as specified in GR-499-CORE, Section 10. In the case of SF or ESF format selections, DS1 performance monitoring information is collected by monitoring the associated DS1 framing format per *ANSI* T1.231-1997.

Alarm thresholding The DS1/DS3/16/1 circuit pack monitors the following:

- Loss of signal (LOS)
- Bit error rate threshold (BER) based on line coding violations (CV-L).

The alarm level for the monitored parameters can be provisioned to critical (CR), major (MJ), minor (MN), or status (NE ACT). B8ZS and AMI coding violation failure thresholds are user settable to 10^{-3} through 10^{-8} .

Loopbacks The following provisionable loopbacks are supported on the DS1/DS3/16/1:

- Per-port DS1 facility loopback
- Per-port DS1 terminal loopback.
- Per-port DS3 facility loopback
- Per-port DS3 terminal loopback

Line build outs (LBOs) Line build outs are software-provisionable. The maximum distance depends on the cable type (maximum 565 feet).

Performance monitoring

PM data is monitored and reported for DS1 and DS3 signals. For detailed information about PM parameters and thresholds, refer to [Chapter 4, “Performance Monitoring”](#).



DS3/12 TDM Circuit Pack (A1AA015)

Electrical specification (DS3)	The DS3/12 circuit pack transmits/receives a standard electrical DS3 signal as specified in GR-499-CORE, Section 9 (44.736 Mb/s rate, DSX-3 interconnect specification, bipolar 3-zero substitution (B3ZS) encoding). However, the signal does not have to contain a standard DS3 frame.
Format specification	The DS3/12 circuit pack provides clear channel transport of any DSX-3 compatible signal. There are no format constraints on this interface. The DS3/12 circuit pack can be provisioned for the following DS3 formats: clear channel (default), superframe (SF), or extended superframe (ESF) as specified in GR-499-CORE, Section 10.
Alarm thresholding	The DS3/12 circuit pack monitors the following: • Loss of signal (LOS) • Bit error rate threshold (BER) based on line coding violations (CV-L). The alarm level for the monitored parameters can be provisioned to critical (CR), major (MJ), minor (MN), or status (NE ACT). B8ZS and AMI coding violation failure thresholds are user settable to 10^{-3} through 10^{-8}.
Loopbacks	The following provisionable loopbacks are supported: • Per-port DS3 facility loopback • Per-port DS3 terminal loopback
Line build outs (LBOs)	Line build outs are software-provisionable. The maximum distance depends on the cable type (maximum 565 feet).
Performance monitoring	PM data is monitored and reported for DS3 signals. For detailed information about PM parameters and thresholds, refer to Chapter 4, “Performance Monitoring” .



FASTE/16 (10/100 Mb/S) Ethernet Circuit Pack (A1AA007)

Electrical specification

The FASTE/16 circuit pack provides a 16-port, 100BASE-TX, IEEE 802.3-compliant interface. The FASTE/16 port performs protocol transparent filtering and bridging of incoming media access control (MAC) frames. MAC frames with a destination address on the local bus are filtered by the FASTE/16 to prevent unnecessary transmission of frames over the wide area network (WAN). The FASTE/16 interface auto-negotiates in full/half duplex mode and speeds (10/100 Mb/s) when interfacing with other 802.3-compliant devices over twisted pair media. The FASTE/16 must be housed in Option Slot 2 and is not equipment protected. However, facility protection is provided through the WAN via SONET UPSR or through the IEEE 802.1D spanning tree algorithm.

The FASTE/16 (10/100 Mb/s) Ethernet interface complies with the following transmission standards:

- standard IEEE 802.1D for transparent bridging and spanning tree protection
- standard IEEE 802.3, Section 25 for 10/100 Mb auto negotiation (including flow control, full-duplex transmission, and half-duplex transmission).

Format specification

The FASTE/16 (10/100 Mb/s) Ethernet interface complies with the following formatting standards:

- standard IEEE 802.1Q VLANs
- standard *ANSI* T1X1.5/2000-147 generic framing procedure (encapsulating Ethernet frames and mapping them into a SONET payload.
- standard ITU G.707 STS-1 virtual concatenation.

Performance monitoring

For detailed information about PM parameters and thresholds, refer to [Chapter 4, “Performance Monitoring”](#).





7 Acceptance Tasks

Overview

Purpose This chapter contains the acceptance tasks for the Metropolis® DMXpress Access Multiplexer.

Contents The following information is included in this chapter:

Task 100: Accept Metropolis® DMXpress Shelf (Looped Back)	7 - 3
Task 101: Test (Accept) End-to-End Metropolis® DMXpress System (Network)	7 - 7



Task 100: Accept Metropolis[®] DMXpress Shelf (Looped Back)

Purpose Use this task to test and accept the Metropolis[®] DMXpress shelf. Metropolis[®] DMXpress optical circuit packs transmit optical power whenever installed and powered-up. No cross-connects, associations, input optical power is required for output optical power.

Important! It is assumed that the Metropolis[®] DMXpress is installed, powered, equipped, and tested per the installation manual. If it is not left in that condition or fails to respond in the indicated manner, notify the installation organization that installed Metropolis[®] DMXpress or refer to the *Metropolis[®] DMXpress Access Multiplexer Alarm Messages and Trouble Clearing Guide*, 365-372-315.

Required equipment The following equipment is required:

- Personal Computer (PC) with WaveStar[®] CIT software installed
- Wrist Strap
- 2 Fiber Jumpers (LC-Type Connectors)
- 1 or more DSX-1 or DSX-3 patch cords

Safety precautions To assure both personal safety and the proper functioning of Metropolis[®] DMXpress, it is imperative to review and understand these warnings and precautions prior to performing this task.



WARNING

Eye damage

Unterminated optical connectors may emit invisible laser radiation. Eye damage may occur if beam is viewed directly or with optical instruments. Avoid direct exposure to the beam.



CAUTION

Electrostatic discharge

Use a static ground wrist strap whenever handling circuit packs or working on a Metropolis® DMXpress to prevent electrostatic discharge damage to sensitive components. See “Electrostatic discharge” in “About this Information Product”.



CAUTION

Equipment damage

The OC-48 and OC-12 Main circuit packs must not be reseated, removed, or installed while power is applied to the system. The system must be powered down before the circuit pack is reseated, removed, or replaced.

When Metropolis® DMXpress is powered down, you must wait at least 10 seconds before switching the power on again. Rapid power-cycling may result in OLIU CP failed alarms.

Related information

For related information, see the following:

- [Chapter 1, “Product Description”](#)
- [Chapter 3, “Provisioning, Security, & Administration”](#)
- *Metropolis® DMXpress Access Multiplexer TL1 Command Manual, 365-372-313*

Before you begin

Before you begin this task, verify that a WaveStar® CIT is connected and logged in to the Metropolis® DMXpress.

Reference: [“Task 214: Install Generic and WaveStar® CIT Software on the PC” \(8-109\)](#)

Task Complete the following steps to accept a Metropolis® DMXpress.

.....

1 Verify correct circuit packs have been installed.

.....

2 Install optical loops and attenuators between the MAIN optical interface IN and OUT connectors. (M1 IN to M1 OUT, M2 IN to M2 OUT)

Important! An inconsistent DCC switches alarm will occur when the OLIUs are looped back.

Reference: “Task 400: Connect OLIU Optical Loopbacks” (10-3)

.....

3 Perform the LED test detailed in “Task 203: Perform LED Test” (8-21).

Reference: “Task 204: Network Synchronization Provisioning” (8-23)

.....

4 Verify proper version of software is installed.

Reference: “Task 207: Retrieve Generic Software Version ID” (8-45)

.....

5 Perform standalone transmission and cross-connect tests for each DS1 and/or DS3, as required. Refer any failures to the organization that installed the Metropolis® DMXpress.

Important! These tasks assume that the Metropolis® DMXpress has been connected to the DSX-() cross-connect points, as required. DS1/DS3/16/1 or DS3/12 circuit packs must be inserted, as required before performing these tests.

Reference: Perform the appropriate task:

- “Task 401: Perform DS1 Transmission Test” (10-9)
- “Task 402: Perform DS3 Transmission Test” (10-17)

-
- 6 If required, from the **System View** menu, select **Fault > Reset > System Controller > Restore the system-level parameters to their default values** to reset provisionable parameters to default values.

Important! This step should not be performed on an in-service system.

.....

- 7 To clear the inconsistent DCC switches alarm, disable the DCC:
From the **System View** menu, select **Configuration > DCC Terminations**.
Under **DCC Channel Parameter > Termination State**, select **Disabled**.
-

- 8 After each shelf in the network has been tested, the Metropolis® DMXpress will be ready for end-to-end testing.

Reference: “Task 101: Test (Accept) End-to-End Metropolis® DMXpress System (Network)” (7-7)

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



Task 101: Test (Accept) End-to-End Metropolis[®] DMXpress System (Network)

Purpose Use this task to test and accept the Metropolis[®] DMXpress in an OC-48 or OC-12 end-to-end configuration.

Important! It is assumed that the Metropolis[®] DMXpress is installed in an end-to-end network configuration and each shelf has previously been tested in a looped-back configuration.

Required equipment The following equipment is required:

- Personal Computer (PC) with WaveStar[®] CIT software installed
- Wrist Strap
- Optical Power Meter

Safety precautions To assure both personal safety and the proper functioning of Metropolis[®] DMXpress, it is imperative to review and understand these warnings and precautions prior to performing this task.



WARNING **Eye damage**

Unterminated optical connectors may emit invisible laser radiation. Eye damage may occur if beam is viewed directly or with optical instruments. Avoid direct exposure to the beam.



CAUTION **Equipment damage**

The OC-48 and OC-12 Main circuit packs must not be reseated, removed, or installed while power is applied to the system. The system must be powered down before the circuit pack is reseated, removed, or replaced.

When Metropolis[®] DMXpress is powered down, you must wait at least 10 seconds before switching the power on again. Rapid power-cycling may result in OLIU CP failed alarms.



CAUTION
Electrostatic discharge

Use a static ground wrist strap whenever handling circuit packs or working on a Metropolis® DMXpress to prevent electrostatic discharge damage to sensitive components. See “Electrostatic discharge” in “About this Information Product”.

Related information For related information, see the following chapters in this document:

- [Chapter 1, “Product Description”](#)
- [Chapter 3, “Provisioning, Security, & Administration”](#)
- *Metropolis® DMXpress Access Multiplexer TL1 Command Manual, 365-372-313*

Before you begin Before you begin this task, verify that a WaveStar® CIT is connected and logged in to the Metropolis® DMXpress.

Reference: [“Task 214: Install Generic and WaveStar® CIT Software on the PC” \(8-109\)](#)

Important! If the Metropolis® DMXpress fails to respond in the indicated manner, refer to *Metropolis® DMXpress Access Multiplexer Alarm Messages and Trouble Clearing Guide, 365-372-315*

Task Complete the following steps to accept a Metropolis® DMXpress in an OC-48/OC-12 end-to-end configuration.

-
- 1** If required, from the **System View** menu, select **Fault>Reset>System Controller>**
Restore the system-level parameters to their default values to reset provisionable parameters to default values.

Important! This step should not be performed on an in-service system.

Result: An inconsistent DCC switches alarm will occur when the command is executed.

-
- 2** To clear the inconsistent DCC switches alarm, disable the DCC:
From the **System View** menu, select **Configuration > DCC Terminations**.
Under **DCC Channel Parameter > Termination State**,
select **Disabled**.
-

- 3** Perform this step at each node to verify proper timing options:
From the **System View** menu, select **Configuration > Timing/Sync**.
From the **System Timing** tab, set at least one node in the network for **Free Running**.

Set all other nodes for **Line** timing.

Under the **System Timing** tab, determine if sync autoreconfiguration is enabled or disabled (Line timing only).

If sync autoreconfiguration is disabled, enable the parameter by selecting **Enabled** under **Synchronization Autoreconfiguration** and clicking **Apply**.

Important! When sync autoreconfiguration is enabled, Sbyte is also enabled.

.....

- 4** Determine the optical loss of the optical facility from office records or by making the required measurements.
-

- 5** Ensure all Metropolis® DMXpress OC-48/OC-12 shelves (NEs) in the network have been properly connected to the optical facility. Verify the integrity of each optical span.

Reference: “Task 403: Perform Connection and Verification of Optical Facility” (10-25)

.....

- 6** From the **System View** menu, select **Configuration > DCC Terminations**.
Under **DCC Channel Parameter > Termination State**,
select **Enabled** to verify/enable the DCC channel between all nodes,
as required.

-
- 7 Perform end-to-end line test on all optical spans. Report any failures to the organization that installed the Metropolis® DMXpress shelf.
- Reference:** “Task 404: Perform End-to-End Optical Line Test on Main OLIU” (10-35)
-
- 8 Perform end-to-end DS1 transmission test in the MUX direction for each DS1/DS3/16/1, if required.
- Reference:** “Task 401: Perform DS1 Transmission Test” (10-9)
-
- 9 Perform end-to-end DS3 transmission test in the MUX direction for each DS1/DS3/16/1 or DS3/12, if required.
- Reference:** “Task 402: Perform DS3 Transmission Test” (10-17)
-
- 10 Remove any unnecessary cross-connections created for the end-to-end test.
-
- 11 The system is ready for service to be established.
-
- 12 Activate remaining optional features as required.
- Reference:** “Task 202: Enable or Lockout System Security and/or Edit, Delete, or Enter a User’s Login” (8-15)

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





8 Operations Tasks

Overview

Purpose This chapter contains the operations tasks for the Metropolis[®] DMXpress Access Multiplexer.

Contents The following information is included in this chapter:

Task 200: Connect Personal Computer (PC) and Establish WaveStar® CIT Session	8 - 3
Task 201: Reserved for Future Use	8 - 13
Task 202: Enable or Lockout System Security and/or Edit, Delete, or Enter a User's Login	8 - 15
Task 203: Perform LED Test	8 - 21
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Task 214: Install Generic and WaveStar® CIT Software on the PC	8 - 109



Task 200: Connect Personal Computer (PC) and Establish WaveStar® CIT Session

Purpose Use this task to connect PC and establish session.

Required equipment The following equipment is required:

- Personal computer (PC) with WaveStar® CIT software installed
- Wrist strap
- At least one of the following cables:
 - RS-232 cable with an RJ-45 connector on one end and a PC serial connector on the other (typically DB9) for the **RS-232 CIT** port
 - CAT5 Ethernet cable with a 10/100 hub or a cross-over cable for the **LAN CIT** or **IAO LAN** ports

Safety precautions To assure both personal safety and the proper functioning of Metropolis® DMXpress, it is imperative to review and understand these warnings and precautions prior to performing this task.



CAUTION

Electrostatic discharge

Use a static ground wrist strap whenever handling circuit packs or working on a system to prevent electrostatic discharge damage to sensitive components. See “Electrostatic discharge” in “About this Information Product”.

Related information For related information, see [Chapter 2, “Operations Interfaces”](#) in this document.

Before you begin Ensure that the descriptions and syntax of the various features and parameters of the Metropolis® DMXpress that may be set using the PC are understood prior to starting this task.

Task Complete the following steps to connect PC and establish a session.

- 1** Connect your PC (using the appropriate cable[s]) to one or more of the following ports:
 - **RS-232 CIT** port on the faceplate of the Main (OC48/1.3I2, OC48 CHx/y, or OC12/1.3I2) circuit pack to the serial port on the PC
 - **LAN CIT** port on the faceplate of the Main circuit pack to the Network Interface Card (NIC) on the PC.
 - **J1 IAO LAN** port on the rear of the Metropolis® DMXpress shelf to the NIC on the PC.

Important! If you are uncertain that the LAN ports have already been provisioned, connecting via the serial port is recommended.

- 2** Start the WaveStar® CIT software on the PC by double-clicking on the WaveStar® CIT icon on your desktop (created by the installation procedure).

Figure 8-1 WaveStar® CIT Welcome Screen

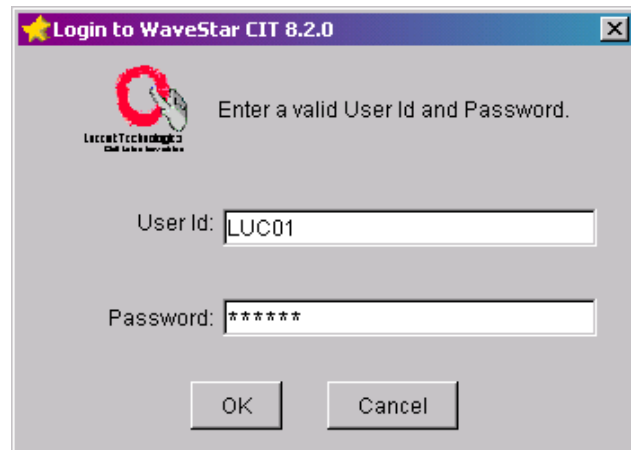


-
- 3 Enter the following in the Login window (login information is case sensitive) to login to the WaveStar® CIT:

User ID: LUC01

Password: LUC+01

Figure 8-2 WaveStar® CIT Login Screen



Important! LUC01/LUC+01 and LUC02/LUC+02 are the default logins/passly for the WaveStar® CIT. It is highly recommended that you change these logins and passwords during your first session to preserve the security of your equipment.

Important! Logins must adhere to the following guidelines:

- Logins must be five to ten alphanumeric characters in length.
- Logins are case sensitive.

Important! Passwords must adhere to the following guidelines:

- Passwords must be six to ten characters in length.
- Passwords must begin with a letter.
- Passwords must contain at least three non-alphabetic characters (numbers or symbols).

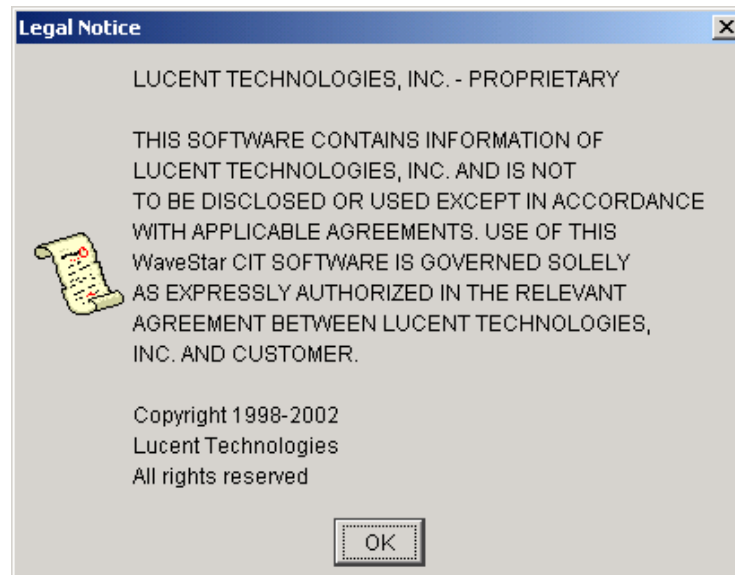
At least one of the non-alphabetic characters must be a symbol

Symbols may *not* include space (), ampersand (&), “at” (@), comma (,), colon (:), semicolon (;), horizontal bar [underscore] (_), equals (=), question (?), or quotation (“).

- Passwords are case sensitive.

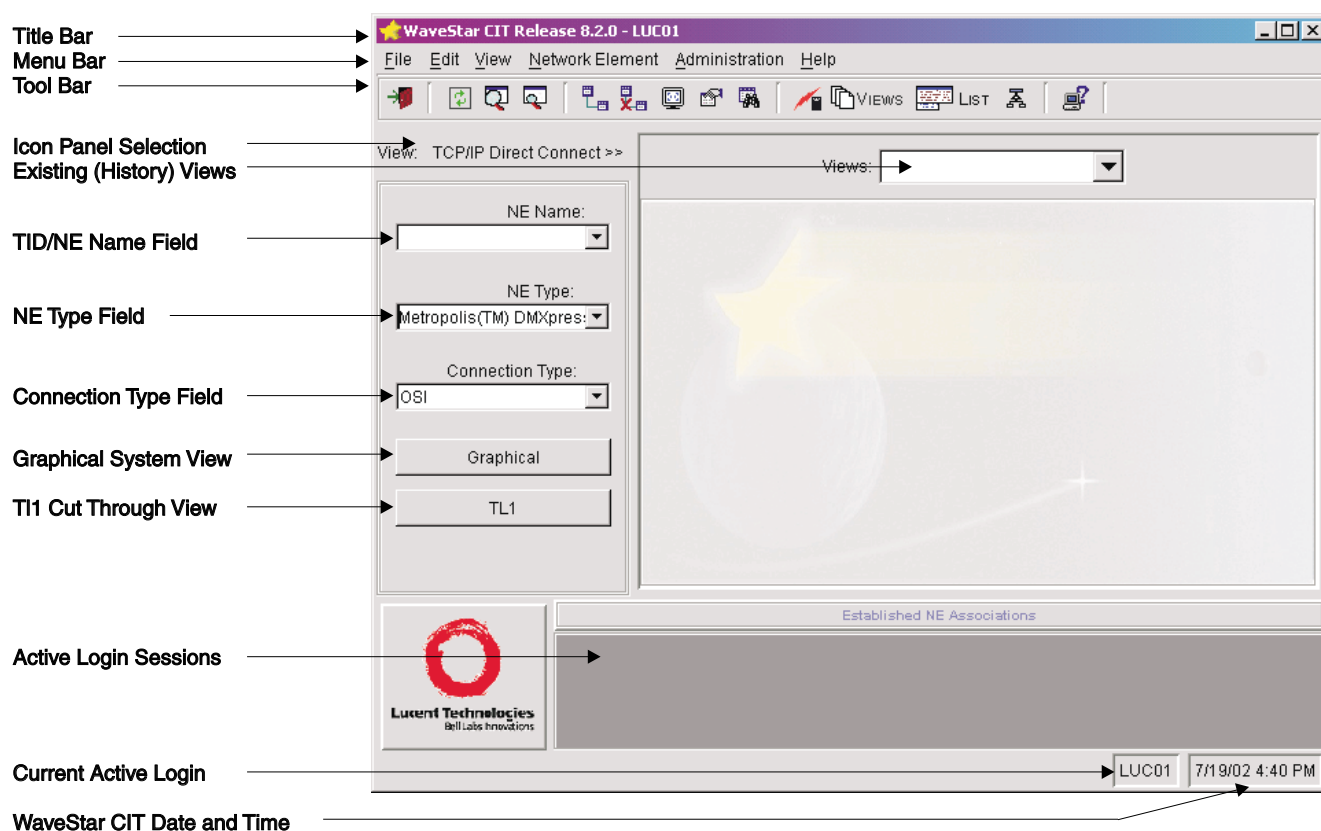
-
- 4 Click **OK** to bring up the Legal Notice.

Figure 8-3 Legal Notice



- 5 Read the Legal Notice and click **OK** to bring up the Network View.

Figure 8-4 Network View



- 6 Enter the name (TID) of the Metropolis® DMXpress shelf that you wish to communicate with in the **NE Name:** window.

Important! The default TID is LT-DMXPRESS.

- 7 In the **NE Type:** field, click on the drop-down arrow and select **Metropolis(TM) DMXpress**.

-
- 8** In the **Connection Type:** field, click on the drop-down arrow and select the appropriate connection type.

- OSI - if connected to the rear **J1 IAO LAN** or front **LAN CIT** port
- Serial - if connected to the front **RS-232 CIT** port
- TCP/IP - if connected to the rear **J1 IAO LAN** or front **LAN CIT** port

Important! The TCP/IP option requires the NE to be provisioned to accept TCP/IP connections “[Task 324: Provision/Enable/Disable TCP/IP on an IAO LAN Port](#)” (9-109). The behavior of the NE depends on the ACID assigned to the connection. TL1test is the ACID of choice for the WaveStar® CIT application.

.....

- 9** After completing the three fields, click on the **Graphical** button.

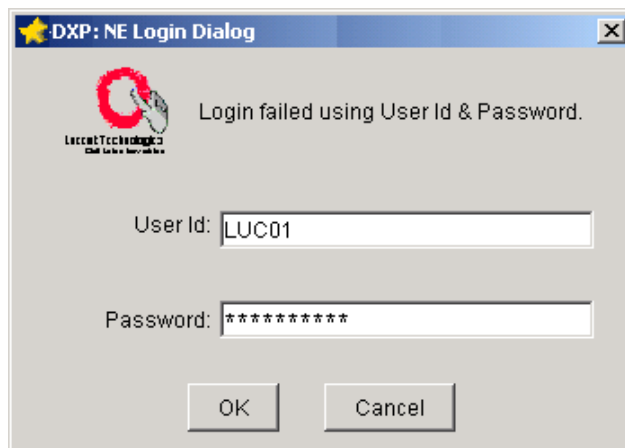
If you select the TCP/IP option, you must also enter the IP address of your NE and then click **OK**.

Important! All tasks in this manual assume that the **Graphical** button is used. However, the other option is the **TL1** button to perform maintenance using a **TL1** command line interface or the TL1 Command Builder interface.

Result: The shelf name can now be selected from the pull-down menu under the **NE Name** window.

- 10 A Login Dialog screen (Figure 8-5) will appear.

Figure 8-5 NE Login Dialog



Enter the following in the Login window (login information is case sensitive) to login to the NE:

User ID: **LUC01**

Password: **DMXPRS2.5G**

If the **Enable these as the default values checkbox** is checked, you will not be asked for login and password the next time you connect to this NE during this CIT session. When the CIT is restarted, you must check the box again.

Important! LUC01, LUC02, LUC03 and DMXPRS2.5G are the default privileged logins/password for Metropolis® DMXpress. It is highly recommended that you change all three logins and passwords during your first session to preserve the security of your equipment.

- 11 After a successful login, the NE Legal Notice screen appears.

Important! Your NE software Release number and User Privilege Level may be different. Your screen should be similar to [Figure 8-6](#).

Figure 8-6 NE Level Legal Notice



- 12 Read and observe the software Release (for example, **2.0.0**), and the User Privilege Level (for example, **Privileged**). Click on **OK** to continue.

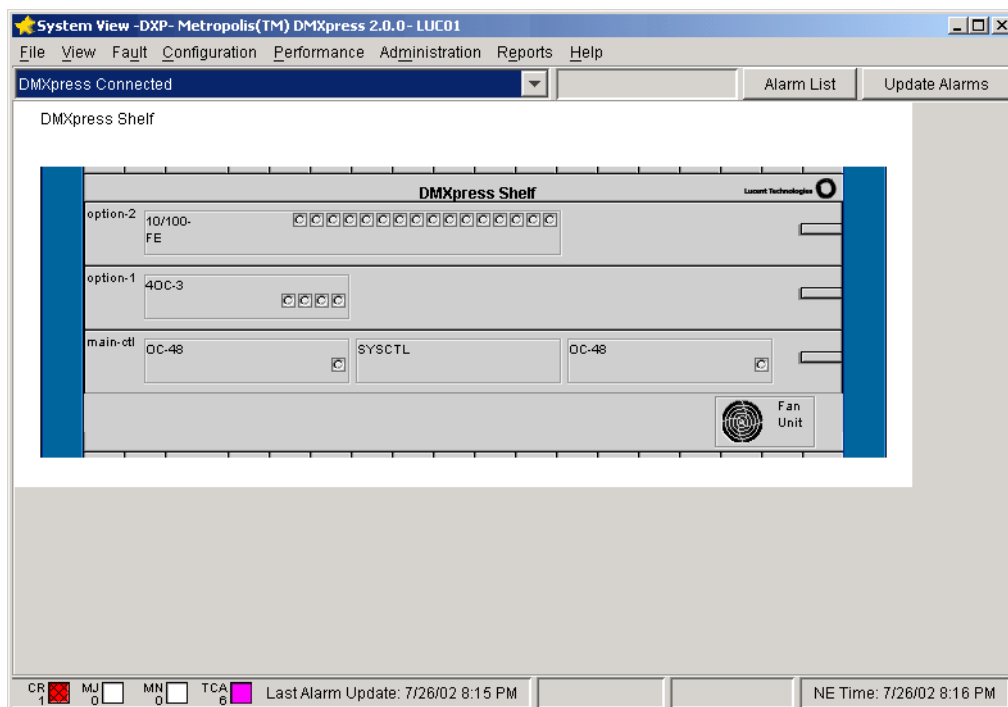
Result: The **System View** window appears.

-
- 13** Familiarize yourself with the different aspects of the graphical presentation of the shelf, including the toolbars, and status indicators.

The WaveStar® CIT has a menu bar across the top of the screen, a toolbar immediately below the menu bar, and status indicators across the bottom of the screen. Each item on the menu bar has a pull-down menu. Some menu items have additional submenu items.

The WaveStar® CIT is designed to Microsoft Windows® standards.

Figure 8-7 System View (Graphical)



Note: Release numbers and time/date stamps on your WaveStar® CIT will not match those displayed in the figure.

.....

END OF STEPS

.....

Task 201: Reserved for Future Use

Task 202: Enable or Lockout System Security and/or Edit, Delete, or Enter a User's Login

Purpose Use this task to change security or a user's login.

Required equipment The following equipment is required:

- Personal Computer (PC) with WaveStar® CIT software installed
- Wrist Strap

Safety precautions To assure both personal safety and the proper functioning of Metropolis® DMXpress, it is imperative to review and understand these warnings and precautions prior to performing this task.



CAUTION

Electrostatic discharge

Use a static ground wrist strap whenever handling circuit packs or working on a system to prevent electrostatic discharge damage to sensitive components. See "Electrostatic discharge" in "About this Information Product".

Related information For related information, see the following:

- [Chapter 3, "Provisioning, Security, & Administration"](#)
- *Metropolis® DMXpress Access Multiplexer TL1 Command Manual, 365-372-313*

Before you begin You must login as a privileged user to complete this task.

The default privileged user login is **LUC01**, **LUC02**, or **LUC03**.

The default privileged user password is **DMXPRS2.5G**

Important! It is highly recommended that you change these logins and passwords during your first session to preserve the security of your equipment.

Important! Logins must adhere to the following guidelines:

- Logins must be one to ten characters in length.
- Logins may *not* include space (), asterisk (*), ampersand (&), “at” (@), back slash (\), comma (,), colon (:), semicolon (;), horizontal bar [underscore] (_), equals (=), exclamation (!), question (?), or quotation (“).
- Logins are case sensitive.

Important! Passwords must adhere to the following guidelines:

- Passwords must be six to ten characters in length.
- Passwords must begin with a letter.
- Passwords must contain at least three non-alphabetic characters (numbers or symbols).

At least one of the non-alphabetic characters must be a symbol.

Symbols may *not* include space (), asterisk (*), ampersand (&), “at” (@), back slash (\), comma (,), colon (:), semicolon (;), horizontal bar [underscore] (_), equals (=), exclamation (!), question (?), or quotation (“).

- Passwords are case sensitive.

Task Complete the following steps to change system security or a user's login.

.....

1 Connect PC and establish a WaveStar® CIT session.

Important! You must login as a privileged user.

Reference: “Task 200: Connect Personal Computer (PC) and Establish WaveStar® CIT Session” (8-3)

.....

2 Are you going to enable or disable system security or are you going to edit, delete, or enter (create) a user's login?

If you wish to...	Then...
Enable or Disable System Security (Lockout logins or enable logins)	Continue with Step 3 .
Create a New User's Login	Proceed to Step 5 .
Edit a User's Login	Proceed to Step 6 .
Delete a User's Login	Proceed to Step 7 .

.....

3 From the **System View** menu, select **Administration > Security > Enable Logins** or **Administration > Security > Lockout Logins** to enable or lockout security on an NE basis. (Performing a lockout will block all but privileged users from the system.)

.....

4 From the **System View** menu, select **Administration > Data Communications...**

- From the **Serial Port** tab, verify the **Access State** information for the **CIT Port**.
- From the **LAN Management** tab, verify the **Access State** information for the **LAN Port**.

Proceed to [Step 8](#).

-
- 5 To create a new user login (refer to “[Before you begin](#)” (8-16) for login and password requirements):

From the **System View** menu select **Administration > Security > User Provisioning...**

1. From the **User ID** panel, select **New User** and enter a new user ID in the adjacent field.
2. From the **User Password** panel, enter a password for the new user in the **Enter Password:** and **Confirm Password:** fields.
3. From the **User Privilege** panel, select a **Security Level** for the new user from the pulldown menu.
4. From the **Password Aging Period** panel, select **Disable** or enter a number of days (from **7-999**) for the new user.
5. From the buttons at the bottom of the **User Provisioning** menu, click **Add**.
6. Proceed to [Step 8](#).

-
- 6 To edit a user login (refer to “[Before you begin](#)” (8-16) for login and password requirements):

From the **System View**, menu select **Administration > Security > User Provisioning...**

1. From the **User ID** panel, select **Existing User** and an existing user ID from the pulldown menu.
The remaining items in this step may be completed as required. Items not changed will maintain existing settings.
2. From the **New User ID** panel, enter the new ID for the existing user in the **Enter New User ID** field.
3. From the **User Password** panel, enter a password for the new user in the **Enter Password:** and **Confirm Password:** fields.
4. From the **User Privilege** panel, select a **Security Level** for the new user from the pulldown menu.
5. From the **Password Aging Period** panel, select **Disable** or enter a number of days (from **7-999**) for the new user.
6. From the buttons at the bottom of the **User Provisioning** menu, click **Modify**.
7. Proceed to [Step 8](#).

.....

7 To delete a user login:

From the System View, menu select **Administration > Security > User Provisioning...**

1. From the **User ID** panel, select **Existing User** and an existing user ID from the pulldown menu.
2. From the buttons at the bottom of the **User Provisioning** menu, click **Delete**.
3. Proceed to [Step 8](#).

Important! Privileged users cannot be removed.

.....

8 Do you want to continue provisioning?

If...	Then...
Yes	Return to Step 2 .
No	STOP! END OF TASK.

.....

END OF STEPS

.....



Task 203: Perform LED Test

Purpose	Use this task to test circuit pack LEDs.
Required equipment	The following equipment is required: • Personal Computer (PC) with WaveStar® CIT software installed • Wrist Strap
Safety precautions	To assure both personal safety and the proper functioning of Metropolis® DMXpress, it is imperative to review and understand these warnings and precautions prior to performing this task.
CAUTION Electrostatic discharge <i>Use a static ground wrist strap whenever handling circuit packs or working on a system to prevent electrostatic discharge damage to sensitive components. See “Electrostatic discharge” in “About this Information Product”.</i>	
Related information	For related information, see the following: • Chapter 1, “Product Description” • Chapter 3, “Provisioning, Security, & Administration” • <i>Metropolis® DMXpress Access Multiplexer TL1 Command Manual, 365-372-313</i>
Before you begin	Ensure that Metropolis® DMXpress is equipped with required circuit packs at the node being tested.

Task Complete the following steps to perform the LED test.

.....
1 Connect PC and establish a WaveStar® CIT session.

Reference: “Task 200: Connect Personal Computer (PC) and Establish WaveStar® CIT Session” (8-3)
.....

2 From the **System View** menu, select **Fault > Test > LED...**
Select the **Number Of Iterations** or cycles from the drop down menu..

Result: All LEDs for the specified address light.
After 10 seconds, all LEDs go off.
After another 10 seconds, all LEDs are updated to show the current status of the system. This is repeated once for each iteration.
.....

3 Did the LED test pass?

If...	Then...
Yes	STOP! END OF TASK.
No	Continue with Step 4 .

.....

4 Were you sent here by another task to perform an LED test?

If...	Then...
Yes	Continue with Step 5 .
No	STOP! END OF TASK.

.....

5 Record the circuit pack(s) (LEDs) that failed the LED test and return to the task that sent you here.

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



Task 204: Network Synchronization Provisioning

Purpose Use this task to provision a timing mode and enable sync messaging and sync autoreconfiguration when needed.

The options for timing in Metropolis® DMXpress are the following:

- Timing Source: either Free Running (default) or Line timing
- Synchronization Autoreconfiguration: Enable/Disable. This option will enable/disable sync messaging using the S1 byte.
- Mode Switching: Revertive/Nonrevertive.
- Synchronization Source. For line timing the source must be Main-1-1 or Main-2-1.

Required equipment The following equipment is required:

- Personal Computer (PC) with WaveStar® CIT software installed
- Wrist Strap

Related information For related information, see the following:

- [Chapter 1, “Product Description”](#)
- [Chapter 6, “Technical Specifications”](#)
- If you are unfamiliar with the parameters in this task, refer to SET-SYNCN in the *Metropolis® DMXpress Access Multiplexer TL1 Command Manual, 365-372-313*

Before you begin Before you begin this task, verify that a PC is available. Ensure that the synchronization plan for the system is available.

Important! Configuring a network for the flow of valid timing signals between network elements under normal and failure conditions requires a well thought out synchronization plan.

Task Complete the following steps to provision network synchronization.

.....

1 Connect PC and establish a WaveStar® CIT session.

Reference: “Task 200: Connect Personal Computer (PC) and Establish WaveStar® CIT Session” (8-3)

.....

2 From the **System View** menu, select **Configuration >Timing/Sync**.

From the **System Timing** tab, select one of the following options from the **Timing Mode** pull-down menu:

- Free Running (default)
 - Line
-

3 If you selected Line timing from the **System Timing** tab,

- from the **Mode Switching** panel, select **Revertive** or **Nonrevertive**.
 - from the **Synchronization Source** panel, select **main-1-1** or **main-2-1**.
 - from the **Synchronization Autoreconfiguration** panel, select **Enabled** or **Disabled**.
-

4 Click **Apply** and then **Close**, or **OK** to enact changes.

.....

5 Do you wish to activate/deactivate Sync Status Messaging (SSM) on the OC-48/OC-12 ports?

If...	Then...
Yes	Continue with Step 6 .
No	STOP! END OF TASK.

-
- 6** From the **System View** menu, select **Configuration>Provision**. Select (expand) the **Shelf**.
Select (expand) the **CP-main-1** or **CP-main-2**.
Select **Port** and click on **Provision**.

From the **Sync Messaging** panel, select **Enable** or **Disable** if required.
Click **Apply** if any changes were made.
Click **Close**.

Important! The ports may be provisioned differently.

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



Task 205: Reserved for Future Use

Task 206: Release Software Generic Download and Upgrade via FTP (In-Service System)

Purpose Use this task to download the software generic via FTP over TCP/IP to the dormant area of any Metropolis® DMXpress shelf (local or remote) that is currently running either 1.1.x or 2.0.x software generic.

This task uses the *cpy-mem* command to download software via FTP over TCP/IP in an in-service Metropolis® DMXpress shelf.

Important!

- A privileged login is required to perform this task.
- FTP cannot be used to download software unless the destination NE is running Release 1.1.x or later.

Required equipment The following equipment is required:

- Personal Computer (PC) with WaveStar® CIT software installed
- Cables to connect the PC to Metropolis® DMXpress
- Working copy of the new system generic software program on CD-ROM
- Current *Metropolis® DMXpress Access Multiplexer Software Release Description* for the software generic being installed.

Safety precautions To assure both personal safety and the proper functioning of the Metropolis® DMXpress, it is imperative to review and understand these warnings and precautions prior to performing this task.



CAUTION

Electrostatic discharge

Use a static ground wrist strap whenever handling circuit packs or working on a system to prevent electrostatic discharge damage to sensitive components. See “Electrostatic discharge” in “About this Information Product”.

Related information For related information, refer to [Chapter 2, “Operations Interfaces”](#) in this document.

Before you begin Before beginning the software download, refer to the *Metropolis® DMXpress Access Multiplexer Software Release Description* for the software being downloaded for a description of any special considerations involving this version of software.

Important! If the FTP server fails to start, it could mean that another program using an FTP server is already running. Depending on what operating system you are using, you must go to the device file and disable the FTP server.

- For Windows 2000 operating systems, select **Start > Settings > Control Panel**. Select **Administrative Tools**, then **Computer Management**, then **Services and Applications**, and then **Services**.
- For Windows NT operating systems, select **Start > Settings > Control Panel**. Select **Devices**.

Task Complete the following steps to download system software via FTP.

-
- 1 If not previously completed, install generic and WaveStar® CIT software on the PC.

Reference: [“Task 214: Install Generic and WaveStar® CIT Software on the PC” \(8-109\)](#)

.....

- 2 Establish a WaveStar® CIT session (specifying either OSI or Serial in the **Connection Type:** field) and log in to the destination shelf (the shelf to which you want to download the software) in your network.

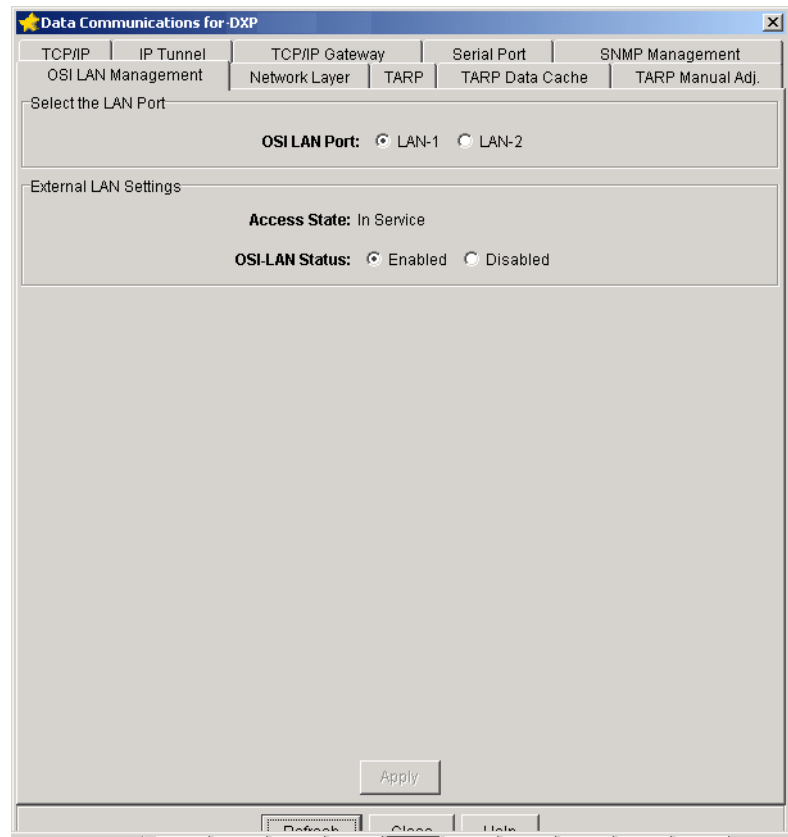
Important! FTP cannot be used to download software unless the gateway and destination NE are both running Release 1.1.x or later.

Reference: [“Task 200: Connect Personal Computer \(PC\) and Establish WaveStar® CIT Session” \(8-3\)](#)

- 3 Provision the destination shelf for TCP/IP communications. From the System View menu, select **Administration > Data Communications...**

Result: The Data Communications for *TID* (your TID) window appears.

Figure 8-8 Example of the Data Communications for TID Window



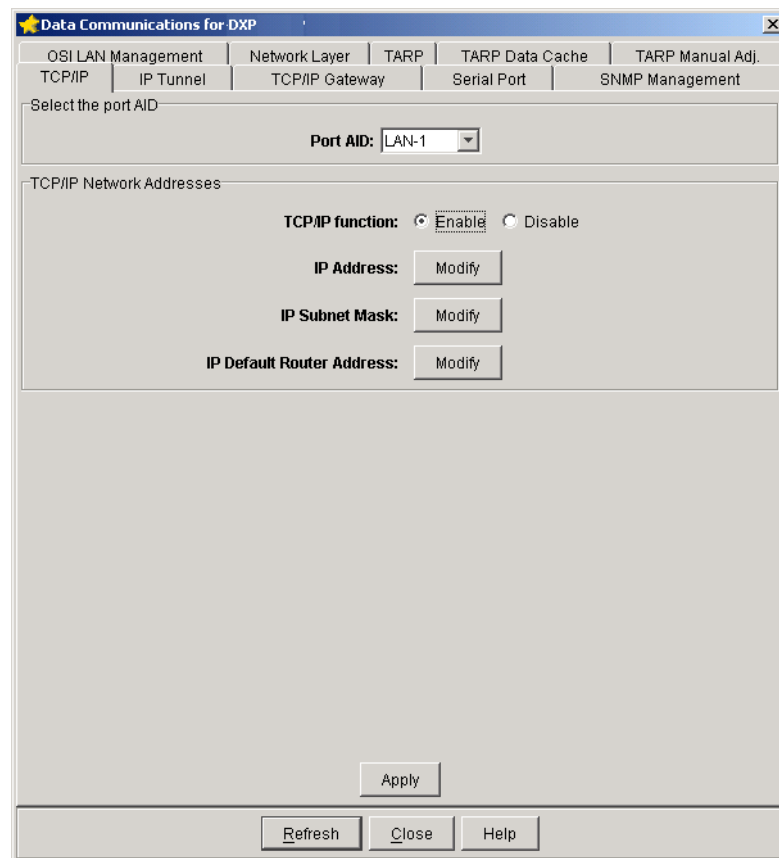
- 4 Which port are you provisioning for TCP/IP?

If...	Then...
lan-1 for the front LAN port on the Main circuit pack	Continue with Step 5 and then proceed to Step 7 .
lan-2 for the rear J1 IAO LAN port on the backplane	Proceed to Step 6 and then continue with Step 7 .

Important! lan-1 is intended to be used for local (direct) software downloads.

- 5 From the Data Communications for *TID* window (Figure 8-9), click on the **TCP/IP** tab and provision the following fields accordingly for lan-1:
- **Port AID:** select the port that you are using for FTP: lan-1
 - **TCP/IP function:** select enable
 - Click **Modify** to either enter or change the following:
 - IP Address
 - IP Subnet Mask
 - IP Default Router Address (if necessary)

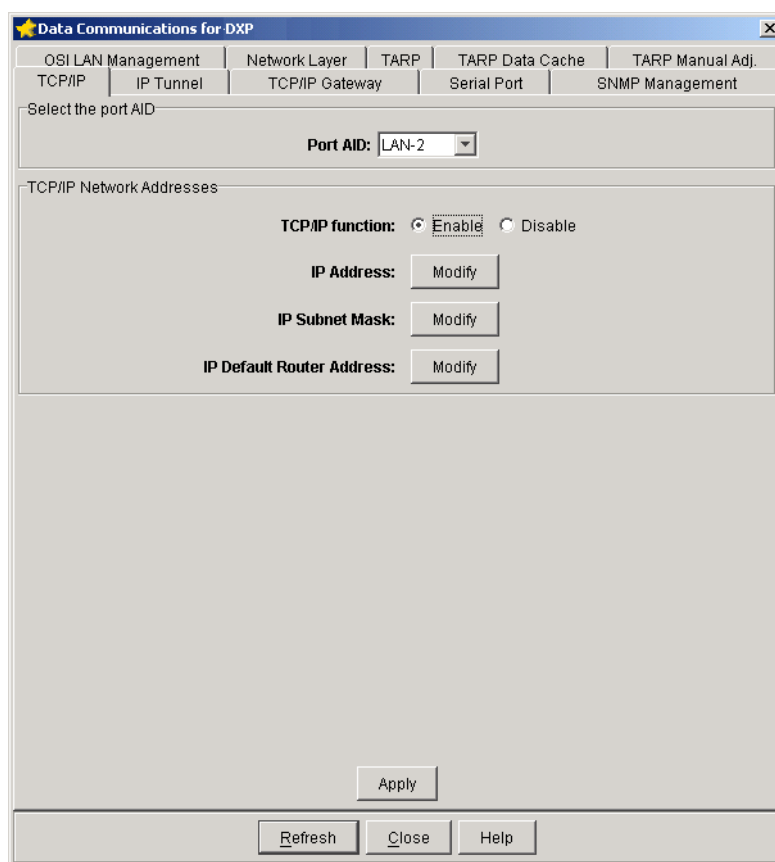
Figure 8-9 lan-1 Data Communications Window



Important! Because lan-1 is intended to be used for local (direct) software downloads, the IP Default Router Address is not required when using lan-1.

-
- 6 From the Data Communications for *TID* window (Figure 8-10), click on the **TCP/IP** tab and provision the following fields accordingly for lan-2:
- **Port AID:** select the port that you are using for FTP: lan-2
 - **TCP/IP function:** select Enable
 - Click **Modify** to either enter or change the following:
 - IP Address
 - IP Subnet Mask
 - IP Default Router Address

Figure 8-10 lan-2 Data Communications Window



.....

7 Click **Apply**.

Result: The following warning message appears:
This operation will cause the System View to close and may cause the system to reset. Do you want to execute this command?

.....

8 Click **Yes**

Important! Following a Metropolis® DMXpress system reset, the date and time revert to January 1, 1970 (70-01-01) at midnight (00:00:00). After 5 minutes (to allow for additional NE resets, as in the case of a network software upgrade), the shelf attempts an automatic synchronization of the time and date with another NE in the network. If the remote NE has not responded to the synchroniztion request within 2 minutes, the request is forwarded to another NE in the network. Each remote NE is allowed 2 minutes to respond. If a valid time and date is not found within the network, it must be entered manually.

Reference: [“Task 354: Set Date and Time” \(9-295\)](#).

.....

9 Specifying either OSI or Serial in the **Connection Type:** field, log in to the destination shelf again.

- 10 From the **System View** menu, select **Configuration > Software > Download Software....**

Result: The Download Generic window appears.

Figure 8-11 Download Generic Window

DXP: Download Generic

Download From / Via: FTP

FTP

Profile: [dropdown]

Server

☒ IP: [input] . [input] . [input] . [input]

☐ name: [input]

port: [input]

User

name: [input]

password: [input]

Save

Clear

Add

Delete

Modify

Apply

Import...

Source directory path

Path: [input]

From,[Src]: "ftp", "ftp://..."

Download Close Help

.....

11 You must create (or select if available) a valid Profile. Enter the following information in the Download Generic window ([Figure 8-11](#)):

1. In the pull-down menu entitled **Download From/Via:** select **FTP**.
NOTE: No other options are available at this time.
2. In the **Profile:** field enter the desired name of this profile.
(If the profile already exists, you may select it from the pull-down menu. NOTE: If you are selecting an existing profile, you may verify/change the name of the profile.)
3. In the **Server** panel, select **IP** and enter the address of the FTP server (often the WaveStar® CIT).
Enter the **port:** (usually 21).
4. In the **User** panel, enter your user name and password for the FTP server (often the WaveStar® CIT).
5. If you are creating a new profile, click **Add**. The profile is now accessible from the **Profile:** pull-down menu.
If you are modifying an existing profile, click **Save**.
6. In the **Source Directory Path** panel, enter the current location of the generic to be downloaded.

Important! If the WaveStar® CIT is the FTP server, this entry must be in the following form:

generics/dxp/2.0.0/p/

Important! If you are using the WaveStar® CIT as your FTP server, you must separate your directory structure using either “/” (as illustrated in the example above) or “\\” because TL1 interprets “\” as a character. The WaveStar® CIT fills in the beginning of the default path (C:/Program Files/Lucent Technologies/WaveStar CIT/).

If the FTP server is not the WaveStar® CIT, then enter the path starting at the FTP home directory on the server.

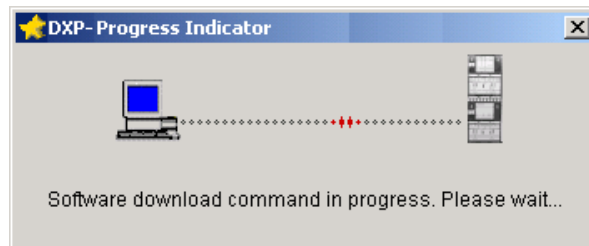
.....

12 Click **Download**.

Result: A warning message appears indicating the transfer you are about to execute. *Do you wish to continue?*

Verify the information and click **Yes**.

While the transfer is in progress, the following in-progress indicator window appears. (The FTP download takes approximately 10 minutes.)



When the transfer is complete, the in-progress indicator window closes and the “Download Software successful” window appears. Click **OK**.

.....

13 Do you wish to watch the FTP download progress?

If...	Then...
Yes	Continue with Step 14 .
No	Proceed to Step 15 .

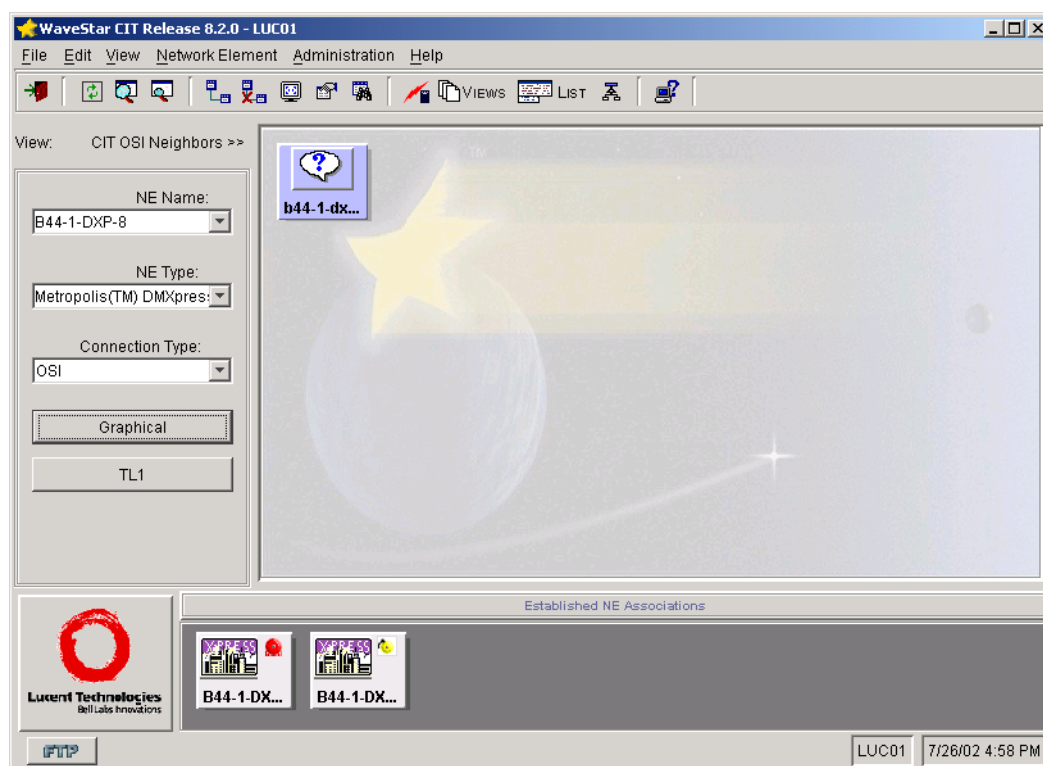
14 From the Network View, either

- select **Administration > FTP Administration...**
or
- click on the rotating FTP icon in the lower left-hand corner of the the Network View Window (not illustrated in [Figure 8-12](#))

Result: The FTP Server window appears. Click **Close** when finished.

Important! [Figure 8-12](#) illustrates the Network View; most WaveStar® CIT activities are executed from the System View menu.

Figure 8-12 Network View



-
- 15** Do you wish to apply (activate) the software generic that you recently downloaded to the dormant area of the Metropolis® DMXpress shelf?

If...	Then...
Yes	Continue with Step 16 .
No	Proceed to Step 22 .

-
- 16** Log in to the remote Metropolis® DMXpress to which you copied the software.

Specify the following when establishing the WaveStar® CIT session:

- **NE Name:** field: TID of the remote NE
- **NE Type:** field: Metropolis DMXpress Access Multiplexer
- **Connection Type:** field: OSI or Serial

Reference: “[Task 200: Connect Personal Computer \(PC\) and Establish WaveStar® CIT Session](#)” (8-3)

Result: After a few moments, the NE with the TID you previously specified appears in the System View.

- 17 From the **System View** menu, select **Configuration > Software > Apply Software....**

Important! The TID of the remote shelf will not be the same as your local shelf. [Figure 8-17](#) is only an example of the window.

Result: The Apply Software window appears.

Figure 8-13 Apply Software Window

LT-DMXPRESS: Apply Software

Active Software Version: 2.0.0

Available Generics

Version	Type	Action	Date	Time
2.0.0	ALL			

Activation Scheduling

☐ Cancel Install

☒ Install In 15 Minutes

☐ Specify Install Date/Time:

☐ Within 24 Hrs.

Year: 2002 Month: July

Sun	Mon	Tue	Wed	Thu	Fri	Sat
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

Hour: 13 Minutes: 12 Seconds: 11

Apply Type

type: ☐ FORCED

OK Close Help

.....

18 Select and/or enter the following information in the **Apply Software** window (Figure 8-17):

1. From the **Available Generics** panel, select the software generic to be activated.
2. From the **Activation Scheduling** panel, you may schedule the activation time and date in *one* of the following ways:
 - Select **Install In 15 Minutes**
The software will install 15 minutes after you click **Okay**.
 - Select **Specify Install Date/Time** and select the **Year, Month, Date** and **Time**.
In this case, the **Hour, Minute**, and **Second** fields are used to enter a 24-hour clock time (13 hours and 15 minutes means that the software will apply at 1:15 PM on the date specified).
 - Select **Specify Install Date/Time and Within 24 Hours**.
In this case, the **Hour, Minute**, and **Second** fields are used to enter the time within 24 hours of the current date and time after you click **OK**.

Important! You may cancel the scheduled apply by returning to the **Apply Software** menu at any time before the software applies and selecting the generic and **Cancel Install** and then clicking **OK**.

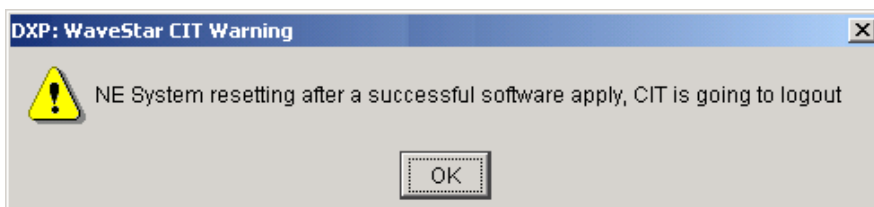
3. Click **OK**.

Result: The following confirmation message appears: *Execution of Provision may affect the NE service. Do you wish to execute this command?*
Click **Yes**.

- 19 After approximately 15 minutes, the apply is complete.

Result: The following warning screen appears, click **OK**. The System View closes.

Important! If the WaveStar® CIT Network View is unresponsive, perform a shut-down using Windows Task Manager to End the WaveStar® CIT.



Important! Following a Metropolis® DMXpress system reset, the date and time revert to January 1, 1970 (70-01-01) at midnight (00:00:00). After 5 minutes (to allow for additional NE resets, as in the case of a network software upgrade), the shelf attempts an automatic synchronization of the time and date with another NE in the network. If the remote NE has not responded to the synchronization request within 2 minutes, the request is forwarded to another NE in the network. Each remote NE is allowed 2 minutes to respond. If a valid time and date is not found within the network, it must be entered manually.

- 20 Establish a WaveStar® CIT session (specifying either OSI or Serial in the **Connection Type:** field) and re-log in to your Metropolis® DMXpress shelf.

Result: The title bars of the System View and the legal notice should both reflect the current NE software generic, R2.0.0.

Reference: [“Task 200: Connect Personal Computer \(PC\) and Establish WaveStar® CIT Session” \(8-3\)](#)

.....

21 Is your Generic Software Version correct?

If...	Then...
Yes	Continue with Step 22 .
No	Contact your support center.

.....

22 Repeat this task from [Step 2](#) for each shelf that you wish to upgrade via FTP.

.....

END OF STEPS

..... ☐

Task 207: Retrieve Generic Software Version ID

Purpose	Use this task to retrieve the generic software version that is loaded into the system.
Required equipment	The following equipment is required: • Personal Computer (PC) with WaveStar® CIT software installed • Wrist Strap
Safety precautions	To assure both personal safety and the proper functioning of Metropolis® DMXpress, it is imperative to review and understand these warnings and precautions prior to performing this task.
CAUTION Electrostatic discharge <i>Use a static ground wrist strap whenever handling circuit packs or working on a system to prevent electrostatic discharge damage to sensitive components. See “Electrostatic discharge” in “About this Information Product”.</i>	
Related information	For related information, see Chapter 2, “Operations Interfaces” in this document.
Before you begin	Ensure that the descriptions and syntax of the commands and parameters of the Metropolis® DMXpress that may be set using the PC are understood prior to starting this task.

Task Complete the following steps to retrieve the generic software version ID.

-
- 1** Connect the PC and establish a Metropolis® DMXpress WaveStar® CIT session.

Reference: “Task 200: Connect Personal Computer (PC) and Establish WaveStar® CIT Session” (8-3)

.....

- 2** The active generic can be accessed from the title bar in the WaveStar® CIT **System View** window.

OR

From the **System View** menu,
right click on the SYSCTL circuit pack,
then click on **View Circuit Pack Sysctl Details**.

In the **Equipment Details** section, **Program Version** indicates the current generic software of the system.

Click **Close**.

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



Task 208: Reserved for Future Use

Task 209: Release 2.0.0 Software Generic Upgrade for Local Shelf (In-Service System)

Purpose Use this task to upgrade a local Metropolis® DMXpress shelf that is in-service and running 1.0.x or 1.1.x to the new R2.0.0 software generic.

Required equipment The following equipment is required:

- Personal Computer (PC) with WaveStar® CIT software installed
- Wrist Strap
- Cables to connect the PC to Metropolis® DMXpress
- Working copy of the new system generic software program on CD-ROM
- Current *Metropolis® DMXpress Access Multiplexer Software Release Description* for the software generic being installed.

Safety precautions To assure both personal safety and the proper functioning of the Metropolis® DMXpress, it is imperative to review and understand these warnings and precautions prior to performing this task.



CAUTION

Electrostatic discharge

Use a static ground wrist strap whenever handling circuit packs or working on a system to prevent electrostatic discharge damage to sensitive components. See “Electrostatic discharge” in “About this Information Product”.

Related information For related information, see [Chapter 2, “Operations Interfaces”](#) in this document.

Before you begin Before beginning the software installation, refer to the *Metropolis® DMXpress Access Multiplexer Software Release Description* for the software being installed for a description of any special considerations required when installing this version of the software.

Important! A privileged login is required to perform this task.

Task Complete the following steps to install system software.

-
- 1** If not previously completed, install generic and WaveStar® CIT software on the PC.

Reference: “Task 214: Install Generic and WaveStar® CIT Software on the PC” (8-109)

.....

- 2** Using the appropriate cable, connect the **COM1** port of your PC to the **RS232 CIT** serial port on the faceplate of the OC48/1.3I2 main circuit pack.

Important! DO NOT establish a WaveStar® CIT session.

.....

- 3** Double-click on **DXP 2.0.0 Downloads** folder on you PC desktop.

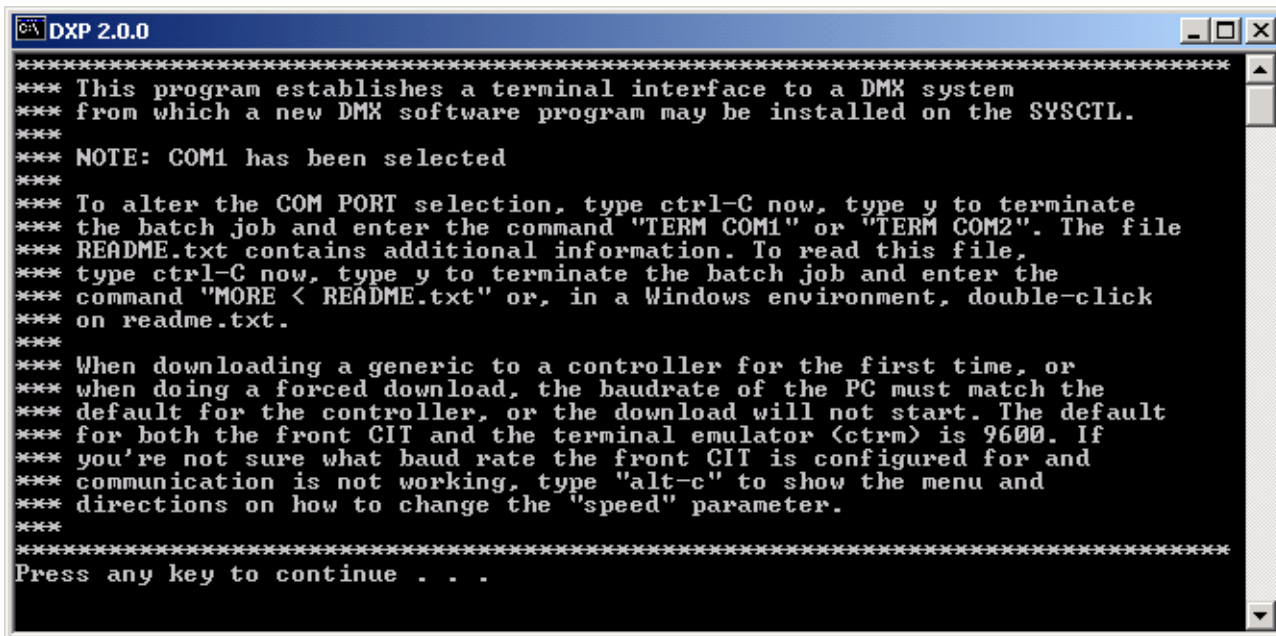
Result: The *DXP 2.0.0 Downloads* folder contains the following icon.

Figure 8-14 Contents of DXP 2.0.0 Downloads Folder



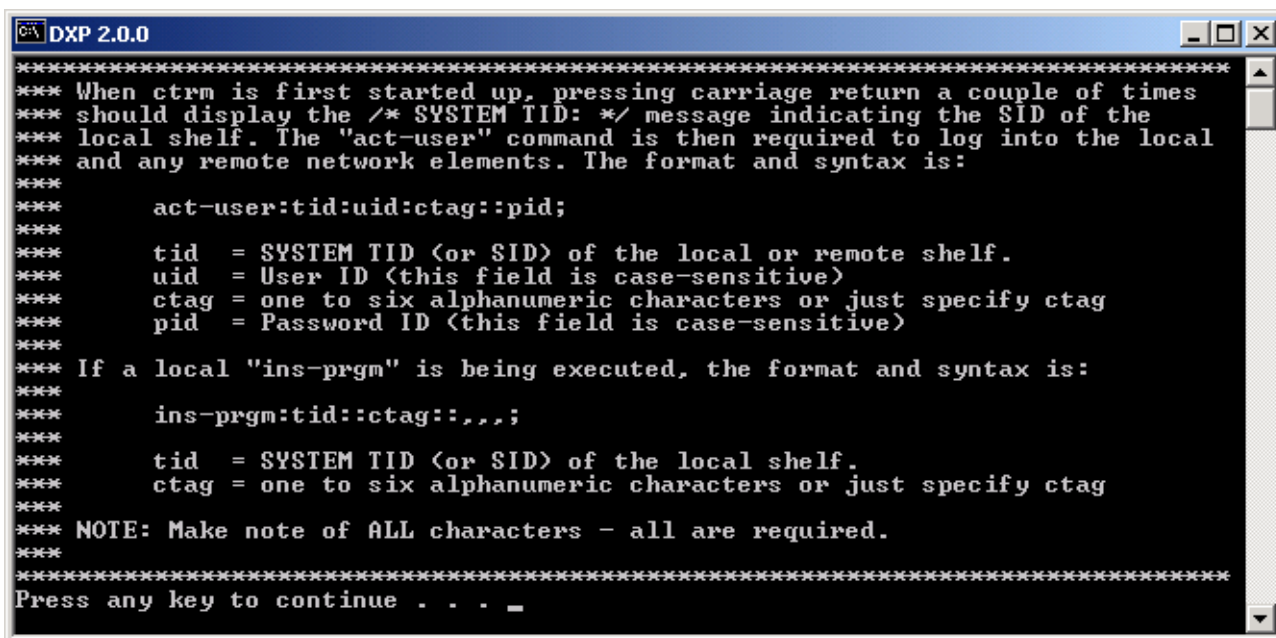
- 4** Double click the **DXP 2.0.0** icon in the *DXP 2.0.0 Downloads* folder to launch the term.bat file.

5 Follow the instructions on the subsequent screens.



A screenshot of a Windows terminal window titled "DXP 2.0.0". The window contains the following text:

```
*****
*** This program establishes a terminal interface to a DMX system
*** from which a new DMX software program may be installed on the SYSCTL.
***
*** NOTE: COM1 has been selected
***
*** To alter the COM PORT selection, type ctrl-C now, type y to terminate
*** the batch job and enter the command "TERM COM1" or "TERM COM2". The file
*** README.txt contains additional information. To read this file,
*** type ctrl-C now, type y to terminate the batch job and enter the
*** command "MORE < README.txt" or, in a Windows environment, double-click
*** on readme.txt.
***
*** When downloading a generic to a controller for the first time, or
*** when doing a forced download, the baudrate of the PC must match the
*** default for the controller, or the download will not start. The default
*** for both the front CIT and the terminal emulator (ctrm) is 9600. If
*** you're not sure what baud rate the front CIT is configured for and
*** communication is not working, type "alt-c" to show the menu and
*** directions on how to change the "speed" parameter.
***
*****
Press any key to continue . . .
```



A screenshot of a Windows terminal window titled "DXP 2.0.0". The window contains the following text:

```
*****
*** When ctrm is first started up, pressing carriage return a couple of times
*** should display the /* SYSTEM TID: */ message indicating the SID of the
*** local shelf. The "act-user" command is then required to log into the local
*** and any remote network elements. The format and syntax is:
***
***   act-user:tid:uid:ctag::pid;
***
***   tid  = SYSTEM TID (or SID) of the local or remote shelf.
***   uid  = User ID (this field is case-sensitive)
***   ctag = one to six alphanumeric characters or just specify ctag
***   pid  = Password ID (this field is case-sensitive)
***
*** If a local "ins-prgm" is being executed, the format and syntax is:
***
***   ins-prgm:tid::ctag::,,,;
***
***   tid  = SYSTEM TID (or SID) of the local shelf.
***   ctag = one to six alphanumeric characters or just specify ctag
***
*** NOTE: Make note of ALL characters - all are required.
***
*****
Press any key to continue . . . -
```

```

C:\ DXP 2.0.0
*****
*** After completion of the "ins-prgm" command, the user should log back into
*** the shelf using the "act-user" command and execute the "apply" command to
*** schedule when the new software should be installed. The format and syntax
*** is:
***
***      apply:tid::ctag::[time],[date],;
***
***      tid  = SYSTEM TID (or SID) of the local or remote shelf.
***      ctag = one to six alphanumeric characters or just specify ctag
***      time = HHMMSS (e.g. 220000 is equal to 10:00PM)
***      date = YYMMDD (e.g. 010425 is equal to April 25, 2001)
***
*** If time/date are NOT specified, the apply will be scheduled 15 minutes
*** from when the command is received.
***
*** NOTE: The square brackets indicates that the time and date fields
***       are not required and are not part of the syntax. However, all
***       other characters within the command must be specified.
***
*****
Press any key to continue . . . _

```

```

C:\ DXP 2.0.0

METROPOLIS DMX NETWORK USER INTERFACE
Version 1.1,
Lucent Technologies
All Rights Reserved.

  Cnfg   Speed   Char   Stop   Parity   Flow   Local
  ----   ----   ----   ----   ----   ----   ----
* 1      9600      8      1     none    xon/xoff  n
  2      9600      8      1     none    xon/xoff  n

Interface ready. (Type Alt-h for help.)
Communications established

```

6 Press Enter.

Result: The following screen appears with the response
/* SYSTEM TID: lt-dmexpress */.

Important! LT-DMXPRESS is the default TID of a new system.
If your system is currently in service, your TID could be different.



The screenshot shows a window titled "DXP 2.0.0" with a black background and green text. The title bar includes standard Windows window controls. The main content area displays the following text:

```

METROPOLIS DMX NETWORK USER INTERFACE
Version 1.1,
Lucent Technologies
All Rights Reserved.

```

Cnfg	Speed	Char Size	Stop Bits	Parity	Flow Ctrl	Local Echo
* 1	9600	8	1	none	xon/xoff	n
2	9600	8	1	none	xon/xoff	n

Interface ready. <Type Alt-h for help.>
Communications established

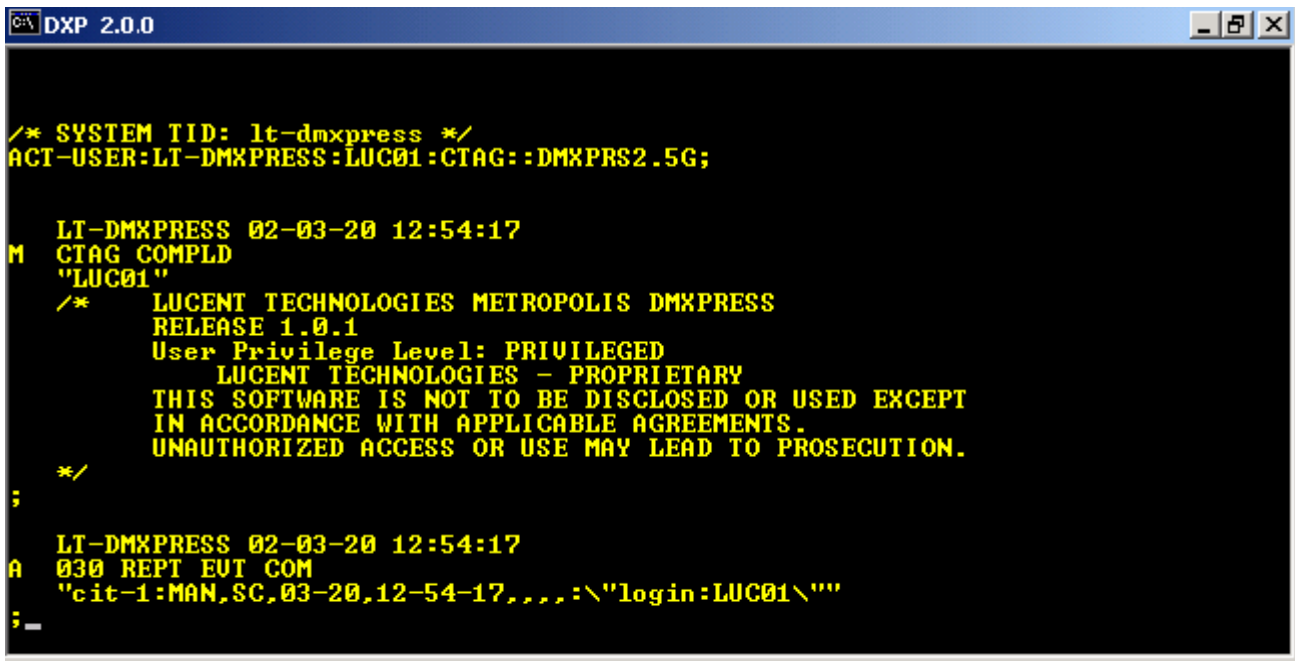
/* SYSTEM TID: lt-dmexpress */

- 7 Press Enter and type

ACT-USER:LT-DMXPRESS:LUC01:CTAG::DMXPRS2.5G;

Important! Replace LT-DMXPRESS with your TID.

Result: The following screen appears.



```
DXP 2.0.0

/* SYSTEM TID: lt-dmypress */
ACT-USER:LT-DMXPRESS:LUC01:CTAG::DMXPRS2.5G;

LT-DMXPRESS 02-03-20 12:54:17
M CTAG COMPLD
  "LUC01"
  /*    LUCENT TECHNOLOGIES METROPOLIS DMXPRESS
        RELEASE 1.0.1
        User Privilege Level: PRIUILEGED
        LUCENT TECHNOLOGIES - PROPRIETARY
        THIS SOFTWARE IS NOT TO BE DISCLOSED OR USED EXCEPT
        IN ACCORDANCE WITH APPLICABLE AGREEMENTS.
        UNAUTHORIZED ACCESS OR USE MAY LEAD TO PROSECUTION.
  */
;

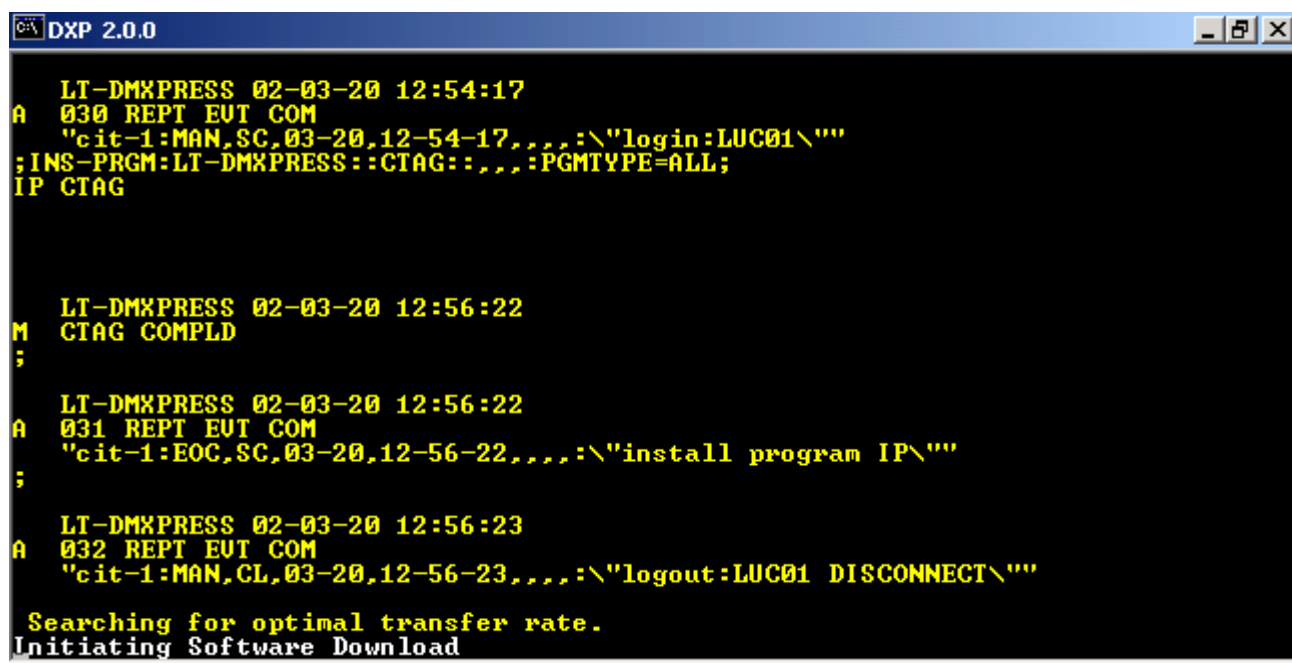
LT-DMXPRESS 02-03-20 12:54:17
A 030 REPT EVT COM
  "cit-1:MAN,SC,03-20,12-54-17,,,,:\\"login:LUC01\\""
```


- 8 Enter INS-PRGM:LT-DMXPRESS::CTAG::,,,:PGMTYPE=ALL;

Important! Replace LT-DMXPRESS with your TID.

Result: System returns CTAG COMPLD and initiates the software download \"install program IP\".

The software download takes approximately 45 minutes.



```
LT-DMXPRESS 02-03-20 12:54:17
A 030 REPT EVT COM
"cit-1:MAN,SC,03-20,12-54-17,,,:\"login:LUC01\\""
;INS-PRGM:LT-DMXPRESS::CTAG::,,,:PGMTYPE=ALL;
IP CTAG

LT-DMXPRESS 02-03-20 12:56:22
M CTAG COMPLD
;

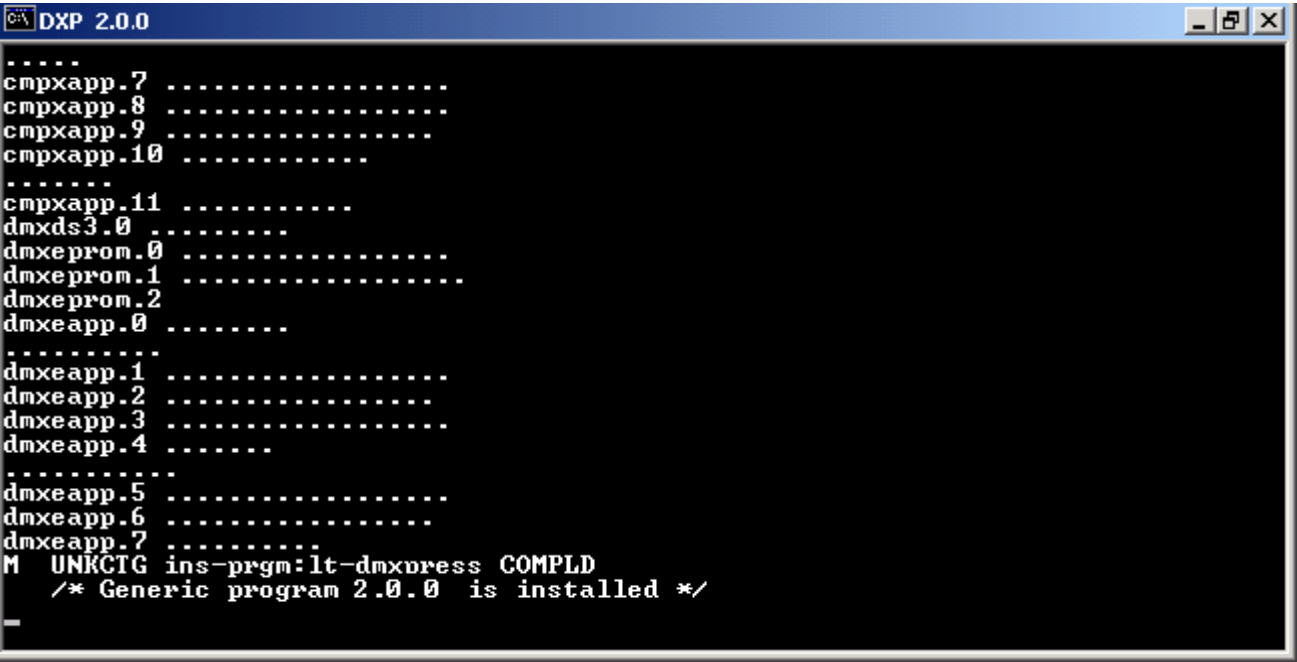
LT-DMXPRESS 02-03-20 12:56:22
A 031 REPT EVT COM
"cit-1:EOC,SC,03-20,12-56-22,,,:\"install program IP\\""
;

LT-DMXPRESS 02-03-20 12:56:23
A 032 REPT EVT COM
"cit-1:MAN,CL,03-20,12-56-23,,,:\"logout:LUC01 DISCONNECT\\""

Searching for optimal transfer rate.
Initiating Software Download
```

- 9 When the software download is complete, the following screen appears.

Important! The downloaded software has been installed in the dormant area.



- 10 Exit the Term program using **ALT+F2**. Continue with [Step 11](#).
- 11 Do you wish to apply (activate) the software generic that you recently downloaded to the dormant area of the Metropolis® DMXpress shelf?

If...	Then...
Yes	Continue with Step 12 .
No	Proceed to Step 18 .

-
- 12** Establish a WaveStar® CIT session (specifying either OSI or Serial in the **Connection Type:** field) and log in to your Metropolis® DMXpress shelf.

Reference: “Task 200: Connect Personal Computer (PC) and Establish WaveStar® CIT Session” (8-3)

.....

- 13** From the System View menu, select **Configuration > Software > Apply Software....**

Result: The Apply Software window appears.

Figure 8-15 Apply Software Window

LT-DMXPRESS: Apply Software

Active Software Version: 2.0.0

Available Generics

Version	Type	Action	Date	Time
2.0.0	ALL			

Activation Scheduling

☐ Cancel Install

☒ Install In 15 Minutes

☐ Specify Install Date/Time:

☐ Within 24 Hrs.

Year: 2002 Month: July

Sun	Mon	Tue	Wed	Thu	Fri	Sat
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

Hour: 13 Minutes: 12 Seconds: 11

Apply Type

type: ☐ FORCED

OK Close Help

.....

14 Select and/or enter the following information in the Apply Software window (Figure 8-15):

1. From the **Available Generics** panel, select the software generic to be activated.
2. From the **Activation Scheduling** panel, you may schedule the activation time and date in *one* of the following ways:
 - Select **Install In 15 Minutes**
The software will install 15 minutes after you click **Okay**.
 - Select **Specify Install Date/Time** and select the **Year, Month, Date** and **Time**.
In this case, the **Hour, Minute, and Second** fields are used to enter a 24-hour clock time (13 hours and 15 minutes means that the software will apply at 1:15 PM on the date specified).
 - Select **Specify Install Date/Time and Within 24 Hours**.
In this case, the **Hour, Minute, and Second** fields are used to enter the time within 24 hours of the current date and time after you click **OK**.

Important! You may cancel the scheduled apply by returning to the **Apply Software** menu at any time before the software applies and selecting the generic and **Cancel Install** and then clicking **OK**.

3. Click **OK**.

Result: The following warning message appears:

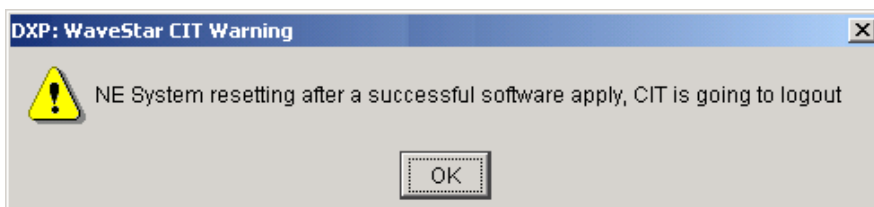
Execution of Provision may affect the NE service. Do you want to execute this command?

Click **Yes**.

-
- 15** After approximately 15 minutes, the apply is complete.

Result: The following warning screen appears, click **OK**. The System View closes.

Important! If the WaveStar® CIT Network View is unresponsive, perform a shut-down using Windows Task Manager to End the WaveStar® CIT.



Important! Following a Metropolis® DMXpress system reset, the date and time revert to January 1, 1970 (70-01-01) at midnight (00:00:00). After 5 minutes (to allow for additional NE resets, as in the case of a network software upgrade), the shelf attempts an automatic synchronization of the time and date with another NE in the network. If the remote NE has not responded to the synchronization request within 2 minutes, the request is forwarded to another NE in the network. Each remote NE is allowed 2 minutes to respond. If a valid time and date is not found within the network, it must be entered manually.

-
- 16** Establish a WaveStar® CIT session (specifying either OSI or Serial in the **Connection Type:** field) and re-log in to your Metropolis® DMXpress shelf.

Result: The title bars of the System View and the legal notice should both reflect the current NE software generic, R2.0.0.

Reference: [“Task 200: Connect Personal Computer \(PC\) and Establish WaveStar® CIT Session” \(8-3\)](#)

.....

17 Is your Generic Software Version correct?

If...	Then...
Yes	Continue with Step 18 .
No	Contact your support center.

.....

18 Is this software generic to be installed on other nodes in this network?

If	Then
Yes	Proceed to “ Task 210: Release 2.0.0 Software Generic Copy to Remote Shelf (In-Service System) ” (8-61).
No	STOP! END OF TASK.

.....

END OF STEPS

.....



Task 210: Release 2.0.0 Software Generic Copy to Remote Shelf (In-Service System)

Purpose Use this task to copy and apply the new R2.0.0 software generic to a remote NE from a local Metropolis® DMXpress shelf.

Important! This task requires that the software generic to be copied is installed in the dormant area of the local Metropolis® DMXpress shelf.

Required equipment The following equipment is required:

- Personal Computer (PC) with WaveStar® CIT software installed
- Wrist strap
- Cable to connect the PC to Metropolis® DMXpress
- Working copy of the new system generic software program on CD-ROM
- Current *Metropolis® DMXpress Access Multiplexer Software Release Description* for the software generic being installed.

Safety precautions To assure both personal safety and the proper functioning of Metropolis® DMXpress, it is imperative to review and understand these warnings and precautions prior to performing this task.



CAUTION

Electrostatic discharge

Use a static ground wrist strap whenever handling circuit packs or working on a system to prevent electrostatic discharge damage to sensitive components. See “Electrostatic discharge” in “About this Information Product”.

Related information For related information, see the following:

- [Chapter 2, “Operations Interfaces”](#)
- [“Task 209: Release 2.0.0 Software Generic Upgrade for Local Shelf \(In-Service System\)” \(8-49\)](#)

Before you begin Before beginning the software installation, refer to the *Metropolis[®] DMXpress Access Multiplexer Software Release Description* for the software being installed for a description of any special considerations required when installing this version of the software.

Important! A privileged login is required to perform this task. This task uses the *cpy-prgm* command to copy the Metropolis[®] DMXpress software generic from a local in-service Metropolis[®] DMXpress shelf a remote Metropolis[®] DMXpress shelf.

Important! For remote copy, it is assumed that the local shelf has already been upgraded and the software has been installed as a dormant copy.

Task Complete the following steps to copy system software to another Metropolis[®] DMXpress shelf.

-
- 1 If not previously completed, install generic and WaveStar[®] CIT software on the PC.

Reference: [“Task 214: Install Generic and WaveStar[®] CIT Software on the PC” \(8-109\)](#)

.....

- 2 Will you be using remote copy (**cpy-prgm**) or FTP (**cpy-mem**)?

Important! Remote copy requires that the desired generic be present on the local shelf to which you are logged in. FTP requires that the remote shelf be running release 1.1.x or later.

If...	Then...
Remote copy (cpy-prgm)	Continue with Step 3 .
FTP (cpy-mem)	Proceed to “Task 206: Release Software Generic Download and Upgrade via FTP (In-Service System)” (8-29) .

-
- 3 Connect the PC to the front LAN (**LAN CIT**) or serial (**RS232 CIT**) port, establish a WaveStar® CIT session (specifying either OSI or Serial in the **Connection Type:** field), and log in to the local shelf.

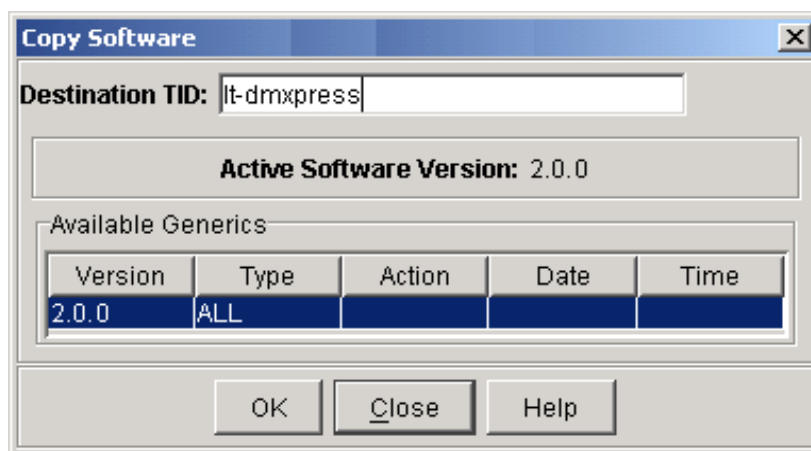
Reference: “[Task 200: Connect Personal Computer \(PC\) and Establish WaveStar® CIT Session](#)” (8-3)

.....

- 4 From the System View menu, select **Configuration > Software > Copy Software....**

Result: The Copy Software window appears.

Figure 8-16 Example of Copy Software Window



.....

5 From the Copy Software Window (Figure 8-16), provision the following fields accordingly:

1. In the **Destination TID:** field, type the TID of the remote NE to which you wish to copy the Metropolis® DMXpress generic software.

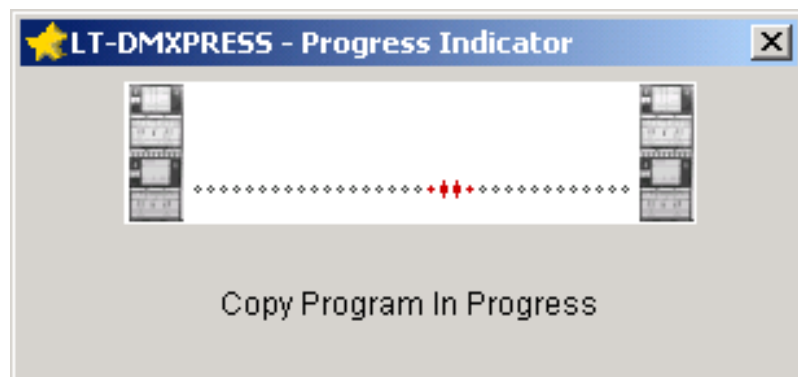
Important! Your remote NE must be a Metropolis® DMXpress shelf.

2. Verify that the software generic that you wish to copy is listed under **Available Generics** and select it.
3. Click **OK**.

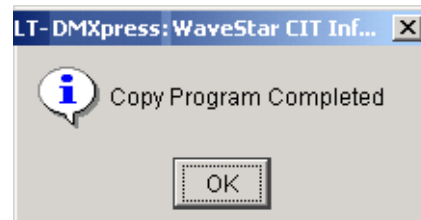
Result: The following confirmation message appears: *Execution of Provision may affect the NE service. Do you wish to execute this command?*

Click **Yes**.

Important! While the copy is in progress, the following window is present.



-
- 6 When the copy is complete, the following window appears. Click **OK**.



Result: The software is now in the dormant area of the remote NE and you are ready to continue.

.....

- 7 Do you wish to apply (activate) the software generic that you recently downloaded to the dormant area of the remote NE?

If...	Then...
Yes	Disconnect from your local NE. Continue with Step 8 .
No	Proceed to Step 14 .

-
- 8** Log in to the remote Metropolis[®] DMXpress to which you copied the software.

Specify the following when establishing the WaveStar[®] CIT session:

- **NE Name:** field: TID of the remote NE
- **NE Type:** field: Metropolis DMXpress Access Multiplexer
- **Connection Type:** field: OSI or Serial

Reference: [“Task 200: Connect Personal Computer \(PC\) and Establish WaveStar[®] CIT Session” \(8-3\)](#)

Result: After a few moments, the NE with the TID you previously specified appears in the System View.

- 9 From the **System View** menu, select **Configuration > Software > Apply Software....**

Important! The TID of the remote shelf will not be the same as your local shelf. [Figure 8-17](#) is only an example of the window.

Result: The Apply Software window appears.

Figure 8-17 Apply Software Window

LT-DMXPRESS: Apply Software

Active Software Version: 2.0.0

Available Generics

Version	Type	Action	Date	Time
2.0.0	ALL			

Activation Scheduling

☐ Cancel Install

☒ Install In 15 Minutes

☐ Specify Install Date/Time:

☐ Within 24 Hrs.

Year: 2002 Month: July

Sun	Mon	Tue	Wed	Thu	Fri	Sat
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

Hour: 13 Minutes: 12 Seconds: 11

Apply Type

type: ☐ FORCED

OK Close Help

.....

10 Select and/or enter the following information in the **Apply Software** window (Figure 8-17):

1. From the **Available Generics** panel, select the software generic to be activated.
2. From the **Activation Scheduling** panel, you may schedule the activation time and date in *one* of the following ways:
 - Select **Install In 15 Minutes**
The software will install 15 minutes after you click **Okay**.
 - Select **Specify Install Date/Time** and select the **Year, Month, Date** and **Time**.
In this case, the **Hour, Minute, and Second** fields are used to enter a 24-hour clock time (13 hours and 15 minutes means that the software will apply at 1:15 PM on the date specified).
 - Select **Specify Install Date/Time and Within 24 Hours**.
In this case, the **Hour, Minute, and Second** fields are used to enter the time within 24 hours of the current date and time after you click **OK**.

Important! You may cancel the scheduled apply by returning to the **Apply Software** menu at any time before the software applies and selecting the generic and **Cancel Install** and then clicking **OK**.

3. Click **OK**.

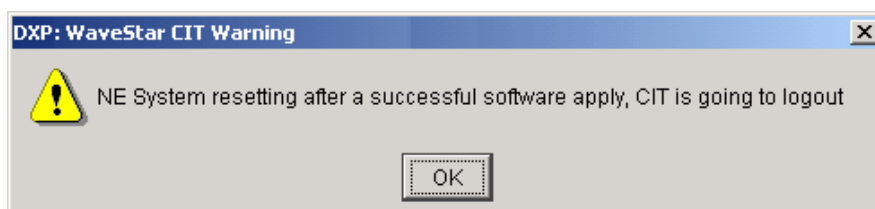
Result: The following confirmation message appears: *Execution of Provision may affect the NE service. Do you wish to execute this command?*

Click **Yes**.

- 11 After approximately 15 minutes, the apply is complete.

Result: The following warning screen appears, click **OK**. The System View closes.

Important! If the WaveStar® CIT Network View is unresponsive, perform a shut-down using Windows Task Manager to End the WaveStar® CIT.



Important! Following a Metropolis® DMXpress system reset, the date and time revert to January 1, 1970 (70-01-01) at midnight (00:00:00). After 5 minutes (to allow for additional NE resets, as in the case of a network software upgrade), the shelf attempts an automatic synchronization of the time and date with another NE in the network. If the remote NE has not responded to the synchronization request within 2 minutes, the request is forwarded to another NE in the network. Each remote NE is allowed 2 minutes to respond. If a valid time and date is not found within the network, it must be entered manually.

- 12 Establish a WaveStar® CIT session (specifying either OSI or Serial in the **Connection Type:** field) and log in to your Metropolis® DMXpress shelf.

Result: The title bars of the System View and the legal notice should both reflect the current NE software generic, R2.0.0.

Reference: [“Task 200: Connect Personal Computer \(PC\) and Establish WaveStar® CIT Session” \(8-3\)](#)

.....

13 Is your Generic Software Version correct?

If...	Then...
Yes	Continue with Step 14 .
No	Contact your support center.

.....

14 Repeat this task from [Step 2](#) for each remote shelf in the network that you wish to upgrade.

.....

END OF STEPS

..... ☐

Task 211: Backup and Restore

- Purpose** Use this task to backup and restore the NE database or to setup an automatic backup schedule.
- Required equipment** The following equipment is required:
- Personal Computer (PC) with WaveStar® CIT software installed
 - Wrist Strap
- Safety precautions** To assure both personal safety and the proper functioning of the Metropolis® DMXpress, it is imperative to review and understand these warnings and precautions prior to performing this task.



CAUTION

Electrostatic discharge

Use a static ground wrist strap whenever handling circuit packs or working on a system to prevent electrostatic discharge damage to sensitive components. See “Electrostatic discharge” in “About this Information Product”.

- Related information** For related information, see the following:
- [Chapter 2, “Operations Interfaces”](#)
 - [“Task 323: Add IP Tunnel\(s\) Through Network” \(9-105\)](#)
 - [“Task 324: Provision/Enable/Disable TCP/IP on an IAO LAN Port” \(9-109\)](#)

Before you begin This task uses FTP to backup and restore all Metropolis® DMXpress provisionable data on a shelf.

The WaveStar® CIT is not a fully implemented FTP server, but it can handle backup and restore capabilities. For automatic backups, a Navis™ Optical Element Management System (Navis™ Optical EMS) or another large capacity FTP server should be used when the WaveStar® CIT is not guaranteed to always be connected and available at the scheduled backup times.

The backup feature can be forced or scheduled to complete automatically at specified intervals. The restore feature utilizes the TL1 CPY-MEM command with the restore option.

It is assumed that IP tunneling has already been established.

Task Complete the following steps to backup and restore the system.

-
- 1 Connect the PC and establish a WaveStar® CIT session.

Reference: “Task 200: Connect Personal Computer (PC) and Establish WaveStar® CIT Session” (8-3)

.....

- 2 Do you wish to...

If	Then
perform an immediate system backup?	Continue with Step 3 .
schedule or discontinue an automatic system backup?	Proceed to Step 10 .
perform an immediate system restore?	Proceed to Step 23 .

.....

- 3 From the **System View** menu, select **Configuration > Software > Remote Backup...**
-

- 4 In the pulldown **Backup To/Via:** menu, select **FTP**.
NOTE: No other options are available at this time.

.....

5 Select the connection from the **Profile** pulldown menu

OR

1. In the **Server** panel, select **IP** and enter the address of the FTP server.
 2. Enter the **port** (should remain as default: **21**).
 3. In the **User** panel, enter the user name and password for the FTP server (default for the WaveStar® CIT is **LUC01/LUC+01**).
-

6 If you entered connection information in [Step 5](#) and wish to keep the information for future backups:

1. Type a new name in the **Profile** menu.
2. Click **Add** to add the profile to the list.
3. Click **Save** to save the list.

Entries to the **FTP Profile** pulldown menu may be changed using the **Modify** and **Apply** buttons
or
removed using the **Delete** button.

.....

7 In the **Destination Directory Path** field, enter the location where the database information is to be stored (a maximum of 80 characters is suggested for this field).

A relative path is assigned to the WaveStar® CIT directory, therefore the user need only enter **FILENAME**. However, it is recommended that the information be stored in the backups directory. To do this, enter **backups/FILENAME**. Subdirectories may be assigned by entering **backups/DIRECTORY/FILENAME** if the **DIRECTORY** exists before the command is sent. Directories will not be created by this command, and therefore the command will be denied if any directory in the path does not already exist.

Important! The WaveStar® CIT can use either “/” or “\” to separate the elements of the path. If the filesystem uses the “\” symbol to separate directories and files (DIRECTORY\FILENAME), then the user must use “\” in this field.

(For example: backups\DIRECTORYFILENAME will be translated to backups\DIRECTORYFILENAME by the NE.)

.....

8 Click Backup.

You will be asked to verify that you wish to backup to the directory that you entered above. Click **Yes** if you typed the path correctly.

Result: The **Progress Indicator** screen appears to indicate that the backup is in progress. When the backup completes, a WaveStar® CIT information screen labeled **Remote Backup Screen** appears. Click the **Okay** button.

.....

9 STOP! END OF TASK.

.....

**10 From the System View menu, select
Configuration > Software > Configure Auto Backup Interval... .**

Important! The WaveStar® CIT is not intended to serve as an FTP server, although it may be used for this application if the WaveStar® CIT is guaranteed to be available (connected and running) at all scheduled backup times. Otherwise a Navis™ Optical Element Management System (Navis™ Optical EMS) or another large capacity FTP server should be used.

.....

**11 From the Configure Auto Backup screen,
select the Files tab at the top of the screen.**

.....

**12 Select the connection from the Profile pulldown menu
OR**

1. In the **Server** panel, select **IP** and enter the address of the FTP server.
2. Enter the **port** (should remain as default: **21**).

3. In the **User** panel, enter the user name and password for the FTP server (default for the WaveStar® CIT is LUC01/LUC+01).

.....

13 If you entered connection information in [Step 12](#) (rather than selected an established profile), you should assign a new profile name to this information to allow Automatic Backup to store the FTP login password. To do this:

1. Type a new name in the **Profile** menu.
2. Click **Add** to add the profile to the list.
3. Click **Save** to save the list.

Entries to the **FTP Profile** pulldown menu may be changed using the **Modify** and **Apply** buttons or removed using the **Delete** button.

.....

14 In the **File Path** field, enter the location where the database information is to be stored (a maximum of 80 characters is suggested for this field).

A relative path is assigned to the WaveStar CIT directory, therefore the user need only enter **FILENAME**. However, it is recommended that the information be stored in the backups directory. To do this, enter **backups/FILENAME**. Subdirectories may be assigned by entering **backups/DIRECTORY/FILENAME** if the **DIRECTORY** exists before the command is sent. Directories will not be created by this command, and therefore the command will be denied if any directory in the path does not already exist.

Important! If the filesystem uses the “\” symbol to separate directories and files (**DIRECTORY\FILENAME**), then the user must use “\\” in this field.

(For example: backups\\DIRECTORYFILENAME will be translated to backups\\DIRECTORYFILENAME by the NE.)

.....

15 From the **Type:** menu in the **Backup Type** panel, select **FORCED** from the pulldown menu.

NOTE: No other options are available at this time.

-
- 16** From the **Files:** menu in the **Number of Files** panel, select a number from 1 to 9 (default is 2) from the pulldown menu, which indicates the number of backup files to be stored automatically before the files begin to overwrite.

Once established, the filename that you supplied in [Step 14](#) will initially be appended with “1” (FILENAME1). In subsequent backups, the “1” will increase by one until the number selected in this step is reached; then the files will begin overwriting beginning with FILENAME1.

-
- 17** Select the **Schedule** tab at the top of the screen.

-
- 18** From the **Days** menu in the **Update Interval** panel, select a number from 1 to 99 (default is 30), which indicates the number of days between automatic backups. The number may be selected by sliding the arrow over the scale until the desired number appears in the field, or by typing the number directly into the field.

Important! Setting this field to “0” cancels automatic backup.

-
- 19** If you wish to specify a start date for the automatic backup:
1. Select **Specify Date** in the **Backup Start Date/Time** panel,
 2. Select the **Year:** and **Month:** from the pulldown menus,
 3. Select a day from the calendar.

If you do not wish to specify a start date, the first backup will begin immediately upon completion of this task and the next backup will begin after the requested number of days.

.....

20 To specify a start time for the automatic backup:

1. Select **Specify Time** in the **Backup Start Date/Time** panel,
 2. Select the **Hour:** (0-23), **Minutes:** (0-59), and **Seconds:** (0-59) from the pulldown menus,
(*NOTE: only one backup can occur at a time, therefore backups for individual NEs should be scheduled at least five minutes apart*)
 3. Select a day from the calendar.
-

21 Click **Okay**.

A warning screen will appear, indicating that execution of provision may temporarily affect service. If this is acceptable, select **Yes**.

.....

22 STOP! END OF TASK.

.....

Important! The restore feature only works if the software release and the equipment populating the NE slots has not changed. If the software release has changed or different pack types have been installed since the backup was performed, then the restore will not work.

23 From the **System View** menu, select
Configuration > Software > Remote Restore... .

.....

24 In the pulldown **Restore From/Via:** menu, select **FTP**.
NOTE: No other options are available at this time.

.....

25 Select the connection from the **Profile** pulldown menu
OR

1. In the **Server** panel, select **IP** and enter the address of the FTP server.
 2. Enter the **port** (should remain as default: **21**).
 3. In the **User** panel, enter the user name and password for the FTP server (default for the WaveStar® CIT is **LUC01/LUC+01**).
-

.....

26 If you entered connection information in [Step 25](#) and wish to keep the information for future restores:

1. Type a new name in the **Profile** menu.
2. Click **Add** to add the profile to the list.
3. Click **Save** to save the list.

Entries to the **FTP Profile** pulldown menu may be changed using the **Modify** and **Apply** buttons or removed using the **Delete** button.

.....

27 In the **Source Directory Path** panel, enter the location where the database information is stored.

A relative path is assigned to the WaveStar CIT directory, therefore the user must enter the path and filename exactly as it was entered in [Step 7](#) or [Step 14](#) (For example: **backups/DIRECTORY/FILENAME**).

If the filesystem uses the “\” symbol to separate directories and files (DIRECTORY\FILENAME), then the user must use “\\” in this field. (For example: backups\\DIRECTORY\FILENAME will be translated to backups\\DIRECTORYFILENAME by the NE.)

.....

28 Click **Restore**.

You will be asked to verify that you wish to restore the data from the backup file that you entered above. Click **Yes** if you typed the path correctly.

A second warning screen will appear that states that Execution of RESTORE will cause a System Reset. If this is acceptable, click **Yes**.

Result: The **DMXPR Progress Indicator** screen appears to indicate that the restore is in progress. A WaveStar® CIT warning screen states **NE reset after successful restore, CIT is going to log out**. Click **Okay**.

.....
29 STOP! END OF TASK.

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



Task 212: Condition and Connect Modems to Establish Communication from Remote CIT Location

Purpose Use this task to connect modems and a Personal Computer (PC) to the Metropolis® DMXpress for use in provisioning the system from a remote location.

Required equipment The following equipment is required:

- Personal Computer (PC) with WaveStar® CIT software installed
- Modem and modem cable
- Wrist Strap

Safety precautions To assure both personal safety and the proper functioning of Metropolis® DMXpress, it is imperative to review and understand these warnings and precautions prior to performing this task.



CAUTION

Electrostatic discharge

Use a static ground wrist strap whenever handling circuit packs or working on a system to prevent electrostatic discharge damage to sensitive components. See “Electrostatic discharge” in “About this Information Product”.

Related information For related information, see the following:

- [Chapter 2, “Operations Interfaces”](#)
- [Chapter 3, “Provisioning, Security, & Administration”](#)
- *Metropolis® DMXpress Access Multiplexer TL1 Command Manual, 365-372-313*

Before you begin Ensure that the descriptions and syntax of the various features and parameters of the Metropolis® DMXpress that may be set using the PC with the WaveStar® CIT program installed are understood prior to starting this task.

Ensure that the proper modem cable is available. Use the following table to determine the correct assembly:

Table 8-1 Modem Cable Assembly and Pin Connections

Description	Cable Assembly #	Cable Length	Metropolis® DMXpress Connections
Modem Cable	848756508	50 ft.	J17
	848756524	100 ft.	
	848756516	150 ft.	
	848756532	250 ft.	

Connection	RJ-45 Connector Pin #	Color	DB25 Connector Pin #
Modem Cable J17	1	White-Orange	8
	2	Brown	20
	3	White-Black	3
	5	Orange (and Shielding)	7
	6	Green	2

Task Complete the following steps to connect modem and establish communication from a remote WaveStar® CIT location.

.....

1 Verify the generic parameters of the modem are set to the following:

Modem Parameters

- 1200, 2400, 4800, 9600, or 19,200 baud
(9600 is the default and recommended rate)
- Full duplex
- 8 data bits
- No parity bits
- 1 start bit
- 1 stop bit
- No flow control
- Transparent data mode - ON (Required for software download on some modems.)
- Direct operating mode - ON (Required for software download on some modems.)

Important! Modems supporting a large set of options and error detection capabilities may require other options be set before using the modems to download generic software. Refer to manufacture's manuals for instructions on setting modem parameters.

.....

2 Are you at the Metropolis® DMXpress location or remote WaveStar® CIT location?

If	Then
Metropolis® DMXpress Location	Continue with Step 3 .
Remote WaveStar® CIT Location	Proceed to Step 8 .

.....

3 Set the modem to answer incoming calls.

.....

4 Connect the modem to the rear CIT port on the Main card in the Metropolis® DMXpress shelf using the proper Metropolis® DMXpress modem cable.

.....

5 Plug the telephone line into the modem.

.....

6 To provision the modem port, login using a LAN connection and perform the following.

From the **System View** menu, select

Administration>Data Communications.

From the **Serial Port** tab, set the options of the serial port.

The Metropolis® DMXpress shelf has a default setting of 9600 baud for the serial port. If the modem is set for another baud rate (1200, 2400, 4800 or 19200), set the baud rate to match that of the modem.

Reference: “[Task 200: Connect Personal Computer \(PC\) and Establish WaveStar® CIT Session](#)” (8-3)

.....

7 STOP! END OF TASK.

.....

8 At the remote WaveStar® CIT location, set the modem parameters to match those set at the Metropolis® DMXpress location. Refer to manufacture’s manual for instructions on setting modem parameters.

.....

9 Connect the remote modem to the WaveStar® CIT terminal using the appropriate modem cable.

.....

10 Verify the telephone line is plugged into the modem.

.....

11 Refer to the PC and Modem documentation to establish a connection (place a call) to the modem at the Metropolis® DMXpress.

-
- 12** Once the Modem at the Metropolis[®] DMXpress has answered, establish a WaveStar[®] CIT session.

Reference: “Task 200: Connect Personal Computer (PC) and Establish WaveStar[®] CIT Session” (8-3)

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



Task 213: Install Software Generic Program in New Shelf Installation

Purpose Use this task to install software generic in a factory-fresh OC48/1.3I2, OC48 CHx/y, OC12/1.3I2 Main circuit pack (A1AA005, A1AA121-159, or A1AA016).

Required equipment The following equipment is required:

- Personal Computer (PC) with WaveStar® CIT software installed
- Wrist Strap
- Working copy of the new system generic software program on CD-ROM
- Current *Metropolis® DMXpress Access Multiplexer Software Release Description* for the software generic being installed.

Safety precautions To assure both personal safety and the proper functioning of Metropolis® DMXpress, it is imperative to review and understand these warnings and precautions prior to performing this task.



CAUTION

Electrostatic discharge

Use a static ground wrist strap whenever handling circuit packs or working on a system to prevent electrostatic discharge damage to sensitive components. See “Electrostatic discharge” in “About this Information Product”.



CAUTION

Equipment damage

The OC-48 and OC-12 Main circuit packs must not be reseated, removed, or installed while power is applied to the system. The system must be powered down before the circuit pack is reseated, removed, or replaced.

When Metropolis® DMXpress is powered down, you must wait at least 10 seconds before switching the power on again. Rapid power-cycling may result in OLIU CP failed alarms.

Related information For related information, see [Chapter 1, “Product Description”](#) in this document.

- Before you begin** Before you begin this task:
1. Verify that new software generic program is available.
 2. Refer to the *Metropolis® DMXpress Access Multiplexer Software Release Description* for a description of any special considerations required when installing this version of software
 3. Unseat all circuit packs in the shelf, except the Main to which you are downloading the new software generic.
 4. If using FTP, determine the IP address assigned to LAN card (in the WaveStar® CIT) that will be used to connect to the shelf.

Important! A privileged login is required to perform this task.

Task Complete the following steps to install software generic program in a new shelf installation with only the Main circuit pack installed.

Important! The power **MUST** be off while the Main circuit pack is being installed. When Metropolis® DMXpress is powered down, you must wait at least 10 seconds before switching the power on again. Rapid power-cycling may result in OLIU CP failed alarms.

- 1 If not previously completed, install generic and WaveStar® CIT software on the PC.

Reference: [“Task 214: Install Generic and WaveStar® CIT Software on the PC” \(8-109\).](#)

-
- 2 Using the appropriate cable, connect the **COM1** port of your PC to the **RS232 CIT** serial port on the faceplate of the Main circuit pack.

Important! DO NOT establish a WaveStar® CIT session.

-
- 3 Double-click on **DXP 2.0.0 Downloads** folder on you PC desktop.

Result: The *DXP 2.0.0 Downloads* folder contains the following icon.

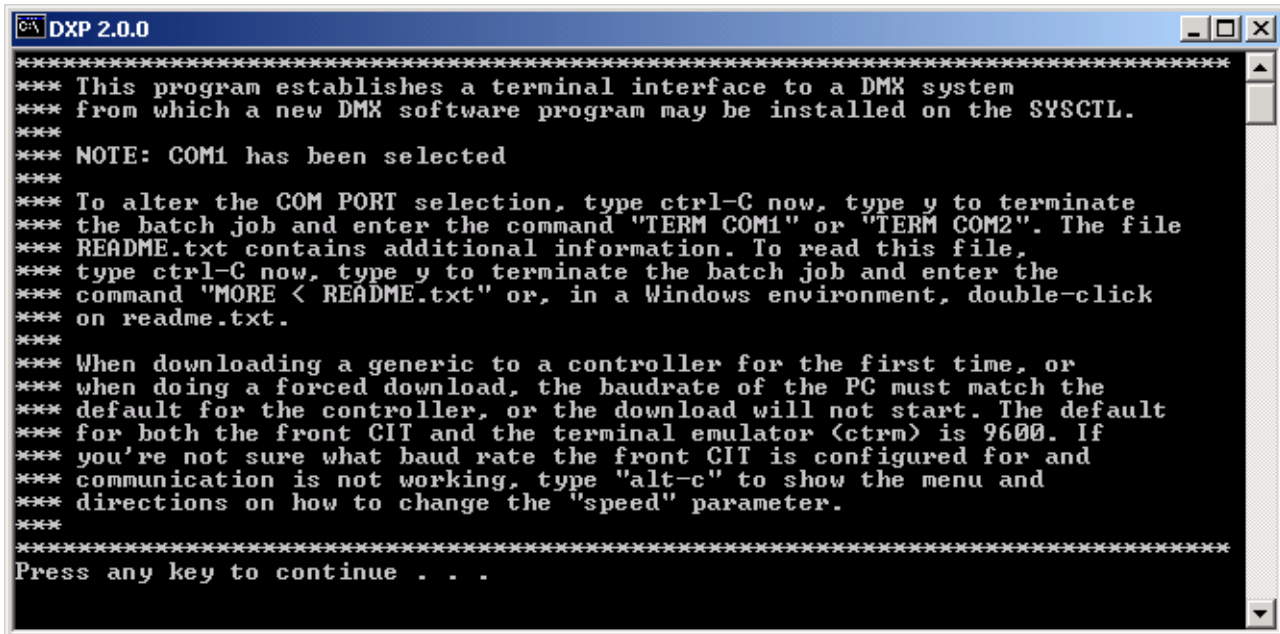
Figure 8-18 Contents of DXP 2.0.0 Downloads Folder



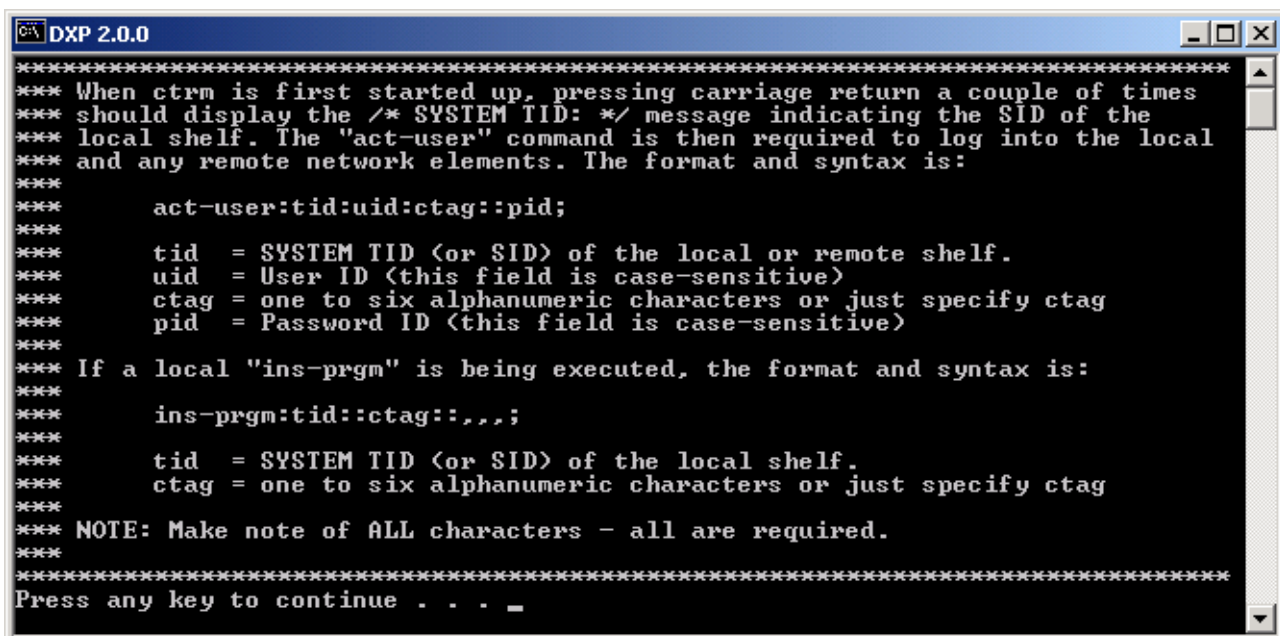
DXP 2.0.0

-
- 4 Double click the **DXP 2.0.0** icon in the *DXP 2.0.0 Downloads* folder to launch the term.bat file.

- 5 Follow the instructions on the subsequent screens.



```
***** DXP 2.0.0 *****
*** This program establishes a terminal interface to a DMX system
*** from which a new DMX software program may be installed on the SYSCtl.
***
*** NOTE: COM1 has been selected
***
*** To alter the COM PORT selection, type ctrl-C now, type y to terminate
*** the batch job and enter the command "TERM COM1" or "TERM COM2". The file
*** README.txt contains additional information. To read this file,
*** type ctrl-C now, type y to terminate the batch job and enter the
*** command "MORE < README.txt" or, in a Windows environment, double-click
*** on readme.txt.
***
*** When downloading a generic to a controller for the first time, or
*** when doing a forced download, the baudrate of the PC must match the
*** default for the controller, or the download will not start. The default
*** for both the front CIT and the terminal emulator (ctrm) is 9600. If
*** you're not sure what baud rate the front CIT is configured for and
*** communication is not working, type "alt-c" to show the menu and
*** directions on how to change the "speed" parameter.
***
*****
Press any key to continue . . .
```



```
***** DXP 2.0.0 *****
*** When ctrm is first started up, pressing carriage return a couple of times
*** should display the /* SYSTEM TID: */ message indicating the SID of the
*** local shelf. The "act-user" command is then required to log into the local
*** and any remote network elements. The format and syntax is:
***
***   act-user:tid:uid:ctag::pid;
***
***   tid  = SYSTEM TID (or SID) of the local or remote shelf.
***   uid  = User ID (this field is case-sensitive)
***   ctag = one to six alphanumeric characters or just specify ctag
***   pid  = Password ID (this field is case-sensitive)
***
*** If a local "ins-prgm" is being executed, the format and syntax is:
***
***   ins-prgm:tid::ctag::,.,.,;
***
***   tid  = SYSTEM TID (or SID) of the local shelf.
***   ctag = one to six alphanumeric characters or just specify ctag
***
*** NOTE: Make note of ALL characters - all are required.
***
*****
Press any key to continue . . . -
```

```

C:\ DXP 2.0.0
*****
*** After completion of the "ins-prgm" command, the user should log back into
*** the shelf using the "act-user" command and execute the "apply" command to
*** schedule when the new software should be installed. The format and syntax
*** is:
***
***      apply:tid::ctag::[time],[date],;
***
***      tid  = SYSTEM TID (or SID) of the local or remote shelf.
***      ctag = one to six alphanumeric characters or just specify ctag
***      time = HHMMSS (e.g. 220000 is equal to 10:00PM)
***      date = YYMMDD (e.g. 010425 is equal to April 25, 2001)
***
*** If time/date are NOT specified, the apply will be scheduled 15 minutes
*** from when the command is received.
***
*** NOTE: The square brackets indicates that the time and date fields
***       are not required and are not part of the syntax. However, all
***       other characters within the command must be specified.
***
*****
Press any key to continue . . . _

```

```

C:\ DXP 2.0.0

METROPOLIS DMX NETWORK USER INTERFACE
Version 1.1,
Lucent Technologies
All Rights Reserved.

  Cnfg   Speed   Char   Stop   Parity   Flow   Local
  ----   ----   ----   ----   ----   ----   ----
  * 1     9600     8     1     none    xon/xoff  n
  2     9600     8     1     none    xon/xoff  n

Interface ready. (Type Alt-h for help.)
Communications established

```

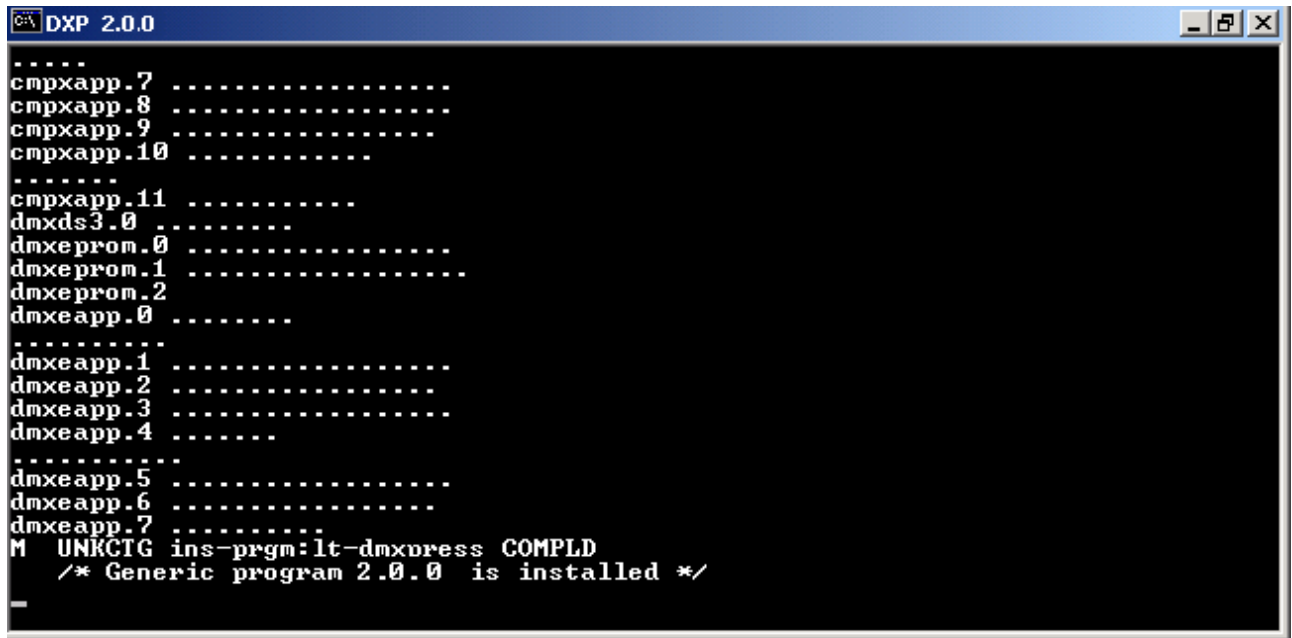
-
- 6** Press Enter.
Determine the boot code of your factory-fresh Main circuit pack.

If...	Then...
the R2.0.0 software generic began to download automatically	your boot code is 1.0. The download will complete in approximately 45 minutes. Continue with Step 7 . <i>OR</i> you may use the serial download described in “ Task 209: Release 2.0.0 Software Generic Upgrade for Local Shelf (In-Service System) ” (8-49).
the term.bat screen returned /* SYSTEM TID: LT-DMXPRESS */	your boot code is either 1.1 or 2.0. Proceed to Step 12 to download the R2.0.0 software using FTP (completes in 10 minutes).

Important! Although TCP/IP connectivity is preferred when your boot code is 1.1 or 2.0, you may still install the software generic following the instructions in [Step 7](#).
Downloading software via FTP download (which requires TCP/IP connectivity) takes approximately 10 minutes. Downloading software using INS-PRGM takes approximately 45 minutes.

-
- 7 When the software download is complete (approximately 45 minutes), the following screen appears.

Important! The downloaded software has been installed in the dormant area.



```
DXP 2.0.0
.....
cmpxapp.7 .....
cmpxapp.8 .....
cmpxapp.9 .....
cmpxapp.10 .....
.....
cmpxapp.11 .....
dmxds3.0 .....
dmxeprom.0 .....
dmxeprom.1 .....
dmxeprom.2 .....
dmxeapp.0 .....
.....
dmxeapp.1 .....
dmxeapp.2 .....
dmxeapp.3 .....
dmxeapp.4 .....
.....
dmxeapp.5 .....
dmxeapp.6 .....
dmxeapp.7 .....
M UNKCTG ins-prgm:lt-dmxpress COMPLD
/* Generic program 2.0.0 is installed */
```

-
- 8 Exit the Term program using **ALT+F2**.
-
- 9 Wait 15 minutes for the software to automatically apply.
-
- 10 Establish a WaveStar® CIT session (specifying either OSI or Serial in the **Connection Type:** field) and log in to your Metropolis® DMXpress shelf.

Result: The title bars of the System View and the legal notice should both reflect the current NE software generic, R2.0.0.

Reference: “Task 200: Connect Personal Computer (PC) and Establish WaveStar® CIT Session” (8-3)

.....
11 Is your Generic Software Version correct?

If...	Then...
Yes	STOP! END OF TASK
No	Contact your support center.

12 Exit the Term program using **ALT+F2**.

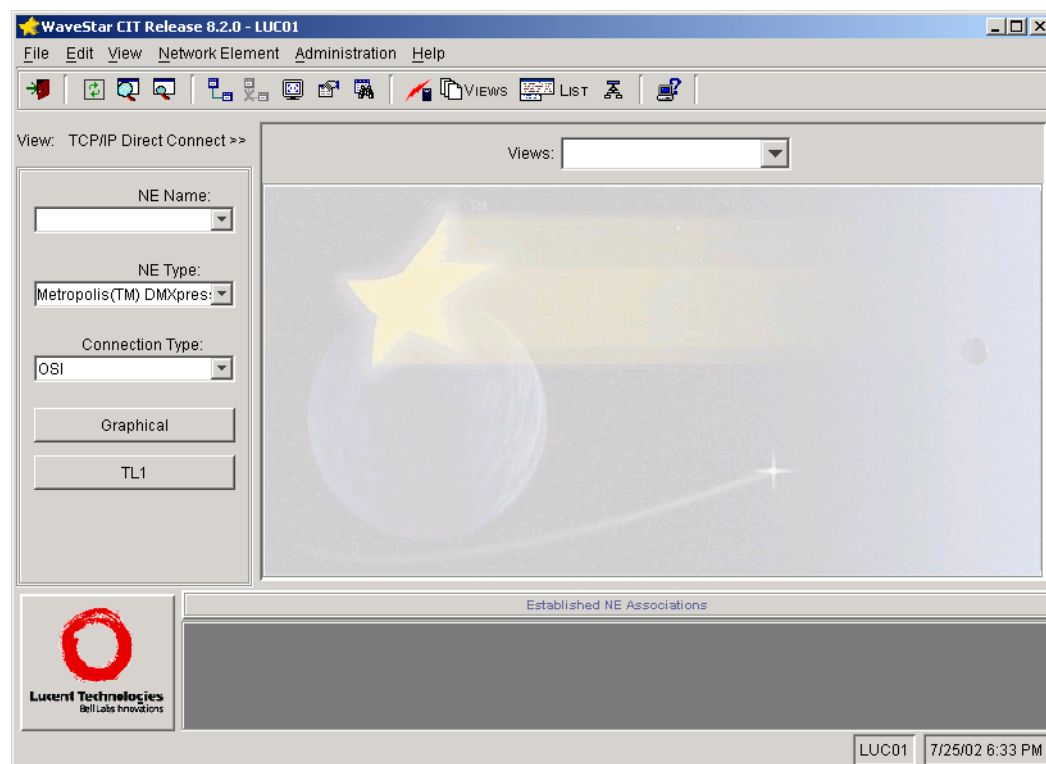
13 Connect the OSI cable from the PC's Network Interface Card (NIC) to the front **LAN CIT** port on the faceplate of the Main circuit pack and establish a WaveStar® CIT session.

Reference: “Task 200: Connect Personal Computer (PC) and Establish WaveStar® CIT Session” (8-3)

Important! Do NOT log into the shelf (WaveStar® CIT System View); only log in to the WaveStar® CIT Network View.

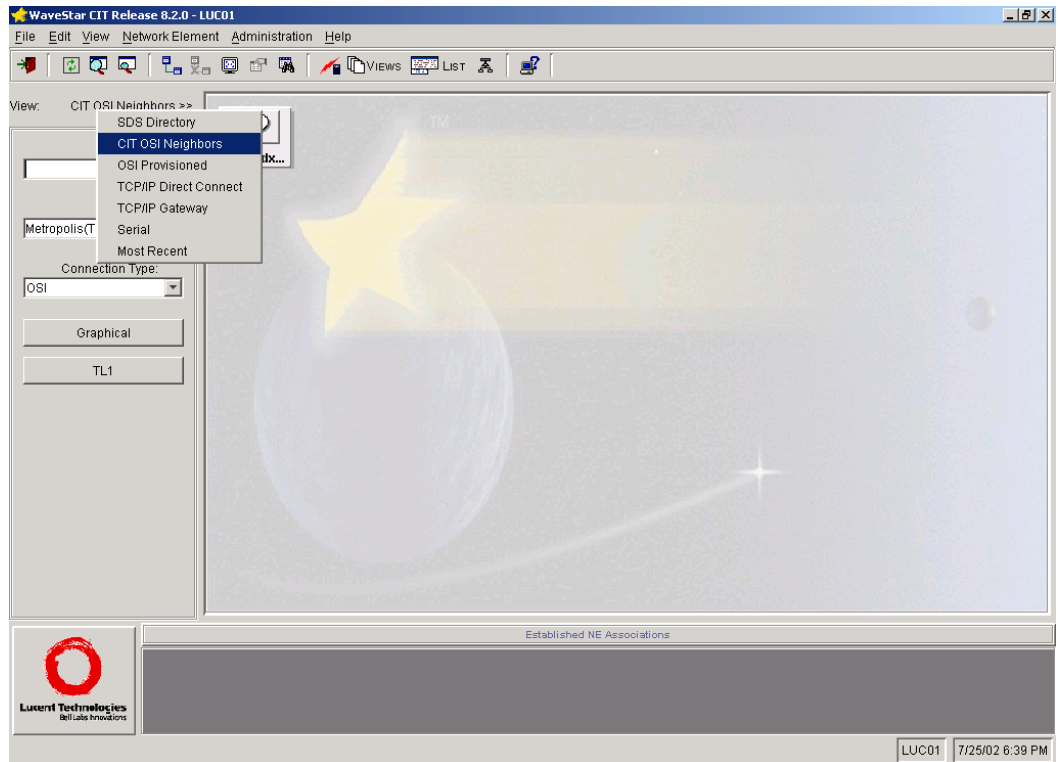
Result: After reading the Legal Notice and clicking OK, the following Network View appears.

Figure 8-19 WaveStar® CIT Network View



-
- 14 From the Network View, click on View: **CIT OSI Neighbors** and the OSI neighbor(s) are automatically detected.

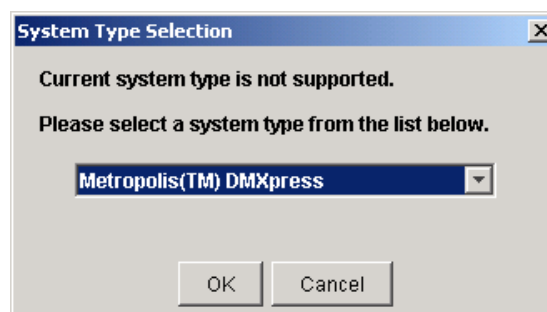
Figure 8-20 CIT OSI Neighbors



-
- 15 In the Network View (Figure 8-20), right-click on the LT-DMXPRESS NE icon and select Graphical (OSI) from the resulting menu.

Result: The System Type Selection window appears.

-
- 16** In the System Type Selection window, select Metropolis(TM) DMXpress and click **OK**.



Result: The NE Login Dialog window appears.

-
- 17** Enter the following in the NE Login Dialog window (login information is case sensitive) to log in to the NE:

User ID: **LUC01**

Password: **DMXPRS2.5G**

Click **OK**.

Important! LUC01, LUC02, LUC03 and DMXPRS2.5G are the default privileged logins/password for Metropolis[®] DMXpress. It is highly recommended that you change all three logins and passwords during your first session to preserve the security of your equipment.

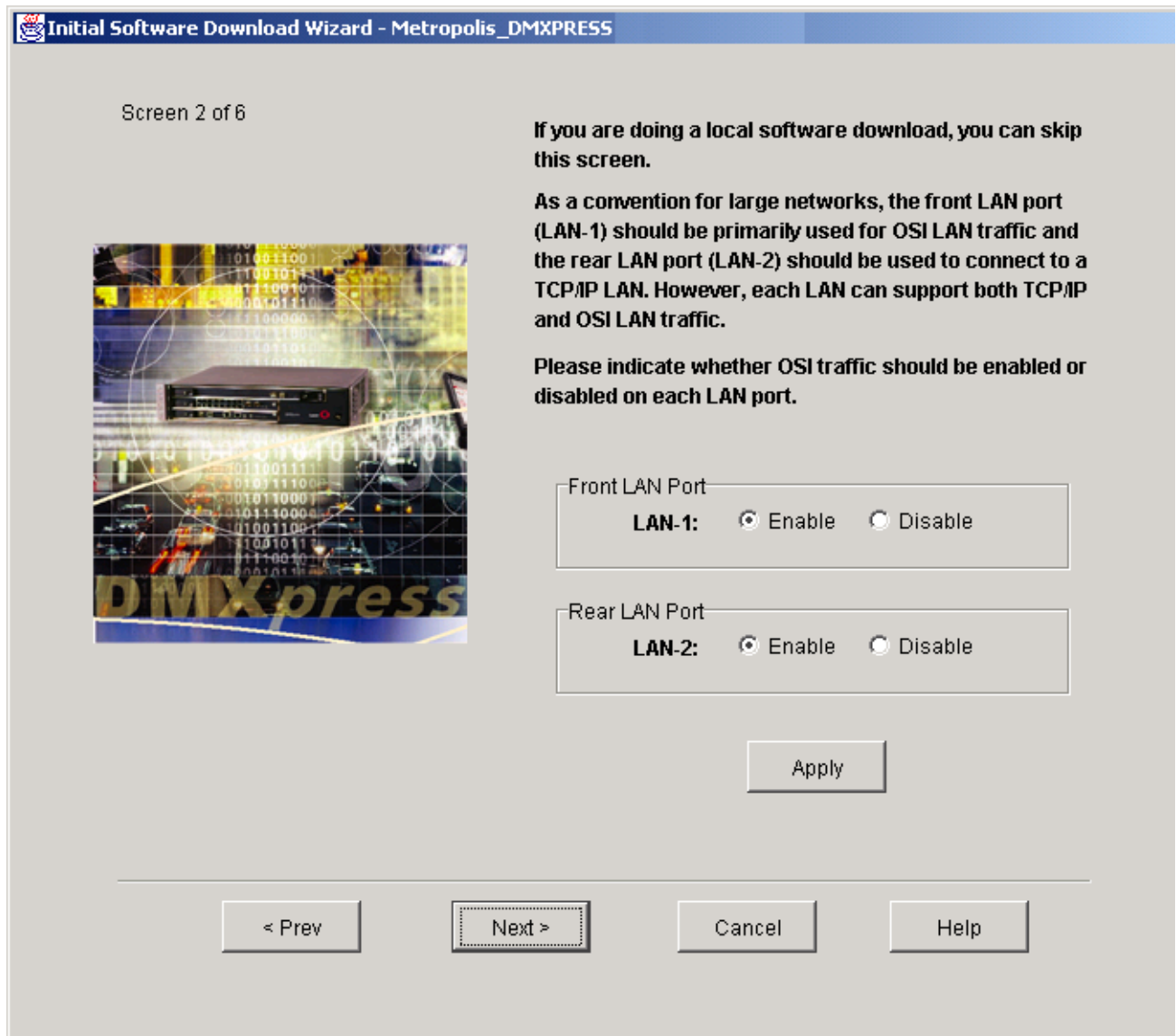
Result: After a successful login, the following welcome screen (Screen 1) appears.



.....

18 On Screen 1, read the material and click **Next**.

Result: Screen 2 appears.



- 19 Because this is a local download, you may skip Screen 2.
Click **Next**.

Result: Screen 3 appears.

Initial Software Download Wizard - Metropolis_DMXPRESS

Screen 3 of 6

Specify the IP Address, IP Subnet Mask, and IP Default Router Address for the selected LAN port. The IP Default Router Address is needed only for remote download.

Note, for the FTP Software Download transfer to be initiated, one of the lan ports must be provisioned with IP parameters and enabled. It is recommended that the rear lan port (LAN-2) be used for TCP/IP LAN traffic but either lan port will work.

LAN Port One IP Addresses

TCP/IP function: ☐ Enable ☒ Disable

IP Address:

IP Subnet Mask:

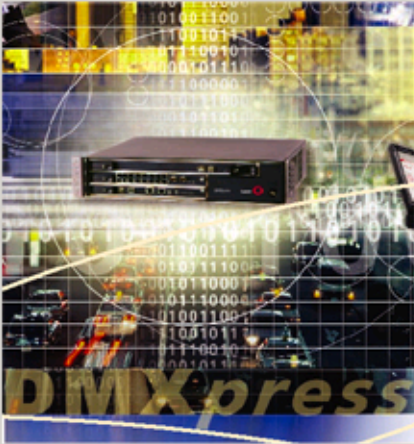
LAN Port Two IP Addresses

TCP/IP function: ☒ Enable ☐ Disable

IP Address:

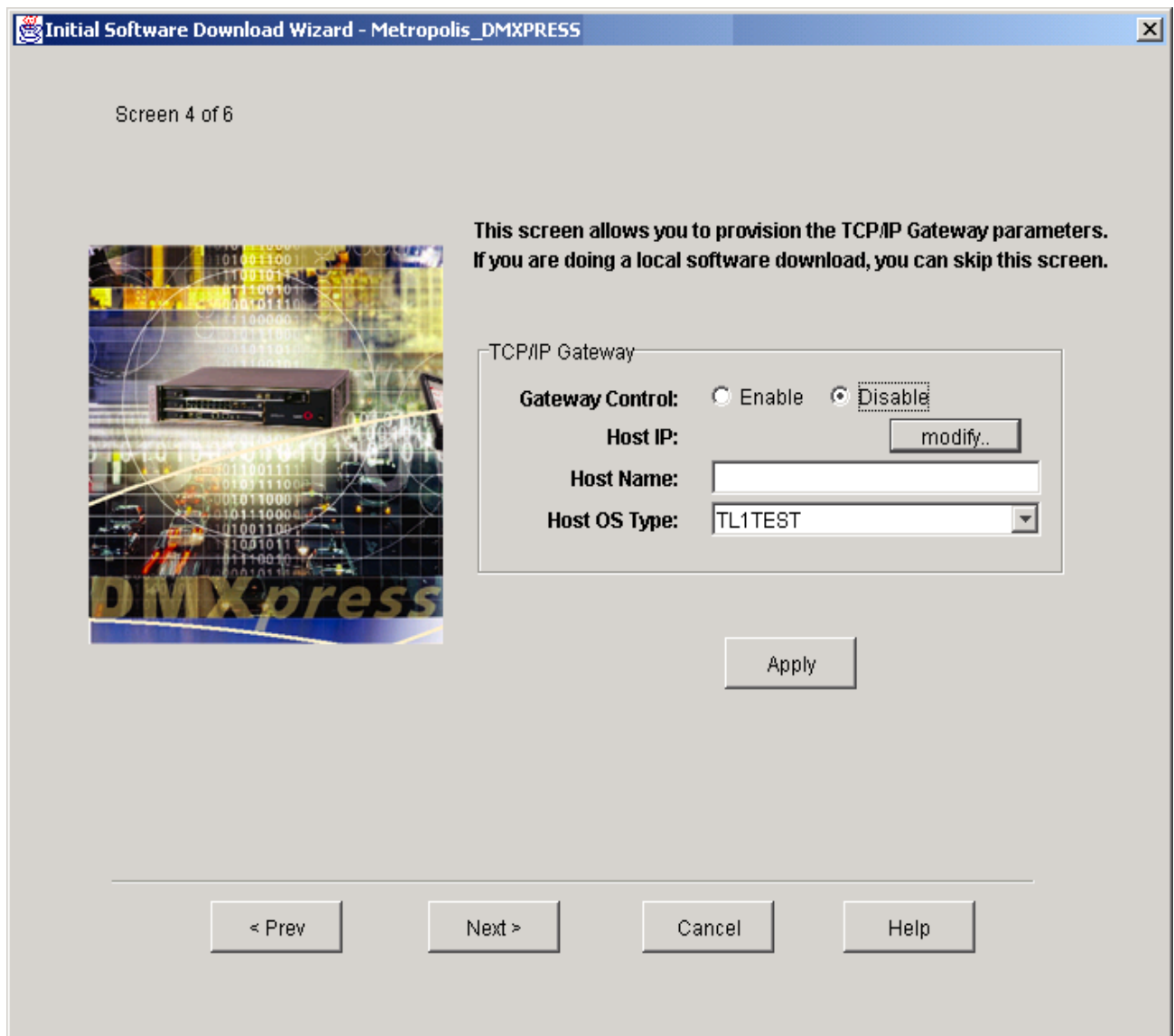
IP Subnet Mask:

IP Default Router Address:



-
- 20** From Screen 3, follow the instructions to enable TCP/IP function on the LAN port (lan-1). Click **Modify** to enter the IP Address, IP Subnet Mask, and/or IP Default Router Address. Click **Next**.

Result: Screen 4 appears.



Initial Software Download Wizard - Metropolis_DMXPRESS

Screen 4 of 6

This screen allows you to provision the TCP/IP Gateway parameters.
If you are doing a local software download, you can skip this screen.

TCP/IP Gateway

Gateway Control: ☐ Enable ☒ Disable

Host IP:

Host Name:

Host OS Type:

365-372-314 R2.0
Issue 3, July 2002

- 21 This step is not required for the initial download.
Click **Next**.

Result: Screen 5 appears.

Initial Software Download Wizard - Metropolis_DMXPRESS

Screen 5 of 6

If the FTP Server is a PC, then one forward slash ("/") or two backslashes ("\\") must be used between directories, since the backslash character is used as the TL1 escape character. For further guidelines on specifying the source directory, please refer to the CPY-MEM command in the DMX Command Manual.

NOTE: The default relative path for source directory is -
"drive:\\Program Files\\Lucent Technologies\\WaveStar CIT\\"

FTP Server

Product Type: DMXpress

IP Address: modify..

Port:

Source Directory:

User Name:

User Password:

< Prev Next > Cancel Help

-
- 22** Follow the directions on Screen 5 to provision the information for you FTP server. Click **Next**.

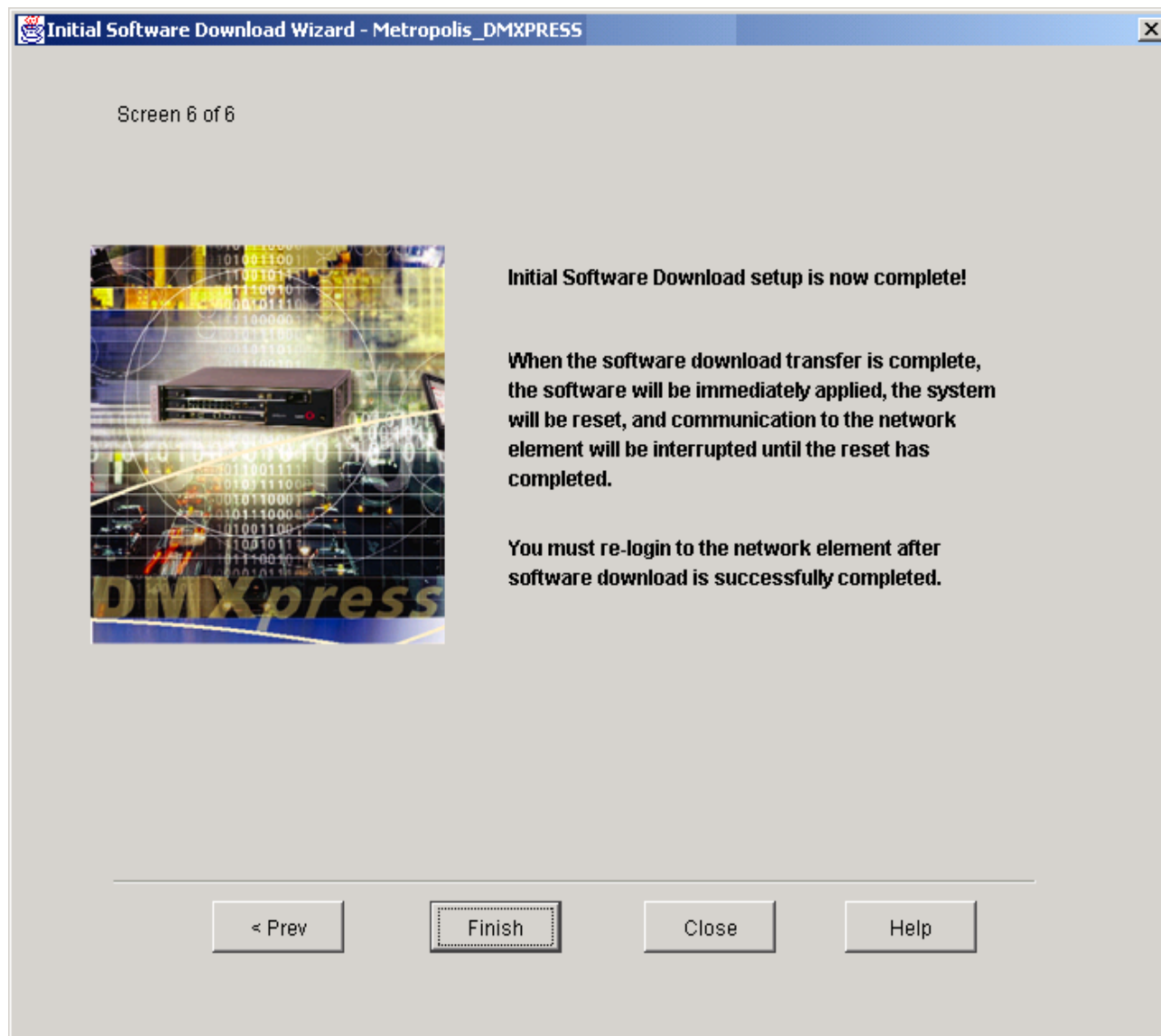
Important! If the WaveStar® CIT is the FTP server, the path of the software generic must be in the following form:

generics/dxp/2.0.0/p/

Important! If you are using the WaveStar® CIT as your FTP server, you must separate your directory structure using either “/” (as illustrated in the example above) or “\\” because TL1 interprets “\” as a character. The WaveStar® CIT fills in the beginning of the default path (C:/Program Files/Lucent Technologies/WaveStar CIT/).

If you are not using the WaveStar® CIT as your FTP server, enter the path starting from the home directory on your FTP server.

Result: Screen 6 appears.



.....

23 On Screen 6, click **Finish**.

Result: A warning message appears that lists the information you provisioned in the six screens. Verify that the information is correct and click **Yes**.

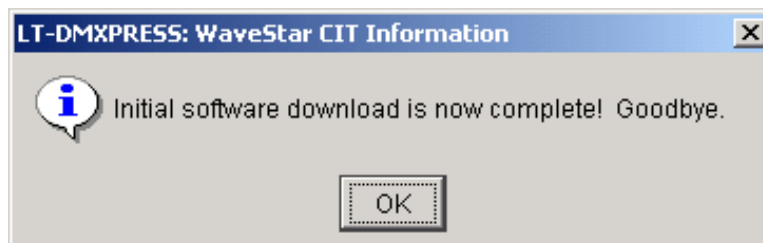
The FTP download of the software (**cpy-mem**), takes approximately 12 minutes.

While the transfer is in progress, the following Progress Indicator appears.



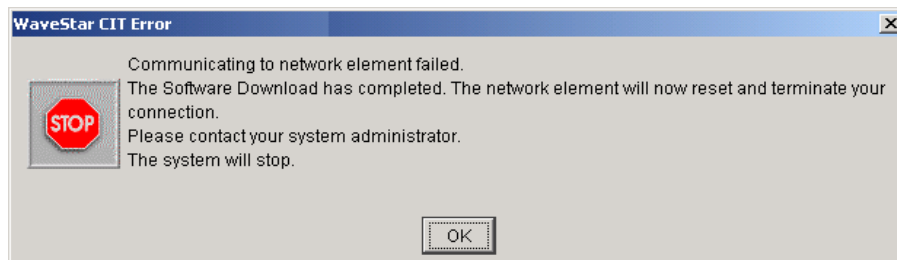
-
- 24** The initial software download is a two-part process, totalling approximately 20 minutes. The first part, FTP download of the software (**cpy-mem**), takes approximately 12 minutes. The second part, the apply/activation of the downloaded software (**apply**) and the reset of the shelf, takes approximately 10 minutes.

After the FTP download is complete, the following completion message appears. Click **OK**.



Result: The second part of the initial software download begins, the apply/activation of the downloaded software (**apply**) and the reset of the shelf.

-
- 25** When the following window appears, indicating that the system is resetting and you are being disconnected, click **OK**.



Result: During the reset and the apply, the Main circuit pack cycles through a series of changes in the LEDs' state.

.....

26 If the WaveStar® CIT Network View is unresponsive, perform a shut-down using Windows Task Manager to End the WaveStar® CIT.

.....

27 Establish a WaveStar® CIT session (specifying either OSI or Serial in the **Connection Type:** field) and log in to your Metropolis® DMXpress shelf.

Result: The title bars of the System View and the legal notice should both reflect the current NE software generic, R2.0.0.

Reference: “Task 200: Connect Personal Computer (PC) and Establish WaveStar® CIT Session” (8-3)

.....

28 Is your Generic Software Version correct?

If...	Then...
Yes	STOP! END OF TASK
No	Contact your support center.

.....

END OF STEPS

.....



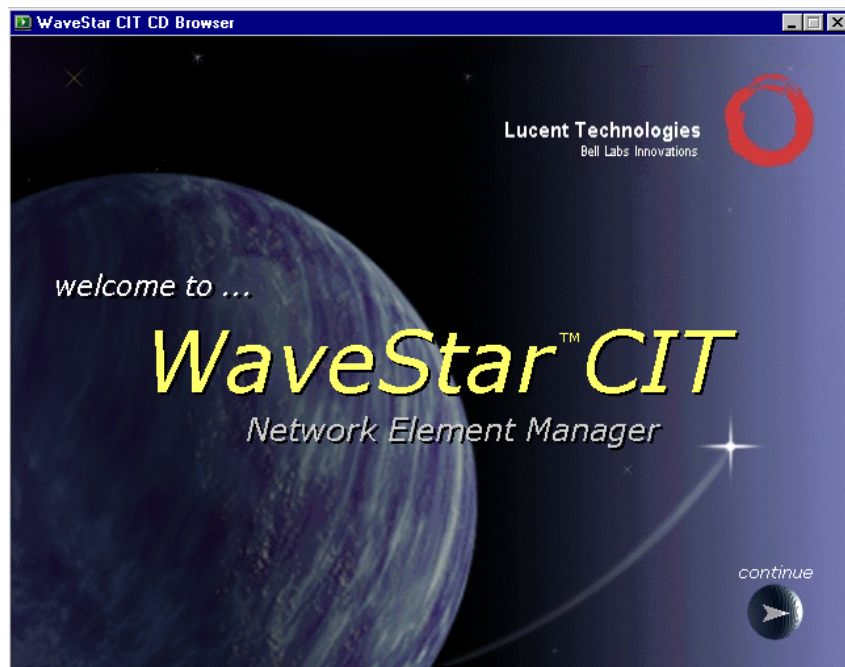
Task 214: Install Generic and WaveStar[®] CIT Software on the PC

Purpose	Use this task to prepare for software download.
Required equipment	The following equipment is required: • Personal Computer (PC) with at least one network interface card (NIC) • Working copy of the new system generic software program on CD-ROM • Current <i>Metropolis[®] DMXpress Access Multiplexer Software Release Description</i> for the software generic being installed.
Safety precautions	There are no safety precautions required for this task.
Related information	For related information, see Chapter 2, “Operations Interfaces” in this document.
Before you begin	Before beginning the software installation procedure, complete the following steps: Preinstallation Steps 1. Become familiar with the characteristics and operating procedures of your PC and the operating system installed. If you are using multiple NICs, know the IP address of the NIC you will be using for this interface. <i>If you are using DHCP with multiple NICs, you may need to temporarily remove all NICs except the one you plan to use for this interface.</i> 2. Operate laptop PCs on AC power during download procedures. 3. Follow proper procedures in handling the CD-ROM. 4. Read the <i>Metropolis[®] DMXpress Access Multiplexer Software Release Description</i> for the software generic being installed.

Task Complete the following steps to install system software and the WaveStar® CIT software on your PC.

- 1 With the PC *not* connected to the Metropolis® DMXpress shelf, insert the CD-ROM into the PC.

Result: The CD autoruns and the following screen appears:

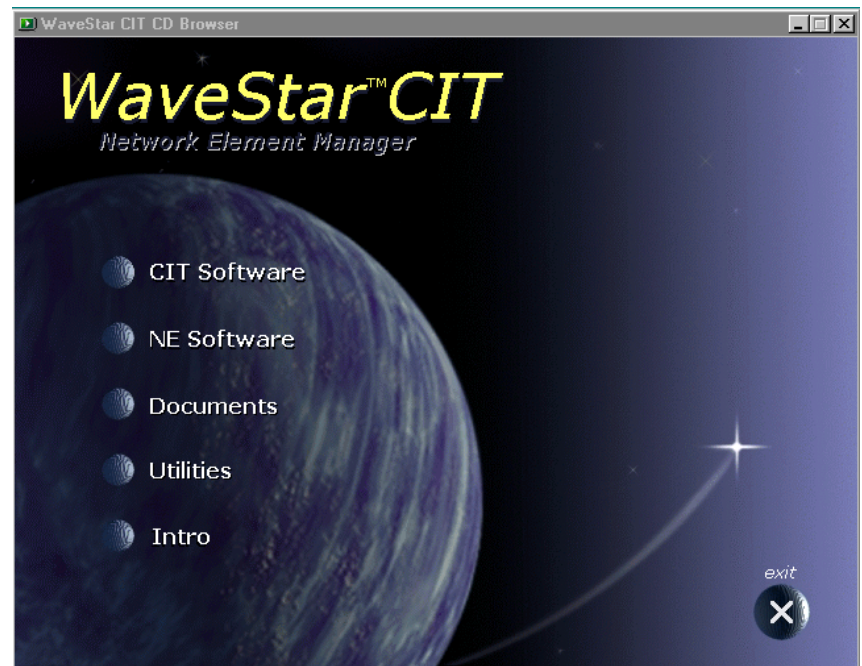


Important! If the CD-ROM does not autorun, verify that the CD is inserted properly in your CD-ROM drive.

1. Double-click on My Computer on your desktop.
2. Double-click on your Compact Disc icon (often identified as drive D:)
3. Double-click on setup.exe

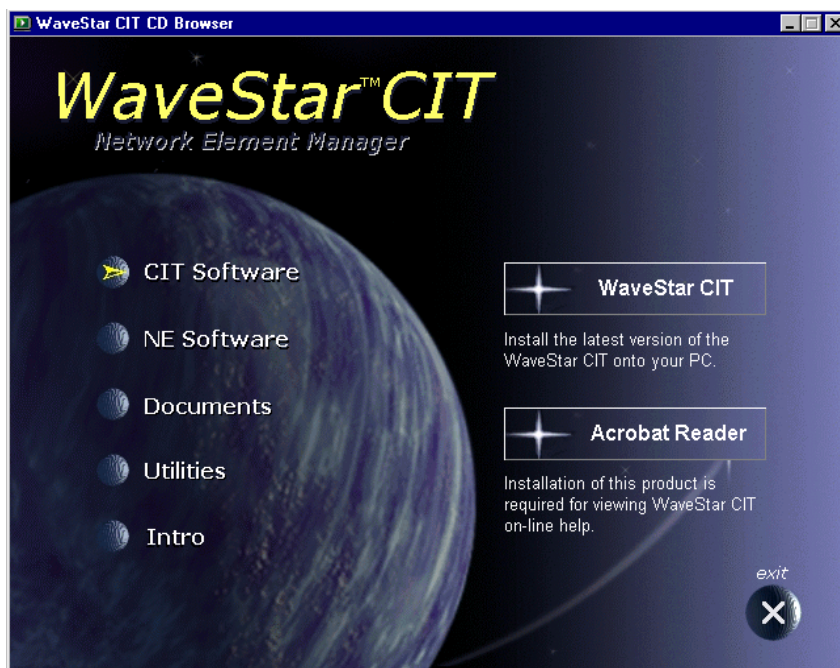
-
- 2 Click *continue*.

Result: The following screen appears:



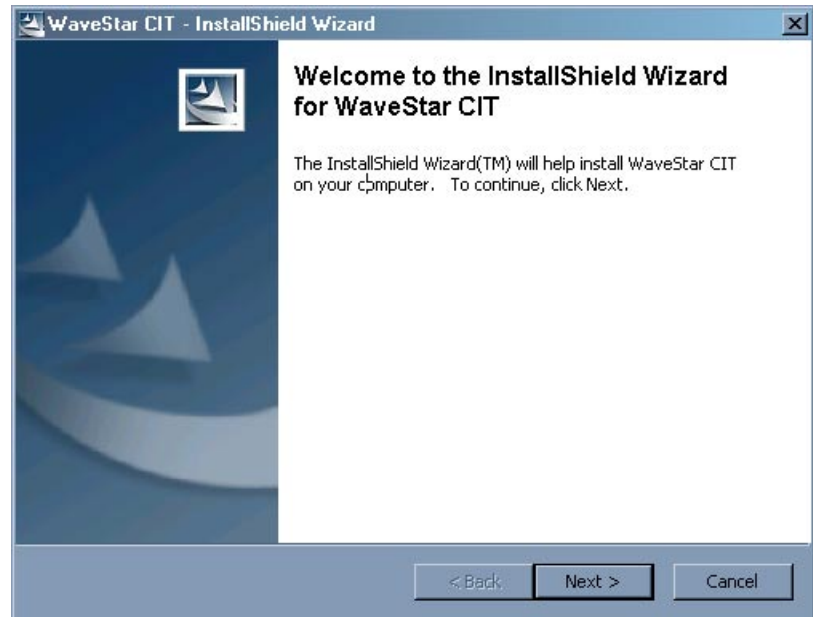
-
- 3 Click **CIT Software** to install the WaveStar® CIT software.

Result: The following screen appears:

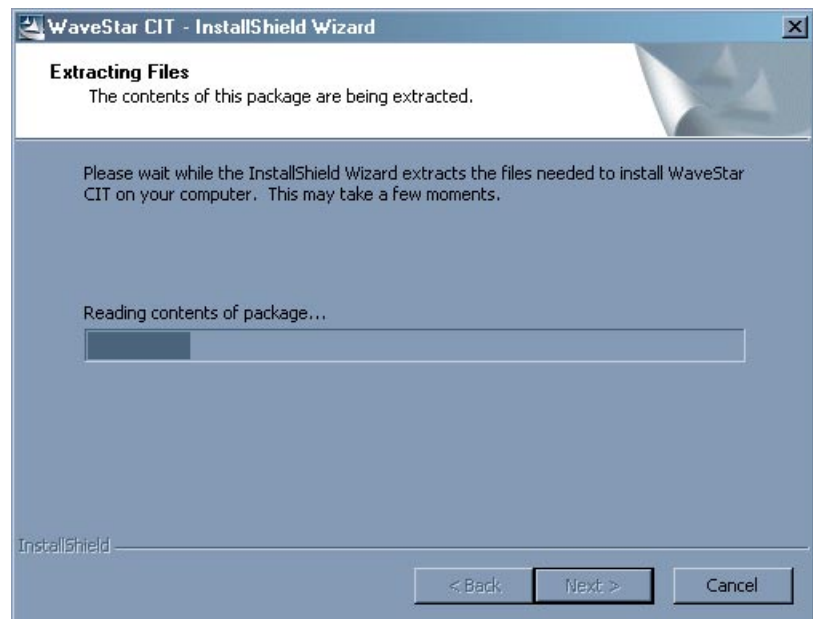


- 4 Click **WaveStar CIT** on the right.

Result: The InstallShield® Wizard appears.



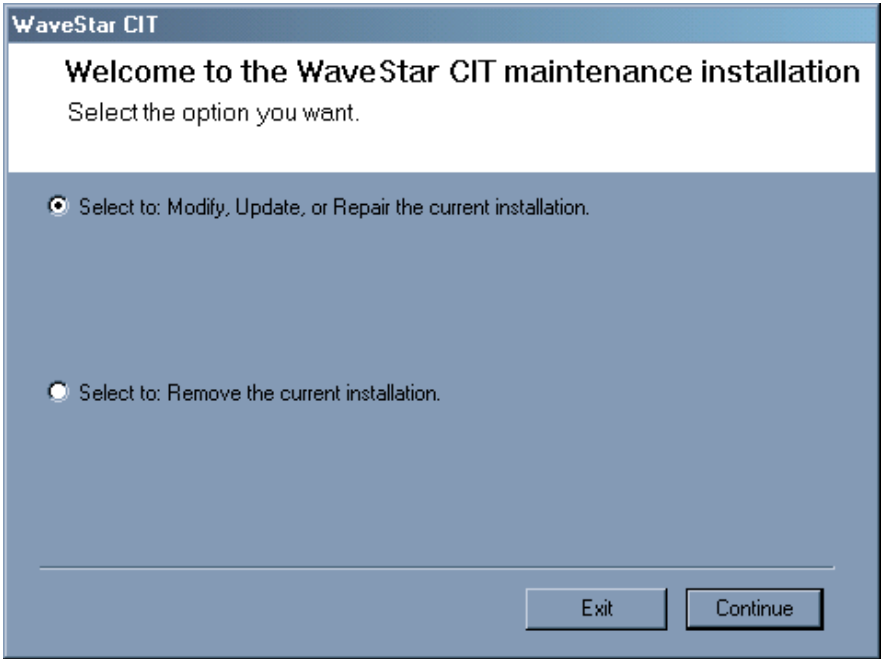
Click **Next** and the InstallShield Wizard begins extracting files.



-
- 5 Do you have a previous version of the WaveStar® CIT installed on your computer?

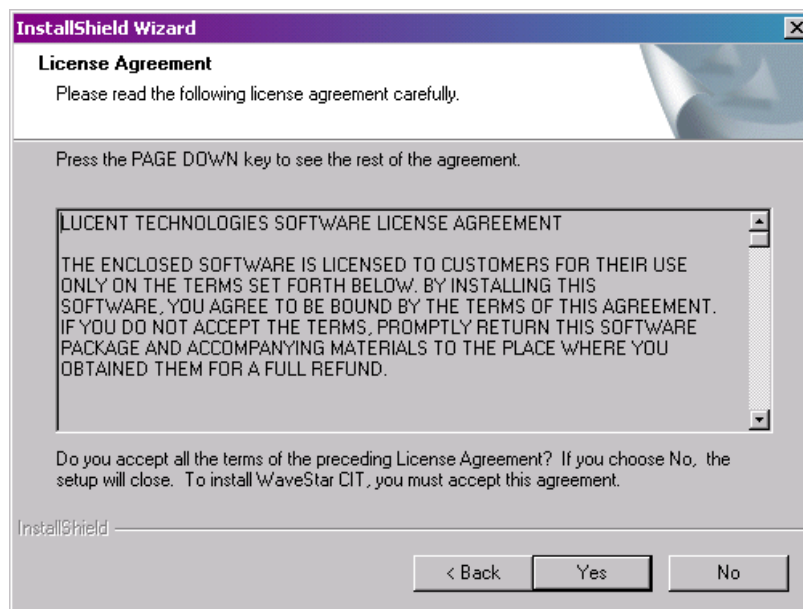
If...	Then...
Yes	Continue with Step 6 .
No	Proceed to Step 7 .

-
- 6 When the following screen appears, select *Select to: Modify, Update, or Repair the current installation* and click **Continue**.

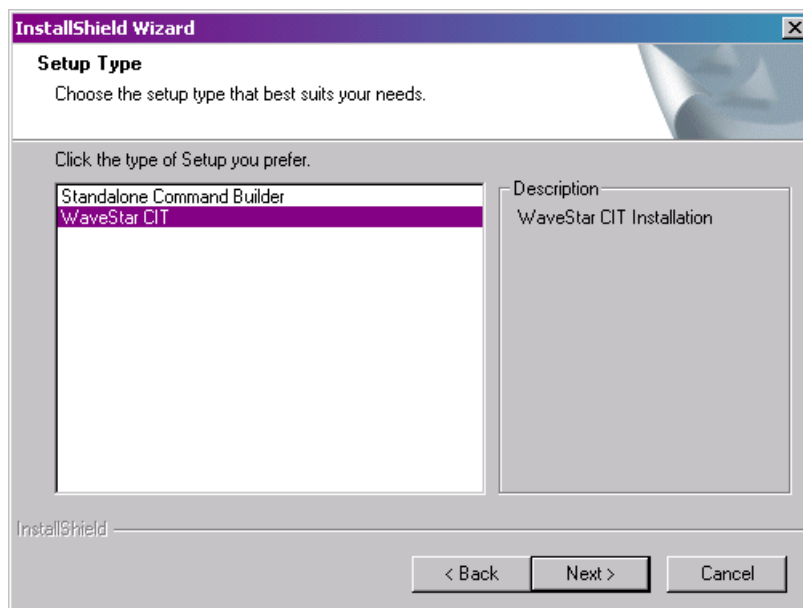


Proceed to [Step 9](#).

- 7 Follow the instructions on the different InstallShield® Wizard screens, including reading and agreeing to the License Agreements.



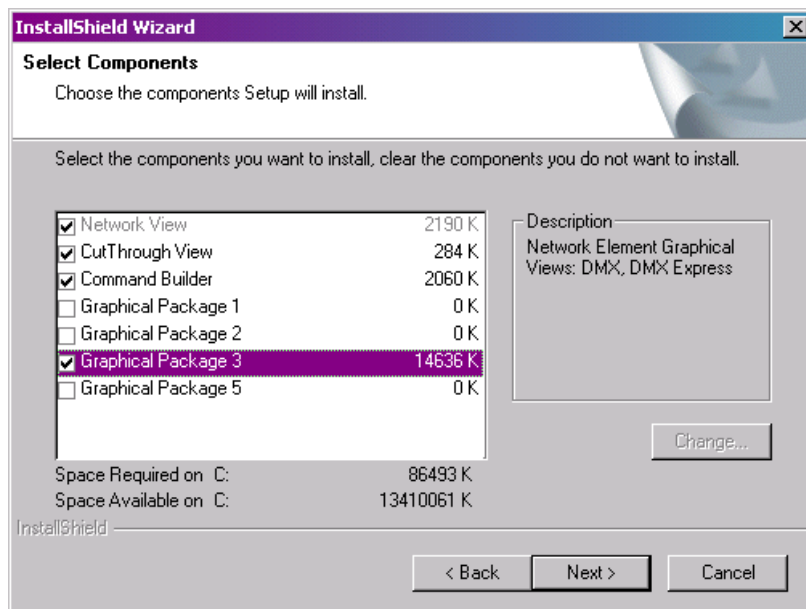
- 8 When the following screen appears, enter the type of installation you want. Select WaveStar CIT.



9 When this screen appears, select the following components to complete the WaveStar® CIT installation.

- Network View
- CutThrough View
- Command Builder
- Graphical Package 3

Important! In order to save valuable disc space, deselect **Graphical Package 1**, **Graphical Package 2**, and **Graphical Package 5** (unless you plan to use this WaveStar® CIT with the other products indicated under Description in the following screen).

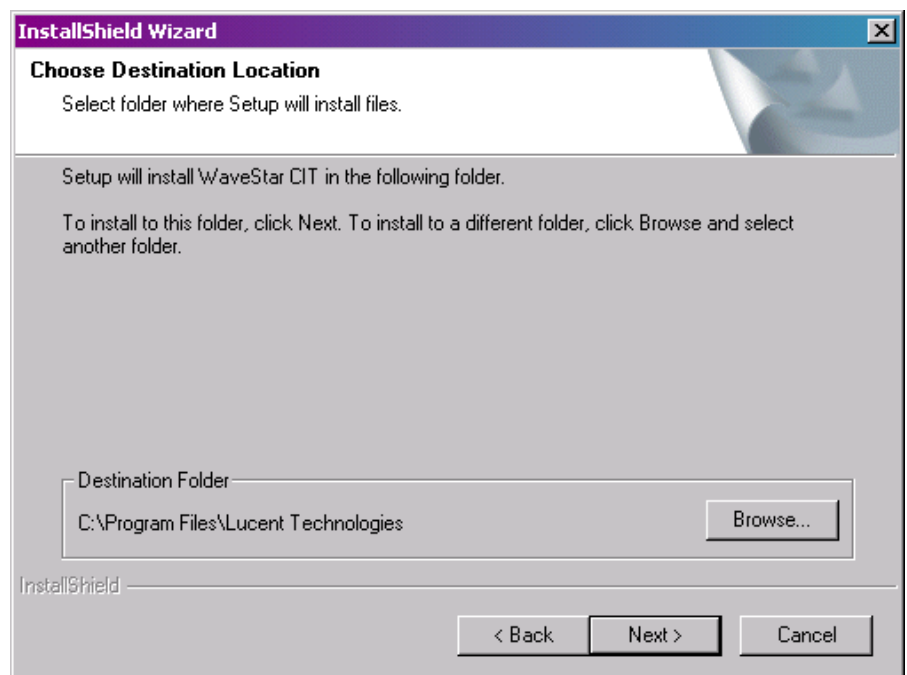


Important! If you have multiple NICs installed, you will be asked to select one in [Step 11](#).

.....

10 When the following screen appears, select where you want the WaveStar® CIT software installed on your PC.

- Select the default Destination Folder:
C:\Program Files\Lucent Technologies\
OR
- Click **Browse** and navigate to your desired directory.



Click **Next**.

Result: The InstallShield® Wizard installs the required files.

-
- 11 If you have more than one Network Card on your PC, select the card you wish to use to connect to the NE.

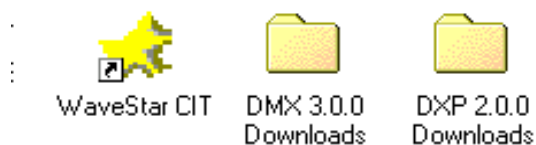
Result: The InstallShield® Wizard continues to install the required files. The following screen appears when the installation is completed.



-
- 12 Select *No, I will restart my computer later.* and click **Finish**.

Important! Before using your new WaveStar® CIT, you *MUST* reboot your computer. This task allows you to continue with the copying the NE software to the PC before rebooting.

Result: You will see the following additional icons on your desktop.



Important! If you had a previous version of Metropolis® DMXpress software on your PC, you may also have icons for those download releases.

-
- 13** Double click on the **DXP 2.0.0 Downloads** icon.

Result: The DXP 2.0.0 Downloads folder contains the following icons.



-
- 14** Return to the WaveStar CIT CD Browser window and click on **NE Software**.

Result: The following screen appears:



-
- 15** Click **NE Software (Copy the NE Software to the PC)** on the right.

Result: A “Copying files, please wait...” window appears. When the window closes, the software files are successfully copied into the following directories on your PC:

C:\Program Files\Lucent Technologies\WaveStar CIT\generics\dxp\2.0.0\p

This directory contains bundled software and is accessible by double-clicking on the DXP 2.0.0 icon that is found within the *DXP 2.0.0 Downloads* folder. (Refer to [Step 13](#) for an illustration of the icon.) This directory is used for initial R2.0.0 installations and upgrades from R1.0.x or R1.1.0.

-
- 16** On the WaveStar CIT CD Browser window, click **Exit**.

-
- 17** Restart your PC before using the new WaveStar® CIT.

.....

END OF STEPS





9 Circuit Order/Provisioning Tasks

Overview

Purpose The following tasks are for performing normal work items other than trouble clearing. They are intended to be used for initial system turn-up, establishing an end-to-end system, or establishing, adding, or discontinuing specific features.

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Task 364: Provision DCC Terminations	9 - 331



Task 300: Equip New Metropolis[®] DMXpress Access Multiplexer

Purpose Use this task to equip and test a new Metropolis[®] DMXpress system.

Important! This task assumes that all hardwired installation, mounting, and testing of the unequipped Metropolis[®] DMXpress has been done. It also assumes that the necessary AC or DC power is available for the shelf, and the power switch is set to OFF.

Required equipment The following equipment is required:

- Personal Computer (PC) with WaveStar[®] CIT software installed
- Wrist strap

Safety precautions To assure both personal safety and the proper functioning of Metropolis[®] DMXpress, it is imperative to review and understand these warnings and precautions prior to performing this task.



WARNING

Eye damage

Unterminated optical connectors may emit invisible laser radiation. Eye damage may occur if beam is viewed directly or with optical instruments. Avoid direct exposure to the beam.



CAUTION

Electrostatic discharge

Use a static ground wrist strap whenever handling circuit packs or working on a Metropolis[®] DMXpress to prevent electrostatic discharge damage to sensitive components. See “Electrostatic Discharge (ESD) Considerations” in “About this Information Product”.



CAUTION

Equipment damage

The OC-48 and OC-12 Main circuit packs must not be reseated, removed, or installed while power is applied to the system. The system must be powered down before the circuit pack is reseated, removed, or replaced.

When Metropolis® DMXpress is powered down, you must wait at least 10 seconds before switching the power on again. Rapid power-cycling may result in OLIU CP failed alarms.

Related information For related information, see the following:

- [Chapter 1, “Product Description”](#)
- [Chapter 3, “Provisioning, Security, & Administration”](#)
- [Appendix A, WaveStar® CIT Tutorial](#)

Before you begin Before you begin this task, verify that:

- A WaveStar® CIT is available, the CIT software has been installed, and you are familiar with the operation of the CIT.
- The required circuit packs are available.

Task Complete the following steps to equip a new Metropolis® DMXpress in a looped-back configuration.

- 1 Verify the proper AC or DC power is available.

Reference:

DC power: [“Task 407: Check -48 VDC Office Battery” \(10-41\)](#)

AC power: Use local procedures



CAUTION

Equipment damage

Power must be OFF before inserting the Main circuit pack. Damage to the Main circuit pack may occur if power is ON.

-
- 2** Ensure the Metropolis® DMXpress shelf ON/OFF power switch is in the *OFF* position before continuing. See [Figure 9-1](#) and [Figure 9-2](#).
-

- 3** Install the Main circuit pack in the Main Slot. See [Figure 9-3](#).

Important! On the Main circuit pack, verify/set the application option plug (P5) to the application (UPSR [default] or 0X1) used for this shelf. See [Figure 9-4](#).

Reference: “Task 339: Install OC48/1.3I2 (A1AA005), OC12/1.3I2 (A1AA016), or OC48 CHx/y (A1AA121-A1AA159) Main Circuit Pack” (9-233)

.....

- 4** Connect OC-48/OC-12 interface optical loopbacks.

Result: The CR LED goes off.

Reference: “Task 400: Connect OLIU Optical Loopbacks” (10-3)

.....

- 5** Connect WaveStar® CIT and establish session with the Metropolis® DMXpress.

Reference: “Task 200: Connect Personal Computer (PC) and Establish WaveStar® CIT Session” (8-3)

.....

- 6** From the **System View** menu, select **View > Timing/Sync > System Timing** and verify that the system Timing Source is set to Free Running.

The system Timing Source should be set to Free Running to avoid timing alarms before the end-to-end system is established. The Timing Source may be reset during end-to-end system configuration.

.....

7

If...	Then...
system Timing Source is set to Free Running,	Continue with Step 9 .

If...	Then...
system Timing Source is NOT set to Free Running,	Use the Configuration > Timing/Sync command to set system Timing Source to Free Running. Reference: “Task 204: Network Synchronization Provisioning” (8-23)

-
- 8** Install the OC-3 or OC-12 Low Speed OLIU circuit pack in the Option 1 Slot, if required.

Reference: “Task 321: Install Low-Speed OLIU Circuit Packs” (9-95)

.....

- 9** Install the DS1/DS3/16/1 TDM or DS3/12 DS3 circuit pack in the Option 1 Slot, if required.

Reference: “Task 338: Install DS1/DS3/16/1 (A1AA006) or DS3/12 (A1AA015) Circuit Pack” (9-231)

.....

- 10** Install GbE/2, GbE/SX/2, or FASTE/16 Ethernet circuit pack in the Option 2 Slot, as required.

Reference: “Task 336: Install GbE/2 (A1AA008), GbE/SX/2 (A1AA019), or FASTE/16 (A1AA007) Ethernet Circuit Packs” (9-227)

.....

- 11** Perform LED test.

Reference: “Task 203: Perform LED Test” (8-21)

.....

- 12** Perform local (looped back) transmission test, if required.

Important! This task assumes that the Metropolis® DMXpress high speed signals are looped back (manual optical OC-48/OC-12 interface loopback).

Reference:

“Task 401: Perform DS1 Transmission Test” (10-9)

“Task 402: Perform DS3 Transmission Test” (10-17)

.....

-
- 13** Perform local cross-connect wiring test (looped back), if required.

Important! This task assumes that the Metropolis® DMXpress has been connected to the low-speed DSX cross connect as required.

Reference:

[“Task 401: Perform DS1 Transmission Test” \(10-9\)](#)

[“Task 402: Perform DS3 Transmission Test” \(10-17\)](#)

.....

- 14** Check office alarm interface, if required.
-

- 15** Change system TID (NE name), as required.

Reference: [“Task 342: Set/Change System TID” \(9-247\)](#)

.....

- 16** Provision optional Metropolis® DMXpress parameters as required from work order or office records.

Reference: [Chapter 3, “Provisioning, Security, & Administration”](#)

.....

- 17** Establish the end-to-end Metropolis® DMXpress OC-48 or OC-12 UPSR ring connections.

Reference: [“Task 301: Establish End-to-End UPSR Ring Connections” \(9-15\)](#)

.....

END OF STEPS

.....

Figure 9-1 DC Enclosure Option Rear View

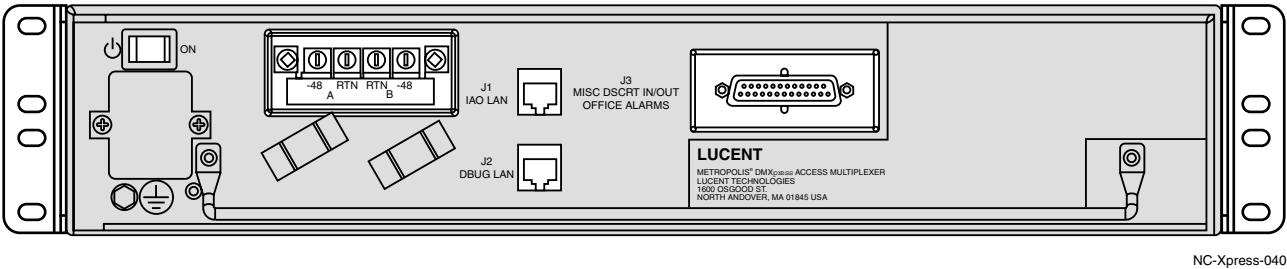


Figure 9-2 AC Enclosure Option Rear View

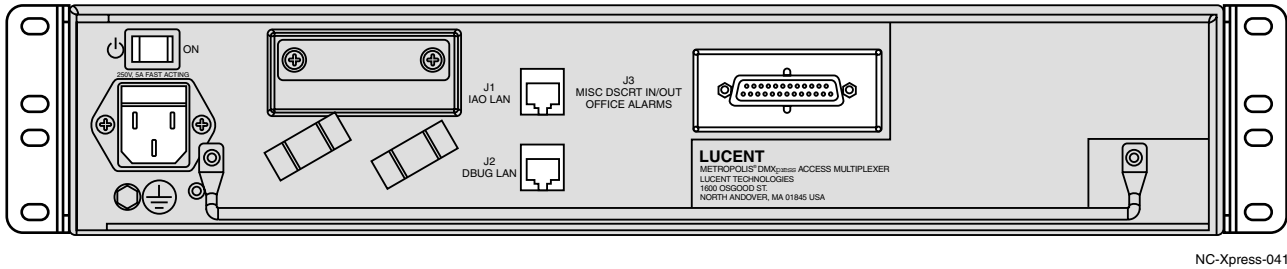


Figure 9-3 Metropolis® DMXpress Access Multiplexer Front View

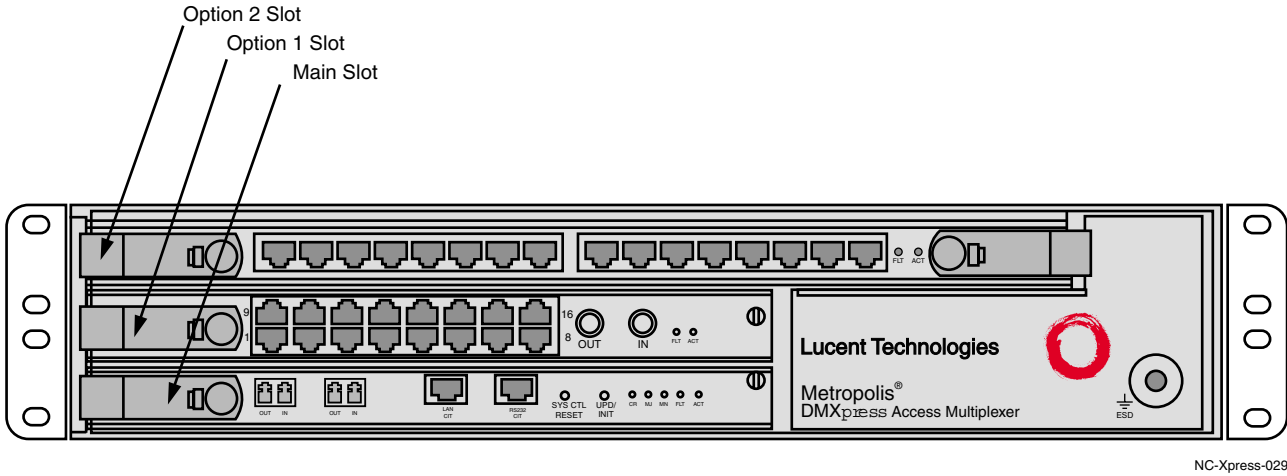
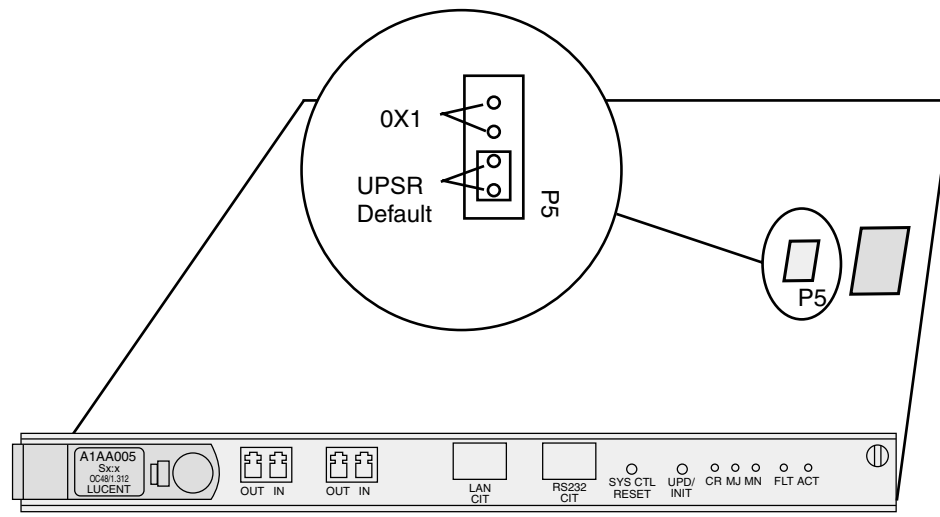


Figure 9-4 Main Circuit Pack Application Option Plug



nc-dmx-234

Task 301: Establish End-to-End UPSR Ring Connections

Purpose Use this task to establish the end-to-end OC-48/OC-12 UPSR optical spans.

Important! This task assumes that all Metropolis® DMXpress Access Multiplexer shelves have been equipped and tested. This task also assumes that all other interconnecting systems have been equipped and tested.

Required equipment The following equipment is required:

- Personal Computer (PC) with WaveStar® CIT software installed
- Wrist strap

Safety precautions To assure both personal safety and the proper functioning of Metropolis® DMXpress, it is imperative to review and understand these warnings and precautions prior to performing this task.



WARNING **Eye damage**

Unterminated optical connectors may emit invisible laser radiation. Eye damage may occur if beam is viewed directly or with optical instruments. Avoid direct exposure to the beam.



CAUTION **Electrostatic discharge**

Use a static ground wrist strap whenever handling circuit packs or working on a Metropolis® DMXpress to prevent electrostatic discharge damage to sensitive components. See “Electrostatic discharge” in “About this Information Product”.

- Related information
- For related information, see the following:
- Chapter 1, “Product Description”
 - Chapter 3, “Provisioning, Security, & Administration”

Task

Complete the following steps to establish the Metropolis® DMXpress OC-48/OC-12 UPSR optical links.

1

Connect PC and establish a WaveStar® CIT session.

Reference: “Task 200: Connect Personal Computer (PC) and Establish WaveStar® CIT Session” (8-3)

2

From the System View menu, select Configuration > DCC Terminations.

Result: The Provision DCC Terminations window opens.

3

Select the appropriate OC-48/OC-12 port from the Port AID: pull-down menu. Provision the DCC connection as needed. Perform this step at each end of the optical span being established.

Important! The LAPD Role parameters of network-side/user-side must be set opposite at each end of the optical span.

4

From the System View menu, select Configuration > DCC Terminations, under LAPD Role:, and Termination State: select the appropriate settings.

Important! The network side/user side parameters must be set opposite at each end of an optical span. The Metropolis® DMXpress default for Main 1 is user-side and Main 2 is network-side. The Termination State: should be set to enable.

Click OK and Yes to execute.

5

From the System View menu, select View > Timing/Sync.

Result: The View Timing Synchronization window opens.

-
- 6** Verify that the system timing source and parameters are set as specified in your work instructions.

Important! The system timing source may only be set to Free Running or Line timing. In most cases, Line timing should be selected. This parameter should be set to Free Running only if ALL the nodes in the ring are Metropolis® DMXpress nodes and this node is providing timing to all the other nodes.

.....

- 7** Are the timing parameters correct?

If...	Then...
Yes	Proceed to Step 10 .
No	Continue with Step 8 .

.....

- 8** If an NE is to be line timed, from the System View menu select **Configuration > Timing/Sync**.

In the **Provision Timing/Sync** window, set the following:

- **Timing Source:** to **Line**
 - **Mode Switching** to **Revertive**
 - **Synchronization Source** to **main-1-1**
 - **Synchronization Autoreconfiguration** to **Enabled**
-

- 9** Set the timing mode specified in the work order or office records.

Important! When sync autoreconfiguration is enabled, Sbyte is also enabled.

If Sbyte (sync messaging) is enabled at any node in the network, it must be enabled at all nodes in the network.

.....

- 10** From the **System View** menu, select **Administration > Set NE**.

Result: The Provision NE Defaults ... window opens.

-
- 11** From your work instructions, provision the NE as an Alarm Gateway (AGNE), if required, and assign the Alarm Group number as required.

Important! The Remote NE Status (rnestat) must be Enabled to designate this NE as an AGNE or to assign Alarm Group numbers. Repeat this step for all NEs in the ring that are part of the same alarm group.

-
- 12** Determine the optical loss of each optical span from office records or by making the required measurements.

-
- 13** At the near end, remove the optical connections and LBO from one of the OC-48/OC-12 interfaces (for example, Main 2) associated with the optical span being established. At the other end, remove the optical connections and LBO from the associated OC-48/OC-12 interface (for example, Main 1) in the optical span being established.

-
- 14** Perform optical fiber connections and verification of the integrity of the optical span being established.

Reference: “Task 403: Perform Connection and Verification of Optical Facility” (10-25)

-
- 15** To designate the NSAPAREA field, from the **System View** menu select **Administration > Data Communications**. Click on the **Network Layer** tab and then click **Modify**. Enter the appropriate NSAP numbers.

-
- 16** Perform end-to-end OC-48/OC-12 line test.

Reference: “Task 404: Perform End-to-End Optical Line Test on Main OLIU” (10-35)

.....
17 The network is now ready for initial service to be established.

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



Task 302: Add New Metropolis[®] DMXpress Node (Shelf) to Path Switched Ring

Purpose Use this task to add a new Metropolis[®] DMXpress node to an OC-48 or OC-12 path switched rings.

Important! This task assumes that Metropolis[®] DMXpress has been equipped and passed the looped transmission test, and that the proper release of software has been loaded.

Required equipment The following equipment is required:

- Personal computer (PC) with WaveStar[®] CIT software installed
- Wrist Strap
- Optical power meter
- Note pad

Safety precautions To assure both personal safety and the proper functioning of Metropolis[®] DMXpress, it is imperative to review and understand these warnings and precautions prior to performing this task.



WARNING **Eye damage**

Unterminated optical connectors may emit invisible laser radiation. Eye damage may occur if beam is viewed directly or with optical instruments. Avoid direct exposure to the beam.



CAUTION **Electrostatic discharge**

Use a static ground wrist strap whenever handling circuit packs or working on a system to prevent electrostatic discharge damage to sensitive components. See “Electrostatic discharge” in “About this Information Product”.

Related information

For related information, see the following:

- Chapter 1, “Product Description”
- Metropolis® DMXpress Access Multiplexer TL1 Command Manual, 365-372-313

Before you begin

Before you begin this task, verify that the WaveStar® CIT program is available.

Task

Important! Technicians must communicate with technicians at each location on the ring.

Complete the following steps to add a new Metropolis® DMXpress node to the Metropolis® DMXpress path switched ring. Observe [Figure 9-5](#) before beginning and refer to it as an example for the following steps.

- 1
- Establish a WaveStar® CIT session to the node to be added and the 2 nodes that will be neighbors to the new node. In our example it would be NE1, NE2, and the new node NE5.

Reference: “[Task 200: Connect Personal Computer \(PC\) and Establish WaveStar® CIT Session](#)” (8-3)

- 2
- To verify that no alarms are present at the two nodes already in the ring (Example NE1, and NE2). Click on **Alarm List** in the top right corner of the **System View**.

To verify that no locks, loops, or switches are present, from the **System View** menu, select **View > View Rolling Events**. Under the line reading **RTRV-COND-ALL:node name::40** any locks, loops, or switches are displayed.

Important! Notify the maintenance center that alarms will be generated and transmission hits will be experienced.

-
- 3 Determine from either the Network Operations Center (NOC) or a work order, all the nodes in the existing ring or network. At one of the nodes adjacent to the new node (in our example NE1 or NE2), verify all the NEs in the ring or network by selecting: **Administration > OSI Routing Map**.

Verify through the NOC, all existing cross-connects that exist on the adjacent NEs to where the new NE will be located. Also, note the cross-connect rate (STS1, STS3, etc.). These will be pass-throughs from the new NE. Enter the pass-through cross-connects into the new NE using the **Configuration > Cross-Connect > Create New Cross Connection > 2-way point-to-point through** from the **System View** menu.

The work order or NOC should be able to determine the synchronization for the new NE. If no external timing is present, view the synchronization of the adjacent NEs to determine the direction of the line timing. Configure the new NE the same way using **Configuration > Timing/Sync** and select the **System Timing** tab from the **System View** menu. If externally timed, provision according to the work order. Refer to “[Task 204: Network Synchronization Provisioning](#)” (8-23).

Important! Note the NEs.

.....

- 4 Verify that no duplicate TID settings exist between the network and the new node that you are adding. If duplicates exist, determine new settings and at new node. Select **Administration > Set TID** from the **System View** menu, and enter new TID settings.

Important! Two or more shelves in the same network cannot have the same system name or TID.

.....

- 5 It will be necessary to sketch a ring map. Use the following procedure to sketch a network map similar to the one in [Figure 9-5](#):

At the adjacent node (NE1), select **Administration > OSI Neighbor Map** and note the NEs connected to **main-1-1** and **main-2-1**.

Repeat until a ring map similar to [Figure 9-5](#) can be sketched.

-
- 6 At one of the adjacent nodes (NE1 or NE2) select **View > Cross-Connections**, double click on **CP main-1 (OC-n)** then double click on **Port 1 (OCn)**. Note all Src VT1.5, STS1, STS3, or STS12 cross connections.

Important! The NE must be a Metropolis® DMXpress

.....

- 7 At the new node (NE5), enter pass-through cross-connections for all **Src** VT1.5, STS1, STS3, or STS12 cross-connections noted in previous step. From the System View, select **Configuration > Cross-Connection** and use the Cross Connection Wizard to enter the **2-Way Point-to-Point, Through** cross-connections required.
-

- 8 The new NE will be line timed. From the System View select **Configuration > Timing/Sync**. Set the following parameters

Timing Mode	Line
Mode Switching	Revertive
Synchronization Autoreconfiguration	Enabled
Synchronization Source	main-1-1

Click on **Apply**.

.....

- 9 Change the NE settings for the new node (NE5) to match the adjacent nodes. At one of the adjacent nodes (NE1 or NE2), from the System View select **Administration > Set NE**. From the **Provision NE Defaults** window, note the settings and use them to provision the new node (NE5).

Important! Do not set the new node to **AGNE**

.....

- 10 To add the new node (NE5) refer to the example in [Figure 9-5](#)

Reference: “[Task 403: Perform Connection and Verification of Optical Facility](#)” (10-25)

Adding the new node is a four step process. Connecting each adjacent node to the new node and adjusting the LBOs for the new node to each adjacent node.

1. Reconnect one adjacent node to M1 of the new node.

At NE1 (for example) move the fiber drop from Main-1 OUT from the LGX appearance for NE2, to the LGX appearance for NE5.

Important! There will be transmission hits when the fiber is disconnected.

2. Measure and adjust power to M1 of the new node from first adjacent node.

At the new node, measure the power to Main-2 IN. If required, insert the proper LBO in Main-1 OUT of NE1 and connect the fiber drop to the LBO. Click on Alarm list and verify that and inc. OC-N LOS alarm is not present for main-1. Connect the fiber drop to Main-2 OUT.

3. Move fiber from the second adjacent node to M2 the new node.

At the other adjacent node (NE2 in our example) disconnect the fiber drop from Main-1 IN. On the LGX, move the fiber drop for Main-2 IN, from the LGX appearance for NE1 to the LGX appearance for the new node.

Important! There will be transmission hits when fiber is disconnected.

4. Measure and adjust power into M2 of the new node.

Measure the power on the fiber drop to Main-2 IN. If required, replace the LBO in Main-1 IN and connect the fiber drop to the LBO. Verify that the flashing red LED on the main circuit pack stops flashing. On the LGX, move the fiber drop from Main-2 OUT from the LGX appearance for NE1 to the LGX appearance for the new node.

-
- 11 At new node, select **Administration > OSI Neighbor Map** from the System View. The new node should be connected to the two adjacent nodes (NE1 and NE2 in figure) via main-1-1 and main-2-1.

If they are not listed correctly, go to the System View and select **Configuration > DCC Terminations**. Verify or set:

Termination State	dcc-m1-1	enabled
	dcc-m2-1	enabled
LAPD Role	dcc-m1-1	user-side
	dcc-m2-1	network-side

-
- 12** Verify that there are no alarms on the new NE as well as the adjacent NEs. Click on **Alarm List** from the System View screen.

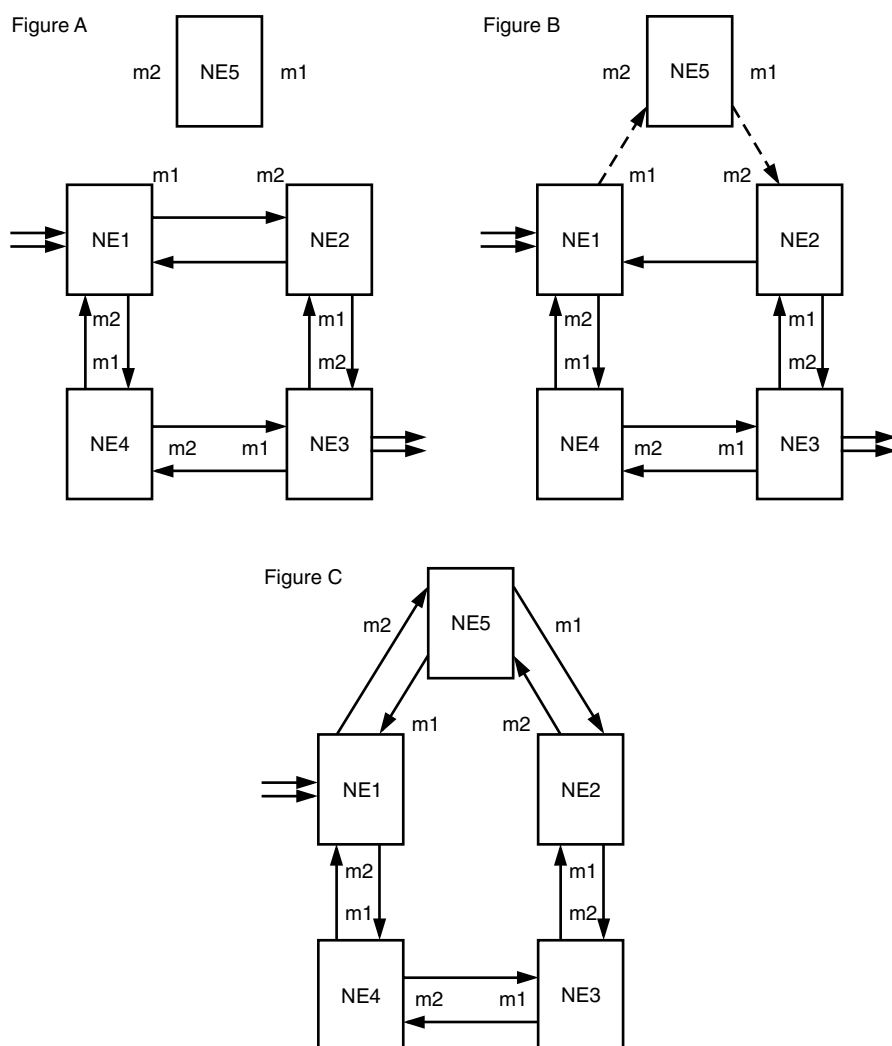
Important! If inc. VT AIS or inc. STSn AIS alarms are present and there is no inc. OCN LOS alarm, check that all pass-through cross-connections have been properly made using **View > Cross-Connects**. See [Step 6](#) and [Step 7](#).

.....

- 13** To determine the NSAPAREA for the new node, at the adjacent NE (NE1 in figure), select **Administration > Data Communications**. Click on the **Network Layer** tab and note the **Routing Capability**.
-

- 14** At the new NE select **Administration > Data Communications**. Click on **Network Layer** tab and set the **Routing Capability** to match the previous step.

Figure 9-5 Example of Adding a Node



NC-Xpress-069

Figure A shows where NE5 is going to be added to the ring. Figure B shows the removal of ring 2 from NE1 to NE2 and shows the transmission on one ring being restored through NE5. Figure C now has traffic flowing through NE5 in both directions.

END OF STEPS



Task 303: Discontinue Metropolis[®] DMXpress Node (Shelf) from a Path Switched Ring

Purpose Use this task to discontinue a Metropolis[®] DMXpress node from an OC-48 or OC-12 path switched ring.

Required equipment The following equipment is required:

- Personal Computer (PC) with WaveStar[®] CIT software installed
- Wrist Strap
- Optical power meter

Important! Technicians at each location should be able to communicate with each other.

Safety precautions To assure both personal safety and the proper functioning of Metropolis[®] DMXpress, it is imperative to review and understand these warnings and precautions prior to performing this task.



WARNING **Eye damage**

Unterminated optical connectors may emit invisible laser radiation. Eye damage may occur if beam is viewed directly or with optical instruments. Avoid direct exposure to the beam.



CAUTION **Electrostatic discharge**

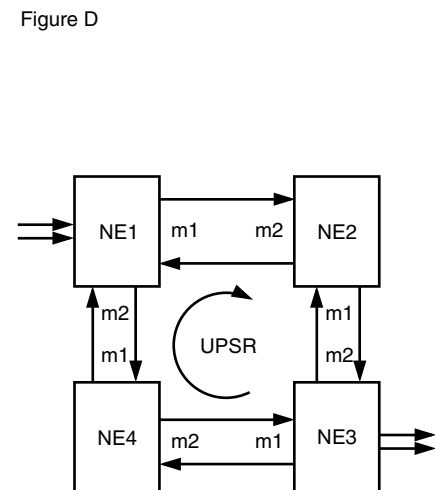
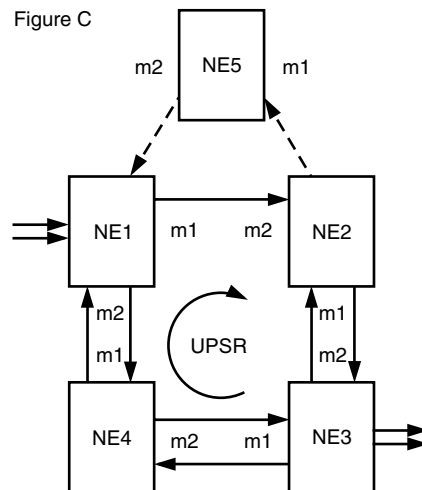
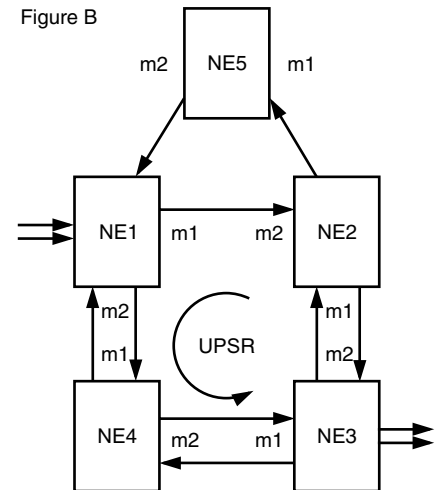
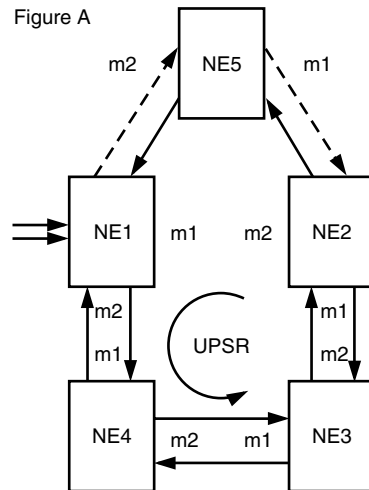
Use a static ground wrist strap whenever handling circuit packs or working on a system to prevent electrostatic discharge damage to sensitive components. See “Electrostatic discharge” in “About this Information Product”.

Related information For related information, see [Chapter 2, “Operations Interfaces”](#) in this document.

Before you begin

Before you begin this task, verify that the WaveStar® CIT program is available.

Review this drawing before continuing. The references to NEs in this procedure use this graphic as an example.



NC-Xpress-078

Task Complete the following steps to discontinue a Metropolis® DMXpress node from the Metropolis® DMXpress path switched ring.

- 1 Connect the PC and establish a WaveStar® CIT session.

Reference: “Task 200: Connect Personal Computer (PC) and Establish WaveStar® CIT Session” (8-3)

-
- 2 Click the **Alarm List** button to verify that no alarms, locks, loops, or switches are present

Important! To retrieve a map of the SONET network use the menu **Administration > OSI Routing Map** and **Administration > OSI Neighbor Map**. The WaveStar® CIT may be used to retrieve the VT1.5 (DS1) and STS-1 (DS3) cross connections within the Metropolis® DMXpress system. From the **System View** menu select **View > Cross Connections**, then select the shelf.

.....

- 3 Determine which Metropolis® DMXpress node (shelf) is being discontinued.
-

- 4 Verify that the optical loss budget will not be exceeded by removing this node.
-

- 5 For external timed rings, if necessary, reconfigure the timing of the network. From the **System View** menu select **Configuration > Timing/ Sync**.
-

- 6 At the shelf being discontinued and all associated terminating shelves and extensions, ensure service (signals) had been removed from the Function Units groups being discontinued. From the **System View** menu, use **View > Cross-connects** to verify that there are no add/drop connections

Reference: “[Task 307: Discontinue End-to-End DS1 Service](#)” (9-41)

“[Task 311: Discontinue End-to-End DS3 Service](#)” (9-61)

.....

- 7 Is the AGNE being discontinued an AGNE?

If	Then
No	Go to Step 9
Yes	Go to Step 8

-
- 8 An existing NE should be designated as the AGNE. From the System View of the designated NE, select **Administration > Set NE**. In the **Provision NE** window, set **Remote NE Status** to **Disabled** and click **OK**.

Now you can disable the AGNE in the NE to be removed. From the System View select **Administration > Set NE**. In the **Provision NE** window, set **Remote NE Status** to **Disabled** and click **OK**.

.....

- 9 At the NE being removed, click on **Administration > OSI Neighbor Map** and note the NEs connected to main-1-1 and main-2-1.

Important! The NE connected to main-1-1 is NE1 in the example in and the NE connected to main-2-1 is NE2.

.....

- 10 At the NE being removed (Example, NE5), remove the fiber drop from Main-1 OUT (connects to NE 2 Main-2 IN), and the fiber drop from Main-2 IN (connected to NE1 Main-1 OUT).

Important! When the fiber drops are removed there will be transmission hits.

.....

- 11 At the LGX, move the fiber drop from Main-1 OUT of NE1 to Main-1 OUT of NE2.
-

- 12 At NE2 disconnect the fiber drop from Main-2 IN. On the LGX move the fiber drop for Main-2 IN, from the LGX appearance for NE5 to the LGX appearance for NE1. Measure the power on the fiber drop to Main-2 IN. If required replace the LBO in Main-2 IN and connect the fiber drop to the LBO. Verify that the flashing red LED on the main circuit pack stops flashing.
-

- 13 At NE5 remove the fiber drop from Main-2 OUT (connects to NE1 Main-1 IN) and the fiber drop from Main-1 IN (connects to NE2 Main-1 OUT).

Important! When the fiber drop is removed, there will be transmission hits.

.....

-
- 14** At NE2 move the fiber drop from Main-2 OUT from the LGX appearance for NE5 to the LGX appearance for NE1.
-

- 15** At NE1, disconnect the fiber drop from Main-1 IN. On the LGX move the fiber drop for Main-1 IN, from the LGX appearance for the NE5 to the LGX appearance for NE1. Measure the power on the fiber drop to Main-1 IN. If required, replace the LBO in Main-1 IN and connect the fiber drop to the LBO.

Verify that the flashing red LED on the main circuit pack stops flashing.

.....

- 16** Is the removed shelf to be powered down?

If...	Then...
Yes	Power down the shelf per local procedures and remove circuit packs (if required), then proceed to Step 20 .
No	Continue with Step 17 .

-
- 17** Connect optical loops to any OLIU circuit packs.

Reference: “[Task 400: Connect OLIU Optical Loopbacks](#)” (10-3)

.....

- 18** If any circuit packs were removed, update the internal equipment list. From the System View menu select **Configuration > Update System**.
-

- 19** Verify that all alarms clear.
-

- 20** The Metropolis® DMXpress node is now removed from the Metropolis® DMXpress path switched ring.

.....

END OF STEPS

.....



Task 304: Establish DS1 Service

Purpose Use this task to establish DS1 service.

Important! This task assumes that the Metropolis® DMXpress Access Multiplexer has been equipped, tested, and the network has been established (all nodes of the network have been equipped and installed).

Required equipment The following equipment is required:

The following equipment is required:

- Personal Computer (PC) with WaveStar® CIT software installed
- Wrist strap

Safety precautions To assure both personal safety and the proper functioning of Metropolis® DMXpress it is imperative to review and understand these warnings and precautions prior to performing this task.



CAUTION

Electrostatic discharge

Use a static ground wrist strap whenever handling circuit packs or working on a Metropolis® DMXpress to prevent electrostatic discharge damage to sensitive components. See “Electrostatic discharge” in “About this Information Product”.

Related information For related information, see [Chapter 3, “Provisioning, Security, & Administration”](#)

Before you begin Before you begin this task, verify that you have the work instructions that state the DS1 ports, DS1 port parameters and required cross-connections.

Task Complete the following steps to establish DS1 service.

-
- 1 Connect the PC and establish a WaveStar® CIT session.

Reference: “Task 200: Connect Personal Computer (PC) and Establish WaveStar® CIT Session” (8-3)

.....

- 2 Verify that no alarms are activated. Click on the **Alarm List** button. If any alarms are activated they must be cleared prior to beginning this task.

Reference: *Metropolis® DMXpress Access Multiplexer Alarm Messages and Trouble Clearing Guide, 365-372-315*

.....

- 3 From the **System View** menu, verify that the DS1/DS3/16/1 circuit pack has been installed at each Metropolis® DMXpress terminating end. Also, verify that the necessary circuit packs and ports are available and provisioned at other equipment terminating ends.
-

- 4 If the DS1/DS3/16/1 circuit pack has not been installed, install circuit pack, as required.

Reference: “Task 338: Install DS1/DS3/16/1 (A1AA006) or DS3/12 (A1AA015) Circuit Pack” (9-231)

.....

- 5 At the DS1 terminating node(s) of the circuit being established, determine which DS1 port(s) is being used and the DS1 port parameters.
-

- 6 From the **System View** menu at each DS1 terminating NE equipped with a DS1/DS3/16/1 circuit pack, select **Configuration > Provision**. Double-click on **CP fn-a-1 (16 DS1)**. Click on **VT Group n** (n = 1 to 4) and click on **Port n-x** (n = 1 to 4).

Or, right-click on one of the four DS1 groups, right-click on **DS1 Port n-x**, and right-click on **Provision Port n-x**

Result: The Port AID window opens.

.....

7 From your work instructions, set and verify the parameters of the DS1 port of the circuit being established, then click **Apply** to make your changes.

.....

8 At each DS1 terminating node, verify the appropriate cable connection(s) have been made to the DS1 cross-connect point(s) or equivalent connection point(s) for the circuit being established.

.....

9 Verify that no alarms are activated. Click on the **Alarm List** button. If any alarms are activated, follow the appropriate trouble-clearing task.

Reference: *Metropolis® DMXpress Access Multiplexer Alarm Messages and Trouble Clearing Guide, 365-372-315*

.....

10 Determine the necessary cross-connections for each node from your work instructions.

.....

11 Make the necessary pass through and add/drop VT1.5/STS-1 cross-connections at each node in the network.

Reference: [“Task 317: Make VT1.5 \(DS1\) or STS1 \(DS3\) Cross-Connections Single OC-48/OC-12 Ring Configuration” \(9-69\)](#)

.....

12 Perform DS1 end-to-end transmission test for each circuit being put into service, as required.

Reference: [“Task 401: Perform DS1 Transmission Test” \(10-9\)](#)

-
- 13** Set/verify the port state of the DS1 ports of the circuit being established. From the **System View** menu at each terminating node, select **Configuration > Provision**, then select the port. Under DS1 Primary State, set/verify the Port Mode to *Not Monitored* or *Automatic*.

Important! If the Port Mode is *Not Monitored*, the signal is not monitored or alarmed and the port will not automatically go to the *in service* state when a signal is detected. If the Port Mode is set to *Automatic*, the port will automatically go to the *in service* state when a signal is detected. The Port Mode must be set to *Automatic* to turn on monitoring of signal failures.

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



Task 305 and 306: Reserved for Future Use

.....

Task 307: Discontinue End-to-End DS1 Service

Purpose Use this task to discontinue end-to-end DS1 service.

Important! This task assumes that the system is in service and that DS1 port(s) are being discontinued.

Required equipment The following equipment is required:

- Personal Computer (PC) with WaveStar® CIT software installed
- Wrist Strap

Safety precautions To assure both personal safety and the proper functioning of Metropolis® DMXpress, it is imperative to review and understand these warnings and precautions prior to performing this task.



CAUTION

Electrostatic discharge

Use a static ground wrist strap whenever handling circuit packs or working on a system to prevent electrostatic discharge damage to sensitive components. See “Electrostatic discharge” in “About this Information Product”.

Related information For related information, see the following:

- [Chapter 1, “Product Description”](#)
- *Metropolis® DMXpress Access Multiplexer TL1 Command Manual, 365-372-313*

Before you begin Before you begin this task, verify that the WaveStar® CIT program is available.

Task Complete the following steps to discontinue DS1 service.

-
- 1** Connect the PC and establish a WaveStar® CIT session.

Reference: “Task 200: Connect Personal Computer (PC) and Establish WaveStar® CIT Session” (8-3)

.....

- 2** Determine which DS1 ports are to be discontinued. Click on the **Alarm List** button. If any LEDs or alarms are activated, they must be cleared prior to beginning this task.

Reference: *Metropolis® DMXpress Access Multiplexer Alarm Messages and Trouble Clearing Guide, 365-372-315*

.....

- 3** At the DSX-1 at the DS1 terminating nodes, remove the DS1 signals associated with the port(s) being discontinued.

Important! This step may activate the office critical, major, minor, or no alarm.

Result: FLT LEDs begin flashing on the DS1/DS3/16/1 circuit pack with signals removed.

.....

- 4** Clear the DS1 LOS alarm. Momentarily depress the UPD/INIT push-button on the Main circuit pack or from the **System View** menu select **Configuration > Update System**.

Result: Flashing FLT LEDs go off.

.....

- 5** Verify that the port has been changed correctly.

From the **System View** menu select **View > View Equipment Details**, then navigate down the tree to the port:

1. Expand **CP fn-a-1 (ds1)**
2. Expand **VT Group #**
3. Select the **Port #-# (ds1)**

Under **Port Data/Fault**, the **Port Mode** should be **Automatic**.

.....

6 Determine the cross-connections for the circuit being discontinued.

Use the work order, or From the System View menu select **View > Cross Connections**, then navigate down the tree to the port.

Select **CP fn-a-1 (ds1)**.

Take note of the **SRC** addresses to be deleted.

Close view.

.....

7 Delete the terminating (drop) node cross-connections for all DS1 service being removed.

From the System View menu select **Configuration > Cross Connection**, then use the Cross Connection Wizard to remove the cross connections.

Important! DS1 slots cannot be unequipped without an alarm until all port cross-connections are removed.

.....

8 Delete the pass-through cross-connections at each nonterminating node for all DS1 service being removed.

From the System View menu select **Configuration > Cross Connection**, then use the Cross Connection Wizard to remove the cross connections.

.....

9 If the DS3 and all sixteen (16) DS1 ports on the DS1/DS3/16/1 circuit pack have been discontinued, you may remove the circuit pack, if required.

.....

10 Have circuit packs been removed?

If...	Then...
Yes	Continue with Step 11 .
No	Proceed to Step 13 .

-
- 11** If circuit packs have been removed, update the internal equipment list. Momentarily depress the UPD/INIT push-button on the Main circuit pack, or From the System View menu select **Configuration > Update System**.
- Click **Yes**.
-
- 12** Insert appropriate application blank(s) into the empty slot, then proceed to [Step 14](#).

-
- 13** If circuit packs have not been removed, set the port mode of the DS1 port(s) to **Automatic** or **Not Monitored**, as required.

From the System View menu select **Configuration > Provision**, then navigate down the tree to the port.

- Expand **CP fn-a-1 (ds1)**
- Select **VT Group #**
- Select **Port #-# (ds1)**
- Click **Provision**.

Under **DS1 Primary State**, you can set the **Port Mode** to **Automatic** or **Not Monitored**,

Important! If the Port Mode is *Not Monitored*, the signal is not monitored or alarmed. The port will not automatically go to the *in service* state when a signal is detected as it will if the Port Mode is set to *Automatic*. The Port Mode must be set to *Automatic* to turn on monitoring of signal failures.

-
- 14** Verify that no alarms are present. Click on the **Alarm List** button.

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



Task 308: Establish DS3 Service

Purpose Use this task to establish DS3 service.

Important! This task assumes that the Metropolis® DMXpress Access Multiplexer has been equipped, tested, and the network has been established (all nodes of the network have been equipped and installed).

Required equipment The following equipment is required:

- Personal Computer (PC) with WaveStar® CIT software installed
- Wrist strap

Safety precautions To assure both personal safety and the proper functioning of Metropolis® DMXpress, it is imperative to review and understand these warnings and precautions prior to performing this task.



CAUTION

Electrostatic discharge

Use a static ground wrist strap whenever handling circuit packs or working on a Metropolis® DMXpress to prevent electrostatic discharge damage to sensitive components. See “Electrostatic discharge” in “About this Information Product”.

Related information For related information, see [Chapter 3, “Provisioning, Security, & Administration”](#).

Before you begin Before you begin this task, verify that you have the work instructions that state the DS3 port parameters and required cross-connections.

Task Complete the following steps to establish DS3 service.

-
- 1 Connect the PC and establish a WaveStar® CIT session.

Reference: “Task 200: Connect Personal Computer (PC) and Establish WaveStar® CIT Session” (8-3)

.....

- 2 Verify that no alarms are activated. Click on the **Alarm List** button. If any alarms are activated they must be cleared prior to beginning this task.

Reference: *Metropolis® DMXpress Access Multiplexer Alarm Messages and Trouble Clearing Guide, 365-372-315*

.....

- 3 From the **System View** menu, verify that the DS1/DS3/16/1 or DS3/12 circuit pack has been installed at each Metropolis® DMXpress terminating end. Also, verify that the necessary circuit packs and ports are available and provisioned at other equipment terminating ends.
-

- 4 If the DS1/DS3/16/1 or DS3/12 circuit pack has not been installed, install circuit pack, as required.

Reference: “Task 338: Install DS1/DS3/16/1 (A1AA006) or DS3/12 (A1AA015) Circuit Pack” (9-231)

.....

- 5 At the DS3 terminating node(s) of the circuit being established, determine the DS3 port parameters.
-

- 6 From the **System View** menu at each DS3 terminating node equipped with a DS3/12 circuit pack. Select **Configuration > Provision** and then click on CP growth-2 (DS3/12) and then on Port n (DS3) (n = 1 to 12).

Or, right-click on the DS3/12 circuit pack port and select **Provision Port**.

Result: The Port AID window opens.

-
- 7** From your work instructions, set and verify the parameters of the DS3 port of the circuit being established, then click **Apply** to make your changes.
-

- 8** From the System View menu at each DS3 terminating node equipped with a DS1/DS3/16/1 circuit pack. Select **Configuration > Provision** and click on **CP fn-b-1 (1 DS3)** then click on **Port 1 (DS3)**.

Or right click on the DS3 port and select **Provision Port 1**.

Result: The **Port AID** window opens.

.....

- 9** From your work instructions, set and verify the parameters of the DS3 port of the circuit being established, then click **Apply** to make your changes.
-

- 10** At each DS3 terminating node, verify the appropriate cable connection(s) have been made to the DS3 cross-connect point(s) or equivalent connection point(s) for the circuit being established.
-

- 11** Verify that no alarms are activated. Click on the **Alarm List** button. If any alarms are activated, follow the appropriate trouble-clearing task.

Reference: *Metropolis® DMXpress Access Multiplexer Alarm Messages and Trouble Clearing Guide, 365-372-315*

.....

- 12** Determine the necessary cross-connections for each node from the work order or circuit order.
-

- 13** Make the necessary pass through and add/drop STS-1 cross-connections at each node in the network.

Reference: [“Task 317: Make VT1.5 \(DS1\) or STS1 \(DS3\) Cross-Connections Single OC-48/OC-12 Ring Configuration” \(9-69\)](#)

-
- 14** Perform DS3 end-to-end transmission test for each circuit being put into service, as required.

Reference: “Task 402: Perform DS3 Transmission Test” (10-17)

-
- 15** Set/verify the port state of the DS3 ports of the circuit being established. From the System View menu at each terminating node, select **Configuration > Provision**, then select the port. Under T3 Primary State, set/verify the Port Mode to *Not Monitored* or *Automatic*.

Important! If the Port Mode is *Not Monitored*, the signal is not monitored or alarmed and the port will not automatically go to the *in service* state when a signal is detected. If the Port Mode is set to *Automatic*, the port will automatically go to the *in service* state when a signal is detected. The Port Mode must be set to *Automatic* to turn on monitoring of signal failures.

.....
E N D O F S T E P S ☐

Task 309: Establish OC-48 0x1 Unprotected Extensions to a Metropolis[®] DMX Shelf from a Metropolis[®] DMXpress Shelf

Purpose Use this task to establish OC-48 0x1 unprotected extensions where the Metropolis[®] DMX Shelf is the host and the Metropolis[®] DMXpress Shelf is the unprotected extension.

Required equipment The following equipment is required at both sites:

- Personal Computer (PC) with WaveStar[®] CIT software installed
- Wrist Strap
- Optical Power Meter.

Safety precautions To assure both personal safety and the proper functioning of the Metropolis[®] DMXpress, it is imperative to review and understand these warnings and precautions prior to performing this task.



WARNING

Eye damage

Unterminated optical connectors may emit invisible laser radiation. Eye damage may occur if beam is viewed directly or with optical instruments. Avoid direct exposure to the beam.



CAUTION

Electrostatic discharge

Use a static ground wrist strap whenever handling circuit packs or working on a system to prevent electrostatic discharge damage to sensitive components. See “Electrostatic discharge” in “About this Information Product”.

Related information For related information, see the following:

- [Chapter 1, “Product Description”](#)
- [Chapter 3, “Provisioning, Security, & Administration”](#)
- *Metropolis® DMXpress Access Multiplexer TL1 Command Manual, 365-372-313*
- *Metropolis® DMX Access Multiplexer User Operations Guide, 365-372-301*

Before you begin Before you begin this task:

- Verify that you have the necessary work instructions detailing the slots, circuit packs, ports, and network element parameters to be used for this task.
- Verify that the network ring containing the host shelf is established and operating properly.
- Verify that the application option plug (p5) on the Main pack was set to 0x1 in the Metropolis® DMXpress linear extension.

Refer to [“Task 300: Equip New Metropolis® DMXpress Access Multiplexer” \(9-7\)](#).

Task Complete the following steps to establish the configuration.

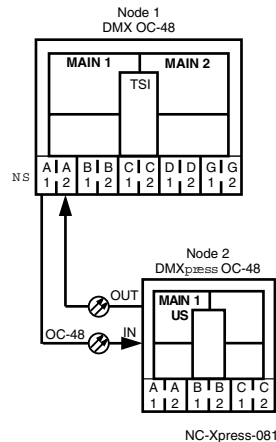
- 1 Connect a PC to the host Metropolis® DMX and the Metropolis® DMXpress and establish a WaveStar® CIT session.

Reference: “Task 200: Connect Personal Computer (PC) and Establish WaveStar® CIT Session” (8-3)

- 2 Determine the network configuration.

Figure 9-6 shows an example where Node 1 is the host and Node 2 is the Metropolis® DMXpress unprotected extension.

Figure 9-6 OC-48 0x1 Unprotected Extension



- 3 Determine the optical loss of each optical span from office records or by making the required measurements.

Reference: “Task 403: Perform Connection and Verification of Optical Facility” (10-25)

-
- 4 At the host node, verify/install OC-48 LS OLIU (LNU31) circuit packs in Function Group or Growth slots (A1, B1, C1, D1, or G1) being used for access.

At the Metropolis® DMXpress linear extension, verify Main 1 is being used for access (Main 2 is unavailable in 0x1 extension).

Important! If you plan to use STS-1 tribs 25-48 on slots A1, B1, or C1 of the host node, then the OC-48 LNU27 OLIU must be used in the MAIN slots.

Important! If the work order or office records do not specify OLIU types, refer to [Chapter 1, “Product Description”](#), for a description of OLIU circuit packs and applications. Optical line power measurements and/or office records must be used to verify that the span length can be supported.

-
- 5 At the host node, an *inconsistent DCC switches* alarm may occur when the OLIUs are looped back and DCC is enabled, ignore the alarm.

-
- 6 From the **System View** menu at the host node, select **Configuration > Provision**, select the required port, and provision port parameters as required from your work instruction.

Important! For this application, ensure the Application port parameter is set to *0x1* at the host nodes.

-
- 7 Verify/set Network Side/User Side parameters at each end of the optical spans being established.

From the **System View** menu select **Configuration > DCC Terminations**, under **LAPD Parameter**, select the appropriate parameter.

Important! The Network Side (NS)/User Side (US) parameters must be set opposite at each end of an optical span. The default for Main 1 of the Metropolis® DMXpress linear extension is “User Side” and the default for the Function/Growth slot of the host is “Network Side”.

-
- 8 Set the timing at the Metropolis® DMXpress NE. From the System View menu select **Configuration > Timing/Sync**.

In the **Provision Timing/Sync** window set the following:

- **Timing Source:** to **Line**
- **Mode Switching** to **Retrieve**
- **Synchronization Source** to **main-1-1**
- **Synchronization Autoreconfiguration** to **Enabled**

-
- 9 Determine from either the Network Operations Center (NOC) or a work order, all the nodes in the existing network. At the DMX NE verify the NEs in the ring or network by selecting **Administration->OSI Routing Map**.

Important! Note the NEs.

Verify that no NE on the ring or network has the same TID name as the NE being added. If a duplicate TID exists request a new TID name from the NOC. At the DMXpress NE being added, select **Administration > Set TID** and enter the new TID Name.

-
- 10 Ensure far-end communication is enabled. From the **System View** menu select **Configuration > DCC Terminations**, set **DCC Channel Parameter: Termination State** to **Enabled**.

Important! The section data communications channel (DCC) used for far end communications, must be enabled at each NE

-
- 11** At the DMX NE, remove the optical loop from the OLIU in the function or growth port in position 1. At the DMXpress NE, remove the optical loop from Main-1.
- Result:** A loss of signal (LOS) alarm will occur if the port is being monitored.
-
- 12** At the DMX NE, connect the fiber drop to function 1 or growth 1 OLIU OUT.
-
- 13** At the DMXpress NE, measure the power on the fiber drop to Main-1 IN. If required, insert an LBO in Main-1 IN and connect the fiber drop to the LBO. Verify that the flashing red LED on the main circuit pack stops flashing. Connect the fiber drop to Main-1 OUT.
-
- 14** At the DMX NE, measure the power on the fiber drop to function 1 or growth 1 OLIU IN. If required, insert an LBO in function 1 or growth 1 IN and connect the fiber drop to LBO. Verify that the flashing red LED on the circuit pack stops flashing.

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



Task 310: Configure Miscellaneous Discrete Inputs and Outputs

- Purpose** Use this procedure to configure the miscellaneous discrete inputs (MDI), miscellaneous discrete outputs (MDO), or operate an MDO.
- Required equipment** The following equipment is required:
- Personal Computer (PC) with WaveStar® CIT software installed
 - Wrist strap
- Safety precautions** To assure both personal safety and the proper functioning of Metropolis® DMXpress, it is imperative to review and understand these warnings and precautions prior to performing this task.



CAUTION

Electrostatic discharge

Use a static ground wrist strap whenever handling circuit packs or working on a system to prevent electrostatic discharge damage to sensitive components. See “Electrostatic discharge” in “About this Information Product”.

- Related information** For related information, see the following chapters in this document:
- [Chapter 3, “Provisioning, Security, & Administration”](#)
 - [Appendix A, WaveStar® CIT Tutorial](#)

Before you begin this task, you must:

- Obtain the work instructions for this task.
- Identify the inputs or outputs you want to configure.
- Determine the names for the various inputs and outputs.
- Log in to the NE with the WaveStar® CIT and be familiar with the operation of the WaveStar® CIT.

Task Complete the following steps to configure miscellaneous discrete inputs (MDI), outputs (MDO), or operate an MDO.

1

If you...	Then...
are configuring miscellaneous discretes INPUTs (MDI) or OUTPUTS (MDO),	Continue with Step 2 .
want to operate a miscellaneous discrete OUTPUT (MDO),	Proceed to Step 6 .

2 From the System View toolbar, select **Configuration > Misc Discretes**.

Result: The Configure Miscellaneous Discretes window opens.

3

If you...	Then...
are configuring miscellaneous discretes INPUTs (MDI),	Continue with Step 4 .
are configuring miscellaneous discretes OUTPUTs (MDO),	Proceed to Step 5 .

4 Click on the **Input** and an **env-1** to **env-15** you want to provision or an existing **env-1** to **env-15** you want to edit.

In the **Misc. Discrete AID:** window, set the **Name:**, **Alarm Type:**, and/ or **Alarm Level:**, click on the **Apply** button to activate.

Result: A warning appears which indicates that the NE service may be affected by the changes.

Click **Yes** in the warning window.

5 Click on the **Output** and a **cont-1** to **cont-4** you want to provision or an existing **cont-1** to **cont-15** you want to edit.

In the **Misc. Discrete AID:** window, set the **Control Type:** and click on **Apply** to activate.

Result: A warning window will appear indicating that the NE service may be affected by the changes.

Click **Yes** in the warning window.

-
- 6** To operate an MDO output, select **Fault > Operate Output Misc. Discretes** from the System View menu.

Click on the **Output** and a **cont-1** to **cont-4** you want to provision or an existing **cont-1** to **cont-15** you want to edit.

In the **Misc. Discrete AID:** window choose **Operate Control Point** or **Release Control Point** and click on **Apply** to activate.

Result: A warning screen appears indicating that the NE service may be affected. Click on **Yes**.

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



Task 311: Discontinue End-to-End DS3 Service

Purpose Use this task to discontinue end-to-end DS3 service.

Important! This task assumes that the system is in service and that DS3 port(s) are being discontinued.

Required equipment The following equipment is required:

- Personal Computer (PC) with WaveStar® CIT software installed
- Wrist Strap

Safety precautions To assure both personal safety and the proper functioning of Metropolis® DMXpress, it is imperative to review and understand these warnings and precautions prior to performing this task.



CAUTION

Electrostatic discharge

Use a static ground wrist strap whenever handling circuit packs or working on a system to prevent electrostatic discharge damage to sensitive components. See “Electrostatic discharge” in “About this Information Product”.

Related information For related information, see the following:

- [Chapter 1, “Product Description”](#)
- *Metropolis® DMXpress Access Multiplexer TL1 Command Manual, 365-372-313*

Before you begin Before you begin this task, verify that the Metropolis® DMXpress WaveStar® CIT program is available.

Task Complete the following steps to discontinue DS3 service.

-
- 1 Connect the PC and establish a WaveStar® CIT session.

Reference: “Task 200: Connect Personal Computer (PC) and Establish WaveStar® CIT Session” (8-3)

.....

- 2 Determine which DS3 ports are to be discontinued.
-

- 3 Determine if any alarms are activated. Click on the List Alarms button. If any LEDs or alarms are activated they must be cleared prior to beginning this task.

Reference: *Metropolis® DMXpress Access Multiplexer Alarm Messages and Trouble Clearing Guide, 365-372-315*

.....

- 4 At the DSX-3 at the DS3 terminating nodes, remove the DS3 signals associated with the port(s) being discontinued.

Important! This step may activate the office critical, major, minor, or no alarm.

Result: FLT LEDs begin flashing on the DS1/DS3/16/1 or DS3/12 circuit pack with signals removed.

.....

- 5 Clear the DS3 LOS alarms. At the terminating (drop) nodes, momentarily depress the UPD/INIT push-button on the Main circuit pack or from the System View menu select **Configuration > Update System**.

Click **Yes**.

Result: Flashing FLT LEDs go off.

-
- 6** Verify that the correct port has been changed from *Monitored* to *Automatic* mode.

Use the work order, or From the System View menu select **View > View Equipment Details**, then navigate down the tree to the port.

- Expand **CP fn-a-1 (ds3)**
- Select **Port # (ds3)**.

Or in the graphical display, right-click on the port and select **View Port Details**. The **Port Mode** is shown under **Port Data/Fault**.

Close view.

-
- 7** Determine the cross-connections for the circuit being discontinued.

Use the work order, or From the **System View** menu select **View > Cross Connections**, then navigate down the tree to the port.

- Expand **CP fn-a-1 (ds3)**
- Select **Port # (ds3)**.

Take note of the **SRC** addresses to be deleted.

Close view.

-
- 8** Delete the terminating (drop) node cross-connections for all DS3 service being removed.

From the System View menu select **Configuration > Cross Connection**, then use the Cross Connection Wizard to remove the cross connections.

- When deletions are complete, close the cross-connection wizard and click **Yes** to confirm.

Important! DS3 slots cannot be unequipped without an alarm until all port cross-connections are removed.

-
- 9** Delete the pass-through cross-connections at each nonterminating node for all DS3 service being removed.

From the **System View** menu select **Configuration > Cross Connection**, then use the Cross Connection Wizard to remove the cross connections.

- When deletions are complete, close the cross-connection wizard and click **Yes** to confirm.
-

- 10** Is DS3 service being removed from a DS1/DS3/16/1 or a DS3/12 circuit pack?

If...	Then...
the DS3 port and all 16 DS1 ports on a DS1/DS3/16/1 circuit pack are being discontinued,	you may remove the circuit pack after all services have been discontinued, if required.
all 12 DS3 ports on a DS3/12 circuit pack are being discontinued,	you may remove the circuit pack after all services have been discontinued, if required.

.....

- 11** Have circuit packs been removed?

If...	Then...
Yes	Continue with Step 12 .
No	Continue with Step 13 .

.....

- 12** If circuit packs have been removed, update the internal equipment list. From the System View menu select **Configuration > Update System**.
Insert an application blank into the empty slot, then proceed to [Step 14](#).

-
- 13** If circuit packs have not been removed, set the port mode of the DS3 port(s) to *Automatic* or *Not Monitored*, as required.

From the **System View** menu select **Configure > Provision**, then navigate down the tree to the port.

- Expand **CP fn-#-# (ds3)**
- Select **Port # (ds3)**
- Click **Provision** in the **T3 Primary State**,
- Change the **Port Mode** to the desired setting.
- Click **Apply**
- Click **Yes** to confirm
- Close the window.

Or in the graphical display, right-click on the port and select **Provision Port**. Under **T3 Primary State**, you can set the **Port Mode**.

Important! If the Port Mode is *Not Monitored*, the signal is not monitored or alarmed. The port will not automatically go to the *in service* state when a signal is detected as it will if the Port Mode is set to *Automatic*. The Port Mode must be set to *Automatic* to turn on monitoring of signal failures.

-
- 14** Verify all alarms are off. Click on the **Alarm List** button.

.....

END OF STEPS

.....



Task 312 through 316: Reserved for Future Use

.....

Task 317: Make VT1.5 (DS1) or STS1 (DS3) Cross-Connections Single OC-48/OC-12 Ring Configuration

Purpose Use this task to make VT1.5 or STS1 cross-connections. See [Figure 9-7](#) and [Figure 9-8](#) for examples.

Required equipment The following equipment is required:

- Personal Computer (PC) with WaveStar® CIT software installed
- Wrist strap

Safety precautions To assure both personal safety and the proper functioning of Metropolis® DMXpress, it is imperative to review and understand these warnings and precautions prior to performing this task.



CAUTION

Electrostatic discharge

Use a static ground wrist strap whenever handling circuit packs or working on a system to prevent electrostatic discharge damage to sensitive components. See “Electrostatic discharge” in “About this Information Product”.

Related information For related information, see the following chapters in this document:

- [Chapter 1, “Product Description”](#)
- [Chapter 3, “Provisioning, Security, & Administration”](#)

Before you begin Ensure that you:

- Have the work instructions that specify the type of cross-connections to be made.
- Know which nodes in the network require pass-through or add/drop cross-connections.
- Have provisioned all the necessary circuit pack and port parameters for the service being established.
- Are familiar with the operation of the WaveStar® CIT.

Task Complete the following steps to make the necessary cross-connections. See [Figure 9-7](#) and [Figure 9-8](#) for examples.

-
- 1 Connect the PC and establish a WaveStar® CIT session.

Reference: “[Task 200: Connect Personal Computer \(PC\) and Establish WaveStar® CIT Session](#)” (8-3)

.....

- 2 Log in to any node in the network. From the System View menu, select **Administration > OSI Routing Map** or **Administration > OSI Neighbor Map** to retrieve a map of the network which lists all the systems and how they are connected to each other.
-

- 3 Verify that the system configuration is the same as specified on your work instructions.
-

- 4 From your work instructions, determine the terminating (add/drop) nodes and the pass-through nodes for the service being established.

Important! In ring configurations, you should use the following rules in establishing cross-connections in each ring.

Cross-Connect Rules

1. All cross-connections to/from the same STS-1 timeslot must be provisioned the same, either all VT1.5 or STS-1.
 2. If all 28 VT1.5s (DS1s) in an STS-1 are being passed through at a node in a VT1.5 path-switched ring, then the cross-connection may be provisioned as either a pass-through STS-1 or VT1.5. However, if you are dropping VT1.5s from the pass through node in the future, you should provision the pass-throughs as VT1.5 cross-connections.
-

- 5 From the System View menu at each node involved in the cross-connections, select **View > View Equipment Details** and verify that each shelf is properly equipped for the service being established.

-
- 6 From your work instructions, determine the cross-connections to be made at each node associated with the service to be established.

Important! Cross-connections supporting DS3 services are STS-1 cross-connections. Cross-connections supporting DS1 services may be either STS-1 or VT1.5 cross-connections. Use VT1.5 cross-connections for DS1 services if you expect to cross connect only *some* of the VT1.5 signals in the STS-1 channel. If STS-1 cross-connections are made at a shelf, there is a fixed mapping of all 28 VT1.5 cross-connections to a specific shelf group.

.....

- 7 Starting at one of the terminating nodes for the DS1/DS3 circuit being established, at each node in the ring verify that the cross-connections specified on the work order or circuit order may be made. If cross-connections are already assigned or improperly assigned, refer trouble to the organization responsibility for facility design. Improperly assigned cross-connections may have to be deleted.
-

- 8 At all *non terminating* nodes in the network, provision pass-through cross-connections first. From the System View menu, select **Configuration > Cross-Connection**, then use the Cross-Connection Wizard to make the cross-connections. Choose **2-Way Point-to-Point, Through** as the **Type of Cross-connection**.

Important! The channel mode provisioning feature provides In-Service, Automatic, or Not Monitored states for VT and STS channels similar to the port modes for DS1 and DS3 ports. At installation, or when a cross-connection is made to a point of termination, the channel is in the Automatic mode and alarming is disabled. The channel must receive a good signal from either ring to cause the channel to transition to in-service.

.....

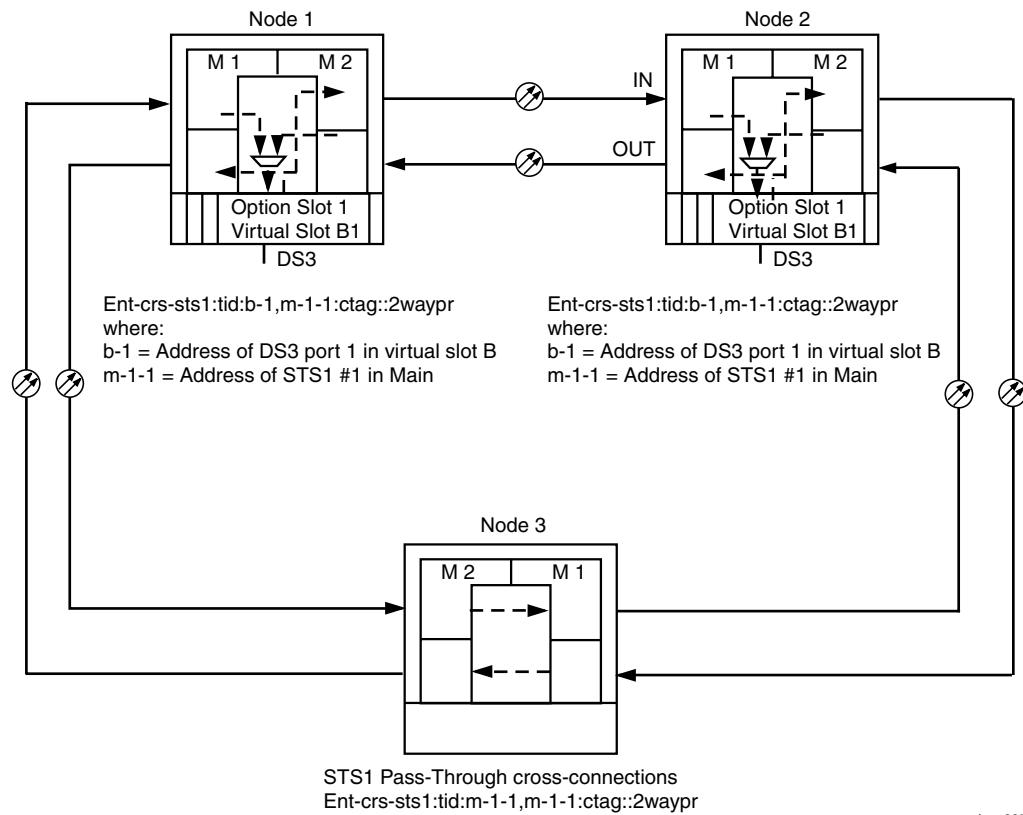
- 9 At the terminating (drop) nodes of the circuit being established, establish the terminating cross-connections. From the System View menu select **Configuration > Cross-Connection**, then use the Cross-Connection Wizard to make the cross-connections. Choose **UPSR Ring Add/Drop** as the **Type of Cross-connection**.

-
- 10** From the System View menu select **View > Cross-Connections** to verify that the proper connections have been made. If changes are required, return to the Cross Connection Wizard.
-
- 11** After all cross-connections are made, click on the **Alarm List** button to verify no alarms are present.
-
- 12** If ne-acty, inc. VT AIS, inc. STSn AIS, inc. VT unequipped, OR inc. STSn unequipped alarms are present, look for missing or improperly made cross-connections.

Reference: *Metropolis® DMXpress Access Multiplexer Alarm Messages and Trouble Clearing Guide, 365-372-315*

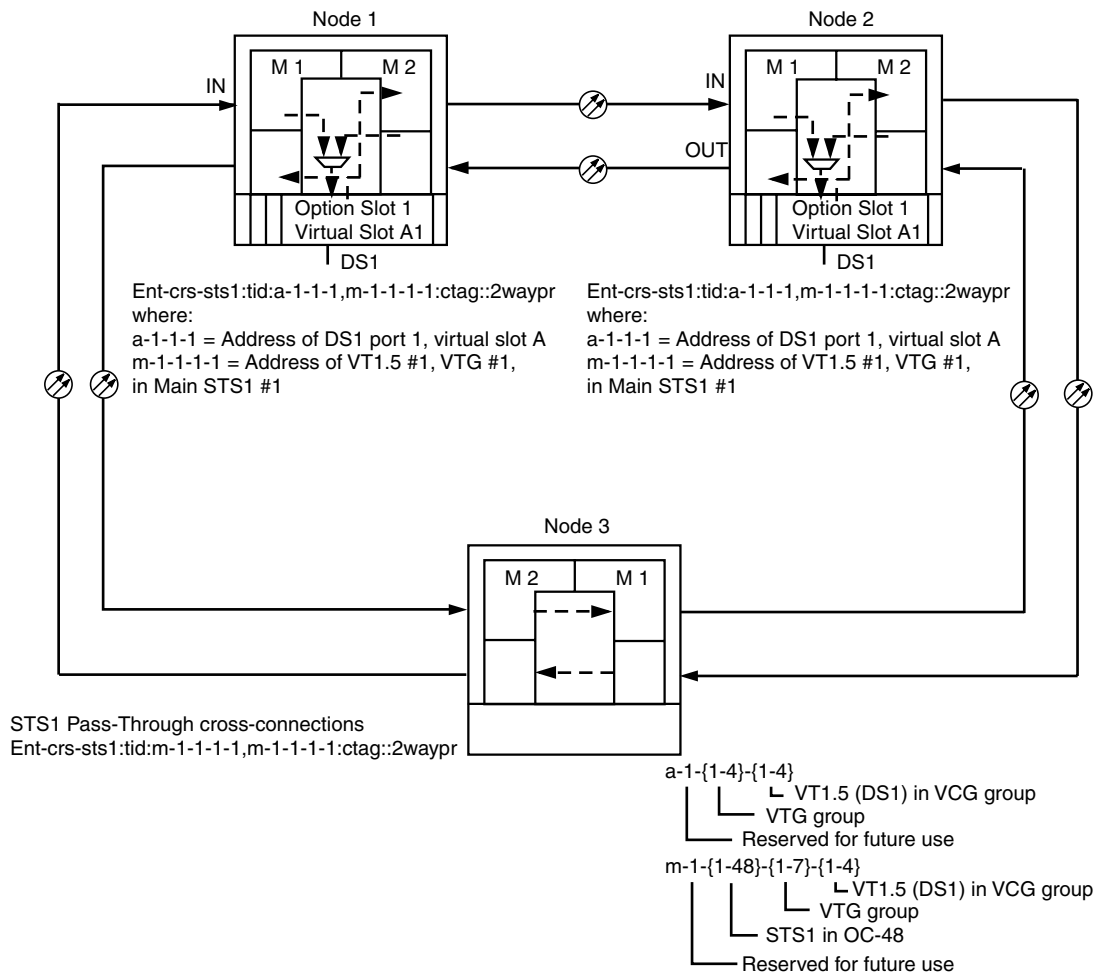
.....
E N D O F S T E P S
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Figure 9-7 DS3 Cross-connections Example



nc-dmx-225

Figure 9-8 DS1 Cross-connections Example



Task 318: Establish Single-Homed OC-12/48 Access via Metropolis[®] DMX UPSR Backbone Ring

Purpose Use this task to establish single-homed OC-12/48 access to a Metropolis[®] DMX UPSR ring.

Required equipment The following equipment is required:

- Personal Computer (PC) with WaveStar[®] CIT software installed
- Wrist Strap
- Optical power meter
- Note pad

Safety precautions To assure both personal safety and the proper functioning of the Metropolis[®] DMXpress, it is imperative to review and understand these warnings and precautions prior to performing this task.



WARNING **Eye damage**

Unterminated optical connectors may emit invisible laser radiation. Eye damage may occur if beam is viewed directly or with optical instruments. Avoid direct exposure to the beam.



CAUTION **Electrostatic discharge**

Use a static ground wrist strap whenever handling circuit packs or working on a system to prevent electrostatic discharge damage to sensitive components. See “Electrostatic discharge” in “About this Information Product”.

Related information For related information, see the following:

- [Chapter 1, “Product Description”](#)
- [Chapter 3, “Provisioning, Security, & Administration”](#)
- *Metropolis[®] DMXpress Access Multiplexer TL1 Command Manual, 365-372-313*

Before you begin Before you begin this task:

- Verify that you have the necessary work instructions detailing the slots, circuit packs, ports, and network element parameters to be used for this task.
- Verify that the network ring containing the host Metropolis® DMX host shelf is established and operating properly using the procedures in this manual.
- Verify that all systems being connected to the host Metropolis® DMX shelf have been equipped and operating properly.
- Review the example in [Figure 9-9](#). The examples in this procedure refer to this drawing.

Task Complete the following steps to establish the configuration.

-
- 1** Connect the PC to the host Metropolis® DMX and establish a WaveStar® CIT session.

Reference: *Metropolis® DMX Access Multiplexer User Operations Guide, 365-372-301* “Task 200: Connect Personal Computer (PC) and Establish WaveStar® CIT Session”

.....

- 2** Verify that the host Metropolis® DMX shelf is equipped with Release 2.0 (or higher) software. From the System View menu select **View > Software Generic**.
-

- 3** Determine the network configuration. For example, see [Figure 9-9](#). Create a sketch of the ring being accessed.
- At the host DMX NE (Node 2 in the figure) select **Administration > OSI Neighbor Map** and note the NEs connected to **main-1-1** and **main-2-1**.
- Login into each Node attached to main-1-1 and main-2-1 and repeat this step until you can sketch a map showing the entire ring.

-
- 4 Determine the optical loss of each optical span from office records or by making the required measurements.

Reference: *Metropolis® DMX Access Multiplexer User Operations Guide, 365-372-301* “Task 403: Perform Connection and Verification of Optical Facility”

.....

- 5 At the host Metropolis® DMX node, verify/install OLIU circuit packs in Function Group or Growth slot pairs (A1 and A2, B1 and B2, C1 and C2, D1 and D2, or G1 and G2) being used for access.

Important! If the work order or office records do not specify OLIU types, refer to *Metropolis® DMX Access Multiplexer User Operations Guide, 365-372-301* Chapter 2, “Platform Description”, for a description of OLIU circuit packs and applications. Optical line power measurements and/or office records must be used to verify that the span length can be supported.

This single-homed ring configuration requires that the host OLIUs be installed in the same Function Group or Growth slot pairs. Note the following connectivity:

Important!

Function Group (A,B,C,D,G) 1	Connects to the M1 OLIU at the first NE from the Metropolis® DMXpress host shelf.
Function Group (A,B,C,D,G) 2	Connects to the M2 OLIU at the first NE from the Metropolis® DMXpress host shelf.

Reference: *Metropolis® DMX Access Multiplexer User Operations Guide, 365-372-301*, “Task 321: Install OLIU Circuit Packs”

.....

- 6 At the host Metropolis® DMX node (Node 2 in example), an *inconsistent DCC switches* alarm may occur when the OLIUs are looped back and DCC is enabled. Ignore the alarm.

-
- 7 From the System View menu at the Metropolis® DMX host node (Node 2 in the example), right click on the **OC-N** (N = 12 or 48) circuit pack in function or growth position 1, select **Provision Port n** and set **Application:** to **UPSR** or **0X1**.

Important! For this application, ensure the Application port parameter is set to *0X1* or *UPSR* at the host nodes.

Reference: *Metropolis® DMX Access Multiplexer User Operations Guide, 365-372-301*, “Task 322: Provision OLIU Circuit Packs/Ports for New Service”

.....

- 8 Verify/set Network Side/User Side parameters at each end of the optical spans being established. From the System View menu select **Configuration > DCC Terminations**, under **LAPD Role**, select the **Termination State:**.

Important! The network-side/user-side parameters must be set opposite at each end of an optical span. The default for Function Unit or Growth slot 1 is **network-side**. The default for Function Unit or Growth slot 2 is **user-side**. The DMXpress default for Main 1 is **user-side** and Main 2 is **network-side**. The **Termination State:** should be set to **enabled**.

.....

- 9 Refer to the Metropolis® DMXpress User Operations Guide for connecting to the Metropolis® DMX host NE. From the System View, select **Configuration > Timing/Sync**. In the Provision Timing/Sync window, set the following parameters:

Timing Mode:	Line
Mode Switching	Revertive
Synchronization Source	main-1-1
Synchronization Autoreconfiguration	Enabled

-
- 10** Verify that the TID settings of the new NE does not exist in the new network. If a duplicate exists, request a new TID name from the NOC. From the System View at each new node, select **Administration > Set TID** to change the TID name.

Important! Two or more shelves in the same network **cannot** have the same system name or TID.

-
- 11** Add new node as a single homed NE to the existing network. Refer to Node 8 in [Figure 9-9](#).

Reference: [“Task 403: Perform Connection and Verification of Optical Facility” \(10-25\)](#)

-
- 12** If installed, remove the optical loop from the function or growth port in position 1 of Node 2, and from Main-1 of new node (node 8).

Result: A loss of signal (LOS) alarm will occur if the port is being monitored.

-
- 13** At Node 2, connect the fiber drop to the function 1 or growth 1 OLIU Port n OUT.

-
- 14** At the new node (Node 8), measure the power on the fiber drop to Main-1 IN. If required, insert an LBO in Main-1 IN and connect the fiber drop to the LBO. Click on **Alarm List** and verify that an **inc. OC-N LOS** alarm is not present for main-1. Connect the fiber drop to Main-1 OUT.

-
- 15** At new node (Node 8), measure the power on the fiber drop to function 1 or growth 1 OLIU (Node 2) Port n IN. If required, insert an LBO in OLIU Port n IN and connect the fiber drop to the LBO. Verify that the flashing red LED on the OLIU stops flashing.

-
- 16** If installed, remove the optical loop from the function or growth port in position 2 of Node 2, and from Main-2 of new node (Node 8).

Result: A loss of signal (LOS) alarm will occur if the port is being monitored.

.....

- 17** At Node 2, connect the fiber drop to the function 2 or growth 2 OLIU Port n OUT.
-

- 18** At the new node (Node 8), measure the power on the fiber drop to Main-2 IN. If required insert an LBO in Main-2 IN and connect the fiber drop to the LBO. Verify that the flashing red LED on the Main circuit pack stops flashing. Connect the fiber drop to Main-2 OUT.
-

- 19** At Node 2, measure the power on the fiber drop to the function 2 or growth 2 OLIU Port n IN. If required, insert an LBO in the OLIU Port n IN and connect the fiber drop to the LBO. Verify that the flashing red LED on the OLIU stops flashing.
-

- 20** The single-homed access network is now ready for initial service to be established. For all terminations on the far-end shelf, use the procedures in that shelf's particular user operations guide to provision those shelves.

Important! Establishing service requires that the proper slots in each terminating node be properly equipped with the correct circuit pack(s) for the type of service being established. It also requires numerous cross-connections in each of the nodes representing the path of the required service. Additionally, transmission tests should be performed to verify the continuity and quality of the established circuit.

.....

END OF STEPS

.....

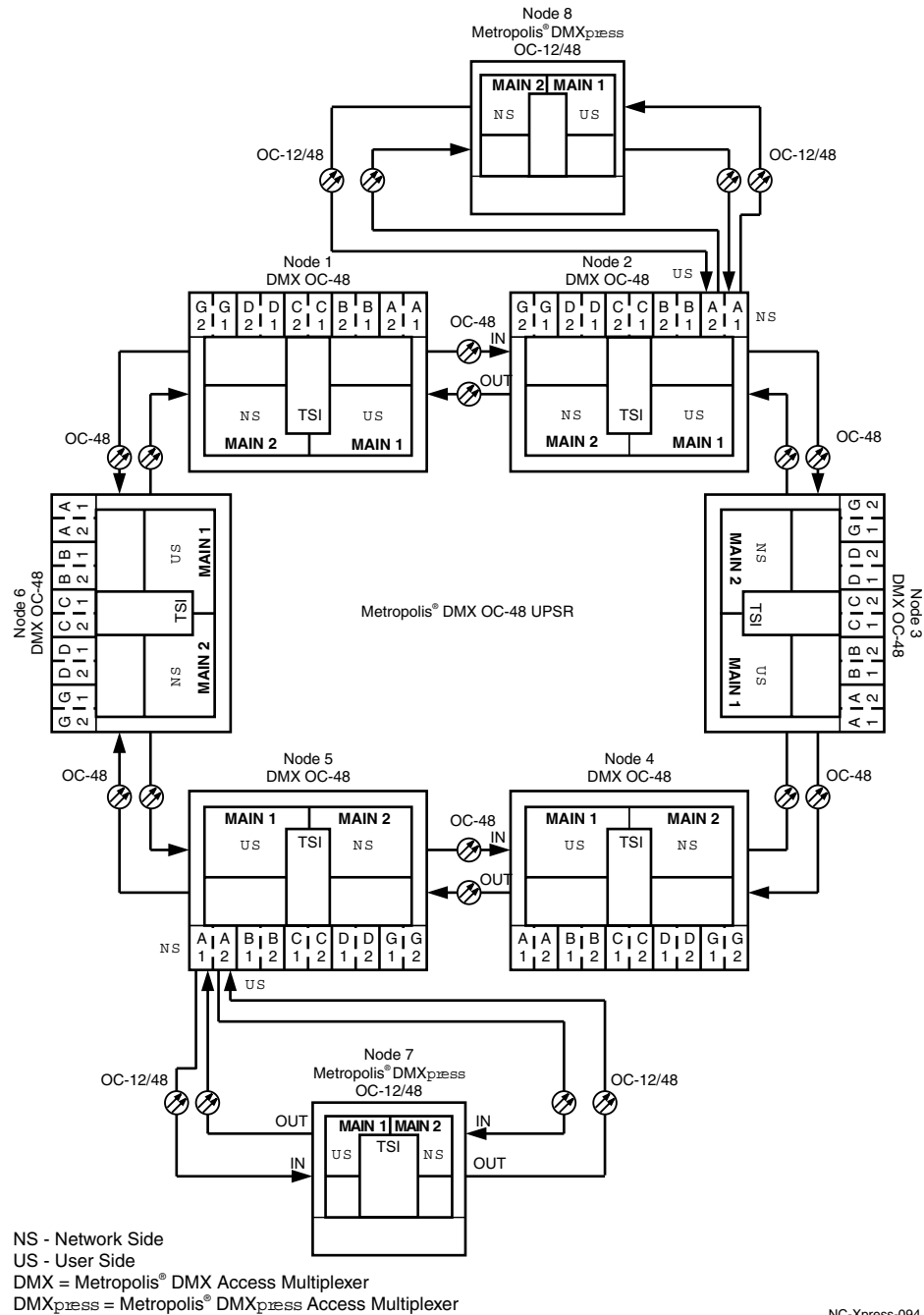
END OF STEPS

.....

Example Single-homed configuration

Figure 9-9 is an example of the single-homed configuration described in this task. Traffic flow is described following the figure.

Figure 9-9 Single-Homed Configuration



Traffic Flow

In the preceding figure, if Node 7 is the source and Node 8 the destination, traffic will flow as follows:

- From Node7:M1 to Node5:A1, then clockwise around the ring from Node5:M1 to Node2:M2. From Node2:A2 to Node8:M2.
- From Node7:M2 to Node5:A2, then counter-clockwise around the ring from Node5:M2 to Node2:M1. From Node2:A1 to Node8:M1.

Protection

The ports that connect the subtending nodes to the Metropolis® DMX (Node5:A1/A2, Node2:A1/A2) should be provisioned for 0x1 protection. The single-homed configuration transports traffic over the Metropolis® DMX UPSR without any protection switching by the Metropolis® DMX on the ring. The end-of-path NEs (Node7 and Node8) do the path protection switching.

Task 319: Establish Dual-Homed OC-12/48 Access via Metropolis[®] DMX UPSR Backbone Ring

Purpose Use this task to establish dual-homed OC-12/48 access to host Metropolis[®] DMX rings.

Required equipment The following equipment is required at the DMX nodes and the DMXpress nodes or any network element being added:

- Personal Computer (PC) with WaveStar[®] CIT software installed
- Wrist Strap
- Optical power meter

Safety precautions To assure both personal safety and the proper functioning of the Metropolis[®] DMXpress, it is imperative to review and understand these warnings and precautions prior to performing this task.



WARNING **Eye damage**

Unterminated optical connectors may emit invisible laser radiation. Eye damage may occur if beam is viewed directly or with optical instruments. Avoid direct exposure to the beam.



CAUTION **Electrostatic discharge**

Use a static ground wrist strap whenever handling circuit packs or working on a system to prevent electrostatic discharge damage to sensitive components. See “Electrostatic discharge” in “About this Information Product”.

Related information	For related information, see the following: - Chapter 1, “Product Description” - Chapter 3, “Provisioning, Security, & Administration” - Metropolis® DMXpress Access Multiplexer TL1 Command Manual, 365-372-313
Before you begin	Before you begin this task: - Verify that you have the necessary work instructions detailing the slots, circuit packs, ports, and network element parameters to be used for this task. - Verify that the network ring containing the host Metropolis® DMX shelves are established and operating properly. - Verify that all systems being connected to the host Metropolis® DMX shelves have been equipped and operating properly. - Technicians at all locations should be able to communicate with each other
Task	Complete the following steps to establish dual-homed ring connections. This procedure is based on a configuration similar to the example in Figure 9-10 and Figure 9-11. Review these figures thoroughly before proceeding with the task. References to nodes are based on these figures. 1 Connect the PC to a host Metropolis® DMX and establish a WaveStar® CIT session. Reference: <i>Metropolis® DMX Access Multiplexer User Operations Guide, 365-372-301, “Task 200: Connect Personal Computer (PC) and Establish WaveStar® CIT Session”</i> 2 Verify in the top of the System View window, that the host Metropolis® DMX nodes are equipped with Release 2.0 (or higher) software. 3 Determine the network configuration. Refer to Figure 9-10 as an example.

At one of the host DMX nodes (NE5 for example) select **Administration > OSI Neighbor Map** and note the NEs connected to **main-1-1** and **main-2-1**. In this example, Node 4 and Node 6.

Access each of the NEs identified as connected to main-1-1 and main-2-1 (Nodes 4 and 6) and select **Administration > OSI Neighbor Map**. Note the Nodes connected to main-1-1 and main-2-1.

Repeat this process until the DMX ring portion can be sketched.

-
- 4 Determine the optical loss of each optical span from the office records or by making the required measurements.

Reference: Metropolis® DMX Access Multiplexer User Operations Guide, 365-372-301 “Task 403: Perform COnnection and Verification of Optical Facility”.

.....

- 5 At the host Metropolis® DMX nodes (Nodes 4 and 5), verify/install OLIU circuit packs in Function Group or Growth slots (A1 or A2, B1 or B2, C1 or C2, D1 or D2, or G1 or G2) being used for access.

Important! If the work order or office records do not specify OLIU types, refer to *Metropolis® DMX Access Multiplexer User Operations Guide, 365-372-301*, Chapter 2, “Platform Description”, for a description of OLIU circuit packs and applications. Optical line power measurements and/or office records must be used to verify that the span length can be supported.

This dual-homed ring configuration requires that the host OLIUs be installed in the following manner:

Important!

Function Group (A,B,C,D,G) 1	Connects to the M1 OLIU at the first NE from one of the Metropolis® DMXpress host shelves.
Function Group (A,B,C,D,G) 2	Connects to the M2 OLIU at the first NE from the second Metropolis® DMXpress host shelf.

Reference: *Metropolis® DMX Access Multiplexer User Operations Guide, 365-372-301*, “Task 321: Install OLIU Circuit Packs”

-
- 6** At the host Metropolis® DMX nodes (Nodes 4, 5, 1, and 2), an *inconsistent DCC switches* alarm will occur when the OLIUs are looped back and DCC is enabled. Ignore the alarm.
-
- 7** From the System View menu at each of the Metropolis® DMX host nodes (Nodes 4 and 5 for example), right click on the OC-N circuit pack Port n (n = 1 or 2) in function or growth position 1 or 2. Select **Provision Port n** and set **Application** to **0X1**.

Important! For this application, ensure the Application port parameter is set to *0X1* at the host nodes.

Reference: *Metropolis® DMX Access Multiplexer User Operations Guide, 365-372-301* “Task 322: Provision OLIU Circuit Packs/Ports for New Service”

- 8 Verify network side/user side parameters at each end of the optical spans being established. From the System View menu at each Metropolis® DMX host node, select **Configuration > DCC Terminations**. Under **LAPD Role:**, and **Termination State:**, select the proper setting.

DMX Host Node	
Function Unit 1 or Growth 1	network-side
Function Unit 2 or Growth 2	user-side
DMXpress Node	
Main-1	user-side
Main-2	network-side
Termination State: (DMX and DMXpress)	enabled

Important! The network side/user side parameters must be set opposite at each end of an optical span.

- 9 Verify/set the following parameters in the Metropolis® DMXpress. From the System View window, select **Configuration > Timing/Sync**. In the **Provision Timing/Sync** window:

Timing Source	Line
Mode Switching	Revertive
Synchronization Source	main-1-1
Synchronization Autoreconfiguration	Enabled

- 10 Determine from the Network Operations Center (NOC) or a work order, all the nodes in the existing network. At NE5 for example, verify the Nodes in the ring or network by selecting **Administration > OSI Routing Map** and note the nodes.

-
- 11** Nodes on the network cannot have duplicate system names or TIDs. Verify that none of the existing nodes has the same TID name as the node being added. If a duplicate TID exists, request a new TID name from the NOC. At the node being added, select **Administration > Set TID** and enter the new TID name.

Important! Assumes two DMXpress nodes are being dual homed.

.....

- 12** The following steps define the dual homing of 2 DMXpress nodes into a DMX UPSR ring. The example is based on Nodes 7 and 8 being homed to Nodes 5 and 6 in [Figure 9-10](#). Note that there are several dual homing configurations that all use the same basic principles.

Reference: “[Task 403: Perform Connection and Verification of Optical Facility](#)” (10-25)

.....

- 13** Connect one of the nodes to be added to one of the host nodes.
- At one of the host nodes (for example, Node 5) remove the optical loop from the OLIU in the function or growth port in position 1. At one of the nodes being added (Node 7 in the figure), remove the optical loops from Main 1.

Reference: If the port is being monitored, a Loss of Signal (LOS) alarm will occur.

.....

- 14** At the host node (Node 5), connect the fiber drop (from the new Node) to the function 1 or growth 1 OLIU Port n OUT.
-

- 15** At the node being added (Node 7), measure the power on the fiber drop to Main-1 IN. If required, insert an LBO in Main-1 IN and connect the fiber drop to the LBO. Click on Alarm List and verify that an inc. OC-N LOS is not present for Main-1.

.....

16 At NE7, connect the fiber drop to Main-1 OUT. At host node (Node 5), measure the power to function 1 or growth 1 OLIU Port n IN (from NE5). If required, insert an LBO in OLIU Port n IN and connect the fiber drop to the LBO. Verify that the flashing red LED on the OLIU extinguishes.

.....

17 Connect the two added nodes together.

At the new node (Node 7), remove the fiber loop from main-2. At the other new node (Node 8), remove the fiber loop from main-1.

Result: A LOS alarm will occur if the port is being monitored.

.....

18 At Node 7, connect the fiber drop (from Node 8) to Main-2 OUT.

.....

19 At Node 8, measure the power on the fiber drop to Main-1 IN. If required, insert an LBO in Main-1 IN and connect the fiber drop to the LBO. Click on **Alarm List** and verify that an **inc. OC-N LOS** alarm is not present for main-1.

.....

20 At Node 8, connect the fiber drop (from Node 7) to Main-1 OUT.

.....

21 At Node 7, measure the power on the fiber drop from Node 8 to Main-1 IN. If required, insert and LBO in Main-2 IN and connect the fiber drop to the LBO. Verify that the flashing red LED on the main circuit pack extinguishes.

.....

22 Connect the second new node (Node 8 in our example) to the existing network at the second home (Node 4 in our example).

At Node 8, remove the loop from Main-2. At Node 4 (in our example), remove the optical loop from the OLIU in the function or growth port in position 2.

Result: An LOS alarm will occur if the port is being monitored.

.....
23 At node 8, connect the fiber drop from Node 4 to Main-2 OUT.

.....
24 At Node 4, measure the power on the fiber drop from Node 8 to the function or growth 2 OLIU Port n IN. If required, insert an LBO in the OLIU Port n IN and connect the fiber drop to the LBO. Verify that the flashing red LED on the OLIU extinguishes.

.....
25 At Node 4, connect the fiber drop from Node 8 to function or growth 2 OLIU Port n OUT.

.....
26 At Node 8, measure the power on the fiber drop from Node 4 to Main-2 IN. If required, insert an LBO in Main-2 IN and connect the fiber drop to the LBO. Verify that the flashing red LED extinguishes.

.....
27 Verify that there are no alarms associated with the network just established.

Reference: *Metropolis® DMXpress Access Multiplexer Alarm Messages and Trouble Clearing Guide, 365-372-315*

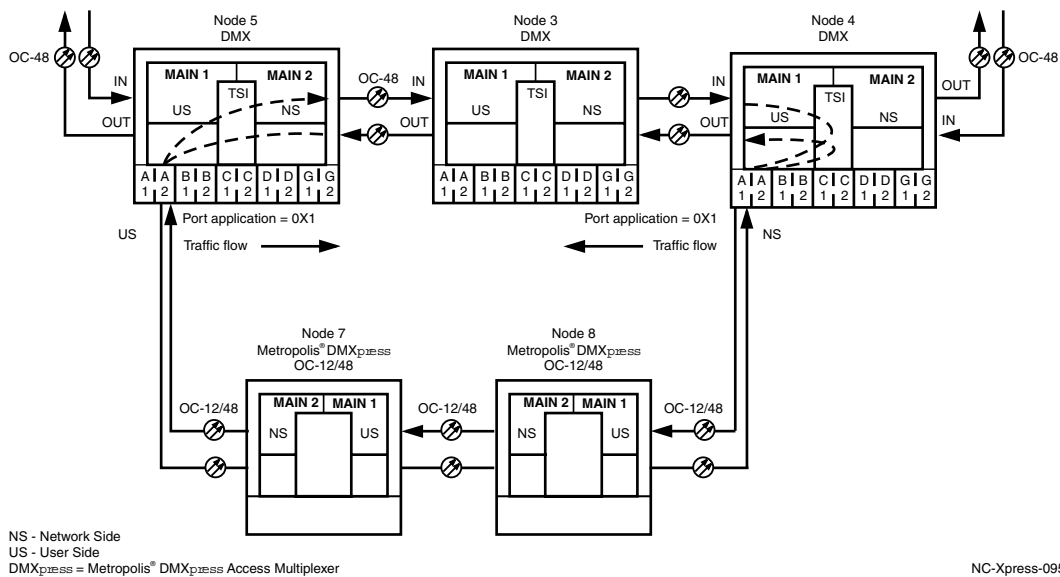
.....
28 The dual-homed access network is now ready for initial service to be established.

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

Figure 9-10 and Figure 9-11 are examples of the dual-homed configuration described in this task. Note the traffic flow shown in the figures.



Figure 9-11 Dual-Homed Network Configuration Example 2



Task 320: Reserved for Future Use

.....

Task 321: Install Low-Speed OLIU Circuit Packs

Purpose Use this task to install the OC3LS/4 (A1AA017) and the OC12LS/2 (A1AA018) Low-Speed circuit packs in the Metropolis® DMXpress Access Multiplexer. These packs are installed in Option Slot 1.

Required equipment The following equipment is required:

- Personal computer (PC) with WaveStar® CIT software installed
- Wrist strap
- Optical loopback cables, LBOs, and optical fiber cleaning tools (if loopbacks are performed)

Safety precautions To assure both personal safety and the proper functioning of Metropolis® DMXpress, it is imperative to review and understand these warnings and precautions prior to performing this task.



WARNING

Eye damage

Unterminated optical connectors may emit invisible laser radiation. Eye damage may occur if beam is viewed directly or with optical instruments. Avoid direct exposure to the beam.



CAUTION

Electrostatic discharge

Use a static ground wrist strap whenever handling circuit packs or working on a system to prevent electrostatic discharge damage to sensitive components. See “Electrostatic discharge” in “About this Information Product.”

Related information For related information, see the following:

- [Chapter 1, “Product Description”](#)
- [Chapter 3, “Provisioning, Security, & Administration”](#)

Before you begin Prior to performing this task:

1. Ensure that correct OC-3/OC-12 OLIU circuit pack(s) is available for installation.

Reference: If not previously completed, install generic and WaveStar CIT software on the PC (refer to [“Task 214: Install Generic and WaveStar® CIT Software on the PC”](#) (8-109)).

Reference: Connect PC and establish a WaveStar CIT session (refer to [“Task 200: Connect Personal Computer \(PC\) and Establish WaveStar® CIT Session”](#) (8-3)).

2. Obtain work instructions for this task.

Important! If responses are not correct when installing OLIU circuit packs, check the connections. If the connections are correct, replace the circuit pack with the wrong response. (The red FAULT LED normally flashes when an OLIU circuit pack is monitored and there is no signal present.)

Task Complete the following steps to install OLIU circuit packs.

-
- 1 Determine that Option Slot 1 is available for OLIU circuit packs.

-
- 2 Ensure all optical fiber connectors and couplings are properly cleaned.

Important! Signal performances may be degraded if the connections and couplings are not cleaned properly.

Reference: [“Task 408: Clean Optical Fibers, Dual LC Adapters and LC Line Buildouts \(LBOs\)”](#) (10-45)

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

Result: **ACT** (active) LED lights on the circuit pack. **FLT** (fault) LED on the circuit pack lights for 30 seconds then flashes.

.....

- 4** From the System View window, click on **Alarm List** button to verify that no lockouts, loopbacks, or switches are present for the ports on the circuit packs just installed.

Result: The “NE Alarm List” window opens.

.....

- 5** Note the existing alarms associated with the OLIU circuit pack(s) just installed, then click **Close** at the bottom of the NE Alarm List window.
-

- 6** Do you want to clear the “incoming OC-n LOS” alarm associated with the installed OLIU circuit pack(s) using the WaveStar® CIT?

If...	Then...
Yes	Proceed to Step 8 to set the OLIU ports to Not Monitored (out of service [OOS])
No	Continue with Step 7 to clear the alarms by looping the OLIU ports back on each other and then proceed to Step 15 .

.....

- 7** Install optical loopbacks on all ports of the OLIU(s) just installed.

Result: All alarms clear. FAULT LED goes off after about 15 seconds.

Reference: “[Task 400: Connect OLIU Optical Loopbacks](#)” (10-3)

.....

- 8** From the System View window, select **Configuration > Provision**.

Result: The “Provision Parameters for Equipment” window opens.

-
- 9** Find the OLIU circuit pack just installed and expand the equipment list by clicking on the plus (+) sign next to the OLIU(s) just installed.
-
- 10** Click (highlight) the first port on the circuit pack to be provisioned, then click **Provision** at the bottom of the window.
- Result:** The port parameters display on the right side of the window.
-
- 11** Under the “OCn Primary State” section, set the **Line State** to **Not Monitored**.
-
- 12** Click **Apply** at the bottom of the window to make your changes.
- Result:** “Execution of provision may affect the NE service. Do you want to execute this command?”
-
- 13** Verify that you are provisioning the correct port, then click **Yes** to apply your changes.
-
- 14** Repeat [Step 8](#) through [Step 13](#) for all ports being set to Not Monitored, then click **Close** at the bottom of the window.
- Result:** After all the ports on an OLIU circuit pack are provisioned to Not Monitored, “incoming OC-n” alarm clear and the FAULT LED goes off immediately.

-
- 15** Do you wish to provision circuit pack and/or port parameters for new service at this time?

If...	Then...
Yes	Refer to “Task 322: Provision Low-Speed OLIU Circuit Packs/Ports for New Service” (9-101)
No	STOP! END OF TASK.

.....

END OF STEPS

.....



Task 322: Provision Low-Speed OLIU Circuit Packs/Ports for New Service

Purpose Use this task to provision OC3LS/2 (A1AA017) and the OC12LS/2 (A1AA018) Low-Speed OLIU circuit pack ports in Option slot 1 for new service in Metropolis® DMXpress.

Required equipment The following equipment is required:

- Personal computer (PC) with WaveStar® CIT software installed
- Wrist strap

Safety precautions To assure both personal safety and the proper functioning of the Metropolis® DMXpress, it is imperative to review and understand these warnings and precautions prior to performing this task.



CAUTION

Electrostatic discharge

Use a static ground wrist strap whenever handling circuit packs or working on a system to prevent electrostatic discharge damage to sensitive components. See “Electrostatic discharge” in “About this Information Product.”

Related information For related information, see the following:

- [Chapter 1, “Product Description”](#)
- [Chapter 3, “Provisioning, Security, & Administration”](#)

Before you begin Prior to performing this task:

1. Ensure OC-3/OC-12 circuit pack(s) are installed.

Reference: “Task 321: Install Low-Speed OLIU Circuit Packs” (9-95)

2. If not previously completed, install generic and WaveStar® CIT software on the PC.

Reference: “Task 214: Install Generic and WaveStar® CIT Software on the PC” (8-109)

3. Connect PC and establish a WaveStar CIT session.

Reference: “Task 200: Connect Personal Computer (PC) and Establish WaveStar® CIT Session” (8-3)

4. Obtain the work instructions for this task.

Task Complete the following steps to provision ports on OC-3/OC-12 OLIU circuit packs.

- 1 From the **System View** window, click on **Alarm List** button to verify that no locks, loops, or switches are present for the ports on the circuit packs just installed.

Result: The “NE Alarm List” window opens.

- 2 From the **System View** window, select **Configuration > Provision**.

Result: The “Provision Parameters for Equipment” window opens.

- 3 Find the OLIU circuit pack(s) with the ports being provisioned, then expand the equipment list by clicking on the plus (+) sign next to the OLIU.

- 4 Click (highlight) the OLIU port being provisioned, then click on **Provision** at the bottom of the window.

Result: The port parameters display on the right side of the window.

-
- 5** Select and provision the required port parameters, according to your work instructions.

-
- 6** Click **Apply** at the bottom of the window to make your changes.

Result: “Execution of provision may affect the NE service. Do you want to execute this command?”

-
- 7** Verify that you are provisioning the correct port, then click **Yes** to apply your changes.

-
- 8** Are there additional OLIU ports to be provisioned on the OLIU circuit pack?

If...	Then...
Yes	Repeat this task from Step 4 for each port.
No	Stop! End of Steps.

.....

END OF STEPS



Task 323: Add IP Tunnel(s) Through Network

Purpose Use this task to add an IP tunnel(s) through the data communications channel (DCC) OSI-based network.

Required equipment A personal computer (PC) with WaveStar® CIT software installed is required to perform this task.

Important! Release 1.1 or later software is required to perform this task.

Related information For related information, see the following:

- [Chapter 1, “Product Description”](#)
- [Chapter 2, “Operations Interfaces”](#)

Before you begin Before you begin this task:

- Obtain the work instructions for this task.
- Verify that the work instructions identify the OS/FTP server, gateway network element, and remote network element.
- Verify that the work instructions specify the required provisioning at each network element (for example, IP addresses and subnet masks).

Task Complete the following steps to add an IP tunnel(s) through the data communications channel (DCC) OSI-based network:

1

If the FTP server is a...	Then verify that the...
Local personal computer used with the WaveStar® CIT,	Personal computer <i>IP address</i> and <i>Subnet Mask</i> parameters are provisioned. Verify that a static route on the PC connects it to the remote NEs.
Remote operations system	remote operations system <i>IP address</i> , and <i>Subnet Mask</i> parameters are provisioned. If the remote operations system and gateway network element are in different subnetworks, verify that the <i>Default Router IP address</i> parameter is provisioned.

-
- 2 If the FTP server is a local PC, a static route on the PC must provide a path to the remote NEs. If packets are intended for the remote NE, then you must route to the gateway NE.

If the FTP server is a remote operations system, the static route must be entered on the router.

Example: If the FTP server is a local PC, from the MS-DOS prompt, enter **route add 120.20.20.0 120.20.30.1** .

In this example 120.20.20.0 is the subnetwork address of the remote NE and 120.20.30.1 is the IP address of the gateway NE.

.....

- 3 If the remote operations system and gateway network element are in different subnetworks, verify that the router in each subnetwork has IP addresses provisioned for all interfaces.
-

- 4 Establish a login session to the gateway network element.

Reference: [“Task 200: Connect Personal Computer \(PC\) and Establish WaveStar® CIT Session” \(8-3\)](#)

.....

- 5 At the gateway network element:

1. At the WaveStar® CIT System View, select **Administration > Data Communications...** The *Data Communications* screen appears.
2. Click on the **TCP/IP** tab.
3. Click on the **Port AID:** drop-down menu and select *LAN-1* or *LAN-2* according to the work instructions.
4. *Enable* the **TCP/IP function**, and provision the **IP Address** and **IP Subnet Mask** parameters according to the work instructions.
5. If the remote operations system and gateway network element are in different subnetworks, provision the **IP Default Router Address** parameter according to the work instructions.
6. Click on **Apply**. A dialog box appears stating that executing this command resets the network element. Click on **Yes** and the WaveStar® CIT disconnects from the network element.

-
- 6** Re-establish the log in session to the gateway network element.

Reference: “Task 200: Connect Personal Computer (PC) and Establish WaveStar® CIT Session” (8-3)

.....

- 7** At the gateway network element:

1. At the WaveStar® CIT System View, select **Administration > Data Communications...** The *Data Communications* screen appears.
 2. Click on the **IP Tunnel** tab.
 3. Enable the **TAP Advertise** and **TAP Learn** parameters. Then provision the **TAP Group** parameter according to the work instructions and click on **Apply**. A dialog box appears asking you to confirm executing this command. Click on **Yes**. Then click on **Close**.
-

- 8** Log out of the gateway network element and log in to the remote network element.

Reference: “Task 200: Connect Personal Computer (PC) and Establish WaveStar® CIT Session” (8-3)

.....

- 9** At the remote network element:

1. At the WaveStar® CIT System View, select **Administration > Data Communications...** The *Data Communications* screen appears.
2. Click on the **TCP/IP** tab.
3. Click on the **Port AID:** drop-down menu and select the *DCC-all*.
4. Enable **IP Tunneling** parameter.
5. Provision the **IP Address** and **IP Subnet Mask** parameters according to the work instructions and click on **Apply**. A dialog box appears stating that executing this command resets the network element. Click on **Yes** and the WaveStar® CIT disconnects from the network element.

-
- 10** Re-establish the log in session to the remote network element.

Reference: “[Task 200: Connect Personal Computer \(PC\) and Establish WaveStar® CIT Session](#)” (8-3)

.....

- 11** At the remote network element:

1. At the WaveStar® CIT System View, select **Administration > Data Communications...** The *Data Communications* screen appears.
 2. Click on the **IP Tunnel** tab.
 3. Enable the **TAP Advertise** and **TAP Learn** parameters. Then provision the **TAP Group** parameter according to the work instructions and click on **Apply**. A dialog box appears asking you to confirm executing this command. Click on **Yes**. Then click on **Close**.
-

- 12** If required, repeat [Step 8](#) through [Step 11](#) at other remote network elements.

.....

END OF STEPS

.....



Task 324: Provision/Enable/Disable TCP/IP on an IAO LAN Port

Purpose Use this task to provision, enable, or disable TCP/IP on an IAO LAN Port.

Required equipment The following equipment is required:

- Personal Computer (PC) with WaveStar® CIT software installed
- Wrist Strap

Safety precautions To assure both personal safety and the proper functioning of Metropolis® DMXpress, it is imperative to review and understand these warnings and precautions prior to performing this task.



CAUTION

Electrostatic discharge

Use a static ground wrist strap whenever handling circuit packs or working on a system to prevent electrostatic discharge damage to sensitive components. See “Electrostatic discharge” in “About this Information Product”.

Related information For related information, see the following:

- [Chapter 2, “Operations Interfaces”](#)
- [Chapter 3, “Provisioning, Security, & Administration”](#)
- *Metropolis® DMXpress Access Multiplexer TL1 Command Manual, 365-372-313*

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

- Obtain the work instructions for this task.
- Know which LAN port is being provisioned.
- Obtain the IP Address and IP Subnet Mask of the desired LAN port and the IP Default Router Address if you are connecting to a router.
- Be able to log in to a Metropolis® DMXpress with the WaveStar® CIT and be familiar with the functions of the WaveStar® CIT.

Task Perform the following steps to complete this task.

-
- 1** Connect the PC and establish a WaveStar® CIT session.

Reference: “Task 200: Connect Personal Computer (PC) and
Establish WaveStar® CIT Session” (8-3)

-
- 2** Determine which IAO LAN port(s) you want to use (front or rear).

Important! If you are using the rear IAO LAN port, use lan-2 as
your AID. If you are using the front IAO LAN port, use lan-1 as
your AID.

-
- 3** From the System View menu, select
Administration > Data Communications.

Result: The **Data Communications** window opens.

-
- 4** In the **Data Communications** window, click on the **TCP/IP** tab at the top
of the window.

Result: The TCP/IP parameters display.

.....

5 Select and/or modify the following parameters:

1. Select the **LAN Port** (**lan-1** [front] or **lan-2** [rear]) being provisioned.
2. One at a time, click the **Modify** button to set the **IP Address** and **IP Subnet Mask** of the desired LAN port and the **IP Default Router Address**, if you are connecting to a default router.

When the provisioning window opens for the IP address being provisioned, enter the IP address as four dot-separated decimal numbers ranging from 0 to 255. Click **OK** to make your changes or **Cancel** to quit.

3. Select **Enable** to enable the **TCP/IP function**, or **Disable** to disable the **TCP/IP function**.

Important! If you select **Enable** and click **OK** to apply any changes, then execute the command when requested, the system will reset and you will be logged off the system. Selecting **Disable** allows you to stay logged on to the system to perform more provisioning. You can then come back to this window and enable the TCP/IP function.

.....

6 Click **Apply** at the bottom of the window to make your changes.

Result: A warning window opens and asks if you want to execute this command.

.....

7 Click **Yes** to execute the command.

Result: If you made changes and also enabled the TCP/IP function, the changes are applied, the system resets, and you are logged off the system. If you made changes and disabled the TCP/IP function, the changes are applied and you are still logged on to the system.

.....

8 Click **Close** when you want to exit window if you are still logged into the system.

.....

END OF STEPS



Task 325: Provision, Enable, or Disable the Metropolis[®] DMXpress Access Multiplexer as a TL1 TCP/IP GNE

Purpose Use this task to provision, enable, or disable the Metropolis[®] DMXpress as a TL1 TCP/IP Gateway Network Element (GNE).

Required equipment The following equipment is required:

- Personal Computer (PC) with WaveStar[®] CIT software installed
- Wrist Strap

Safety precautions To assure both personal safety and the proper functioning of Metropolis[®] DMXpress, it is imperative to review and understand these warnings and precautions prior to performing this task.



CAUTION

Electrostatic discharge

Use a static ground wrist strap whenever handling circuit packs or working on a system to prevent electrostatic discharge damage to sensitive components. See “Electrostatic discharge” in “About this Information Product”.

Related information For related information, see the following:

- [Chapter 2, “Operations Interfaces”](#)
- [Chapter 3, “Provisioning, Security, & Administration”](#)
- [Appendix A, WaveStar[®] CIT Tutorial](#)
- *Metropolis[®] DMXpress Access Multiplexer TL1 Command Manual, 365-372-313*

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

- Obtain the work instructions for this task.
- Complete “[Task 324: Provision/Enable/Disable TCP/IP on an IAO LAN Port](#)” (9-109) to provision and enable TCP/IP for the selected LAN port.
- Know which LAN port is being provisioned.
- Know the IP calling addresses, host names, and host types for the gateway hosts which will be allowed access to the Metropolis® DMXpress TL1 TCP/IP GNE.
- Be able to log in to a Metropolis® DMXpress with the WaveStar® CIT and be familiar with the functions of the WaveStar® CIT.

Task Complete the following steps to provision, enable, or disable the Metropolis® DMXpress as a TL1 TCP/IP GNE.

.....

1 Connect the PC and establish a WaveStar® CIT session.

Reference: “[Task 200: Connect Personal Computer \(PC\) and Establish WaveStar® CIT Session](#)” (8-3)

.....

2 On the System View menu, select
Administration > Data Communications.

Result: The **Data Communications** window opens.

.....

3 In the Data Communications window, click on the **TCP/IP** tab at the top of the window.

Result: The TCP/IP parameters display.

.....

4 Verify that TCP/IP is properly provisioned and enabled for the required LAN port(s).

Reference: “[Task 324: Provision/Enable/Disable TCP/IP on an IAO LAN Port](#)” (9-109)

-
- 5** In the Data Communications window, click on the **TCP/IP Gateway** tab at the top of the window.

Result: The TCP/IP Gateway parameters display.

-
- 6** From your work instructions, determine which IP calling addresses will be allowed to access the Metropolis® DMXpress TL1 TCP/IP GNE.

-
- 7** Use the instructions on the screen to add, modify, or delete a gateway host from the **TCP/IP Gateway Host List**.

The following parameters apply:

- The OS Host IP address which is four dot-separated decimal numbers, each ranging from 0 to 255.
- The OS Host Name which may consist of 1 to 24 alpha-numeric characters.
- The OS Type which may consist of standard types or listed as other.

-
- 8** Repeat this procedure to provision each of the Host IP addresses you want to authorize for access to the Metropolis® DMXpress TL1 TCP/IP GNE. There may be up to 50 provisioned entries in the list.

-
- 9** On the Data Communications window under **TCP/IP Gateway Control**, select **Enable** to enable the TCP/IP Gateway, or select **Disable** to disable the TCP/IP Gateway.

.....
10 Click **Apply** at the bottom of the window.

Result: A warning window opens and asks if you want to execute this command.

.....
11 Click **Yes** to execute the command, then click **Close** to exit window, if desired.

.....
E N D O F S T E P S
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Task 326: Make Dual-Homed Cross-Connections to a Metropolis® DMX Backbone Ring

Purpose Use this task as an example for making cross-connections in Metropolis® DMXpress dual-homed ring configurations:

This procedure uses an example for DS1 type cross-connections to illustrate the steps involved in cross-connections in a dual-homed UPSR ring configuration. This same procedure could also be used to make any allowable VT, STS-1, STS-3c, or STS-12c, cross-connection using related AIDs and the appropriate rate type in the `ent-crs()` command or CIT Cross Connection Wizard. See [“Cross-Connection Provisioning” \(3-6\)](#) and [“Allowable Cross-Connections” \(3-9\)](#) in Chapter 3, [“Provisioning, Security, & Administration”](#) for rates, types, restrictions, and allowable cross-connections.

Required equipment The following equipment is required:

- Personal Computer (PC) with WaveStar® CIT software installed
- Wrist Strap

Safety precautions To assure both personal safety and the proper functioning of the Metropolis® DMXpress, it is imperative to review and understand these warnings and precautions prior to performing this task.



CAUTION

Electrostatic discharge

Use a static ground wrist strap whenever handling circuit packs or working on a system to prevent electrostatic discharge damage to sensitive components. See “Electrostatic discharge” in “About this Information Product”.

- Related information
- For related information, see the following:
- [Chapter 1, “Product Description”](#)
 - [Chapter 3, “Provisioning, Security, & Administration”](#)
 - *Metropolis® DMXpress Access Multiplexer TL1 Command Manual, 365-372-313*
 - [“Task 319: Establish Dual-Homed OC-12/48 Access via Metropolis® DMX UPSR Backbone Ring” \(9-83\)](#)

- Before you begin
- Prior to performing this task, you must:
- Obtain the work instructions for this task.
 - Verify that the dual-homed network has been established using the procedures in [“Task 319: Establish Dual-Homed OC-12/48 Access via Metropolis® DMX UPSR Backbone Ring” \(9-83\)](#).
 - Determine the cross-connection types, rates, terminating nodes, pass-through nodes, and Metropolis® DMXpress host nodes.
 - Be able to log in to a Metropolis® DMXpress with the WaveStar® CIT and be familiar with the functions of the WaveStar® CIT.

Task

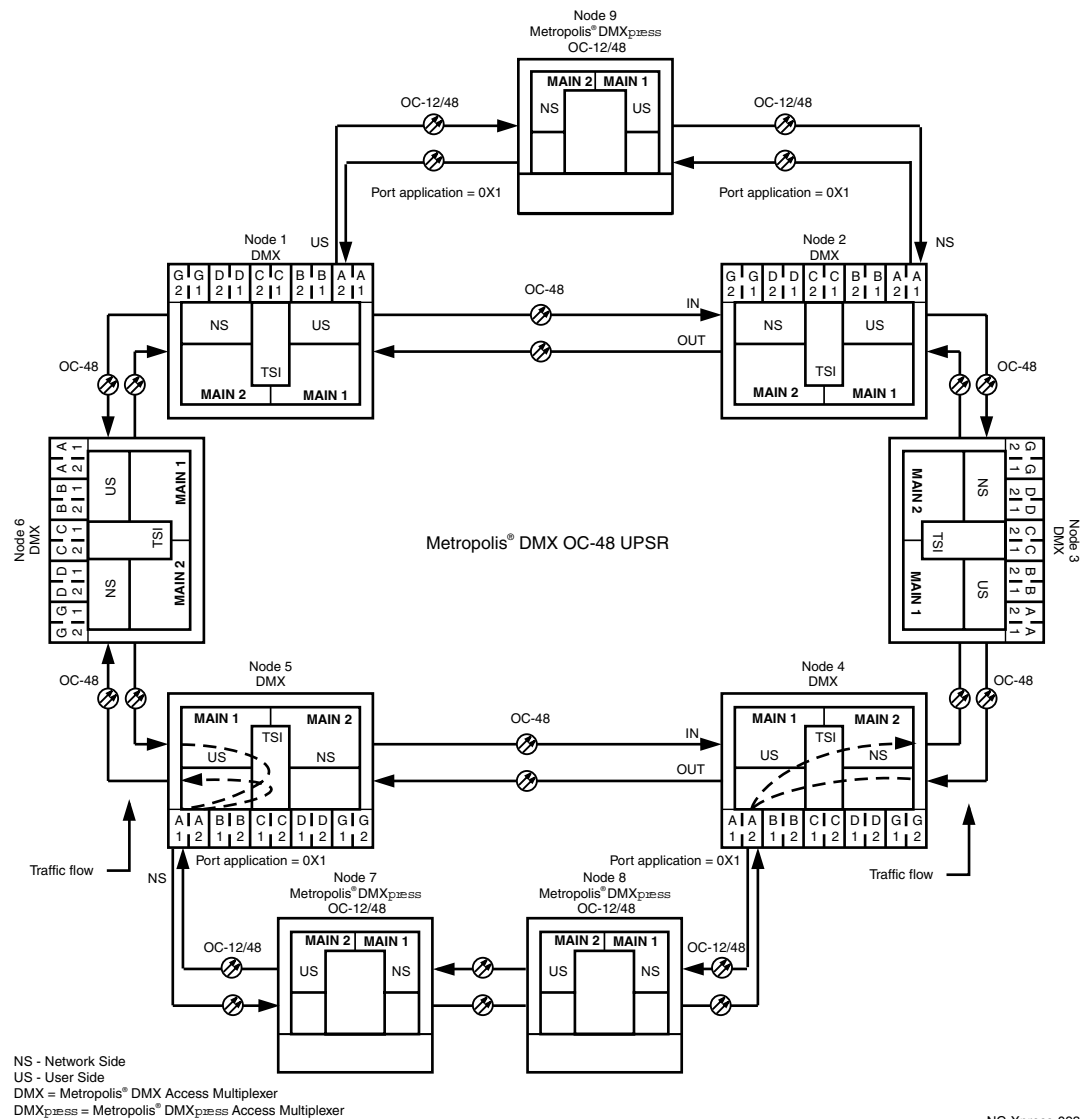
Complete the following steps to make the necessary cross-connections.

-
- 1 Use the WaveStar® CIT to log in to one of the Metropolis® DMX host nodes being used for dual homing.

Reference: *Metropolis® DMX Access Multiplexer User Operations Guide, 365-372-301* “Task 200: Connect Personal Computer (PC) and Establish WaveStar® CIT Session”

- 2 Refer to [Figure 9-12](#) for an example of a dual-homed Metropolis® DMXpress ring configuration.

Figure 9-12 Example of Metropolis® DMXpress Dual-Homed Ring Configuration



NC-Xpress-093

-
- 3 On the **System View** menu, select **Administration > OSI Routing Map** to retrieve a node-to-node listing of every node on this ring.

Important! If a drawing of the network is not provided with the work instructions, it is recommended that you draw a simple diagram of the ring (indicating node-to-node connections) and list each node's TID.

Result: The "OSI Routing Map" window opens.

.....

- 4 Verify that the ring configuration, Metropolis® DMX host nodes, terminating nodes, and pass-through nodes are the same as specified in the work instructions.

Important! All differences between the work instructions and the actual ring configuration must be resolved before continuing.

.....

- 5 One at a time, use the WaveStar® CIT to log in to each node. From the **System View** menu at each node, select **View > View Equipment Details**.

Result: The "View Equipment Details" window opens.

.....

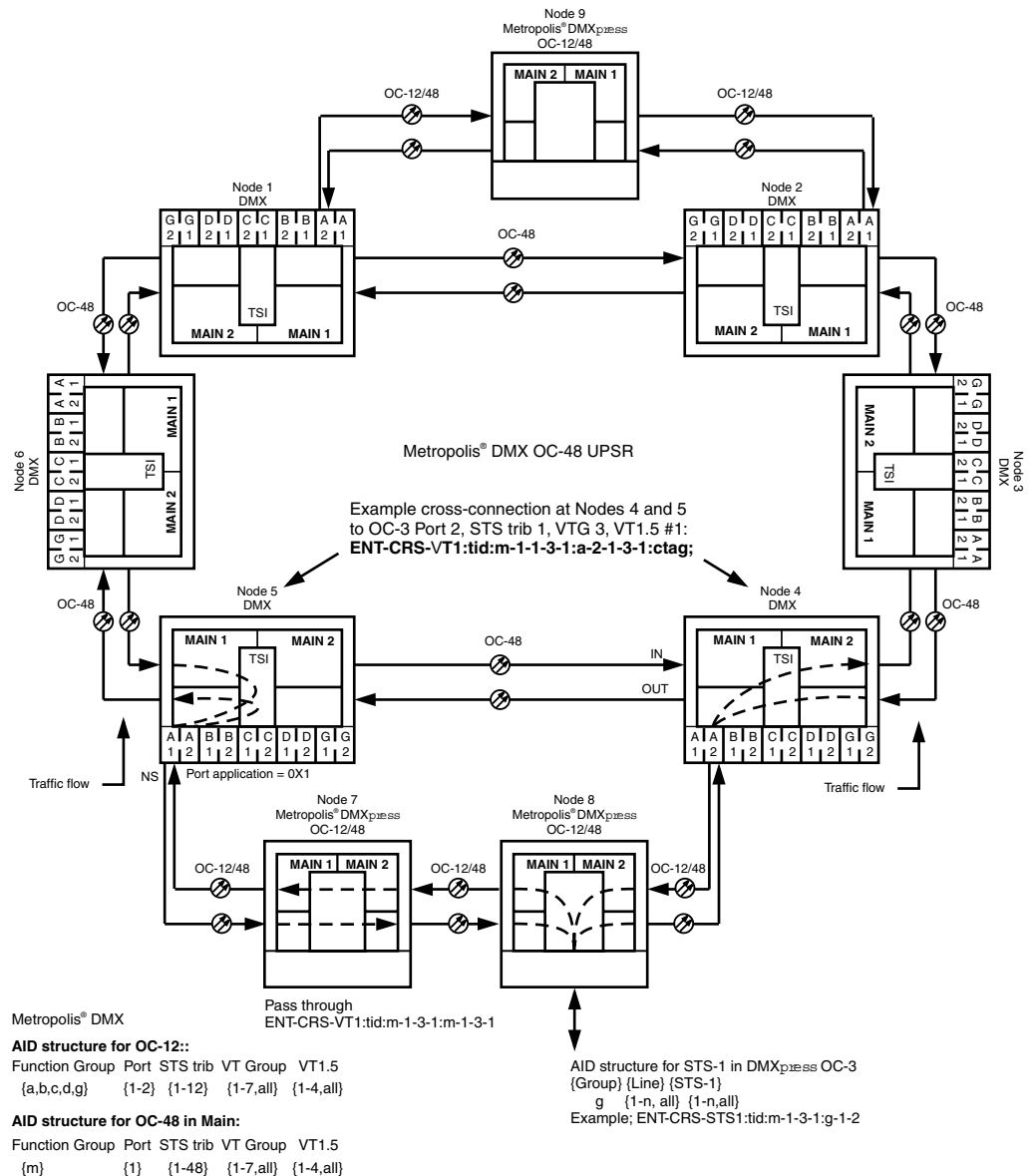
- 6 Find the circuit pack, port, and/or tributaries being used for this service. Select the entity to view, then click the **Select** button at the bottom of the window. View the provisioning details for the selected entity and verify the entities are properly provisioned.
-

- 7 Use product documentation for non Metropolis® DMXpress nodes in the network to verify proper circuit pack/port provisioning details.
-

- 8 If the entities are not provisioned properly, use the procedures in this document to provision the Metropolis® DMXpress circuit packs/ports for service.

- 9 From your work instructions, determine the type of cross-connections to be made at each node for the service being established. Figure 9-13 illustrates an example network with dual-homed cross-connections at Metropolis® DMX node 4 and node 5:

Figure 9-13 Example of Metropolis® DMXpress Dual-Homed Cross-Connections



NC-Xpress-096

Important! Cross-connections supporting DS3 services are STS1 cross-connections. Cross-connections supporting DS1 services may be either STS1 or VT1.5 cross-connections. Use VT1.5 cross-connections for DS1 services if you expect to cross connect only a portion of the VT1.5 signals in the STS-1 channel. If STS1 cross-connections are made at a shelf, there is a fixed mapping of all 28 VT1.5 cross-connections to a specific shelf group.

-
- 10** Starting at one of the “host” nodes for the circuit being established, select **View > Cross Connections** from the System View menu at each node in the ring to verify that that the cross-connections specified on the work instructions may be made. If cross-connections are already assigned or improperly assigned, refer trouble to the provisioning organization. Improperly assigned cross-connections may have to be deleted, or a different time-slot must be selected for the service being selected.
-
- 11** Select **Configuration > Cross-Connection** from the **System View** menu to start the Cross Connection Wizard. Use the Cross Connection Wizard at all non terminating nodes in the network to provision pass-through cross-connections.
-
- 12** Use the Cross Connection Wizard at the terminating (add/drop) nodes of the circuit being established to make the terminating cross-connections. (Select **Configuration > Cross-Connection** from the **System View** menu to start the Cross Connection Wizard).
-
- 13** From the **System View** menu, select **View > Cross Connections** at each node to verify that the proper connection has been made.
-
- 14** After all cross-connections are made, click on the **Alarm List** button on the **System View** window and verify no alarms are present.

-
- 15** If *inc. STSn AIS*, *inc. STS1 unequipped*, *inc. VT AIS*, or *inc. VT unequipped* alarms are present, look for missing or improperly made cross-connections.

Reference: *Metropolis® DMXpress Access Multiplexer Alarm Messages and Trouble Clearing Guide, 365-372-315*

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



Task 327: Make Single-Homed Cross-Connections to a Metropolis[®] DMX Access Multiplexer Backbone Ring

Purpose Use this task as an example for making cross-connections in Metropolis[®] DMXpress single-homed ring configurations:

This procedure uses an example for DS1 type cross-connections to illustrate the steps involved in cross-connections in a single-homed UPSR ring configuration. This same procedure could also be used to make any allowable VT, STS-1, STS-3c, STS-12c, or STS-48c cross-connection using related AIDs and the appropriate rate type in the `ent-ers()` command or CIT Cross Connection Wizard. See “[Cross-Connection Provisioning](#)” (3-6) and “[Allowable Cross-Connections](#)” (3-9) in Chapter 3, “Provisioning, Security, & Administration” for rates, types, restrictions, and allowable cross-connections.

Required equipment The following equipment is required:

- Personal Computer (PC) with WaveStar[®] CIT software installed
- Wrist Strap

Safety precautions To assure both personal safety and the proper functioning of the Metropolis[®] DMXpress, it is imperative to review and understand these warnings and precautions prior to performing this task.



CAUTION

Electrostatic discharge

Use a static ground wrist strap whenever handling circuit packs or working on a system to prevent electrostatic discharge damage to sensitive components. See “Electrostatic discharge” in “About this Information Product”.

Related information

For related information, see the following:

- [Chapter 1, “Product Description”](#)
- [Chapter 3, “Provisioning, Security, & Administration”](#)
- *Metropolis® DMXpress Access Multiplexer TL1 Command Manual, 365-372-313*
- [“Task 318: Establish Single-Homed OC-12/48 Access via Metropolis® DMX UPSR Backbone Ring” \(9-75\)](#)

Before you begin

Prior to performing this task, you must:

- Obtain the work instructions for this task.
- Verify that the single-homed network has been established using the procedures in [“Task 318: Establish Single-Homed OC-12/48 Access via Metropolis® DMX UPSR Backbone Ring” \(9-75\)](#).
- Determine the cross-connection types, rates, terminating nodes, and pass-through nodes.
- Be able to log in to a Metropolis® DMXpress with the WaveStar® CIT and be familiar with the functions of the WaveStar® CIT.

Task

Complete the following steps to make the necessary cross-connections.

.....

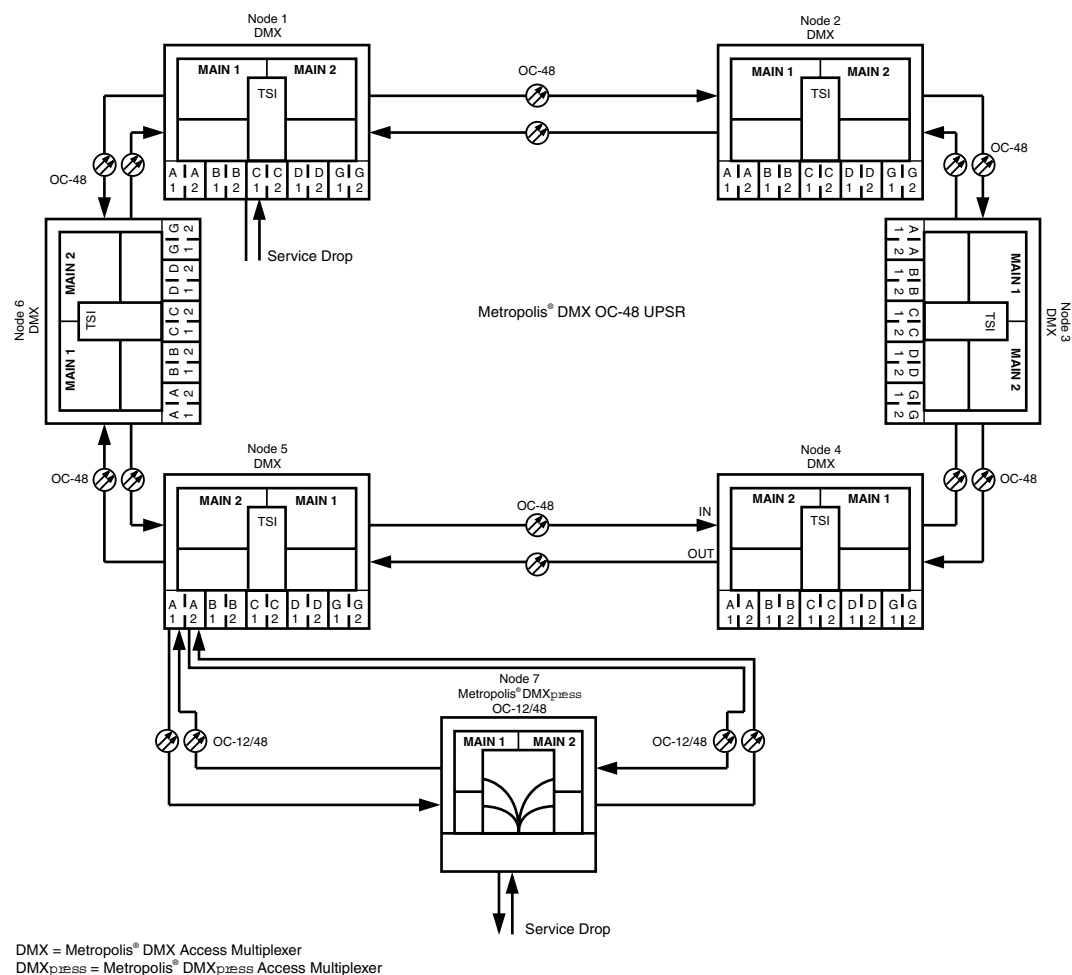
1

Use the WaveStar® CIT to log in to the Metropolis® DMX host node being used for single homing.

Reference: *Metropolis® DMX Access Multiplexer User Operations Guide, 365-372-301* “Task 200: Connect Personal Computer (PC) and Establish WaveStar® CIT Session”

- 2 Refer to [Figure 9-14](#) for an example of a simple single-homed Metropolis® DMXpress ring configuration.

Figure 9-14 Example of a Single-Homed Metropolis® DMXpress Ring



NC-Xpress-098

-
- 3 On the **System View** menu, select **Administration > OSI Routing Map** to retrieve a node-to-node listing of every node on this Metropolis® DMXpress ring.

Important! If a drawing of the network is not provided with the work instructions, it is recommended that you draw a simple diagram of the ring (indicating node-to-node connections) and list each node's TID.

Result: The "OSI Routing Map" window opens.

.....

- 4 Verify that the ring configuration is the same as specified in the work instructions.

Important! All differences between the work instructions and the actual ring configuration must be resolved before continuing.

.....

- 5 From the work instructions, determine the terminating (add/drop) nodes and the pass-through nodes for the particular service that is being established.
-

- 6 One at a time, use the WaveStar® CIT to log in to each node. From the **System View** menu at each node, select **View > View Equipment Details**.

Result: The "View Equipment Details" window opens.

.....

- 7 Find the circuit pack, port, and/or tributaries being used for this service. Select the entity to view, then click the **Select** button at the bottom of the window. View the provisioning details for the selected entity and verify the entities are properly provisioned.
-

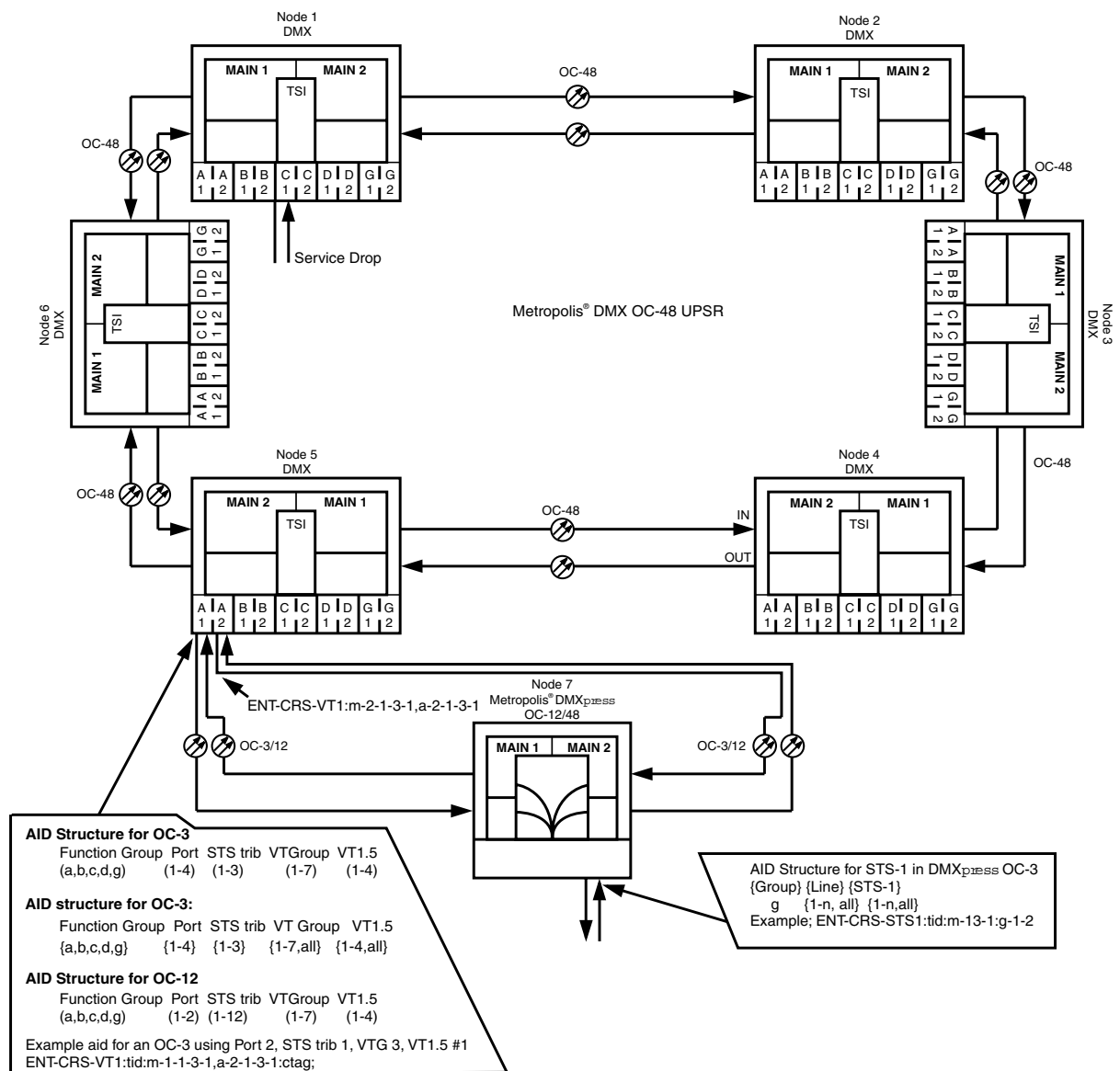
- 8 Use product documentation for non Metropolis® DMXpress nodes in the network to verify proper circuit pack/port provisioning details.
-

- 9 If the entities are not provisioned properly, use the procedures in this section to condition the circuit packs/ports for service.

- 10 From your work instructions, determine the type of cross-connections to be made at each node for the service being established.

Figure 9-15 illustrates an example network with single-homed cross-connections at Metropolis® DMXpress node 5.

Figure 9-15 Example Network with Single-Homed Cross-Connections



DMX = Metropolis® DMX Access Multiplexer
DMXpress = Metropolis® DMXpress Access Multiplexer

NC-Xpress-097

Important! Cross-connections supporting DS3 services are STS1 cross-connections. Cross-connections supporting DS1 services may be either STS1 or VT1.5 cross-connections. Use VT1.5 cross-connections for DS1 services if you expect to cross connect only a portion of the VT1.5 signals in the STS-1 channel. If STS1 cross-connections are made at a shelf, there is a fixed mapping of all 28 VT1.5 cross-connections to a specific shelf group.

-
- 11 Starting at the host node for the circuit being established, select **View > Cross Connections** from the **System View** menu at each node in the ring to verify that the cross-connections specified on the work instructions may be made. If cross-connections are already assigned or improperly assigned, refer trouble to the provisioning organization. Improperly assigned cross-connections may have to be deleted, or a different time-slot must be selected for the service being selected.
 -
 - 12 Select **Configuration > Cross-Connection** from the **System View** menu to start the Cross Connection Wizard. Use the Cross Connection Wizard at all nonterminating nodes in the network to provision pass-through cross-connections.
 -
 - 13 Use the Cross Connection Wizard at the terminating (add/drop) nodes of the circuit being established to make the terminating cross-connections. (Select **Configuration > Cross-Connection** from the **System View** menu to start the Cross Connection Wizard).
 -
 - 14 From the **System View** menu, select **View > Cross Connections** at each node to verify that the proper connection has been made.
 -
 - 15 After all cross-connections are made, click on the **Alarm List** button on the **System View** window and verify no alarms are present.

-
- 16** If any alarms are present, look for missing or improperly made cross-connections.

Reference: *Metropolis® DMXpress Access Multiplexer Alarm Messages and Trouble Clearing Guide, 365-372-315*

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



Task 328 and 329: Reserved for Future Use

Task 330: Establishing Ethernet Services

Purpose Use this task for examples on provisioning ethernet services.

This task provides references to numerous examples for provisioning ethernet services. They are intended to be used as reference only to provide you with general ethernet related provisioning. The examples given may not match your particular configuration. It is impossible to provide examples for all the configurations you may use.

Important! This task assumes that the network system has already been established with all nodes of the network properly equipped and operating for standard SONET transmission.

Required equipment The following equipment is required:

- Personal Computer (PC) with WaveStar® CIT software installed
- Wrist Strap

Safety precautions To assure both personal safety and the proper functioning of the Metropolis® DMXpress, it is imperative to review and understand these warnings and precautions prior to performing this task.



WARNING **Eye damage**

Unterminated optical connectors may emit invisible laser radiation. Eye damage may occur if beam is viewed directly or with optical instruments. Avoid direct exposure to the beam.



CAUTION **Electrostatic discharge**

Use a static ground wrist strap whenever handling circuit packs or working on a system to prevent electrostatic discharge damage to sensitive components. See “Electrostatic Discharge (ESD) Considerations” in “About this Information Product.”

- Related information** For related information, see the following:
- [Chapter 1, “Product Description”](#)
 - [Chapter 2, “Operations Interfaces”](#)
 - [Chapter 3, “Provisioning, Security, & Administration”](#)
 - [Chapter 5, “Ethernet”](#)
 - [Appendix A, WaveStar® CIT Tutorial](#)
 - *Metropolis® DMXpress Access Multiplexer TL1 Command Manual, 365-372-313*

- Before you begin** Before you begin this task, you must:
- Obtain the work instructions for the ethernet service being established.
 - Be familiar with ethernet service provisioning or have complete work instructions detailing the particular service being established.

Task Perform the following steps to provision ethernet services.

-
- 1** Use the WaveStar® CIT to log in to a terminating node.

Reference: [“Task 200: Connect Personal Computer \(PC\) and Establish WaveStar® CIT Session” \(8-3\)](#)

.....

- 2** Click on the **Alarm List** button on the System View window and verify no alarms are present.
-

- 3** If any alarms are activated, they must be cleared prior to beginning this task.

Reference: *Metropolis® DMXpress Access Multiplexer Alarm Messages and Trouble Clearing Guide, 365-372-315*

.....

- 4** One at a time, use the WaveStar® CIT to log in to each terminating end node. From the System View menu at each node, select **View > View Equipment Details**.

Result: The “View Equipment Details” window opens.

.....

-
- 5** Verify that the ethernet circuit packs have been installed correctly at each NE providing ethernet service.

Reference: “Task 336: Install GbE/2 (A1AA008), GbE/SX/2 (A1AA019), or FASTE/16 (A1AA007) Ethernet Circuit Packs” (9-227)

.....

- 6** Note the following general order of provisioning requirements for the type of service being provisioned:
1. Set tagging mode (No Tag, 802.1Q, Transparent) of the circuit pack using the *ed-eqpt* TL1 command (must be done first).
 2. Create Virtual Switch and assign ports (must be done second, if required [does not apply to the No Tag mode]).
 3. Establish SONET STS-1 cross-connections.
 4. Create Spanning Tree groups and assign ports (does not apply to the No Tag mode or to UPSR protected services using 2waypr cross-connections)
 5. Establish VLANs and assign ports (802.1Q Tag Mode ONLY).
 6. Assign port tags (Transparent Tag mode ONLY).

-
- 7 Refer to one of the following to use as an example for the service being provided:
- “SE 330-1: Establish Point-to-Point UPSR Protected 1GbE Full Rate Private Line Service (No Tag Mode)” (9-139)
 - “SE 330-2: Establish Point-to-Point UPSR Protected GbE Service (802.1q Mode)” (9-145)
 - “SE 330-3: Establish Point-to-Point UPSR Protected GbE Service (Transparent Mode)” (9-155)
 - “SE 330-4: Establish Ethernet Packet Ring on a UPSR Ring” (9-163)
 - “SE 330-5: Establish 802.1q Mode Ethernet Service on Established Packet Ring (UPSR Ring)” (9-173)
 - “SE 330-6: Establish Transparent Mode Ethernet Service on Established Packet Ring (UPSR Ring)” (9-179)
 - “SE 330-10: Editing Ethernet Port Parameters” (9-189)
 - “SE 330-11: Editing VCG Parameters” (9-193)
 - “SE 330-12: Editing Ethernet Circuit Pack Parameters” (9-197)

END OF STEPS

.....

☐

SE 330-1: Establish Point-to-Point UPSR Protected 1GbE Full Rate Private Line Service (No Tag Mode)

Overview This procedure provides an example for configuring point-to-point UPSR protected GbE full rate private line ethernet service using the No Tag tagging mode. See [Figure 9-16](#) for an example.

This procedure uses TL1 commands and specific WaveStar® CIT menu selections to illustrate the detailed provisioning parameters. If you prefer, you can use the Data Provisioning Wizard to perform the provisioning in this procedure. From the System View menu, select **Configuration > Ethernet Service** to invoke the wizard.

Important! On connected gigabit Ethernet devices with autonegotiation turned on/enabled, if transmission is interrupted in one direction of transmission on a gigabit ethernet device, then transmission will also be disabled in the other direction. For example, if one fiber in a transmit/receive pair is cut, then one-way transmission on the other fiber can be maintained only if autonegotiate is turned off/disabled and the link state is forced good at the transmit source equipment.

Reference: [Chapter 5, “Ethernet”](#)

Before you begin Before you begin this procedure, you must have complete work instructions for this task that detail:

- The network configuration and the terminating ethernet nodes.
- The shelf slots, circuit packs, ports, and VCGs being provisioned.
- The number and type of 2waypr cross-connections to be made at each node.

Related information For related information and explanation of TL1 commands and the WaveStar® CIT menus, see the following:

- [Appendix A, WaveStar® CIT Tutorial](#)
- *Metropolis® DMXpress Access Multiplexer TL1 Command Manual, 365-372-313*

Procedure Use this procedure as an example for configuring a point-to-point UPSR protected 1GbE full rate private line service (No Tag mode). See [Figure 9-16](#) for an example.

-
- 1 Use the WaveStar® CIT to log in to one of the terminating nodes, if not already performed.

Reference: “[Task 200: Connect Personal Computer \(PC\) and Establish WaveStar® CIT Session](#)” (8-3)

.....

- 2 On the System View menu, select **Administration > OSI Routing Map** to retrieve a node-to-node listing of every node in the network.

Important! If a drawing of the network is not provided with the work instructions, it is recommended that you draw a simple diagram of the ring (indicating node-to-node connections) and list each node’s TID.

This command may take several minutes to complete depending on the size of the network.

Result: The “OSI Routing Map” window opens.

.....

- 3 Verify that the system configuration is the same as specified on your work instructions.
-

- 4 From your work instructions, determine the circuit pack, port, and cross-connections to be made at each node associated with the service to be established.
-

5 CONFIGURE TAGGING MODE

Determine the existing tagging mode for the circuit pack being provisioned. Use the TL1 **rtrv-eqpt** command or select **View > View Equipment Details** from the System View menu, select the CP, then click **Select**. Note the VLAN Tagging Mode.

6

If...	Then...
the tagging mode is set correctly to NO TAG,	Proceed to Step 11 .
the tagging mode is NOT set to NO TAG,	Continue with Step 7 .

7 Determine if a virtual switch ID has already been assigned to the LAN/WAN ports used for this service. Use the TL1 **rtrv-vrtsw** command or select the **View > Data > Virtual Switch** command from the System View menu, select the GbE circuit pack being provisioned, then click **Select**. Note if a virtual switch ID has been assigned.

8 If you are going to change the VLAN Tagging Mode that presently exists AND a virtual switch ID already exists, you must delete the existing virtual switch ID before changing the tagging mode.

If required, use the TL1 **dlt-vrtsw** command or select the **Configuration > Data > Delete a Virtual Switch** command from the System View menu, select the circuit pack being provisioned, then click **Select**. Highlight the **VRTSW ID** being deleted, then click **Apply** and **Yes** on the warning dialog box to exit.

9 Use the TL1 **ed-eqpt** command or select the **Configuration > Provision** command from the System View menu, select the circuit pack being provisioned, then click **Provision**.

10 Select **NOTAG** in the Select VLAN Tagging Mode box, then click **Apply**. Read the warning message, then click **OK** to make your changes. Click **Close** to exit.

.....

11 ESTABLISH SONET CROSS-CONNECTIONS

Determine the necessary **2wayPR** STS-1 cross-connections to be made at each terminating and non terminating node in the network.

Note that full rate gigabit service requires 21 STS-1 cross-connections. If LAN port 1 is being used, as in this example, then make cross-connections to VCG 1. If LAN port 2 is being used, then make cross-connections to VCG 3.

.....

- 12** One at a time at each node in the network, use the TL1 **ent-crs-sts1** command to provision the **2waypr** cross-connections. Or, select **Configuration > Cross-Connection** from the System View menu to start the Cross Connection Wizard. Use the Cross Connection Wizard at each of the nodes in the network to provision the **2wayPR** (UPSR) cross-connections.

Important! Note that cross-connections at the terminating nodes are add/drop and cross-connections at the non terminating nodes are pass-through.

Reference: [“Task 331: Make STS1 Cross-Connections for Ethernet Service” \(9-201\)](#)

.....

- 13** From the System View menu, select **View > Cross Connections** at each node to verify that the proper connections have been made.
-

- 14** After all cross-connections are made, click on the **Alarm List** button on the System View window and verify no alarms are present.
-

- 15** If alarms are present, look for missing or improperly made cross-connections.

Reference: *Metropolis® DMXpress Access Multiplexer Alarm Messages and Trouble Clearing Guide, 365-372-315*

.....

16 PROVISION LAN PORTS

Use the TL1 **ed-eport** command to provision the LAN port parameters, or select **Configuration > Provision** from the System View menu, highlight the Ethernet card and then the LAN port and click **Provision**. Provision the parameters as required.

Reference: [“SE 330-10: Editing Ethernet Port Parameters” \(9-189\)](#)

.....

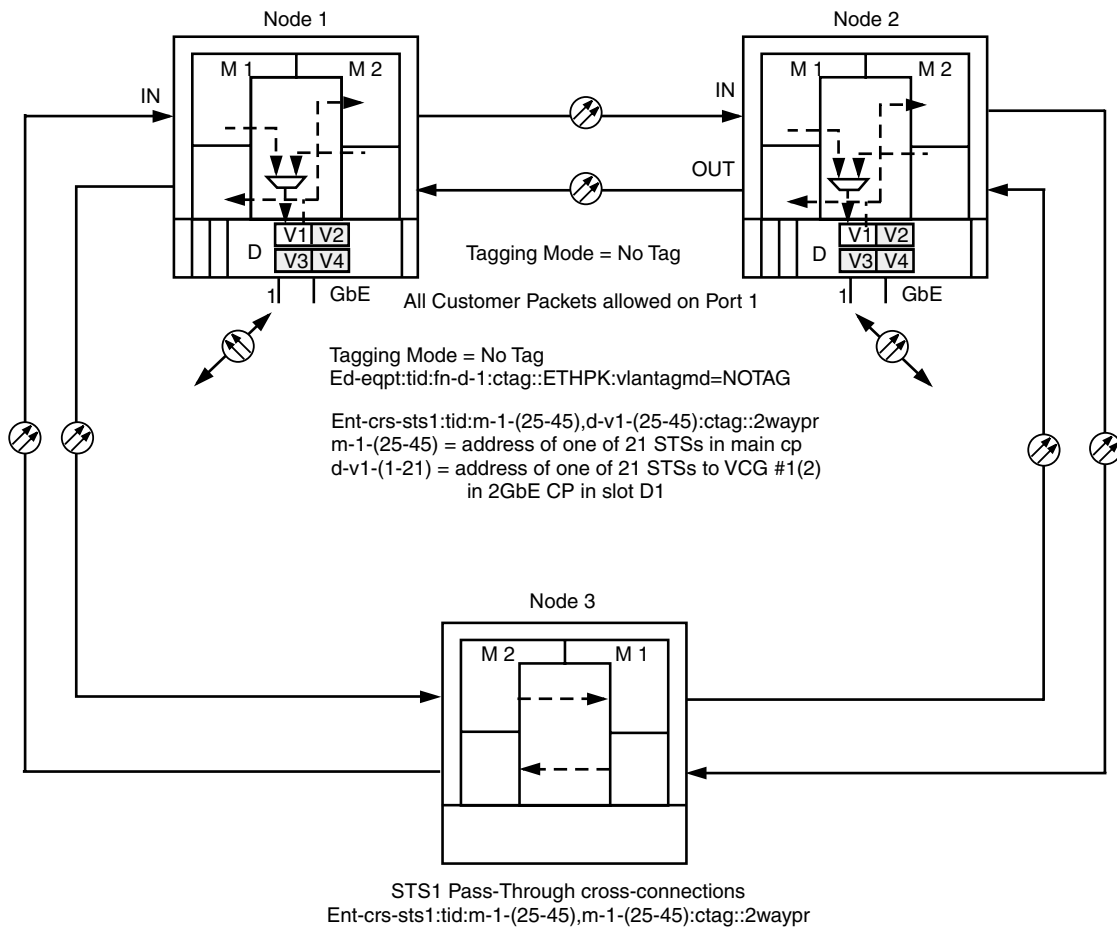
17 PROVISION VCGS

Use the **ed-vcg** TL1 command to provision the WAN (VCG) port parameters, or select **Configuration > Provision** from the System View menu, highlight the Ethernet card and then the VCG port, and click **Provision**. Provision the parameters as required.

Reference: [“SE 330-11: Editing VCG Parameters” \(9-193\)](#)

END OF STEPS
.....

Figure 9-16 Point-to-Point 1GbE Full Rate Private Line Example



SE 330-2: Establish Point-to-Point UPSR Protected GbE Service (802.1q Mode)

Overview This procedure provides an example for configuring point-to-point UPSR protected GbE ethernet service using the 802.1q tagging mode. See [Figure 9-17](#) for an example.

This procedure uses TL1 commands and specific WaveStar® CIT menu selections to illustrate the detailed provisioning parameters. If you prefer, you can use the Data Provisioning Wizard to perform the provisioning in this procedure. From the System View menu, select **Configuration > Ethernet Service** to invoke the wizard.



CAUTION

In Release 3.0 and earlier, additional STS-1 cross-connection capacity may NOT be added to an in-service ethernet circuit pack without the risk of service interruption.

Important! On connected gigabit Ethernet devices with autonegotiation turned on/enabled, if transmission is interrupted in one direction of transmission on a gigabit ethernet device, then transmission will also be disabled in the other direction. For example, if one fiber in a transmit/receive pair is cut, then one-way transmission on the other fiber can be maintained only if autonegotiate is turned off/disabled and the link state is forced good at the transmit source equipment. See [“Auto-negotiation disable” \(5-4\)](#) in [Chapter 5, “Ethernet”](#) for more information.

Before you begin Before you begin this procedure, you must have complete work instructions for this task that detail:

- The network configuration and the terminating ethernet nodes.
- The shelf slots, circuit packs, ports, and VCGs being provisioned.
- The number and type of 2waypr cross-connections to be made at each node.
- The tagging mode (802.1q) and virtual switch ID.

Related information

For related information and explanation of TL1 commands and the WaveStar® CIT menus, see the following:

- [Chapter 3, “Provisioning, Security, & Administration”](#)
- [Chapter 5, “Ethernet”](#)
- [Appendix A, WaveStar® CIT Tutorial](#)
- *Metropolis® DMXpress Access Multiplexer TL1 Command Manual, 365-372-313*

Procedure

Use this procedure as an example for configuring point-to-point UPSR protected GbE ethernet service using the 802.1q tagging mode. See [Figure 9-17](#) for an example.

-
- 1 Use the WaveStar® CIT to log in to one of the terminating nodes, if not already performed.

Reference: [“Task 200: Connect Personal Computer \(PC\) and Establish WaveStar® CIT Session” \(8-3\)](#)

.....

- 2 On the System View menu, select **Administration > OSI Routing Map** to retrieve a node-to-node listing of every node in the network.

Important! If a drawing of the network is not provided with the work instructions, it is recommended that you draw a simple diagram of the ring (indicating node-to-node connections) and list each node’s TID.

This command may take several minutes to complete depending on the size of the network.

Result: The “OSI Routing Map” window opens.

.....

- 3 Verify that the system configuration is the same as specified on your work instructions.
-

- 4 From your work instructions, determine the circuit pack, port, and cross-connections to be made at each node associated with the service to be established.



CAUTION

If the ethernet circuit pack is already in service, the existing tagging mode cannot be changed without removing all existing service.

5 CONFIGURE TAGGING MODE

Determine the existing tagging mode and parameters for the circuit pack being provisioned. Use the TL1 **rtrv-eqpt** command or select **View > Equipment Details** from the System View menu, select the CP, then click **Select**. Note the VLAN Tagging Mode, Burst Size, and Credit Interval parameters.

6 Select one of the following:

If...	Then...
the tagging mode and all parameters are set correctly,	Proceed to Step 12 .
the tagging mode is set correctly to 802.1TAG but other parameters are not correct,	Proceed to Step 9 .
the tagging mode is NOT set to 802.1TAG,	Continue with Step 7 .

7 If you are going to change the VLAN Tagging Mode that presently exists AND a virtual switch ID already exists, you must delete the existing virtual switch ID before changing the tagging mode.

Determine if a virtual switch ID has already been assigned to the LAN/WAN ports used for this service. Use the TL1 **rtrv-vrtsw** command or select the **View > Data > Virtual Switch** command from the System View menu, select the GbE circuit pack being provisioned, then click **Select**. Note if a virtual switch ID has been assigned.

-
- 8 If required, use the TL1 **dlt-vrtsw** command or select the **Configuration > Data > Delete A Virtual Switch** command from the System View menu, highlight the circuit pack being provisioned, then click **Select**. Highlight the **VRTSW ID** being deleted, then click **Apply**.

Read the warning message, then click **Yes** to execute the command.
Click **Close** to exit.

.....

- 9 Use the TL1 **ed-eqpt** command or select the **Configuration > Provision** command from the System View menu. Select the circuit pack being provisioned, then click **Provision**.
-

- 10 Verify/Select **802.1TAG** in the Select VLAN Tagging Mode box.
-

- 11 Verify/Enter the **Burst Size** and **Credit Interval** parameter values as required, then click **Apply**. Read the warning message, then click **OK** to make your changes. Click **Close** to exit.

Reference: [“SE 330-12: Editing Ethernet Circuit Pack Parameters” \(9-197\)](#)

.....



CAUTION

Once a virtual switch is created and service has been established on the circuit pack, you cannot delete the virtual switch without interrupting service. If the service you are establishing in this procedure is a second service on an existing GbE circuit pack with all LAN/WAN ports in the same virtual switch, then the existing virtual switch ID must be retained or the ports not in service must be removed from the existing virtual switch and a new virtual switch created.

12 ASSIGN VIRTUAL SWITCH ID

- For circuit packs not yet in service with no virtual switch assigned:
 - Use the TL1 **ent-vrtsw** command to create an assigned virtual switch ID or select **Configuration > Data > Create A Virtual Switch** command from the CIT System View menu.
- For circuit packs not yet in service with a virtual switch assigned:
 - Use the TL1 **dlt-vrtsw** command to delete an assigned virtual switch ID or select **Configuration > Data > Delete A Virtual Switch** command from the CIT System View menu, if a different virtual switch ID is required.
 - Use the TL1 command **ent-vrtsw** command or select **Configuration > Data > Create A Virtual Switch** to create a new virtual switch ID containing the selected LAN/WAN ports.
- For circuit packs in service, on only one set of ports, with a virtual switch assigned:
 - Use the TL1 **ed-vrtsw** command to change an assigned virtual switch ID or select **Configuration > Data > Provision A Virtual Switch** command from the CIT System View menu to add/remove ports from a virtual switch.
 - Use the TL1 command **ent-vrtsw** command or select **Configuration > Data > Create A Virtual Switch** to create a new virtual switch ID containing the selected LAN/WAN ports.



CAUTION

In Release 3.0 and earlier, additional STS-1 cross-connection capacity may NOT be added to an in-service ethernet circuit pack without the risk of service interruption.

13 ESTABLISH SONET CROSS-CONNECTIONS

Determine the necessary **2wayPR** STS-1 cross-connections to be made at each terminating and non terminating node in the network.

Note that full rate gigabit service requires 21 STS-1 cross-connections.

-
- 14** One at a time at each node in the network, use the TL1 **ent-crs-sts1** command to provision the **2waypr** cross-connections. Or, select **Configuration > Cross-Connection** from the System View menu to start the Cross Connection Wizard. Use the Cross Connection Wizard at each of the nodes in the network to provision the **2wayPR** cross-connections.

Important! Note that cross-connections at the terminating nodes are add/drop and cross-connections at the non terminating nodes are pass-through.

Reference: [“Task 331: Make STS1 Cross-Connections for Ethernet Service” \(9-201\)](#)

-
- 15** From the System View menu, select **View > Cross Connections** at each node to verify that the proper connections have been made.

-
- 16** After all cross-connections are made, click on the **Alarm List** button on the System View window and verify no alarms are present.

-
- 17** If alarms are present, look for missing or improperly made cross-connections.

Reference: *Metropolis® DMXpress Access Multiplexer Alarm Messages and Trouble Clearing Guide, 365-372-315*

18 ASSIGN VLAN IDs

Use the TL1 **ent-vlan** command to assign the default VLAN ID for customer untagged frames or the customer VLAN ID for tagged frames to the associated LAN ports and VCG WAN ports. Or select **Configuration > Data > Create A VLAN** command from the CIT System View menu. For example, see [Figure 9-17](#).

Example: In [Figure 9-17](#), assume a GbE circuit pack is installed in function slot d-1 and LAN port 2 at each circuit pack is used for service.

Note that a service has been established between Node 1 and Node 2 for customer untagged frames using a default VLAN ID of 34.

Note that a service has been established between Node 1 and Node 2 for customer tagged frames using a VLAN ID of 55.

19 PROVISION LAN PORTS

Use the TL1 **ed-eport** command to provision the LAN port parameters, or select **Configuration > Provision** from the System View menu. Expand the details for the circuit pack, highlight the LAN Port, then click **Provision**. Provision the parameters as required.

Reference: [“SE 330-10: Editing Ethernet Port Parameters” \(9-189\)](#)

20 Click **Apply**. Read the warning message, then click **Yes** to execute the command.

21 PROVISION VCGS

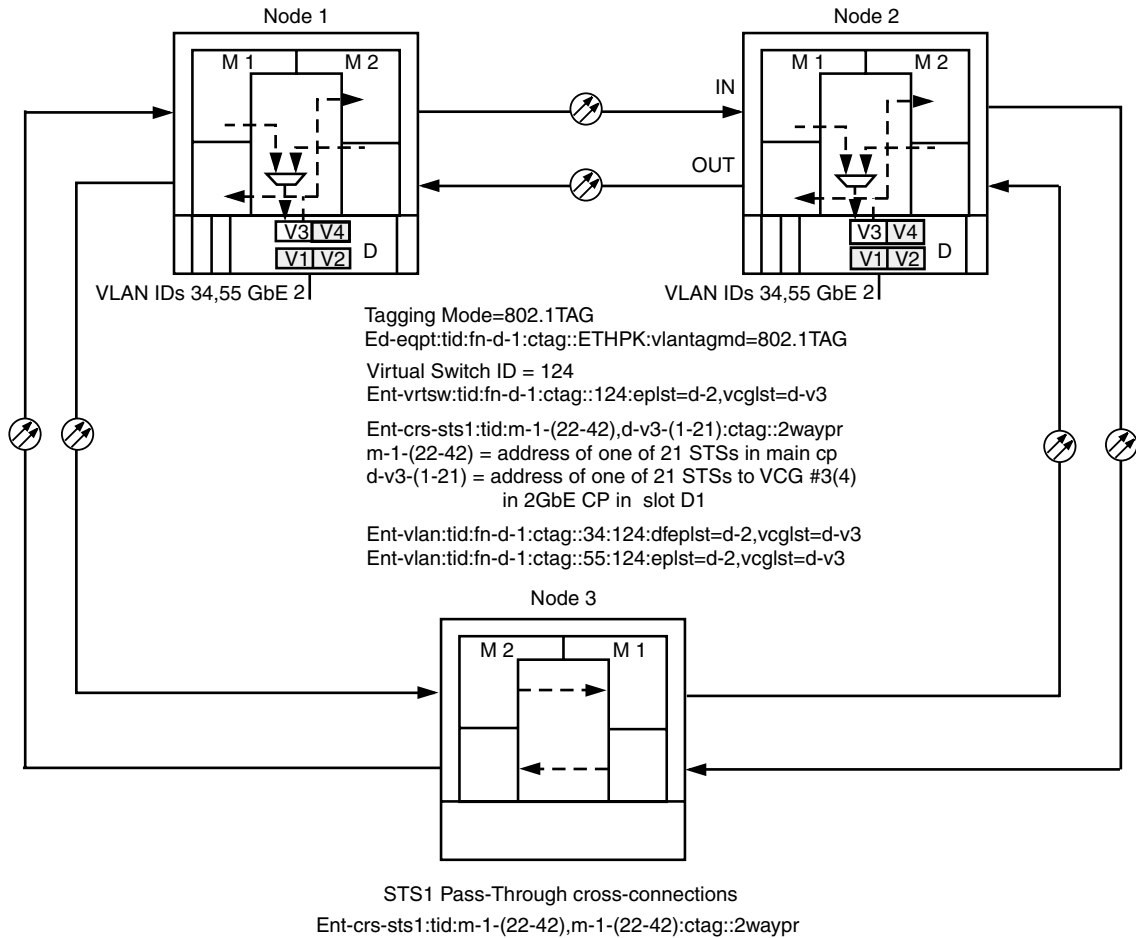
Use the **ed-vcg** TL1 command to provision the WAN (VCG) port parameters, or select **Configuration > Provision** from the System View menu, if window is not already open from the provision step. Expand the details for the circuit pack, highlight the VCG port, then click **Provision**. Provision the parameters as required.

Reference: [“SE 330-11: Editing VCG Parameters” \(9-193\)](#)

-
- 22** Click **Apply**. Read the warning message, then click **Yes** to execute the command. Click **Close** to exit or repeat from [Step 19](#) for other port provisioning.

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

Figure 9-17 Point-to-Point GbE Using 802.1q Tagging Mode



nc-dmx-229

SE 330-2: Establish Point-to-Point UPSR Protected GbE
Service (802.1q Mode)

SE 330-3: Establish Point-to-Point UPSR Protected GbE Service (Transparent Mode)

Overview This procedure provides an example for configuring point-to-point UPSR protected GbE ethernet service using the Transparent tagging mode. See [Figure 9-18](#) for an example.

This procedure uses TL1 commands and specific WaveStar® CIT menu selections to illustrate the detailed provisioning parameters. If you prefer, you can use the Data Provisioning Wizard to perform the provisioning in this procedure. From the System View menu, select **Configuration > Ethernet Service** to invoke the wizard.



CAUTION

In Release 3.0 and earlier, additional STS-1 cross-connection capacity may NOT be added to an in-service ethernet circuit pack without the risk of service interruption.

Important! On connected gigabit Ethernet devices with autonegotiation turned on/enabled, if transmission is interrupted in one direction of transmission on a gigabit ethernet device, then transmission will also be disabled in the other direction. For example, if one fiber in a transmit/receive pair is cut, then one-way transmission on the other fiber can be maintained only if autonegotiate is turned off/disabled and the link state is forced good at the transmit source equipment. See [“Auto-negotiation disable” \(5-4\)](#) in [Chapter 5, “Ethernet”](#) for more information.

Before you begin Before you begin this procedure, you must have complete work instructions for this task that detail:

- The network configuration and the terminating ethernet nodes.
- The shelf slots, circuit packs, ports, and VCGs being provisioned.
- The number and type of 2waypr cross-connections to be made at each node.
- The tagging mode (transparent) and virtual switch ID.

Related information For related information and explanation of TL1 commands and the WaveStar® CIT menus, see the following:

- [Chapter 3, “Provisioning, Security, & Administration”](#)
- [Chapter 5, “Ethernet”](#)
- [Appendix A, WaveStar® CIT Tutorial](#)
- *Metropolis® DMXpress Access Multiplexer TL1 Command Manual, 365-372-313*

Procedure Use this procedure as an example for configuring point-to-point UPSR protected GbE ethernet service using the Transparent tagging mode.

-
- 1** Use the WaveStar® CIT to log in to one of the terminating nodes, if not already performed.

Reference: [“Task 200: Connect Personal Computer \(PC\) and Establish WaveStar® CIT Session” \(8-3\)](#)

.....

- 2** On the System View menu, select **Administration > OSI Routing Map** to retrieve a node-to-node listing of every node in the network.

Important! If a drawing of the network is not provided with the work instructions, it is recommended that you draw a simple diagram of the ring (indicating node-to-node connections) and list each node’s TID.

This command may take several minutes to complete depending on the size of the network.

Result: The “OSI Routing Map” window opens.

.....

- 3** Verify that the system configuration is the same as specified on your work instructions.
-

- 4** From your work instructions, determine the circuit pack, port, and cross-connections to be made at each node associated with the service to be established.



CAUTION

If the ethernet circuit pack is already in service, the existing tagging mode cannot be changed without removing all existing service.

5 CONFIGURE TAGGING MODE

Determine the existing tagging mode and parameters for the circuit pack being provisioned. Use the TL1 **rtrv-eqpt** command or select **View > Equipment Details** from the System View menu, select the CP, then click **Select**. Note the VLAN Tagging Mode, Burst Size, and Credit Interval parameters.

6 Select one of the following:

If...	Then...
the tagging mode and all parameters are set correctly,	Proceed to Step 11 .
the tagging mode is set correctly to TRANS but other parameters are not correct,	Proceed to Step 9 .
the tagging mode is NOT set to TRANS,	Continue with Step 7 .

7 If you are going to change the VLAN Tagging Mode that presently exists AND a virtual switch ID already exists, you must delete the existing virtual switch ID before changing the tagging mode.

Determine if a virtual switch ID has already been assigned to the LAN/WAN ports used for this service. Use the TL1 **rtrv-vrtsw** command or select the **View > Data > Virtual Switch** command from the System View menu, select the GbE circuit pack being provisioned, then click **Select**. Note if a virtual switch ID has been assigned.

-
- 8 If required, use the TL1 **dlt-vrtsw** command or select the **Configuration > Data > Delete A Virtual Switch** command from the System View menu, highlight the circuit pack being provisioned, then click **Select**. Highlight the **VRTSW ID** being deleted, then click **Apply**.

Read the warning message, then click **Yes** to execute the command.
Click **Close** to exit.

.....

- 9 Use the TL1 **ed-eqpt** command or select the **Configuration > Provision** command from the System View menu. Select the circuit pack being provisioned, then click **Provision**.
-

- 10 Verify/Select **TRANS** in the Select VLAN Tagging Mode box.
-

- 11 Verify/Enter the **Burst Size** and **Credit Interval** parameter values as required, then click **Apply**. Read the warning message, then click **OK** to make your changes. Click **Close** to exit.

Reference: [“SE 330-12: Editing Ethernet Circuit Pack Parameters” \(9-197\)](#)

.....



CAUTION

Once a virtual switch is created and service has been established on the circuit pack, you cannot delete the virtual switch without interrupting service. If the service you are establishing in this procedure is a second service on an existing GbE circuit pack with all LAN/WAN ports in the same virtual switch, then the existing virtual switch ID must be retained or the ports not in service must be removed from the existing virtual switch and a new virtual switch created.

12 ASSIGN VIRTUAL SWITCH ID

- For circuit packs not yet in service with no virtual switch assigned:
 - Use the TL1 **ent-vrtsw** command to create an assigned virtual switch ID or select **Configuration > Data > Create A Virtual Switch** command from the CIT System View menu.
- For circuit packs not yet in service with a virtual switch assigned:
 - Use the TL1 **dlt-vrtsw** command to delete an assigned virtual switch ID or select **Configuration > Data > Delete A Virtual Switch** command from the CIT System View menu, if a different virtual switch ID is required.
 - Use the TL1 command **ent-vrtsw** command or select **Configuration > Data > Create A Virtual Switch** to create a new virtual switch ID containing the selected LAN/WAN ports.
- For circuit packs in service, on only one set of ports, with a virtual switch assigned:
 - Use the TL1 **ed-vrtsw** command to change an assigned virtual switch ID or select **Configuration > Data > Provision A Virtual Switch** command from the CIT System View menu to add/remove ports from a virtual switch.
 - Use the TL1 command **ent-vrtsw** command or select **Configuration > Data > Create A Virtual Switch** to create a new virtual switch ID containing the selected LAN/WAN ports.



CAUTION

In Release 3.0 and earlier, additional STS-1 cross-connection capacity may NOT be added to an in-service ethernet circuit pack without the risk of service interruption.

13 ESTABLISH SONET CROSS-CONNECTIONS

Determine the necessary **2wayPR** STS-1 cross-connections to be made at each terminating and non terminating node in the network.

Note that full rate gigabit service requires 21 STS-1 cross-connections.

-
- 14** One at a time at each node in the network, use the TL1 **ent-crs-sts1** command to provision the **2waypr** cross-connections. Or, select **Configuration > Cross-Connection** from the System View menu to start the Cross Connection Wizard. Use the Cross Connection Wizard at each of the nodes in the network to provision the **2wayPR** cross-connections.

Important! Note that cross-connections at the terminating nodes are add/drop and cross-connections at the non terminating nodes are pass-through.

Reference: [“Task 331: Make STS1 Cross-Connections for Ethernet Service” \(9-201\)](#)

-
- 15** From the System View menu, select **View > Cross Connections** at each node to verify that the proper connections have been made.

-
- 16** After all cross-connections are made, click on the **Alarm List** button on the System View window and verify no alarms are present.

-
- 17** If alarms are present, look for missing or improperly made cross-connections.

Reference: *Metropolis® DMXpress Access Multiplexer Alarm Messages and Trouble Clearing Guide, 365-372-315*

-
- 18** PROVISION LAN (Ethernet) PORTS

Use the TL1 **ed-eport** command to provision the Default Port Tag (**dftporttag**) and other parameters for the LAN port being provisioned. Or, select **Configuration > Provision** from the System View menu. Expand the details for the circuit pack, highlight the LAN Port, then click **Provision**. Provision the Default Port Tag and other parameters as required.

Reference: [“SE 330-10: Editing Ethernet Port Parameters” \(9-189\)](#)

-
- 19** Click **Apply**. Read the warning message, then click **Yes** to execute the command.
-

20 PROVISION WAN (VCG) PORTS

Use the TL1 **ed-vcg** command to add port tags (**addporttag**) to the WAN (VCG) ports and provision other parameters as required. Or, select **Configuration > Provision** from the System View menu, if window is not already open from the provision step. Expand the details for the circuit pack, highlight the VCG port, then click **Provision**. Add the port tag to the VCG and provision the other parameters as required.

Reference: “[SE 330-11: Editing VCG Parameters](#)” (9-193)

.....

- 21** Click **Apply**. Read the warning message, then click **Yes** to execute the command. Click **Close** to exit or repeat from [Step 18](#) for other port provisioning.
-

- 22** Note that this procedure provided the following example of point-to-point UPSR protected GbE service using Transparent tagging mode.

Example: In [Figure 9-18](#), assume a GbE circuit pack is installed in function slot fn-d-1 and LAN port 2 at each circuit pack is used for service.

Note that a service has been established between Node 1 and Node 2 with a default port tag of 55.

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

STS1 Pass-Through cross-connections
Ent-crs-sts1:tid:m-1-(22-42),m-1-(22-42):ctag::2waypr



SE 330-4: Establish Ethernet Packet Ring on a UPSR Ring

Overview This procedure provides an example for establishing an ethernet packet ring on a unidirectional path switched ring (UPSR). A packet ring is a set of ethernet switches (ethernet circuit packs) connected to each other in a ring configuration. When the packet ring is first established, the capacity of the ring is predetermined by the number of multipoint (mltpt) STS-1 cross-connections (1-21) applied to the ring and switches. The tagging mode (**802.1TAG** or Transparent [**Trans**]), virtual switch ID, and spanning tree group is also predetermined. For example, see [Figure 9-19](#).

This procedure assumes that the UPSR ring network configuration has already been established and no alarms are present.

This procedure uses TL1 commands and specific WaveStar® CIT menu selections to illustrate the detailed provisioning parameters. If you prefer, you can use the Data Provisioning Wizard to perform the provisioning in this procedure. From the System View menu, select **Configuration > Ethernet Service** to invoke the wizard.



CAUTION

Service Interruption

In Release 3.0 and earlier, STS-1 cross-connection capacity may not be added to an in-service packet ring without the risk of service interruption.

Before you begin

Before you begin this procedure, you must have complete work instructions for this task that detail:

- The network configuration and the nodes participating in the packet ring network.
- The shelf slots, circuit packs, ports, VCGs involved in the packet ring network.
- The number and type of **mltpt** cross-connections to be made at each node.

Note, that once the capacity of the packet ring is established, additional capacity (cross-connections) may not be added in service without the risk of service interruption.

- The tagging mode (transparent or 802.1q), virtual switch ID, and spanning tree group ID.

Procedure Use this procedure as an example to establish an ethernet packet ring on a UPSR ring. See [Figure 9-19](#) for an example.

-
- 1 Use the WaveStar® CIT to log in to one of the terminating nodes, if not already performed.

Reference: “[Task 200: Connect Personal Computer \(PC\) and Establish WaveStar® CIT Session](#)” (8-3)

.....

- 2 On the System View menu, select **Administration > OSI Routing Map** to retrieve a node-to-node listing of every node in the network.

Important! If a drawing of the network is not provided with the work instructions, it is recommended that you draw a simple diagram of the ring (indicating node-to-node connections) and list each node’s TID.

This command may take several minutes to complete depending on the size of the network.

Result: The “OSI Routing Map” window opens.

.....

- 3 Verify that the system configuration is the same as specified on your work instructions.
-

- 4 From your work instructions, determine the circuit pack, port, and cross-connections to be made at each node associated with the packet ring being established.
-

- 5 Verify that the ethernet circuit packs have been installed correctly at each NE providing ethernet service.

Reference: “[Task 336: Install GbE/2 \(A1AA008\), GbE/SX/2 \(A1AA019\), or FASTE/16 \(A1AA007\) Ethernet Circuit Packs](#)” (-1)

6 CONFIGURE TAGGING MODE

Determine the existing tagging mode for the circuit pack being provisioned. Use the TL1 **rtrv-eqpt** command or select **View > Equipment Details** from the System View menu, select the CP, then click **Select**. Note the VLAN Tagging Mode, Burst Size, and Credit Interval parameters.

When GbE circuit packs are installed in the shelf, the default “NO TAG” mode is assigned to the circuit pack. When FE circuit packs are installed in the shelf, the default “802.1TAG” mode is assigned to the circuit pack.

7

If...	Then...
the tagging mode and all parameters are set correctly,	Proceed to Step 13 .
the tagging mode is set correctly but other parameters are not correct,	Proceed to Step 10 .
the tagging mode is NOT set correctly,	Continue with Step 8 .

-
- 8 If you are going to change the VLAN Tagging Mode that presently exists AND a virtual switch ID already exists, you must delete the existing virtual switch ID before changing the tagging mode.

Determine if a virtual switch ID has already been assigned to the LAN/WAN ports used for this service. Use the TL1 **rtrv-vrtsw** command or select the **View > Data > Virtual Switch** command from the System View menu, select the GbE circuit pack being provisioned, then click **Select**. Note if a virtual switch ID has been assigned.

-
- 9 If required, use the TL1 **dlt-vrtsw** command or select the **Configuration > Data > Delete A Virtual Switch** command from the System View menu, select the circuit pack being provisioned, then click **Select**. Highlight the **VRTSW ID** being deleted, then click **Apply**.

Read the warning message, then click **Yes** to execute the command. Click **Close** to exit.

-
- 10 Use the TL1 **ed-eqpt** command or select the **Configuration > Provision** command from the System View menu, select the circuit pack being provisioned, then click **Provision**.

-
- 11 Verify/Select the tagging mode (**802.1TAG** or Transparent [**Trans**]) in the Select VLAN Tagging Mode box.

-
- 12 Verify/Enter the **Burst Size** and **Credit Interval** parameter values as required, then click **Apply**. Read the warning message, then click **OK** to make your changes. Click **Close** to exit.

Reference: [“SE 330-12: Editing Ethernet Circuit Pack Parameters” \(9-197\)](#)



CAUTION

Once a virtual switch is created and service has been established on the circuit pack, you cannot delete the virtual switch without interrupting service. If the service you are establishing in this procedure is a second service on an existing GbE circuit pack with all LAN/WAN ports in the same virtual switch, then the existing virtual switch ID must be retained or the ports not in service must be removed from the existing virtual switch and a new virtual switch created.

13 ASSIGN VIRTUAL SWITCH ID

- For circuit packs not yet in service with no virtual switch assigned:
 - Use the TL1 **ent-vrtsw** command to create an assigned virtual switch ID or select **Configuration > Data > Create A Virtual Switch** command from the CIT System View menu.
- For circuit packs not yet in service with a virtual switch assigned:
 - Use the TL1 **dlt-vrtsw** command to delete an assigned virtual switch ID or select **Configuration > Data > Delete A Virtual Switch** command from the CIT System View menu, if a different virtual switch ID is required.
 - Use the TL1 command **ent-vrtsw** command or select **Configuration > Data > Create A Virtual Switch** to create a new virtual switch ID containing the selected LAN/WAN ports.
- For circuit packs in service, on only one set of ports, with a virtual switch assigned:
 - Use the TL1 **ed-vrtsw** command to change an assigned virtual switch ID or select **Configuration > Data > Provision A Virtual Switch** command from the CIT System View menu to add/remove ports from a virtual switch.
 - Use the TL1 command **ent-vrtsw** command or select **Configuration > Data > Create A Virtual Switch** to create a new virtual switch ID containing the selected LAN/WAN ports.

**CAUTION**

In Release 3.0 and earlier, additional STS-1 cross-connection capacity may NOT be added to an in-service ethernet circuit pack without the risk of service interruption.

14 ESTABLISH SONET CROSS-CONNECTIONS

Determine the necessary Multipoint (**mltpt**) STS-1 cross-connections to be made at each ethernet terminating node and any **2waypr** cross-connections to made at any non terminating nodes in the network.

- 15** One at a time at each node in the network, use the TL1 **ent-crs-sts1** command to provision the cross-connections. Or, select **Configuration > Cross-Connection** from the System View menu to start the Cross Connection Wizard. Use the Cross Connection Wizard at each non terminating node to provision the **2-Way Point-to-Point, Through** pass-through cross-connections. Use the Cross Connection Wizard at each terminating node to provision the ethernet **mltpt** cross-connections. For example, see [Figure 9-19](#).

Reference: Refer to “[Task 331: Make STS1 Cross-Connections for Ethernet Service](#)” (9-201) for cross-connection examples.

- 16** From the System View menu, select **View > Cross Connections** to verify that the proper connections have been made.

- 17** After all cross-connections are made, click on the **Alarm List** button on the System View window and verify no alarms are present.

- 18** If alarms are present, look for missing or improperly made cross-connections.

Reference: *Metropolis® DMXpress Access Multiplexer Alarm Messages and Trouble Clearing Guide, 365-372-315*

19 CREATE SPANNING TREE GROUP

If required, determine a preferred spanning tree configuration (span to be blocked under nominal conditions), the preferred root node, and spanning tree root priorities for this service.

Note that it is not necessary to determine a preferred spanning tree configuration. A default spanning tree configuration is configured when you establish the spanning tree group.

Reference: [“Task 332: Determine Preferred Spanning Tree Configuration” \(9-211\)](#)

-
- 20** Use the TL1 command **ent-stgrp** to assign and provision the parameters for the VCGs involved in the spanning tree group. Or select **Configuration > Data > Create A Spanning Tree Group** command from the CIT System View menu. For example, see [Figure 9-19](#).

Important! Networks running 802.1d STP (Release 1.1) support a maximum of up to nine nodes participating in a spanning tree. Networks with more than nine nodes will not reconfigure properly. Spanning tree default parameters support a network of up to nine nodes.

Networks running 802.1w rapid spanning tree protocol (Release 2 or later) support more than nine nodes participating in a spanning tree. To support more than nine nodes in the spanning tree, the maximum age timer must be increased. Note that spanning tree restoration time increases as the number of nodes increase.

If the network consists of more than nine (9) nodes which are participating in the spanning tree configuration, use the following formula to determine the proper setting for the spanning tree maximum age timer (**stmaxage**): $2 \times (N + 1)$, where N equals the number of nodes.

Example: If the network consists of 20 nodes, then the **stmaxage** timer should be set to 42 seconds: $2 \times (20 + 1) = 42$.

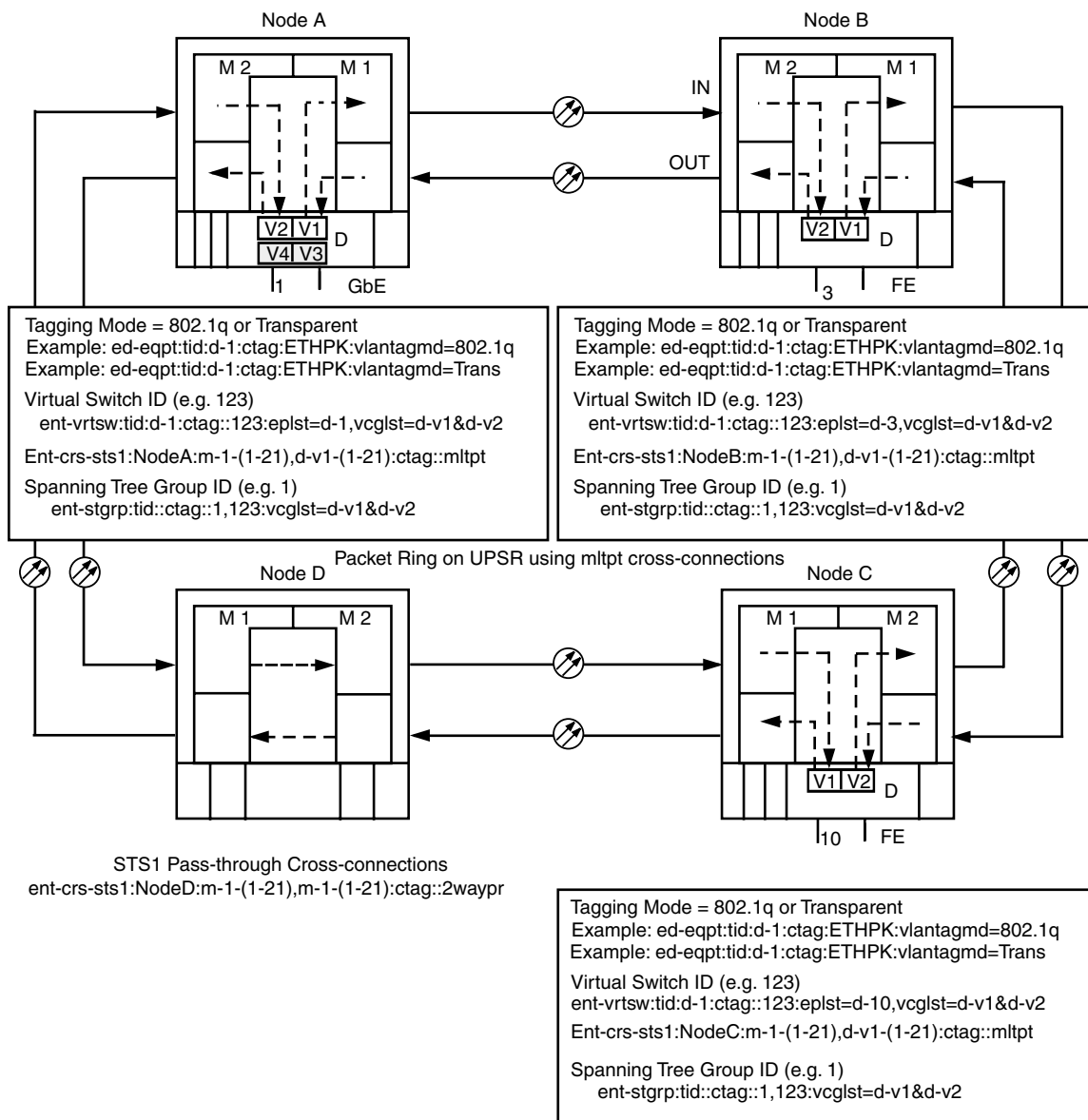
-
- 21** Repeat all the assignments in this procedure at each ethernet node in the network.

.....

END OF STEPS

.....

Figure 9-19 Ethernet Packet Ring on a UPSR



nc-dmx-232

SE 330-5: Establish 802.1q Mode Ethernet Service on Established Packet Ring (UPSR Ring)

Overview This procedure provides an example for configuring ethernet service using the 802.1q tagging mode on an established packet ring. See [Figure 9-20](#) and [Figure 9-21](#) for examples.

This procedure uses TL1 commands and specific WaveStar® CIT menu selections to illustrate the detailed provisioning parameters. If you prefer, you can use the Data Provisioning Wizard to perform the provisioning in this procedure. From the System View menu, select **Configuration > Ethernet Service** to invoke the wizard.



CAUTION

In Release 3.0 and earlier, additional STS-1 cross-connection capacity may NOT be added to an in-service ethernet circuit pack without the risk of service interruption.

Important! The packet ring must already be established on the UPSR before continuing. This procedure assumes the packet ring is established with the necessary tagging modes, virtual switch IDs, cross-connections, and spanning tree groups established.

On connected gigabit ethernet devices with autonegotiation turned on/enabled, if transmission is interrupted in one direction of transmission on a gigabit ethernet device, then transmission will also be disabled in the other direction. For example, if one fiber in a transmit/receive pair is cut, then one-way transmission on the other fiber can be maintained only if autonegotiate is turned off/disabled and the link state is forced good at the transmit source equipment. See [“Auto-negotiation disable” \(5-4\)](#) in [Chapter 5, “Ethernet”](#) for more information.

Before you begin Before you begin this procedure, you must have complete work instructions for this task that detail:

- The network configuration and the terminating ethernet nodes.
- The shelf slots, circuit packs, ports, and VCGs being provisioned.
- The number and type of 2waypr cross-connections to be made at each node.
- The tagging mode (802.1q) and virtual switch ID.
- The VLAN IDs being assigned.

Related information For related information and explanation of TL1 commands and the WaveStar® CIT menus, see the following:

- [Chapter 3, “Provisioning, Security, & Administration”](#)
- [Chapter 5, “Ethernet”](#)
- [Appendix A, WaveStar® CIT Tutorial](#)
- *Metropolis® DMXpress Access Multiplexer TL1 Command Manual, 365-372-313*

Procedure Use this procedure as an example for configuring ethernet service on a UPSR protected packet ring using the 802.1q tagging mode. See [Figure 9-20](#) and [Figure 9-21](#) for examples.

-
- 1** Use the WaveStar® CIT to log in to one of the terminating nodes, if not already performed.

Reference: [“Task 200: Connect Personal Computer \(PC\) and Establish WaveStar® CIT Session” \(8-3\)](#)

.....

- 2** On the System View menu, select **Administration > OSI Routing Map** to retrieve a node-to-node listing of every node in the network.

Important! If a drawing of the network is not provided with the work instructions, it is recommended that you draw a simple diagram of the ring (indicating node-to-node connections) and list each node’s TID.

Result: The “OSI Routing Map” window opens.

-
- 3 Verify that the system configuration is the same as specified on your work instructions.

-
- 4 From your work instructions, determine the terminating nodes, circuit packs, LAN ports, virtual switch ID, and VLAN IDs associated with the service being established.

.....

- 5 **ASSIGN VLAN IDs TO ESTABLISH SERVICE**

Use the TL1 **ent-vlan** command to assign the default VLAN ID for customer untagged frames or the customer VLAN ID for tagged frames to the associated LAN ports and VCG WAN ports. Or, select **Configuration > Data > Create A VLAN** command from the CIT System View menu. For example, see [Figure 9-20](#).

Example: In [Figure 9-20](#), assume a GbE circuit pack is installed in function slot d-1 at Node A using LAN port 1. Assume FE circuit packs are installed in function slot d-1 at Node B (using LAN port 3) and at Node C (using LAN port 10). Assume the packet ring has already been established.

Note that a service has been established between Node C, Node B, and Node A for customer tagged frames using a VLAN ID of 55.

.....

- 6 **PROVISION LAN PORTS**

Use the TL1 **ed-eport** command to provision the LAN port parameters, or select **Configuration > Provision** from the System View menu, expand the details for the circuit pack, highlight the LAN port, then click **Provision**. Provision the parameters as required.

Reference: [“SE 330-10: Editing Ethernet Port Parameters” \(9-189\)](#)

.....

7 PROVISION VCGS

Use the **ed-vcg** TL1 command to provision the WAN (VCG) port parameters, or select **Configuration > Provision** from the System View menu, expand the details for the circuit pack, highlight the VCG port, then click **Provision**. Provision the parameters as required.

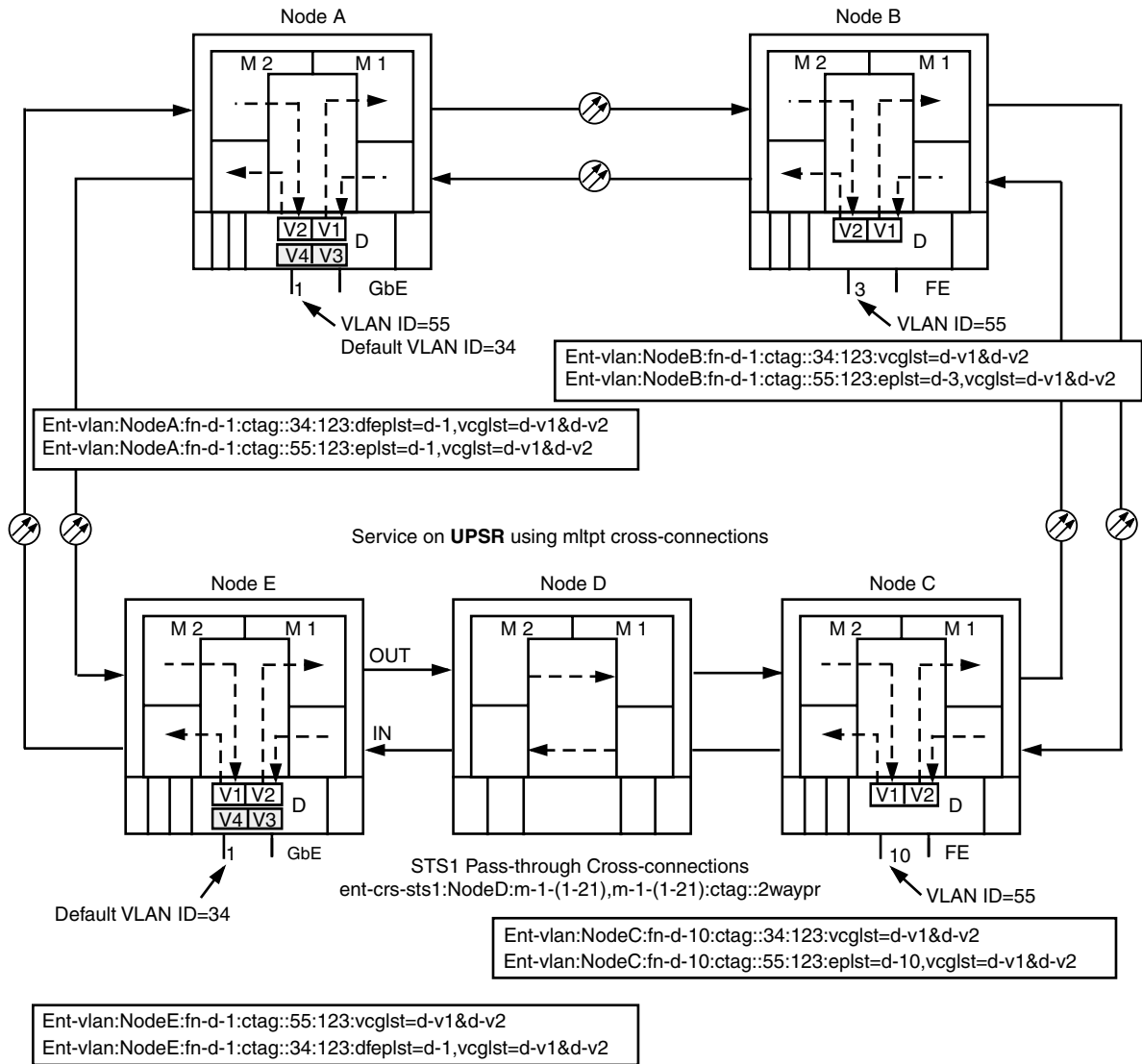
Reference: [“SE 330-11: Editing VCG Parameters” \(9-193\)](#)

.....

END OF STEPS

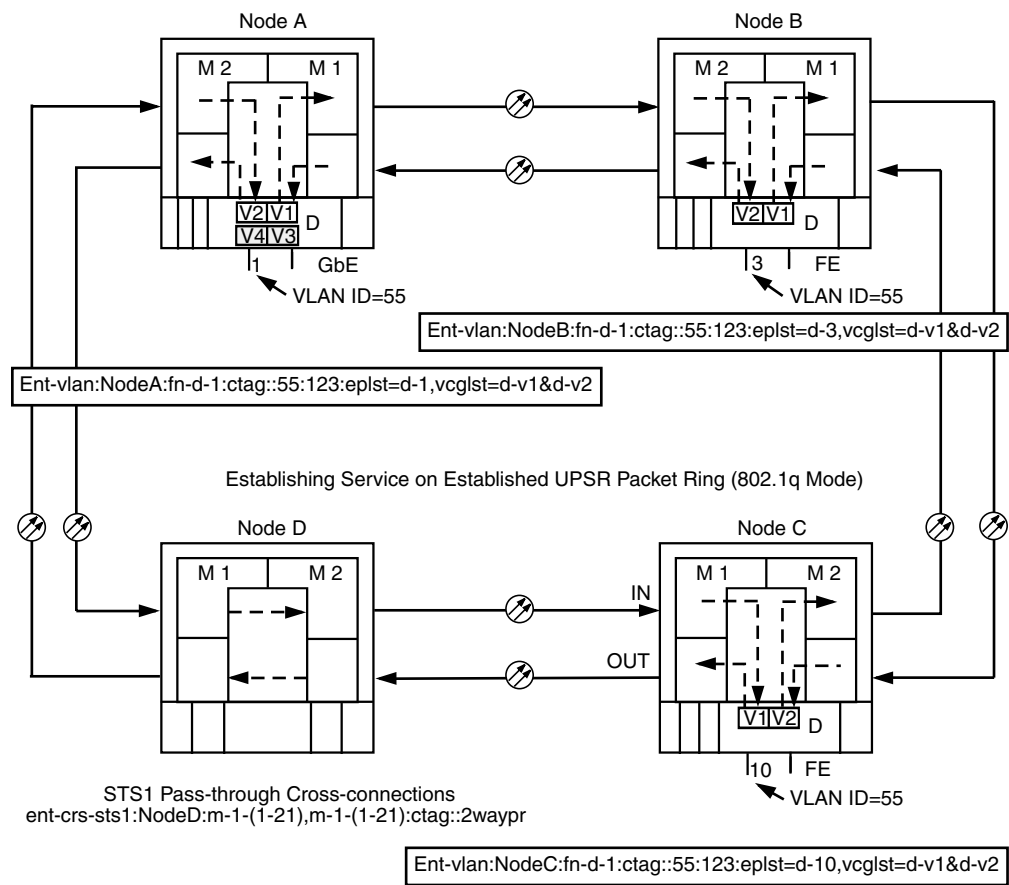
.....

**Figure 9-20 Example 1 Service on UPSR Ring Using 802.1q
Tagging Mode**



nc-dmx-228

Figure 9-21 Example 2 Service on UPSR Ring Using 802.1q
Tagging Mode



SE 330-6: Establish Transparent Mode Ethernet Service on Established Packet Ring (UPSR Ring)

Overview This procedure provides an example for configuring ethernet service using the Transparent tagging mode on an established packet ring. See [Figure 9-22](#) for an example.

This procedure uses TL1 commands and specific WaveStar® CIT menu selections to illustrate the detailed provisioning parameters. If you prefer, you can use the Data Provisioning Wizard to perform the provisioning in this procedure. From the System View menu, select **Configuration > Ethernet Service** to invoke the wizard.



CAUTION

In Release 3.0 and earlier, additional STS-1 cross-connection capacity may NOT be added to an in-service ethernet circuit pack without the risk of service interruption.

Important! The packet ring must already be established on the UPSR before continuing. This procedure assumes the packet ring is established with the necessary tagging modes, virtual switch IDs, cross-connections, and spanning tree groups established.

On connected gigabit Ethernet devices with autonegotiation turned on/enabled, if transmission is interrupted in one direction of transmission on a gigabit ethernet device, then transmission will also be disabled in the other direction. For example, if one fiber in a transmit/receive pair is cut, then one-way transmission on the other fiber can be maintained only if autonegotiate is turned off/disabled and the link state is forced good at the transmit source equipment. See [“Auto-negotiation disable” \(5-4\)](#) in [Chapter 5, “Ethernet”](#) for more information.

Before you begin Before you begin this procedure, you must have complete work instructions for this task that detail:

- The network configuration and the terminating ethernet nodes.
- The shelf slots, circuit packs, ports, and VCGs being provisioned.
- The number and type of 2waypr cross-connections to be made at each node.
- The tagging mode (Transparent) and virtual switch ID.
- The Port Tags being assigned.

Related information For related information and explanation of TL1 commands and the WaveStar® CIT menus, see the following:

- [Chapter 3, “Provisioning, Security, & Administration”](#)
- [Chapter 5, “Ethernet”](#)
- [Appendix A, WaveStar® CIT Tutorial](#)
- *Metropolis® DMXpress Access Multiplexer TL1 Command Manual, 365-372-313*

Procedure Use this procedure as an example for configuring ethernet service on a UPSR protected packet ring using the Transparent tagging mode. See [Figure 9-22](#) for an example.

-
- 1** Use the WaveStar® CIT to log in to one of the terminating nodes, if not already performed.

Reference: [“Task 200: Connect Personal Computer \(PC\) and Establish WaveStar® CIT Session” \(8-3\)](#)

.....

- 2** On the System View menu, select **Administration > OSI Routing Map** to retrieve a node-to-node listing of every node in the network.

Important! If a drawing of the network is not provided with the work instructions, it is recommended that you draw a simple diagram of the ring (indicating node-to-node connections) and list each node’s TID.

Result: The “OSI Routing Map” window opens.

.....

3 Verify that the system configuration is the same as specified on your work instructions.

.....

4 From your work instructions, determine the terminating nodes, circuit packs, LAN ports, virtual switch ID, and VLAN IDs associated with the service being established.

.....

5 PROVISION LAN (Ethernet) PORTS

Use the TL1 **ed-eport** command to provision the Default Port Tag (**dfporttag**) and other parameters for the LAN port being provisioned. Or, select **Configuration > Provision** from the System View menu, expand the details for the circuit pack, highlight the LAN port, then click **Provision**. Provision the parameters as required.

Reference: [“SE 330-10: Editing Ethernet Port Parameters” \(9-189\)](#)

.....

6 PROVISION WAN (VCG) PORTS

Use the TL1 **ed-vcg** command to add port tags (**addporttag**) to the WAN (VCG) ports and provision other parameters as required. Or, select **Configuration > Provision** from the System View menu, expand the details for the circuit pack, highlight the VCG port, then click **Provision**. Provision the parameters as required.

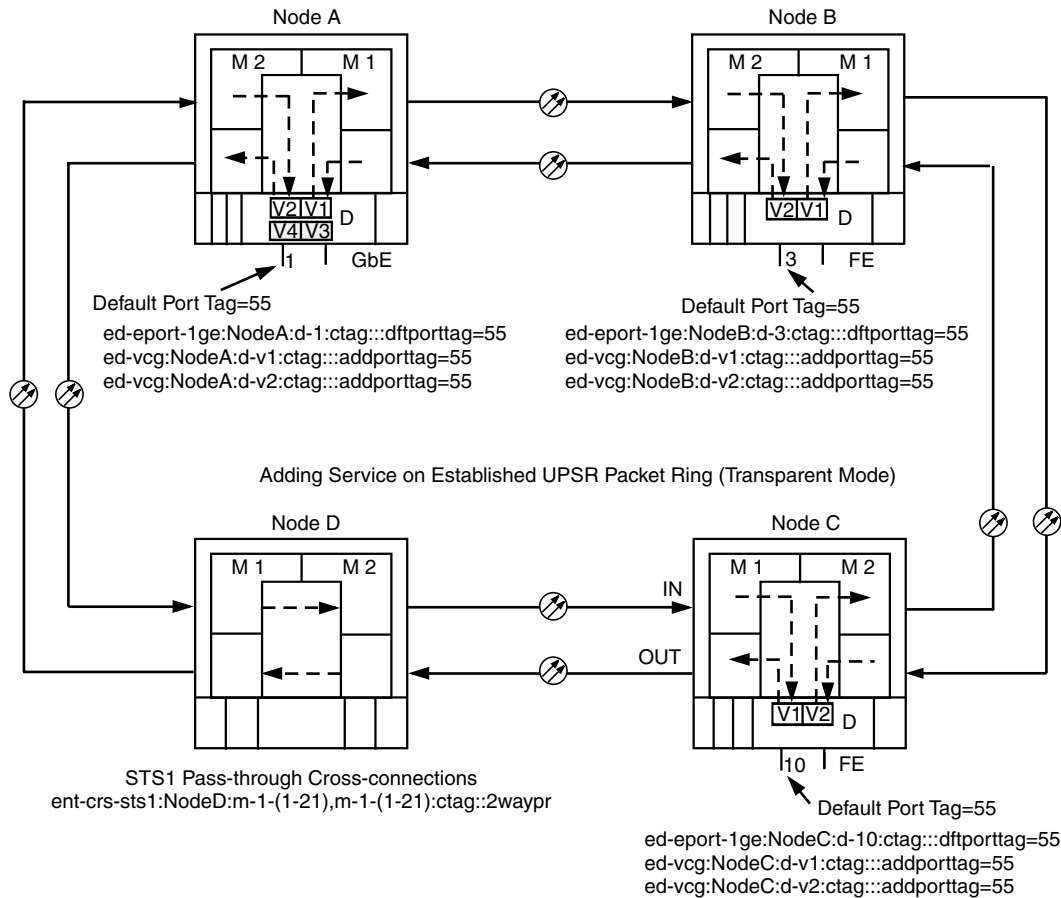
Reference: [“SE 330-11: Editing VCG Parameters” \(9-193\)](#)

.....

END OF STEPS

.....

**Figure 9-22 Example Service on UPSR Ring Using Transparent
Tagging Mode**



nc-dmx-226

SE 330-7: Reserved for Future Use

SE 330-8: Reserved for Future Use

SE 330-9: Reserved for Future Use

SE 330-10: Editing Ethernet Port Parameters

Purpose This procedure provides a list of provisionable parameters for ethernet LAN ports.

Procedure Use this procedure as a reference for provisionable LAN eport parameters.

.....

1 Use the **ed-eport** TL1 command or select **Configuration > Provision** from the System View menu. Double click the Ethernet card to expand it and select the port to be provisioned, then click **Provision**.

.....

2 Use the table below to provision the necessary parameters from your work instructions.

Important! Some of the parameters may have already been provisioned from earlier procedures for establishing service or packet rings.

.....

END OF STEPS

.....

ED-EPORT command parameters

The following table lists the provisionable parameters for the **ED-EPORT** command:

Table 9-1 ED-EPORT Command Provisionable Parameters

Parameter	Description
tid	Target identifier (system name). Refer to the RTRV-HDR command for the input parameter syntax and description of this parameter.
aid	Ethernet port Access Identifier (AID): Metropolis [®] DMX Access Multiplexer {a,b,c,d}-{1-24} for Fast Ethernet {a,b,c,d,g}-{1-2} for Gigabit Ethernet Metropolis [®] DMXpress Access Multiplexer d-{1-16} for Fast Ethernet d-{1-2} for Gigabit Ethernet
ctag	Correlation tag. Refer to the RTRV-HDR command for the input parameter syntax and description of this parameter.
dplxmd	Duplex Mode may have one of the following values: HALF FULL AUTO (initial value) This parameter applies only to 10/100 Fast Ethernet ports.
epmode	Ethernet Port Monitoring Mode may have one of the following values: AUTO (initial value) NMON
eppm	This parameter controls whether Ethernet performance monitoring is enabled for the specified Ethernet port. Ethernet Port PM parameter may have one of the following values: ENABLE DISABLE (initial value)
fcmd	Flow Control Mode may have one of the following values: ENABLE (Enable Transmit & Receive) DISABLE (Disable Transmit & Receive) AUTO (initial vale)

Parameter	Description
lnrate	For 10/100 Fast Ethernet (FE), the port Line Rate may be assigned one of the following values:. 10M (sets the port as a 10 Mbs port) 100M (sets the port as a 100 Mbs port) AUTO (initial value [auto negotiates the port rate]) This parameter only applies to Fast Ethernet (FE) ports.
dftporttag	Default Port Tag (Default Vlan ID). Value: An integer in the range "1-4093", or "0". A "0" means that the user does not want a default value to be set. For untagged frames from the customer, the default port tag must be set to the same as the default port tag used for the vcg group. This parameter is only valid when it is in TRANSPARENT mode and has already been assigned as a member of a Virtual Switch (VRTSW)
dftpri	Default priority values may be one of the following: High Low NA (default value) A high priority gives a port a higher priority for service than another port.
almlvl	Alarm Level. This parameter sets the alarm level for an incoming signal Failure and may have one of the following values: MJ (Major Alarm) MN (Minor Alarm) NA (No Alarm)

SE 330-11: Editing VCG Parameters

Purpose This procedure provides a list of provisionable parameters for virtual concatenation groups (VCGs).

Procedure Use this procedure as a reference for provisioning VCG parameters.

1 Use the **ed-vcg** TL1 command or select **Configuration > Provision** from the System View menu. Double-click on the Ethernet card to expand it and select the VCG port to be provisioned, then click **Provision**.

2 Use the table below to provision the necessary parameters from your work instructions.

Important! Some of the parameters may have already been provisioned from earlier procedures for establishing service or packet rings.

END OF STEPS

ED-VCG command parameters

The following table lists the provisionable parameters for the ED-VCG command:

Table 9-2 ED-VCG Command Provisionable Parameters

Parameter	Description
tid	Target identifier. Refer to the RTRV-HDR command for the input parameter syntax and description of this parameter.
aid	VCG Access Identifier. Metropolis [®] DMX Access Multiplexer {a,b,c,d}-v{1,2} for Fast Ethernet {a,b,c,d,g}-v{1-4} for Gigabit Ethernet Metropolis [®] DMXpress Access Multiplexer d-v{1,2} for Fast Ethernet d-v{1-4} for Gigabit Ethernet
ctag	Correlation tag. Refer to the RTRV-HDR command for the input parameter syntax and description of this parameter.
stpp	Spanning Tree Port Priority. Values range from 0 to 255. The initial value is 128. This parameter not valid in NOTAG mode.
stpcost	Spanning Tree Path Cost. Value is an integer in the range from 1 to 65535. The default value is 10. This parameter not valid in NOTAG mode.
sthellotm	Spanning Tree Hello Timer. Value is an integer in the range from 1 to 10 seconds. The initial value is 2 seconds. This parameter not valid in NOTAG mode.
vmode	VCG Monitoring Mode may have one of the following values: AUTO (initial value) NMON
vss	VCG Spanning Tree Status. Values are as follows: ENABLE (Enable VCG port for spanning tree) DISABLE (Disable VCG port for spanning tree) The default is ENABLE. When enabling the VCG port for Spanning Tree, the retrieved spanning tree status could be “blocked”, “discarded”, or some other status value depending on the state of the spanning tree. This parameter is not valid in NOTAG mode.

Parameter	Description
addporttag	Composite list of port tag identifiers to be added. Values are an ampersand (&) separated list of port tag identifiers. Port tag identifiers are integers in the range from 1 to 4093. This parameter is valid only in TRANSPARENT mode.
psctl	Pause Control. Pause Control may have one of the following values: TRANSPARENT LOCAL (default) NONE
almlvl	Alarm Level. This parameter sets the alarm level for an incoming signal Failure and may have one of the following values: MJ (Major Alarm) MN (Minor Alarm) NA (No Alarm)
vpm	This parameter controls when the performance monitoring is enabled for the specified VCG. VCG PM Enable may have one of the following values: ENABLE DISABLE (initial value)

SE 330-12: Editing Ethernet Circuit Pack Parameters

Procedure Use this procedure as a reference for provisioning ethernet circuit pack parameters.

- 1** Use the **ed-eqpt** TL1 command or select **Configuration > Provision** from the System View menu. Select the ethernet circuit pack being provisioned, then click **Select**.
- 2** Use the following table to provision the necessary parameters from your work instructions.

END OF STEPS

ED-Eqpt command parameters

The following table lists the provisionable parameters for the ethernet circuit packs:

Table 9-3 ED-EQPT Command Provisionable Parameters

Parameter	Description
tid	Target identifier. Refer to the RTRV-HDR command for the input parameter syntax and description of this parameter.
aid	Circuit Pack Access Identifier (AID). Metropolis [®] DMX Access Multiplexer fn-{a,b,c,d}-1 for Fast Ethernet fn-{a,b,c,d}-1 or growth-1 for Gigabit Ethernet Metropolis [®] DMX ^{press} Access Multiplexer fn-d-1 for Fast Ethernet or Gigabit Ethernet
ctag	Correlation tag. Refer to the RTRV-HDR command for the input parameter syntax and description of this parameter.
vlantagmd	Vlan Tagging Mode. • 802.1TAG - IEEE 802.1Q mode. Default value for FE circuit packs. Allows VLAN ID assignments to LAN and VCG ports for customer identification. • TRANS - Transparent mode. Allows Port Tag provisioning independent of customer VLANs. • NOTAG - No VLAN or port tag assignments. Accepts all customer packets. Default value for Gigabit Ethernet circuit pack.

Parameter	Description
brst	Burst Size (1-255): Burst size determines the length or size of the burst that will be allowed by the PIR (peak information rate) policer. The valid range is 1 to 255. The default is 5. A larger value of burst size means that larger bursts will be allowed; a smaller value of burst size means that the PIR is more strictly enforced, i.e. less "burstability" is allowed. This parameter affects policing for all VLANs (in 802.1Q mode) or all port tags (in transparent mode). It does not apply to NO TAG mode.
cint	Credit Interval (1-4095): Credit interval for adding tokens to the token buckets used by the PIR (peak information rate) rate policer. The valid range is 1 to 4095. The default is 143, which corresponds to an interval of 75ms. The minimum value of 1 corresponds to an interval of 524us. The maximum value of 4095 corresponds to 2.15 sec. This parameter affects policing for all VLANs (in 802.1Q mode) or all port tags (in transparent mode). It does not apply to NOTAG mode.

Task 331: Make STS1 Cross-Connections for Ethernet Service

Procedure Use this procedure as an example for making STS1 cross-connections for point-to-point UPSR and multipoint gigabit ethernet service.

- 1 Use the WaveStar® CIT to log in to one of the terminating nodes.

Reference: “Task 200: Connect Personal Computer (PC) and Establish WaveStar® CIT Session” (8-3)

- 2 On the System View menu, select **Administration > OSI Routing Map** to retrieve a node-to-node listing of every node in the network.

Important! If a drawing of the network is not provided with the work instructions, it is recommended that you draw a simple diagram of the ring (indicating node-to-node connections) and list each node’s TID.

It may take several minutes for this command to complete depending on the size of the network.

Result: The “OSI Routing Map” window opens.

- 3 Verify that the system configuration is the same as specified on your work instructions.
-

- 4 From your work instructions, determine the cross-connections to be made at each node associated with the service to be established.

Although the following figures illustrate the use of TL1 commands, the cross-connection rate (STS-1), type (2wayPR or mltp), and STS-1 AID addresses remain the same when using the Cross Connection Wizard in the following steps.

- [Figure 9-23](#) illustrates a path protected OC-48 ring network with 2wayPR STS1 cross-connections for ethernet service.
- [Figure 9-24](#) and [Figure 9-25](#) illustrate OC-48 ring networks with mltp STS1 cross-connections for ethernet service.

-
- 5 Starting at one of the nodes in the ring for the circuit being established, select **View > Cross Connections** at each node in the ring to verify that that the cross-connections specified on the work instructions may be made.

If cross-connections are already assigned or improperly assigned, refer trouble to the provisioning organization. Improperly assigned cross-connections may have to be deleted, or a different time-slot must be selected for the service being selected.

-
- 6 One at a time, at each *non terminating node*, select **Configuration > Cross-Connection** from the System View menu to start the Cross Connection Wizard. Use the Cross Connection Wizard at all *non terminating nodes* in the network to provision the **2-Way Point-to-Point, Through STS-1** pass-through cross-connections.

Reference: [“SE 331-1: STS1 Cross-Connections for Ethernet” \(9-207\)](#)

-
- 7 One at a time, at each terminating node, select **Configuration > Cross-Connection** from the **System View** menu to start the Cross Connection Wizard. Use the Cross Connection Wizard at all terminating nodes in the network to provision the STS-1 **UPSR Add/Drop** cross-connections.

Reference: [“SE 331-1: STS1 Cross-Connections for Ethernet” \(9-207\)](#)

-
- 8 From the System View menu, select **View > Cross Connections** at each node to verify that the proper connections have been made.

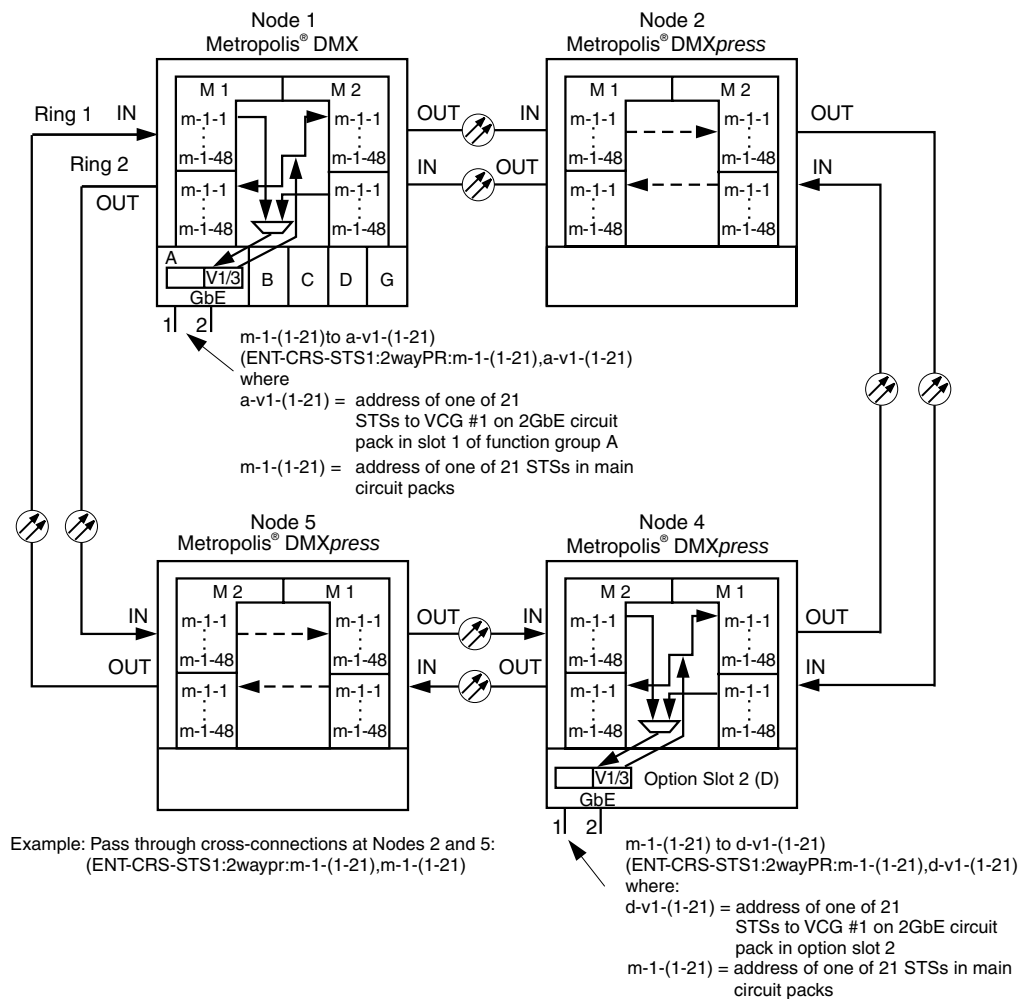
-
- 9 After all cross-connections are made, click on the **Alarm List** button on the System View window and verify no alarms are present.

- 10 If alarms are present, look for missing or improperly made cross-connections.

Reference: *Metropolis® DMXpress Access Multiplexer Alarm Messages and Trouble Clearing Guide, 365-372-315*

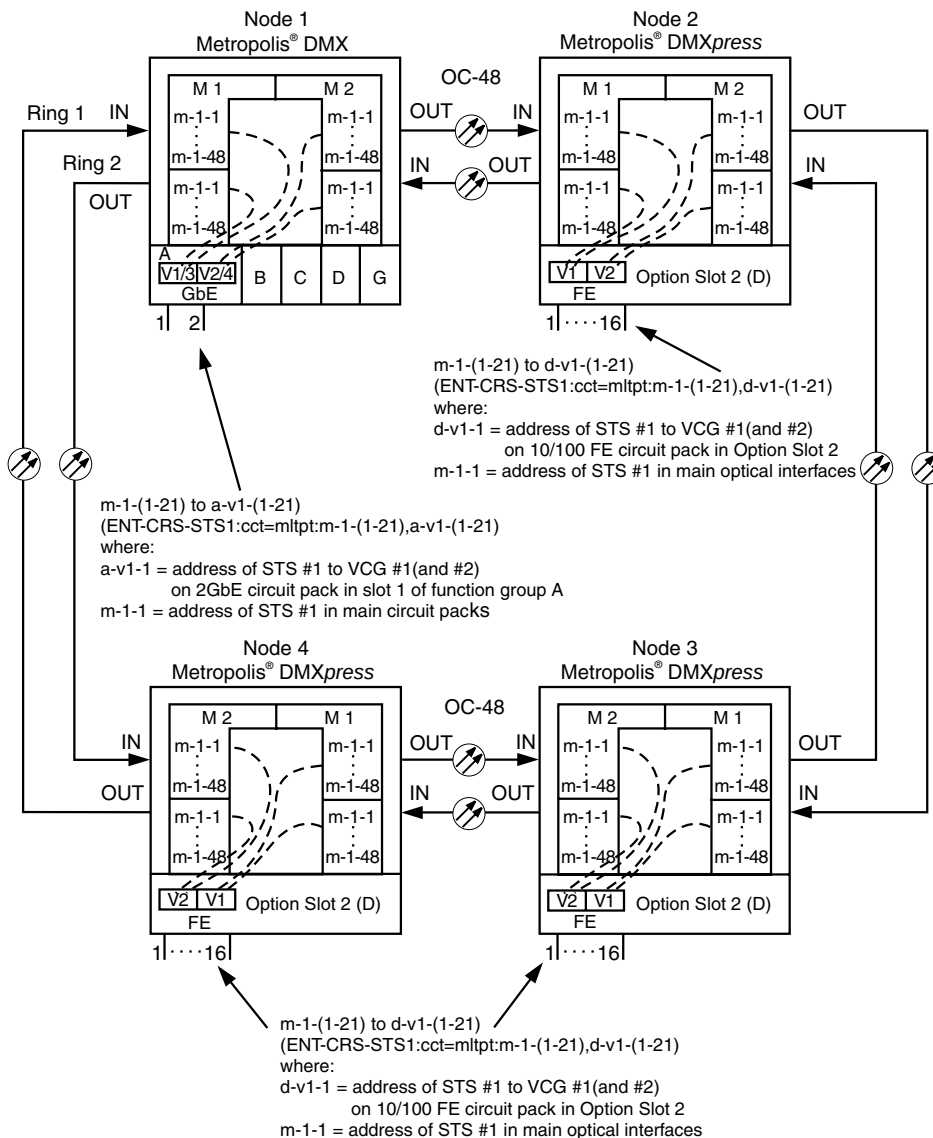
END OF STEPS

Figure 9-23 2wayPR Cross-connections on a UPSR Ring



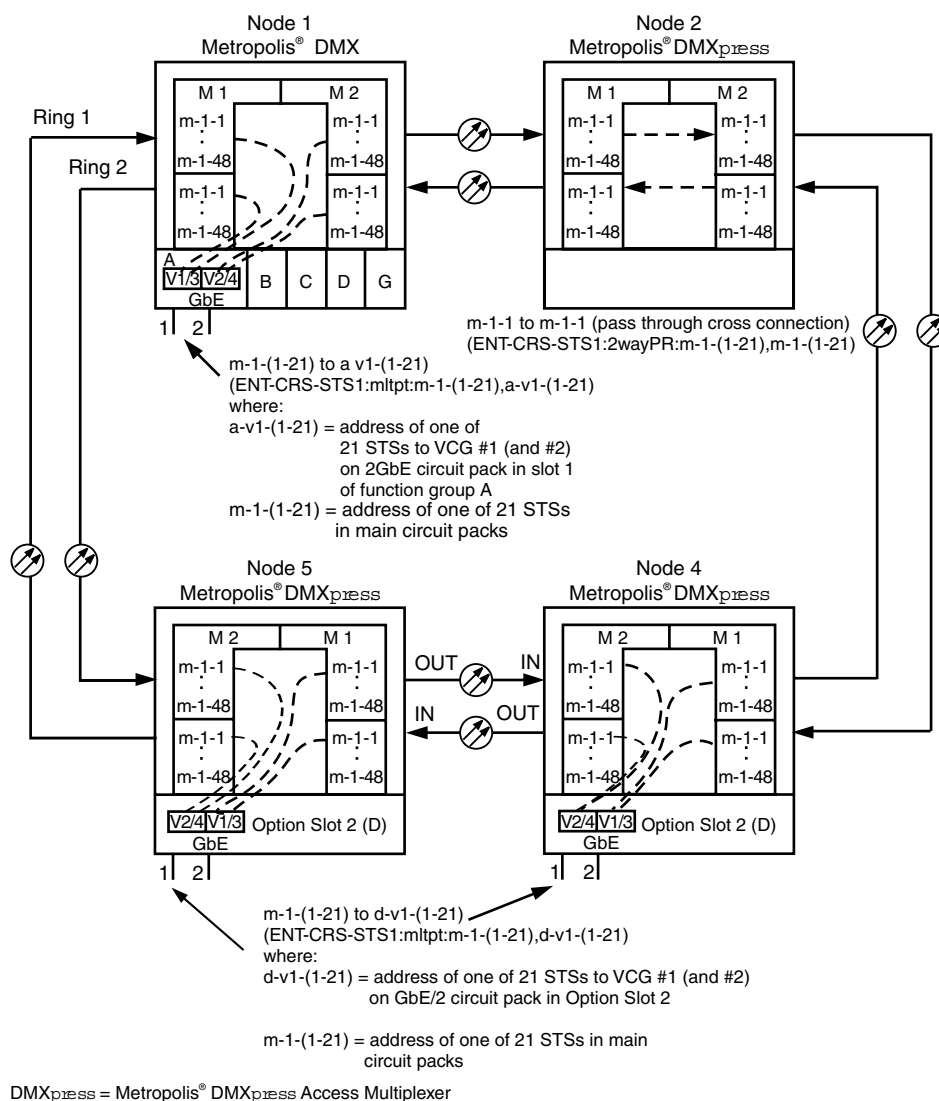
NC-Xpress-062

Figure 9-24 Multipoint Mixed GbE and FE Cross-connections on a UPSR Ring



NC-Xpress-063

Figure 9-25 Multipoint GbE Cross-connections on a UPSR Ring



Task 331: Make STS1 Cross-Connections for Ethernet Service

SE 331-1: STS1 Cross-Connections for Ethernet

STS1 Cross-Connections for Ethernet

Cross connections supporting Ethernet services are STS1 cross-connections. Each Ethernet virtual concatenation group (VCG) may have from 1 to 21 STS1s cross-connected to support the bandwidth assignment.

The following table shows the allowable STS1 Cross-Connections.

From		To			
Address 1	CP Type	Address 2	CP Type	Command Option	Remarks
m-1-{1-48}	OC-48 OLIU	m-1-{1-48}	OC-48 OLIU	cct=2waypr	Pass Through
m-1-{1-48}	OC-48 OLIU	d-v1-{1-21}	10/100 Mb interface	cct=2waypr, mltpt	UPSR or Multipoint
m-1-{1-48}	OC-48 OLIU	d-{v1,v3}-{1-21}	1 GbE interface	cct=2waypr, mltpt	UPSR or Multipoint

Cross connect type (cct)

Cross-connect types consist of two-way path ring (*2waypr*) and multipoint (*mltpt*).

Important!

MLTPT Cross-connections

When a mltpt connection is made to an STS trib in VCG “n” (for example, v1), a connection is automatically made internally to the corresponding STS trib in VCG “n+1” (for example, v2). VCG v2 and associated trib then become unavailable for other connections. For example, if a-v1-1 is mltpt connected, then a-v2-1 is automatically connected as well and therefore becomes unavailable for any other connection.

2WAYPR Cross-connections

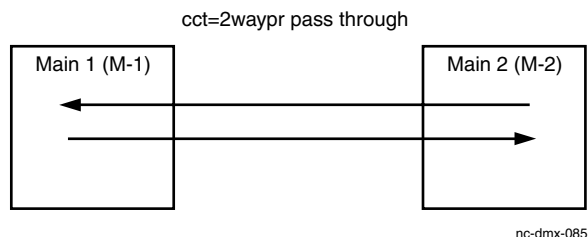
When a twowaypr connection is made to an STS trib in VCG “n”, then VCG “n+1” is unused and unavailable for any connection.

2waypr

2waypr requests a two-way add/drop or pass-through cross-connection be established between the source and destination in a path switched ring. *2waypr* is the default value.

Figure 9-26 illustrates a *2waypr* pass-through cross-connection from one side of the ring to the other.

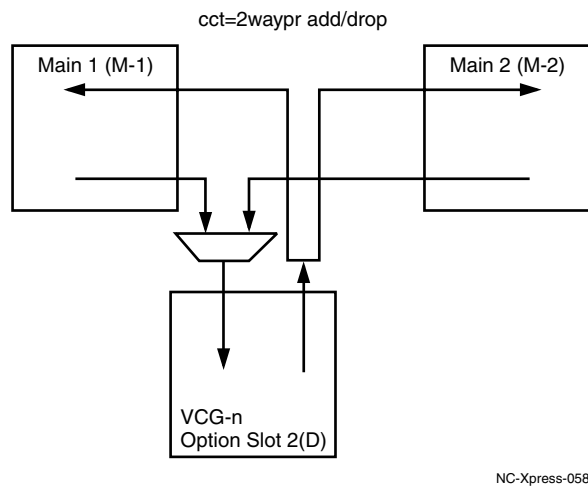
Figure 9-26 2wayPR Pass-Through Cross-Connection



For Ethernet services, the *2waypr* cct value can be applicable to the 10/100 Fast Ethernet and the 1 GbE circuit packs at the STS-1 rate. If the cct value is null, the default value of 2WAYPR will be used as default.

Figure 9-27 illustrates an Ethernet *2waypr* add/drop cross-connection.

Figure 9-27 2wayPR Add/Drop Cross-Connection

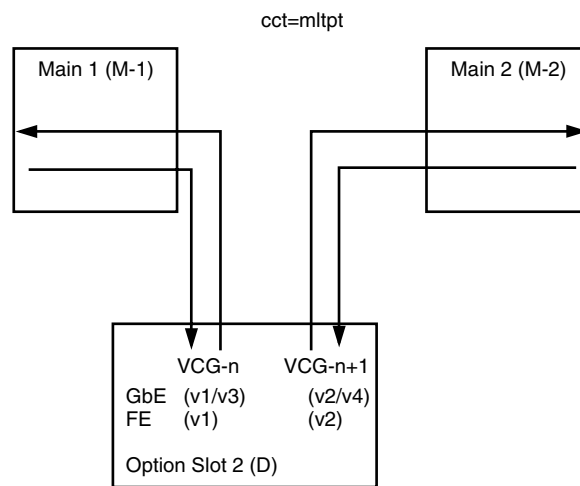


Mltpt

Mltpt requests a multipoint (unprotected) cross-connection be established between the source and destination in a non-path switched ring configuration. The *mltpt* cross-connect type for an STS-1 can only be selected if either the 10/100 Mb Fast Ethernet or the 1 GbE interface is being addressed. When using either the 10/100 Mb or the 1GbE interface and an STS-1 Trib is “*mltpt*” cross-connected, the signal locking mechanism is provided.

Figure 9-28 illustrates a multipoint cross-connection.

Figure 9-28 Multipoint Cross-Connection



NC-Xpress-059



Task 332: Determine Preferred Spanning Tree Configuration

Purpose This procedure provides an example for determining the preferred spanning tree configuration.

Before you begin Before you begin this procedure, you should:

- Know your network configuration
- Know which nodes in the network are participating in the spanning tree configuration for the service being configured
- Have a knowledge of ethernet services and spanning tree configurations

Procedure Use the following procedure as an example for determining the preferred spanning tree configuration.

- 1** Use the WaveStar® CIT to log in to a terminating Metropolis® DMXpress shelf.

Reference: [“Task 200: Connect Personal Computer \(PC\) and Establish WaveStar® CIT Session” \(8-3\)](#)

- 2** On the System View menu, select **Administration > OSI Routing Map** to retrieve a node-to-node listing of every node in the network.

Important! If a drawing of the network is not provided with the work instructions, it is recommended that you draw a simple diagram of the ring (indicating node-to-node connections) and list each node's TID.

Result: The “OSI Routing Map” window opens.

- 3** Verify that the system configuration is the same as specified on your work instructions.

-
- 4 From your work instructions and the network map, determine the nodes in the ring at which ethernet services are provided and are part of the same spanning tree group.

Important! When determining if the ring consists of an odd or even number nodes, count only the nodes at which ethernet service is being provided in the same spanning tree configuration. If a node in the ring has only SONET pass through cross-connections for ethernet services, that node is not counted in determining an odd or even configuration. The figures in this task assume all nodes are providing ethernet service.

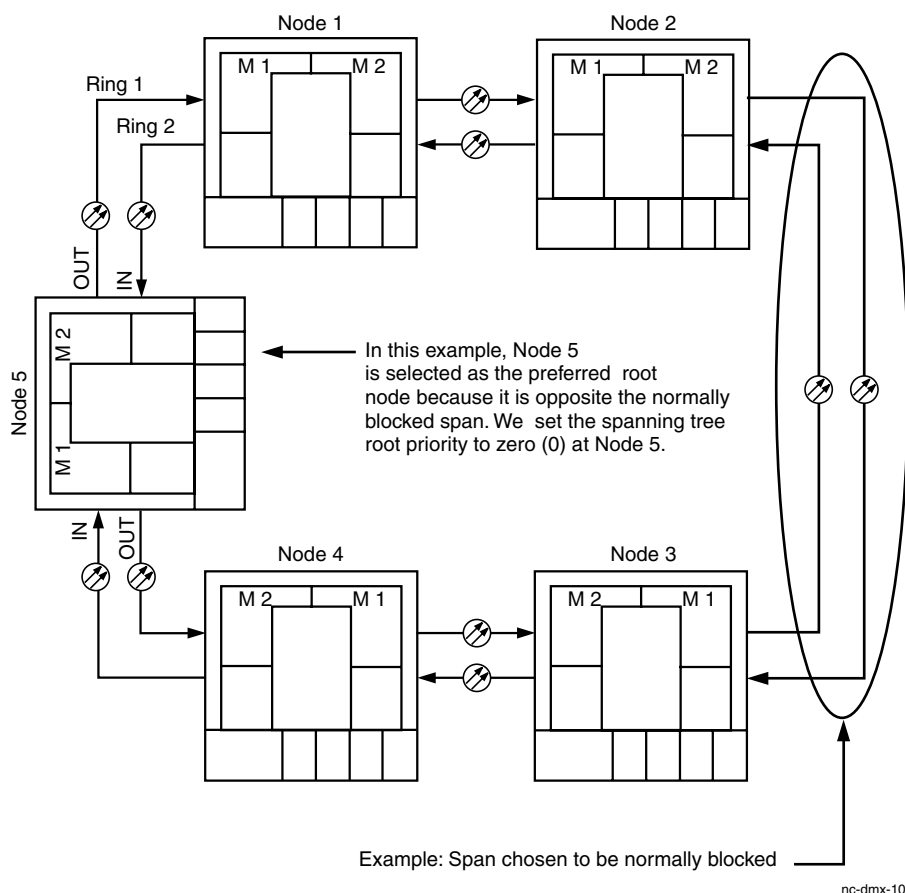
.....

- 5 Determine if the ring consists of an odd or even number of nodes.

If...	Then...
there are an ODD number of nodes in the ring,	Continue with Step 6 .
there are an EVEN number of nodes in the ring,	Proceed to Step 10 .

-
- 6 Refer to [Figure 9-29](#) for rings with an odd number of nodes.

Figure 9-29 Spanning Tree Odd Node Example



- 7 Select the span that should be blocked under nominal conditions. The span should be selected based on traffic patterns to get the most efficient use of capacity on both sides of the ring during nominal conditions.

Example: The span between Nodes 2 and 3 was selected in this example.

- 8 Determine the preferred root node. The preferred root node in an odd-number node ring is the node on the ring opposite the span which should be normally blocked.

Example: In the odd node configuration figure above, Node 5 is the preferred root node.

.....
9 Use the WaveStar® CIT to log in to the preferred root node.

.....
10 From the System View menu, select **Configuration > Data > Create a Spanning Tree Group** or use the **ent-stgrp** TL1 command.

Result: The “Create Spanning Tree Group” window opens displaying the parameters for the spanning tree group.

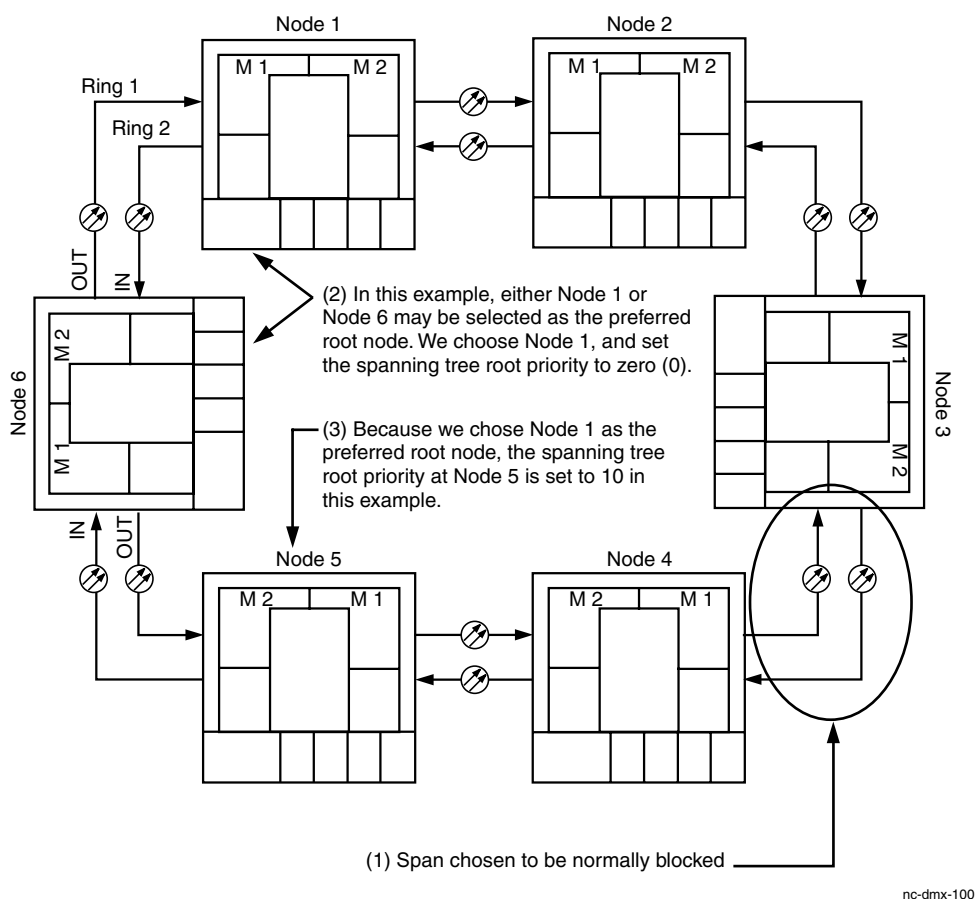
.....
11 Set the spanning tree Root Priority parameter (*strp*) to zero (0) at the preferred root node (Node 5 in this example).

At ALL other ethernet nodes in the ring, set the spanning tree root priority to the default value of 32768.

END OF STEPS FOR ODD NODE EXAMPLE

- 12 Refer to [Figure 9-30](#) for rings with an EVEN number of nodes:

Figure 9-30 Spanning Tree Even Node Example



- 13 Select the span that should be blocked under nominal conditions. The span should be selected based on traffic patterns to get the most efficient use of capacity on both sides of the ring during nominal conditions.

Example: The span between Nodes 3 and 4 was selected in this example.

-
- 14** Determine the preferred root node. The preferred root node in an even-number node ring may be either of the two nodes at the opposite ends of the span that is opposite to the span which is normally blocked.

Example: In the even node configuration figure above, either Node 1 or Node 6 may be selected as the preferred root node. Note that there are 2 spans between Node 3 and Node 1, and two spans between Node 4 and Node 6. In this example, we choose Node 1 to be the preferred root node.

.....

- 15** Use the WaveStar® CIT to log in to the preferred root node.
-

- 16** From the **System View** menu, select **Configuration > Data > Create a Spanning Tree Group** or use the **ent-stgrp** TL1 command.

Result: The “Create Spanning Tree Group” window opens displaying the parameters for the spanning tree group.

.....

- 17** Set the spanning tree Root Priority parameter (*strp*) to zero (0) at the preferred root node (Node 1 in this example).
-

- 18** Determine the node opposite the selected preferred root node.

Example: In this example, Node 4 is the node opposite Node 1, the preferred root node. Note that there are two nodes on either side of the ring between Node 1 and Node 4.

.....

- 19** At the node (in this example, Node 4) opposite the selected preferred root node, follow the span that is NOT normally blocked to the next node in that direction around the ring.

Example: In this example, the span to the right of Node 4 is normally blocked; therefore, you would follow the span to the left of Node 4 to Node 5.

.....

- 20** At the node determined in the previous step (in this example, Node 5), use the WaveStar® CIT to log in to the node.
-

-
- 21** From the System View menu, select **Configuration > Data > Create a Spanning Tree Group** or use the **ent-stgrp** TL1 command.

Result: The “Create Spanning Tree Group” window opens displaying the parameters for the spanning tree group.

.....

- 22** Set the spanning tree Root Priority parameter (*strp*) to 10 (or any value from 1 to 32767).

Important! The spanning tree root priority for ALL other ethernet nodes in the ring should be set to the default value of 32768.

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



Task 333: Change an Existing Spanning Tree Configuration

Purpose This procedure provides an example of how to change an existing spanning tree configuration by changing the spanning tree path cost at one of the nodes.

This procedure might be used if traffic patterns change and dictate that a reconfiguration would provide more efficient service.

Safety precautions To assure both personal safety and the proper functioning of the Metropolis® DMXpress Access Multiplexer, it is imperative to review and understand these warnings and precautions prior to performing this task.



CAUTION

Service interruption

A minimal amount of service interruption may be encountered when performing this procedure. Be sure to follow your work instructions in performing this task.

- Before you begin** Before you begin this procedure, you should:
- Know your network configuration.
 - Know which nodes in the network are participating in the spanning tree configuration for the service being configured.
 - Have a knowledge of ethernet services and spanning tree configurations.
 - Have detailed work instructions for performing this task.
 - Know which span in the spanning tree configuration is normally blocked and which span you are going to reconfigure as blocked.
 - Know which node is the root node (root bridge) in the configuration.
 - Know the spanning tree group ID (*stgrp_id*) of the spanning tree group being reconfigured.

Procedure Use this procedure as an example to reconfigure an existing spanning tree configuration.

-
- 1 Use the WaveStar® CIT to log in to a terminating Metropolis® DMXpress shelf.

Reference: [“Task 200: Connect Personal Computer \(PC\) and Establish WaveStar® CIT Session” \(8-3\)](#)

.....

- 2 On the System View menu, select **Administration > OSI Routing Map** to retrieve a node-to-node listing of every node in the network.

Important! If a drawing of the network is not provided with the work instructions, it is recommended that you draw a simple diagram of the ring (indicating node-to-node connections) and list each node’s TID.

Result: The “OSI Routing Map” window opens.

.....

- 3 Verify that the system configuration is the same as specified on your work instructions.
-

- 4 From your work instructions and the network map, determine the nodes in the ring at which ethernet services are provided and are part of the same spanning tree group. [Figure 9-31](#) for an example.

-
- 5** Use the **rtrv-stgrp** command or the **View > Data > Spanning Tree** command from the System View menu at each node to determine which node is the root node (root bridge), the spanning tree root path cost (**strtpcost**), the VCG spanning tree port role (**stprole**), and the VCG spanning tree path cost (**stpcost**) for each VCG AID in the spanning tree group. Make a note of these parameter values at each node.

Example: See [Figure 9-31](#). Assuming VCGs v1 and v2 are used at each node, if you logged into Node 5, the root bridge, you should see a root path cost of zero (0), and each VCG port would have a port role of *Designated*.

At Nodes 1 and 2, you should see Port Roles for VCG v1 at both nodes as being *root* port, indicating traffic toward the root bridge. At Nodes 3 and 4, you should see Port Roles for VCG v2 at both nodes as being *root* port, indicating traffic toward the root bridge.

.....

6 PRINCIPLES OF SPANNING TREE AND PORT COST

Refer to [Figure 9-31](#) and read the following to understand how spanning tree blocks a span:

To have spanning tree block a span, the spanning tree root path cost is set equally at the two bridges (nodes) at each end of the blocked span. The spanning tree root path cost (**strtpcost**) at a node (bridge) is the sum of the path costs of the root port VCGs that connect the node to the root node.

Example: Assume that in the original configuration the spanning tree path cost (**stpcost**) for each VCG is set to the default of 10 at each node. Node 2 is connected to root Node 5 through VCG v1 at Node 2 and VCG v1 at Node 1. Therefore, the root path cost of Node 2 is 20, which is the sum of the path costs of Node 2 VCG v1 and Node 1 VCG v1 ($10 + 10 = 20$).

Node 3 is connected to root Node 5 through VCG v2 at Node 3 and VCG v2 at Node 4. Therefore, the root path cost of Node 3 is also 20, which is the sum of the path costs of Node 3 VCG v2 and Node 4 VCG v2 ($10 + 10 = 20$).

-
- 7 Assume that your traffic studies indicate a more efficient service would be obtained by blocking the span between Node 3 and Node 4 instead of the presently blocked span between Node 2 and Node 3.
-

8 HOW TO CHANGE PATH COST TO RECONFIGURE SPANNING TREE

To change the spanning tree configuration to block the span between Nodes 3 and 4, we need to have the root path cost of Node 3 and Node 4 set equally.

We can increase the spanning tree path cost (**stpcost**) at the root port (VCG v2) on Node 4. Use either the **ed-vcg** command or **Configuration > Provision** command, then double-click on the Ethernet card and select the proper VCG. Select the Spanning Tree tab to change the path cost.

Example: Refer to [Figure 9-32](#).

If the span between Nodes 3 and 4 is going to be blocked, then Node 3 will be connected to root Node 5 through Node 3 VCG v1, Node 2 VCG v1, and Node 1 VCG v1. The root path cost at Node 3 will then be 30, the sum of the path costs of root port VCG v1 at Nodes 3, 2, and 1 ($10 + 10 + 10 = 30$).

We need to ensure the root path cost at Node 4 is also 30. Note that Node 4 is connected to root Node 5 only through Node 4's VCG v2. If we increase the path cost at Node 4 VCG v2 to 30, then the root path cost at Node 4 will also be 30.

Since the root path cost at Node 4 is now equal to the root path cost at Node 3, the span between Nodes 3 and 4 will be blocked.

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

Task 333: Change an Existing Spanning Tree Configuration

Figure 9-31 Existing Spanning Tree Configuration

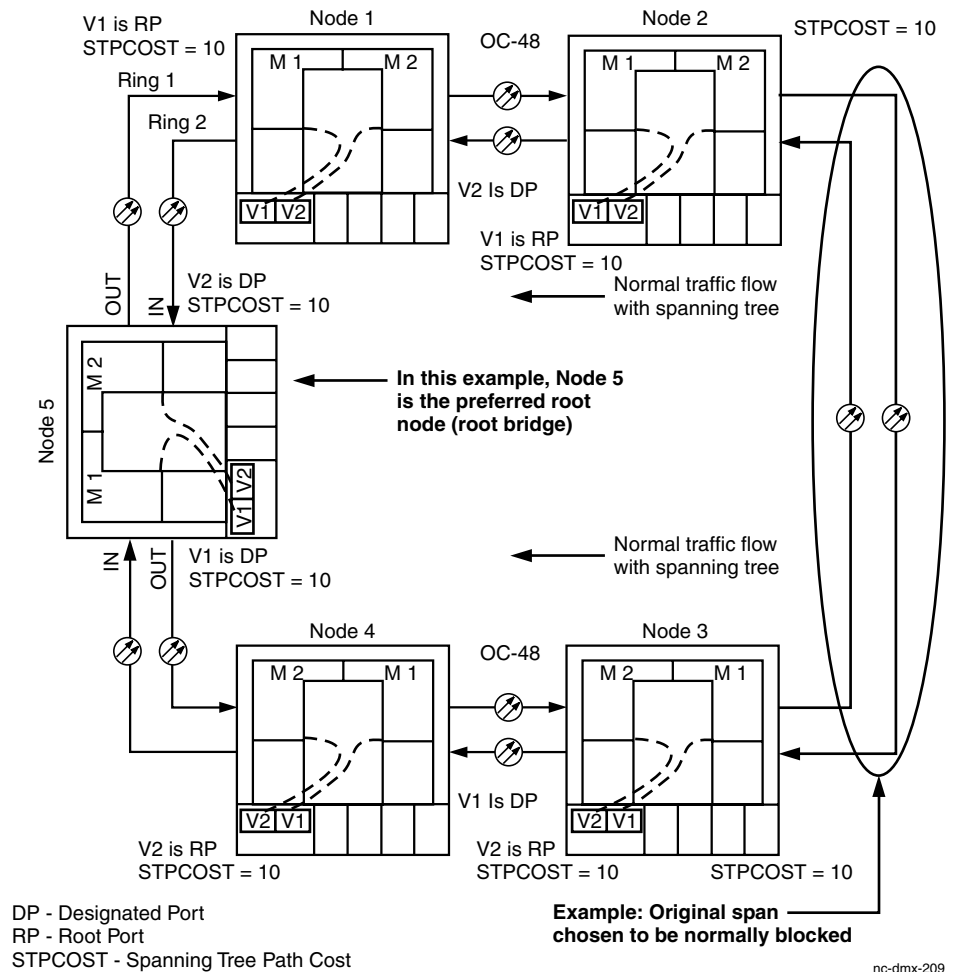
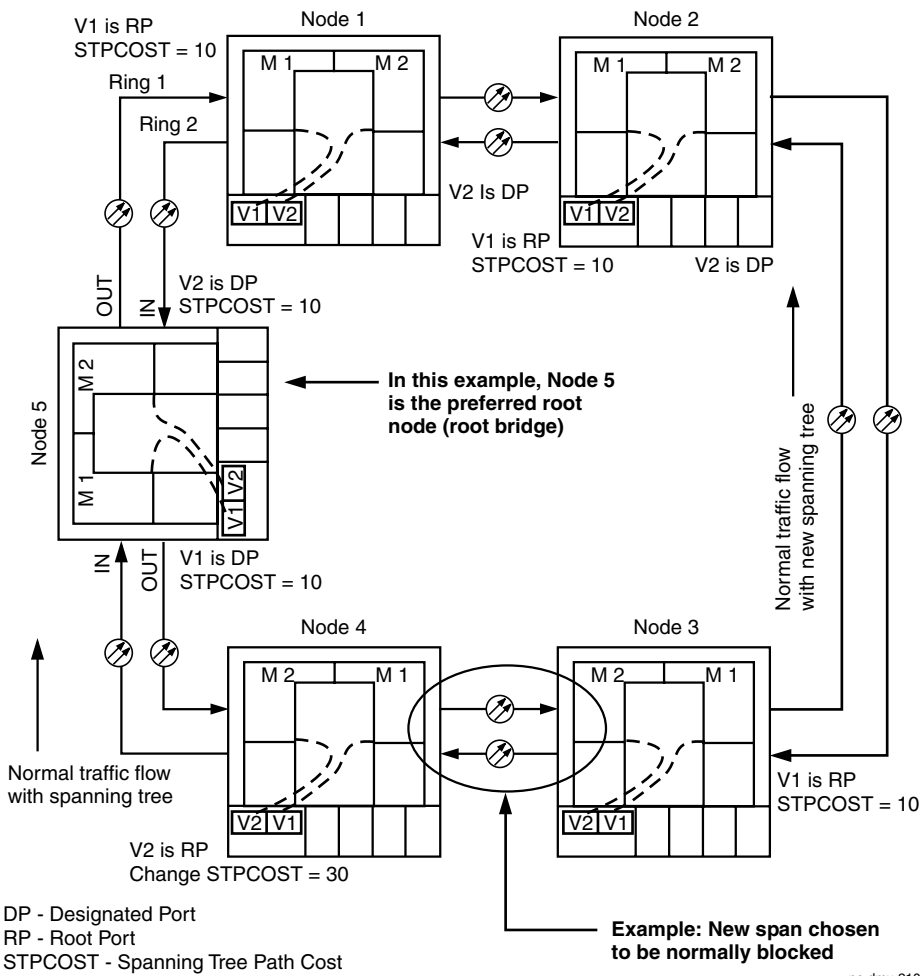


Figure 9-32 New Spanning Tree Configuration



nc-dmx-210

Task 334 and 335: Reserved for Future Use

Task 336: Install GbE/2 (A1AA008), GbE/SX/2 (A1AA019), or FASTE/16 (A1AA007) Ethernet Circuit Packs

Purpose Use this task to install either the GbE/2, GbE/SX/2, or FASTE/16 Ethernet circuit pack in the Option 2 Slot of the Metropolis[®] DMXpress shelf.

Important! The Ethernet circuit packs may be installed only in the Option 2 Slot.

Required equipment The following equipment is required:

- Personal Computer (PC) with WaveStar[®] CIT software installed
- Wrist strap

Safety precautions To assure both personal safety and the proper functioning of Metropolis[®] DMXpress, it is imperative to review and understand these warnings and precautions prior to performing this task.



WARNING **Eye damage**

Unterminated optical connectors may emit invisible laser radiation. Eye damage may occur if beam is viewed directly or with optical instruments. Avoid direct exposure to the beam.



CAUTION **Electrostatic discharge**

Use a static ground wrist strap whenever handling circuit packs or working on a Metropolis[®] DMXpress to prevent electrostatic discharge damage to sensitive components. See “Electrostatic discharge” in “About this Information Product”.

Before you begin Before you begin this task, be familiar with the WaveStar[®] CIT.

Task Complete the following steps to install the Ethernet circuit pack.

-
- 1** Open the faceplate latches and seat the Ethernet circuit pack in Option 2 Slot. Apply a steady pressure to each end of the circuit pack until the pack is seated, then close the faceplate latches.

Result: ACT (active) LED lights on the circuit pack. FLT (fault) LED on the circuit pack lights for about 20 seconds then goes off.

-
- 2** Connect the PC and establish a WaveStar® CIT session.

Reference: [“Task 200: Connect Personal Computer \(PC\) and Establish WaveStar® CIT Session” \(8-3\)](#)

-
- 3** From the System View menu, select **View > Equipment Details**.

Result: The “View Equipment Details” window opens.

-
- 4** Verify presence of the new circuit pack in the equipment list.

-
- 5** Select (highlight) the new circuit pack, then click **Select** at bottom of window.

Result: Circuit pack parameter values display on right side of window.

-
- 6** Under State Information, verify the circuit pack is in an out-of-service (OOS) state.

-
- 7** Click **Close** to exit.

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



Task 337: Reserved for Future Use

Task 338: Install DS1/DS3/16/1 (A1AA006) or DS3/12 (A1AA015) Circuit Pack

Purpose Use this task to install a DS1/DS3/16/1 or DS3/12 circuit pack in the Option 1 Slot of the *Metropolis*® DMXpress shelf.

Important! The DS1/DS3/16/1 or DS3/12 circuit packs may be installed only in the Option 1 Slot.

Required equipment The following equipment is required:

- Personal Computer (PC) with WaveStar® CIT software installed
- Wrist strap

Safety precautions To assure both personal safety and the proper functioning of *Metropolis*® DMXpress, it is imperative to review and understand these warnings and precautions prior to performing this task.



CAUTION

Electrostatic discharge

Use a static ground wrist strap whenever handling circuit packs or working on a Metropolis® DMXpress to prevent electrostatic discharge damage to sensitive components. See “Electrostatic discharge” in “About this Information Product”.

Related information For related information, see the following chapters in this document:

- [Chapter 1, “Product Description”](#)
- [Chapter 3, “Provisioning, Security, & Administration”](#)

Before you begin Before you begin this task, be familiar with the WaveStar® CIT.

Task Complete the following steps to install the DS1/DS3/16/1 or DS3/12 circuit pack.

.....
1 Open the faceplate latch and place, but do not fully seat, the circuit pack into the shelf Option 1 Slot.

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

Result: ACT (active) LED lights on the circuit pack. FLT (fault) LED on the circuit pack lights for about 20 seconds then goes off.

.....
3 Connect the required cables to the circuit pack and dress to front cable rack if provided.

.....
4 From the System View window, click on **Alarm List** button to verify that no alarms, locks, loops, or switches are present for the ports on the circuit packs just installed.

Result: The “NE Alarm List” window opens.

.....
5 Do you wish to provision circuit pack and/or port parameters at this time?

If...	Then...
Yes	Refer to “Task 340: Provision DS1 or DS3 Ports for New DS1 or DS3 Service” (9-241)
No	STOP! END OF TASK.

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



Task 339: Install OC48/1.3I2 (A1AA005), OC12/1.3I2 (A1AA016), or OC48 CHx/y (A1AA121-A1AA159) Main Circuit Pack

Purpose Use this task to install the Main circuit pack in a new Metropolis® DMXpress Access Multiplexer for the first time.

The Main circuit pack may be:

- OC48/1.3I2 (A1AA005)
- OC12/1.3I2 (A1AA016)
- OC48 CHx/y (A1AA121-159)

Required equipment The following equipment is required:

- Personal Computer (PC) with WaveStar® CIT software installed
- Wrist strap

Safety precautions To assure both personal safety and the proper functioning of Metropolis® DMXpress, it is imperative to review and understand these warnings and precautions prior to performing this task.



CAUTION

Electrostatic discharge

Use a static ground wrist strap whenever handling circuit packs or working on a Metropolis® DMXpress to prevent electrostatic discharge damage to sensitive components. See “Electrostatic discharge” in “About this Information Product”.



CAUTION

Equipment damage

The OC-48 and OC-12 Main circuit packs must not be reseated, removed, or installed while power is applied to the system. The system must be powered down before the circuit pack is reseated, removed, or replaced.

When Metropolis® DMXpress is powered down, you must wait at least 10 seconds before switching the power on again. Rapid power-cycling may result in OLIU CP failed alarms.

- Related information**
- For related information, see the following chapters in this document:
- Chapter 1, “Product Description”
 - Chapter 3, “Provisioning, Security, & Administration”

Task

Complete the following steps to install the Main circuit pack in a new Metropolis® DMXpress shelf.

- 1

Remove power from the shelf by setting the shelf power switch on the rear of the unit to the OFF (O) position.

Important! Shelf power must be turned off when inserting a Main circuit pack. After a new Main circuit pack is installed and power is applied to the shelf, the shelf circuitry is automatically initialized. (TID returns to default and cross-connections are lost.) Default parameters are used in the shelf initialization and may require changing after the initialization process is complete.

Important! When Metropolis® DMXpress is powered down, you must wait at least 10 seconds before switching the power on again. Rapid power-cycling may result in OLIU CP failed alarms.

- 2

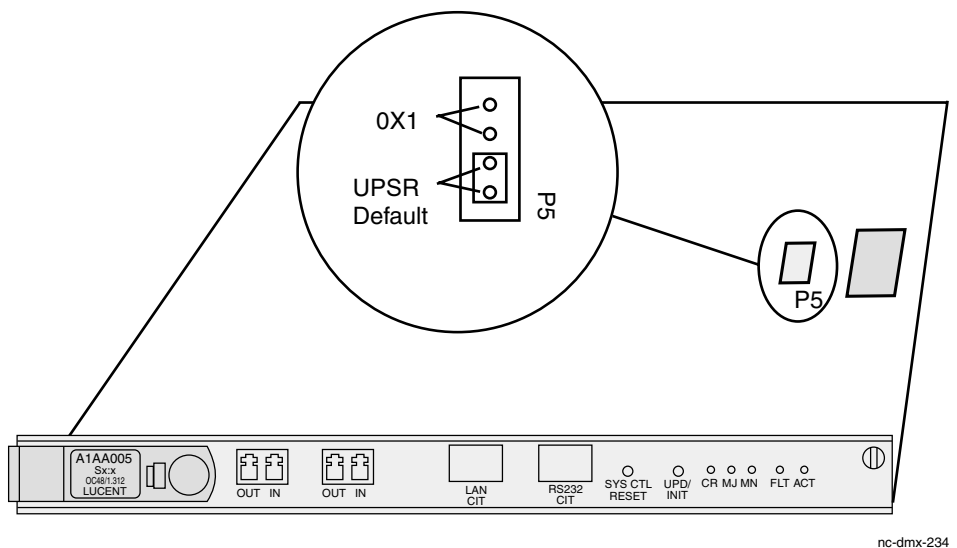
Which type of Main circuit pack are you replacing?

If...	Then...
OC48/1.3I2	Continue with Step 3 .
OC12/1.3I2	
OC48 CHx/y	Proceed to Step 4 .

- 3 Verify/set the application option plug (P5) to the application (UPSR [default] or 0x1) used for this shelf and then proceed to [Step 9](#).

[Figure 9-33](#) illustrates the location and settings for P5 on the OC48/1.3I2 or OC12/1.3I2 Main circuit pack.

Figure 9-33 Main Circuit Pack Application Option Plug (OC48/1.3I2 shown)



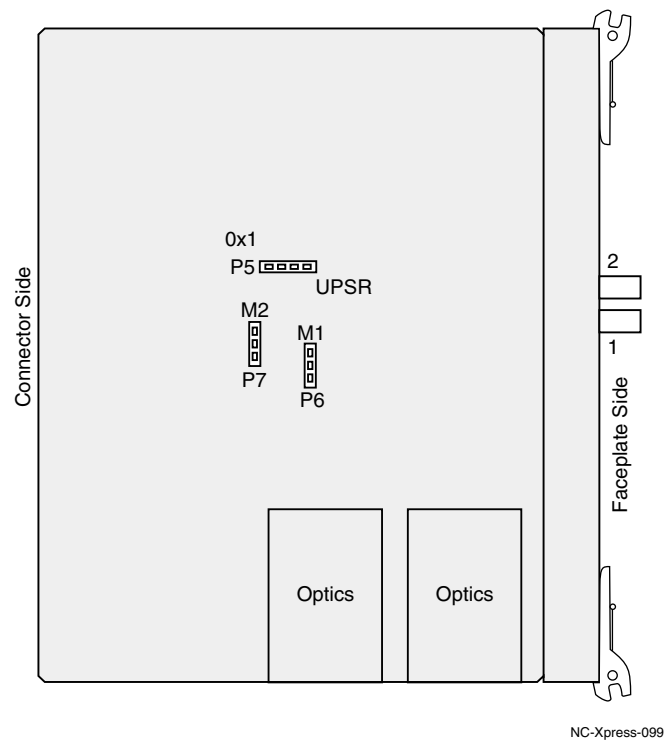
- 4 Verify/set the application option plug (P5) to the application (UPSR or 0x1) used for this shelf.

Reference: [Figure 9-34](#)

- 5 If installing the OC48 CHx/y (A1AA121-A1AA159), the technician must set jumpers to determine the wavelength (odd or even channel) for both M1 and M2. Locate the jumpers at P6 and P7 as shown in [Figure 9-34](#).

Important! The factory default setting for the M1 and M2 ports is the odd channel.

Figure 9-34 OC48 CHx/y Channel Selection Jumpers



-
- 6** Determine which of the OC48 CHx/y (A1AA121-A1AA159) circuit packs you are installing?

If...	Then...
A1AA121-137	Continue with Step 7 .
A1AA143-159	Proceed to Step 8 .

-
- 7** Set the jumpers for M1 and M2 on **A1AA121-137** according to the following table and then proceed to [Step 9](#).

Important! If held upright, with the faceplate to the right, ([Figure 9-34](#)) the jumper connector pins are numbered from the bottom.

If...	Then...
Odd Channel	Top position (connector pins 2 and 3)
Even Channel	Bottom position (connector pins 1 and 2)

-
- 8** Set the jumpers for M1 and M2 on **A1AA143-159** according to the following table.

Important! If held upright, with the faceplate to the right, ([Figure 9-34](#)) the jumper connector pins are numbered from the bottom.

If...	Then...
Odd Channel	Bottom position (connector pins 1 and 2)
Even Channel	Top position (connector pins 2 and 3)

-
- 9** To install the Main circuit pack in the Metropolis® DMXpress shelf, orient the circuit pack into a horizontal position (components up) and align the circuit pack with the slides at the edges of the Main Slot.

-
- 10** Apply a steady pressure to the faceplate and latch assembly until the circuit pack is seated.

-
- 11** Secure the circuit pack in the Metropolis® DMXpress shelf using the latch lever and thumbscrew.
-

- 12** Switch the shelf ON/OFF power switch to ON.

Important! When Metropolis® DMXpress is powered down, you must wait at least 10 seconds before switching the power on again. Rapid power-cycling may result in OLIU CP failed alarms.

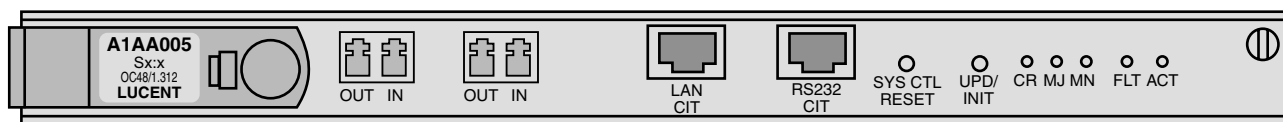
Result: The following LED sequence occurs:

1. All LEDs except ACT (active) LED lights
 2. The CR (critical) LED then extinguishes
 3. The FLT (fault) LED lights
 4. The CR LED flashes
 5. After approximately 10 seconds, the FLT LED extinguishes
 6. The CR and ACT LEDs remain lit
 7. On the OC48 CHx/y card, the odd or even LED for each port (1 or 2) will remain lit.
-

- 13** Connect the **LAN CIT** interface, and/or the **RS-232 CIT** interface cables.

Figure 9-35 illustrates the OC48/1.3I2 circuit pack.

Figure 9-35 OC48/1.3I2 (A1AA005) Circuit Pack



NC-Xpress-031

Task 339: Install OC48/1.3I2 (A1AA005), OC12/1.3I2 (A1AA016), or OC48 CHx/y (A1AA121-A1AA159)
Main Circuit Pack

Figure 9-36 illustrates the OC12/1.3I2 circuit pack.

Figure 9-36 OC12/1.3I2 (A1AA016) Circuit Pack

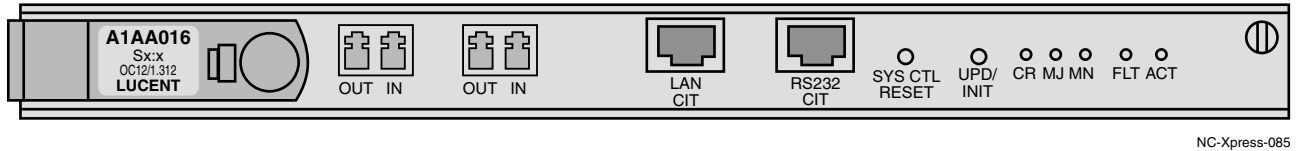
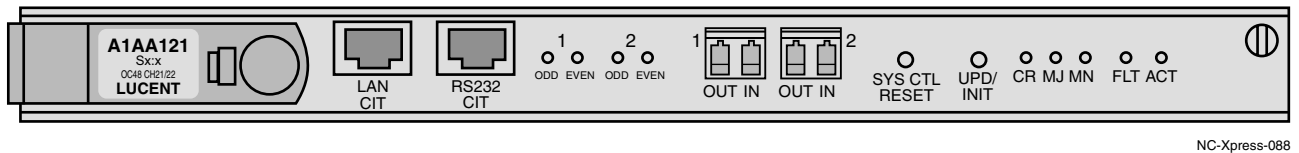


Figure 9-37 illustrates the OC48 CHx/y circuit pack. In this example, A1AA121 is illustrated.

Figure 9-37 OC48 CH21/22 (A1AA121) Circuit Pack



Important! Follow locally developed plans and records to make the local connections between the Metropolis® DMXpress shelf and the local network(s).

- 14 Install or verify new software generic version, if not already performed.

Reference: “Task 213: Install Software Generic Program in New Shelf Installation” (8-87)

END OF STEPS



Task 339: Install OC48/1.3I2 (A1AA005), OC12/1.3I2 (A1AA016), or OC48 CHx/y (A1AA121-A1AA159) Main Circuit Pack

Task 340: Provision DS1 or DS3 Ports for New DS1 or DS3 Service

Purpose	Use this task to provision ports on a DS1/DS3/16/1 or 12/DS3 circuit pack.
Required equipment	The following equipment is required: • Personal Computer (PC) with WaveStar® CIT software installed • Wrist Strap
Safety precautions	To assure both personal safety and the proper functioning of Metropolis® DMXpress, it is imperative to review and understand these warnings and precautions prior to performing this task.



CAUTION

Electrostatic discharge

Use a static ground wrist strap whenever handling circuit packs or working on a system to prevent electrostatic discharge damage to sensitive components. See “Electrostatic discharge” in “About this Information Product.”

Related information	For related information, see the following chapters in this document: • Chapter 1, “Product Description” • Chapter 3, “Provisioning, Security, & Administration”
Before you begin	Prior to performing this task: • Ensure either a DS1/DS3/16/1 or DS3/12 circuit pack is installed. • Connect PC and establish a WaveStar® CIT session. • Obtain work instructions for this task.

Task Complete the following steps to provision DS1/DS3/16/1 or DS3/12 circuit pack ports.

-
- 1 From the **System View** window, click on **Alarm List** button to verify that no alarms, locks, loops, or switches are present for the ports on the circuit packs to be provisioned.

Result: The “NE Alarm List” window opens.

.....

- 2 From the **System View** menu, select **Configuration > Provision**.

Result: The “Provision Parameters for Equipment” window opens.

.....

- 3 Find the DS1/DS3/16/1 or DS3/12 circuit pack with the ports being provisioned, then expand the equipment list by clicking on the plus (+) signs.
-

- 4 Click (highlight) the port being provisioned, then click on **Provision** at the bottom of the window.

Result: The port parameters display on the right side of the window.

.....

- 5 Select and provision the required port parameters, according to your work instructions.

Important! When BPV=N (default), then incoming BPVs at the DS1 port are corrected by the port unit circuitry before the DS1 is mapped into the VT1.5 payload. Certain digital loop carrier (DLC) equipment (e.g., SLC-96) requires either a DS1 LOS or a DS1 LOF in order to effect a protection switch.

The DS1 port units in DMX need to be provisioned accordingly:

- For the DMX DS1 port unit connected to the DLC remote terminal, set BPV=Y.
- For the DMX port unit connected to the DLC central office terminal (COT), set LINECDE=AMI for DS1 LOS, or to B8ZS for DS1 LOF.

-
- 6** Click **Apply** at the bottom of the window to make your changes.

Result: A confirmation window appears: “Execution of provision
may affect the NE service. Do you want to execute this command?”

-
- 7** Verify that you are provisioning the correct port, then click **Yes** to apply
your changes.

-
- 8** Repeat this procedure for all other ports (DS1 and/or DS3) to be
provisioned.

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



Task 340: Provision DS1 or DS3 Ports for New DS1 or DS3
Service

Task 341: Reserved for Future Use

Task 342: Set/Change System TID

Purpose Use this procedure to set or change the system Target Identifier (TID). The more common time to change a TID is prior to placing the system in-service. However, this procedure can also be used to change the TID of an in-service system.

Required equipment The following equipment is required:

- Personal Computer (PC) with WaveStar® CIT software installed
- Wrist strap

Safety precautions To assure both personal safety and the proper functioning of Metropolis® DMXpress, it is imperative to review and understand these warnings and precautions prior to performing this task.



WARNING **Eye damage**

Unterminated optical connectors may emit invisible laser radiation. Eye damage may occur if beam is viewed directly or with optical instruments. Avoid direct exposure to the beam.



CAUTION **Electrostatic discharge**

Use a static ground wrist strap whenever handling circuit packs or working on a Metropolis® DMXpress to prevent electrostatic discharge damage to sensitive components. See “Electrostatic discharge” in “About this Information Product”.

Related information For related information, see [Chapter 3, “Provisioning, Security, & Administration”](#) in this document.

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

- Obtain the TID from your work instructions.
- Be able to log in to the system with the WaveStar® CIT, and be familiar with the functions of the CIT.

Task Complete the following steps to set or change the system TID.

.....

1 Connect the PC and establish a WaveStar® CIT session.

Reference: “Task 200: Connect Personal Computer (PC) and Establish WaveStar® CIT Session” (8-3)

.....

2 From your work instructions, obtain the TID (also known as NE Name).

Important! The TID is a case sensitive ASCII character string from 1 to 20 characters and must be unique for each NE in the ring. The allowed characters are:

- Letters from "a" to "z" (upper and lower case).
 - Numbers from "0" to "9".
 - Special characters: "#" (pound), "%" (percent), "+" (plus), "-" (hyphen), and "." (period).
-

3 From the System View menu, select **Administration > Set TID**, then:

1. In the **New TID/NE Name:** box, enter the new TID.
2. Confirm your entry in the **Confirm TID/NE Name:** box.
3. Click the **OK** button.
4. Read the information message, then click the **YES** button.

Result: The NE performs an automatic reset and the current login session is terminated.

.....

END OF STEPS

.....



Task 343 through 348: Reserved for Future Use

Task 349: Setting Optional System Parameters

Purpose Use this task as reference for provisioning optional system parameters. Depending on local procedures, types of configurations, and shelf equipage, some or none of the optional parameters may need to be set. It is assumed that local system administration is responsible for determining these parameter settings.

Some of the parameter values may be set during the initial shelf turn-up. Other parameter values may be set after the system is integrated into the network configuration.

Required equipment The following equipment is required:

- Personal Computer (PC) with WaveStar® CIT software installed
- Wrist Strap

Safety precautions To assure both personal safety and the proper functioning of the Metropolis® DMXpress, it is imperative to review and understand these warnings and precautions prior to performing this task.



WARNING

Eye damage

Unterminated optical connectors may emit invisible laser radiation. Eye damage may occur if beam is viewed directly or with optical instruments. Avoid direct exposure to the beam.



CAUTION

Electrostatic discharge

Use a static ground wrist strap whenever handling circuit packs or working on a system to prevent electrostatic discharge damage to sensitive components. See “Electrostatic discharge” in “About this Information Product.”

Related information For related information, see the following:

- [Chapter 3, “Provisioning, Security, & Administration”](#)
- [Appendix A, WaveStar® CIT Tutorial](#)
- *Metropolis® DMXpress Access Multiplexer TL1 Command Manual, 365-372-313*

Before you begin Before you begin this task, you must:

- Obtain the work instructions for the parameters being set.
- Be familiar with using the WaveStar® CIT.

Task Reference the following for parameters being set.

-
- 1** Use the WaveStar® CIT to log in to the Metropolis® DMXpress shelf.
- Reference:** [“Task 200: Connect Personal Computer \(PC\) and Establish WaveStar® CIT Session” \(8-3\)](#)
-
- 2** Reference the following to provision the necessary parameters from your work instructions.
- Important!** Some of the parameters may have already been provisioned from earlier procedures.

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

Administration Parameters Administration parameters allow you to:

- Change your own password (Change Password).
- Provision Security
- Provision Data Communications
- Set TL1 Message Map.
- Change NE Login Banner.
- Set Date and Time.
- Set TID (system name).
- Set NE defaults (FTP, AGNE, remote NE status)

Administration Change Password

This command allows any user to change his/her own password.

Administration > Change Password

[“Task 202: Enable or Lockout System Security and/or Edit, Delete, or Enter a User’s Login” \(8-15\)](#)

Administration Security Parameters

Security parameters allow privileged users to:

- Lockout/Enable Logins

Administration > Security > Lockout Logins

Administration > Security > Enable Logins

[“Task 202: Enable or Lockout System Security and/or Edit, Delete, or Enter a User’s Login” \(8-15\)](#)

- User Provisioning

Administration > Security > User Provisioning

[“Task 202: Enable or Lockout System Security and/or Edit, Delete, or Enter a User’s Login” \(8-15\)](#)

- Allow/Inhibit Autonomous Messages

Administration > Security > Allow/Inhibit Autonomous messages

[“Task 359: Enable/Disable Autonomous Messages” \(9-319\)](#)

Allows/Inhibits reporting of autonomous alarm and status messages on a user basis per login session. Select Enabled or Disabled as required.

Administration Data Communications

Provisioning Data Communications parameters may consist of one or more of the following:

- IP Tunneling

Administration > Data Communications > IP Tunnel

[“Task 323: Add IP Tunnel\(s\) Through Network” \(9-105\)](#)

Use this task to add an IP tunnel(s) through the data communications channel (DCC) OSI-based network.

- TCP/IP Gateway control and host list

Administration > Data Communications > TCP/IP Gateway

[“Task 325: Provision, Enable, or Disable the Metropolis[®] DMXpress Access Multiplexer as a TL1 TCP/IP GNE” \(9-113\)](#)

Use this task to enable or disable the Metropolis[®] DMXpress as a TL1 TCP/IP GNE and provision authorized IP calling OS host addresses.

Note that TCP/IP must also be enabled and the required TCP/IP parameters provisioned for at least one of the NE's IAO LAN ports. See [“TCP/IP — Enabling/Disabling TCP/IP function and assigning TCP/IP addresses.” \(9-255\)](#) below for reference.

- CIT serial port parameters

Administration > Data Communications > Serial Port

[“Task 357: Set Serial Port CIT-1 Parameters” \(9-305\)](#)

Use this task to provision the selected CIT-1 serial port parameters.

- SNMP Management

Administration > Data Communications > SNMP Management

[“Task 355: Provision System SNMP Management Features and Users” \(9-297\)](#)

Use this task to provision system SNMP management features and/or add, modify, or delete SNMP users.

- Enabling/Disabling LAN port status
Administration > Data Communications > LAN Management
[“Task 360: Enable/Disable LAN Port Status” \(9-321\)](#)
This procedure allows you to enable or disable the OSI-LAN port status for LAN ports lan-1 and/or lan-2.
- Modification of Network Service Access Point (NSAP) addresses and Intermediate System Level 1 or Level 2 routing functions.
Administration > Data Communications > Network Layer
[“Task 356: Modify Network Layer NSAP Address and/or Level 1 or Level 2 Routing Capability” \(9-301\)](#)
This command allows you modify the NSAP address for this NE and provision it as a Level 1 or Level 1&2 router. Values should not be changed from default values except by users who intend to provision the SONET subnetwork and partition DCC communications.
- TARP — Provisioning TARP functions
 - **TARP** — Provisioning TARP Propagation and Origination parameters
Administration > Data Communications > TARP
 - **TARP Data Cache** — Provisioning TARP Data Cache entries
Administration > Data Communications > TARP Data Cache
 - Provisioning TARP Manual Adjacencies
Administration > Data Communications > TARP Manual Adj.
[“Task 351: Set TARP Parameters” \(9-283\)](#)
- **TCP/IP** — Enabling/Disabling TCP/IP function and assigning TCP/IP addresses.
Administration > Data Communications > TCP/IP
[“Task 324: Provision/Enable/Disable TCP/IP on an IAO LAN Port” \(9-109\)](#)
Use this task to provision, enable, or disable TCP/IP on an IAO LAN Port.

**Administration Set TL1
Message Map**

This command allows you to map TL1 autonomous message types to an OS type application context ID (ACID). TL1 autonomous messages are not reported unless they are assigned to an OS type. This command allows a user to assign specific TL1 autonomous message types, or none at all.

Administration > Set TL1 Message Map

[“Task 352: Map TL1 Message Types to OS Applications” \(9-287\)](#)

**Administration Change NE
Login Banner**

This command allows you to provision your own company proprietary notice at login. This command allows a privileged user to add a user defined proprietary notice at login to enhance system security.

Administration > Change NE Login Banner

[“Task 353: Create or Edit Login Banner” \(9-291\)](#)

**Administration Set Date
and Time**

This command allows you to manually set the Date and Time for this NE.

Administration > Set Date and Time

[“Task 354: Set Date and Time” \(9-295\)](#)

Administration Set TID

This command allows you to set the Target Identifier (TID)/NE Name for this NE. The more common time to change a TID will be prior to placing the system in-service. However, this procedure can also be used to change the TID of an in-service system.

Administration > Set TID

[“Task 342: Set/Change System TID” \(9-247\)](#)

The TID is an ASCII character string from 1 to 20 characters and must be unique for each NE in the ring.

If the TID is changed for a node participating in a BLSR with manual ring provisioning, then you must update the FE NE Name List at each far end node in the ring.

Administration Set NE

This command allows you to provision the NE defaults for the following:

- Enable/Disable remote NE status.
- Enable/Disable File Transfer Protocol (FTP).
- Enable/Disable FTAM-FTP Gateway Control.
- Enable/Disable the NE as an Alarm Gateway Network Element (AGNE) and assign alarm group numbers.

Administration > Set NE

[“Task 358: Set NE Defaults — Enabling/Disabling Alarm Gateway, Alarm Group, Remote NE Status, and FTP” \(9-309\)](#)

Performance Monitoring

Performance monitoring parameters allow you to view and provision performance monitoring parameters.

Performance

[“Task 350: Provision Performance Monitoring \(PM\) Functions” \(9-261\)](#)

Performance monitoring parameters may consist of the following:

- View PM threshold information for ports and channels (tributaries).

Performance > View PM Thresholds then select ports or tributaries.

[“SE 350-1: View or Provision Performance Monitoring \(PM\) Thresholds for Ports or Tributaries” \(9-263\)](#)

- Provision PM threshold information for ports and channels (tributaries).

Performance > Prov PM Thresholds then select ports or tributaries.

[“SE 350-1: View or Provision Performance Monitoring \(PM\) Thresholds for Ports or Tributaries” \(9-263\)](#)

- Initialize all current daily and/or 15-minute PM registers.

Performance > Initialize PM Registers then select 15-min, 1-Day, or Both.

[“SE 350-2: Initialize Performance Monitoring \(PM\) Registers” \(9-267\)](#)

- View PM parameters for ports and tributaries.
Performance > View PM Ports then select the port.
[“SE 350-3: View or Provision Performance Monitoring \(PM\) Parameters for Ethernet Ports or VCG Tributaries” \(9-269\)](#)
- Provision PM parameters for ports and tributaries.
Performance > Prov PM Ports then select the port to provision.
[“SE 350-3: View or Provision Performance Monitoring \(PM\) Parameters for Ethernet Ports or VCG Tributaries” \(9-269\)](#)
- View Performance Monitoring reports.
Performance > Reports then choose the entity.
[“SE 350-4: View Performance Monitoring \(PM\) Reports” \(9-271\)](#)
- Schedule PM reports.
TL1 command only at this time: **sched-pmrept**
[“SE 350-5: Schedule PM” \(9-273\)](#)
- Clear TCA counts, entered here for reference.
Fault > Clear TCA Counts
[“SE 350-6: Clear TCA Counts on Logged In WaveStar® CIT” \(9-281\)](#)

Configuration Parameters

This section lists configuration parameters. Depending on your requirements, default settings may be sufficient for many of the parameters. Other parameters in the Configuration menu are necessary for system and network operation but may not be listed here. They are accessed through various tasks associated with system turnup, network configuration, and establishing service.

Configuration parameters consist of the following:

- Provisioning general system (aid=system), circuit pack, port, and tributary parameters.
- Provisioning miscellaneous discretes.
- Provisioning DCC terminations
- Provisioning system timing and synchronization functions.
- Provisioning system alarm configurations
- Provisioning system software backup intervals

Configuration Provision System, Circuit Packs, Ports, and Tribs

The following references commands and procedures associated with provisioning system, port, and tributary parameters that may apply for the entire system or circuit pack. Certain individual parameters may be provisioned in other procedures depending on the type of service, system configuration, and/or network configuration.

- General system setting parameters

Configuration > Provision, select the system (aid=system), then click **Provision**.

[“Task 362: Set General System Parameters” \(9-325\)](#)

Options available:

- System settings for Idle Channel Signals, or autonomous messages.
- Date and Time manual settings.
- Signal Degrade and Signal Failure Thresholds for entire system.

- Circuit packs, ports, and tributary parameters.

Configuration > Provision, select the circuit pack, port, or tributary, then click **Provision**. Provision the parameters as required.

Reference the following tasks, if required:

Sets the characteristics of individual circuit packs, ports, or tributaries.

- [“Task 322: Provision Low-Speed OLIU Circuit Packs/Ports for New Service” \(9-101\)](#)
- [“Task 340: Provision DS1 or DS3 Ports for New DS1 or DS3 Service” \(9-241\)](#)

Configuration Miscellaneous Discretes

This command allows you to provision environmental miscellaneous discrete input and output controls.

Configuration > Misc. Discretes

[“Task 310: Configure Miscellaneous Discrete Inputs and Outputs” \(9-57\)](#)

Configuration DCC Terminations

This command allows you to provision DCC Terminations.

Configuration > DCC Terminations

[“Task 364: Provision DCC Terminations” \(9-331\)](#)

Configuration Data Use for *reference only*. Data parameters apply to establishing ethernet service.

Configuration > Data

[“Task 330: Establishing Ethernet Services” \(-135\)](#)

Configuration Cross-Connection Use for *reference only*. Invokes the cross-connection wizard for establishing cross-connections.

Configuration > Cross-Connection

The Cross-Connection wizard is referenced in other procedures relating to establishing specific services. If you have explicit work instructions and are familiar with the cross-connection wizard, use the wizard to make your cross-connections.

Configuration Timing/Sync Allows you to provision system timing and timing input and output ports.

Configuration > Timing/Sync

[“Task 204: Network Synchronization Provisioning” \(8-23\)](#)

Configuration Alarms Allows you to provision system alarm clear delay, alarm generate delay, and the alarm level of power minor alarms.

Configuration > Alarms > Alarm Configuration

[“Task 363: Provision System Alarm Configuration” \(9-329\)](#)

Configuration Software Allows you to provision certain software functions for the NE. Optional parameters not relating to downloading or copying software, or backup and restoring software include the automatic backup intervals.

Configuration > Software > Configure Auto Backup Interval

[“Task 211: Backup and Restore” \(8-71\)](#)



Task 350: Provision Performance Monitoring (PM) Functions

Purpose This procedure is provided as a reference for all the performance monitoring tasks provided in this manual. Use this procedure to access all the following performance monitoring tasks:

- View/Provision PM thresholds for ports or tributaries
- Initialize PM registers
- View/Provision PM parameters for Ethernet ports and VCG tributaries
- View PM reports

Required equipment The following equipment is required:

- Personal Computer (PC) with WaveStar® CIT software installed
- Wrist Strap

Safety precautions To assure both personal safety and the proper functioning of Metropolis® DMXpress, it is imperative to review and understand these warnings and precautions prior to performing this task.



CAUTION

Electrostatic discharge

Use a static ground wrist strap whenever handling circuit packs or working on a Metropolis® DMXpress to prevent electrostatic discharge damage to sensitive components. See “Electrostatic discharge” in “About this Information Product”.

Related information For related information, see the following:

- [Chapter 3, “Provisioning, Security, & Administration”](#)
- *Metropolis® DMXpress Access Multiplexer TL1 Command Manual, 365-372-313*

- Task** Choose the task you want to perform from the tasks listed
-
- 1** View/Provision PM thresholds for ports or tributaries.
- Reference:** “SE 350-1: View or Provision Performance Monitoring (PM) Thresholds for Ports or Tributaries” (9-263)
-
- 2** Initialize PM registers.
- Important!** Use this task with Caution. This task is used to reset all selected registers to zero for selected ports or tributaries.
- Reference:** “SE 350-2: Initialize Performance Monitoring (PM) Registers” (9-267)
-
- 3** View/Provision PM parameters for Ethernet ports and VCG tributaries.
- Reference:** “SE 350-3: View or Provision Performance Monitoring (PM) Parameters for Ethernet Ports or VCG Tributaries” (9-269)
-
- 4** View PM reports.
- Reference:** “SE 350-4: View Performance Monitoring (PM) Reports” (9-271)
-
- 5** Schedule PM reports using TL1.
- Reference:** “SE 350-5: Schedule PM” (9-273)
-
- END OF STEPS
-



SE 350-1: View or Provision Performance Monitoring (PM) Thresholds for Ports or Tributaries

Purpose Use this task as reference for viewing or provisioning performance monitoring (PM) Thresholds for port or tributaries.

Required equipment The following equipment is required:

- Personal Computer (PC) with WaveStar® CIT software installed
- Wrist Strap

Safety precautions To assure both personal safety and the proper functioning of Metropolis® DMXpress, it is imperative to review and understand these warnings and precautions prior to performing this task.



CAUTION

Electrostatic discharge

Use a static ground wrist strap whenever handling circuit packs or working on a Metropolis® DMXpress to prevent electrostatic discharge damage to sensitive components. See “Electrostatic discharge” in “About this Information Product”.

Related information For related information, see the following:

[Chapter 3, “Provisioning, Security, & Administration”](#)

[Chapter 4, “Performance Monitoring”](#)

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Task Perform the following steps to view or provision PM thresholds.

-
- 1 Use the WaveStar® CIT to log in to the Metropolis® DMXpress shelf.

Reference: [“Task 200: Connect Personal Computer \(PC\) and Establish WaveStar® CIT Session” \(8-3\)](#)

.....

If...	Then...
you are viewing PM thresholds,	Continue with Step 3 .
you are provisioning PM thresholds,	Proceed to Step 5 .

.....

3 VIEWING PM THRESHOLDS

From the System View menu, select **Performance > View PM Threshold** then highlight the port or tributary you want to view.

Result: The View () PM Threshold Screen opens for the port or tributary selected.

.....

-
- 4** View the parameters, then click **Close** to exit.
- STOP! End of Steps.**
-

5 PROVISIONING PM THRESHOLDS

From the System View menu, select **Performance > Prov PM Threshold >** then highlight the port or tributary you want to provision.

Result: The Provision () PM Threshold Screen opens for the port or tributary selected.

.....

- 6** In the table, double-click inside the table cell for the parameter being provisioned. Enter or edit the parameter values you require. Repeat for each parameter being provisioned.
- For help on parameter values, click on the **Help** button at the bottom of the screen.

-
- 7** After all parameter values are entered, click **OK** at the bottom of the screen. Read the warning message, then click **Yes** to execute the command. Click **Close** to exit.

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



SE 350-1: View or Provision Performance Monitoring (PM)
Thresholds for Ports or Tributaries

SE 350-2: Initialize Performance Monitoring (PM) Registers

Purpose Use this task to initialize 15-min, 1-day, or both PM registers.



CAUTION

Executing the command in this procedure will reset and clear the PM registers selected. Ensure you want to execute this procedure before continuing.

Required equipment The following equipment is required:

- Personal Computer (PC) with WaveStar® CIT software installed
- Wrist Strap

Safety precautions To assure both personal safety and the proper functioning of the Metropolis® DMXpress, it is imperative to review and understand these warnings and precautions prior to performing this task.



CAUTION

Electrostatic discharge

Use a static ground wrist strap whenever handling circuit packs or working on a system to prevent electrostatic discharge damage to sensitive components. See “Electrostatic discharge” in “About this Information Product”.

Related information For related information, see the following:

[Chapter 3, “Provisioning, Security, & Administration”](#)

[Chapter 4, “Performance Monitoring”](#)

Metropolis® DMXpress Access Multiplexer TL1 Command Manual, 365-372-313

Task Perform the following steps to initialize (clear) PM registers.

-
- 1** Use the WaveStar® CIT to log in to the Metropolis® DMXpress shelf.

Reference: “Task 200: Connect Personal Computer (PC) and Establish WaveStar® CIT Session” (8-3)

.....

- 2** From the System View menu, select **Performance > Initialize PM Registers >** and then select the register or registers you want to initialize.

Result: A warning screen opens warning you that executing this command will reset the selected register(s).

.....

- 3** Read the warning message, then click **Yes** to execute the command or **No** to abort.

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



SE 350-3: View or Provision Performance Monitoring (PM) Parameters for Ethernet Ports or VCG Tributaries

Purpose Use this task as reference for viewing or provisioning performance monitoring (PM) Thresholds for port or tributaries.

Required equipment The following equipment is required:

- Personal Computer (PC) with WaveStar® CIT software installed
- Wrist Strap

Safety precautions To assure both personal safety and the proper functioning of the Metropolis® DMXpress, it is imperative to review and understand these warnings and precautions prior to performing this task.



CAUTION

Electrostatic discharge

Use a static ground wrist strap whenever handling circuit packs or working on a system to prevent electrostatic discharge damage to sensitive components. See “Electrostatic discharge” in “About this Information Product”.

Related information For related information, see the following:

[Chapter 3, “Provisioning, Security, & Administration”](#)

[Chapter 4, “Performance Monitoring”](#)

Metropolis® DMXpress Access Multiplexer TLI Command Manual, 365-372-313

Task Perform the following steps to view or provision PM thresholds.

-
- 1 Use the WaveStar® CIT to log in to the Metropolis® DMXpress shelf.

Reference: [“Task 200: Connect Personal Computer \(PC\) and Establish WaveStar® CIT Session” \(8-3\)](#)

2

If...	Then...
you are viewing PM Ports,	Continue with Step 3 .
you are provisioning PM Ports,	Proceed to Step 6 .

3

VIEWING PM PORTS

From the System View menu, select **Performance > View PM Ports**.

Result: The View Parameters for Port Performance Monitoring Screen opens.

4

Expand the details for the ethernet circuit pack. Then, highlight the port or VCG you want to view, then click **Select**.

5

View the parameters, then click **Close** to exit.

STOP! End of Steps.

6

PROVISIONING PM PORTS

From the System View menu, select **Performance > Prov PM Ports**.

Result: The Provision Parameters for Port Performance Monitoring Screen opens.

7

Expand the details for the ethernet circuit pack. Then, select the port or VCG you want to provision.

8

Select the Port Mode and Enable or Disable Ethernet PM.

END OF STEPS



SE 350-4: View Performance Monitoring (PM) Reports

Purpose Use this task as reference for viewing performance monitoring (PM) reports.

Required equipment The following equipment is required:

- Personal Computer (PC) with WaveStar® CIT software installed
- Wrist Strap

Safety precautions To assure both personal safety and the proper functioning of the Metropolis® DMXpress, it is imperative to review and understand these warnings and precautions prior to performing this task.



CAUTION

Electrostatic discharge

Use a static ground wrist strap whenever handling circuit packs or working on a system to prevent electrostatic discharge damage to sensitive components. See “Electrostatic discharge” in “About this Information Product”.

Related information For related information, see the following:

[Chapter 3, “Provisioning, Security, & Administration”](#)

[Chapter 4, “Performance Monitoring”](#)

Metropolis® DMXpress Access Multiplexer TL1 Command Manual, 365-372-313

Task Perform the following steps to view or provision PM thresholds.

-
- 1 Use the WaveStar® CIT to log in to the Metropolis® DMXpress shelf.

Reference: [“Task 200: Connect Personal Computer \(PC\) and Establish WaveStar® CIT Session” \(8-3\)](#)

-
- 2** From the System View menu, select **Performance > Reports >** then select the entity you want to report.

Result: The PM Parameters Selection Screen opens for the entity you chose.

.....

- 3** Expand the details for the circuit pack and ports. Then, highlight the entity from which you want to report. Then click **Select**.

Result: A parameter selection details screen opens.

Note that if a TCA report was requested the report is displayed automatically.

.....

- 4** Enter the time and date selection parameters for the report you want, if required. Then, select the parameters to report. Click **Apply**.

Result: The PM report is displayed.

.....

- 5** At the bottom of the screen, choose an option to **Close, Print, Save As,** or **Refresh** the data, as required.

Click on the **Help** button for additional information if needed.

.....

END OF STEPS

.....



SE 350-5: Schedule PM

Purpose This task allows a user to Schedule Performance Monitoring data on a Metropolis® DMXpress. Performance monitoring can be scheduled to provide quarter hour and daily reports beginning at different time intervals.

In order to schedule PM reports, PM messaging must be enabled and you must use the WaveStar® CIT TL1 cut-through mode or the TL1 Command Builder.

Important! The WaveStar® CIT Graphical User Interface (GUI) does not, at this time, support this command.

Required equipment The following equipment is required:

- Personal Computer (PC) with WaveStar® CIT software installed
- Wrist Strap

Related information For related information, see the following:

- [Chapter 4, “Performance Monitoring”](#)
- If you are unfamiliar with the parameters in this task, refer to **SCHED-PMREPT** in the *Metropolis® DMXpress Access Multiplexer TL1 Command Manual, 365-372-313*

Before you begin Prior to beginning this task:

1. Ensure that Performance Monitoring is enabled for all circuit pack(s).
Reference: [Chapter 4, “Performance Monitoring”](#)
2. If not previously completed, install generic and WaveStar® CIT software on the PC..
Reference: [“Task 214: Install Generic and WaveStar® CIT Software on the PC” \(8-109\)](#)
3. Connect PC and establish a WaveStar® CIT session.
Reference: [“Task 200: Connect Personal Computer \(PC\) and Establish WaveStar® CIT Session” \(8-3\)](#)

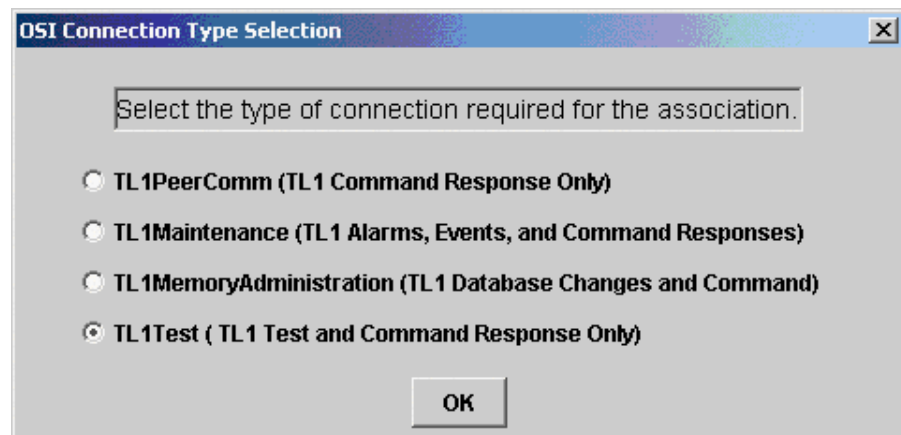
Task Complete the following steps to schedule PM. The NE supports up to a maximum of 100 active scheduled PM reports, counting every aid as many times as it is scheduled (aid values that include ALL are counted multiple times). The NE accepts each **SCHED-PMREPT** as a request for a different scheduled PM report unless two requests are exact duplicates. **SCHED-PMREPT** command does not generate a **REPT DBCHG** message.

- 1 From the System View menu (GUI), verify that the PM message type has been enabled for the OSI Application Type being used by selecting **Administration > Set TL1 Message Map**.

Reference: [“Task 352: Map TL1 Message Types to OS Applications” \(9-287\)](#)

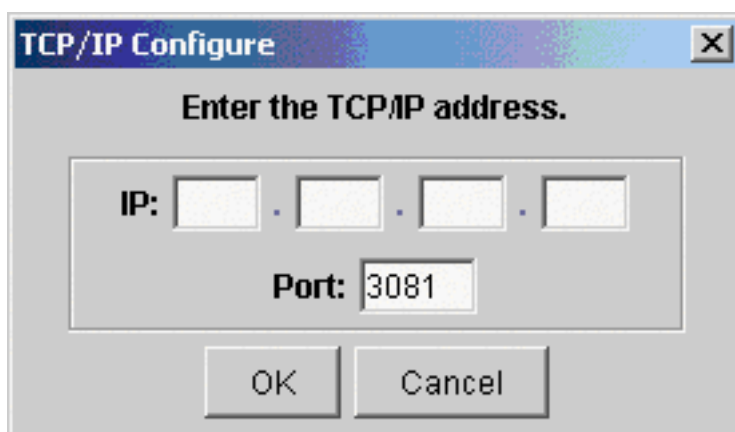
- 2 From the System View menu (GUI), select **File > NE Disconnect** and click **Yes** in the resulting confirmation window.
- 3 From the Network View, log back into the NE but this time click on **TL1** not **Graphical**. There are 3 choices: **OSI**, **TCP/IP**, and **Serial**.

If connecting by **OSI**, the following screen appears:



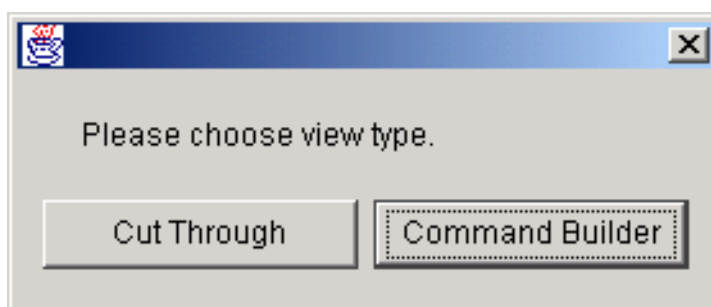
Select the appropriate OSI connection Type and Click **OK**.

Or if connecting by TCP/IP, the following screen appears.



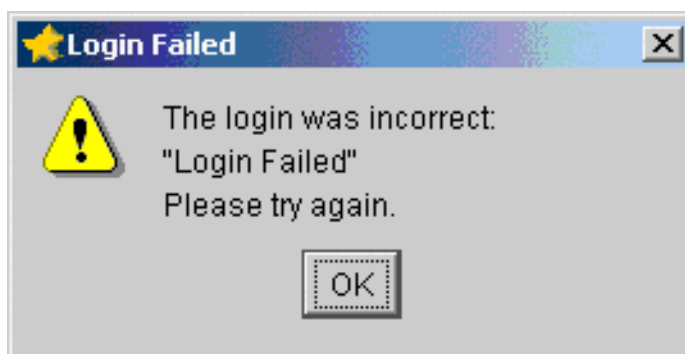
Enter the TCP/IP address and Click **OK**.

Or if Connecting by Serial, The following screen appears:

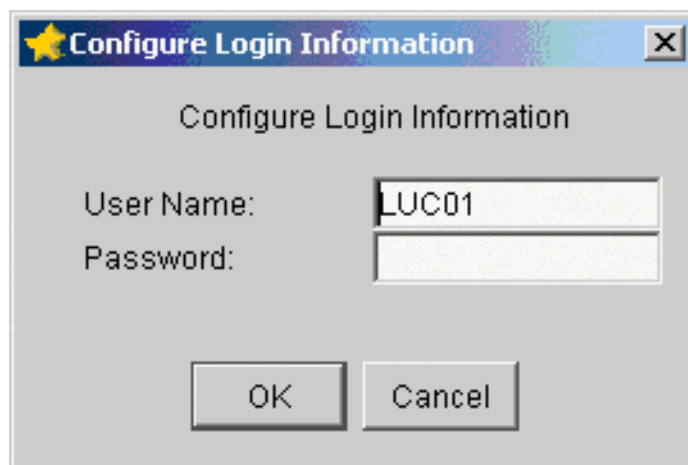


Select Command Builder.

The Login Failed screen appears:



Click OK and the Login dialog window appears:

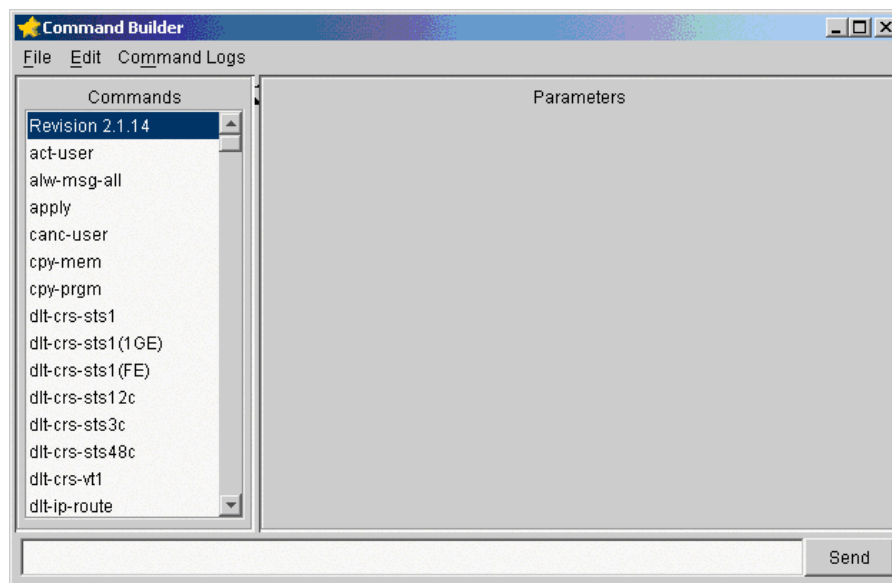


Enter your User ID and Password. The Default is:

User Name: LUC01

Password: DMXPRS2.5G

This brings up the Command Builder screen:



4 Perform a **sched-pmrept** command to the NE.

sched-pmrept-modifier:tid: aid: ctag:: [reptinvl], [reptstatm],[numrept], [montype],[monlev],[locn],[dirn],[tmper],[tmofst];

- Where **modifier** is listed in “[List of Modifiers](#)” (9-278).
- Where **AID** is any valid parameter specified in *Metropolis® DMXpress Access Multiplexer TL1 Command Manual, 365-372-313*, Appendix A.
- Where **reptinvl** is 15-MIN (every 15 minutes), (1-24)-HR (generates report every 1 to 24 hours), or 1-DAY generates 1 report every day.
- Where **reptstatm** is report start time. in HH-MM where HH =0 to 23 and MM =0 to 59
- Where **numrept** is the number of reports from 0 to 96. A Null character may be used to generate one report.

Important! If **numrept** is NULL (default), the NE activates the PM report schedule indefinitely, that is, until the schedules deleted by a subsequent **sched-pmrept**, or a processor reset results in the deletion of all PM report schedules. If **numrept** is 0, the NE deletes any previous PM report schedule(s) that match based on all other input parameter values (except **ctag**).

- Where **montype** is equal to the monitored type. Null is all. For a complete list see “[SCH-PMREPT-T3:LT-TID123:b-1:123456::15-MIN,12-05,1,CVL,1-UP,NEND,,15-MIN,0.0&0.45&0.30&0.15;](#)” (9-279).
- Where **monlev** is equal to Monitored Level. This has the format **LEV-DIRN**. The LEV value may be a decimal numeral. DIRN may have one of the following values: DN This requests PM data be reported for monval values equal to or less than the value of LEV. UP This requests PM data be reported for monval values equal to or greater than the value of LEV. The default for **monlev** is 1-UP.
- Where **locn** is equal to FEND and NEND. Null is both.
- Where **dirn** is equal to Direction. This requests PM data be reported for a specified direction. The value of direction must be NULL or NA (not applicable). If NULL, the default value is NA.

- Where **tmper** is equal to Time Period. This requests PM data for a specified time interval. This parameter must have one of the following values: 15-MIN This requests PM data in 15-minute intervals. 1-DAY This requests daily PM data. If tmper is NULL, the default value is 15-MI.
- Where **tmofst** is the Time Offset.
This parameter specifies the start time of the time period (tmper) for which PM data is to be reported, by subtracting the tmofst from the time of the most recently completed time period (**tmper**). This has the format DD-HH-MM (day-hours-minutes). If tmper= 1-DAY, allowable values of tmofst are 0.0 and 1.0 only. If tmper = 15-MIN, allowable values of tmofst are 0-{0-7}-{0,15,30,45} and 0.0. In the specific case of tmofst = 0.0, the NE reports the PM data accumulated during the current time period (**tmper**)

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

Modifiers

Table 9-4 List of Modifiers

Modifier	Description
OC3	optical OC-3 level external interfaces.
OC12	optical OC-12 level external interfaces.
OC48	optical OC-48 level external interfaces.
STS1	STS1 channel.
STS3c	STS3c channels.
STS12c	STS12c channels.
T1	DS1 level external interfaces.
T3	DS3 level external interfaces.
VT1	dropped VT channel interfaces.

EXAMPLE**Table 9-5** SCHED-PMREPT-T3:LT-TID123:b-1:123456::15-MIN,12-05,1,CVL,1-UP,NEND,,15-MIN,0.0&0.45&0.30&0.15;

Description	Meaning
CVL	Coding Violation count - Line
CVP	Coding Violation count - Path
ESL	Errored Second count - Line
ESA-L	Errored Second Type A count - Line
ESB-L	Errored Second Type B count - Line
PJC	STS pointer justification count - Line
ESP	Errored Second count - Path
ESA-P	Errored Second Type A count - Path,
ESB-P	Errored Second Type B count - Path,
SESL	Severely Errored Second count - Line
SESP	Severely Errored Second count - Path
SESV	Severely Errored Second count - VT1 Path
UASL	Unavailable Second Count - Line
UASP	Unavailable Second Count - Path
UASV	Unavailable Second Count - VT1 Path

SE 350-6: Clear TCA Counts on Logged In WaveStar® CIT

Purpose Use this task to clear TCA counts on the WaveStar® CIT.

Required equipment The following equipment is required:

- Personal Computer (PC) with WaveStar® CIT software installed
- Wrist Strap

Safety precautions To assure both personal safety and the proper functioning of the Metropolis® DMXpress, it is imperative to review and understand these warnings and precautions prior to performing this task.



WARNING **Eye damage**

Unterminated optical connectors may emit invisible laser radiation. Eye damage may occur if beam is viewed directly or with optical instruments. Avoid direct exposure to the beam.



CAUTION **Electrostatic discharge**

Use a static ground wrist strap whenever handling circuit packs or working on a system to prevent electrostatic discharge damage to sensitive components. See “Electrostatic discharge” in “About this Information Product”.

Related information For related information, see the following:

- [Chapter 3, “Provisioning, Security, & Administration”](#)
- [Chapter 4, “Performance Monitoring”](#)
- *Metropolis® DMXpress Access Multiplexer TL1 Command Manual, 365-372-313*

Task Perform the following steps to clear TCA counts.

-
- 1** Use the WaveStar® CIT to log in to the Metropolis® DMXpress shelf.

Reference: “[Task 200: Connect Personal Computer \(PC\) and Establish WaveStar® CIT Session](#)” (8-3)

-
- 2** From the System View menu, select **Fault > Clear TCA Counts**.

Result: The TCA counts are cleared.

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



Task 351: Set TARP Parameters

Purpose This procedure allows you to provision user settable fields and functions relating to the following TARP capabilities for this NE:

- TARP Propagation and Origination parameters
- TARP Data Cache entries
- TARP Manual Adjacencies

Important! Values should not be changed from default values except by users who intend to provision the SONET subnetwork and partition DCC communications. All the Layer 4 parameters that can be provisioned and are needed for NE operation have default values. Therefore, it is not necessary to provision these parameters for the NE to operate in the network.

Required equipment Personal Computer (PC) with WaveStar® CIT software installed

Safety precautions To assure both personal safety and the proper functioning of the Metropolis® DMXpress, it is imperative to review and understand these warnings and precautions prior to performing this task.



CAUTION

Electrostatic discharge

Use a static ground wrist strap whenever handling circuit packs or working on a system to prevent electrostatic discharge damage to sensitive components. See “Electrostatic discharge” in “About this Information Product.”

Related information For related information, see the following:

- [Chapter 3, “Provisioning, Security, & Administration”](#)
- [Appendix A, WaveStar® CIT Tutorial](#)
- *Metropolis® DMXpress Access Multiplexer TL1 Command Manual, 365-372-313*

Before you begin Before you begin this task, obtain the work instructions for the parameters being set.

Task Perform the following steps to provision TARP parameters, as required.

- 1 Use the WaveStar® CIT to log in to the Metropolis® DMXpress shelf, if not already performed.

Reference: “Task 200: Connect Personal Computer (PC) and Establish WaveStar® CIT Session” (8-3)

- 2 From the System View menu, select **Administration > Data Communications**.

Result: The Data Communications for ... window opens.

- 3 TARP ORIGINATION AND PROPAGATION

Select the TARP tab.

Result: The TARP Propagation and Origination parameters window opens.

- 4 Set the TARP Propagation timers as required.

- 5 Click on the **Set Parameters** button for the TARP Origination function.

Important! Note that the TARP Origination function is always enabled and cannot be changed.

Result: The Provision TARP Originator for system window opens.

- 6 Provision the **TARP Lifetime** and **TARP Timers**, as required. **Enable** or **Disable** TARP Data Cache as required. Click **OK**.

- 7 Click **Apply**, read the warning message, then click **Yes** to execute the command.

.....

8 TARP DATA CACHE

Click on the **TARP Data Cache** tab.

Result: The TARP Data Cache Entry List window opens.

.....

- 9** Click on the sunglasses icon to add, modify, or delete entries. Follow the directions in the subsequent windows to edit the TARP Data Cache Entry **NE Name** and **NSAP**.
-

- 10** Click **Apply**, read the warning message, then click **Yes** to execute the command.
-

11 TARP MANUAL ADJACENCIES

Click on the **TARP Manual Adj.** tab.

Result: The TARP Manual Adjacency window opens.

.....

- 12** Up to two Manual Adjacencies may be provisioned. Select one to provision by clicking on the **Modify** button next to **MAJ1:** or **MAJ2:**.

Result: The NSAP Provisioning window opens.

.....

- 13** Modify the NSAP as required, then click **OK**.
-

- 14** Click **Apply** at bottom of the window, read the warning message, then click **Yes** to execute the command or **No** to abort the command.
-

- 15** If you are finished provisioning Data Communications parameters, click **Close** to exit. Otherwise, continue with another tab.

.....

END OF STEPS

.....



Task 352: Map TL1 Message Types to OS Applications

Purpose Use this task to map TL1 autonomous message types to an OS type application context ID (ACID). TL1 autonomous messages are not reported unless they are assigned to an OS type. This command allows a user to assign specific TL1 autonomous message types, or none at all.

Required equipment The following equipment is required:

- Personal Computer (PC) with WaveStar® CIT software installed
- Wrist Strap

Safety precautions To assure both personal safety and the proper functioning of the Metropolis® DMXpress, it is imperative to review and understand these warnings and precautions prior to performing this task.



CAUTION

Electrostatic discharge

Use a static ground wrist strap whenever handling circuit packs or working on a system to prevent electrostatic discharge damage to sensitive components. See “Electrostatic discharge” in “About this Information Product”.

Related information For related information, see the following:

- [Chapter 3, “Provisioning, Security, & Administration”](#)
- *Metropolis® DMXpress Access Multiplexer TL1 Command Manual, 365-372-313*

Before you begin Verify that you have the work instructions for this task, particularly all relevant ACID/OS requirements.

Task Complete the following steps to map TL1 message types to the OS.

.....

1 Connect PC and establish a WaveStar® CIT session.

Reference: “Task 200: Connect Personal Computer (PC) and Establish WaveStar® CIT Session” (8-3)

.....

2 From the **System View** menu, select **Administration > Set TL1 Message Map...** to bring up the **Provision TL1 Message Map for DMXpress** screen.

.....

3 From the **TL1 Message Type List**, select one of the following ACIDs from the **OS Application Type** column:

- **TL1MAINTENANCE** — Maintenance
To be used by the systems that monitor alarms and performance monitoring.
Defaults: Alarms, Events, and Command Response.
- **TL1MEMORYADMINISTRATION** — Memory Administration
To be used by systems that provision cross-connections.
Defaults: Database Changes and Command Response.
- **TL1TEST** — Test
Defaults: Test and Command Response ONLY.
- **TL1PEERCOM** — Peer Communications
Defaults: Command Response ONLY.
- **TL1OTHER1** — *Other OS.*
- **TL1OTHER2** — *Another OS.*

-
- 4** For the selected OS type, verify the desired status (**ENABLED** or **DISABLED**) for each of the following Message Types:
- **Alarm (ALM)** — Reports the occurrence of alarms.
 - **Environment (ENV)** — Reports the occurrence of environmental alarms.
 - **Conditions (CON)** — Periodically reports the active status conditions.
 - **Database Changes (DB)** — Reports the occurrence of provisioning changes.
 - **Events (EVT)** — Reports the occurrence of status conditions (events).
 - **Performance Monitoring (PM)** — Reports performance monitoring data on a scheduled basis.
 - **Protection Switch (SW)** — Reports automatic equipment protection switches.
-

- 5** To change an **ENABLED/DISABLED** status, double-left-click on the status cell and select the correct status from the dropdown menu.
-

- 6** Continue from [Step 3](#) until all associations have been correctly defined.
-

- 7** When you have completed all changes click **OK**.

Result: A warning screen appears confirming your changes.

If you agree to this, click **Yes**.

If you do not agree to this, click **No** and then **Close**.

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



Task 353: Create or Edit Login Banner

Purpose Use this task to create or edit a user defined login banner for a Metropolis® DMXpress shelf.

Required equipment The following equipment is required:

- Personal Computer (PC) with WaveStar® CIT software installed
- Wrist Strap

Safety precautions To assure both personal safety and the proper functioning of the Metropolis® DMXpress, it is imperative to review and understand these warnings and precautions prior to performing this task.



CAUTION

Electrostatic discharge

Use a static ground wrist strap whenever handling circuit packs or working on a system to prevent electrostatic discharge damage to sensitive components. See “Electrostatic discharge” in “About this Information Product”.

Related information For related information, refer to [Chapter 3, “Provisioning, Security, & Administration”](#).

Before you begin Determine the text you wish to appear on the login banner (you have a maximum of 11 lines with 58 characters per line).

Task Complete the following steps to create a user defined login banner:

- 1 Connect PC and establish a WaveStar® CIT session.

Reference: [“Task 200: Connect Personal Computer \(PC\) and Establish WaveStar® CIT Session” \(8-3\)](#)

-
- 2 From the **System View** menu, select **Administration > Change NE Login Banner...** to bring up the **Change Login Banner - DMXpress** screen.

★ Change Login Banner - DMXPR

Choose Banner

☒ User Defined ☐ No User Defined Banner

Change Login Banner

LINE 1:

LINE 2:

LINE 3:

LINE 4:

LINE 5:

LINE 6:

LINE 7:

LINE 8:

LINE 9:

LINE 10:

LINE 11:

OK Close Help

-
- 3 From the **Choose Banner** panel, verify that **User Defined** is selected.

Important! If **No User Defined Banner** is selected, you will not be able to enter text in the 11 lines provided for the banner.

-
- 4** In the **Change Login Banner** panel, enter the text that you wish to appear on the login screen in the 11 lines provided.

Important! The following rules must be adhered to when populating the login banner:

- The first and last character of each line must be a quotation mark (“).
- Each line may contain up to 60 characters (including the quotation marks).
- The banner may begin on Line 1 or Line 2.
- Only one blank line may exist between each two populated rows.

-
- 5** Click **OK**.

-
- 6** Log out. When you log in the next time, the changes will appear.

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



Task 354: Set Date and Time

Purpose Use this task to set the system date and time.

Required equipment The following equipment is required:

- Personal Computer (PC) with WaveStar® CIT software installed
- Wrist Strap

Safety precautions To assure both personal safety and the proper functioning of the Metropolis® DMXpress, it is imperative to review and understand these warnings and precautions prior to performing this task.



CAUTION

Electrostatic discharge

Use a static ground wrist strap whenever handling circuit packs or working on a system to prevent electrostatic discharge damage to sensitive components. See “Electrostatic discharge” in “About this Information Product”.

Related information For related information, refer to [Chapter 3, “Provisioning, Security, & Administration”](#).

Before you begin Decide upon a source for your time setting.

Task Complete the following steps to set the system time and date:

1 Connect PC and establish a WaveStar® CIT session.

Reference: [“Task 200: Connect Personal Computer \(PC\) and Establish WaveStar® CIT Session” \(8-3\)](#)

2 From the **System View** menu, select **Administration > Set Date and Time** to bring up the **Set system’s date and time for DMXpress** screen.

-
- 3** From the **Date** panel, select the **Year** and **Month** from the pulldown menus.

Result: A calendar is displayed for the month and year selected.

.....

- 4** Click on the date from the calendar.
-

- 5** From the **Time** panel, select the **Hour, Minute, and Seconds** from the pulldown menus (based upon a twelve hour clock).
-

- 6** Select **am** or **pm**.
-

- 7** Click **OK**.
-

- 8** Verify that Date and Time are correct in the bottom right hand corner of the System View window.

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



Task 355: Provision System SNMP Management Features and Users

Purpose Use this task to provision system SNMP management features and/or add, modify, or delete SNMP users.

Required equipment The following equipment is required:

- Personal Computer (PC) with WaveStar® CIT software installed
- Wrist Strap

Safety precautions To assure both personal safety and the proper functioning of the Metropolis® DMXpress, it is imperative to review and understand these warnings and precautions prior to performing this task.



WARNING **Eye damage**

Unterminated optical connectors may emit invisible laser radiation. Eye damage may occur if beam is viewed directly or with optical instruments. Avoid direct exposure to the beam.



CAUTION **Electrostatic discharge**

Use a static ground wrist strap whenever handling circuit packs or working on a system to prevent electrostatic discharge damage to sensitive components. See “Electrostatic discharge” in “About this Information Product.”

Related information	For related information, see the following: - Chapter 3, “Provisioning, Security, & Administration” - Appendix A, WaveStar® CIT Tutorial
Before you begin	Before you begin this task, obtain the work instructions for the parameters being set.
Task	Perform the following steps to provision the SNMP management feature. 1 Use the WaveStar® CIT to log in to the Metropolis® DMXpress shelf. Reference: “Task 200: Connect Personal Computer (PC) and Establish WaveStar® CIT Session” (8-3) 2 SYSTEM SNMP MANAGEMENT FUNCTIONS From the System View menu, select Administration > Data Communications. Result: The Data Communications window opens. 3 Click on the SNMP Management tab to view parameters. 4 Enter the following parameters: - NE Contact Contact Name: an alphanumeric string of up to 255 characters consisting of the name of the contact person for this NE and how to contact the person. - NE Location Location Name: an alphanumeric string of up to 255 characters describing the physical location of this NE.

- SNMP Authentication Failure Trap

SNMP Trap Control: Select Enable or Disable.

Traps are the SNMP equivalent of SONET alarm and event autonomous messages.

Enabling this feature sends an authentication failure trap to the SNMP manager if both the User Community ID and the source User IP Address of the request does not match the provisioned User Community ID and User IP Address of the SNMP User.

Disabling this feature prevents traps from being sent if there is an authentication failure.

END OF STEPS



Task 356: Modify Network Layer NSAP Address and/or Level 1 or Level 2 Routing Capability

Purpose This procedure allows you to modify the network service address point (NSAP) and/or enable Level 1 and/or Level 2 routing capabilities for this NE.

Important! Values should not be changed from default values except by users who intend to provision the SONET subnetwork and partition DCC communications.

Required equipment Personal Computer (PC) with WaveStar® CIT software installed

Safety precautions To assure both personal safety and the proper functioning of the Metropolis® DMXpress, it is imperative to review and understand these warnings and precautions prior to performing this task.



CAUTION

Electrostatic discharge

Use a static ground wrist strap whenever handling circuit packs or working on a system to prevent electrostatic discharge damage to sensitive components. See “Electrostatic discharge” in “About this Information Product.”

Related information For related information, see the following:

- [Chapter 3, “Provisioning, Security, & Administration”](#)
- [Appendix A, WaveStar® CIT Tutorial](#)
- *Metropolis® DMXpress Access Multiplexer TL1 Command Manual, 365-372-313*

Before you begin Before you begin this task, obtain the work instructions for the parameters being set.

Task Perform the following steps to provision the network layer.

- 1 Use the WaveStar® CIT to log in to the Metropolis® DMXpress shelf, if not already performed.

Reference: “Task 200: Connect Personal Computer (PC) and Establish WaveStar® CIT Session” (8-3)

- 2 From the System View menu, select **Administration > Data Communications**.

Result: The Data Communications for ... window opens.

- 3 Select the **Network Layer** tab.

Result: The Network Layer parameters window opens.

- 4 **NETWORK SERVICE ACCESS POINT**

Click on the **Modify** button to the right of the NSAP address if you want to modify the NSAP address for this NE.

Important! The first eight characters of the NSAPs are always the same and cannot be changed. The remaining 18 characters of the NSAP area address are provisionable but only the Area field should be changed to assign a node to a different area. The remainder of the NSAP includes the System Identifier field, which is unique to each node, and the Selector (SEL) field.

Result: The NSAP Provisioning window opens.

- 5 Modify the user settable parameters as required, then click **OK**.

Result: The Network Layer parameters window is again displayed.

- 6 Select the desired Routing Capability for this NE as either **Level 1** or **Level 1&2**.

-
- 7** Click **Apply** at bottom of the window, read the warning message, then click **Yes** to execute the command or **No** to abort the command.

Important! Note that the system will reset when you execute the command and you will be logged off. Also, if the system cannot resynchronize the date and time with other systems in the network, you may have to manually reset the date and time for this NE.

Reference: [“Task 354: Set Date and Time” \(9-295\)](#)

-
- 8** If you are finished provisioning Data Communications parameters, click **Close** to exit. Otherwise, continue with another tab.

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



Task 356: Modify Network Layer NSAP Address and/or
Level 1 or Level 2 Routing Capability

Task 357: Set Serial Port CIT-1 Parameters

Purpose

This procedure allows you to:

- Enable or disable timeout on the selected serial port.
- Set the baud rate for the serial port.
- Enable or disable command echo mode.
- Assign OS type application context IDs (ACIDs) to the serial ports.

Assigning an acid to a serial port determines the TL1 autonomous message types to be output by the local network element (NE), and any TL1-RNEs (remote NEs) accessed through that serial port.

Important! Note that changing the serial port parameters may affect access to the serial port. Software downloads using the cit-1 serial port generally use the default setting of 9600 baud. Changing this setting may affect default initial communications to this NE for future downloads. Also, changing the OS type and/or Timeout settings may also affect port communications.

Required equipment

The following equipment is required:

- Personal Computer (PC) with WaveStar® CIT software installed
- Wrist Strap

Safety precautions

To assure both personal safety and the proper functioning of the Metropolis® DMXpress, it is imperative to review and understand these warnings and precautions prior to performing this task.



CAUTION

Electrostatic discharge

Use a static ground wrist strap whenever handling circuit packs or working on a system to prevent electrostatic discharge damage to sensitive components. See “Electrostatic discharge” in “About this Information Product.”

Related information For related information, see the following:

- [Chapter 3, “Provisioning, Security, & Administration”](#)
- [Appendix A, WaveStar® CIT Tutorial](#)
- *Metropolis® DMXpress Access Multiplexer TL1 Command Manual, 365-372-313*

Before you begin Before you begin this task, obtain the work instructions for the parameters being set.

Task Perform the following steps to provision CIT-1 serial port.

-
- 1** Use the WaveStar® CIT to log in to the Metropolis® DMXpress shelf.

Reference: [“Task 200: Connect Personal Computer \(PC\) and Establish WaveStar® CIT Session” \(8-3\)](#)

.....

- 2** From the System View menu, select **Administration > Data Communications**.

Result: The Data Communications parameters window opens.

.....

- 3** Select the **Serial Port** tab.

Result: The Serial Port parameters window opens.

.....

- 4** Select the **CIT Port (cit-1)** you want to provision.

Important! Note that changing the serial port parameters may affect access to the serial port. Software downloads using the cit-1 serial port generally use the default setting of 9600 baud. Changing this setting may prevent default initial communications to this NE for future downloads. Also, changing the OS type and/or Timeout settings may also affect port communications.

-
- 5** Note the **Access State** of the selected CIT Port. If the **Access State** is **In Service** you may continue to provision the serial port. If the **Access State** is **Lockout**, the parameters are *not* provisionable at this time.

An **Access State** of **Lockout** indicates that login access to all ports has been locked out.

Administration > Security > Lockout Logins

Administration > Security > Enable Logins

Reference: “[Task 202: Enable or Lockout System Security and/or Edit, Delete, or Enter a User’s Login](#)” (8-15)

.....

- 6** Provision the Serial Port Parameters as required.

- **Timeout** – Specifies the value of the inactivity timer. If no TL1 messages are transmitted or received during the time set, then *all* login sessions on the port are terminated. Values range from **Disabled** (no timeout), or from **1** to **120** minutes.
- **Echo** – Specifies whether or not TL1 messages received on the port are echoed back to the user. Values are **enabled** or **disabled**.
- **Baud Rate** – Specifies the baud rate at which TL1 messages are transmitted/received on the port. Values are **1200**, **2400**, **4800**, **9600** (default), or **19200**.
- **OS Type** – Specifies the Application Context Identifier from the following values:
 - **TL1PeerComm** (By default, TL1 Command Response Only)
 - **TL1Maintenance** (By default, TL1 Alarms, Events, and Command Responses)
 - **TL1MemoryAdministration** (By default, TL1 Database Changes and Command Responses)
 - **TL1Test** (By default, TL1 Test and Command Response Only)
 - **TL1CR** (By default, TL1 Command Response Only)
 - **TL1OTHER1** (Other OS1)
 - **TL1OTHER2** (Other OS2)

Important! Changing the baud rate will terminate any active login sessions on the selected port.

-
- 7

Click **Apply** at bottom of the window, read the warning message, then click **Yes** to execute the command.
-
- 8

In order for the serial port provisioning to take effect, you must send an additional command to the NE before you log off the system. It is suggested that you click on the **Alarm List** button from the System View menu.

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



Task 358: Set NE Defaults — Enabling/Disabling Alarm Gateway, Alarm Group, Remote NE Status, and FTP

Purpose Use this task to provision NE defaults. NE defaults as defined in the WaveStar® CIT consist of the following:

- Enabling/Disabling Remote NE Status
- Enabling/Disabling Alarm Gateway and assigning Alarm Groups
- Enabling/Disabling File Transfer Protocol (FTP) and/or FTAM-FTP Gateway Control

Provision these parameters using the **Administration > Set NE** command from the System View menu.

Required equipment The following equipment is required:

- Personal Computer (PC) with WaveStar® CIT software installed
- Wrist Strap

Safety precautions To assure both personal safety and the proper functioning of the Metropolis® DMXpress, it is imperative to review and understand these warnings and precautions prior to performing this task.



CAUTION

Electrostatic discharge

Use a static ground wrist strap whenever handling circuit packs or working on a system to prevent electrostatic discharge damage to sensitive components. See “Electrostatic discharge” in “About this Information Product.”

Related information For related information, see the following:

- [Chapter 3, “Provisioning, Security, & Administration”](#)
- [Appendix A, WaveStar® CIT Tutorial](#)
- *Metropolis® DMXpress Access Multiplexer TL1 Command Manual, 365-372-313*

Before you begin Before you begin this task, obtain the work instructions for the parameters being set.

Task Perform the following steps to provision NE defaults.

.....

1 Use the WaveStar® CIT to log in to the Metropolis® DMXpress shelf.

Reference: “Task 200: Connect Personal Computer (PC) and Establish WaveStar® CIT Session” (8-3)

.....

2 From the System View menu, select **Administration > Set NE**.

Result: The Provision NE Defaults window opens.

.....

3 Reference the following, as required, to provision NE defaults:

- “SE 358-1: Provision Alarm Gateway, Alarm Groups, Remote NE Status” (9-311)
- “SE 358-2: Enable/Disable FTP Protocol and/or FTAM-FTP Gateway Control Functions” (9-315)

.....

END OF STEPS

.....



SE 358-1: Provision Alarm Gateway, Alarm Groups, Remote NE Status

Purpose Use this task to provision alarm groups, alarm gateways, and remote NE status, as required. This task might best be performed after all network elements have been equipped, tested, and integrated into the network. See below.

AGNE

The Alarm Gateway parameter may have a value of **Yes** or **No** (default). Setting the value to **Yes** designates the NE as an AGNE for its alarm group. One AGNE is needed for each alarm group to support the message communications for Remote NE Status feature. One other NE in the same alarm group may be provisioned as a backup AGNE, if required.

Any NE in an alarm group can be an AGNE. It is recommended that you NOT provision an NE as both an AGNE and a TCP/IP GNE or TL1/X.25 GNE.

Remote NE Status must be **Enabled** in order to provision the NE as an AGNE. An NE with Remote NE Status (rnestat) **Enabled** but no AGNE in its alarm group reports an "AGNE Communications failure" alarm.

Alarm Groups

Alarm group has a numeric value of 1 through 255. The default is 255. All NEs with DCC connectivity, whether nearby or not, that have the same Alarm Group number are members of the same alarm group. All members of an alarm group share Remote NE Status information with each other but not with NEs in different alarm groups.

Remote NE Status must be **Enabled** in order to assign an alarm group number to the NE.

Remote NE Status

Remote NE status may be **Enabled** or **Disabled** (default). Enabling this parameter activates support for far-end activity LED, remote office alarms, and remote alarm/status reports.

Required equipment The following equipment is required:

- Personal Computer (PC) with WaveStar® CIT software installed
- Wrist Strap

Safety precautions To assure both personal safety and the proper functioning of the Metropolis® DMXpress, it is imperative to review and understand these warnings and precautions prior to performing this task.



WARNING

Eye damage

Unterminated optical connectors may emit invisible laser radiation. Eye damage may occur if beam is viewed directly or with optical instruments. Avoid direct exposure to the beam.



CAUTION

Electrostatic discharge

Use a static ground wrist strap whenever handling circuit packs or working on a system to prevent electrostatic discharge damage to sensitive components. See “Electrostatic discharge” in “About this Information Product.”

Related information For related information, see the following:

- [Chapter 3, “Provisioning, Security, & Administration”](#)
- [Appendix A, WaveStar® CIT Tutorial](#)
- *Metropolis® DMXpress Access Multiplexer TL1 Command Manual, 365-372-313*

Before you begin Before you begin this task, obtain the work instructions for the parameters being set.

Task Perform the following steps to provision the alarm group functions.

- 1 Use the WaveStar® CIT to log in to the Metropolis® DMXpress shelf, if not already performed.

Reference: “Task 200: Connect Personal Computer (PC) and Establish WaveStar® CIT Session” (8-3)

- 2 From the System View menu, select **Administration > Set NE**.

Result: The Provision NE Defaults window opens.

- 3 For Remote NE Status, select **Enabled** to enable Remote NE Status.

Important! Note that Remote NE Status must be Enabled in order to provision the alarm group functions.

- 4 If this NE will serve as an Alarm Gateway, select **Yes** to provision this NE as an alarm gateway (AGNE). Otherwise, select **No**.

An NE serving as a backup AGNE should have this parameter set to **Yes**. In this configuration both NEs will actively serve as AGNEs to provide redundant alarm monitoring and distribution. The system does not assign one as primary and the other as secondary.

- 5 Enter or select the Alarm Group number (1-255) being assigned to this NE.

- 6 Ensure the other parameters in the window have not been changed, unless you are provisioning them also. Click **OK** at the bottom of the window.

-
- 7 Read the warning message, then click **Yes** to execute the command.

Important! An AGNE Communications failure alarm may occur if no AGNE has been selected for the alarm group. If you need to clear the alarm, select **Administration > Set NE**, then select **Disabled** to disable the Remote NE Status. You will have to enable the remote NE status again when the AGNE has been established in order for this NE to be part of the alarm group.

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



SE 358-2: Enable/Disable FTP Protocol and/or FTAM-FTP Gateway Control Functions

Purpose

This procedure allows you to:

- Enable/Disable the NE for FTP file transfers to and from the NE. File transfers may be directly to and from an FTP-GNE, or through an FTP-GNE to/from an FTP enabled remote NE using IP tunneling. Software downloads and provisionable database backup and restore are supported using FTP file transfers.
- Enable/Disable the NE as an FTAM-FTP Gateway (GNE). Enabling the NE as an FTAM-FTP Gateway allows the NE to act as a File Transfer Translation Device (FTTD) to perform file transfers between an FTP server and a remote NE using the FTAM protocol for file transfers.

Important! Other provisioning may be necessary to use this function. Depending on your requirements, provisioning may include TCP/IP addressing and gateways, IP Tunneling, NSAP addresses, LAN port provision, and area routing.

Required equipment

The following equipment is required:

- Personal Computer (PC) with WaveStar® CIT software installed
- Wrist Strap

Safety precautions

To assure both personal safety and the proper functioning of the Metropolis® DMXpress, it is imperative to review and understand these warnings and precautions prior to performing this task.



CAUTION

Electrostatic discharge

Use a static ground wrist strap whenever handling circuit packs or working on a system to prevent electrostatic discharge damage to sensitive components. See “Electrostatic discharge” in “About this Information Product.”

- Related information** For related information, see the following:
- [Chapter 3, “Provisioning, Security, & Administration”](#)
 - [Appendix A, WaveStar® CIT Tutorial](#)
 - [“Task 206: Release Software Generic Download and Upgrade via FTP \(In-Service System\)” \(8-29\)](#)
 - *Metropolis® DMXpress Access Multiplexer TL1 Command Manual, 365-372-313*
- Before you begin** Before you begin this task, obtain the work instructions for the parameters being set.
- Task** Perform the following steps to Enable/Disable FTP Protocol and/or FTAM-FTP Gateway Control Functions.
-
- 1** Use the WaveStar® CIT to log in to the Metropolis® DMXpress shelf, if not already performed.
- Reference:** [“Task 200: Connect Personal Computer \(PC\) and Establish WaveStar® CIT Session” \(8-3\)](#)
-
- 2** From the System View menu, select **Administration > Set NE**, if not already performed.
- Result:** The Provision NE Defaults for ... window opens.
-
- 3** If FTP will be used on this NE, under File Transfer Protocol, select **Enabled** to enable FTP on this NE. Otherwise, select **Disabled** to disable FTP.
- Important!** If this NE is also being provisioned as an FTAM-FTP Gateway, then File Transfer Protocol must also be **Enabled**.
-
- 4** If this NE will be used as an FTAM-FTP Gateway, under FTAM-FTP Gateway Control, select **Enabled** to enable this NE as an FTAM-FTP Gateway. Otherwise, select **Disabled**.

-
- 5** Click **OK** at bottom of the window, read the warning message, then click **Yes** to execute the command.

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



SE 358-2: Enable/Disable FTP Protocol and/or FTAM-FTP
Gateway Control Functions

Task 359: Enable/Disable Autonomous Messages

Purpose This procedure allows you to enable or disable autonomous messages. Enabling autonomous messages allows you to receive all active alarm and status conditions from the NE through autonomous messages. Disabling this feature inhibits the reporting of alarm and status conditions through autonomous messages.

Autonomous message reporting is enabled or disabled on an individual user basis for the current login session. When the user logs out, autonomous messaging is enabled by default.

Required equipment The following equipment is required:

- Personal Computer (PC) with WaveStar® CIT software installed
- Wrist Strap

Safety precautions To assure both personal safety and the proper functioning of the Metropolis® DMXpress, it is imperative to review and understand these warnings and precautions prior to performing this task.



CAUTION

Electrostatic discharge

Use a static ground wrist strap whenever handling circuit packs or working on a system to prevent electrostatic discharge damage to sensitive components. See “Electrostatic discharge” in “About this Information Product.”

Related information For related information, see the following:

- [Chapter 3, “Provisioning, Security, & Administration”](#)
- [Appendix A, WaveStar® CIT Tutorial](#)
- *Metropolis® DMXpress Access Multiplexer TL1 Command Manual, 365-372-313*

Before you begin Before you begin this task, obtain the work instructions for the parameters being set.

Task Perform the following steps to enable/disable autonomous message reporting from this NE.

-
- 1** Use the WaveStar® CIT to log in to the Metropolis® DMXpress shelf, if not already performed.

Reference: “Task 200: Connect Personal Computer (PC) and Establish WaveStar® CIT Session” (8-3)

-
- 2** From the System View menu, select **Administration > Security > Allow/Inhibit Autonomous messages**.

Result: The Allow/Inhibit Autonomous Messages for ... window opens.

-
- 3** For the Autonomous Message Options: Select **Enabled** to enable autonomous message reporting on this NE, or select **Disabled** to disable reporting, as required.

-
- 4** Click **OK** at bottom of the window, read the caution message, then click **Yes** to execute the command.

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



Task 360: Enable/Disable LAN Port Status

Purpose This procedure allows you to enable or disable the OSI-LAN port status for LAN ports lan-1 and/or lan-2.

Required equipment Personal Computer (PC) with WaveStar® CIT software installed

Safety precautions To assure both personal safety and the proper functioning of the Metropolis® DMXpress, it is imperative to review and understand these warnings and precautions prior to performing this task.



CAUTION

Electrostatic discharge

Use a static ground wrist strap whenever handling circuit packs or working on a system to prevent electrostatic discharge damage to sensitive components. See “Electrostatic discharge” in “About this Information Product.”

Related information For related information, see the following:

- [Chapter 3, “Provisioning, Security, & Administration”](#)
- [Appendix A, WaveStar® CIT Tutorial](#)
- *Metropolis® DMXpress Access Multiplexer TL1 Command Manual, 365-372-313*

Before you begin Before you begin this task, obtain the work instructions for the parameters being set.

Task Perform the following steps to enable/disable LAN port communication with this NE.

- 1 Use the WaveStar® CIT to log in to the Metropolis® DMXpress shelf, if not already performed.

Reference: [“Task 200: Connect Personal Computer \(PC\) and Establish WaveStar® CIT Session” \(8-3\)](#)

-
- 2 From the System View menu, select **Administration > Data Communications**.

Result: The Data Communications for ... window opens.

.....

- 3 Select the **LAN Management** tab.

Result: The LAN parameters window opens.

.....

- 4 Select the **LAN Port, lan-1** or **lan-2**.
-

- 5 Note the **Access State** of the selected LAN Port. If the **Access State** is **In Service** you may continue to provision the LAN port. If the **Access State** is **Lockout**, the parameters are *not* provisionable at this time.

An **Access State** of **Lockout** indicates that login access to all ports has been locked out.

Administration > Security > Lockout Logins

Administration > Security > Enable Logins

Reference: “[Task 202: Enable or Lockout System Security and/or Edit, Delete, or Enter a User’s Login](#)” (8-15)

.....

- 6 Select **Enabled** to enable OSI communications for the selected LAN port. Select **Disabled** to disable OSI communications on the selected LAN port.
-

- 7 Click **Apply** at bottom of the window, read the warning message, then click **Yes** to execute the command or **No** to abort the command.
-

- 8 Repeat from [Step 4](#) if you want to provision the other LAN port, otherwise click **Close** to exit.

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



Task 361: Reserved for Future Use

Task 362: Set General System Parameters

Purpose	Use this task to provision certain parameters that apply to the entire system (aid=system). System parameters as defined in the WaveStar® CIT consist of the following: • Settings – Idle Channel parameters Determines whether or not an AIS or Unequipped signal should be inserted toward the SONET line in VT1.5 and STS-1, STS-3c, STS-12c channels that are not cross-connected. – Autonomous Message Reporting Allows the user to enable or disable all autonomous messages coming from the NE. Note that this parameter may also be set from Administration > Security > Allow/Inhibit Autonomous messages. • Date and Time Allows the user to manually set system Date and Time. See “Task 354: Set Date and Time” (9-295) for instructions on setting date and time. • STSn Settings Allows the user to set the STSn and VT1.5 Signal Degrade and STSn Signal Failure Thresholds for ALL system signal rates. Provision these parameters using the Configuration > Provision command from the System View menu, then select the system (aid=system).
Required equipment	The following equipment is required: • Personal Computer (PC) with WaveStar® CIT software installed • Wrist Strap
Safety precautions	To assure both personal safety and the proper functioning of the Metropolis® DMXpress, it is imperative to review and understand these warnings and precautions prior to performing this task.



CAUTION
Electrostatic discharge

Use a static ground wrist strap whenever handling circuit packs or working on a system to prevent electrostatic discharge damage to sensitive components. See “Electrostatic discharge” in “About this Information Product.”

- Related information** For related information, see the following:
- [Chapter 3, “Provisioning, Security, & Administration”](#)
 - [Appendix A, WaveStar® CIT Tutorial](#)
 - *Metropolis® DMXpress Access Multiplexer TL1 Command Manual, 365-372-313*

Before you begin Before you begin this task, obtain the work instructions for the parameters being set.

Task Perform the following steps to provision system parameters.

-
- 1** Use the WaveStar® CIT to log in to the Metropolis® DMXpress shelf.

Reference: [“Task 200: Connect Personal Computer \(PC\) and Establish WaveStar® CIT Session” \(8-3\)](#)

.....

- 2** From the System View menu, select **Configuration > Provision**.

Result: The Provision Parameters for ... window opens.

.....

- 3** Select (highlight) Metropolis® DMXpress Access Multiplexer or enter system in the **Enter AID** box. Click **Provision** at the bottom of the window.

Result: The Provision Parameters for Equipment window opens.

.....

4 Click on the **Settings** tab.

Result: System Settings parameters display

Idle Channel Signal

- **AIS** – When idle is set to AIS (default), STS-1 or VT1.5 AIS is inserted towards the SONET line from the SONET interfaces (OLIUs and STS1Es) if the channel is not cross-connected, or if a low-speed slot is not equipped but the function unit is STS-1 cross-connected.
- **UNEQUIPPED** – When idle is set to UNEQUIPPED, the STS-1 or VT1.5 UNEQUIPPED signal is inserted towards the SONET line from the SONET interfaces (OLIUs and STS1Es) if the channel is not cross-connected, or if a low-speed slot is not equipped, but the function unit is STS-1 cross-connected

Autonomous Message Reporting

- **Enabled** – When set to Enabled, autonomous alarm and status messages from the NE are reported to the user.
 - **Disabled** – When set to Disabled, autonomous alarm and status messages from the NE are *not* reported to the user.
-

5 Provision parameters as required, then click **Apply** at the bottom of window. Read the warning message, then click **Yes** to execute the command.

.....

6 If you are finished provisioning, click **Close** at the bottom of window, otherwise continue with the next step.

.....

7 Click on the **Date and Time** tab.

Result: The current date and time settings are displayed.

Note that the date and time settings displayed are generally the current PC date and time settings if date and time have never been provisioned. Click **Refresh** at the bottom of the date and time parameters to get the correct settings.

.....

8 Set the Date and Time parameters as required.

Reference: [“Task 354: Set Date and Time” \(9-295\)](#)

.....

9 Provision parameters as required, then click **Apply** at the bottom of window. Read the warning message, then click **Yes** to execute the command.

.....

10 If you are finished provisioning, click **Close** at the bottom of window, otherwise continue with the next step.

.....

11 Click on the **STSn Settings** tab.

Result: The **Signal Degrade Thresholds** and **Signal Failure Thresholds** parameters display.

.....

12 Use the drop down boxes to provision each parameter as required, then click **Apply** at the bottom of window. Read the warning message, then click **Yes** to execute the command.

.....

13 Click **Close** to exit or select another entity from the left window that you want to provision.

.....

.....

END OF STEPS

.....



Task 363: Provision System Alarm Configuration

Purpose Use this task to provision system alarm clear delay, alarm generate delay, and power alarm level.

Provision these parameters using the **Configuration > Alarm > Alarm Configuration** command from the System View menu:

- **Alarm Clear Delay**
Sets the time in seconds that the system waits before reporting an alarm condition is cleared.
- **Alarm Generate Delay**
Sets the time in seconds that the system waits before reporting an incoming alarm condition.
- **Power Level Alarm**
Allows you assign a value of **Major** or **Minor** to a power alarm.

Required equipment The following equipment is required:

- Personal Computer (PC) with WaveStar® CIT software installed
- Wrist Strap

Safety precautions To assure both personal safety and the proper functioning of the Metropolis® DMXpress, it is imperative to review and understand these warnings and precautions prior to performing this task.



CAUTION

Electrostatic discharge

Use a static ground wrist strap whenever handling circuit packs or working on a system to prevent electrostatic discharge damage to sensitive components. See “Electrostatic discharge” in “About this Information Product.”

Related information For related information, see the following:

- [Chapter 3, “Provisioning, Security, & Administration”](#)
- [Appendix A, WaveStar® CIT Tutorial](#)
- *Metropolis® DMXpress Access Multiplexer TL1 Command Manual, 365-372-313*

Before you begin Before you begin this task, obtain the work instructions for the parameters being set.

Task Perform the following steps to provision system alarm parameters.

-
- 1** Use the WaveStar® CIT to log in to the Metropolis® DMXpress shelf.

Reference: “Task 200: Connect Personal Computer (PC) and Establish WaveStar® CIT Session” (8-3)

.....

- 2** From the System View menu, select **Configuration > Alarms > Alarm Configuration**.

Result: The Configure Alarm window opens.

.....

- 3** Use the drop down box to set the **Alarm Clear Delay**. Values range from **0** to **30** seconds.
-

- 4** Use the drop down box to set the **Alarm Generate Delay**. Values range from **0** to **30** seconds.
-

- 5** Set the **Power Level Alarm** to **Major** or **Minor**, as required.

Allows you set an alarm level of Major or Minor to a power alarm associated with the loss of one -48 V power fuse.

.....

- 6** Click **OK**, read the warning message, then click **Yes** to execute the command.

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



Task 364: Provision DCC Terminations

Purpose This procedure allows you to enable or disable the DCC channel over OSI on a selected port, and/or provision the Link Access Protocol D-channel (LAPD) to user side or network side.



CAUTION

Do not change the LAPD settings on an inservice system unless you are directed to do so from another procedure. Changes in the LAPD parameter may affect system operations. Disabling the DCC channel may affect system communications.

Important! The LAPD parameter is generally set when the system is integrated into a network. Note that you cannot disable both OSI and TCP/IP on both LAN ports.

Required equipment Personal Computer (PC) with WaveStar® CIT software installed

Safety precautions To assure both personal safety and the proper functioning of the Metropolis® DMXpress, it is imperative to review and understand these warnings and precautions prior to performing this task.



CAUTION

Electrostatic discharge

Use a static ground wrist strap whenever handling circuit packs or working on a system to prevent electrostatic discharge damage to sensitive components. See “Electrostatic discharge” in “About this Information Product.”

Related information For related information, see the following:

- [Chapter 3, “Provisioning, Security, & Administration”](#)
- [Appendix A, WaveStar® CIT Tutorial](#)
- *Metropolis® DMXpress Access Multiplexer TL1 Command Manual, 365-372-313*

Before you begin Before you begin this task, obtain the work instructions for the parameters being set.

Task Perform the following steps to provision DCC terminations.

-
- 1** Use the WaveStar® CIT to log in to the Metropolis® DMXpress shelf, if not already performed.

Reference: “Task 200: Connect Personal Computer (PC) and Establish WaveStar® CIT Session” (8-3)

.....

- 2** From the System View menu, select **Configuration > DCC Terminations**.

Result: The Provision DCC Terminations for ... window opens.

.....

- 3** Note the DCC Termination State **Access State**. If the **Access State** is **In Service** you may continue to provision the DCC port. If the **Access State** is **Lockout**, the parameters are *not* provisionable at this time.

An **Access State** of **Lockout** indicates that login access to all ports has been locked out.

Administration > Security > Lockout Logins
Administration > Security > Enable Logins

Reference: “Task 202: Enable or Lockout System Security and/or Edit, Delete, or Enter a User’s Login” (8-15)

.....

- 4** Select the DCC Port being provisioned from the **Port AID** drop-down box.
-

- 5** Set the DCC Channel Parameter **Termination State** to **enabled** or **disabled** as required.

-
- 6** Select the LAPD Parameter **LAPD Role** as **user-side** or **network-side**, as required.

Important! The LAPD parameter is generally set when the system is integrated into a network and should not be changed unless you are reconfiguring the network and have been directed to do so.

-
- 7** Click **OK** at bottom of the window, read the warning message, then click **Yes** to execute the command or **No** to abort the command.

-
- 8** Repeat from [Step 4](#) if you want to provision other DCC ports, otherwise click **Close** to exit.

.....

END OF STEPS





10 Supporting Tasks

Overview

Purpose This section provides the supporting tasks for Metropolis[®] DMX*press* Access Multiplexer.

Contents The following information is included in this section:

Task 400: Connect OLIU Optical Loopbacks	10 - 3
Task 401: Perform DS1 Transmission Test	10 - 9
Task 402: Perform DS3 Transmission Test	10 - 17
Task 403: Perform Connection and Verification of Optical Facility	10 - 25
Task 404: Perform End-to-End Optical Line Test on Main OLIU	10 - 35
Task 405 and 406: Reserved for Future Use	10 - 39
Task 407: Check -48 VDC Office Battery	10 - 41
Task 408: Clean Optical Fibers, Dual LC Adapters and LC Line Buildouts (LBOs)	10 - 45
Task 409 and 410: Reserved for Future Use	10 - 55
Task 411: Install/Remove LC Lightguide Buildouts (LBOs)	10 - 57



Task 400: Connect OLIU Optical Loopbacks

Purpose Use this task to loop back an **out-of-service** optical line at the OLIU faceplate connectors.

Important! In Metropolis® DMXpress, the Main1 (left port) and Main2 (right port) are both on the Main circuit pack. This circuit pack is NOT hot pluggable. The system must be powered down before the circuit pack is removed or replaced.

Required equipment The following equipment is required:

- Wrist strap
- One lightguide jumper (MS1A40LC-A40LC-2, Comcode 108918269) for each optical line to be looped back (LC-type connections)
- One 15-dB loss LBO (ABLCS-15.0, comcode 1082793480 for LC connectors) (singlemode) for each DWDM OC-48 optical line to be looped back

Safety precautions To assure both personal safety and the proper functioning of Metropolis® DMXpress, it is imperative to review and understand these warnings and precautions prior to performing this task.



WARNING **Eye damage**

Unterminated optical connectors may emit invisible laser radiation. Eye damage may occur if beam is viewed directly or with optical instruments. Avoid direct exposure to the beam.

**CAUTION****Equipment damage**

The OC-48 and OC-12 Main circuit packs must not be reseated, removed, or installed while power is applied to the system. The system must be powered down before the circuit pack is reseated, removed, or replaced.

When Metropolis® DMXpress is powered down, you must wait at least 10 seconds before switching the power on again. Rapid power-cycling may result in OLIU CP failed alarms.

**CAUTION****Equipment damage**

Avoid excessive bending of the optical jumper used to loop the OLIU on itself.

**CAUTION****Equipment damage**

Ensure all optical fiber connectors, adapters, and LBOs are properly cleaned “[Task 408: Clean Optical Fibers, Dual LC Adapters and LC Line Buildouts \(LBOs\)](#)” (10-45). Signal performance may be degraded if the connectors, adapters, and LBOs are not cleaned.

**CAUTION****Equipment damage**

Use a static ground wrist strap whenever handling circuit packs or working on the Metropolis® DMXpress system to prevent electrostatic discharge damage to sensitive components. See “Electrostatic Discharge (ESD) Considerations” in the “About This Information Product” Section.

Related information For related information, see [Chapter 1, “Product Description”](#) in this document.

Task Complete the following steps to loop back an **out-of-service** optical line at the OLIU faceplate connectors.

1 Obtain the correct LBO and lightguide jumper:

IF the OLIU is ...		THEN obtain a ...
Long Reach (LR) Optics	A1AA121B-159B OC48 CHx/CHy High Speed (Main)	lightguide jumper (MS1A40LC-A40LC-2, Comcode 108918269) and a 15-dB LBO (code ABLCS-15.0, comcode 108279480 for LC connectors)
Intermediate Reach (IR) Optics	A1AA005 OC48/1.3I2 High Speed (Main)	No LBO required (attenuation not needed)
Intermediate Reach (IR) Optics	A1AA016 OC12/1.3I2 High Speed (Main)	No LBO required (attenuation not needed)
Intermediate Reach (IR) Optics	A1AA017 OC3LS/4 Low Speed	No LBO required (attenuation not needed)
Intermediate Reach (IR) Optics	A1AA018 OC12LS/2 Low Speed	No LBO required (attenuation not needed)

2 If required, remove the optical line connections from the OLIU faceplate. Make a record of these disconnections so they can be replaced.

3 Remove the LBO (if equipped) from the **IN** connector of the OLIU faceplate.

Reference: [“Task 411: Install/Remove LC Lightguide Buildouts \(LBOs\)” \(10-57\)](#)

4 Remove the protector caps from the ends of the lightguide jumper (loopback cable).

**CAUTION**

Ensure all optical fiber connectors/adapters, fiber, and LBOs are properly cleaned. Signal performance may be degraded if the connectors/adapters, fiber, and LBOs are not cleaned.

- 5 Clean the LBOs (if required), fiber, and connectors.

Reference: “Task 408: Clean Optical Fibers, Dual LC Adapters and LC Line Buildouts (LBOs)” (10-45)

- 6 If you are looping back an OC48 CHx/CHy OLIUs (A1AA121-159), install a 15-dB LBO (ABLCs-15.0, comcode 108279480) on the receive (**IN**) side of the dual LC adapter.

Important! The OC48 CHx/CHy OLIUs (A1AA121-159) are the only circuit packs in Metropolis® DMXpress that require attenuation for loopbacks.

Reference: “Task 411: Install/Remove LC Lightguide Buildouts (LBOs)” (10-57)

- 7 Using the lightguide jumper (MS1A40LC-A40LC-2, Comcode 108918269), connect the **IN** connector and the corresponding **OUT** connector on the same OLIU.

Important! The LC LBOs and lightguide jumpers connect to the LC-shielded, angled adapter on the OLIU faceplate.

Important! Do not remove or install the Main OLIU while power is applied to the system. Power down the system before removing/replacing the Main OLIU.

Result: After a short time, the **FLT** LED on the OLIU stops flashing. The **ACT** LED remains on. The MJ LED extinguishes. There will be an “Inconsistent DCC switches” and a “Section DCC Channel Failed” alarm. If responses are not as indicated, check connections and looping fibers. Clean connections and repeat this step. If responses are still not correct, replace the OLIU.

.....
8 Repeat [Step 1](#) through [Step 7](#) for additional ports.

.....
E N D O F S T E P S
.....
☐

Task 401: Perform DS1 Transmission Test

Purpose Use this task to perform a DS1 transmission test at a stand-alone (Main OLIUs optically looped) Metropolis® DMXpress shelf or in a Metropolis® DMXpress network.

When this procedure is being used to perform DS1 transmission tests in a Metropolis® DMXpress network, it is assumed that the complete end-to-end system has already been tested and that only a particular DS1 port is being tested at this time.

In end-to-end testing, one shelf is referred to as the near end and the other shelf as the far end. These designations are arbitrary; either shelf can be the near-end or the far-end shelf.

Required equipment The following equipment is required:

- Personal Computer (PC) with WaveStar® CIT software installed
- Wrist strap

Safety precautions To assure both personal safety and the proper functioning of Metropolis® DMXpress, it is imperative to review and understand these warnings and precautions prior to performing this task.



CAUTION

Electrostatic discharge

Use a static ground wrist strap whenever handling circuit packs or working on a system to prevent electrostatic discharge damage to sensitive components. See “Electrostatic discharge” in “About this Information Product”.

Related information For related information, see the following chapters in this document:

- [Chapter 1, “Product Description”](#)
- [Chapter 3, “Provisioning, Security, & Administration”](#)

Before you begin Before you begin this task:

- Obtain the work instructions for this task and note the assigned AIDs.
- Verify that the WaveStar® CIT is connected and logged in to the Metropolis® DMXpress.

Reference: “Task 200: Connect Personal Computer (PC) and Establish WaveStar® CIT Session” (8-3)

- Verify that the DS1 port parameters have been provisioned correctly (using the **View>View Equipment Details...** command) at the terminating Metropolis® DMXpress shelf(s) of the circuit being tested. If required, use the **Configuration>Provision** to make DS1 port provisioning changes.

Task Complete the following steps to perform the DS1 transmission test.

Important! Proper terminating and pass through cross-connections must exist at each shelf (including stand-alone shelves) to establish continuity for the DS1 circuit being tested.

- 1 Make/verify that the proper STS-1/VT1(DS1) cross-connections have been made for the DS1 circuit to be tested, as required.

Reference: “Task 317: Make VT1.5 (DS1) or STS1 (DS3) Cross-Connections Single OC-48/OC-12 Ring Configuration” (9-69)

2

IF the DS1 transmission test is to be performed ...	THEN...
at a standalone shelf in the <i>Terminal</i> direction (toward the fiber),	At the Main OLIUs, loop back the fiber. (Refer to Figure 10-1 .) Reference: “Task 400: Connect OLIU Optical Loopbacks” (10-3)
at a standalone shelf in the <i>Facility</i> direction (toward the DSX),	At the DSX, connect a patch cord from the OUT jack to the IN jack associated with the DS1 circuit being tested. (Refer to Figure 10-2 .)
in a Metropolis® DMXpress network (end-to-end)	At the far end DSX, connect a patch cord from the OUT jack to the IN jack associated with the DS1 circuit being tested, <i>OR</i> log in to the far end Metropolis® DMXpress shelf and perform a <i>Terminal</i> loopback on the DS1 circuit being tested using the Fault > Loopback command. (Refer to Figure 10-3 .)

Result: The following figures show the test arrangements.

Figure 10-1 Standalone Shelf with Main OLIU Loop Back

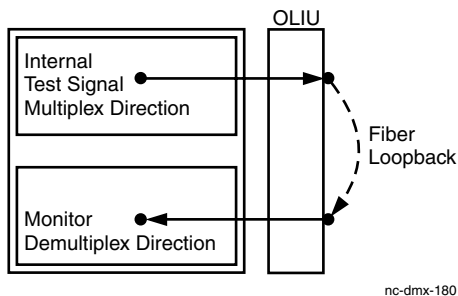


Figure 10-2 Standalone Shelf with DSX Loop Back

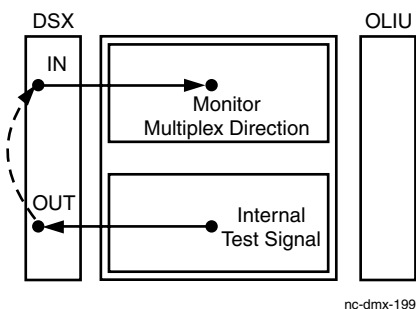
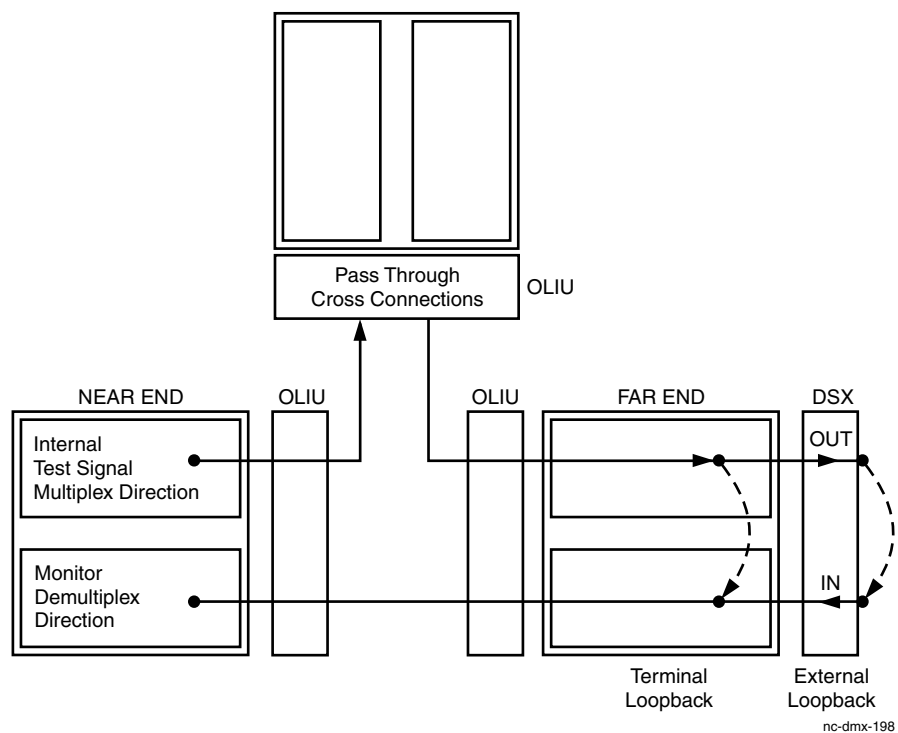


Figure 10-3 End-to-End DS1 Circuit with Far End Loop Back

3

If the DS1 transmission test is to be performed ...	Then...
at a standalone shelf in the <i>Terminal</i> direction (toward the fiber),	Perform a <i>terminal</i> transmission test on the DS1 using the Fault>Test>Test Transmission command, or connect a DS1 test set to the port to be tested at the DSX panel and apply a DS1 test signal.
at a standalone shelf in the <i>Facility</i> direction (toward the DSX),	Perform a <i>facility</i> transmission test on the DS1 using the Fault>Test>Test Transmission command.
in a Metropolis [®] DMXpress network (end-to-end),	Perform a <i>terminal</i> transmission test on the DS1 using the Fault>Test>Test Transmission command, or connect a DS1 test set to the port to be tested at the DSX panel and apply a DS1 test signal.

4 Was the test successful (error free)?

If...	Then...
Yes	Continue with Step 5 .
No	Proceed to Step 21 .

5 Are you performing this test for a stand-alone (Main OLIUs optically looped) shelf or for end-to-end testing within a Metropolis[®] DMXpress network?

If...	Then...
Stand-alone test	Continue with Step 6 .
End-to-end test	Proceed to Step 11 .

6 If connected, disconnect the DS1 test set from the DSX-1.

7 In the System View screen, click on the **Update Alarms** button in order to retire existing alarms caused by this procedure.

-
- 8** Repeat [Step 3](#) through [Step 7](#) for each DS1 circuit to be tested.
-

- 9** Delete the cross-connections entered to perform this procedure.
-

Reference: “[Task 307: Discontinue End-to-End DS1 Service](#)” (9-41)

.....

- 10** STOP! END OF TASK.
-

- 11** Use the **View > Protection** command to determine the active path.
-

- 12** Use the **Fault > Protection Switch** command to switch the path of the circuit under test to the other ring. This may cause a hit to the test signal and register some errors during the switch.
-

- 13** Use the **View > Protection** command to verify the switch.
-

- 14** Was the switch successful (recovered error free)?

If...	Then...
Yes	Continue with Step 15 .
No	Proceed to Step 23 .

.....

- 15** At the near-end, disconnect the DS1 test set from the DSX-1, if required.
-

- 16** At the far-end, release the *terminal* loopback using the **Fault > Loopback** command, or remove the patch cords at the DSX panel for the circuit under test.
-

- 17** In the System View window, click on the **Update Alarms** button in order to retire existing alarms caused by this procedure.

-
- 18** If required, return to [Step 3](#) and repeat this procedure for each DS1 circuit to be tested.
-

- 19** Delete the cross-connections entered to perform this procedure.

Reference: “[Task 307: Discontinue End-to-End DS1 Service](#)” (9-41)

.....

- 20** STOP! END OF TASK.
-

- 21** Has the DS1/DS3/16/1 circuit pack that failed this test been replaced?

If...	Then...
Yes	Proceed to Step 23 .
No	Continue with Step 22 .

.....

- 22** Replace the DS1/DS3/16/1 circuit pack and repeat this procedure.
-

- 23** Trouble may be in the DSX cross-connect wiring, T1 interface wiring, VT1/STS-1 cross-connections in the ring network, or the shelf backplane. Refer to *Metropolis® DMXpress Access Multiplexer Alarm Messages and Trouble Clearing Guide*, 365-372-315 to isolate the trouble.

.....

END OF STEPS

.....



Task 402: Perform DS3 Transmission Test

Purpose Use this task to perform a DS3 transmission test at a stand-alone (Main OLIUs optically looped) Metropolis® DMXpress shelf or in a Metropolis® DMXpress network.

When this procedure is being used to perform DS3 transmission tests in a Metropolis® DMXpress network, it is assumed that the complete end-to-end system has already been tested and that only a particular DS3 port is being tested at this time.

In end-to-end testing, one shelf is referred to as the near end and the other shelf as the far end. These designations are arbitrary; either shelf can be the near-end or the far-end shelf.

Required equipment The following equipment is required:

- Personal Computer (PC) with WaveStar® CIT software installed
- Wrist Strap

Safety precautions To assure both personal safety and the proper functioning of Metropolis® DMXpress, it is imperative to review and understand these warnings and precautions prior to performing this task.



CAUTION

Electrostatic discharge

Use a static ground wrist strap whenever handling circuit packs or working on a system to prevent electrostatic discharge damage to sensitive components. See “Electrostatic discharge” in “About this Information Product”.

Related information For related information, see the following chapters in this document:

- [Chapter 1, “Product Description”](#)
- [Chapter 3, “Provisioning, Security, & Administration”](#)

Before you begin Before you begin this task:

- Obtain the work instructions for this task and note the assigned AIDs.
- Verify that the WaveStar® CIT is connected and logged in to the Metropolis® DMXpress.

Reference: “[Task 200: Connect Personal Computer \(PC\) and Establish WaveStar® CIT Session](#)” (8-3)

- Verify that the DS3 port parameters have been provisioned correctly (using the **View > View Equipment Details...** command) at the terminating Metropolis® DMXpress shelf(s) of the circuit being tested. If required, use the **Configuration > Provision** to make DS3 port provisioning changes.
- For the DS1/DS3/16/1 pack, the DS3 port must be in clear-channel mode with AIS set to **No AIS**.

Task Complete the following steps to perform the DS3 transmission test.

Important! Proper terminating and pass through cross-connections must exist at each shelf (including stand-alone shelves) to establish the continuity for the DS3 circuit being tested.

- 1 Make/verify that the proper STS-1 cross-connections have been made for the DS3 circuit to be tested, as required.

Reference: “[Task 317: Make VT1.5 \(DS1\) or STS1 \(DS3\) Cross-Connections Single OC-48/OC-12 Ring Configuration](#)” (9-69)

2

IF the DS3 transmission test is to be performed ...	THEN...
on a standalone shelf in the <i>Terminal</i> direction (toward the fiber),	At the Main OLIUs, loop back the fiber. (Refer to Figure 10-4 .) Reference: “Task 400: Connect OLIU Optical Loopbacks” (10-3)
in a Metropolis® DMXpress network (end-to-end)	At the far end DSX, connect a patch cord from the OUT jack to the IN jack associated with the DS3 circuit being tested, <i>OR</i> log in to the far end Metropolis® DMXpress shelf and perform a <i>Terminal</i> loopback on the DS3 circuit being tested using the Fault > Loopback > Operate command. (Refer to Figure 10-5 .)

Result: The following figures show the test arrangements.

Figure 10-4 Standalone Shelf with Main OLIU Loop Back

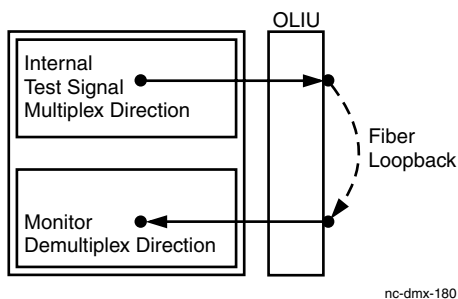
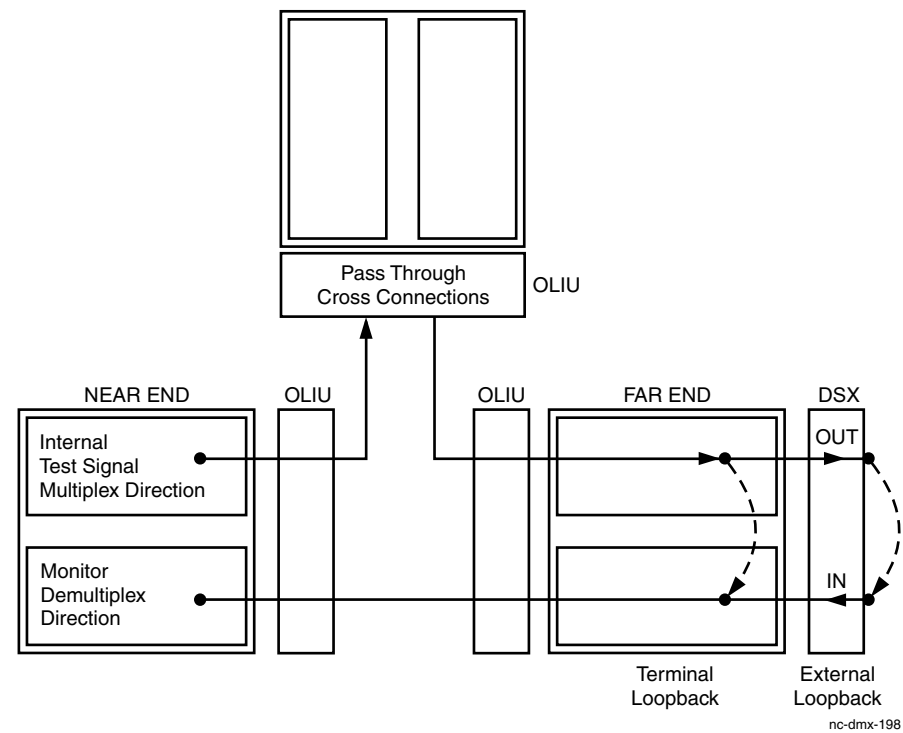


Figure 10-5 End-to-End DS3 Circuit with Far End Loop Back



-
- 3 Perform a *terminal* transmission test on the DS3 circuit using the **Fault > Test > Test Transmission** command, or connect a DS3 test set to the port to be tested at the DSX panel and apply a DS3 test signal.
-

- 4 Was the test successful (error free)?

If...	Then...
Yes	Continue with Step 5 .
No	Proceed to Step 23 .

.....

- 5 Are you performing this test for a stand-alone (Main OLIUs optically looped) shelf or for end-to-end testing within a Metropolis® DMXpress network?

If...	Then...
Stand-alone test,	Continue with Step 6 .
End-to-end test,	Proceed to Step 11 .

-
- 6** If connected, disconnect the DS3 test set from the DSX-3.

Important! Unterminated DS3 circuits require a 75 ohm termination or loopback at the DSX to prevent incoming alarm indications.

.....

- 7** In the System View screen, click on the **Update Alarms** button to retire any existing alarms caused by this procedure.
-

- 8** Repeat [Step 6](#) through [Step 7](#) for each DS3 circuit to be tested.
-

- 9** Delete the cross-connections entered to perform this procedure.

Reference: “[Task 311: Discontinue End-to-End DS3 Service](#)” (9-61)

.....

- 10** STOP! END OF TASK.
-

- 11** Use the **View > Protection Switch** command to determine the active path.
-

- 12** Use the **Fault > Protection Switch** command to switch the path of the circuit under test to the other ring. This may cause a hit to the test signal and register some errors during the switch.
-

- 13** Use the **View > Protection Switch** command to verify the protection switch.
-

- 14** Was the switch successful (recovered error free)?

If...	Then...
Yes	Continue with Step 15 .
No	Proceed to Step 21 .

.....

15 At the near-end, disconnect the DS3 test set from the DSX-3, if connected.

.....

16 At the far-end, release the *terminal* loopback using the **Fault>Loopback** command, or remove the patch cords at the DSX-3 panel for the circuit under test.

.....

17 In the System View screen, click on the **Update Alarms** button to retire any existing alarms caused by this procedure.

.....

18 If required, return to [Step 3](#) and repeat this procedure for each DS3 circuit to be tested.

.....

19 Delete the cross-connections entered to perform this procedure.

Reference: “[Task 311: Discontinue End-to-End DS3 Service](#)” (9-61)

.....

20 STOP! END OF TASK.

.....

21 Has the DS1/DS3/16/1 or DS3/12 circuit pack that failed this test been replaced?

If...	Then...
Yes	Proceed to Step 23 .
No	Continue with Step 22 .

.....

22 Replace the DS1/DS3/16/1 or DS3/12 circuit pack and repeat this procedure.

Reference: *Metropolis® DMXpress Access Multiplexer Alarm Messages and Trouble Clearing Guide, 365-372-315*

-
- 23** Trouble may be in the DSX cross-connect wiring, T3 interface wiring, STS-1 cross-connections in the ring network, or the shelf backplane. Refer to the *Metropolis® DMXpress Access Multiplexer Alarm Messages and Trouble Clearing Guide, 365-372-315* to isolate the trouble.

.....
E N D O F S T E P S
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Task 403: Perform Connection and Verification of Optical Facility

Purpose Use this task to connect and verify an OC-48/OC-12/OC-3 optical facility.

Important! In Metropolis® DMXpress, the Main 1 and Main 2 OLIUs are both on the Main circuit pack.

The Main circuit pack may be an

- OC48/1.3I2 (A1AA005)
- OC48 CHx/CHy (A1AA121-159)
- OC12/1.3I2 (A1AA0016)

Important! These circuit packs are NOT hot-pluggable. The system must be powered down before the circuit pack is removed or replaced.

Required equipment The following equipment is required:

- Personal Computer (PC) with WaveStar® CIT software installed
- Wrist Strap
- Lightguide Jumpers
- Lightguide Buildouts (LBOs)

Safety precautions To assure both personal safety and the proper functioning of Metropolis® DMXpress, it is imperative to review and understand these warnings and precautions prior to performing this task.



WARNING **Eye damage**

Unterminated optical connectors may emit invisible laser radiation. Eye damage may occur if beam is viewed directly or with optical instruments. Avoid direct exposure to the beam.



CAUTION

Equipment damage

The OC-48 and OC-12 Main circuit packs must not be reseated, removed, or installed while power is applied to the system. The system must be powered down before the circuit pack is reseated, removed, or replaced.

When Metropolis[®] DMXpress is powered down, you must wait at least 10 seconds before switching the power on again. Rapid power-cycling may result in OLIU CP failed alarms.



CAUTION

Equipment damage

Avoid excessive bending of the optical jumpers.

Related information

For related information, see [Chapter 1, “Product Description”](#) in this document.

Single-Mode Lightguide Jumpers

The following single-mode lightguide angled boot jumpers are available for connecting the OLIUs to the optical span.

Code	Comcode	Length (Ft)	Connectors
MS1A40LC-A40LC-2	108918269	2	LC-LC
MS1A40LC-A40LC-4	108918707	4	LC-LC
MS1A40LC-A40LC-E/W	108918715	Customer Specified	LC-LC
MS1A40LC-LC-2	108918830	2	LC-LC
MS1A40LC-LC-4	108918855	4	LC-LC
MS1A40LC-LC-6	108918863	6	LC-LC
MS1A40LC-LC-8	108918871	8	LC-LC
MS1A40LC-LC-10	108918889	10	LC-LC
MS1A40LC-LC-15	108918897	15	LC-LC
MS1A40LC-LC-20	108918913	20	LC-LC
MS1A40LC-LC-25	108918921	25	LC-LC
MS1A40LC-LC-30	108918939	30	LC-LC
MS1A40LC-LC-35	108918947	35	LC-LC
MS1A40LC-LC-40	108918962	40	LC-LC
MS1A40LC-LC-50	108918970	50	LC-LC
MS1A40LC-LC-E/W	108918988	Customer Specified	LC-LC
MS1A40LC-SC-2	108919002	2	LC-SC
MS1A40LC-SC-4	108919010	4	LC-SC
MS1A40LC-SC-6	108919028	6	LC-SC
MS1A40LC-SC-8	108919036	8	LC-SC
MS1A40LC-SC-10	108919044	10	LC-SC
MS1A40LC-SC-15	108919051	15	LC-SC
MS1A40LC-SC-20	108919069	20	LC-SC
MS1A40LC-SC-25	108919077	25	LC-SC
MS1A40LC-SC-30	108919085	30	LC-SC
MS1A40LC-SC-35	108919093	35	LC-SC

Code	Comcode	Length (Ft)	Connectors
MS1A40LC-SC-40	108919101	40	LC-SC
MS1A40LC-SC-50	108919119	50	LC-SC
MS1A40LC-SC-E/W	108919996	Customer Specified	LC-SC
MS1A40LC-FC-2	108918723	2	LC-FC
MS1A40LC-FC-4	108918731	4	LC-FC
MS1A40LC-FC-6	108918749	6	LC-FC
MS1A40LC-FC-8	108918756	8	LC-FC
MS1A40LC-FC-10	108918764	10	LC-FC
MS1A40LC-FC-15	108918772	15	LC-FC
MS1A40LC-FC-20	108918780	20	LC-FC
MS1A40LC-FC-25	108918798	25	LC-FC
MS1A40LC-FC-30	108918806	30	LC-FC
MS1A40LC-FC-35	108918814	35	LC-FC
MS1A40LC-FC-40	108918822	40	LC-FC
MS1A40LC-FC-50	108918848	50	LC-FC
MS1A40LC-FC-E/W	108918905	Customer Specified	LC-FC
MS1A40LC-EP-2	108919713	2	LC-ST
MS1A40LC-EP-4	108919721	4	LC-ST
MS1A40LC-EP-6	108919739	6	LC-ST
MS1A40LC-EP-8	108919747	8	LC-ST
MS1A40LC-EP-10	108919754	10	LC-ST
MS1A40LC-EP-15	108919770	15	LC-ST
MS1A40LC-EP-20	108919788	20	LC-ST
MS1A40LC-EP-25	108919796	25	LC-ST
MS1A40LC-EP-30	108919804	30	LC-ST
MS1A40LC-EP-35	108919812	35	LC-ST
MS1A40LC-EP-40	108919820	40	LC-ST

Code	Comcode	Length (Ft)	Connectors
MS1A40LC-EP-50	108919838	50	LC-ST
MS1A40LC-EP-E/W	108919846	Customer Specified	LC-ST

Important! The single-mode angled boot lightguide jumpers used to connect the OLIUs must be equipped with LC connectors.

LC-type lightguide buildouts

The following lightguide buildouts are required for attenuating the OLIUs.

Code	Comcode	Loss (dB)	Fiber Type	Color
ABLCS-05.0	108279381	5	SM	Yellow
ABLCS-10.0	108279431	10	SM	Yellow
ABLCS-15.0	108279480	15	SM	Yellow

Metropolis® DMXpress optical power and required LBOs

The following information is required to install the proper LBO on the system OLIUs.

Optics	Circuit Pack	Received Power (dBm)	LBO (dB)
Long Reach (LR) Optics	OC48 CHx/y (A1AA121-159)	+3.0 to -9.0	15
		-9.0 to -29.0	0
Intermediate Reach (IR) Optics	OC48/1.3I2 (A1AA005)	0.0 to -18.0	0
	OC12/1.3I2 (A1AA016)	-8.0 to -28.0	0
	OC3LS/4 (A1AA017)		
	OC12LS/2 (A1AA018)		

Before you begin Before you begin this task:

- 1. Verify that the correct lightguide buildouts and jumpers are available.
- 2. Ensure all optical fiber connectors and couplings have been properly cleaned. Signal performances may be degraded if the connections and couplings are not cleaned properly.

Reference: “Task 408: Clean Optical Fibers, Dual LC Adapters and LC Line Buildouts (LBOs)” (10-45)

- 3. Verify that the WaveStar® CIT is connected and logged in to the Metropolis® DMXpress .

Reference: “Task 200: Connect Personal Computer (PC) and Establish WaveStar® CIT Session” (8-3)

- 4. Ensure that technicians are available at both ends of the optical span(s).

Task Complete the following steps to connect and verify an optical facility.

- 1 Remove the optical covers from the connectors on the Main 1 and Main 2 OLIUs and the LGX panel.
- 2 Make the appropriate transmit and receive connections from the connectors on the near end Main 1 and Main 2 OLIUs to the LGX panel.

-
- 3** Verify that the near end Main 1 and Main 2 OLIUs transmit power levels at the LGX panel are within specifications. (Refer to [Chapter 6, “Technical Specifications”](#) for optical power specifications.)

If the power levels are...	Then...
within specifications,	Continue with Step 4 .
not within specifications,	Clean the fibers between the Main OLIU and the LGX “ Task 408: Clean Optical Fibers, Dual LC Adapters and LC Line Buildouts (LBOs) ” (10-45), then remeasure. If the power level is not within specifications, measure the power directly from the OUT connector on the OLIU faceplate. If the power level is within specifications, replace the fiber between the Main OLIU and LGX panel.

-
- 4** Establish communication with technician at other end of the optical span. Repeat [Step 1](#) through [Step 3](#) at the other end of the optical span.

-
- 5** At the near end measure the receive optical power at the Main 1 OLIU, and at the far end measure the receive optical power at the Main 2 OLIU. If required, add attenuation.

Reference: “[Metropolis® DMXpress optical power and required LBOs](#)” (10-29)

-
- 6** At the near end LGX panel, connect the transmit side of the near end Main 1 OLIU to the receive side of the far end Main 2 OLIU, and connect the receive side of the near end Main 1 OLIU to the transmit side of the far end Main 2 OLIU.

Important! In ring applications, optical fibers extend in two different directions to make up the ring. At each shelf in the ring, the Main 1 OLIU connects to the Main 2 OLIU at the adjacent ring node, and the Main 2 OLIU connects to the Main 1 OLIU at the adjacent ring node.

- 7 Repeat [Step 6](#) and [Step 5](#) for the remain remaining spans around the ring.

- 8 Verify that the LOS alarm (or FLT LED) clears between Main 1 and Main 2 OLIU spans. It takes from 15 to 45 seconds for the FLT LED to extinguish.

If the FLT LEDs...	Then...
does not go off,	Continue with Step 9 .
goes off,	Proceed to Step 10 .

- 9 Check optical fiber connections. Verify the integrity of fiber connections by ensuring correct output at one end is connected to correct input at the other end. Verify output power level from the fiber. If power level is okay, replace the LBO. If the FLT LED did not go off, refer to the *Metropolis® DMXpress Access Multiplexer Alarm Messages and Trouble Clearing Guide, 365-372-315* to clear the trouble before continuing to the next step.

- 10 Disconnect the fiber cable from the OUT connector on the OLIU at one end of the span. At the other end, verify that the associated FLT LED is flashing, indicating a loss of signal. Reconnect the fiber and repeat the process for the other direction of transmission.

- 11 Verify that nodes have been connected properly and that they can communicate with each other. Use the **Administration > OSI Routing Map** and **Administration > OSI Neighbor** commands to retrieve a map of the network.

-
- 12** After all connections and tests have been made, verify optical fiber cables are placed correctly in fiber tray and properly routed in bay framework

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E N D O F S T E P S



Task 404: Perform End-to-End Optical Line Test on Main OLIU

Purpose Use this task to verify the integrity of the OC-48/OC-12 fiber lines between two shelves.

Required equipment The following equipment is required:

- Personal Computer (PC) with WaveStar® CIT software installed
- Wrist Strap

Safety precautions To assure both personal safety and the proper functioning of Metropolis® DMXpress, it is imperative to review and understand these warnings and precautions prior to performing this task.



WARNING **Eye damage**

Unterminated optical connectors may emit invisible laser radiation. Eye damage may occur if beam is viewed directly or with optical instruments. Avoid direct exposure to the beam.



CAUTION **Equipment damage**

The OC-48 and OC-12 Main circuit packs must not be reseated, removed, or installed while power is applied to the system. The system must be powered down before the circuit pack is reseated, removed, or replaced.

When Metropolis® DMXpress is powered down, you must wait at least 10 seconds before switching the power on again. Rapid power-cycling may result in OLIU CP failed alarms.



CAUTION
Electrostatic discharge

Use a static ground wrist strap whenever handling circuit packs or working on a system to prevent electrostatic discharge damage to sensitive components. See “Electrostatic discharge” in “About this Information Product”.

Related information For related information, see [Chapter 1, “Product Description”](#) in this document.

Before you begin Before you begin this task, verify that the Metropolis® DMXpress WaveStar® CIT program is available for this test.

Important! It is assumed that each node has passed the local (looped) transmission tests. If these tests have not been completed, refer to the appropriate task and perform the tests.

Task Complete the following steps to perform the optical line test.

-
- 1** At the test location, physically connect the PC to the shelf and login to the Metropolis® DMXpress node.

Important! This test must be performed locally at each shelf location associated with the optical span(s) being tested.

Reference: [“Task 200: Connect Personal Computer \(PC\) and Establish WaveStar® CIT Session” \(8-3\)](#)

-
- 2 From the System View menu, select **Performance > Initialize PM Registers > Both**, if allowed.



CAUTION

The following step clears all current day and all current quarter-hour performance-monitoring storage registers.

Important! If local tasks prohibit you from doing the **Performance > Initialize PM Registers > Both** command, you may perform the following in [Step 4](#) and [Step 5](#). Use the **Performance > Reports > OCn Line** command to obtain the line performance monitoring status report, note the readings on the current time line in the report, wait 20 seconds and then obtain another report. There should be no change in readings from the first report.

-
- 3 Wait 20 seconds.

-
- 4 From the System View menu, select **Performance > Reports > OCn Line**. This will open the OCn Line PM Parameters Selection screen. Select the OC-48 or OC-12 port

If main-1 is being tested, select **CP main-1 (OC-48/OC-12) > Port 1 (OC48/OC12)**. **Port AID main-1-1** should be displayed. Select parameters and click on **APPLY**.

If main-2 is being tested, select **CP main-2 (OC-48/OC-12) > Port 1 (OC48/OC12)**. **Port AID main-2-1** should be displayed. Select parameters and click on **APPLY**.

Result: These reports will indicate the status of the equipment.

-
- 5 Has performance-monitoring report been obtained from all shelf locations associated with optical span(s) being tested?

If...	Then...
Yes	Proceed to Step 7 .
No	Continue with Step 6 .

-
- 6 Repeat this task from [Step 1](#) at other locations.

-
- 7 Did the report indicate any errors?

If...	Then...
Yes	Continue with Step 8 .
No	STOP. END OF TASK.

-
- 8 Trouble may be in optical and/or fiber connections. Trouble may also be in OLIUs. If report indicated trouble when the report was obtained from the near end of the span, trouble may be in the receive direction. If the report indicated trouble when the report was obtained from the far end of the span, trouble may be in the transmit direction. Check optical fiber and connections. Clean optical fiber connections. If no trouble was found in the optical fibers, replace OLIU(s) associated with the address indicated in the report.

Reference: “[Task 408: Clean Optical Fibers, Dual LC Adapters and LC Line Buildouts \(LBOs\)](#)” (10-45)

Important! The Main cards must not be removed or installed while power is applied to the system. The system must be powered down before the circuit pack is removed or replaced.

.....

END OF STEPS



Task 405 and 406: Reserved for Future Use

.....

Task 407: Check -48 VDC Office Battery

Purpose Use this task to check the office battery voltage.

Required equipment The following equipment is required:

- Personal Computer (PC) with WaveStar® CIT software installed
- Wrist strap
- Multimeter capable of measuring voltage in the 40 to 60 volt range

Safety precautions To assure both personal safety and the proper functioning of Metropolis® DMXpress, it is imperative to review and understand these warnings and precautions prior to performing this task.



WARNING

Risk of electric shock

-48 volt DC is present in the input power cables at the rear of the Metropolis® DMXpress shelf.



CAUTION

Service affecting

If system is in service, service interruption will occur if both power cables are disconnected.

Related information For related information, see [Chapter 1, “Product Description”](#) in this document.

Before you begin Before you begin this task, verify that a multimeter is available for this test.

Task Complete the following steps to perform the office battery test.

- 1** Check the -48 VDC power connections and verify that they are secure.

If...	Then...
Yes	Continue with Step 2 .
No	Use a flat head screwdriver to secure the power leads.

- 2** Is the unit power switch in the ON (1) position?

If...	Then...
Yes	Continue with Step 3 .
No	Set to the ON (1) position.

- 3** Are any LEDs lit on the circuit pack faceplates (visible from the front of the Metropolis[®] DMXpress shelf)?

If...	Then...
Yes	Continue with Step 4 .
No	Check the shelf power connections. Proceed to Step 7 .

- 4** Connect PC and establish a WaveStar[®] CIT session.

Reference: “[Task 200: Connect Personal Computer \(PC\) and Establish WaveStar[®] CIT Session](#)” (8-3)

-
- 5** Click on the Alarm List button and view the top entry(ies) in the pop-up alarm list.
-

- 6** Is -48v power/fuse FA failed OR 48v power/fuse FB failed listed as a Minor alarm?

If...	Then...
Yes	One of the two DC power feeds is missing or incorrect. Continue with Step 7 .
No	The shelf DC power input is OK.

-
- 7** Obtain multimeter for measuring the DC voltage.
-

- 8** Remove ONE of the input power cables at the rear of the Metropolis® DMXpress shelf.
-

- 9** Use multimeter to measure DC voltage in the power cable connector. Place negative probe in power cable connector and positive probe to a solid chassis ground.

Result: Voltage measurement is between -40.0 and -60.0 volts DC.

.....

- 10** Was requirement met?

If...	Then...
Yes	Proceed to Step 12 .
No	Continue with Step 11 .

-
- 11** Trouble in power feeder(s) or office battery distribution. Refer trouble to organization that installed the shelf.
-

- 12** Reconnect the power feeder and disconnect the second power feeder.

.....
13 Repeat [Step 8](#) through [Step 12](#) for the second power feeder.

.....
14 Are the **ACT** LEDs lit on the circuit pack faceplates (visible from the front of the Metropolis® DMXpress shelf)?

If...	Then...
Yes	STOP! END OF TASK.
No	Replace the shelf. (Refer to the <i>Metropolis® DMXpress Access Multiplexer Alarm Messages and Trouble Clearing Guide, 365-372-315.</i>)

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E N D O F S T E P S
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Task 408: Clean Optical Fibers, Dual LC Adapters and LC Line Buildouts (LBOs)

Purpose This task 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.

Important! It is critical that connector faces are clean and free from particular contamination to assure proper performance and reliability of lightwave systems. With the modern high speed, high power, and wider bandwidth optical transmission systems, clean connectors along the optical path are essential for successful operation.

Required equipment The following table lists required and recommended equipment for proper cleaning:

Product	Model/ Description	Comcode	ITE #	Installation Order #
Optical Fiber Scope	Noyes OFS 300-200X	408197028	ITE-7129	33712900
2.5mm Universal adapter cap	For use with the Noyes OFS 300-200X	408197044	ITE-7129D1	33712901
1.25mm Universal adapter cap	For use with the Noyes OFS 300-200X	408197069	ITE-7129D2	33712902
Video Fiber Scope1	Noyes VFS-1	TBD	TBD	TBD
Individual pre-saturated alcohol wipes	99% pure isopropyl alcohol	901375147	ITE-7136	33713600
CLETOP Cleaning Cassette	Type A Reel	901375154	ITE-7137	33713700
CLETOP Cleaning Cassette Replacement Reel	Type A Reel	901375014	ITE-7137 D1	33713701
Luminex Stick port cleaners	1.25 mm	901375030	ITE-7134	33713400
Luminex Stick port cleaners	2.5 mm	901375022	ITE-7135	33713500
Luminex Cloth	5.5" x 5.5"	408201226	R6033	23603300
<i>Note 1:</i> This equipment may not be necessary at all locations. It is to be used when the ports need to be verified for cleanliness. If care is exercised when cleaning fibers, the video scope may not be needed. <i>Note 2:</i> The equipment and material listed above has been tested and is proven effective when used in conjunction with this procedure. Substitution of equipment or materials is at the discretion of the user and is not recommended				

Safety precautions To assure both personal safety and the proper functioning of Metropolis[®] DMXpress, it is imperative to review and understand these warnings and precautions prior to performing this task.



WARNING
Eye damage

Unterminated optical connectors may emit invisible laser radiation. Eye damage may occur if beam is viewed directly or with optical instruments. Avoid direct exposure to the beam.



WARNING

Alcohol is flammable and is harmful if swallowed, inhaled or absorbed through the skin. Keep alcohol away from heat, sparks, or flame. Avoid contact with eyes, skin and clothing.



CAUTION
Equipment damage

When handling optical pigtails of jumpers, keep bending radius as large as possible.

Related information A course on connector cleaning and the connector inspection process is now offered through Lucent Technologies Learning and Performance Center, Course Code: LMC200H “*Understanding Fiber Optic Cleaning, Inspection and Testing.*” To learn more about this course, consult your local Lucent Account Representative.

The procedure that follows utilizes the “Wet/Dry” method for connector cleaning. This method first applies a “wet” solvent such as high purity alcohol to the connector endface to dissolve/remove any organic particulate or oily films, followed by a “dry” double clean wipe using the CLETOP cleaning cassette.

This procedure is recommended for connector ferrules 2.5 mm and 1.25 mm in diameter associated with ST, SC, FC, and LC connectors. The ferrule of a fiber optic connector consists of a ceramic or stainless steel cylinder with a hole located longitudinally down the center of its axis, allowing enough tolerance for a fiber to pass through.

All optical connectors should be cleaned prior to being connected. Keep the protective ferrule dust cap on the connector until initiating the cleaning process.

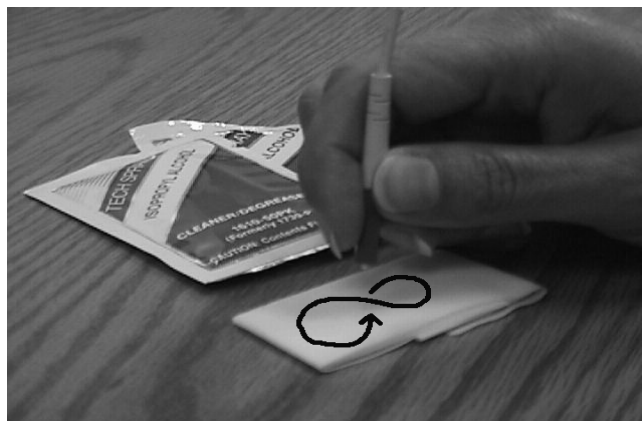
Task The following cleaning procedure is acceptable for field service/
installation activities.

-
- 1** Remove the dust cap from the connector ferrule, thus exposing the connector endface

-
- 2** Open an individual foil packet of pre-saturated isopropyl alcohol (99% pure) wipe.

Grasp the connector housing and place the connector ferrule endface perpendicular to the alcohol wipe

Drag it against the wipe three (3) times in a figure eight pattern. This action applies the alcohol solvent to the endface and initially loosens and scrubs away organic/solid contaminants.



-
- 3** If a CLETOP cassette cleaner is not available, proceed with [Step 7](#). Otherwise, hold the CLETOP cassette cleaner in the palm of your hand with the cassette shutter door facing up.

Rotate the cassette lever all the way down with your thumb. Do not release the lever. The lever advances the “dry” Luminex cleaning cloth inside the case and simultaneously opens the shutter. The CLETOP cassette shutter door is now open and ready for cleaning the connector.



-
- 4** Insert and press the connector ferrule endface perpendicular against the cleaning cloth in the first of two slots of the cleaner.

Refer to the figure in [“Connector inspection” \(10-51\)](#)

Drag it down (in the direction indicated by the arrows on the cleaner). Make certain not to release the lever of the cassette.

- Proceed to “Connector inspection” (10-51)

END OF STEPS

Connector inspection



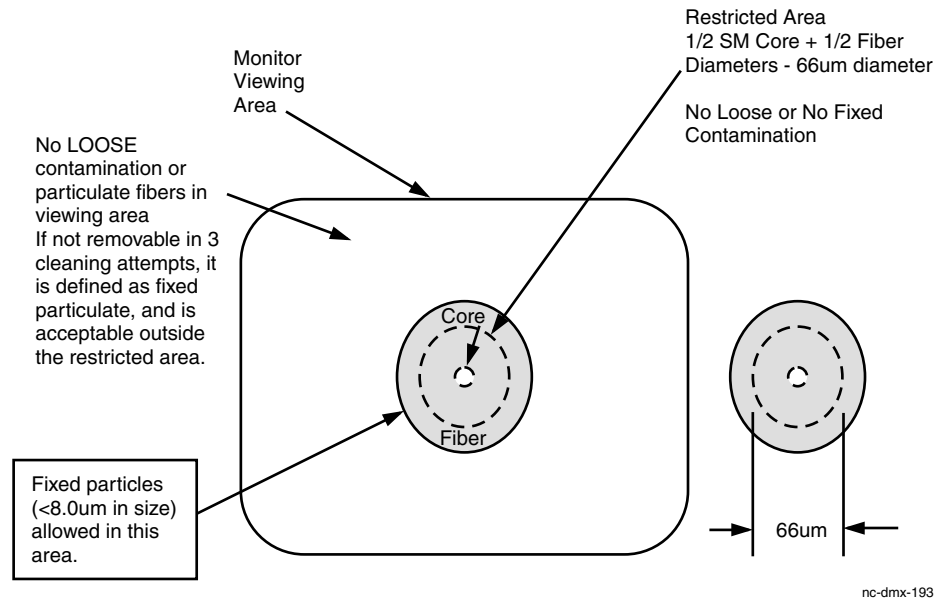
WARNING **Eye damage**

When using an optical power meter to verify the connector and fiber are clean, take special precaution to make sure that no power is being emitted from the fiber before viewing.

After cleaning the connector, inspect the ferrule endface to ensure that it is free from any particulate contamination using an optical fiber inspection scope of at least 200X magnification. When using an optical fiber scope (for example, the Noyes OFS 300-200X) exercise extreme caution to assure fiber being examined is de-energized.

-
- 1 Follow the instructions in the manual provided with the Optical Fiber Scope to view the ferrule endface of the fiber under inspection.

-
- 2** The visual area of the ferrule endface (ferrule and fiber) as observed by the inspection system/scope should be free of any contaminants.



Repeat the Cleaning Procedure if the fiber endface does not meet the following requirements:

- No fixed type of contamination (contaminates that remain at the same location after 3 wet-dry cleaning cycles), regardless of size, is allowed in the restricted area of the glass fiber endface.

Important: The restricted area is defined as ~66 microns (µm) diameter for both singlemode and multimode fibers.

- No chips, cracks or scratches are allowed near the core of the glass fiber endface.
- No large floating (loose) contaminants are allowed on the glass fiber and ceramic ferrule endface.

-
- 3** After the connector has been verified to be clean, it should be immediately inserted into the adapter buildout of the optical component. This will assure maximum cleanliness and effectiveness of the connector.

-
- 4 If the cleaned connector can not be immediately connected to a corresponding adapter, the connector ferrule must be protected with a connector dust cap. Before placing the cap on the ferrule, make sure the cap is clean. This can be accomplished by inserting a CLETOP stick cleaner (swab) of the same inside diameter as the cap (either 2.5 or 1.25 mm) and rotate the stick 360 degrees three (3) times. Following this procedure, carefully place the cap over the ferrule. When the cleaned connector is ready for assembly, it should be re-inspected for cleanliness prior to connection.

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E N D O F S T E P S
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**Fiber adapters/circuit pack
connectors**



CAUTION

Equipment damage

Do not attempt to clean ports equipped with yellow Line Buildout (LBO) attenuators. Attenuators contain a thin glass lens that is extremely fragile. The LBO will be damaged if cleaned using this method.

During testing and/or trouble shooting activities it may be necessary to clean the optical buildout adapter or the circuit pack connector. The following procedure is recommended

-
- 1 Using the appropriate CLETOP stick cleaner (2.5 mm for SC, ST, and FC connectors, 1.25 mm for LC connectors) dampen the stick cleaner with Ethyl alcohol using the alcohol wipe. Insert the stick cleaner into the adapter rotating the stick 360 degrees while inserting. Push/rotate stick until the stick cleaner makes contact with the connector. Apply slight pressure upon contact and rotate stick 360 degrees at least three (3) times.
-
- 2 Remove the stick cleaner rotating it upon removal.

-
- 3** Using a dry CLETOP stick cleaner of appropriate diameter, repeat the above cleaning procedure. This procedure will clean the side walls of the adapter and the endface of the circuit pack connector.
-
- 4** Gently insert the Video Fiber Scope probe into the port until the fiber ferrule comes into view.
-
- 5** Verify that the fiber ferrule is clean. Repeat [Step 1](#) through [Step 3](#) if the fiber does not meet the requirements specified in “[Connector inspection](#)” (10-51).

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



Task 409 and 410: Reserved for Future Use

.....

Task 411: Install/Remove LC Lightguide Buildouts (LBOs)

Purpose Use this task to install or remove an LC lightguide buildout (LBO).

Important! All LC LBOs should be cleaned before making initial connections or reconnections per [“Task 408: Clean Optical Fibers, Dual LC Adapters and LC Line Buildouts \(LBOs\)” \(10-45\)](#). Only the components being assembled at this time should be cleaned.

Required equipment A wrist strap is required to perform this task.

Safety precautions To assure both personal safety and the proper functioning of Metropolis[®] DMXpress, it is imperative to review and understand these warnings and precautions prior to performing this task.



WARNING **Eye damage**

Unterminated optical connectors may emit invisible laser radiation. Eye damage may occur if beam is viewed directly or with optical instruments. Avoid direct exposure to the beam.



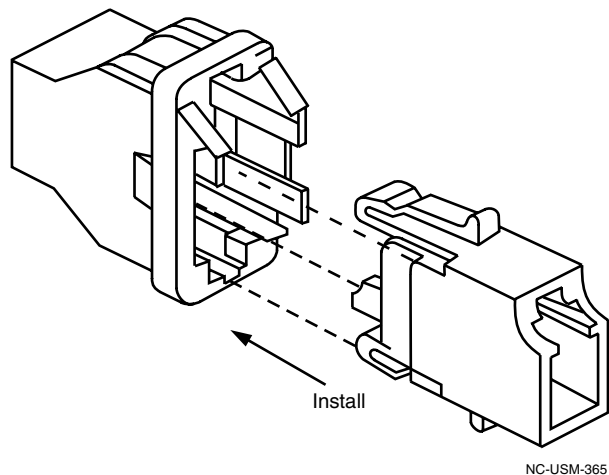
CAUTION **Electrostatic discharge**

Use a static ground wrist strap whenever handling circuit packs or working on a system to prevent electrostatic discharge damage to sensitive components. See “Electrostatic Discharge (ESD) Considerations” in “About this Information Product”.

Task Complete the following steps to install or remove an LC lightguide buildout (LBO).

- 1 Remove the protector caps and plugs (if equipped) from the LC LBO and the dual adapter, and store them in a clean container.

Figure 10-6 LC LBO



- 2 Is LC LBO being installed or removed?

If the LC LBO is being...	Then...
Installed,	Continue with Step 3 .
Removed,	Proceed to Step 5 .

- 3 Align the LBO with the slot in the adapter, depress locking tab, and push LBO into the dual adapter until a click is heard. The LBO is now locked into position.

- 4 STOP! END OF TASK.

-
- 5 Depress the locking tab on the LBO and pull the LBO out of the dual adapter.



CAUTION

The locking tab must only be pushed along a line perpendicular to the LBO body in the direction towards the LBO in order to avoid damage to the locking tab.

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E N D O F S T E P S



Task 412 and 413: Reserved for Future Use

Task 414: Perform End-to-End Optical Line Test on Low Speed OLIUs

Purpose Use this task to verify the integrity of the OC-3/OC-12 fiber lines between a Metropolis® DMXpress and another Metropolis® DMXpress or Metropolis® DMX shelf.

Required equipment The following equipment is required:

- Personal Computer (PC) with WaveStar® CIT software installed
- Wrist Strap

Safety precautions To assure both personal safety and the proper functioning of the Metropolis® DMXpress, it is imperative to review and understand these warnings and precautions prior to performing this task.



WARNING **Eye damage**

Unterminated optical connectors may emit invisible laser radiation. Eye damage may occur if beam is viewed directly or with optical instruments. Avoid direct exposure to the beam.



CAUTION **Electrostatic discharge**

Use a static ground wrist strap whenever handling circuit packs or working on a system to prevent electrostatic discharge damage to sensitive components. See “Electrostatic discharge” in “About this Information Product”.

Related information For related information, see the following:

- [Chapter 1, “Product Description”](#)

Before you begin Before you begin this task, verify that the WaveStar® CIT is available for this test.

Important! It is assumed that each Metropolis® DMXpress has passed the local (looped) transmission tests. If these tests have not been completed, refer to the appropriate task and perform the tests.

Task Complete the following steps to perform the optical line test.

-
- 1** Connect the PC and establish a WaveStar® CIT session.

Important! This test must be performed locally at each Metropolis® DMXpress shelf location associated with the optical span(s) being tested.

Reference: “Task 200: Connect Personal Computer (PC) and Establish WaveStar® CIT Session” (8-3)

.....

- 2** Enter the **Performance > Initialize PM Registers> Both** command, if allowed.



CAUTION
Service affecting

This step initializes (clears) all current day and/or all current quarter-hour performance-monitoring storage registers.

Important! If local tasks prohibit you from doing the **Performance >Initialize PM Registers >Both** command, you may perform the following in [Step 4](#) and [Step 5](#). Use the **Performance >Reports >OCn Line** command to obtain the line performance monitoring status report, note the readings on the current time line in the report, wait 20 seconds and then obtain another report. There should be no change in readings from the first report.

.....

- 3** Wait 20 seconds.

-
- 4** From the menu bar select **Performance>Reports>OCn Line**. This will result in producing the screen titled *OCn Line PM Parameters Selection*. Select the OC-3/OC-12 Port.

Result: These reports will indicate the status of the equipment.

.....

- 5** Has performance-monitoring report been obtained from all shelf locations associated with optical span(s) being tested?

If...	Then...
Yes	Proceed to Step 7 .
No	Continue with Step 6 .

-
- 6** Repeat this task from [Step 1](#) through [Step 5](#) at other locations.
-

- 7** Did reports indicate any errors?

If...	Then...
Yes	Continue with Step 8 .
No	STOP! END OF TASK.

-
- 8** Trouble may be in optical and/or fiber connections. Trouble may also be in OLIUs. If report indicated trouble when the report was obtained from the near end of the span, trouble may be in the receive direction. If the report indicated trouble when the report was obtained from the far end of the span, trouble may be in the transmit direction. Check optical fiber and connections. Clean optical fiber connections

Reference: “Task 408: Clean Optical Fibers, Dual LC Adapters and LC Line Buildouts (LBOs)” (10-45).

If no trouble found in the optical fibers, replace OLIU(s) associated with the address indicated in the report.

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Appendix A: WaveStar[®] CIT Tutorial

| Overview

Purpose This appendix shows, through a series of exercises, the features of the WaveStar[®] CIT software. It is strongly recommended that this tutorial only be used with a Metropolis[®] DMXpress Access Multiplexer that is **out of service**.

Users should be familiar with the information in this appendix before using the tasks in this manual.

This tutorial provides the following information about using the WaveStar[®] CIT.

- How to log in to the WaveStar[®] CIT
- How to determine user security privileges
- How to recognize the WaveStar[®] CIT, *System View*, and *Cut Through* screens
- How to determine which WaveStar[®] CIT software release is running on the PC
- How to determine which NE software releases are supported by the WaveStar[®] CIT
- How to determine which network element (NE) software release is running on the NE
- How to view equipment details
- How to access help information

- How to view parameter defaults
- How to provision a parameter
- How to view an NE alarm list

How to use this tutorial

It is strongly recommended that users start at the beginning of this tutorial and complete each task in sequence.

Related information

Metropolis® DMXpress Access Multiplexer Software Release Description

Contents

This appendix provides the following information.

WaveStar® CIT Overview	A - 3
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WaveStar® CIT Overview

Minimum hardware and software requirements

For detailed information about the minimum hardware and software requirements for the WaveStar® CIT, refer to the *Metropolis® DMXpress Access Multiplexer Software Release Description*.

System Administration

The system administrator installs the WaveStar® CIT software and provisions the operating environment for other users.

The system 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.

The WaveStar® CIT system administrator can customize the access privileges and security attributes on a per login ID basis. This allows centralized operation, decentralized operation, or a combination of both.

Cable connections

The WaveStar® CIT connects to the WaveStar network element using the following different physical connection arrangements:

- A LAN 10BaseT cross-over cable is used to connect the WaveStar® CIT LAN port directly to the **LAN CIT** connector on the OC48/1.3I2 Main circuit pack faceplate.
- A LAN 10BaseT cross-over cable is used to connect the WaveStar® CIT LAN port directly to the **J1 IAOLAN** connector on the Metropolis® DMXpress shelf backplane.
- The CIT cable assembly (848748869) is used to connect the WaveStar® CIT serial port directly to the **RS232 CIT** connector on the OC48/1.3I2 Main circuit pack faceplate.

To install the cables, refer to the *Metropolis® DMXpress Access Multiplexer, Installation Manual, 365-372-311*.

Important! In this tutorial, it is assumed that the WaveStar® CIT cables are already installed.

Default login IDs The WaveStar® CIT has two default/system logins: LUC01 with password LUC+01, and LUC02 with password LUC+02. (The default/system login IDs can be changed by the user.) Additional logins can also be created. To create additional logins, refer to [“Task 202: Enable or Lockout System Security and/or Edit, Delete, or Enter a User’s Login” \(8-15\)](#).

Login sessions The WaveStar® CIT supports one active login session at a time (one active WaveStar® CIT screen). From the single active WaveStar® CIT screen a user can establish only one login session to a particular network element. However, a user can establish multiple simultaneous logins to different network elements. Users can log in to a new network element without logging out from another network element.

WaveStar® CIT software installation For information about installing the WaveStar® CIT software, refer to the *Metropolis® DMXpress Access Multiplexer Software Release Description*.

Important! In this tutorial, it is assumed that the WaveStar® CIT software is already installed on the PC.

Network element software installation For information about installing the Metropolis® DMXpress network element software, refer to the *Metropolis® DMXpress Access Multiplexer Software Release Description*.

Important! In this tutorial, it is assumed that the network element software is already installed on all NEs within the subnetwork.

Apply and OK buttons The **OK** button is used to execute the selected action and close the screen.

The **Apply** button is used to execute the selected action and return to the screen for further provisioning. If no further provisioning is desired and the **OK** button is used, the command is executed again and the screen is closed.

The **Close** button is used to close the screen without executing any commands.



Log in to the WaveStar® CIT

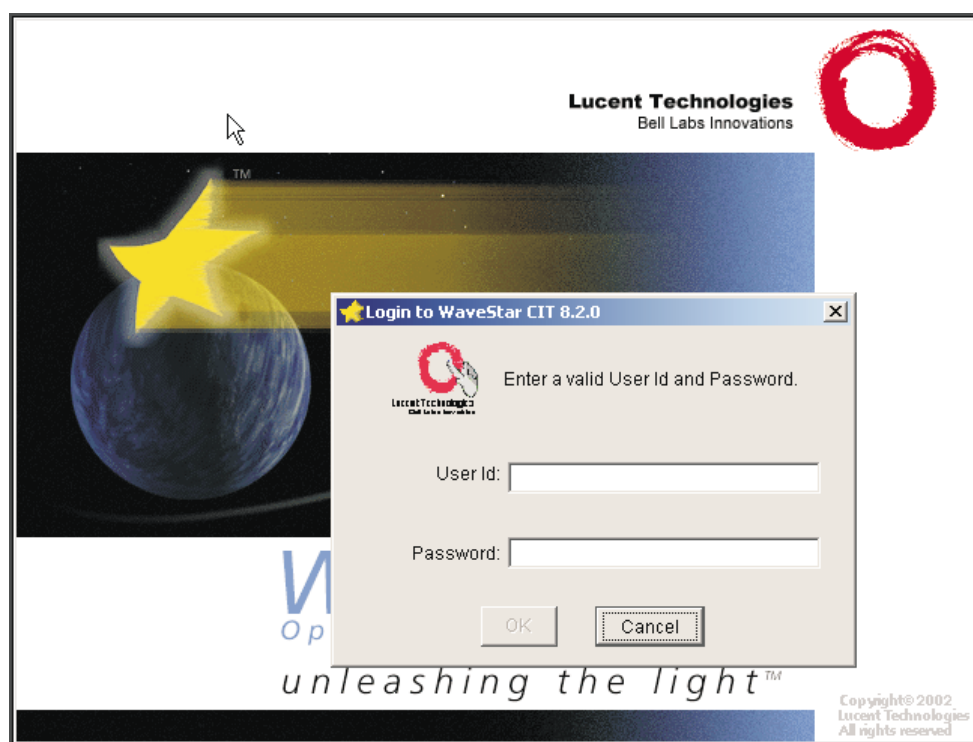
Procedure Perform the following to log in to the WaveStar® CIT.

Important! In this tutorial, it is assumed that the WaveStar® CIT software is already installed on the PC.

- 1 At the Windows NT desktop, double-click on the WaveStar® CIT icon or select Start-Programs-WaveStar CIT-WaveStar CIT.

Result: The *Login to WaveStar CIT* screen appears. (Refer to [Figure A-1](#)). If your PC is running a different software release and/or build number of WaveStar® CIT software, there may be some differences between the screens shown in this tutorial and what is displayed on your PC.

Figure A-1 Login to WaveStar® CIT Screen

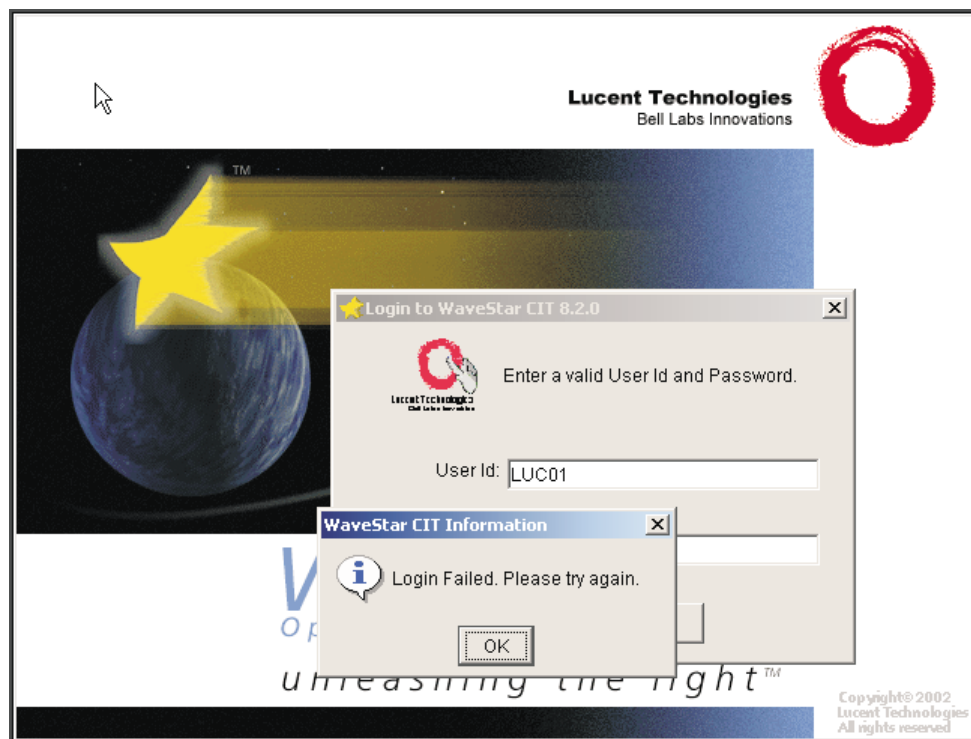


- 2 Position the cursor in the User Id: field and enter a valid login (obtained from the system administrator).

-
- 3 Position the cursor in the Password: field and enter an *incorrect* password. Click on OK.

Result: The Login Failed message appears. (Refer to [Figure A-2](#).)
The password entered did not match the password in the database.

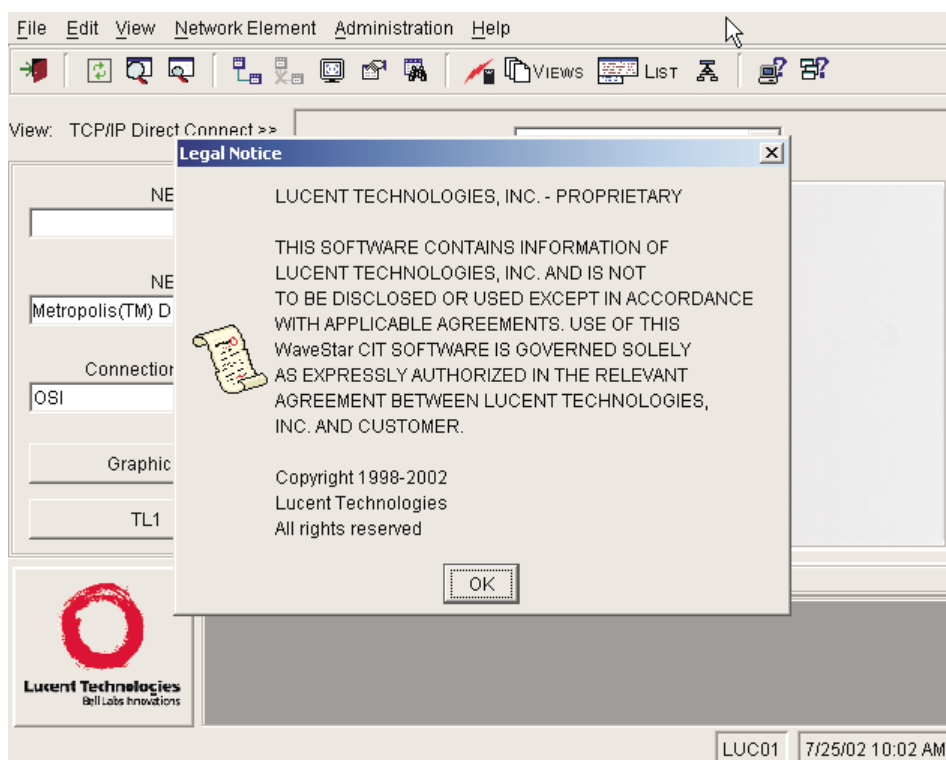
Figure A-2 Login Failed Message



-
- 4 Click on OK, then place the cursor in the Password: field and enter the correct password.

Result: The WaveStar® CIT screen and the Legal Notice appear. (Refer to [Figure A-3.](#))

Figure A-3 WaveStar® CIT Screen and Legal Notice



-
- 5 Read the Legal Notice and click on OK to continue.

Result: The WaveStar® CIT screen appears. (Refer to [Figure A-4.](#))

END OF STEPS



View the WaveStar® CIT Screen

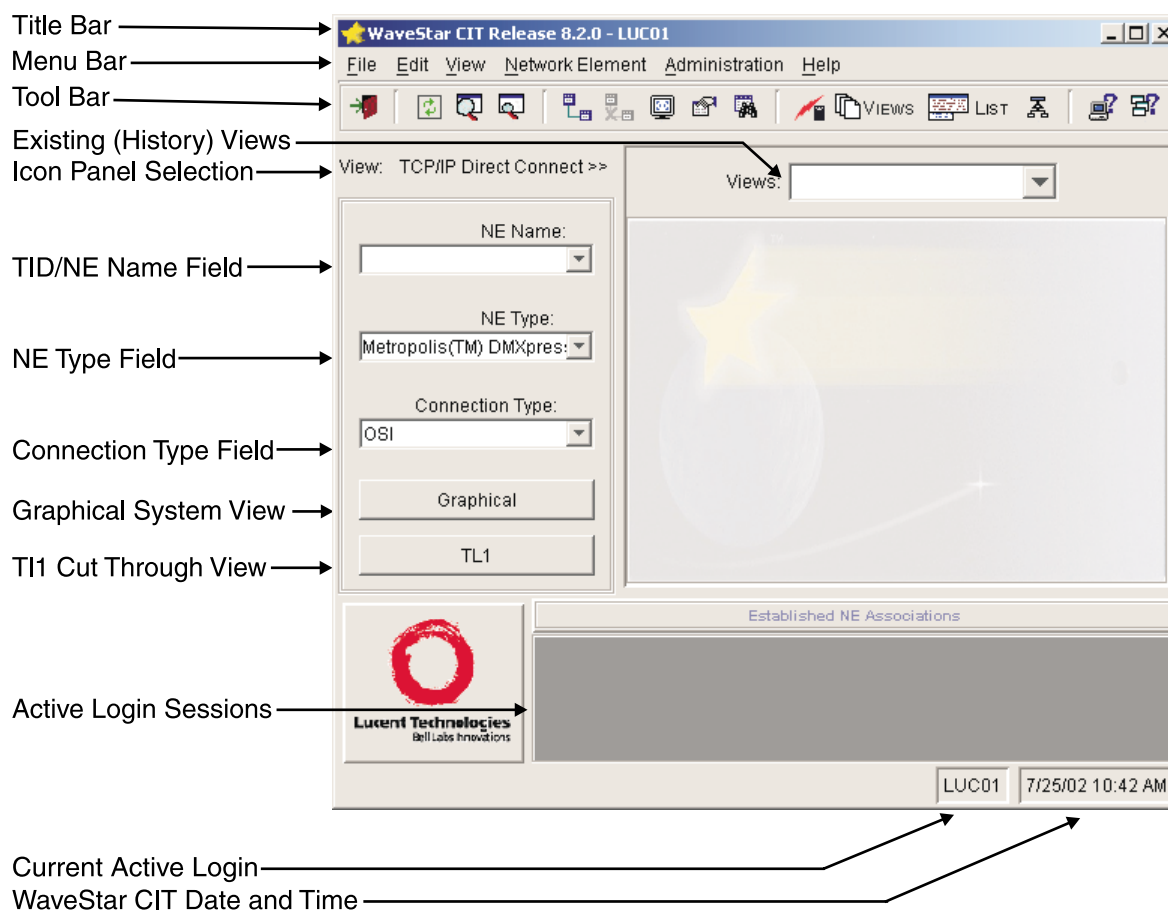
Procedure

Important! The WaveStar® CIT has a menu bar across the top of the screen, a toolbar immediately below the menu bar, and status indicators across the bottom of the screen. Each item on the menu bar has a pull-down menu. Some menu items have additional submenu items.

- 1 View the WaveStar® CIT screen, menu bar, toolbar, and status indicators. (Refer to [Figure A-4.](#))

Important! If your PC is running a different version of WaveStar® CIT software, there may be some differences between the screen shown in this tutorial and what is displayed on your PC.

Figure A-4 WaveStar® CIT Screen



-
- 2** The WaveStar® CIT screen supports tool-tips. To determine the meaning of a toolbar item, position the cursor over that item, hold for two seconds, and its name/function is displayed. Repeat for all items on the toolbar.

Important! In the [Figure A-4](#), the *WaveStar® CIT Time and Date* field is the WaveStar® CIT Time and Date. The WaveStar® CIT time/date is separate from an NE time/date. Changing an NE time/date does not change the WaveStar® CIT time and date.

- 3** Observe the WaveStar® CIT screen menus and submenus. (Refer to the following table.)

Important! Some menu items have an associated shortcut keys. For example, the shortcut key for Graphical is Ctrl+T.

Menus	Submenus
File	Save Setting Login as New User... Exit
Edit	Copy Icon(s) To>
View	Refresh OSI View Ctrl+R Large Icons Small Icons Arrange Icons> NE Name NE Type Preferences...
Network Element	Graphical... Ctrl+T TLI... Ctrl+U Disconnect from NE... Disconnect from All NEs FSTS Find... Ctrl+F Properties... Ctrl+P
Administration	View CIT Administration... Change Password... Security> View User Logins User Provisioning Change Superuser Login ID Prepare PCMCIA Disks... Data Communications... Serial COM Selection... Address List... Administer Views... Defaults... Auto Router Discovery... FTP Administration... SDS Administration...
Help	About WaveStar® CIT Help, Contents, Index & Find Ctrl+L Supported NEs

END OF STEPS



Important! If your PC is running a different software release and/or build number of WaveStar® CIT software, there may be some differences between the screens shown in this tutorial and what is displayed on your PC.

- Result:** The WaveStar® CIT Software Release and Build number (BLD####) are displayed. (Refer to [Figure A-5](#).) *Your PC may be running a different software release and/or build number.*

- A - 11

Important! The WaveStar® CIT software (depending on whether the installation was a "Custom" or "Full") may function with different types of NEs (for example, Metropolis® DMX Access Multiplexer, WaveStar® BandWidth Manager, and WaveStar® 2.5G/10G).

- 3** Click on **Help>Supported NEs** to obtain a list of NE types the WaveStar® CIT supports.

-
- 4** Click on **OK** to close the WaveStar® CIT Information screen.

END OF STEPS



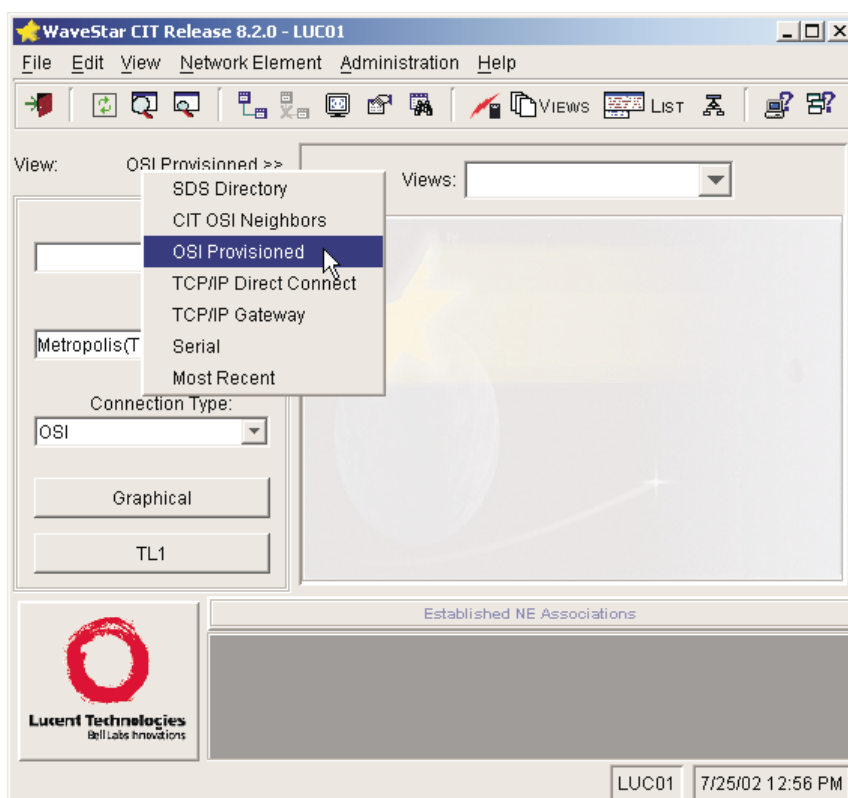
Log in to the Network Element

Procedure Perform the following to log in to the network element.

Important! When the Icon Panel Selection button is selected, a drop-down list containing seven different views is displayed. The right-hand part of the screen changes to the proper format for the selected view. The drop-down list includes SDS Directory, CIT OSI Neighbor, OSI Provisioned, TCP/IP Direct Connect, TCP/IP Gateway, Serial, and Most Recent.

- 1 Click on the Icon Panel Selection button and select OSI Provisioned. (Refer to [Figure A-6](#).)

Figure A-6 Icon Panel Selection Button



-
- 2** Enter the appropriate NE Name/TID in the NE Name: field.

Important! This tutorial uses the NE name **dmxpr**. Your NE name may differ. This tutorial assumes that the WaveStar® CIT is already connected to the network/subnetwork via a LAN.

- 3** In the NE Type: field, click on the drop-down arrow and select **Metropolis® DMXpress Access Multiplexer**.
-

- 4** Verify that OSI is displayed in the Connection Type: field and click on Graphical. The WaveStar® CIT is connected to the NE via the LAN.

Result: The OSI Connection Type Selection screen appears.

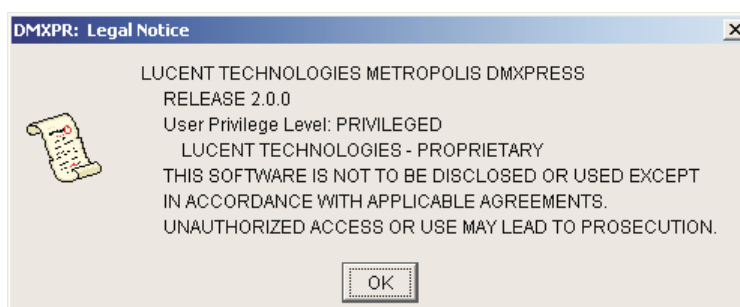
- 5** Select option **TLI Maintenance (TL1 Alarms, Events, and Command Responses)** and click on OK.

Important! If access to the specified network element is denied, you must enter a valid User ID and password. The default user IDs are LUC01, LUC02, and LUC03. The default password is DMXPRS2.5G. Users are always asked for the login and password with the first NE connection. The login and password can be saved for subsequent connections, but the login and password can not be saved past the current CIT session.

- 6 After a successful login, the NE Legal Notice screen appears. (Refer to [Figure A-7](#).) Read and observe the software Release number (for example, 2.0.0) and the User Privilege Code (for example, Privileged). Click on **OK** to continue.

Important! Your software Release number and User Privilege Code may be different.

Figure A-7 NE Level Legal Notice



END OF STEPS



View the System View Screen

Procedure

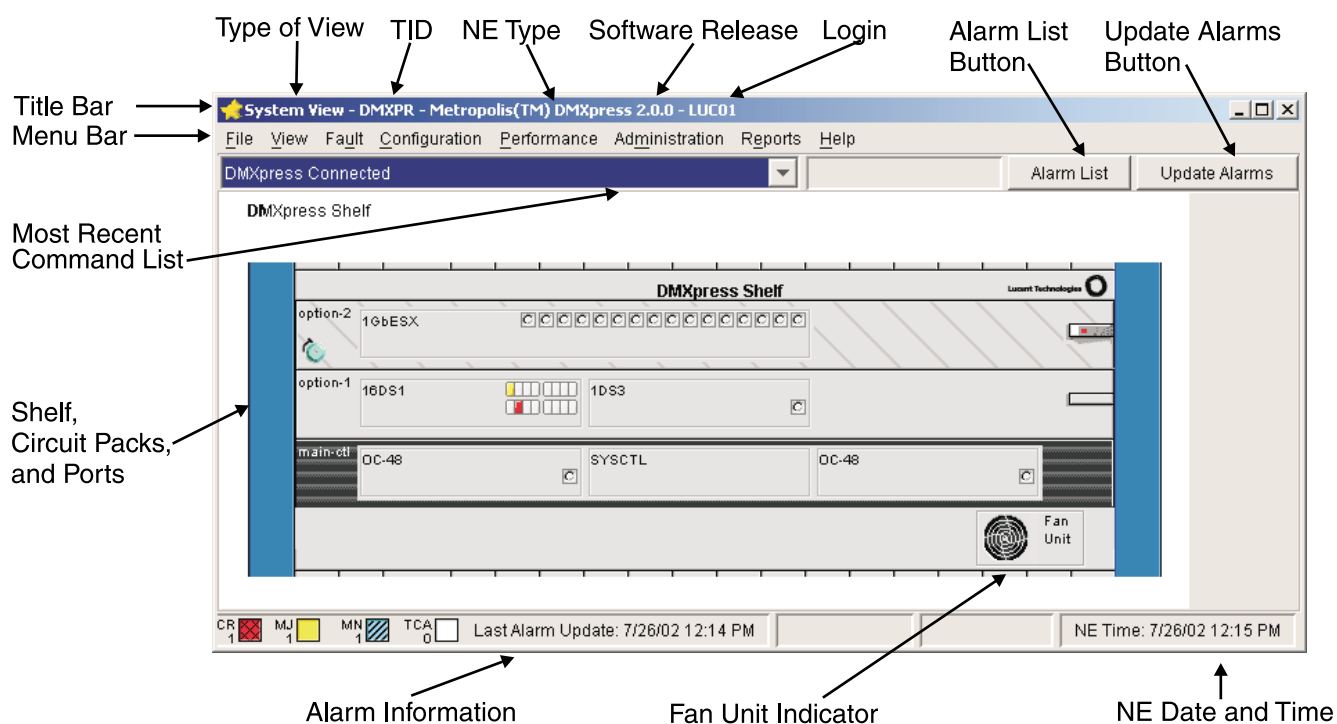
Important! This series of steps assumes that a successful login has already been established to the desired NE. The WaveStar® CIT screen and the System View screen should be displayed.

The *System View* screen shows a graphical representation of the shelf, circuit packs, and alarms. You can interact with these components by using your cursor. The shelf, circuit packs, and alarms may be different for your network element.

- 1 Observe the System View screen (Refer to Figure Figure A-8.)

Important! Your software release number may be different.

Figure A-8 System View Screen



Important! Depending on the software Release/BLD#### that you are using, there may be variations in the menu contents. If a menu item is visible but “grayed-out,” the item is not selectable from the current environment, or the lighted-out item may not be selectable at anytime from this product.

- 2** Click on the System View Menus items and submenus. (Refer to the following table.)

Menu	Submenus
File	Enable TL1 Logging... Disable TL1 Logging... Set/Change TL1 Logging File NE Disconnect
View	View Equipment Details... View Rolling Events View Rolling TCA Events Protection.. Loopback View Alarms> View Alarm Configuration... Cross Connections... DCC Terminations... Data> VLAN Details... LAN (Ethernet) Port... WAN (VCG) Port... Spanning Tree... Virtual Switch... Misc. Discretes... Timing/Sync Software Generic Refresh Equipment... Refresh System View... Preferences View Tree

Fault	NE Alarm List... Remote NE Alarms List... Protection Switch... Loopback... Test> LED... Test IAO LAN... Test System Controller... Test Transmission... Reset> System Controller... Initialize System... Clear TCA Count Timing/Sync Protection Switch> Clock Mode Switch System Timing Reference/ Source Switch Operate Output Misc. Discretes...
Configuration	Provision... Ethernet Service Misc Discretes... DCC Terminations... Data> Create A Virtual Switch... Delete A Virtual Switch... Provision A Virtual Switch Create A VLAN... Delete A VLAN... Provision A VLAN... Create A Spanning Tree Group Delete A Spanning Tree Group Provision A Spanning Tree Cross-Connections... Timing/Sync Alarms> Alarm Configuration... Update System Software> Remote Backup... Remote Restore... Configure Auto Backup Interval.. Download Software... Copy Software... Apply Software... FTP Browser..

Performance	View PM Threshold> Prov PM Threshold> DS3 (Near End) DS3 (Far End) OC3... OC12... OC48... STS1... STS3C... STS12C... VT1... Initialize PM Registers> 15-Min 1-Day Both View PM Ports... Prov PM Ports... Reports> DS3 Line... DS3 Path... OC-N Section... OC-N Line... STSn Path... VT1.5 Path... TCA... Ethernet...
Administration	Change Password... Security> View User Logins... Lockout Logins Enable Logins User Provisioning Allow/Inhibit Automous Messages View NE Administration... View MAC Addresses... IAO LAN Reset... Data Communications... Set TL1 Message Map... OSI Routing Map... OSI Neighbor Map... Change NE Login Banner Set Date and Time... Set TID... Set NE...

Reports	Equipment Lists> Pack... Port... VCG... Trib... Misc. Discretes... Status Lists> Pack... Port... Trib... Path Protection List... Cross Connection List... NE Alarm List Remote NE Alarms List NE History Log...
Help	About This Network Element... Help Contents, Index, and Find... View Documents> AMTCG User Operations Guide Applications and Planning Guide TL1 Message Details

END OF STEPS

| Determine the NE Login Security Level

Procedure Perform the following to determine the security level of your NE login.

Important! Each login has a provisioned security level. Four security levels are available. The security levels are privileged, maintenance, general, and reports-only. For detailed information about login security levels, refer to [Chapter 3, “Provisioning, Security, & Administration”](#).

- 1** From the System View screen select **Administration>Security>User Provisioning**.

Result: The User Provisioning screen appears. The User Provisioning screen is used to create/ modify logins, perform initial password administration, and provision a login’s Security Level.

- 2** Select the Existing User in the User ID Panel. Then select your user login from the drop down list. (Refer to [Figure A-9](#).)

Figure A-9 User Provisioning Screen

The screenshot shows a window titled "User Provisioning - DMXPR". It contains several sections for user management:

- User ID Panel:** Has two radio buttons: "New User" and "Existing User". The "Existing User" option is selected, and a dropdown menu next to it shows "LUC01".
- New User ID:** A text box with the label "Enter New User ID:".
- User Password:** Two text boxes, one labeled "Enter Password:" and another labeled "Confirm Password:".
- User Privilege:** A dropdown menu labeled "Security Level:" with "privileged" selected.
- Password Aging Period:** A section with a "Disable" radio button (which is selected) and a numeric spinner set to "7" followed by the text "Days".

At the bottom of the window are five buttons: "Add", "Modify", "Delete", "Close", and "Help".

3 Observe the Security Level in the User Privilege field.

If you are logged in as LUC01, LUC02, or LUC03; then your Security Level is "Privileged". If you are using another login, the Security Level may be different.

An alternate method to view the security level of all login IDs is to select: **Administration>Security>View User Logins**.

A detailed explanation of each User Security Level is contained in [Chapter 3, "Provisioning, Security, & Administration"](#).

4 Click the **Close** button to continue.

END OF STEPS



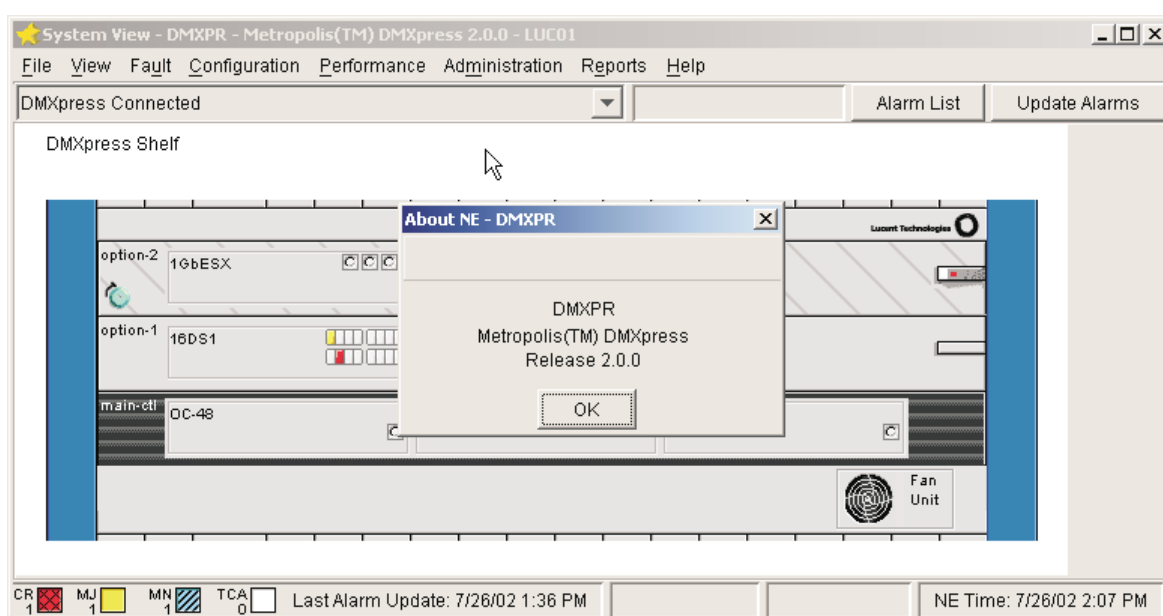
Identify the Active NE Software Releases and the Available Generics

Procedure Perform the following to identify the active NE software release and the available generics.

- 1 Select **Help>About This Network Element**.

Result: The About NE screen appears. (Refer to [Figure A-10](#).)
Your software release number may be different.

Figure A-10 System View and About NE Screen



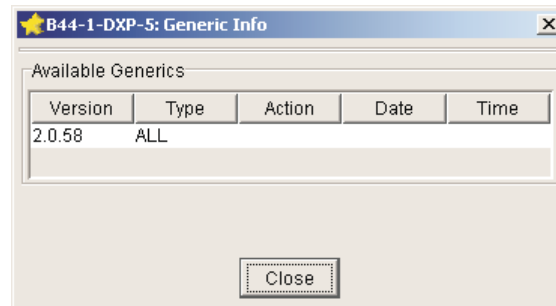
Important! The software release currently running on your network element may be different.

- 2 Determine the current NE software release and click on OK.

-
- 3** Select **View>Software Generic**.

Result: The Generic Info screen appears. (Refer to [Figure A-11](#).)
The contents of your screen may be different.

Figure A-11 Generic Info Screen



Important! The contents of your screen (for example, version, date, and time) may be different.

- 4** Observe the active software version and the available generics. Then, click on **Close**.

END OF STEPS

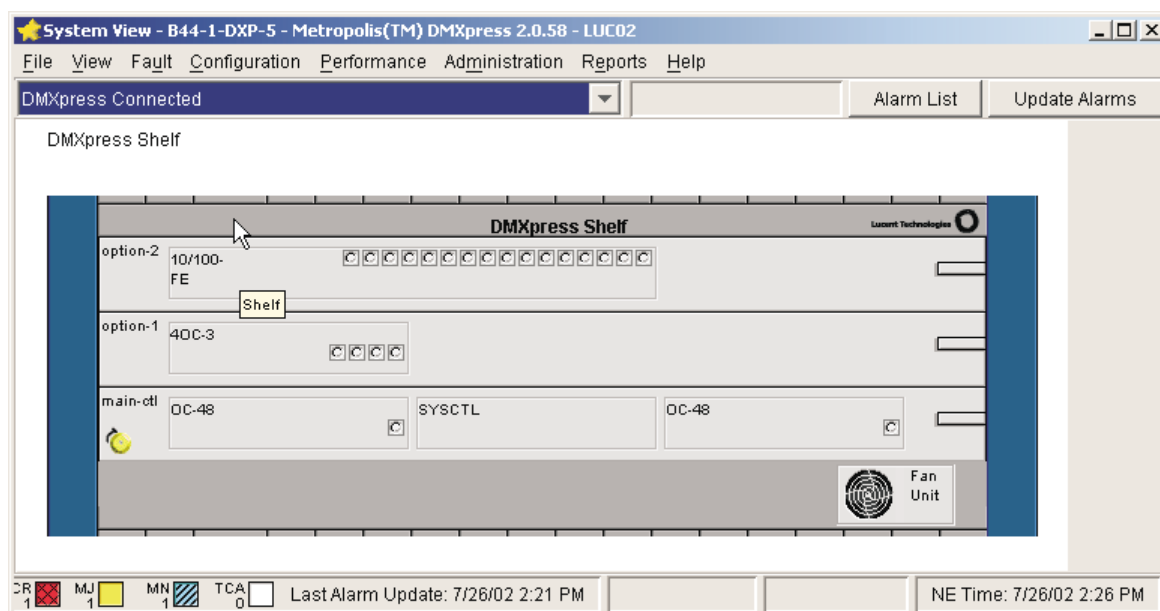


View Equipment Details

Procedure Perform the following to view shelf, circuit pack, and port equipment details.

- 1 Position the cursor on the shelf panel and observe the shelf Tool-Tip. Your screen should look similar to [Figure A-12](#).

Figure A-12 System View Screen with Shelf Tool Tip



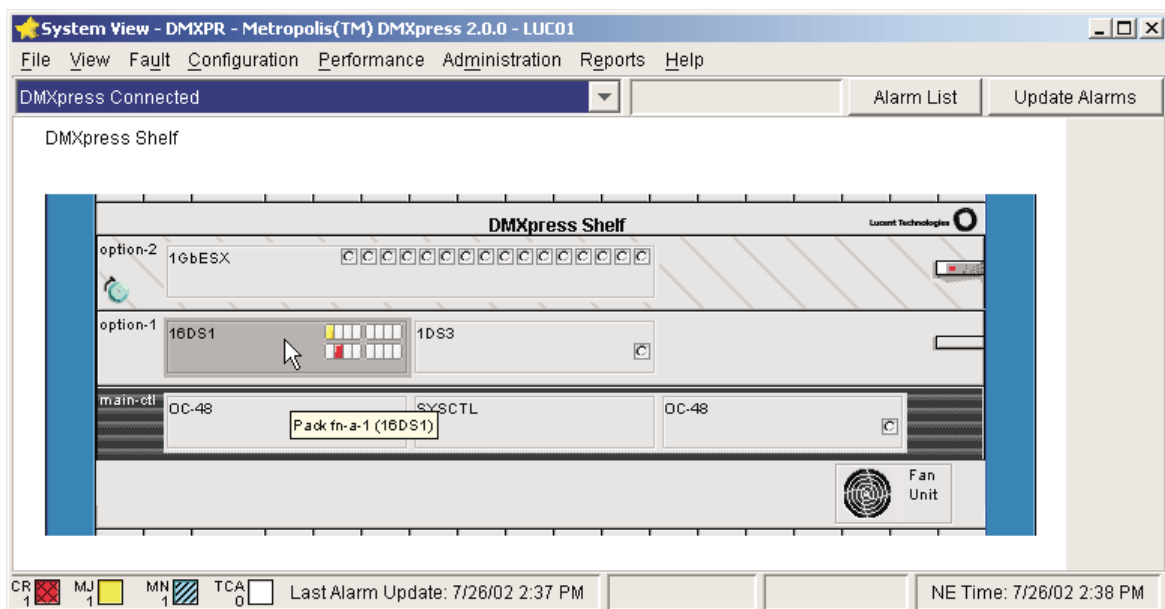
Important! Your System View screen may differ from the screens in this tutorial.

- 2 Observe the following information in the System View screen.
 - Tool Tip *Shelf* in the top left part of the screen
 - Circuit pack slot positions
 - Empty slots appear as a dark gray color
 - Equipped slots are shown with the label of the occupying circuit pack (for example in the figure, slot option-2 is equipped with a 10/100FE circuit pack).

- Physical circuit packs may consist of virtual circuit packs. For example, the OC48/1.3I2 Main circuit in slot main-ctl is shown with virtual circuit packs OC48, SYSTCL, and OC48.
- Active electrical circuit packs have an (A) on the faceplate, and standby circuit packs have an (S) on the faceplate.
- Circuit packs with transmission ports have indicators on the faceplate. The indicators report alarm conditions. DS1 port indicators are shown as rectangles. The Ethernet, DS3, and OC-n port indicators are shown as circles.
- Circuit packs with an active alarm have a color indicator on faceplate.

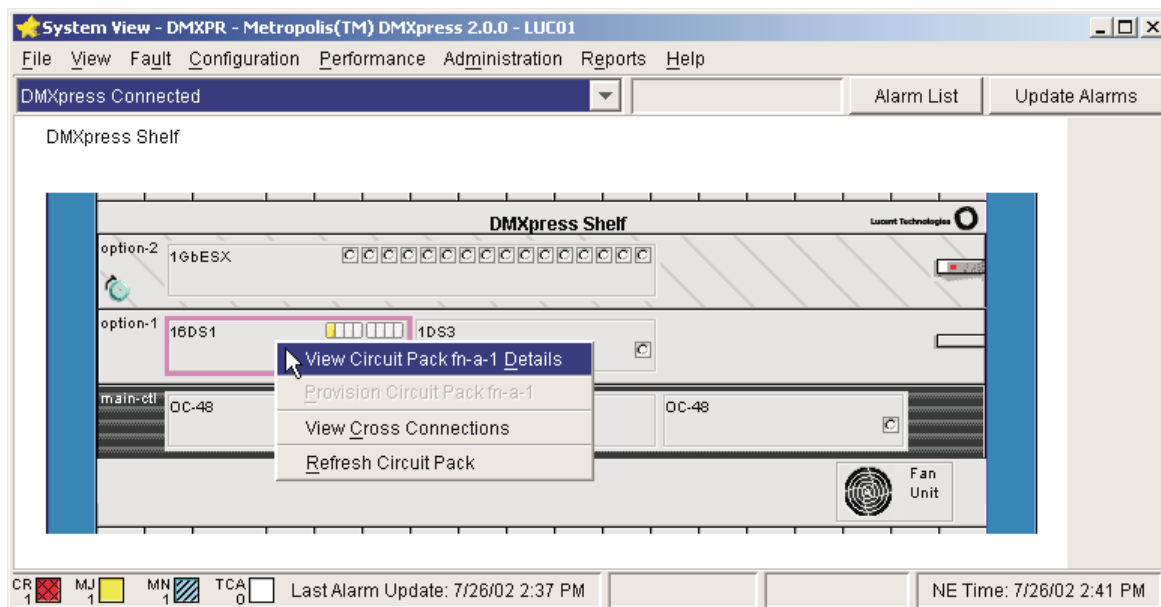
- 3 Position the cursor over a virtual circuit pack faceplate (for example, 16DS1 or 1DS3) until the tool tip appears. Your screen should look similar to [Figure A-13](#).

Figure A-13 System View Screen with Virtual Circuit Pack Tool Tip



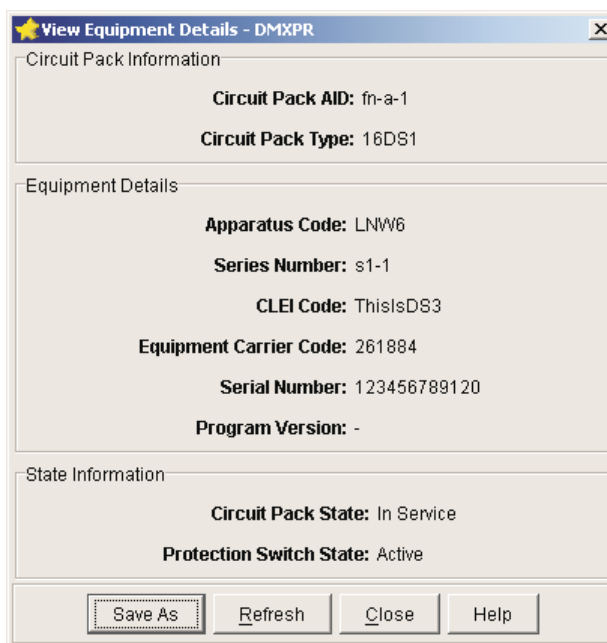
- 4 Position the cursor over a virtual circuit pack faceplate (for example, 16DS1 or 1DS3). Right-click on the circuit pack faceplate.

Result: The Circuit Pack Menu appears. Your screen should look similar to [Figure A-14](#).

Figure A-14 System View Screen and Circuit Pack Menu

- 5 Click on menu item *View Circuit Pack fn-a-1 Details*.

Result: The View Equipment Details Screen for the circuit pack appears. Your screen should be similar to [Figure A-15](#).

Figure A-15 View Equipment Details Screen for a Circuit Pack

-
- 6 Observe the View Equipment Details screen. The screen contains circuit pack information, equipment details, and state information.
-

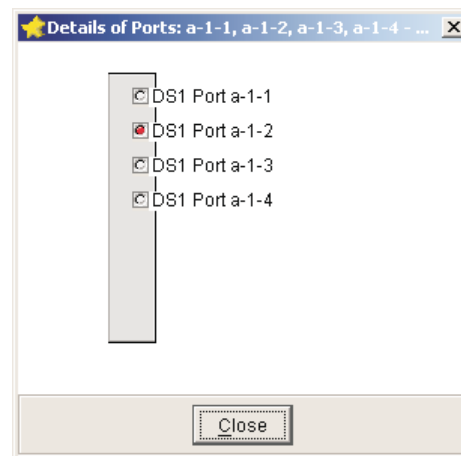
- 7 Click on **Close**.
-

Important! Circuit packs with ports have port indicators on the circuit pack faceplate. A port AID (for example, PORT 1) and alarm status is indicated by the color of the indicator (White = no alarm, Red = critical alarm, Yellow = major alarm, or Cyan = minor alarm).

- 8 Position the cursor over a port indicator on a circuit pack faceplate (for example, a DS1 port). Right-click on the circuit pack faceplate.

Result: The Detail of Ports Screen appears for DS1 ports. (Refer to [Figure A-16](#).) For DS3, OC-48, and ethernet ports, the Port Menu appears.

Figure A-16 Details of Ports Screen



- 9 Select and double-click an individual DS1 port (for example, DS1 Port a-1-1. (Or, right-click on each port in the Details of Ports screen and click on *View Port Details* in the submenu).

Result: The View Equipment Details screen for the port appears.
Your screen should look similar to [Figure A-17](#).

Figure A-17 View Equipment Details Screen for a Port

The screenshot shows a window titled "View Equipment Details - DMXPR". It contains four main sections:

- Port Information:**
 - Port AID: a-1-1
 - Port Type: DS1
- Alarms:**
 - Highest Alarm: Not Alarmed
 - Provisioned Notification Code: Minor
- Port Data/Fault:**
 - Bi-Polar Violations: Yes
 - Alarm Indication Signal: No AIS
 - Signal Degrade: -
 - Port Mode: -
 - Performance Monitoring Mode: Off
- Transmission:**
 - Signal Format: Super Frame
 - Line Code: AMI
 - Line Build Out: 20 (90, 133)

At the bottom, there is a row of buttons: "View Prev Port", "View Port 1-2" (which is highlighted with a dashed border), "Save As", "Refresh", "Close", and "Help".

- 10 Observe the View Equipment Details screen.
- 11 Click on **Close** to close the View Equipment Details screen. Then click on **Close** to close the Details of Ports screen.

Important! The View Equipment Details screen for ports can also be accessed by selecting **View>View Equipment Details** from the System View menu.

END OF STEPS



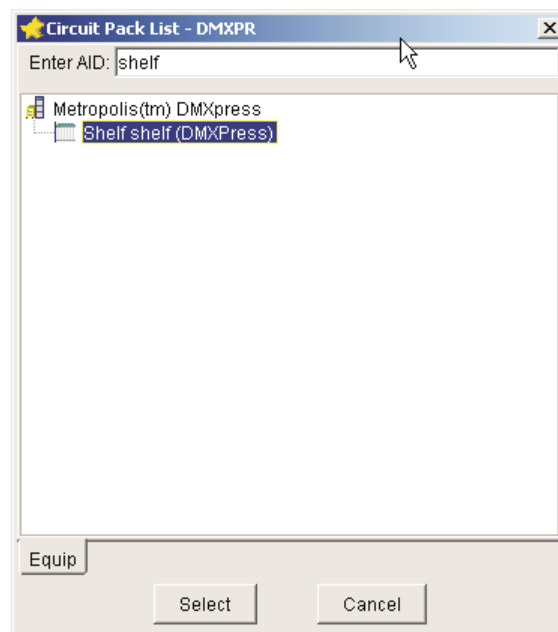
View Reports

Procedure Perform the following to become familiar with obtaining and viewing reports.

- 1 From the System View menu bar select **Reports>Equipment Lists>Pack**.

Result: The Circuit Pack List Selection screen appears. Your screen should look similar to [Figure A-18](#).

Figure A-18 Circuit Pack List Selection Screen



- 2 Highlight the shelf in the directory tree and click on **Select**.

Result: The Circuit Pack List Report appears. Your screen should look similar to [Figure A-19](#).

Figure A-19 Circuit Pack List Report

Circuit Pack Type	AID	Apparatus Code	Series Number	CLEI Code	ECI Code	Serial Number	Version
OC-48	main-1	-	-	-	-	-	-
OC-48	main-2	-	-	-	-	-	-
SYSCtl	sysctl	-	-	-	-	-	-
16DS1	fn-a-1	LNW6	s1-1	ThisIsDS3	261884	123456789120	-
1DS3	fn-b-1	LNW6	s1-1	ThisIsDS3	261884	123456789120	-
1GbESX	fn-d-1	LNW63	s1-1		261884	123456789120	-

Save As Print Close Refresh Help

NE Time: 7/26/02 2:51 PM

- 3 Observe the Circuit Pack List Report. The columns may be rearranged by selecting the column header and dragging it left or right as desired. Columns can be resized by dragging and dropping the vertical bar to the left or right of the column header. Also, you can click on a column header and reorder that column by alphabetical order.
- 4 Click on **Close**.

Important! System information is also available by selecting the *View* menu from the System View screen.

END OF STEPS



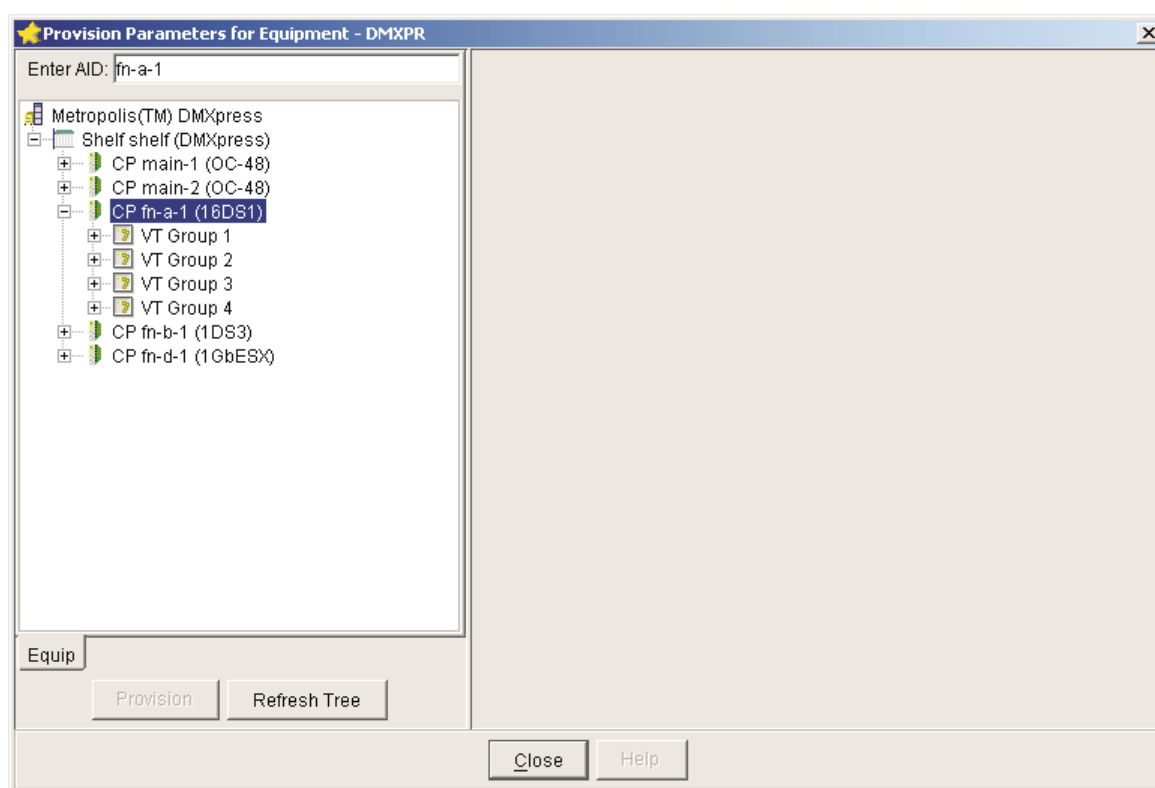
Provision Parameters

Procedure Perform the following to become familiar with accessing and provisioning parameters.

- 1 From the System View screen, highlight a group of DS1 ports (for example, a-1-1, a-1-2, a-1-3, a-1-4) and select **Configuration>Provision**.

Result: The Provision Parameter for Equipment Selection screen appears. Your screen should be similar to [Figure A-20](#).

Figure A-20 Provision Parameters for Equipment Selection Screen



- 2 Click on the (+) sign to the left of highlighted entry (VT Group 1) and click on **Port 1-1 (DS1)**. Then click on **Provision**.

Result: The Provision Parameter for Equipment screen appears. Your screen should look similar to [Figure A-21](#).

Figure A-21 Provision Parameters for Equipment Screen

Enter AID: a-1-1

Metropolis(TM) DMXpress

- Shelf shelf (DMXpress)
 - CP main-1 (OC-48)
 - CP main-2 (OC-48)
 - CP fn-a-1 (16DS1)
 - VT Group 1
 - Port 1-1 (DS1)
 - Port 1-2 (DS1)
 - Port 1-3 (DS1)
 - Port 1-4 (DS1)
 - VT Group 2
 - VT Group 3
 - VT Group 4
 - CP fn-b-1 (1DS3)
 - CP fn-d-1 (1GbESX)

Equip

Provision Refresh Tree

Port AID: a-1-1

Port Type: DS1

Transmission

Line Code: ☒ AMI ☐ B8ZS

Line Build Out: 20 (90, 133)

Fault Management

Bi-Polar Violations: ☐ No ☒ Yes

Performance Monitoring Mode: ☐ On ☒ Off

Alarm Indication Signal: ☐ AIS ☒ No AIS

Provisioned Notification Code: Minor

Signal Degrade: 10E-3

DS1 Primary State

Port Mode:

Refresh

Close Apply Help

3 Change the value of the **Alarm Indication Signal** field to AIS by clicking on the AIS radio button.

4 Click on the **Port Mode** drop down list and select *Not Monitored*.

5 Click on **Apply**.

Result: A dialog box appears asking you to confirm executing this command. Click on **Yes**.

6 Click on **Close** to close the Provision Parameter for Equipment screen.

END OF STEPS



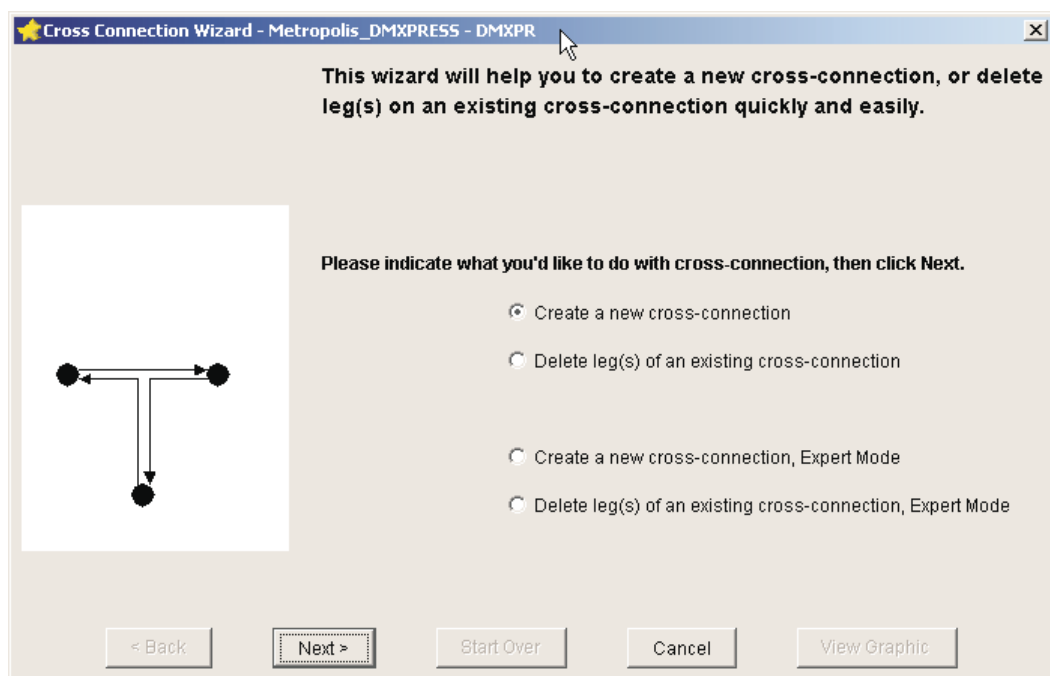
Use the Cross-Connection Wizard

Procedure Perform the following to become familiar with the cross-connection wizard:

- 1 From the System View menu select **Configuration>Cross Connection**.

Result: The Cross Connection Wizard screen appears. (Refer to [Figure A-22](#).) The Cross Connection Wizard instructs/guides you through the process of creating, modifying, or deleting a cross-connection.

Figure A-22 Cross Connection Wizard Screen



- 2 Observe the Cross Connection Wizard screen. The default is to Create a New Cross Connection. Select the desired operation and click on **Next**.
- 3 Read the instructions on each screen, verify that the correct information is selected, and proceed as required.

END OF STEPS



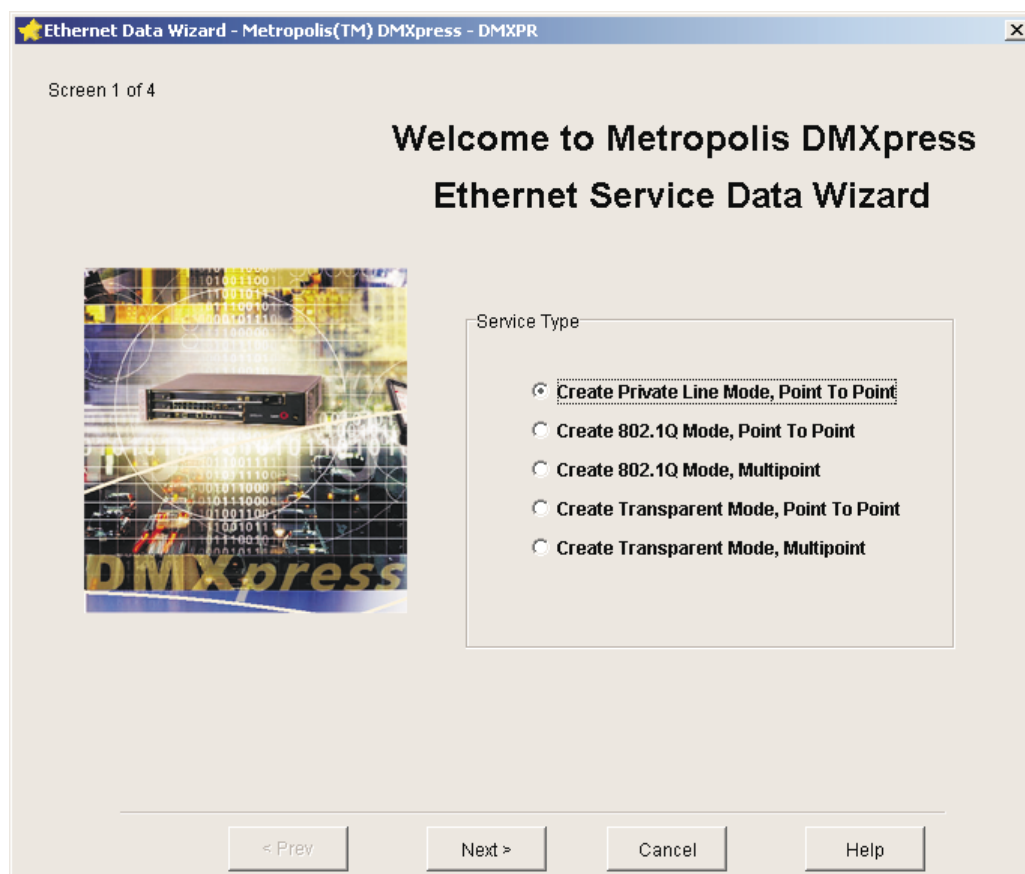
Use the Ethernet Service Data Wizard

Procedure Perform the following to become familiar with the Ethernet Service data wizard.

- 1 At the System View screen, select **Configuration>Ethernet Service....**

Result: The Ethernet Service Data wizard screen appears. (Refer to [Figure A-23](#).)

Figure A-23 Ethernet Service Data Wizard (Screen 1)



Important! The Ethernet Service Data wizard leads you through the process of creating different types of ethernet service. The wizard includes steps to establish cross-connections, a virtual switch, spanning trees, and VLANs, as required per service type.

2 Select the *Service Type* and click on **Next**.

3 Read the instructions on each screen, verify that the correct information is selected, and proceed as required per service type.

END OF STEPS



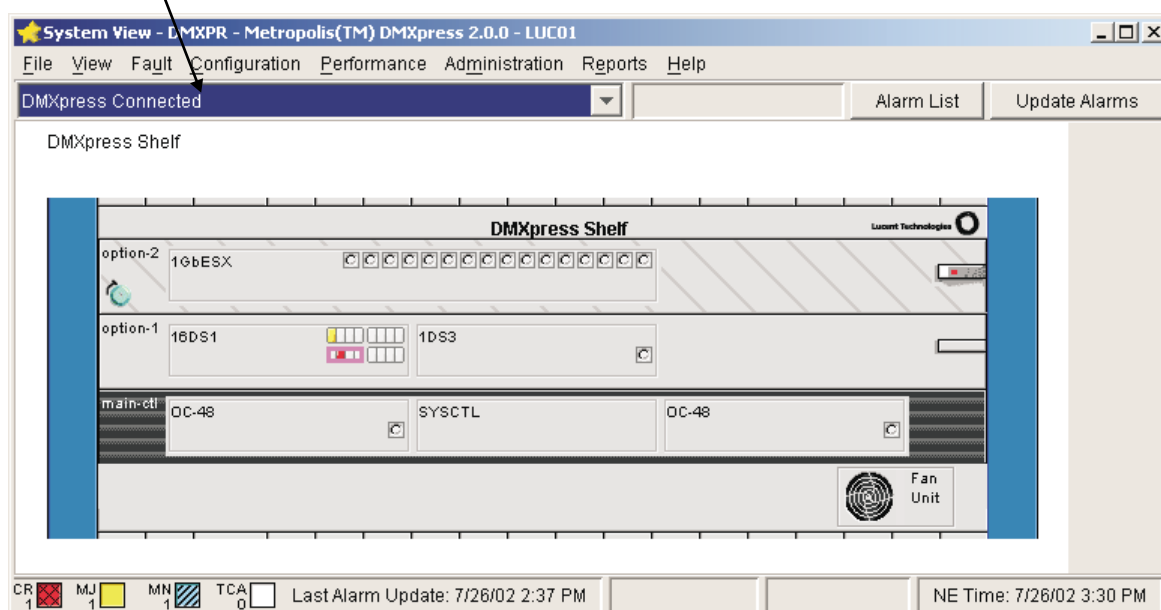
View Command List

Procedure Perform the following to become familiar with the drop down command list.

- 1 Locate the most recently executed command displayed on the command line near the top, left of the System View screen. (Refer to [Figure A-24.](#))

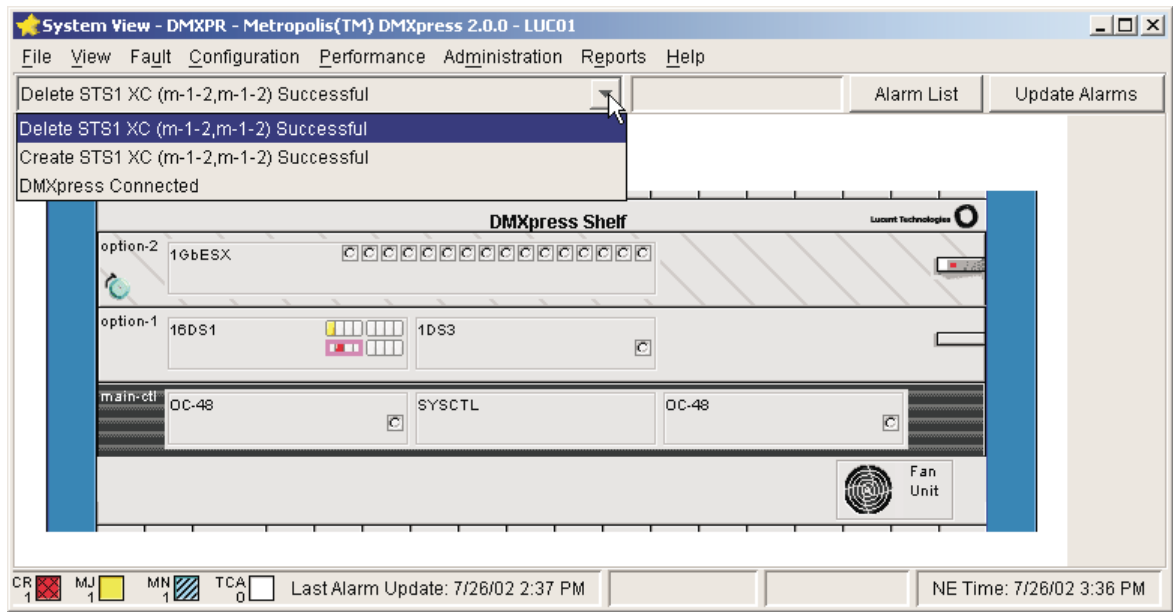
Figure A-24 System View Screen and Command List

Most Recent Command



- 2 Position your cursor on the drop-down arrow for the command line and click to display a list of the last attempted commands (successful and unsuccessful). Your screen should look similar to [Figure A-25](#).

Figure A-25 System View and Drop-Down List of NE Commands



- 3 Click on the same drop-down arrow to collapse this command list.

END OF STEPS



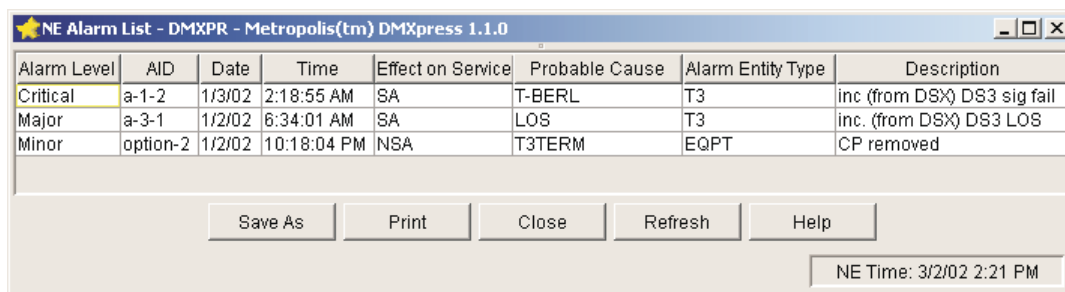
View NE Alarm List

Procedure Perform the following to view the NE alarm list.

- 1 On the upper-right part of the System View screen, click on the *Update Alarm* button. This causes the alarm list to be updated.
- 2 On the upper-right part of the System View screen, click on the *Alarm List* button.

Result: The NE Alarm List screen appears. Your screen should look similar to [Figure A-26](#). Your list of alarms and software release may differ.

Figure A-26 NE Alarm List Screen



The screenshot shows a window titled "NE Alarm List - DMXPR - Metropolis(tm) DMXpress 1.1.0". Inside the window is a table with the following data:

Alarm Level	AID	Date	Time	Effect on Service	Probable Cause	Alarm Entity Type	Description
Critical	a-1-2	1/3/02	2:18:55 AM	SA	T-BERL	T3	inc. (from DSX) DS3 sig fail
Major	a-3-1	1/2/02	6:34:01 AM	SA	LOS	T3	inc. (from DSX) DS3 LOS
Minor	option-2	1/2/02	10:18:04 PM	NSA	T3TERM	EQPT	CP removed

Below the table are five buttons: "Save As", "Print", "Close", "Refresh", and "Help". In the bottom right corner, it says "NE Time: 3/2/02 2:21 PM".

- 3 Observe the NE Alarm List screen. The NE Alarm List column headings are selectable. This permits the list to be sorted (top-to-bottom) according to the selected column heading (for example, by alarm level, effect on service, etc.). Also, the individual columns may be re-sized (expanded or contracted) and rearranged.
- 4 Select the column headers (click, hold, drag-and-drop) and change the arrangement of the NE Alarm List.
- 5 Save the NE alarm list to a file by clicking on **Save As** and specifying the file name or obtain a paper copy by clicking on **Print**.
- 6 Click on **Close** to exit the NE Alarm List.

Important! The NE Alarm List may also be obtained and filtered using the **Fault>NE Alarm List...** command.

7 Select **Fault>NE Alarm List...**

Result: The Alarm Selection Panel screen appears.

Important! The Alarm Selection Panel allows users to filter the NE Alarm List by Alarm Category, Alarm Level, Effect on Service, and Signal Level Affected.

8 Click on the Alarm Level drop down list and select Major. Then click on **OK**.

Result: The NE Alarm List appears showing any Major alarms present in the system.

9 Observe the NE Alarm List and click on **Close**. Then click on **Close** to exit the Alarm Selection Panel screen.

END OF STEPS



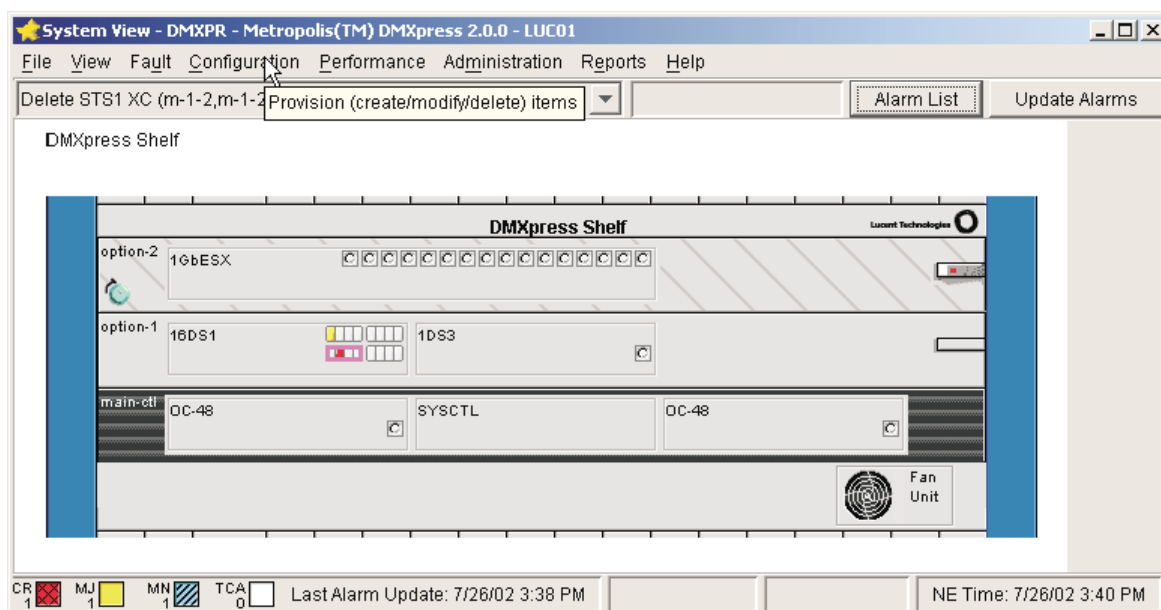
Use On-Line Help

Procedure Perform the following to become familiar with the different types of on-line help.

- 1 From the System View screen, position the cursor over *Configuration* in the Menu bar.

Result: The tool tip automatically appears for the Configuration menu item. (Refer to [Figure A-27](#).)

Figure A-27 System View Screen and Menu Tool Tip

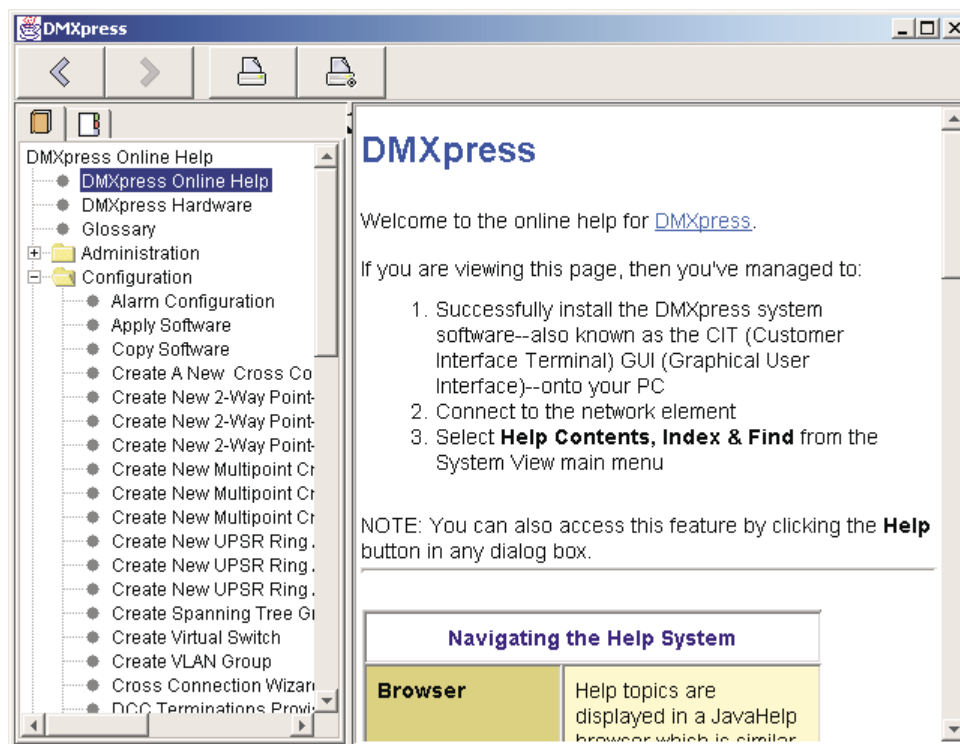


- 2 Position the cursor over the other System View Menu items and observe the tool tips.

-
- 3 From the System View screen, select **Help>Help Contents, Index & Find...** .

Result: The On-Line Help screen appears. (Your screen should appear similar to [Figure A-28](#).)

Figure A-28 On-Line Help Screen



-
- 4 Read the information about navigating the help system. Then, click on several items in the left part of the screen and observe the help information displayed in the right part of the screen.
-
- 5 From the System View menu, select **File-NE Disconnect** to disconnect from the network element.

END OF STEPS



Use TL1 Commands

Log in to network element using TL1 cut through

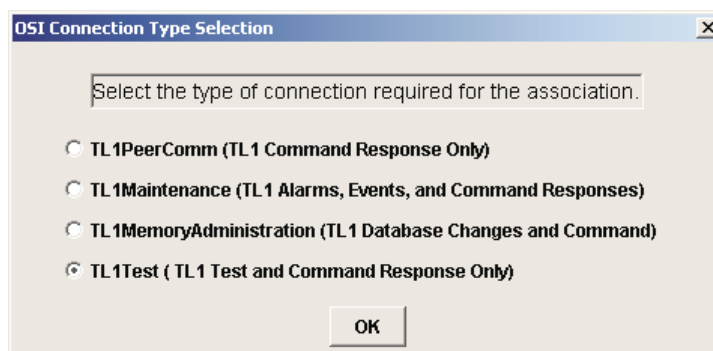
Important! As an alternative to the graphical System View screen, the WaveStar® CIT provides a TL1 Cut Through screen. The TL1 Cut Through Screen allows users to select TL1 (to Cut-Through) or the TL1 Command Builder. For more information about TL1 commands refer to 365-372-306, *Metropolis® DMXpress Access Multiplexer Command Manual*. The Cut Through view allows TL1 commands to be executed one-at-a-time or in a series/script.

Perform the following to log in to the network element TL1 Cut Through screen:

- 1 From the WaveStar® CIT screen, enter or select the desired network element information in the *NE Name:*, *NE Type:*, and *Connection Type:* fields.
- 2 Click on the TL1 button.

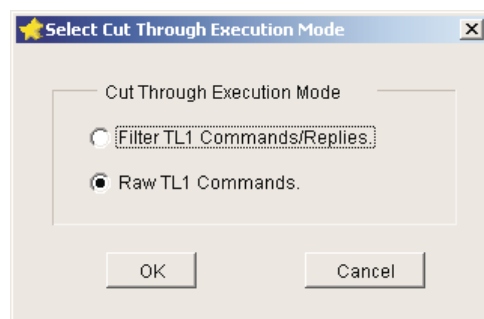
Result: The OSI Connection Type Selection screen appears. Your screen should look similar to [Figure A-29](#).

Figure A-29 OSI Connection Type Selection Screen



- 3 Select *TL1 Maintenance (TL1 Alarms, Events, and Command Responses)* and click on **OK**.

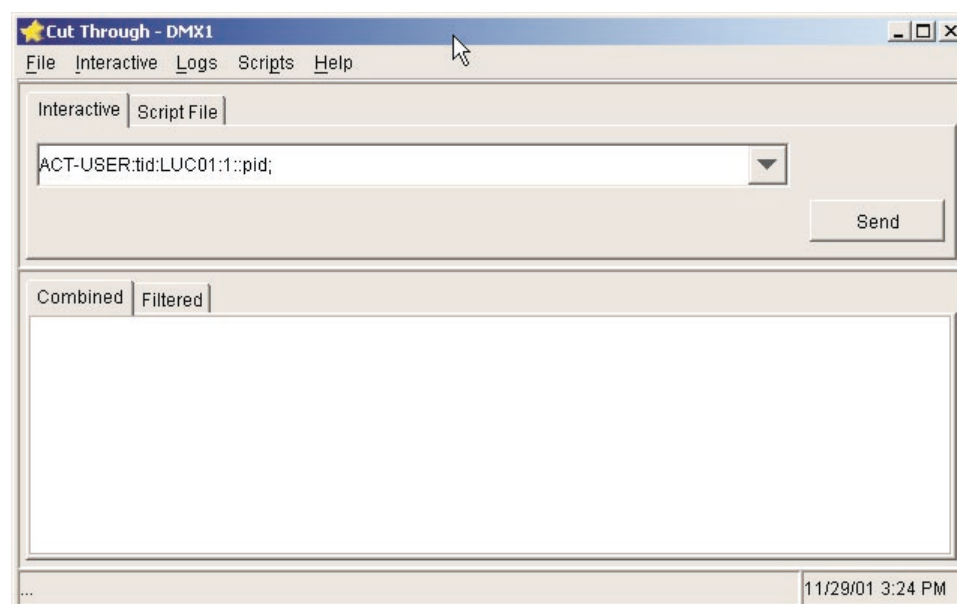
Result: A dialog box appears asking you to *please choose view type*. Click on **TL1**. The Select Cut Through Execution Mode screen appears. (Refer to [Figure A-30](#).)

Figure A-30 Select Cut Through Execution Mode Screen

Important! The *Filter TL1 Commands/Replies* Mode separates the user input commands and the NE responses. Some pre-processing (for example, syntax parsing) is performed on the user inputs. The *Raw TL1 Commands* Mode is similar to a debug mode. The exact TL1 command entered by the user is sent to the NE. Inputs and outputs are grouped together. The user command and NE response are not separated.

- 4 Select *Filter TL1 Commands/Replies* and click on **OK**.

Result: The Cut Through Screen appears. (Your screen should be similar to [Figure A-31](#).)

Figure A-31 Cut Through Screen

 END OF STEPS

Interactive – execute TL1 commands one-at-a-time

Important! The TL1 Cut Through screen and Command Builder do not provide warning messages in response to commands. There is no second opportunity to review/reconsider executing the command.

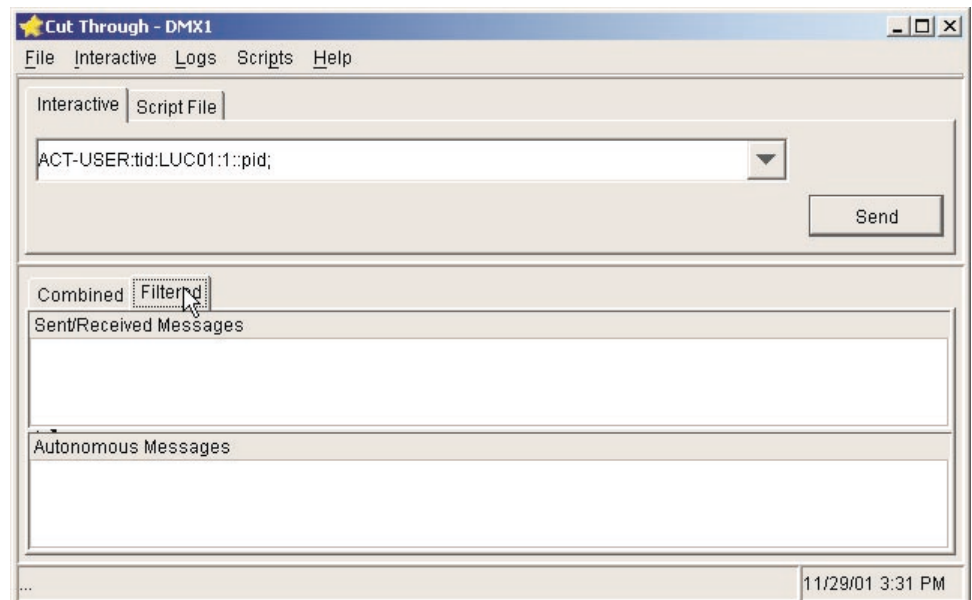
Perform the following to become familiar with the entering individual TL1 commands:

- 1 Enter the desired TL1 command on the command line or click on the drop-down arrow and select a TL1 command from the drop down list. The TL1 commands in the drop down list can be edited.

Example: Login=LUC01 wants to establish a login session to the NE that has TID = dmopr. This can be accomplished with the first TL1 command in the drop-down list. Click on the first command to select/place it on the command line and click on **Send**.

- 2 The system responses may be viewed in a combined format or a filtered format. Click on the Filtered tab. Your screen should look similar to [Figure A-32](#).

Figure A-32 Cut Through Screen Showing the Filtered Response



The *Combined* tab displays commands, in the order that they are sent, with the replies. Because of delays, a command and its reply may be separated by other commands/replies. This may occur when sending commands from a script file where the commands are separated by a small delay interval.

The *Filtered* tab separates autonomous messages from the sent commands and their replies. A sent command is not displayed until its corresponding reply is received. Demarcation banners are added to help distinguish between sent/received messages.

END OF STEPS

Interactive – manage a listbox file

Perform the following to become familiar with the TL1 list box file:

- 1 From the Cut Through screen menu bar, select **Interactive**.

- 2 Select an existing TL1 Listbox file that already exists on the PC hard drive. The text contained within the newly selected file replaces the previous text displayed in the interactive TL1 box

- 3 Edit a TL1 Listbox file by opening up the Wordpad application. The Wordpad application opens the file selected or defaults to the originally displayed TL1 list box found in the default file of [drive:]\Program Files\Lucent Technologies\WaveStar CIT\bin\tl1-listbox.txt. The user may also manually overwrite the TL1-listbox.txt file outside of the WaveStar® CIT so that it becomes the new default.

- 4 Add the last TL1 command to the TL1 Listbox and file. No NE operations are performed in this step. The last command sent from the interactive command line will be added to the interactive TL1 listbox.

END OF STEPS

Working with logs

Perform the following to become familiar with logs:

- 1 From the Cut Through screen menu bar, select **Logs>Start**.

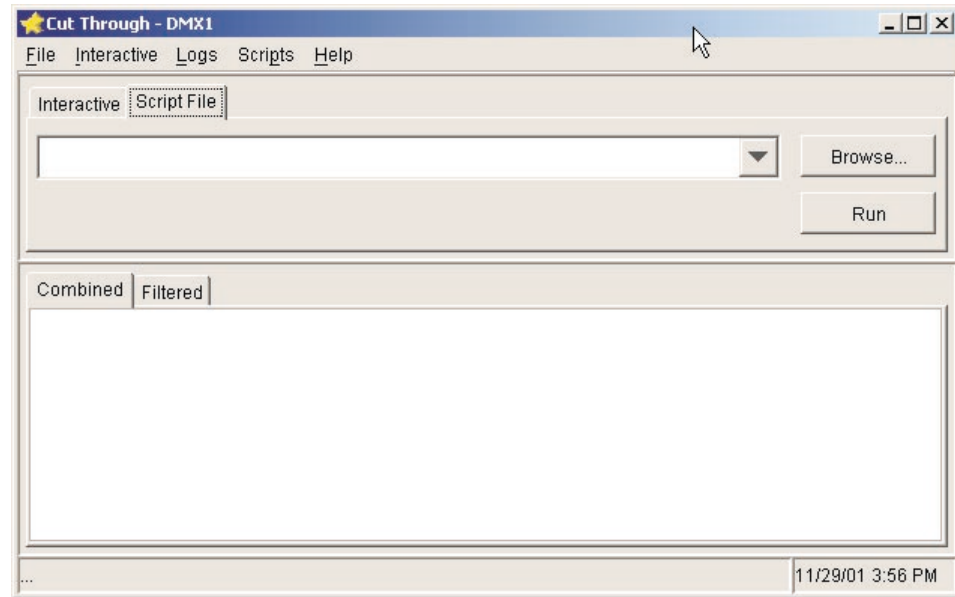
-
- 2** Enter the name for a new log file (for example, [drive:]\Program Files\Lucent Technologies\WaveStar CIT\bin\logs\new-log-file), or enter the full path name of an existing log file.
 - 3** Start the TL1 logging process by clicking on OK. All TL1 commands sent/received are logged in a filtered format.
 - 4** Once TL1 logging is started, the next time that menu bar item Logs is selected, the start menu item will toggle to stop. Select Stop to stop logging TL1 commands and close the user log file.
 - 5** From the Cut Through screen menu bar, select Logs>View. You are prompted to enter the name of an existing log file that you wish to view. The selected log file is displayed using Wordpad. You can view and/or print the log file.
 - 6** Select **Logs>Time/Date Stamp** to toggle (on/off) the time and date stamp. The time and date stamp, when on, is listed at the beginning of the command head for both the filtered view and the log file.
-

END OF STEPS

Working with script files

Perform the following to become familiar with script files.

- 1** Click on the *Script File* tab. Your screen should look similar to [Figure A-33](#).

Figure A-33 Cut Through Screen and Script File Tab

Important! A script file is an existing file that contains TL1 commands. The script file(s) exist on the PC hard disk.

- 2 Click on the **Browse** button and select an existing script. The **Browse** button is used to move up and down the directory structure to locate the script file.
- 3 Click on the **Run** button to execute the script file (selected in the previous step).

Additional information about using script files includes the following:

- A script file can contain any number lines of ASCII text.
- Any line not containing a valid command will be displayed in an Invalid TL1 message box.
- Lines beginning with forward-slash forward-slash // are ignored.
- A log file can be created (automatically) for each script file by inserting #logfile=on on any single line. This can be inserted/turned-on at anytime during the script file and can be turned on multiple times. Each time that a new #logfile=on command is

executed, the previous logfile is closed. The generated log file will have a unique name consisting of the current time/date-stamp plus the name of the current script file.

- A log file can also change the interval at which a command is sent by having #delayP00 on a single line where 5000, in this case, is 5 seconds. This delay may be increased or decreased as often as desired.
- A script file may be edited from the script menu, and a script may be stopped at any time by selecting stop from the script menu.
- When beginning to execute a script file, you are prompted once to select one of the *Pause and Prompt each command*, *Stop on deny from NE*, or *Send all commands* mode.

-
- 4** From the Cut Through screen menu bar, Select File>Exit.

Result: A dialog box appears asking you to confirm executing the command. Click on **Yes**.

-
- 5** From the WaveStar® CIT screen, select File>Exit.

Result: A dialog box appears asking you to confirm executing the command. Click on **Yes**.

END OF STEPS





Glossary

Abbreviations and Acronyms

- A**
- ABN**
Abnormal (status condition)
 - ADM**
Add/Drop Multiplexer
 - AGNE**
Alarm Gateway Network Element
 - AIS**
Alarm Indication Signal
 - AMI**
Alternate Mark Inversion
 - ANSI**
American National Standards Institute
 - APS**
Automatic Protection Switch
 - ARM**
Access Resource Manager
 - AS&C**
Alarm, Status, and Control
 - ASCII**
American Standard Code for Information Interchange
 - ASN.1**
Abstract Syntax Notation 1
 - ASNE**
Alarm Server Network Element

ATM

Asynchronous Transfer Mode

Auto

Automatic

AUXCTL

Auxiliary Control

B B3ZS

Bipolar 3-Zero Substitution

B8ZS

Bipolar 8-Zero Substitution

BDFB

Battery Distribution and Fuse Bay

BER

Bit Error Rate

BIP

Bit Interleaved Parity

C CC

Clear Channel

CCITT

International Telephone and Telegraph Consultative Committee

CEV

Controlled Environment Vault

CD-ROM

Compact Disk, Read-Only Memory

CDTU

Channel and Drop Test Unit

CIT

Craft Interface Terminal

CLF

Carrier Line Failure Status

CLK

Clock

CMISE

Common Management Information Service Element

CMOS

Complementary Metal Oxide Semiconductor

CMTS

Cable Modem Termination System

CO

Central Office

CP

Circuit Pack

CPE

Customer Premises Equipment

CR

Critical (alarm status)

CSA

Carrier Serving Area

CSU

Channel Service Unit

CS&O

Customer Support and Operations

CV

Coding Violation

CVFE

Coding Violation Far End

-
- D** **DCC**
Data Communications Channel
- DCE**
Data Communications Equipment
- DEMUX**
Demultiplexer
- DLC**
Digital Loop Carrier
- DPLL**
Digital Phase-Locked Loop
- DRI**
Dual Ring Interworking
- DS1**
Digital Signal Level 1
- DS3**
Digital Signal Level 3
- DSLAM**
Digital Subscriber Line Access Multiplexer
- DSNE**
Directory Services Network Element
- DSX**
Digital Cross-Connect Panel
- DT**
Distant Terminal
- DTE**
Data Terminating Equipment
-
- E** **EC-1**
Electrical Carrier Level 1

ECI

Equipment Catalog Item

EEPROM

Electrically-Erasable Programmable Read-Only Memory

EIA

Electronic Industries Association

EMC

Electromagnetic Compatibility

EMI

Electromagnetic Interference

EOOF

Excessive Out of Frame

EPROM

Erasable Programmable Read-Only Memory

EQ

Equipped (memory administrative state)

ES

Errored Seconds

ESD

Electrostatic Discharge

ESF

Extended Super Frame

EST

Environmental Stress Testing

F FCC

Federal Communications Commission

FDDI

Fiber Distribution Data Interface

FE

Far End

FE ACTY

Far End Activity

FEBE

Far End Block Error

FE ID

Far End Identification

FEPROM

Flash EPROM

FERF

Far End Receive Failure

FE SEL

Far End Select

FIT

Failures in 10^{-9} hours of operation.

G GbE

Gigabit Ethernet

GNE

Gateway Network Element

GR

Telcordia Technologies General Requirement

GTP

General Telemetry Processor

GTSIP

Global Technical Support Information Platform

GUI

Graphical User Interface

H **HECI**
Humans Equipment Catalog Item

I **IC**
Internal Clock

ID
Identifier

IEC
International Electrotechnology Commission

IMF
Infant Mortality Factor

INC
Incoming Status

I/O
Input/Output

IP
Internet Protocol

IR
Intermediate Reach

IS
In Service

ISCI
Intershef control Interface

ISI
Intershef Interface

ISDN
Integrated Services Digital Network

ISO
International Standards Organization

ISP

Internet Service Provider

IVHS

Intelligent Vehicle Highway System

L LAN

Local Area Network

LAPD

Link Access Procedure "D"

LBO

Line Build Out

LCN

Local Communications Network

LEC

Local Exchange Carrier

LED

Light-Emitting Diode

LOF

Loss of Frame

LOP

Loss of Pointer

LOS

Loss of Signal

LR

Long Reach

LS

Low Speed

M MD

Mediation Device

MJ

Major Alarm

MM

Multimode

MML

huMan-Machine Language

MN

Minor Alarm

MPEG

Moving Picture Experts Group

MSDT

Multi-Services Distant Terminal

MTBF

Mean Time Between Failures

MTBMA

Mean Time Between Maintenance Activities

Mult

Multipling

MUX

Multiplex

MXBIU

Multiplexer and Backplane Interface Unit

N NE

Near End

NE

Network Element

NE ACTY

Near-End Activity

NEBS

Network Equipment-Building System

nm

Nanometer (10^{-9} meters)

NMA

Network Monitoring and Analysis

NMON

Not Monitored (provisioning state)

NRZ

Nonreturn to Zero

NNI

Network-Network Interface

NSA

Not Service Affecting

NSAP

Network Services Access Point

NTF

No Trouble Found

O OAM&P

Operations, Administration, Maintenance, and Provisioning

OC-1

Optical Carrier Level 1 Signal (51.84 Mb/s)

OC-3

Optical Carrier Level 3 Signal (155 Mb/s)

OC-12

Optical Carrier Level 12 Signal (622 Mb/s)

OC-48

Optical Carrier Level 48 Signal

OLIU

Optical Line Interface Unit

OOF

Out of Frame

OOL

Out of Lock

OPS/INE

Operations System/Intelligent Network Element

OS

Operations System

OSGNE

Operations System Gateway Network Element

OSI

Open Systems Interconnection

OSMINE

Operations Systems Modifications for the Integration of Network Elements

OSP

Outside Plant

P P-bit

Performance Bit

PC

Personal Computer

PCU

Power Conversion Unit

PID

Program Identification

PINFET

Positive Intrinsic Negative Field Effect Transistor

PJC

Pointer Justification Count

PLL

Phase-Locked Loop

PM

Performance Monitoring

PMN

Power Minor Alarm

POH

Path Overhead

POP

Points of Presence

POTS

Plain Old Telephone Service

PRM

Performance Report Message

PROTN

Protection

PRS

Primary Reference Source

PSU

Power Supply Unit

PVC

Permanent Virtual Circuit

PWR

Power

R RAM

Random Access Memory

RPP

Reliability Prediction Procedure (described in Telcordia Technologies TR-NWT-00032)

RT

Remote Terminal

RTAC

Lucent Regional Technical Assistance Center (1-800-225-RTAC)

RU

Rack Unit

RZ

Return to Zero

S**SA**

Service Affecting

SCADA

Supervisory Control and Data Acquisition

SD

Signal Degrade

SEFS

Severely Errored Frame Seconds

SEO

Single-Ended Operations

SES

Severely Errored Seconds

SF

Super Frame (format for DS1 signal)

SID

System Identification

SLA

Service Level Agreements

SLIM

Subscriber Loop Interface Module

SM

Single Mode

SMC

SONET Minimum Clock

SONET

Synchronous Optical NETwork

SPE

Synchronous Payload Envelope

SQU

Sync Quality Unknown

SRD

Software Release Description

STS, STS-n

Synchronous Transport Signal

STM

Synchronous Transfer Mode

STS-1 SPE

STS-1 Synchronous Payload Envelope

STS-3c

Synchronous Transport Level 3 Concatenated Signal

STS-12c

Synchronous Transport Level 12 Concatenated Signal

SYSCTL

System Controller (circuit pack)

T T1X1 and T1M1

The ANSI committees responsible for telecommunications standards

TA

Telcordia Technologies Technical Advisory

TABS

Telemetry Asynchronous Byte Serial (Protocol)

TARP

Target ID Address Resolution Protocol

TCA

Threshold-Crossing Alert

TCP/IP

Transmission Control Protocol/Internet Protocol

TDM

Time Division Multiplexing

TID

Target Identifier

TL1

Transaction Language 1

TLB

Timing Looped Back

TOP

Task Oriented Practice

TR

Telcordia Technologies Technical Requirement

TSA

Time Slot Assignment

TSI

Time Slot Interchange

TSO

Technical Support Organization

U **UAS**
Unavailable Seconds

UNI
User Network Interface

UPD/INIT
Update/Intialize

UPSR
Unidirectional Path Switched Rings

V **VF**
Voice Frequency

VLAN
Virtual Local Area Network

VLSI
Very Large Scale Integration

VM
Violation Monitor

VMR
Violation Monitor and Removal

VoIP
Voice over Internet Protocol

VONU
Virtual Optical Network Unit

VPN
Virtual Private Network

vslot
Virtual Slot

VT
Virtual Tributary

VT1.5

Virtual Tributary 1.5 (1.728 Mb/s)

VT-G

Virtual Tributary Group

W WAN

Wide Area Network

0x1

See Ring (0x1) Low-Speed Interface.

Terms and Definitions

**Nu
me
rics****1+1**

The 1+1 protection switching architecture protects against failures of the optical transmit/receive equipment and their connecting fiber facility. One bidirectional interface (two fibers plus associated OLIUs on each end) is designated "service," and the other is designated "protection." In each direction, identical signals are transmitted on the service and protection lines ("dual-fed"). The receiving equipment monitors the incoming service and protection lines independently, and selects traffic from one line (the "active" line) based on performance criteria and technician/OS control. In 1+1 both service and protection lines could be active at the same time (service in one direction, protection in the other).

1xN, 1x1

1xN protection switching pertains to circuit pack protection that provides a redundant signal path through the DMX 2.5G Multiplexer (it does not cover protection switching of an optical facility; see "1+1"). In 1xN switching, a group of N service circuit packs share a single spare protection circuit pack. 1x1 is a special case of 1xN, with N=1. In 1x1 only one is active at a time.

A Active

Active identifies a 1+1 protected OC-N line which is currently selected by the receiver at either end as the payload carrying signal or a 1x1 or 1xN protected circuit pack that is currently carrying service. (See Standby).

AGNE - Alarm Gateway Network Element

A defined NE in an alarm group through which members of the alarm group exchange information.

AIS - Alarm Indication Signal

A code transmitted downstream in a digital network that shows that an upstream failure has been detected and alarmed.

AMI - Alternate Mark Inversion

A line code that employs a ternary signal to convey binary digits, in which successive binary ones are represented by signal elements that are normally of alternating, positive and negative polarity but equal in amplitude, and in which binary zeros are represented by signal elements that have zero amplitude.

ASCII - American Standard Code for Information Interchange

A standard 8-bit code used for exchanging information among data processing systems and associated equipment.

Auto

One possible state of a DS1 or DS3 port. In this state, the port will automatically be put "in service" if a good signal is detected coming from the DSX panel.

Automatic Protection Switch

A feature that allows another synchronization source to be automatically selected and the synchronization source provisioning to be automatically reconfigured in the event of a synchronization source failure or network synchronization change, for example, a fiber cut.

Available Time

In performance monitoring, the 1-second intervals.

B B3ZS - Bipolar 3-Zero Substitution

A line coding method that replaces a string of three zeros with a sequence of symbols having some special characteristic.

B8ZS - Bipolar 8-Zero Substitution

A line coding method that replaces a string of eight zeros with a sequence of symbols having some special characteristic.

Backbone Ring

A host ring.

BER - Bit Error Rate

The ratio of bits received in error to the total bits sent.

BIP - Bit Interleaved Parity

A method of error monitoring over a specified number of bits, that is BIP-3 or BIP-8.

BITS - Building Integrated Timing Supply

A single clock that provides all the DS1 and DS0 synchronization references required by clocks in a building.

Blocking

The state in which an ethernet port does not participate in frame relay. The forwarding process discards received frames.

Broadband

Any communications channel with greater bandwidth than a voice channel; sometimes used synonymously with wideband.

C CC - Clear Channel

A provisionable mode for the DS3 output that causes parity violations not to be monitored or corrected before the DS3 signal is encoded.

CCITT - International Telephone and Telegraph Consultative Committee

An international advisory committee under United Nations' sponsorship that has composed and recommended for adoption worldwide standards for international communications. Recently changed to the International Telecommunications Union Telecommunications Standards Sector (ITU-TSS).

Channel

A logical signal within a port. For example, for an EC-1 port, there is one STS-1 channel and sometimes 28 VT1.5 channels. See Port.

Channel State Provisioning

A feature that allows a user to suppress reporting of alarms and events during provisioning by supporting multiple states (automatic, in-service and not monitored) for VT1.5 and STS-1 channels. See Port State Provisioning.

Cost

Cost is used to help determine the efficiency of any given path. Cost is provisioned for a port (depending on speed of transmission) and calculated automatically for a path (sum of the port costs for the path).

CV - Coding Violation

A performance monitoring parameter.

CVFE - Coding Violation Far-End

An indication returned to the transmitting terminal that an errored block has been detected at the receiving terminal.

D DACS III-2000

Digital Access and Cross-Connect System that provides clear channel switching at either the DS3 or the STS-1 rates, eliminating the need for manual DSXs.

DACS IV-2000

Digital Access and Cross-Connect System that provides electronic DS3/STS-1 or DS1/VT1.5 cross-connect capability, eliminating the need for manual DSXs.

DCC - Data Communications Channel

The embedded overhead communications channel in the SONET line. It is used for end-to-end communications and maintenance. It carries alarm, control, and status information between network elements in a SONET network.

DCE - Data Communications Equipment

In a data station, the equipment that provides the signal conversion and coding between the data terminal equipment (DTE) and the line. The DCE may be separate equipment or an integral part of the DTE or of intermediate equipment. A DCE may perform other functions usually performed at the network end of the line.

DDM-2000

Lucent's current SONET multiplexers that multiplex DS1, DS3, or EC-1 inputs into EC-1, OC-1, OC-3, or OC-12 outputs.

Default Provisioning

The parameter values that are preprogrammed as shipped from the factory.

Demultiplexing

A process applied to a multiplexed signal for recovering signals combined within it and for restoring the distinct individual channels of these signals.

DEMUX - Demultiplexer

The DEMUX direction is from the fiber toward the DSX.

Digital Multiplexer

Equipment that combines time-division multiplexing several digital signals into a single composite digital signal.

Disable admin

An ethernet port that does not participate in the spanning tree. The port is disabled by management.

Disable failure

A port in this state does not participate in the spanning tree. The port is disabled due to a hardware or software failure.

DRI - Dual Ring Interworking

Two ring networks interconnected at two common nodes.

Drop and Continue

A technique that allows redundant signal appearances at two central offices in a DRI network, allowing protection against central office failures.

DS1

Digital Signal Level 1 (1.544 Mb/s)

DS1(28) Circuit Pack

The DS1(28) circuit pack interfaces to the DSX-1 panel.

DS3

Digital Signal Level 3 (44.736 Mb/s).

DSn - Digital Signal Rate n

One of the possible digital signal rates at DMX 2.5G Multiplexer interfaces: DS1 (1.544 Mb/s) or DS3 (44.736 Mb/s).

DSNE - Directory Services Network Element

A designated network element that is responsible for administering a database that maps network element names (TIDs) to addresses (NSAPs - network service access points) in an OSI subnetwork. There can be one DSNE per ring. Can also be a GNE.

DSX - Digital Cross-Connect Panel

A panel designed to interconnect to equipment that operates at a designated rate. For example, a DSX-3 interconnects equipment operating at the DS3 rate.

DTE - Data Terminating Equipment

That part of a data station that serves as a data source (originates data for transmission), a data sink (accepts transmitted data), or both.

Dual Homing

A network topology in which two OC-3 or OC-12 shelves serve as DMX 2.5G Multiplexer hosts supporting up to 16 OC-3 rings or 4 OC-12 rings. Each DMX 2.5G Multiplexer ring is interconnected between the two separate hosts.

E EC-1, EC-n - Electrical Carrier

The basic logical building block signal with a rate of 51.840 Mb/s for an EC-1 signal and a rate of n times 51.840 Mb/s for an EC-n signal. An EC-1 signal can be built in two ways: A DS1 can be mapped into a VT1.5 signal and 28 VT1.5 signals multiplexed into an EC-1 (VT1.5 based EC-1), or a DS3 can be mapped directly into an EC-1 (DS3 based EC-1).

ECI - Equipment Catalog Item

The bar code number on the faceplate of each circuit pack used by some inventory systems.

ES - Errored Seconds

A performance monitoring parameter.

ESF - Extended Super Frame

The format for a DS1 signal.

F FE - Far End

Any other network element in a maintenance subnetwork other than the one the user is at or working on.
Also called remote.

FE ACTY - Far End Activity

An LED on the SYSCTL circuit pack faceplate.

FEBE - Far End Block Error

An indication returned to the near-end transmitting node that an errored block has been detected at the far end.

FE ID - Far End Identification

The 7-segment display on the faceplate of the SYSCTL circuit pack.

FEPROM - Flash EPROM

A new technology that combines the nonvolatility of EPROM with the in-circuit reprogrammability of EEPROM (electrically-erasable PROM).

FERF - Far End Receive Failure

An indication returned to the transmitting terminal that the receiving terminal has detected an incoming section failure.

FE SEL - Far End Select

An LED on the faceplate of the SYSCTL circuit pack.

FIT

Failures in 10^{-9} hours of operation.

Filtering database

The filtering database maintains a dynamic list of paths to which packets should be routed based on the destination address. The database entries are created, updated, and removed by the learning process.

Forwarding

The state in which an ethernet port participates in frame relay.

Free Running

An operating condition of a clock in which its local oscillator is not locked to an internal synchronization

reference and is using no storage techniques to sustain its accuracy.

FT-2000

Lucent's SONET OC-48 Lightwave System.

Function Unit

Refers to any one of a number of different circuit packs that can reside in the A, B, C, or D function unit slots on the DMX 2.5G Multiplexer.

G GNE - Gateway Network Element

A network element that has an active X.25 link. Can also be a DSNE.

H Hairpin Routing

A cross-connection between function units (inter-function unit). For example, function unit C to function units A, B, or D. Also, a cross-connection within the same function unit (intra-function unit). Cross-connections go through Main, but no bandwidth or time slots are taken from the backbone ring. Eliminates need for another shelf.

Holdover

An operating condition of a network element in which its local oscillator is not locked to any synchronization reference but is using storage techniques to maintain its accuracy with respect to the last known frequency comparison with a synchronization reference.

I IC - Internal Clock

Used in synchronization messaging.

ID

See shelf ID and site ID.

IR - Intermediate Reach

A term used to describe distances of 15 to 40 km between optical transmitter and receiver without regeneration. See long reach.

IS - In Service

One possible state of a DS1, DS3, or EC-1 port. Other possible states are "auto" (automatic) and "nmon" (not monitored).

J Jitter

Timing jitter is defined as short-term variations of the significant instants of a digital signal from their ideal positions in time.

L LBO - Line Build Out

An equalizer network that guarantees the proper signal level and shape.

LED - Light Emitting Diode

Used on a circuit pack faceplate to show failure (red) or service state. It is also used to show the alarm and status condition of the system.

Line Timing

The capability to directly derive clock timing from an incoming OC-N signal while providing the user the capability to provision whether switching to an alternate OC-N from a different source (as opposed to entering holdover) will occur if the OC-N currently used as the timing reference for that NE becomes unsuitable as a reference. For example, intermediate nodes in a linear network are line timed. See Loop Timing.

Listening

The state in which an ethernet port is preparing to participate in frame relay. In the listening state, frame relay is disabled. This is an interim state between blocking and learning.

Local

See Near-End.

Locked Cross-Connection

This is a variation of the ring cross-connection that allows the user to lock the path selector to a specified rotation of the ring. Any signal received from the other rotation of the ring is ignored.

LOF - Loss of Frame

A failure to synchronize to an incoming signal.

Loop Timing

Loop timing is a special case of line timing. It applies to NEs that have only one OC-N interface. For example, terminating nodes in a linear network are loop timed. See Line Timing.

LOP - Loss of Pointer

A failure to extract good data from an STS-1 payload.

LOS - Loss of Signal

The complete absence of an incoming signal.

LR - Long Reach

A term used to describe distances of 40 km or more between optical transmitter and receiver without regeneration. See Intermediate Reach.

M Main

The two slots (M-1 and M-2) on the DMX 2.5G Multiplexer shelf in which the OC-48 OLIU circuit packs are installed.

Midspan Meet

The capability to interface between two lightwave terminals of different vendors. This applies to high-speed optical interfaces.

Multiplexing

The process of combining several distinct digital signals into a single composite digital signal.

Mult - Multipling

The cascading of signals in a bay. In the MULT mode, the DS1 external reference can be cascaded to other shelves in a bay using Mult cables. Normally starting with the bottom shelf (Number 1) and working towards the top of the bay.

N NE - Near End

The network element the user is at or working on. Also called local.

NE - Network Element

The basic building block of a telecommunications equipment within a telecommunication network that meets SONET standards. Typical internal attributes of a network element include: one or more high- and low-speed transmission ports, built-in intelligence, synchronization and timing capability, and access interfaces for use by technicians and/or operation systems. In addition, a network element may also include a time slot interchanger.

NE ACTY - Near End Activity

An LED on the faceplate of the SYSCTL circuit pack.

NMA - Network Monitoring and Analysis

An operations system designed by Telcordia Technologies which is used to monitor network facilities.

NMON - Not Monitored

A provisioning state for equipment that is not monitored or alarmed.

Node

In SONET, a node is a line terminating element.

Non-Revertive

A protection switching mode in which, after a protection switch occurs, the equipment remains in its current configuration after any failure conditions that caused a protection switch to occur clear or after any external switch commands are reset. See Revertive.

NSAP - Network Services Access Point

An address that identifies a network element. Used for maintenance subnetwork communication using the OSI protocol.

O OC, OC-n - Optical Carrier

The optical signal that results from an optical inversion of an STS signal; that is, OC-1 from STS-1 and OC-n from STS-n.

OC-1

Optical Carrier Level 1 Signal (51.844 Mb/s).

OC-3

Optical Carrier Level 3 Signal (155 Mb/s).

OC-3c (STS-3c)

Optical Carrier Level 3 Concatenated Signal. Low-speed broadband equivalent to three STS-1s linked together with a single path overhead.

OC-12

Optical Carrier Level 12 Signal (622 Mb/s).

OC-12c (STS-12c)

Optical Carrier Level 12 Concatenated Signal. High-speed broadband equivalent to twelve STS-1s linked together with a single path overhead.

OC-48

Optical Carrier Level 48 Signal.

Operations Interface

Any interface that provides information on the system performance or control. These include the equipment LEDs, SYSCTL faceplate, and office alarms.

OS - Operations System

A central computer-based system used to provide operations, administration, and maintenance functions.

OSI - Open Systems Interconnection

Referring to the OSI reference model, a logical structure for network operations standardized by the International Standards Organization (ISO).

OSGNE - Operations System Gateway Network Element

An OSGNE serves as a single interface to the OS for NEs in the same subnetwork using X.25 interfaces.

P Pass Through

Paths that are cross-connected directly across an intermediate node in a ring network.

Plesiochronous Network

A network that contains multiple maintenance subnetworks, each internally synchronous and all operating at the same nominal frequency, but whose timing may be slightly different at any particular instant. For example, in SONET networks, each timing traceable to their own Stratum 1 clock are considered plesiochronous with respect to each other.

PM - Performance Monitoring

Measures the quality of service and identifies degrading or marginally operating systems (before an alarm would be generated).

Port

The physical, electrical, or optical interface on a system. For example, DS1, DS3, EC-1, OC-3, OC-12, and OC-48. *See Channel.*

Port State Provisioning

A feature that allows a user to suppress alarm reporting and performance monitoring during provisioning by supporting multiple states (automatic, in-service, and not monitored) for low-speed ports. *See Channel State Provisioning.*

Proactive Maintenance

Refers to the process of detecting degrading conditions not severe enough to initiate protection switching or alarming, but indicative of an impending signal fail or signal degrade defect (for example, performance monitoring).

Protection Line

As defined by the SONET standard, the protection line is the pair of fibers (one transmit and one receive) that carry the SONET APS channel (K1 and K2 bytes in the SONET line overhead). On a DMX 2.5G Multiplexer, a protection line is a pair of fibers that terminate an OLIU circuit pack in the Main-2, A-2, B-2, C-2, or D-2 slots. *See Service Line.*

Product Family 2000

Lucent's line of SONET standard network products providing total network solutions.

Product Family 3000

Lucent's next generation line of network products. Also called the WaveStar™ Product Family.

R Reactive Maintenance

Refers to detecting defects/failures and clearing them.

Remote

See Far-End (FE).

Revertive

A protection switching mode in which, after a protection switch occurs, the equipment returns to the nominal configuration (that is, the service equipment is active, and the protection equipment is standby) after the clearing of any failure conditions that caused a protection switch to occur or after any external switch commands are reset. *See Non-Revertive.*

Ring

A configuration of nodes comprised of network elements connected in a circular fashion. Under normal conditions, each node is interconnected with its neighbor and includes capacity for transmission in either direction between adjacent nodes. Path switched rings use a head-end bridge and tail-end switch. Line switched rings actively reroute traffic over a protection line.

Ring (0x1) Low-Speed Interface

Formerly referred to as dual 0x1 or single 0x1. In ring applications, the DMX 2.5G Multiplexer may use a 0x1 interface, meaning both fibers carry service, as opposed to a linear (1+1) low-speed interface where one fiber is used for service and other for protection. *See 1+1.*

Root node

The node from which path cost to any other node is measured.

Root port

In a bridge, the port that connects to the root (the port on the root side of the bridge).

RPP - Reliability Prediction Procedure

Described in Telcordia Technologies TR-NWT-00032.

RT - Remote Terminal

An unstaffed equipment enclosure that may have a controlled or uncontrolled environment.

S S3-TG - Stratum 3 Timing Generator

The timing generator circuit pack, located in the OC-48 OLIU circuit pack, generates clock signals for distribution to the transmit circuits. It operates in the free-running, loop-timing, phase-lock, and holdover modes.

Self-Healing

Ring architecture in which two or more fibers are used to provide route diversity. Node failures only affect traffic dropped at the failed node.

SEO - Single-Ended Operations

The maintenance capability that provides remote access to all DMX 2.5G Multiplexer systems from a single

location over the DCC.

Service Line

On a DMX 2.5G Multiplexer system, a service (or "working") line is a pair of fibers (one transmit and one receive) that terminate on an OLIU circuit pack in the Main-1, A-1, B-1, C-1, or D-1 slots. As defined by the SONET standard, the SONET APS channel is not defined on a service line. *See Protection Line.*

SES - Severely Errored Seconds

This performance monitoring parameter is a second in which a signal fail occurs, or more than a preset amount of coding violations (dependent on the type of signal) occurs.

SF - Super Frame

The format for DS1 signals.

Shelf ID

A switch-settable parameter with values from 1 to 8. Used to log into a selected shelf in a by using the CIT.

Single 0x1 Cross-Connection

In a dual-homed application, the DMX 2.5G Multiplexer uses a single 0x1 cross-connection to map the VT1.5 channels between the DDM-2000 FiberReach, OC-3 Multiplexer, or OC-12 Multiplexer and the DMX 2.5G Multiplexer rings. This single 0x1 architecture maps low speed to high speed on a specified ring rotation. The high speed to low speed drop is made on the same specified ring with no path switching. Protection is provided at the VT1.5 end points.

Single Homing

A network topology in which a single DDM-2000 FiberReach, OC-3 Multiplexer, or OC-12 Multiplexer serves as a DMX 2.5G Multiplexer host supporting up to six OC-3 or OC-12 rings.

Site ID

A switch-settable parameter with values from 1 to 8. Displayed on the SYSCTL circuit pack to indicate to which site the faceplate alarms and LEDs apply.

Spanning Tree Group

Nodes can be provisioned to belong to a spanning tree group. Only the nodes within that group participate in the spanning tree for the group.

Standby

Standby identifies a 1+1 protected OC-N line which is not currently selected by the receiver at either end as the payload carrying signal, or 1x1 or 1xN protected circuit pack that is not currently carrying service. *See Active.*

Status

The indication of a short-term change in the system.

STS, STS-n - Synchronous Transport Signal

The basic building block signal with a rate of 51.840 Mb/s for an STS-1 signal and a rate of n times 51.840 Mb/s for an STS-n signal.

STS-1 SPE - STS-1 Synchronous Payload Envelope

A 125-microsecond frame structure composed of STS path overhead and the STS-1 payload.

STS-3c

Synchronous Transport Level 3 Concatenated Signal. *See OC-3c.*

Subnetwork

Group of SONET network elements that share a SONET data communications channel.

Synchronization Messaging

SONET synchronization messaging is used to communicate the quality of network timing, internal timing status, and timing states throughout a subnetwork.

SYSCTL - System Controller

The system controller circuit pack that provides overall administrative control of the terminal.

T T1X1 and T1M1

The ANSI committees responsible for telecommunications standards.

TCA - Threshold Crossing Alert

A condition set when a performance monitoring counter exceeds a user-selected threshold. A TCA does not generate an alarm but is available on demand through the CIT and causes a message to be sent to NMA via the X.25/TL1 interface.

TL1 - Transaction Language 1

A Telcordia Technologies machine-to-machine communications language that is a subset of ITU-TSS, formerly CCITT's, human-machine language.

U UAS - Unavailable Seconds

In performance monitoring, the count of seconds in which a signal is declared failed or, in which, 10 consecutively severely errored seconds (SES) occurred, until the time when 10 consecutive non-SES occur.

Unidirectional

A protection switching mode in which the system at each end of an optical span monitors both service and protection lines and independently chooses the best signal (unless overridden by an equipment failure or by an external request, such as a forced switch or lockout). In a system that uses unidirectional line switching, both the service and protection lines may be active simultaneously, with one line carrying traffic in one direction and other line carrying traffic in the other direction. For a 1+1 protection scheme the K1 and K2

bytes in the SONET line overhead are used to convey to the far end which line the near-end receiver has chosen, so that an "active" indication may be made at the far end.

UOC - Universal Optical Connector

Receptacles on the faceplate of some OLIUs that accept *ST*, SC, or FC connectors.

UPD/INIT

A push-button on the SYSCTL faceplate.

V VM - Violation Monitor

A mode of the DS3 circuit pack in which it will monitor but not remove P-bit parity violations on the DS3 signal from the received fiber.

VMR - Violation Monitor and Removal

A mode of the DS3 circuit pack in which it will monitor and remove P-bit parity violations on the DS3 signal received from the fiber.

VT - Virtual Tributary

A structure designed for transport and switching of a sub-DS3 payload.

VT1.5

A 1.728 Mb/s virtual tributary.

VT-G - Virtual Tributary Group

A 9-row by 12-column SONET structure (108 bytes) that carries one or more VTs of the same size. Seven VT groups (756 bytes) are byte-interleaved within the VT-organized STS-1 synchronous payload envelope

Z Zero Code Suppression

A technique used to reduce the number of consecutive zeros in a line-codes signal (B3ZS for DS3 signals and B8ZS for DS1 signals).



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