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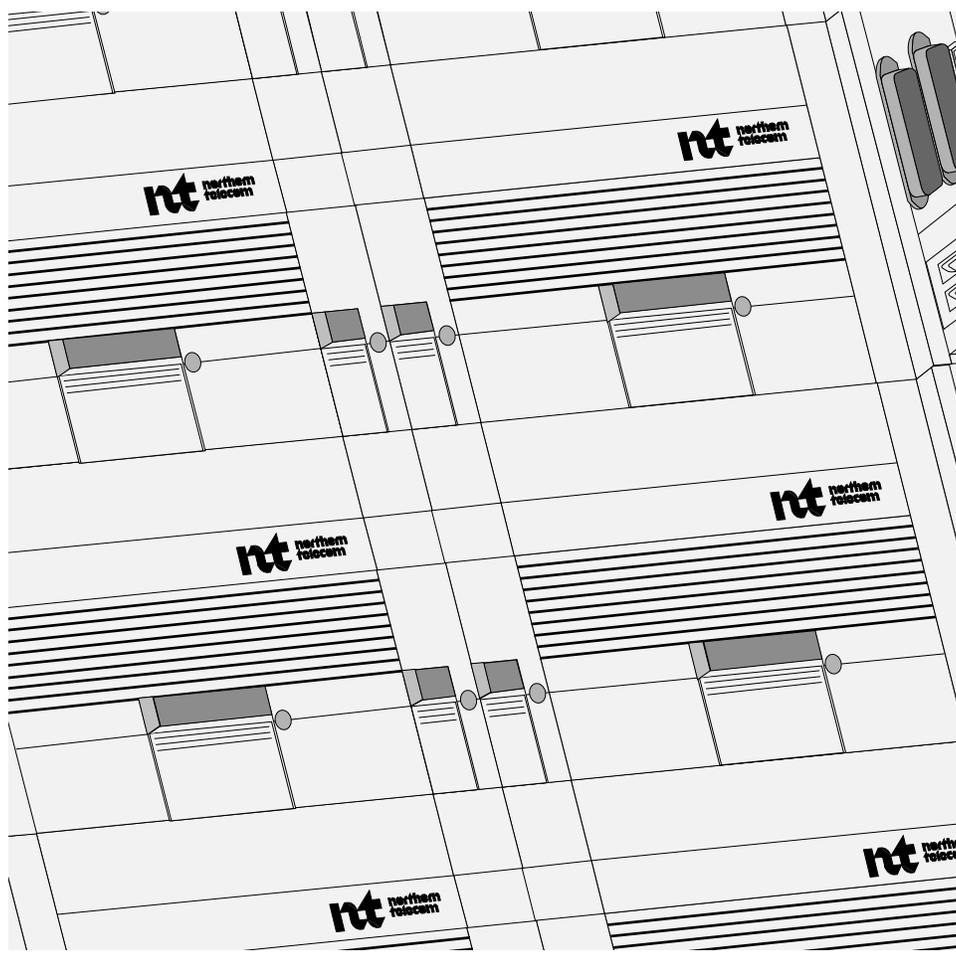
323-3001-324

SONET Products

# AccessNode

## System Expansion Procedures

Issue 2.0 October 1999





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SONET Products

# **AccessNode**

## System Expansion Procedures

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# Publication history

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**October 1999**

Standard release for AN17.2. The task to convert a system to a VTBM ring was deleted from Table 1-7.

**June 1999**

Standard release for AN17. For this release, references to Universal Edge 9000 (UE900) documentation were added to chapter 1.

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AN16 Issue 1.0 of the document. Removed all references to FST, including chapter 10, "Equipping and Testing DLE shelves."

**June 1998**

AN15 Standard 01.01 release of this document.

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AN14 Standard 01.01 release of this document. Added STS-1 tributaries information.

**April 1997**

AN12.21 Standard 01.01 release of the document. For this release, the following information has been added:

- COMM facility changes to Chapter 13
- synchronization updates to Chapter 14

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**November 1995**

Standard AN11 release of the document. This document was changed from NTP 323-2001-224 in Volume 3 to NTP 323-2001-324 in Volume 4.

**May 1995**

Update to Standard AN10 release of the document. Repair policy information on pages 2-5 and 2-6 has been updated, and step 5 on page 10-5 is improved.

**April 1995**

Standard AN10 release of the document. The main changes include:

- new and revised procedures accommodating DS1-fed AccessNode (DFA) and single-ended AccessNode configurations
- the distributed task navigation structure is changed so that the document task list is the single point of reference for main task and subtask navigation. The chapter task lists are replaced with chapter procedure lists.

**March 1995**

Update to Standard AN08 release of the document. Revisions have been made to chapters 3, 4, 7, and 11, the table of contents, and the index.

**February 1995**

Update to Standard AN08 release of the document. Revisions have been made to chapter 10.

**December 1994**

Standard AN08 release of the document. Changes include the addition of DS1 provisioning for TR-08 systems in Chapter 3. A procedure to upgrade from OC-3 to OC-12 has been added in Chapter 11.

**November 1994**

Standard AN07 release of the document with various improvements, including but not limited to the following:

- addition of the procedure for adding a backup OPC
- addition to Procedure 7-2 the steps for changing the ABM BIP breaker alarm contacts to normally closed from the normally open position

**April 1994**

Standard AN07 release of the document.

**May 1993**

Standard FWP06 release of the document.

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# About this document

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This document contains the installation and test procedures for adding new equipment (such as DS1 equipment and facilities or copper-distribution shelves [CDS]) to an existing in-service AccessNode system.

Procedures in this document apply to both access bandwidth manager (ABM) shelves and transport bandwidth manager (TBM) shelves unless the procedure title or introductory paragraph indicates otherwise.

For procedures to install and test new line cards, see *Line Card Testing Procedures*, 323-3001-316, in *Operations, Administration, and Provisioning*, Volume 4B.

## Audience

This document is for maintenance technicians and experienced installers from Nortel Networks or a telephone operating company.

## How to use this document

To determine which procedures you need, start with the “System expansion task list” on page 1-5. This task list shows the tasks you need for system expansion.

The document task lists point you to the correct procedure and page number for each task that you need for system expansion. By following the system expansion task list and the document task lists in Chapter 1, you perform only those tasks needed for your specific system.

## Warnings and safety precautions

This section presents samples of the danger and caution warnings for proper handling and operation of equipment.

To avoid injury, follow all danger warnings provided with this product, as well as safety procedures established by your company.

To avoid damage to equipment or service interruptions, follow all caution warnings provided with this product, as well as procedures established by your company.

Samples of danger and caution warnings follow.

|   |   |
|---|---|
|  | <p><b>DANGER</b><br/><b>Risk of personal injury</b><br/>A danger warning informs the reader of a risk of personal injury.</p> |
|---|---|

|  |   |
|--|---|
|  | <p><b>CAUTION</b><br/><b>Risk of service interruption or equipment damage</b><br/>A caution warning informs the reader of a risk of service interruption or equipment damage.</p> |
|--|---|

|   |  |
|---|--|
|  | <p><b>DANGER</b><br/><b>Risk of electric shock</b><br/>This warning advises you of a possible electrical hazard. When you see this warning, proceed with care, to avoid personal injury.</p> |
|---|--|

## Operations controller and network element user interface command conventions

For information about user interface commands, see the *Network Element User Interface Description*, 323-3001-300, or the *OPC User Interface Description*, 323-3001-301, in *Operations, Administration, and Provisioning*, Volume 4A.

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## References in this document

This document references the following documents:

### **Engineering, Configuration, and Ordering Guide, Volume 1**

- *Engineering and Ordering Procedures*, 323-3001-032
- *Line Card Application and Special Services Engineering*, 323-3001-155

### **Commissioning and Testing, Volume 3**

### **Operations, Administration, and Provisioning, Volume 4**

- *Network Element User Interface Description*, 323-3001-300
- *OPC User Interface Description*, 323-3001-301
- *System Administration Procedures*, 323-3001-302
- *Data Administration Procedures*, 323-3001-304
- *Provisioning and Operations Procedures*, 323-3001-310
- *Line Card Provisioning Procedures*, 323-3001-315
- *Line Card Testing Procedures*, 323-3001-316

### **Maintenance, Volume 5**

- *Network Surveillance Procedures*, 323-3001-510
- *Alarm and Trouble Clearing Procedures*, 323-3001-543
- *Module Replacement Procedures*, 323-3001-547

### **Installation NTPs**

- *Bay in Central Office Installation Manual—ABM*, 323-3001-201
- *Bay in Central Office Installation Manual—TBM*, 323-3001-202
- *Modular Business Package Installation Manual*, 323-3001-206
- *Series 800A Outside Plant Cabinet Installation Manual*, 323-3001-210
- *MBP VTBM Ring Installation Guide*

### **DMS SuperNode documentation**

- *SMA Translations Guide*, 297-2741-350 (BCS36)
- *XPM Translations Reference Manual*, 297-8321-815 (NA002)



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# Overview of system expansion

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This chapter contains information you must understand before you start system expansion.

## Chapter contents

This chapter includes the following topics:

| Topic  | See       |
|--|-----------|
| Equipment cautions and warnings                                  | page 1-2  |
| Equipment warning label  | page 1-4  |
| System expansion task list                                       | page 1-5  |
| • DS1 tasks  | page 1-6  |
| • DS3 tasks  | page 1-9  |
| • STS-1 tasks  | page 1-10 |
| • DS1/DS3/STS-1/OC-3 conversion tasks                            | page 1-11 |
| • Shelf, bay, and cabinet tasks                                  | page 1-14 |
| • VTBM upgrade tasks   | page 1-16 |
| • ESI card tasks   | page 1-17 |
| • DFA tasks  | page 1-18 |
| System configurations  | page 1-19 |
| Introduction to shelves, circuits, and topologies                | page 1-23 |
| Test equipment   | page 1-26 |
| Group and slot associations for DS1, DS3, STS-1, OC-3, and OC-12 | page 1-27 |
| Clearing alarms  | page 1-31 |

## Equipment cautions and warnings

This section contains warnings and precautions for personal safety and for proper handling and operation of equipment.

### Static electricity

Static electrical charges build up on your body if you walk a short distance. This buildup of static electricity can damage some circuit packs if it is not properly discharged first. Circuit packs that are sensitive to damage by static electricity should be packaged in antistatic material. The following precautions are recommended.

### Handling circuit packs

Units that are sensitive to static electricity have the following label on their antistatic shipping bags:



To avoid damage when handling circuit packs, follow these rules:

- Do not remove circuit packs from their antistatic packages unless you are using antistatic protection, such as an antistatic wrist strap. The wrist strap is attached to a long cord, which must terminate at a good ground source so that static buildup is discharged harmlessly. Alternative antistatic methods include conductive carpet, conductive shoes, and heel grounders. Use the equipment recommended by your company.
- Handle each circuit pack by the faceplate or stiffener. Do not touch electrical connections, pins, or soldered surfaces.
- Protect optical connectors by covering them with clean dust caps.

### Storing and transporting circuit packs

To safely store and transport circuit packs, follow these rules:

- Place circuit packs in their antistatic material and shipping package before you transport, stack, or store them. Be careful not to damage any parts when you insert a circuit pack into its packaging.

**Note:** Proper packaging is especially important for heavier dual-card units like the integrated remote test unit (IRTU). Proper packaging avoids physical damage and the accumulation of dirt or dust on goldplated contacts.

- Avoid storage in areas where the relative humidity can exceed 95% or where the temperature can exceed 70° C. Excessive heat or humidity might warp or corrode the boards.

### Laser radiation

AccessNode equipment and associated optical test sets use laser sources that emit light energy into fiber cables. This energy is within the red (visible) and infrared (invisible) regions of the electromagnetic spectrum.

Laser products are subject to federal and state or provincial regulations and local practices. Regulation 21 CFR 1040 of the U.S. Bureau of Radiological Health requires manufacturers to certify each laser product as Class I, II, III, or IV, depending on the characteristics of the emitted laser radiation. In terms of health and safety, Class I products present the least hazard (none at all), while Class IV products present the greatest hazard.



#### **DANGER**

##### **Risk of eye damage**

When you handle optical fibers, follow the safety procedures recommended by your company at all times.

Read and follow the precautions below to decrease the risk of exposure to laser radiation.

Although Nortel Networks optical products have a Class I certification, hazardous exposure to laser radiation could occur when fibers that interconnect system components are disconnected or broken. Certain testing procedures require the handling of optical fibers without dust caps and, therefore, increase the risk of exposure. Exposure to either visible or invisible laser light can cause eye damage under certain conditions.

The caution label at right is on the optical interface card, near the optical connector, and should be observed.

#### **Caution**

Avoid direct exposure to beam. Invisible light can blind. Keep all optical connectors capped.

### Handling optical fibers

During service, maintenance, repair, or removal of cables or equipment, follow these rules:

- Avoid direct exposure to fiber ends or optical connector ends where the laser signal can be accessed.
- Follow the manufacturer's instructions when using an optical test set. Incorrect calibration or control settings could result in hazardous levels of radiation.

### **Splicing optical fibers**

When you splice fiber cable, you might have to use an eye loupe (a small magnifier) to look at the fibers. Take the following precautions:

- Before you start, turn off the power to all laser sources to the fibers and make sure the power remains off. Do this whether the power source is at the central office, a subscriber's premises, or a remote location.
- Before you start, disconnect any optical test sets from the fibers. Do this whether the optical test sets are locally connected or remotely connected.
- Use only the optical instruments approved by your company.

### **Repairing optical fibers**

If the fiber feeder cable breaks, take the following steps:

- Notify both central-office personnel and field-repair personnel of the problem.
- Identify to central-office personnel which fibers are damaged.
- Power off all laser sources related to the damaged fibers. Do this whether the power source is at the central office, a subscriber's premises, or a remote location.

### **Equipment warning label**

The following warning label is in the top left corner of the back cover of the equipment.

To be installed only in restricted access areas (dedicated equipment rooms, equipment closets, or the like) in accordance with articles 110-16, 110-17, and 110-18 of the National Electrical Code, ANSI/NFPA No. 70.

## System expansion task list

Table 1-2 through Table 1-9 are the task lists for expanding an AccessNode system. Refer to Table 1-1 to determine which task list to use.

**Table 1-1**  
**Task types**

| If you are performing               | Then use this task list |
|-------------------------------------|-------------------------|
| DS1 tasks                           | Table 1-2 on page 1-6   |
| DS3 tasks                           | Table 1-3 on page 1-9   |
| STS-1 tasks                         | Table 1-4 on page 1-10  |
| DS1/DS3/STS-1/OC-3 conversion tasks | Table 1-5 on page 1-11  |
| Shelf, bay, and cabinet tasks       | Table 1-6 on page 1-14  |
| VTBM upgrade tasks                  | Table 1-7 on page 1-16  |
| ESI card tasks                      | Table 1-8 on page 1-17  |
| DFA tasks                           | Table 1-9 on page 1-18  |

Before adding mappers to your system, plan your mapper layouts using *Mapper Layouts Planning Guide*, 323-3001-154, in the *Engineering, Configuration, and Ordering Guide*, Volume 1.

To complete a task, perform the procedures in the sequence given in the document task list. If the procedure is not in this document, then a reference is made to the appropriate AccessNode document or to other manufacturers' documentation.

If you cannot successfully complete these procedures, contact your next level of support.

For proper electromagnetic interference (EMI) protection, you must replace the shelf cover after you complete your task. See the appropriate cabinet document for details.

**Note:** When preprovisioning STS and VT connections, log your connection data onto the Mapper Layout Worksheet from the *Mapper Layouts Planning Guide*, 323-3001-154, in the *Engineering, Configuration, and Ordering Guide*, Volume 1. The preprovisioning choices do not show up on the operations controller (OPC) screens until you equip the circuit.

**Table 1-2  
DS1 tasks**

| <b>If you want to perform this task</b>  | <b>Then perform these procedures</b>   | <b>Found on</b> |
|--|--|-----------------|
| Add a DS1/VT sync mapper to an in-service point-to-point or virtual tributary bandwidth manager (VTBM) ring system | Planning the mapper layouts  | 323-3001-154    |
|  | Procedure 2-6  | page 2-28       |
|  | Transferring an existing OPC to another shelf (if it occupies the required slot) |                 |
|  | Adding or changing STS or VT connections, if required                            | 323-3001-310    |
|  | Procedure 2-1  | page 2-2        |
|  | Verifying DS1 transmission test set performance                                  |                 |
|  | Procedure 2-2  | page 2-4        |
|  | Adding DS1 equipment   |                 |
|  | Adding a circuit pack group  | 323-3001-310    |
|  | Adding a facility  | 323-3001-310    |
| Add a DS1/VT sync mapper to an in-service DS1-fed system   | Provisioning DS1 facility parameters   | 323-3001-310    |
|  | Depending on the DS1 type, perform:  |                 |
|  | Procedure 2-4  | page 2-16       |
|  | Testing continuity on a new DS1/VT mapper for transport DS1s                     |                 |
|  | or   |                 |
|  | Procedure 2-5  | page 2-22       |
|  | Testing continuity on a new DS1/VT mapper for GR-303 DMS or tandem DS1s          |                 |
|  | Deleting a facility (for any unused DS1 facilities)                              | 323-3001-310    |
|  | Manually testing the protection groups on a shelf                                | 323-3001-311    |
|  |  |                 |
| Procedure 2-1  | Verifying DS1 transmission test set performance                                  | page 2-2        |
| Procedure 2-2  | Adding DS1 equipment   | page 2-4        |
| Adding a circuit pack group  |  | 323-3001-310    |
| Adding a facility  |  | 323-3001-310    |
| Provisioning DS1 facility parameters   |  | 323-3001-310    |
| Procedure 2-7  | Testing DS1 facilities on a DS1-fed system                                       | page 2-35       |
| Deleting a facility (for any unused DS1 facilities)  |  | 323-3001-310    |
| Manually testing the protection groups on a shelf  |  | 323-3001-311    |
| —continued—  |  |                 |

**Table 1-2  
DS1 tasks (continued)**

| If you want to perform this task   | Then perform these procedures  | Found on  |
|--|--|---|
| Add a DS1/VT protection mapper   | Planning the mapper layouts  | 323-3001-154  |
|  | Adding a circuit pack group  | 323-3001-310  |
|  | Manually testing the protection groups on a shelf  | 323-3001-311  |
| Add a DS1/VT sync mapper for transport DS1s in a single-ended AccessNode system        | Planning the mapper layouts  | 323-3001-154  |
|  | Adding or changing STS or VT connections, if required  | 323-3001-310 or TransportNode documentation         |
|  | Procedure 2-1<br>Verifying DS1 transmission test set performance   | page 2-2  |
|  | Procedure 2-2<br>Adding DS1 equipment  | page 2-4  |
|  | Adding a circuit pack group  | 323-3001-310  |
|  | Adding a facility  | 323-3001-310  |
|  | Provisioning DS1 facility parameters   | 323-3001-310  |
|  | Adding and provisioning DS1 equipment on the switching and transport equipment   | DMS SuperNode and OC-12 TransportNode documentation |
|  | Procedure 2-4<br>Testing continuity on a new DS1/VT mapper for transport DS1s  | page 2-16   |
|  | Deleting a facility (for any unused DS1 facilities)  | 323-3001-310  |
| Manually testing the protection groups on a shelf                                      | 323-3001-311   |   |
| Add a DS1 facility for DS1 tandem, TR-303 CSC, or TR-08 to an in-service DS1/VT mapper | <b>Note:</b> Before adding the first TR-08 DS-1 facility, ensure that the RFT ABM shelf is equipped with the NT4K56AC or NT4K56CA transport interface card and the NT7E04CA DS1/VT sync mapper (for primary and protection). |   |
|  | Adding a circuit pack group  | 323-3001-310  |
|  | Adding a facility  | 323-3001-310  |
|  | Provisioning DS1 facility parameters   | 323-3001-310  |
| —continued—  |  |   |

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**Table 1-2  
DS1 tasks (continued)**

| If you want to perform this task  | Then perform these procedures  | Found on                         |
|---|--|----------------------------------|
| Add a transport DS1 facility to an in-service DS1/VT mapper in a point-to-point or single-ended AccessNode system | Procedure 2-1<br>Verifying DS1 transmission test set performance   | page 2-2                         |
|   | Adding a circuit pack group  | 323-3001-310                     |
|   | Adding a facility  | 323-3001-310                     |
|   | Provisioning DS1 facility parameters   | 323-3001-310                     |
|   | Procedure 2-3<br>Testing a new DS1 transport facility on an in-service DS1/VT mapper   | page 2-9                         |
| Add a TR-08 system to an in-service AccessNode  | Replacing the transport interface card (TIC) if the NT4K56AC or NT4K56CA is not installed  | 323-3001-547                     |
|   | Adding or replacing the DS1/VT mapper (if the NT7E04CA is not already installed for the primary and the protection slots):<br><ul style="list-style-type: none"><li>• to add a mapper, locate the task on the previous two pages called “Add a DS1/VT sync mapper” that applies to your configuration and perform its procedures</li><li>• to replace an existing mapper card of earlier vintage</li></ul> | page 1-6 and 1-7<br>323-3001-547 |
|   | Assigning the DS1 span(s) for TR-08  | 323-3001-310                     |
|   | Adding a circuit pack group  | 323-3001-310                     |
|   | Adding a facility  | 323-3001-310                     |
|   | Provisioning DS1 facility assignments  | 323-3001-245                     |
|   | Provisioning DS1 facility parameters   | 323-3001-310                     |
|   | Testing the DS1 span(s) to the switching equipment   | Switching documentation          |
|   | Procedure 9-1<br>Installing common-equipment circuit packs in a copper-distribution shelf  | page 9-7                         |
|   | Procedure 9-2<br>Testing a copper-distribution shelf   | page 9-12                        |
|   | Procedure 9-3<br>Diagnosing failed NLIC circuit packs  | page 9-23                        |
|   | Provisioning new line card services  | 323-3001-315                     |
|   | Adding line cards  | 323-3001-316                     |
|   | Testing new line card services   | Switching documentation          |
| —end—   |  |                                  |

**Table 1-3**  
**DS3 tasks**

| If you want to perform this task                   | Then perform these procedures  | Found on     |
|--|--|--------------|
| Add a DS3/STS mapper to an in-service system       | <b>Note:</b> The Series 800A outside plant cabinet does not support DS3 equipment in this release. |              |
|  | Planning the mapper layouts  | 323-3001-154 |
|  | Adding or changing STS connections, if required  | 323-3001-310 |
|  | Procedure 2-6<br>Transferring an existing OPC to another shelf (if it occupies the required slots) | page 2-28    |
|  | Procedure 3-1<br>Adding DS3 equipment to an existing system  | page 3-2     |
|  | Perform the procedures listed for the task “Add a DS3 facility to an in-service DS3/STS mapper.”   | page 1-9     |
| Add a DS3 facility to an in-service DS3/STS mapper | Adding a facility (to add the new DS3 facility)  | 323-3001-310 |
|  | Procedure 3-2<br>Activating/deactivating a DS3 facility (to activate the new facility)             | page 3-4     |
|  | Deleting a facility (to delete any unused DS3 facilities)  | 323-3001-310 |
|  | Provisioning DS3 facility parameters   | 323-3001-310 |
|  | Provisioning DS3 protection parameters   | 323-3001-311 |
|  | Procedure 3-3<br>Verifying DS3 transmission test set performance                                   | page 3-5     |
|  | Procedure 3-4<br>Testing a new facility on an in-service DS3/STS mapper                            | page 3-7     |
|  | Manually testing the protection groups on a shelf  | 323-3001-311 |

**Table 1-4**  
**STS-1 tasks**

| If you want to perform this task                            | Then perform these procedures   | Found on     |
|---|---|--------------|
| Add an STS-1 interface card to an in-service system         | <b>Note:</b> The Series 800A outside plant cabinet does not support STS-1 equipment in this release.      |              |
|   | Planning the mapper layouts   | 323-3001-154 |
|   | Adding or changing STS connections, if required   | 323-3001-310 |
|   | Procedure 2-6<br>Transferring an existing OPC to another shelf (if it occupies the required slots)        | page 2-28    |
|   | Procedure 4-1<br>Adding STS-1 equipment to an existing system   | page 4-2     |
|   | Perform the procedures listed for the task “Add an STS-1 facility to an in-service STS-1 interface card.” | page 1-10    |
| Add an STS-1 facility to an in-service STS-1 interface card | Adding a facility (to add the new STS-1 facility)   | 323-3001-310 |
|   | Procedure 4-2<br>Activating/deactivating an STS-1 facility (to activate the new facility)                 | page 4-4     |
|   | Deleting a facility (to delete any unused STS-1 facilities)   | 323-3001-310 |
|   | Provisioning STS-1 facility parameters  | 323-3001-310 |
|   | Provisioning STS-1 protection parameters  | 323-3001-311 |
|   | Procedure 4-3<br>Verifying STS-1 transmission test set performance  | page 4-5     |
|   | Manually testing the protection groups on a shelf   | 323-3001-311 |

**Table 1-5  
DS1/DS3/STS-1/OC-3 conversion tasks**

| If you want to perform this task   | Then perform these procedures   | Found on         |
|--|---|------------------|
| Convert a DS1 system to a DS1/DS3/STS-1 mix system when the slots required for DS3/STS-1 are not occupied                                  | <b>Note:</b> The Series 800A outside plant cabinet does not support DS3 equipment in this release.                    |                  |
|  | Perform the procedures for task "Add a DS3/STS mapper to an in-service system".                                       | page 1-9         |
|  | Perform the procedures for task "Add an STS-1 interface card to an in-service system"                                 | page 1-10        |
| Convert a DS1 system to a DS1/DS3/STS-1 mix system when the required slots are occupied by transport DS1 equipment                         | <b>Note:</b> The Series 800A outside plant cabinet does not support DS3 equipment in this release.                    |                  |
|  | Deleting a facility for the DS1/VT mapper to be moved   | 323-3001-310     |
|  | Deleting a circuit pack group for the DS1/VT mapper to be moved   | 323-3001-310     |
|  | Procedure 5-1<br>Removing DS1/VT mapper equipment   | page 5-3         |
|  | Perform the procedures for the task "Add a DS1/VT sync mapper to an in-service . . . "                                | page 1-6 and 1-7 |
|  | Perform the procedures for task "Add a DS3/STS mapper to an in-service system"  | page 1-9         |
|  | Perform the procedures for task "Add an STS-1 interface card to an in-service system"                                 | page 1-10        |
| Convert a DS1 system to a DS1/DS3/STS-1 mix system when the required slots are occupied by DS1 equipment used for GR-303 DMS or DS1 tandem | <b>Note:</b> The Series 800A outside plant cabinet does not support DS3 equipment in this release.                    |                  |
|  | Procedure 5-2<br>Moving a DS1/VT mapper (GR-303 or DS1 tandem) and preserving the odd/even order                      | page 5-4         |
|  | Perform the procedures for the task "Add a DS3/STS mapper to an in-service system."                                   | page 1-9         |
|  | Perform the procedures for the task "Add an STS-1 interface card to an in-service system"                             | page 1-10        |
| Convert a DS3 system to a DS1/DS3/STS-1 mix system when the required slots are not occupied  | Locate the task "Add a DS1/VT sync mapper..." that applies to the services being added and perform its procedures.    | page 1-6 and 1-7 |
|  | Locate the task "Add an STS-1 interface card..." that applies to the services being added and perform its procedures. | page 1-10        |
| —continued—  |   |                  |

**Table 1-5  
DS1/DS3/STS-1/OC-3 conversion tasks (continued)**

| <b>If you want to perform this task</b>  | <b>Then perform these procedures</b>  | <b>Found on</b>  |
|--|---|------------------|
| Convert a DS3 system to a DS1/DS3/STS-1 mix system when the required slots are occupied by DS3 equipment | Deleting a facility for the DS3/STS mapper to be moved  | 323-3001-310     |
|  | Deleting a circuit pack group (for the equipment to be moved)   | 323-3001-310     |
|  | Procedure 6-1<br>Removing DS3/STS mapper equipment  | page 6-2         |
|  | Re-add the DS3 equipment in its new slot(s): perform the procedures for the task “Add a DS3/STS mapper to an in-service system” | page 1-9         |
|  | Locate the task “Add a DS1/VT sync mapper ... “ that applies to the services being added and perform its procedures             | page 1-6 and 1-7 |
|  | Locate the task “Add an STS-1 interface card ... “ that applies to the services being added and perform its procedures          | page 1-10        |
| Convert a DS1/DS3/STS-1 mix system to a DS3-only system  | Deleting a facility for the DS1/VT mapper or STS-1 interface card   | 323-3001-310     |
|  | Deleting a circuit pack group for the DS1/VT mapper or STS-1 interface card   | 323-3001-310     |
|  | Procedure 5-1<br>Removing DS1/VT mapper equipment   | page 5-3         |
|  | Procedure 7-1<br>Removing STS-1 tributary equipment   | page 7-2         |
| Convert a DS1/DS3/STS-1 mix system to a DS1-only system  | Deleting a facility for the DS3/STS mapper or STS-1 interface card to be moved  | 323-3001-310     |
|  | Deleting a circuit pack group for the equipment to be moved   | 323-3001-310     |
|  | Procedure 6-1<br>Removing DS3/STS mapper equipment  | page 6-2         |
|  | Procedure 7-1<br>Removing STS-1 tributary equipment   | page 7-2         |
| —continued—  |   |                  |

**Table 1-5**  
**DS1/DS3/STS-1/OC-3 conversion tasks (continued)**

| If you want to perform this task                                    | Then perform these procedures                                      | Found on  |
|---|--|-----------|
| Add a new OC-3 tributary  | Procedure 8-1<br>Preparing to add an OC-3 tributary                | page 8-2  |
|   | Procedure 8-2<br>Removing existing DS1 mappers                     | page 8-3  |
|   | Procedure 8-3<br>Removing existing DS3 mappers                     | page 8-4  |
|   | Procedure 8-5<br>Adding an OC-3 tributary                          | page 8-6  |
| Upgrade an unprotected OC-3 tributary to a protected OC-3 tributary | Procedure 8-1<br>Preparing to add an OC-3 tributary                | page 8-2  |
|   | Procedure 8-2<br>Removing existing DS1 mappers                     | page 8-3  |
|   | Procedure 8-3<br>Removing existing DS3 mappers                     | page 8-4  |
|   | Procedure 8-4<br>Removing existing STS-1 interface cards           | page 8-5  |
|   | Procedure 8-6<br>Upgrading an unprotected OC-3 to a protected OC-3 | page 8-8  |
| Convert an OC-3 system to OC-12                                     | Procedure 13-1<br>Upgrading a system from OC-3 to OC-12            | page 13-2 |
| —end—   |  |           |

**Table 1-6  
Shelf, bay, and cabinet tasks**

| If you want to perform this task  | Then perform these procedures   | Found on  |
|---|---|---|
| Add a copper-distribution shelf to an in-service system                           | Procedure 9-1<br>Installing common-equipment circuit packs in a copper-distribution shelf   | page 9-7  |
|   | Procedure 9-2<br>Testing a copper-distribution shelf  | page 9-12   |
|   | Procedure 9-3<br>Diagnosing failed NLIC circuit packs   | page 9-23   |
|   | Add line cards; provision and test new services for the following: <ul style="list-style-type: none"> <li>• TR303 CSC systems</li> <li>• All other systems</li> </ul> | DMS SuperNode documentation<br><br>323-3001-315 and<br>323-3001-316 |
| Add a Universal Edge 9000 (UE9000) shelf  | Installing a UE9000 shelf   | <i>UE9000 Installation Quick Reference Guide</i>                    |
|   | Installing an adjacent bay  | <i>UE9000 Adjacent Bay Installation Quick Reference Guide</i>       |
| Occasional tasks to add equipment to an in-service Modular Business Package (MBP) | Reviewing the rules for expanding an MBP system   | 323-3001-032  |
|   | Adding a field expansion module (FEM) or an expansion cabinet   | 323-3001-206  |
|   | Installing and cable a T1 repeater shelf and DS1 cross-connect panel  | 323-3001-206  |
|   | Testing a T1 repeater shelf and DS1 cross-connect panel   | Refer to manufacturer's documentation                               |
|   | Equipping and testing a T1 repeater card in an existing T1 repeater shelf   | Refer to manufacturer's documentation                               |
| Add and test a new rectifier in an existing modular power package (MPP) cabinet   | Procedure 10-1<br>Installing a new rectifier in an existing MPP cabinet   | page 10-3   |
|   | Procedure 10-2<br>Verifying a new rectifier in an existing MPP cabinet  | page 10-9   |
| —continued—   |   |   |

**Table 1-6**  
**Shelf, bay, and cabinet tasks (continued)**

| If you want to perform this task  | Then perform these procedures   | Found on                              |
|---|---|---------------------------------------|
| Add T1 equipment to an in-service Series 800A outside plant cabinet           | Equipping and testing a T1 repeater card in an existing T1 repeater shelf   | Refer to manufacturer's documentation |
| Add and test a new rectifier in an existing Series 800A outside plant cabinet | Maintenance procedures in 323-3001-210 describe how to replace a rectifier and how to adjust the replacement rectifier in a Series 800A outside plant cabinet. When you add a new rectifier for growth, use the same maintenance procedures, but ignore the steps for removing a defective rectifier. |                                       |
| Add an integrated remote test unit to an in-service system                    | Procedure 11-1<br>Modifying the ABM shelf to add the IRTU   | page 11-2                             |
|   | Provisioning IRTU line cards (ILCs)   | 323-3001-315                          |
|   | Provisioning the test access method for IRTU  | Volume 3                              |
|   | Verifying the connections to the IRTU   | Volume 3                              |
| Add a backup operations controller  | Procedure 12-1<br>Adding a backup OPC   | page 12-2                             |
| —end—   |   |                                       |

**Table 1-7  
VTBM upgrade tasks**

| <b>If you want to perform this task</b>                     | <b>Then perform these procedures</b>  | <b>Found on</b>                |
|---|---|--------------------------------|
| Add or remove a node from a VTBM ring                       | Adding a node to an existing VTBM ring<br>or  | the appropriate AccessNode CAP |
|   | Removing a node from an existing VTBM ring<br>or  | the appropriate AccessNode CAP |
| Add an STS-managed STS-1 channel                            | Adding the STS-managed STS-1 connection   | 323-3001-310                   |
|   | Performing an audit of STS connection data  | 323-3001-310                   |
|   | Adding, provisioning, and testing tributary equipment and facilities (DS1, DS3, STS-1, or OC-3) | Table 1-1 on page 1-5          |
|   | Performing a manual NE database backup  | Volume 3                       |
|   | Saving OPC data to tape   | 323-3001-304                   |
|   | Transferring OPC data to the backup OPC   | Volume 3                       |
| Add a VT1.5 connection on a new VT-managed STS-1 connection | Adding the VT-managed STS-1 connection  | 323-3001-310                   |
|   | Adding the VT1.5 connection   | 323-3001-310                   |
|   | Performing an audit of STS connection data  | 323-3001-310                   |
|   | Adding, provisioning, and testing tributary equipment and facilities (DS1, STS-1, OC-3)         | Table 1-1 on page 1-5          |
|   | Performing a manual NE database backup  | Volume 3                       |
|   | Saving OPC data to tape   | 323-3001-304                   |
|   | Transferring OPC data to the backup OPC   | Volume 3                       |

**Table 1-8  
ESI card tasks**

| If you want to perform this task  | Then perform these procedures  | Found on  |
|---|--|---|
| Setting up ESI timing at a fiber central office terminal (FCOT) (with ESI for a building-integrated timing source [BITS]) | Procedure 15-1<br>Installing ESI equipment<br><br>Changing the ESI external timing reference input parameters<br><br>Changing the timing reference source (to normal)<br><br>Changing timing and cross-connect parameters<br><br>Changing the ESI target clock mode<br><br>Procedure 15-2<br>Testing ESI clock mode<br><br>Procedure 15-3<br>Verifying protection switching of timing references<br><br>Changing the network element shelf clock source<br><br>Procedure 15-5<br>Verifying ESI equipment protection<br><br>Performing a manual database backup | page 15-4<br><br>323-3001-310<br><br>323-3001-310<br><br>323-3001-310<br><br>323-3001-310<br><br>page 15-13<br><br>page 15-16<br><br>323-3001-310<br><br>page 15-22<br><br>Volume 3 |
| Adding ESI for external distribution of timing at a linetimed FCOT ring node  | Procedure 15-1<br>Installing ESI equipment<br><br>Changing the ESI timing distribution output parameters<br><br>Procedure 15-4<br>Verifying ESI facilities for timing distribution<br><br>Procedure 15-5<br>Verifying ESI equipment protection<br><br>Performing a manual database backup  | page 15-4<br><br>323-3001-310<br><br>page 15-20<br><br>page 15-22<br><br>Volume 3   |
| Adding ESI to improve holdover stability at a linetimed FCOT ring node  | Procedure 15-1<br>Installing ESI equipment<br><br>Changing the ESI target clock mode<br><br>Procedure 15-2<br>Testing ESI clock mode<br><br>Changing the network element shelf clock source<br><br>Procedure 15-5<br>Verifying ESI equipment protection<br><br>Performing a manual database backup   | page 15-4<br><br>323-3001-310<br><br>page 15-13<br><br>323-3001-310<br><br>page 15-22<br><br>Volume 3   |

**Table 1-9**  
**DFA tasks**

| <b>If you want to perform this task</b>   | <b>Then perform these procedures</b>   | <b>Found on</b> |
|---|--|-----------------|
| Adjust the bandwidth of the operations maintenance channel (OMC) for a DFA RFT    | Procedure 14-1<br>Adjusting the OMC bandwidth  | page 14-3       |
| Move the operations maintenance channel (OMC) to a new DS1/VT mapper at a DFA RFT | Perform the procedures for the task "Add a DS1/VT sync mapper to an in-service DS1-fed system"<br><br>(If the mapper is in slot 4, it does not carry customer traffic. In this case, the test procedure on page 2-35 is optional.) | page 1-6        |
|   | Procedure 14-2<br>Moving an OMC link to a new DS1 facility   | page 14-8       |

## System configurations

Figure 1-1 through Figure 1-4 show the different types of configurations. Refer to these figures as necessary as you perform procedures in this document.

**Figure 1-1**  
**Point-to-point system**

PC-11336

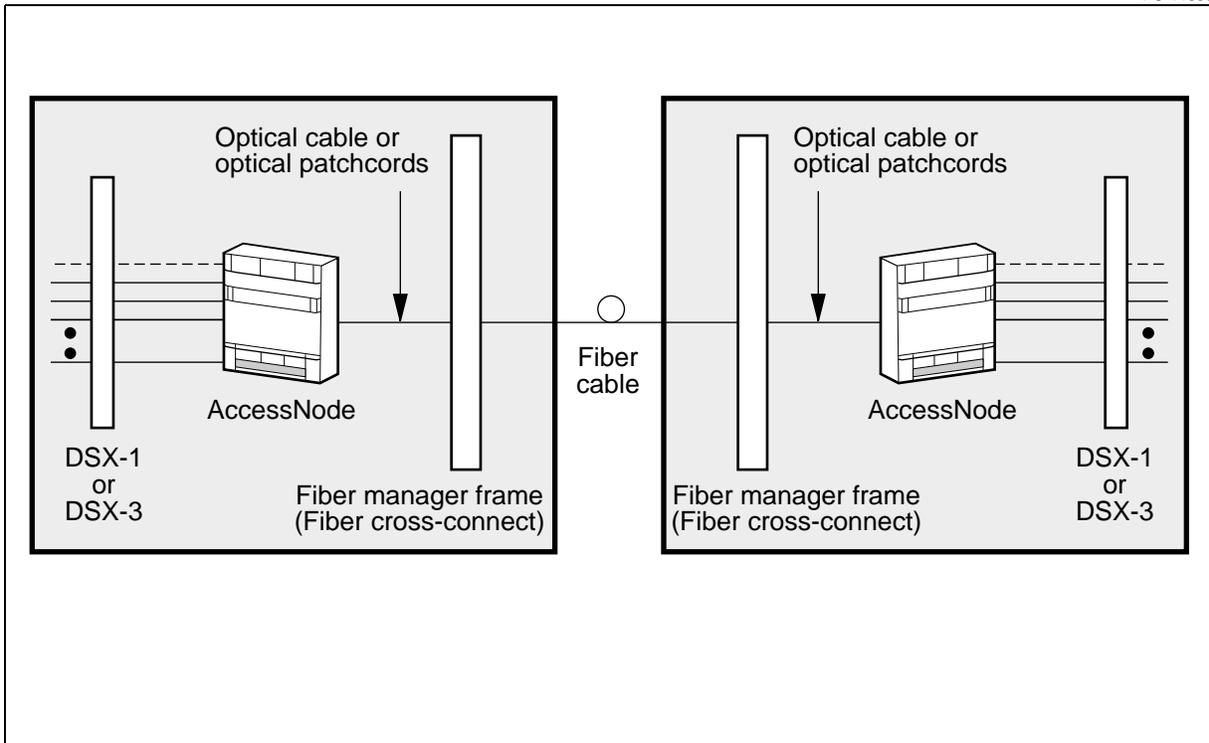
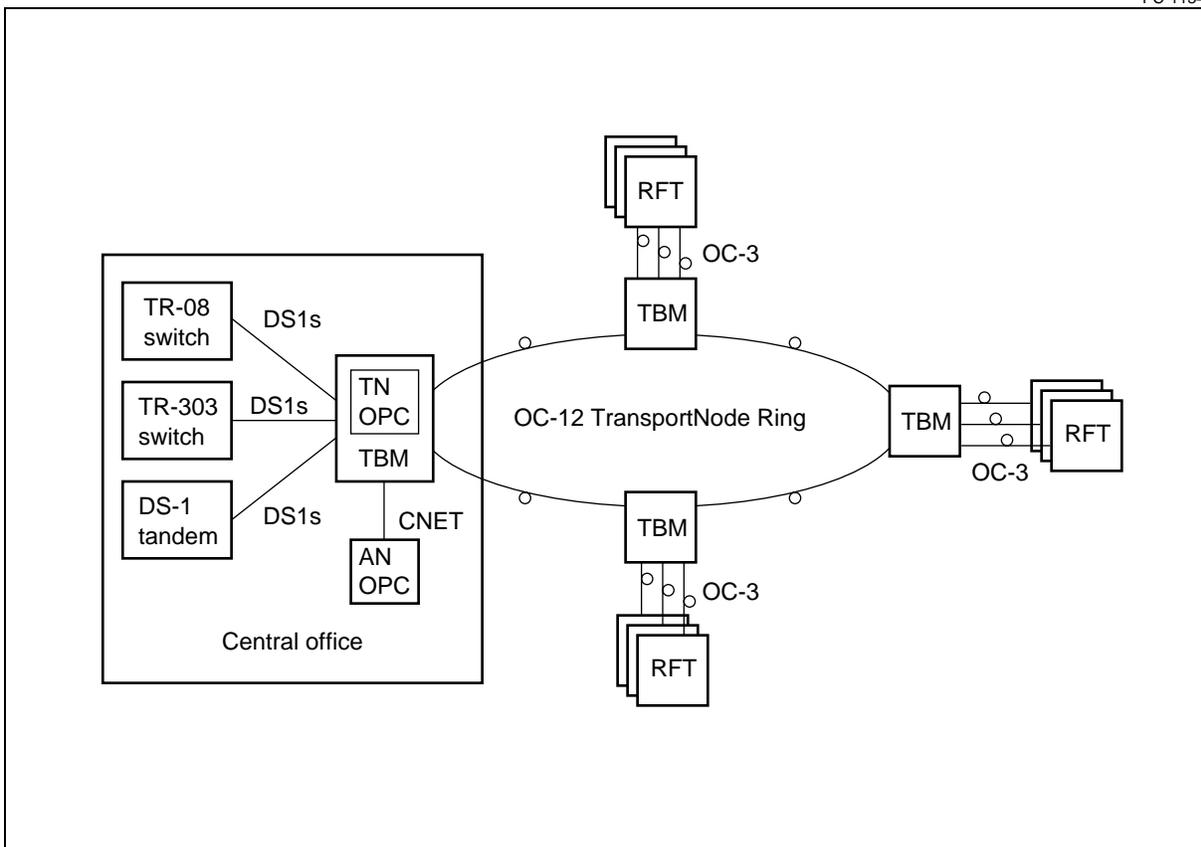


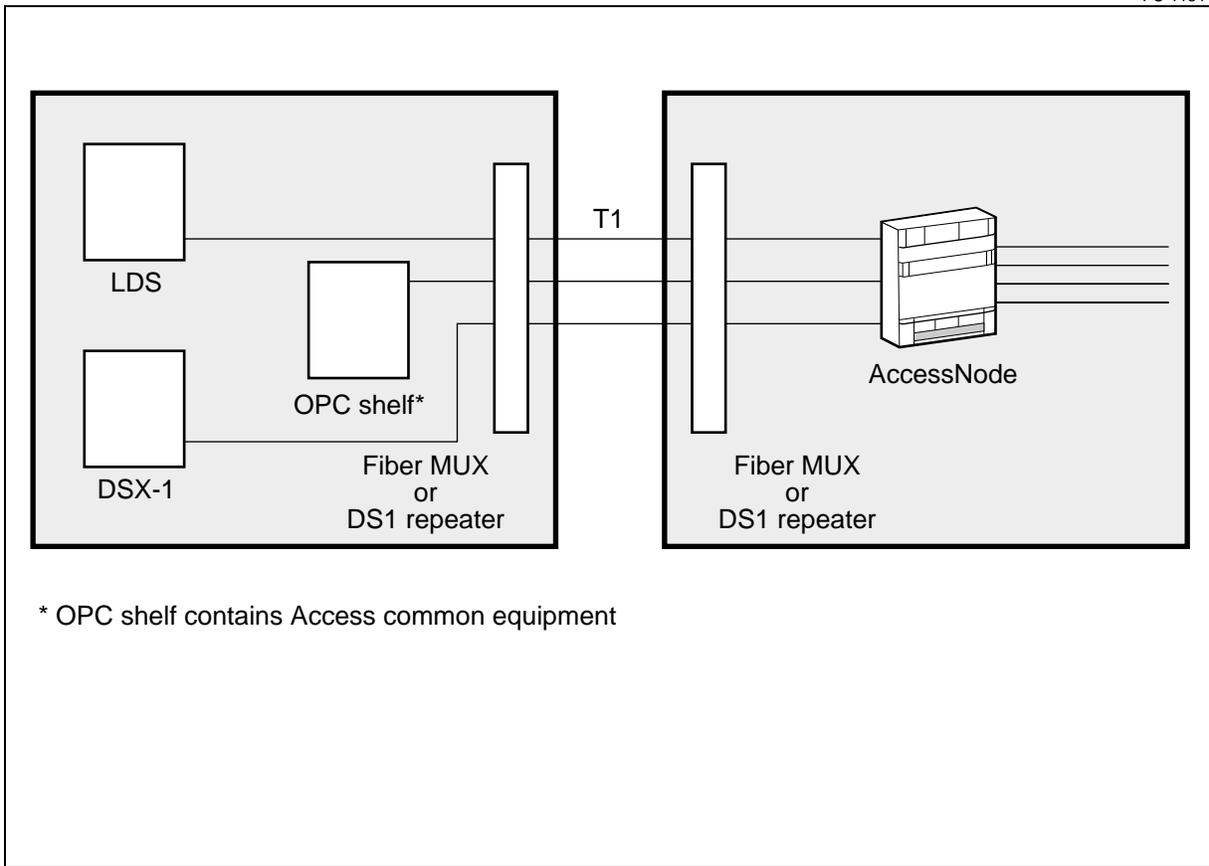
Figure 1-2  
Single-ended system

PC-11343



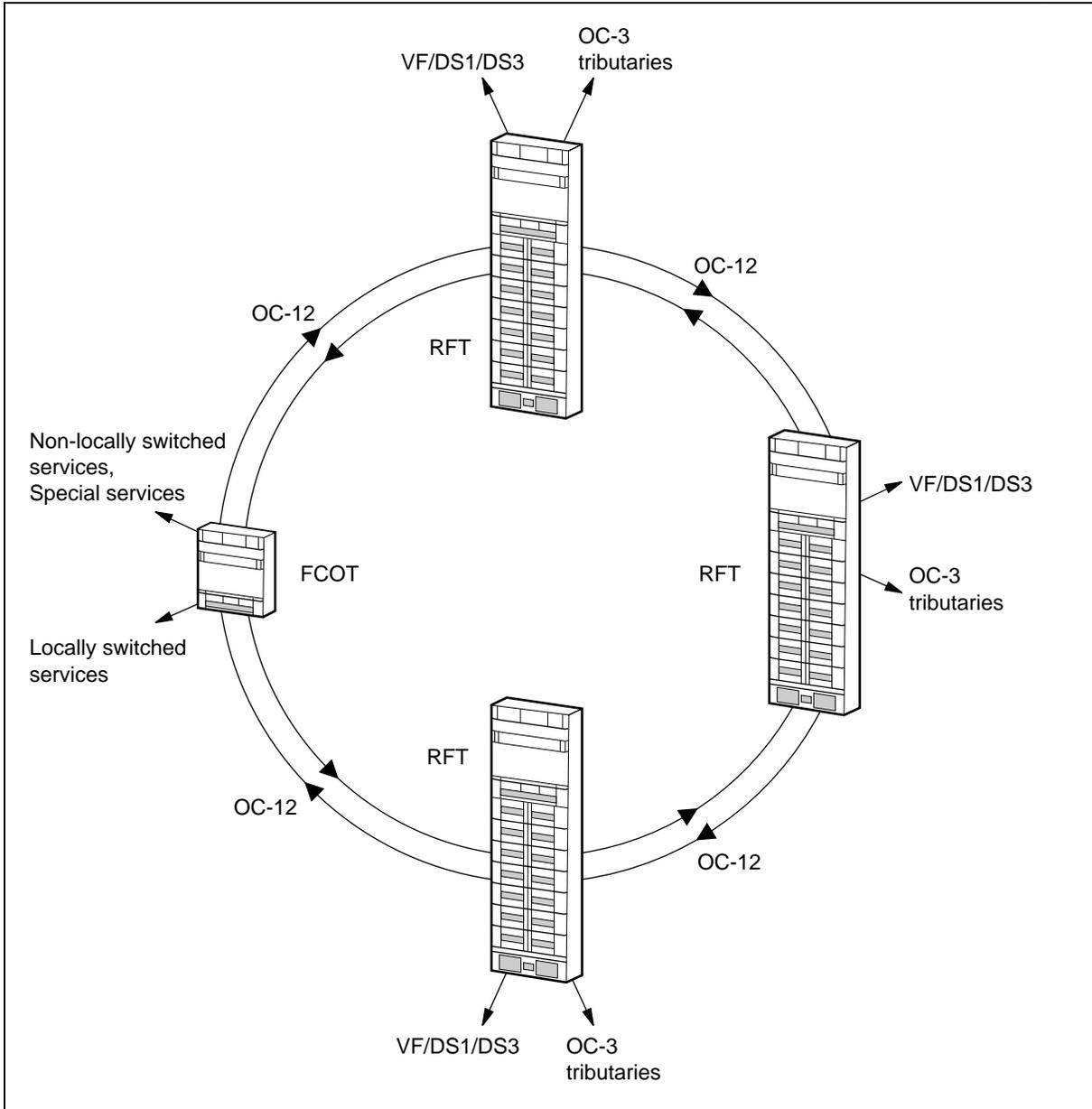
**Figure 1-3**  
**DS1-fed system**

PC-11341



**Figure 1-4**  
**VTBM ring system**

PC-11550



**VTBM rings**

A virtual tributary bandwidth manager (VTBM) ring, also called a 2-card bidirectional line-switched ring (BLSR), uses two NT7E05 OC-12 VTBM circuit packs in the primary transport slots of each network element.

## Introduction to shelves, circuits, and topologies

This section provides a summary description of AccessNode shelves, circuits, and system topologies. For more information, refer to the *Description* volume.

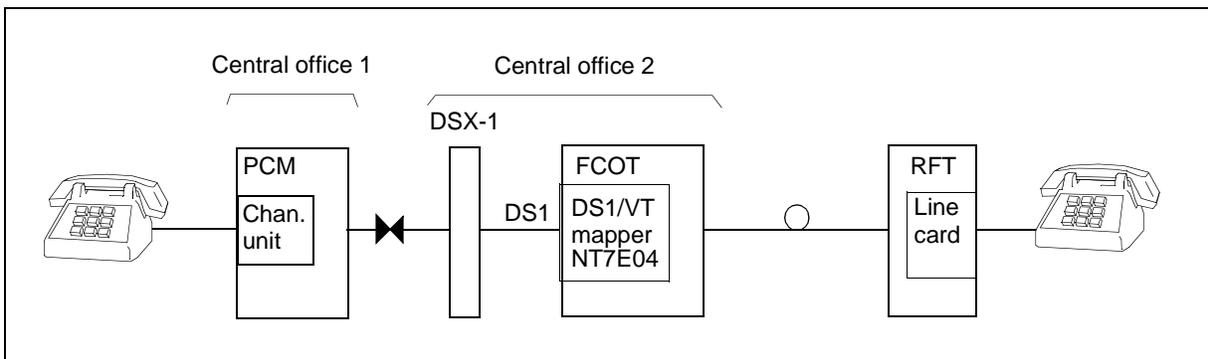
The following list describes the two AccessNode shelf types:

- The access bandwidth manager (ABM) shelf supports transport DS1s and DS3s, and the termination of DS0 circuits on line cards installed in copper distribution shelves (CDS). It can be installed as a fiber central office terminal (FCOT), a remote fiber terminal (RFT), or a RFT\_BLSR.
- The transport bandwidth manager (TBM) shelf supports a larger number of transport DS1s and DS3s than the ABM shelf, but no DS0 circuits or CDSs. It also supports STS-1 tributaries. It can be installed as an FCOT, FCOT\_BLSR, or TN\_BLSR.

Certain AccessNode systems can carry the following circuits:

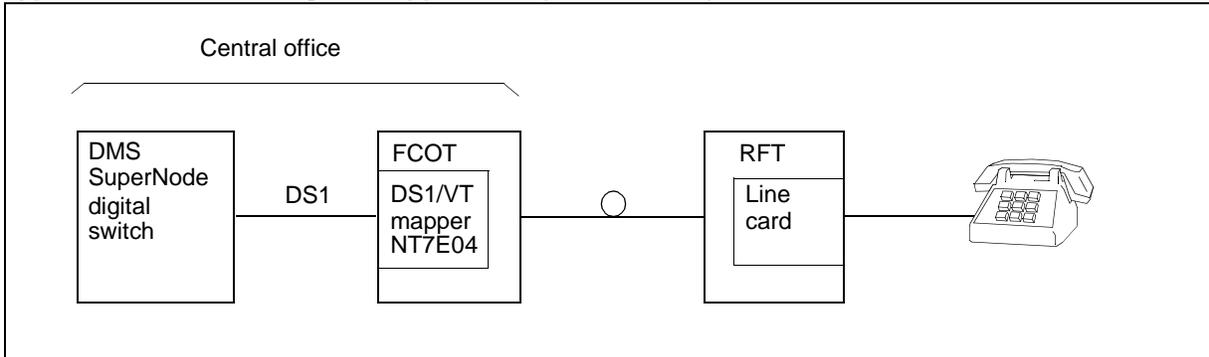
- Transport DS1s are wideband facilities that require a DS1/VT mapper at any network element where they are accessed at the DS1 level.
- Transport DS3s are wideband facilities supported in point-to-point and ring topology. They require a DS3/STS mapper at the FCOT and RFT.
- Transport STS-1s are wideband facilities supported only in a ring topology and only on a TN\_BLSR shelf.
- DS1 tandem circuits are non-locally switched or non-switched narrowband circuits (DS0s) terminated on line cards at the RFT. They are mapped to DS1 channels at the site where they interface with a digital line (at the FCOT in point-to-point, or at the RFT in single-ended or DS1-fed systems). They require a DS1/VT mapper at the FCOT or RFT. DS1 tandem circuits are supported in all topologies and applications. Figure 1-5 shows a typical DS1 tandem circuit.

**Figure 1-5**  
Typical DS1 tandem circuit



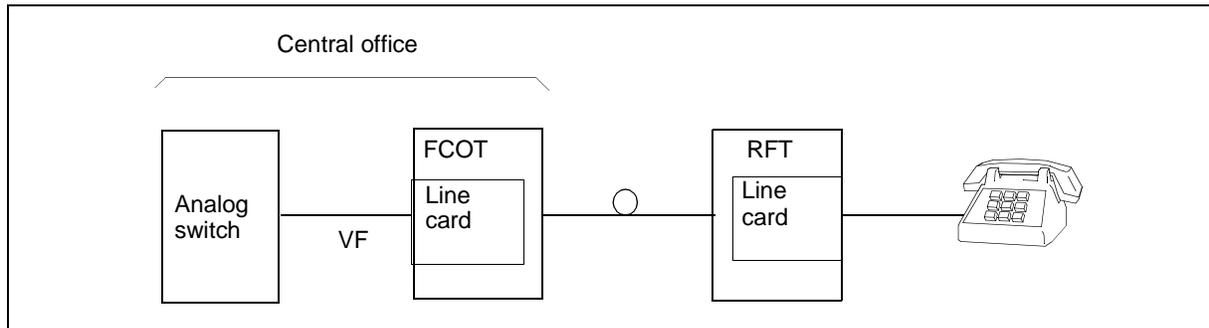
- GR-303 DMS narrowband circuits are DS0s from the RFT that exit the FCOT on DS1s and terminate on a digital switch. They require a DS1/VT mapper at the FCOT; however, GR-303 DMS and DS1 tandem circuits can use the same mapper, and they terminate on line cards at the RFT. GR-303 DMS circuits are supported in all topologies and applications except in the univertdigital loop carrier (UDLC) application. Figure 1-6 shows a typical circuit in an integrated application. Three types of GR-303 DMS circuits are as follows:
  - TR303 DMS (GR-303 DMS circuits that terminate at a Nortel Networks DMS switch).
  - TR303 MVI (GR-303 DMS circuits meeting the multi-vendor interface standard).
  - TR-08 (GR-303 DMS circuits that meet the TR-08 interface standard). TR-08 circuits require a particular DS1/VT mapper unit.

**Figure 1-6**  
**Typical circuit in an integrated application (GR-303 DMS)**



- UDLC narrowband circuits exit the FCOT at the voice frequency (VF) level and require line cards at both the FCOT and the RFT. UDLC circuits are supported in the point-to-point topology in UDLC and combined applications. Figure 1-7 shows a typical circuit in a universal application.

**Figure 1-7**  
**Typical circuit in a universal application (UDLC)**



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The following list describes the four basic AccessNode system topologies and the circuit types they support:

- A bidirectional line-switched ring (BLSR) system supports GR-303 DMS, DS1 tandem, DS1 transport, DS3 transport, and STS-1 transport circuits. An FCOT node requires an ABM or TBM shelf, an RFT node requires an ABM shelf, and a TN\_BLSR node requires a TBM shelf.
- A point-to-point system can be configured for a UDLC, GR-303 DMS, combined, or multiplex system application, described as follows. It also supports DS1 tandem, DS1 transport, and DS3 transport circuits.
  - A UDLC system application contains UDLC circuits. It requires an ABM shelf at both the FCOT and RFT.
  - A GR-303 DMS system application contains GR-303 DMS circuits. It requires an ABM or a TBM shelf at the FCOT, and an ABM shelf at the RFT.
  - A combined application contains GR-303 DMS and UDLC circuits. It requires an ABM shelf at both the FCOT and RFT. (DS3 transport circuits are not supported with an operations controller [OPC] installed at the FCOT, because no slots are available.)
  - A multiplex system application contains transport DS1s, DS3s, or STS-1s. It requires an ABM or a TBM shelf at the FCOT, an ABM shelf at the RFT, and a TBM shelf at the TN\_BLSR. It does not terminate DS0 circuits.
- A single-ended system supports GR-303 DMS, DS1 tandem, and DS1 transport circuits. It requires an ABM shelf at the RFT. A TBM or ABM shelf at the central office houses the OPC.
- A DS1-fed (DFA) system supports GR-303 DMS, DS1 tandem, and DS1 transport circuits. It requires an ABM shelf at the RFT. A TBM or ABM shelf at the central office houses the OPC.

## Test equipment

Table 1-10 lists the test equipment required to carry out the tests in this document.

**Table 1-10**  
**Test equipment requirements**

| Qty | Equipment  | Details   | Use for  |
|-----|--|---|--|
| 1   | network element user terminal, Digital Equipment Corporation VT100 or equivalent | includes a keyboard and display, power supply cord, and RS-232C cable with a 25-pin D-connector | most procedures  |
| 1   | DS1 transmission test set, Tau-Tron S5104 (Tx-Rx)                                | DS1 signal transmitter/receiver   | DS1 tests  |
| 2   | electrical test cords, P3Q3B   | bantam-to-310 connectors, 2 m (6 ft)  | DS1 tests, for connection to the DS1 test set          |
| 13  | electrical test cords  | bantam-to-bantam connectors, 1 m (3 ft)   | DS1 tests, for continuity test at DSX-1                |
| 1   | DS3 test set, Tau-Tron S5200 (Tx)  | DS3 signal transmitter  | DS3 tests  |
| 1   | DS3 transmission test set, Tau-Tron S5200 (Rx)                                   | DS3 signal receiver   | DS3 tests  |
| 1   | STS-1 test set, HP 156 MTS (Cerjac)  | STS-1 signal transmitter/receiver   | STS-1 tests  |
| 2   | Coaxial test cords, NT3E60AA   | BNC-to-WECO (NE-358)  | Connection to the appropriate equipment                |
| 2   | Coaxial test cords, NT-P2BJ  | WECO (NE-358) connectors, 2.4 m (8 ft)  | DS3/STS-1 continuity test at DSX-3/STS-1 cross-connect |
| 1   | NT4K69AA Omega four-wire line card   | required when adding a copper-distribution shelf  | testing a new copper-distribution shelf                |

### Group and slot associations for DS1, DS3, STS-1, OC-3, and OC-12

The group number you enter in a command string depends on the shelf type and function, the mapper type, and its slot location. Table 1-11 summarizes the group and slot associations for the different mappers and shelves.

*Note:* The following tables do not imply that all slots are available for your configuration. For details about the capacity for each configuration, see *Mapper Layouts Planning Guide*, 323-3001-154, in the *Engineering, Configuration, and Ordering Guide*, Volume 1.

**Table 1-11**  
**Group and slot association matrix**

| Mapper and shelf function |                          | Mapper slot |    |    |    |     |    |     |    |    |    |    |     |    |    |    |     |     |     |    |
|---------------------------|--------------------------|-------------|----|----|----|-----|----|-----|----|----|----|----|-----|----|----|----|-----|-----|-----|----|
|                           |                          | 1           | 2  | 3  | 4  | 5   | 6  | 7   | 8  | 9  | 10 | 11 | 12  | 13 | 14 | 15 | 16  | 17  | 18  | 19 |
| <b>DS1</b>                | DS1-fed ABM              | G1          | G2 | P  | G4 | G5  | G6 |     |    |    |    |    |     |    |    |    |     |     |     |    |
|                           | ABM FCOT or FCOT_BLSR    | G1          | G2 | P  | G4 | G5  | G6 | G7  | G8 |    |    |    |     |    |    |    |     |     |     |    |
|                           | TBM FCOT                 |             |    | G3 | G4 |     |    |     |    |    |    | G5 | G6  | P  | G8 | G9 | G10 | G11 | G12 |    |
|                           | TBM FCOT_BLSR            | G1          | G2 | G3 | G4 |     |    |     |    |    |    | G5 | G6  | P  | G8 | G9 | G10 | G11 | G12 |    |
|                           | TBM TN_BLSR              | G1          | G2 | G3 | G4 |     |    |     |    |    |    | G5 | G6  | G7 | G8 | G9 | G10 | G11 | G12 | P  |
| <b>DS3</b>                | ABM                      | P           | S  | G1 |    | G2  |    | G3  |    |    |    |    |     |    |    |    |     |     |     |    |
|                           | TBM FCOT                 | P           | S  |    |    |     |    |     |    |    | G1 |    | -   |    | G3 |    | G4  |     |     |    |
|                           | TBM FCOT_BLSR or TN_BLSR | P           | S  |    |    |     |    |     |    |    | G1 |    | G2* |    | G3 |    | G4  |     |     |    |
| <b>STS-1</b>              | TN_BLSR                  |             | S  | P  |    |     |    |     |    |    | G1 |    | G2  |    | G3 |    | G4  |     |     |    |
| <b>OC-3</b>               | ABM tributary            | G3          |    | G4 |    | G1S |    | G2S |    |    |    |    |     |    |    |    |     |     |     |    |
|                           | TBM tributary            | G3          |    | G4 |    | G1S |    | G2S |    |    |    | G5 | G6  |    | G7 |    | G8  |     |     |    |
|                           | Feeder                   |             |    |    |    |     |    |     |    | G1 | G2 |    |     |    |    |    |     |     |     |    |
| <b>OC-12</b>              | Feeder                   |             |    |    |    |     |    |     |    | G1 | G2 |    |     |    |    |    |     |     |     |    |
| <b>OC-12 VTBM</b>         | Feeder                   |             |    |    |    |     |    |     |    | G1 | G2 |    |     |    |    |    |     |     |     |    |
|                           |                          | 1           | 2  | 3  | 4  | 5   | 6  | 7   | 8  | 9  | 10 | 11 | 12  | 13 | 14 | 15 | 16  | 17  | 18  | 19 |

\* For DS3 TBM FCOT\_BLSR fiber-fed shelves, this group is available only if no DS1s are provisioned for the shelf.

**Group and slot associations for DS1, DS3, and STS-1 I/O cards**

For some tasks, you must also know the slot numbers of the input and output cards. The following table shows which table defines the I/O slots for the mapper you need.

| If you are provisioning this equipment | For this shelf type               | Then refer to |
|--|-----------------------------------|---------------|
| DS1 equipment                          | access bandwidth manager (ABM)    | Table 1-12    |
|  | transport bandwidth manager (TBM) | Table 1-13    |
| DS3 equipment                          | ABM                               | Table 1-14    |
|  | TBM                               | Table 1-15    |
| STS-1 equipment                        | TBM                               | Table 1-16    |

For DS1, DS3, and STS-1 circuit packs, Tables 1-12 through 1-16 show the association between circuit packs in the lower level of the common equipment shelf and I/O cards in the upper level.

For example, DS1 circuit pack group G1 refers to the group of modules including the working DS1/VT mapper circuit pack in slot 1 and its corresponding DS1 input and output cards in slots 30 and 32. Similarly, DS1 circuit pack group P refers to the group of modules including the protection DS1/VT mapper circuit pack in slot 3 and the DS1 protection bridge cards in slots 34 and 36.

### DS1 I/O numbers

Table 1-12 lists the DS1 circuit pack groups for the ABM shelf functions. It also shows the association between mappers in the lower level of the shelf and input cards and output cards in the upper level.

**Table 1-12**  
**ABM DS1 mapper, group, and I/O numbers**

| Shelf function | Group or I/O slot | Mapper slot |     |      |     |     |     |    |    |   |    |    |    |    |    |    |    |    |    |
|----------------|-------------------|-------------|-----|------|-----|-----|-----|----|----|---|----|----|----|----|----|----|----|----|----|
|                |                   | 1           | 2   | 3    | 4   | 5   | 6   | 7  | 8  | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| RFT            | Group             | g1*         | g2* | P*   | g4* | g5* | g6* | g7 | g8 |   |    |    |    |    |    |    |    |    |    |
| RFT_BLSR       | Input slot        | 30*         | 31* | 34p* | 35* | 38  | 39  | 42 | 43 |   |    |    |    |    |    |    |    |    |    |
| FCOT           | Output slot       | 32*         | 33* | 36p* | 37* | 40  | 41  | 44 | 45 |   |    |    |    |    |    |    |    |    |    |
| FCOT_BLSR      |                   |             |     |      |     |     |     |    |    |   |    |    |    |    |    |    |    |    |    |

**Note 1:** \* DS1 equipment allowed in a DS1-fed ABM shelf.  
**Note 2:** The symbol "p" in the DS1 input and output slots denotes a protection bridge card.  
**Note 3:** The feeder occupies slots 9 and 10. If an OPC is installed, it occupies slots 5 through 8.

Table 1-13 lists the DS1 circuit pack groups for the different TBM shelf functions. It also shows the association between mappers in the lower level of the shelf and input cards and output cards in the upper level.

**Table 1-13**  
**TBM DS1 mapper, group, and I/O numbers**

| Shelf function | Group or I/O slot | Mapper slot |     |    |    |   |   |   |   |   |    |    |    |     |    |    |     |     |     |    |  |
|----------------|-------------------|-------------|-----|----|----|---|---|---|---|---|----|----|----|-----|----|----|-----|-----|-----|----|--|
|                |                   | 1           | 2   | 3  | 4  | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13  | 14 | 15 | 16  | 17  | 18  | 19 |  |
| FCOT           | Group             |             |     | g3 | g4 |   |   |   |   |   |    | g5 | g6 | P   | g8 | g9 | g10 | g11 | g12 |    |  |
|                | Input slot        |             |     | 34 | 35 |   |   |   |   |   |    | 38 | 39 | 42p | 43 | 46 | 47  | 50  | 51  |    |  |
|                | Output slot       |             |     | 36 | 37 |   |   |   |   |   |    | 40 | 41 | 44p | 45 | 48 | 49  | 52  | 53  |    |  |
| FCOT_BLSR      | Group             | g1*         | g2* | g3 | g4 |   |   |   |   |   |    | g5 | g6 | P   | g8 | g9 | g10 | g11 | g12 |    |  |
|                | Input slot        | 30*         | 31* | 34 | 35 |   |   |   |   |   |    | 38 | 39 | 42p | 43 | 46 | 47  | 50  | 51  |    |  |
|                | Output slot       | 32*         | 33* | 36 | 37 |   |   |   |   |   |    | 40 | 41 | 44p | 45 | 48 | 49  | 52  | 53  |    |  |
| TN_BLSR        | Group             | g1*         | g2* | g3 | g4 |   |   |   |   |   |    | g5 | g6 | g7  | g8 | g9 | g10 | g11 | g12 | P  |  |
|                | Input slot        | 30*         | 31* | 34 | 35 |   |   |   |   |   |    | 38 | 39 | 42  | 43 | 46 | 47  | 50  | 51  | -  |  |
|                | Output slot       | 32*         | 33* | 36 | 37 |   |   |   |   |   |    | 40 | 41 | 44  | 45 | 48 | 49  | 52  | 53  | -  |  |

**Note 1:** \* FCOT\_BLSR and TN\_BLSR shelves can contain two additional DS1 working groups (compared to a FCOT) when DS3 protection mappers are not used in slots 1 and 2. The two additional DS1 working groups are g1 (slots 1, 30, 32) and g2 (slots 2, 31, 33).  
**Note 2:** The symbol "p" in the DS1 input and output slots denotes a protection bridge card.  
**Note 3:** The feeder occupies slots 9 and 10. If an OPC is installed, it occupies slots 5 through 8.

**DS3 I/O numbers**

Table 1-14 lists the DS3 circuit pack groups for the ABM shelf functions. It also shows the association between mappers in the lower level of the shelf and input cards and output cards in the upper level.

**Table 1-14  
ABM DS3 mapper, group, and I/O numbers**

| Shelf function  | Group or I/O slot | Mapper slot |   |    |   |    |   |    |   |   |    |    |    |    |    |    |    |    |    |   |
|---|-------------------|-------------|---|----|---|----|---|----|---|---|----|----|----|----|----|----|----|----|----|---|
|   |                   | 1           | 2 | 3  | 4 | 5  | 6 | 7  | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | - |
| RFT   | Group             | P           | S | g1 | — | g2 | — | g3 | — |   |    |    |    |    |    |    |    |    |    |   |
| RFT_BLSR  | I/O slots         | —           | — | 34 |   | 38 |   | 42 |   |   |    |    |    |    |    |    |    |    |    |   |
| FCOT  |                   | —           | — | 35 |   | 39 |   | 43 |   |   |    |    |    |    |    |    |    |    |    |   |
| FCOT_BLSR   |                   | —           | — | 36 |   | 40 |   | 44 |   |   |    |    |    |    |    |    |    |    |    |   |
| <p><b>Note 1:</b> The feeder occupies slots 9 and 10. If an OPC is installed, it occupies slots 5 through 8.</p> <p><b>Note 2:</b> The symbol “P” in slot 1 denotes a protection mapper; the symbol “S” in slot 2 denotes a protection switch card.</p> |                   |             |   |    |   |    |   |    |   |   |    |    |    |    |    |    |    |    |    |   |

Table 1-15 lists the DS3 circuit pack groups for the TBM shelf functions. It also shows the association between mappers in the lower level of the shelf and input/output cards in the upper level.

**Table 1-15  
TBM DS3 mapper, group, and I/O numbers**

| Shelf function   | Group or I/O slot | Mapper slot |   |   |   |   |   |   |   |   |    |    |    |     |    |    |    |    |    |    |  |
|--|-------------------|-------------|---|---|---|---|---|---|---|---|----|----|----|-----|----|----|----|----|----|----|--|
|  |                   | 1           | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13  | 14 | 15 | 16 | 17 | 18 | 19 |  |
| FCOT   | Group             | P           | S | — | — |   |   |   |   |   |    | g1 | —  | g2* | —  | g3 | —  | g4 | —  | —  |  |
| FCOT_BLSR  | I/O slots         | —           | — |   |   |   |   |   |   |   |    | 38 |    | 42* |    | 46 |    | 50 |    |    |  |
| TN_BLSR  |                   | —           | — |   |   |   |   |   |   |   |    | 39 |    | 43* |    | 47 |    | 51 |    |    |  |
|  |                   | —           | — |   |   |   |   |   |   |   |    | 40 |    | 44* |    | 48 |    | 52 |    |    |  |
| <p><b>Note 1:</b> * This group is available for FCOT_BLSR shelves that have no DS1s provisioned.</p> <p><b>Note 2:</b> The feeder occupies slots 9 and 10. If an OPC is installed, it occupies slots 5 through 8.</p> <p><b>Note 3:</b> The symbol “P” in slot 1 denotes a protection mapper; the symbol “S” in slot 2 denotes a protection switch card.</p> |                   |             |   |   |   |   |   |   |   |   |    |    |    |     |    |    |    |    |    |    |  |

### STS-1 I/O numbers

Table 1-16 lists the STS-1 circuit pack groups for the TBM shelf functions. It also shows the association between interface cards in the lower level of the shelf and input/output cards in the upper level.

**Table 1-16**  
**TBM STS-1 interface, group, and I/O numbers**

| Shelf function | Group or I/O slot | Mapper slot |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |
|----------------|-------------------|-------------|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|
|                |                   | 1           | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 |
| TN_BLSR        | Group             |             | S | P | — |   |   |   |   |   |    | g1 | —  | g2 | —  | g3 | —  | g4 | —  | —  |
|                | I/O slots         | —           | — |   |   |   |   |   |   |   |    | 38 |    | 42 |    | 46 |    | 50 |    |    |
|                |                   | —           | — |   |   |   |   |   |   |   |    | 39 |    | 43 |    | 47 |    | 51 |    |    |
| —              |                   | —           |   |   |   |   |   |   |   |   | 40 |    | 44 |    | 48 |    | 52 |    |    |    |

**Note 1:** The feeder occupies slots 9 and 10. If an OPC is installed, it occupies slots 5 through 8.

**Note 2:** The symbol “P” in slot 3 denotes a protection mapper; the symbol “S” in slot 2 denotes a protection switch card.

### Clearing alarms

If you encounter unexplained alarm conditions while carrying out the tests in this volume, see *Alarm and Trouble Clearing Procedures*, 323-3001-543, in *Maintenance*, Volume 5A.



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## Adding DS1s

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This chapter describes how to add and test new DS1 facilities on a new or existing DS1/VT mapper circuit pack. The network element is in service and continues to carry live traffic during these procedures.

### How to use this chapter

To use procedures in this chapter, refer to the document task list in Chapter 1, “Overview of system expansion,” locate the task you need, and perform the sequence of given procedures.

### Chapter task list

This chapter contains the following procedures. If you cannot successfully complete a procedure, contact your next level of support.

| Procedure | Task  | See       |
|-----------|---|-----------|
| 2-1       | Verifying DS1 transmission test set performance                         | page 2-2  |
| 2-2       | Adding DS1 equipment  | page 2-4  |
| 2-3       | Testing a new DS1 transport facility on an in-service DS1/VT mapper     | page 2-9  |
| 2-4       | Testing continuity on a new DS1/VT mapper for transport DS1s            | page 2-16 |
| 2-5       | Testing continuity on a new DS1/VT mapper for GR-303 DMS or tandem DS1s | page 2-22 |
| 2-6       | Transferring an existing OPC to another shelf                           | page 2-28 |
| 2-7       | Testing DS1 facilities on a DS1-fed system                              | page 2-35 |

**Note:** When you expand a system to add the first TR-08 DS-1 facility, be sure to equip the remote fiber terminal (RFT) access bandwidth manager (ABM) shelf with the NT4K56AC or NT4K56CA transport interface card (TIC), which allows the extraction of alarms and other messages in the derived data link. If an earlier version of the TIC is installed, it must be replaced; see *Module Replacement Procedures*, 323-3001-547, in *Maintenance*, Volume 5C.

## Procedure 2-1 Verifying DS1 transmission test set performance

---

This procedure describes how to verify the performance of the DS1 transmission test set. The verification is necessary to obtain reliable test results.

### Requirements

The following materials are required:

- DS1 transmitter-receiver test set, Tau-Tron S5104 (Tx-Rx)
- electrical test cord, bantam-to-bantam, 1 m (3 ft)

This procedure describes settings for Tau-Tron test sets. Other brands of test sets use similar settings.

### Action

---

| Step | Action  |
|------|---|
| 1    | Set the Power switch to On.   |
| 2    | Set the Transmitter Out controls as follows:<br><br>Frame: <b>Frame</b><br><br>Pattern: <b>PRBS</b><br><br>DS: <b>DSX-1</b> |
| 3    | Set the Error Inject controls as follows:<br><br>Type: <b>Bit</b><br><br>Mode: <b>Err free</b>                              |
| 4    | Connect the bantam-to-bantam test cord between input and output.  |
| 5    | Set the Measurement Time controls as follows:<br><br>Mode: <b>Untimed</b><br><br>Start/Stop: <b>In Proc</b>                 |

—continued—

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Procedure 2-1 (continued)

**Verifying DS1 transmission test set performance**

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| <b>Step</b> | <b>Action</b>  |
|-------------|--|
| <b>6</b>    | Set the Measurements control as follows:<br><br>Type: <b>Bit</b>   |
| <b>7</b>    | Set the Receiver Input controls as follows:<br><br>Frame: <b>Frame</b><br>Pattern: <b>PRBS</b><br>Channel: <b>CH1</b><br>DS: <b>DSX-1</b>                                  |
| <b>8</b>    | At the rear of the test set, set the DS1 Output switch to Bipolar.   |
| <b>9</b>    | On the test set, press the <b>Start/Stop</b> button 2 times to reset the error count to zero.<br><br><i>The test set indicates "in process" and displays 0 bit errors.</i> |
| <b>10</b>   | Press the <b>Single-bit error inject</b> button 3 times.<br><br><i>The test set displays 3 errors.</i>   |
| <b>11</b>   | If you did not obtain the required results, check the settings and repeat the test. If necessary, replace the test set.  |
| <b>12</b>   | Disconnect the test cord.<br><br><i>You are ready for tests.</i>   |

—end—

## Procedure 2-2 Adding DS1 equipment

Use this procedure to install a new DS1/VT mapper circuit pack and the corresponding DS1 input and output cards and cables. The following table describes the location at which you should install the equipment for each DS1 type.

**Table 2-1  
DS1/VT Mapper Circuit Pack Installation Locations**

| If your system is   | And you are adding DS1s of type  | Then perform this procedure at            |
|---|----------------------------------|---|
| point-to-point or virtual tributary bandwidth manager (VTBM) ring | TR-303 CSC, TR-08, or DS1 tandem | fiber central office terminal (FCOT) only |
|   | transport DS1s                   | FCOT and remote fiber terminal (RFT)      |
| DS1-fed   | TR-303 CSC, TR-08, or DS1 tandem | RFT only                                  |
| single-ended  | TR-303 CSC, TR-08, or DS1 tandem | not required                              |
|   | transport DS1s                   | RFT only                                  |

### Requirements

**Note:** You must commission the slot locations for each DS1/VT mapper circuit pack that you install. You can commission the slot locations either before or after you install the circuit packs. See the instructions for commissioning a network element in *Commissioning and Testing*, Volume 3, for directions.

Make sure you have the following equipment and materials:

- facility record indicating the slot locations for each circuit pack. For DS1 slot planning and equipping rules, see *Commissioning and Testing*, Volume 3.
- to add a working mapper:
  - DS1/VT mapper circuit pack (NT7E04)
  - DS1 input (NT4K32) cards and cables
  - DS1 output (NT4K33) cards and cables

—continued—

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Procedure 2-2 (continued)  
**Adding DS1 equipment**

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**Note 1:** Provision DS1 facilities for TR-08 systems on an NT7E04CA DS1/VT mapper. The protection mapper must also be an NT7E04CA. To prevent a circuit pack mismatch alarm, replace an NT7E04BA DS1 protection mapper with an NT7E04CA unit *before* adding TR-08 services. (Either mapper, NT7E04BA or NT7E04CA, can carry DS1 facilities for DS1 transport, GR-303 DMS, or DS1 tandem.)

**Note 2:** Before adding TR-08 services, equip the RFT with the NT4K56AC or NT4K56CA transport interface card (TIC), which allows the extraction of alarms and other messages in the derived data link (DDL). If two TICs are installed, both must be of the same model (either NT4K56AC or NT4K56CA). If an earlier version of the TIC is installed, you must replace it, preferably during a low-traffic period. See *Module Replacement Procedures*, 323-3001-547, in *Maintenance*, Volume 5C.

- to add DS1 protection:
  - DS1/VT mapper circuit pack (NT7E04)
  - DS1 protection bridge (NT4K31) cards

The applicable installation manual describes the installation of the I/O cards and DS1 cables.

### **Coordination requirements**

You must inform telephone company maintenance personnel before you perform either of the following actions:

- replace the protection DS1/VT mapper. Inform maintenance personnel of the loss of DS1 protection during circuit pack replacement.
- insert a new DS1/VT mapper. Tell maintenance personnel to expect alarms to be generated because of the autoprovisioning of DS1 ports.



#### **DANGER**

##### **Risk of injury or damage**

Read “Warnings and safety precautions” in “About this document” to minimize any risk to personnel and equipment.

—continued—

2-6 Adding DS1s

Procedure 2-2 (continued)  
Adding DS1 equipment

Action

| Step | Action   |
|------|--|
| 1    | If you are adding a DS1/VT protection mapper or an NT7E04CA DS1/VT working mapper, see Note 1 in the Requirements section of this procedure.   |
| 2    | To remove the cover of the common equipment shelf, turn the right locking fastener one-quarter turn to the right. Turn the left fastener one-quarter turn to the left. Open both latches and pull the cover to remove it.  |
| 3    | Install and terminate the connectorized DS1 cables. Follow the directions in the installation manual that applies to your equipment configuration.   |
| 4    | Install one DS1 input card (NT4K32) and one DS1 output card (NT4K33) or two DS1 protection bridge cards (NT4K31) in the I/O slots that correspond to the DS1/VT mapper being installed. Use the slotted screwdriver to fasten the cards securely.<br><br>See <i>Commissioning and Testing</i> , Volume 3, for the slot association between I/O cards and DS1/VT mappers. |
| 5    | Put on the antistatic wrist strap and make sure it is properly grounded to the electrostatic discharge (ESD) jack on the local craft access panel (LCAP).<br>Figure 2-1 and Figure 2-2 show the location of the jack.  |

Figure 2-1  
ESD jack on the LCAP of the ABM shelf

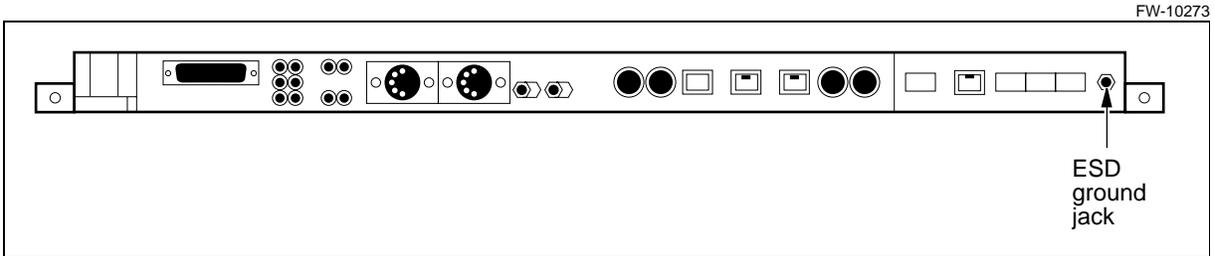
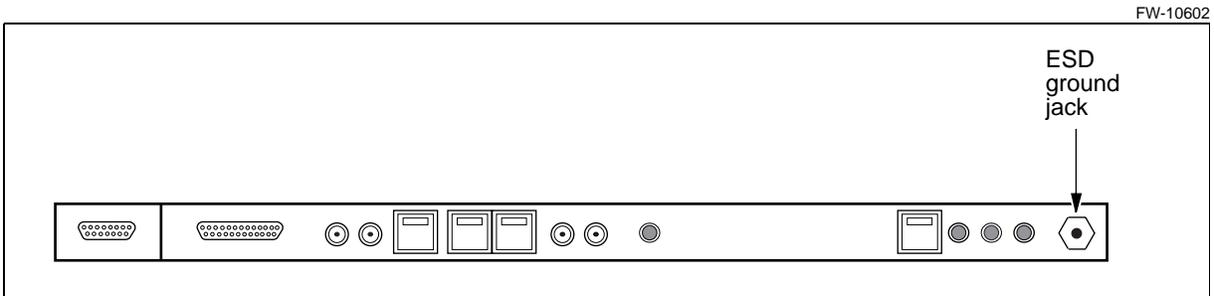


Figure 2-2  
ESD jack on the LCAP of the TBM shelf



—continued—

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 Procedure 2-2 (continued)  
**Adding DS1 equipment**


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| Step  | Action   |
|---|--|
| 6   | Carefully unwrap the DS1/VT mapper circuit pack and check it for damage. If it is damaged, replace it.   |
| 7   | With the top and bottom latches in the closed position, carefully insert each DS1/VT mapper circuit pack into its slot, but leave it disengaged (not inserted into the backplane pins). Latches are illustrated in Figure 2-3 on page 2-8.   |
| <div style="border: 1px solid black; padding: 10px; display: inline-block;">  <p style="margin: 0;"><b>CAUTION</b><br/> <b>Risk of equipment damage</b><br/>           When you seat the circuit pack on the backplane pins, do not force the circuit pack, as that can damage the backplane pins. If you have trouble seating the circuit pack: be sure it is in the correct slot, pull the circuit pack out, and press gently to seat it again.</p> </div> |  |
| 8   | <p>Fully engage each circuit pack, as follows:</p> <ol style="list-style-type: none"> <li>a. Pull open the top and bottom latches.</li> <li>b. Press on the circuit pack faceplate to slide the circuit pack fully into its slot and seat it on the backplane pins. When the circuit pack is seated, the tabs on the top and bottom latches are positioned opposite the grooves in the shelf.</li> <li>c. Close the latches to rotate the tabs into the grooves in the shelf. This seats the circuit pack firmly.</li> </ol> <p><i>A circuit pack is engaged when it is fully inserted into the backplane pins.</i></p> <p><b>Note:</b> The system raises a major alarm (Rx Loss of Signal) for each of the 14 DS1 facilities that are autoprovioned when you insert the circuit pack.</p> |
| 9   | Check that all DS1/VT mapper circuit packs and all I/O cards required for your application are present and inserted in the correct slots.  |
| 10  | After you install all of the circuit packs, remove the antistatic wrist strap.   |
| 11  | Set the facility parameters for the new DS1 equipment. For directions, see the procedure for provisioning DS1 facility parameters in <i>Provisioning and Operations Procedures</i> , 323-3001-310, in <i>Operations, Administration, and Provisioning</i> , Volume 4B.   |
| 12  | Add the DS1 facility assignments. For directions, see For directions, see the procedure for provisioning in <i>Provisioning and Operations Procedures</i> , 323-3001-310, in <i>Operations, Administration, and Provisioning</i> , Volume 4B.  |

—continued—

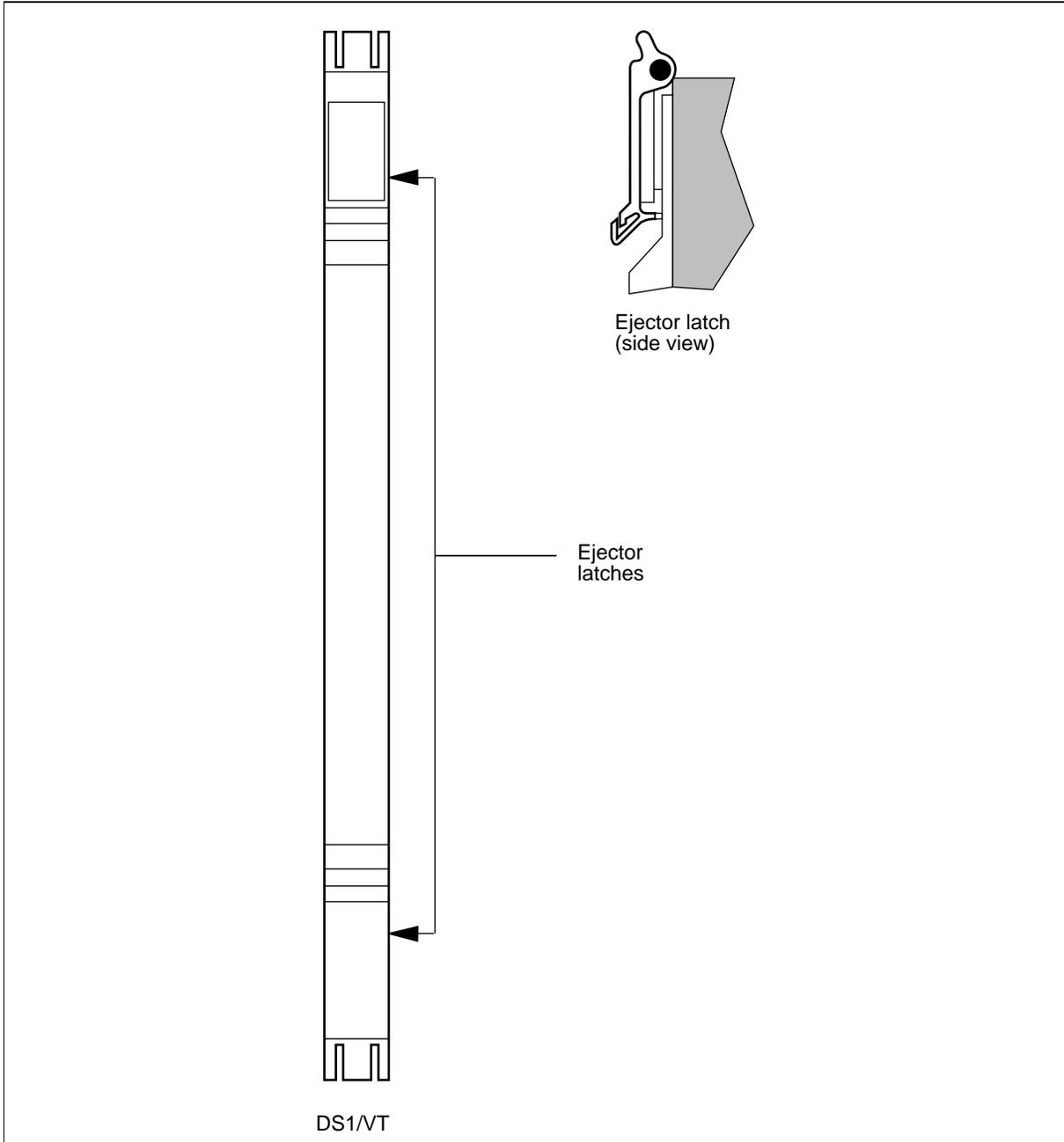
2-8 Adding DS1s

Procedure 2-2 (continued)  
Adding DS1 equipment

| Step | Action |
|------|--------|
|------|--------|

Figure 2-3  
Circuit pack latches

FW-10799



—end—

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## Procedure 2-3

# Testing a new DS1 transport facility on an in-service DS1/VT mapper

---

Use this procedure to check end-to-end continuity of a DS1 facility on a DS1/VT mapper that is in service and carrying live traffic. The DS1 facility being tested is *not* in service.

This procedure uses both the terminal loopback feature of the DS1/VT mapper circuit pack and the remote network element login feature. The procedure applies to a point-to-point system or a single-ended system.

**Note 1:** A single technician at the central office can perform this procedure.

**Note 2:** This procedure applies to both point-to-point systems and single-ended systems. Before testing a single-ended system, notify network surveillance personnel to expect alarms on the DS1 facility being tested.

**Note 3:** For proper protection against electromagnetic interference, replace the shelf cover after you have finished the test.

## Requirements

Before you begin this procedure you must do the following:

- make sure the new DS1 facility is available between the remote fiber terminal (RFT) and the central office DS1 cross-connect panel
- know how to log in to and out of both the operations controller (OPC) and the remote network element. See *Network Element User Interface Description*, 323-3001-300, and *OPC User Interface Description*, 323-3001-301, in *Operations, Administration, and Provisioning*, Volume 4A.

The following equipment is required:

- a VT100-compatible user terminal
- a DS1 transmission test set, Tau-Tron S5104, or equivalent
- two electrical test cords, P3Q3B
- a System Expansion Test Results form

—continued—

Procedure 2-3 (continued)

**Testing a new DS1 transport facility on an in-service DS1/VT mapper**



**DANGER**

**Risk of injury or damage**

Read “Warnings and safety precautions” in “About this document” to minimize any risk to personnel and equipment.



**CAUTION**

**Risk of service loss**

Do not use the 3 in 24 or 1 in 8 test patterns if you are testing DS1s using loopbacks, and your system is provisioned for all of the following:

- Superframe frame format
- alternate mark inversion (AMI) line coding
- bytesynchronous synchronization mode

If you use these patterns, traffic is not restored if you remove the loopback and re-insert it. To restore traffic, place the facility out of service, then back in service.



**CAUTION**

**This equipment is in service.**

Use care during this procedure to make sure customer service is not interrupted.

**Action**

| Step | Action  |
|------|---|
| 1    | Log in to the remote fiber terminal (RFT).<br><i>The Network Element Status screen appears.</i>   |
| 2    | Display the Detail Protection screen for DS1/VT mapper circuit packs by entering:<br><b>pr;dtlprot ds1 ↵</b><br><i>The DS1 Protection screen appears.</i> |

—continued—

---

 Procedure 2-3 (continued)

**Testing a new DS1 transport facility on an in-service DS1/VT mapper**


---

- | Step | Action   |
|------|--|
| 3    | Impose a lockout on the DS1/VT mapper circuit pack under test (so that it cannot be protected) by entering:<br><b>lockout op &lt;circuit pack group&gt; ↵</b><br>where<br><circuit pack group>      group number of the mapper circuit pack under test<br><br><i>You are prompted to confirm the command.</i><br>Enter:<br><b>y ↵</b><br><i>The DS1 protection screen displays an asterisk (*) in the Lockout field.</i> |
| 4    | Display the DS1 Facility screen by entering:<br><b>facility ds1 &lt;circuit pack group&gt; &lt;port&gt; ↵</b><br>where<br><circuit pack group>      group number from step 3<br><port>                      number of the new DS1 facility: <b>1 to 14</b><br><br><i>The DS1 Facility screen appears.</i>  |
| 5    | Take the DS1 facility out of service by entering:<br><b>chgstate oos ↵</b><br><i>You are prompted to confirm the command.</i><br>Enter:<br><b>y ↵</b><br><i>The screen displays a message indicating the command has been completed successfully.</i>  |
| 6    | For a point-to-point system, log in to the fiber central office terminal (FCOT) and repeat steps 2 through 3. Skip this step for a single-ended system.  |
| 7    | At the RFT user interface, loop back the new facility by entering:<br><b>loopback op term ↵</b><br><i>The following message appears:</i><br>Loopback command successful.   |
| 8    | At the DS1 cross-connect, connect the Out jack of the DS1 test set to the In jack of the new DS1 facility. Connect the In jack of the test set to the Out jack of the same DS1 facility.   |

—continued—

2-12 Adding DS1s

Procedure 2-3 (continued)

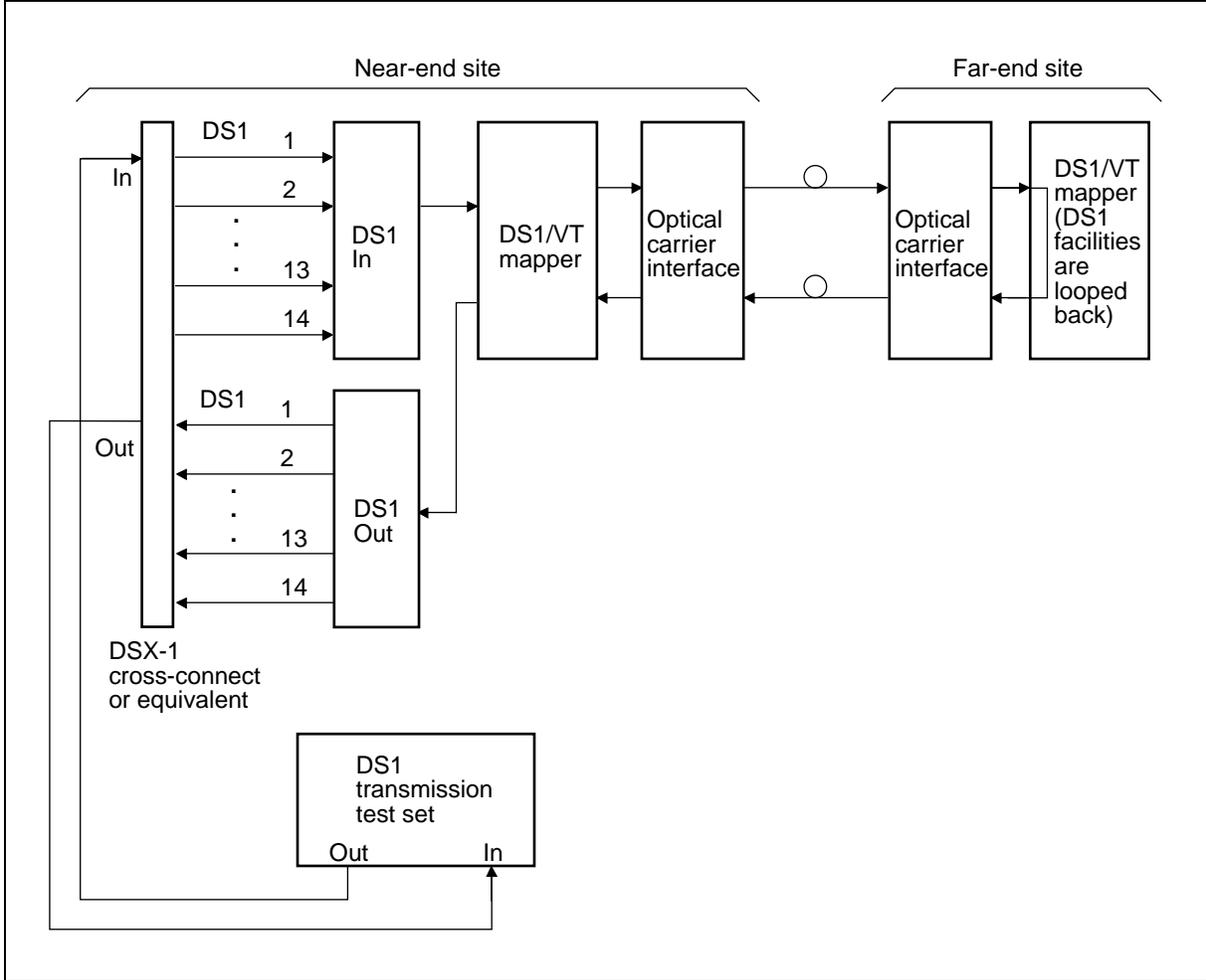
Testing a new DS1 transport facility on an in-service DS1/VT mapper

**Step Action**

Figure 2-4 shows a point-to-point system. The test setup for a single-ended system is the same.

**Figure 2-4**  
Test arrangement for testing a new facility

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- 9 To reset the error count to zero, press the **Start/Stop** button on the test set 2 times.

*The receiver test set indicates "in process" and displays 0 bit errors.*

—continued—

---

 Procedure 2-3 (continued)

**Testing a new DS1 transport facility on an in-service DS1/VT mapper**


---

| Step      | Action   |
|-----------|--|
| <b>10</b> | <p>Press the <b>Single-bit error inject</b> button 3 times.</p> <p><i>The test set indicates "in process" and displays 3 errors.</i></p> <p>If the continuity requirement is not met, perform the following substeps in the order in which they are listed until the problem is resolved.</p> <ol style="list-style-type: none"> <li>a. Check the DS1 test set and its connections to the DS1 cross-connect panel, then repeat steps 9 and 10.</li> <li>b. Check the connections from the DS1 cross-connect panel to the DS1 In and DS1 Out cards (<i>do not remove any connections on cables carrying live DS1 traffic</i>), then repeat steps 9 and 10.</li> <li>c. Use another spare port, if one is available, then repeat steps 4 through 10.</li> <li>d. If this is a point-to-point system, perform a DS1 facility loopback (parameter: fac) at the FCOT to isolate the problem to one network element or the other. Repeat steps 9 and 10.</li> <li>e. Manually switch to DS1 protection to isolate a DS1/VT mapper problem. If warranted, replace the DS1/VT mapper circuit pack (see <i>Module Replacement Procedures, 323-3001-547, in Maintenance, Volume 5C</i>). Repeat steps 9 and 10.</li> </ol>   |
| <b>11</b> | <p>Press the <b>Start/Stop</b> button 2 times to reset the error count to zero. Monitor the error count for 3 hours and record the results in the System Expansion Test Results form.</p> <p><i>The test set displays 0 errors.</i></p> <p>If the bit-error requirement is not met, perform the following substeps in the order in which they are listed until the problem is resolved.</p> <ol style="list-style-type: none"> <li>a. Check the DS1 test set and its connections to the DS1 cross-connect panel, then repeat steps 9 through 11.</li> <li>b. Check the connections from the DS1 cross-connect panel to the DS1 In and DS1 Out cards (<i>do not remove any connections on cables carrying live DS1 traffic</i>), then repeat steps 9 through 11.</li> <li>c. Use another spare port, if one is available, then repeat steps 4 through 11.</li> <li>d. If this is a point-to-point system, perform a DS1 facility loopback (parameter: fac) at the FCOT to isolate the problem to one network element or the other. Repeat steps 9 through 11.</li> <li>e. Manually switch to DS1 protection to isolate a DS1/VT mapper problem. If warranted, replace the DS1/VT mapper circuit pack (see <i>Module Replacement Procedures, 323-3001-547, in Maintenance, Volume 5C</i>). Repeat steps 9 through 11.</li> </ol> |

—continued—

2-14 Adding DS1s

---

Procedure 2-3 (continued)

**Testing a new DS1 transport facility on an in-service DS1/VT mapper**

---

| <b>Step</b> | <b>Action</b>   |
|-------------|---|
| 12          | At the central office, remove the test equipment at the DS1 cross-connect panel.  |
| 13          | At the RFT user interface, remove the loopback for the new DS1 facility by entering:<br><b>facility ds1 &lt;circuit pack group&gt; &lt;port&gt;</b> ↵<br>where<br><b>&lt;circuit pack group&gt;</b> group from step 3<br><b>&lt;port&gt;</b> port from step 4<br><br><i>The DS1 Facility screen appears.</i><br>Enter:<br><b>loopback re</b> ↵<br><i>The following message appears:</i><br>Loopback command successful. |
| 14          | Release the lockout by entering:<br><b>dtlprot ds1</b> ↵<br><b>lockout re &lt;circuit pack group&gt;</b> ↵<br>where<br><b>&lt;circuit pack group&gt;</b> group from step 3<br><br><i>You are prompted to confirm the command.</i><br>Enter:<br><b>y</b> ↵<br><i>The DS1 protection screen displays a dot (.) in the Lockout field for the DS1/VT mapper.</i>  |
| 15          | Log out of the remote fiber terminal by entering:<br><b>logout</b> ↵  |

—continued—

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Procedure 2-3 (continued)

**Testing a new DS1 transport facility on an in-service DS1/VT mapper**

---

**Step Action**

---

**16** Complete the instructions in the following table:

| <b>If you have a</b>  | <b>Then</b>   |
|-----------------------|---|
| single-ended system   | When you are ready to add traffic, provision the DS1 facility with the desired parameter values, then place the facility into service.<br><br>See <i>Provisioning and Operations Procedures</i> , 323-3001-310, in <i>Operations, Administration, and Provisioning</i> , Volume 4B. |
| point-to-point system | Repeat steps 13 and 14 at the FCOT user interface, then log out of the FCOT.<br><br><b>Note:</b> To avoid alarms, leave the DS1 facility out of service (OOS).  |

—end—

## Procedure 2-4

# Testing continuity on a new DS1/VT mapper for transport DS1s

---

Use this procedure to check end-to-end signal continuity and measure the bit error rate (BER) on all DS1s on a new DS1/VT mapper. The DS1s are daisy-chained at the DSX-1 cross-connect panel so that they can be tested in one operation.

**Note 1:** A single technician can perform this procedure using the terminal loopback feature of the DS1/VT mapper circuit pack and the remote network element login feature.

**Note 2:** This procedure applies to both point-to-point and single-ended systems. Before testing a single-ended system, notify network surveillance personnel to expect alarms on the DS1 facilities being tested.

**Note 3:** For proper protection from electromagnetic interference, replace the shelf cover after you have finished the test.

## Requirements

Before you begin this procedure, you must do the following:

- make sure the new DS1 facilities are available between the remote fiber terminal (RFT) and the central office DS1 cross-connect panel
- make sure DS1s have been provisioned to correspond with the appropriate terminating equipment
- set up the DS1 transmission test set as described in Procedure 2-1, “Verifying DS1 transmission test set performance,” on page 2-2
- know how to log in to the remote network element. See *Network Element User Interface Description, 323-3001-300*, in *Operations, Administration, and Provisioning, Volume 4A*.

The following equipment is required:

- a DS1 transmission test set, Tau-Tron S5104, or equivalent
- two electrical test cords, P3Q3B
- thirteen electrical test cords, bantam-to-bantam connectors, 1 m (3 ft), used as DSX-1 jumpers
- a System Expansion Test Results form

—continued—

Procedure 2-4 (continued)

**Testing continuity on a new DS1/VT mapper for transport DS1s**



**DANGER**

**Risk of injury or damage**

Read “Warnings and safety precautions” in “About this document” to minimize any risk to personnel and equipment.



**CAUTION**

**Risk of service loss**

Do not use the 3 in 24 or 1 in 8 test patterns if you are testing DS1s using loopbacks, and your system is provisioned for all of the following:

- Superframe frame format
- alternate mark inversion (AMI) line coding
- bytesynchronous synchronization mode

If you use these patterns, traffic is not restored if you remove the loopback and re-insert it. To restore traffic, place the facility out of service, then back in service.

**Action**

| Step | Action  |
|------|---|
| 1    | Log in to the RFT user interface.<br><i>The Network Element Status screen appears.</i>  |
| 2    | Display the Detail Protection screen for DS1/VT mapper circuit packs by entering:<br><b>pr;dtlprot ds1 ↵</b><br><i>The DS1 Protection screen appears.</i> |

—continued—

Procedure 2-4 (continued)

**Testing continuity on a new DS1/VT mapper for transport DS1s**

---

- | Step | Action  |
|------|---|
| 3    | <p>Impose a lockout on the new DS1/VT mapper circuit pack (so that it cannot be protected) by entering:</p> <p><b>lockout op &lt;circuit pack group&gt; ↵</b></p> <p>where</p> <p>&lt;circuit pack group&gt; group number associated with the DS1/VT mapper slot being provisioned. See "Group and slot associations for DS1, DS3, STS-1, OC-3, and OC-12" on page 1-27.</p> <p><i>You are prompted to confirm the command.</i></p> <p>Enter:</p> <p><b>y ↵</b></p> <p><i>The DS1 protection screen displays an asterisk (*) in the Lockout field for the mapper.</i></p> |
| 4    | <p>Take the DS1 facilities out of service by entering:</p> <p><b>facility ds1 &lt;circuit pack group&gt; all ↵</b></p> <p>where</p> <p>&lt;circuit pack group&gt; group from step 3</p> <p><i>The DS1 Facility screen appears.</i></p> <p>Enter:</p> <p><b>chgstate oos ↵</b></p> <p><i>You are prompted to confirm the command.</i></p> <p>Enter:</p> <p><b>y ↵</b></p> <p><i>The screen displays a message indicating that the command has been completed successfully.</i></p>   |
| 5    | <p>For a point-to-point system, log in to the remote network element and repeat steps 2 through 3. Skip this step for a single-ended system.</p>  |
| 6    | <p>At the remote network element, set up a terminal loopback for all DS1s on this circuit pack group by entering:</p> <p><b>loopback op term ↵</b></p> <p><i>The following message appears:</i></p> <p>The Loopback command was successful in all cases.</p>  |

—continued—

Procedure 2-4 (continued)

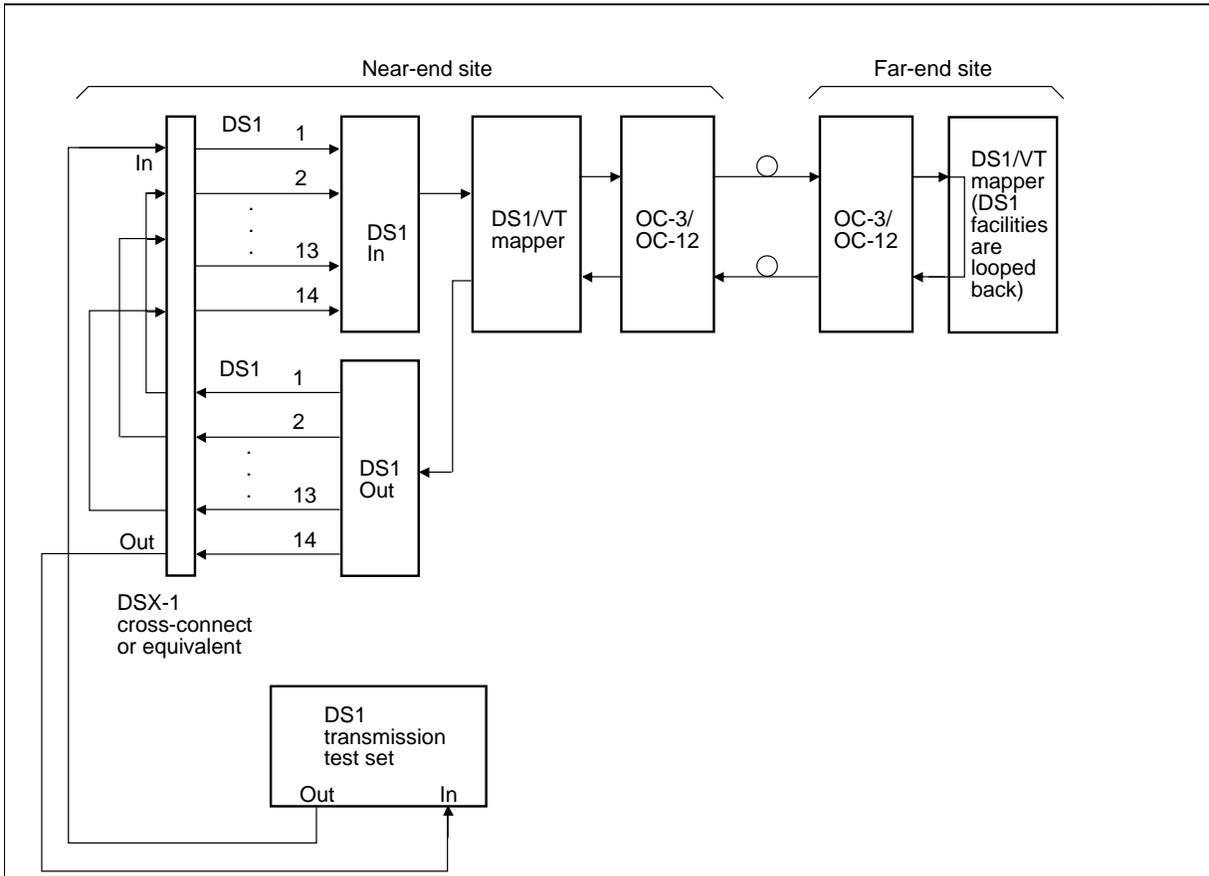
**Testing continuity on a new DS1/VT mapper for transport DS1s**

- | Step | Action   |
|------|--|
| 7    | <p>At the local network element, complete the following instructions to daisy-chain all DS1 circuits of the DS1/VT mapper circuit pack being tested.</p> <ol style="list-style-type: none"> <li>At the DSX-1 cross-connect panel, use a test cord to loop the output of the first DS1 to the input of the next DS1.</li> <li>Daisy-chain in this manner until all DS1s on the circuit pack are included.</li> <li>Connect the output of the DS1 transmission test set to the input of the first DS1. Connect the input of the test set to the output of the last DS1.</li> </ol> |

Figure 2-5, illustrates a point-to-point system. The test setup for a single-ended system is the same.

**Figure 2-5  
Daisy Chain for DS1 circuits for transport DS1s**

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—continued—

Procedure 2-4 (continued)

**Testing continuity on a new DS1/VT mapper for transport DS1s**

---

| <b>Step</b> | <b>Action</b>  |
|-------------|--|
| <b>8</b>    | Press the <b>Start/Stop</b> button 2 times to reset the error count to zero.<br><i>The receiver test set indicates "in process" and displays 0 bit errors.</i>   |
| <b>9</b>    | Press the <b>Single-bit error inject</b> button 3 times.<br><i>The test set indicates "in process" and displays 3 errors.</i><br><br>If the continuity requirement is not met, perform the following substeps in the order they are listed until the problem is resolved. <ol style="list-style-type: none"><li>Check the test set and its connections to the DS1 cross-connect panel, then repeat steps 8 and 9.</li><li>Check the connections from the DS1 cross-connect to the DS1 In and DS1 Out cards, then repeat steps 8 and 9.</li><li>Replace the DS1/VT mapper (see <i>Module Replacement Procedures</i>, 323-3001-547, in <i>Maintenance</i>, Volume 5C), then repeat steps 8 and 9.</li><li>Replace any faulty DS1 In card or DS1 Out card, then repeat steps 8 and 9. Installing cards in the I/O section is described in the <i>Bay in Central Office Installation Manual—ABM</i>, 323-3001-201.</li></ol> |
| <b>10</b>   | Press the <b>Start/Stop</b> button 2 times to reset the error count to zero. Monitor the error count for 1 hour and record the results in the System Expansion Results form.<br><i>The test set displays 0 errors.</i><br><b>Note:</b> If the bit-error requirement is not met, isolate and fix any problems as suggested in step 9, then repeat steps 8 through 10.   |
| <b>11</b>   | Remove the daisy chain patch cords and the test cords to the DS1 transmission test set.  |
| <b>12</b>   | Remove the terminal loopback at the remote network element by entering:<br><b>loopback re ↵</b><br><i>The following message appears:</i><br><br>The Loopback command was successful in all cases.  |

—continued—

---

Procedure 2-4 (continued)

**Testing continuity on a new DS1/VT mapper for transport DS1s**

---

- | <b>Step</b> | <b>Action</b>  |
|-------------|--|
| <b>13</b>   | <p>Release the lockout of the new DS1/VT mapper by entering:</p> <pre>dtlprot ↵<br/>lockout re &lt;circuit pack group&gt; ↵</pre> <p>where</p> <p>&lt;circuit pack group&gt; group from step 3</p> <p><i>You are prompted to confirm the command.</i></p> <p>Enter:</p> <pre>y ↵</pre> <p><i>The DS1 protection screen displays a dot (.) in the Lockout field for the mapper.</i></p> |
| <b>14</b>   | <p>Log out of the RFT user interface.</p>  |
| <b>15</b>   | <p>For a point-to-point system, repeat steps 12 through 14 at the fiber central office terminal (FCOT).</p> <p><b>Note:</b> To avoid alarms, leave the facilities out of service.</p>  |
| <b>16</b>   | <p>When you are ready to add traffic, provision the required parameter values for the DS1 facility and place it into service. See <i>Provisioning and Operations Procedures</i>, 323-3001-310, in <i>Operations, Administration, and Provisioning</i>, Volume 4B.</p>  |

—end—

## Procedure 2-5

# Testing continuity on a new DS1/VT mapper for GR-303 DMS or tandem DS1s

---

Use this procedure to check DS1 signal continuity and to measure the bit error rate (BER) on all DS1s on a new DS1/VT mapper. The DS1/VT mapper must be installed for GR-303 DMS, TR-08, or DS1 tandem circuits at the fiber central office terminal (FCOT). By daisy-chaining the DS1s at the DSX-1 cross-connect panel, you can test all of the DS1s in one operation.

*Note:* A single technician can perform this procedure using the local DS1 loopback feature of the DS1/VT mapper circuit pack.

### Requirements

Before you begin this procedure, make sure DS1s have been provisioned to correspond with the appropriate terminating equipment.

The following equipment is required:

- a DS1 transmission test set, Tau-Tron S5104, or equivalent
- two electrical test cords, P3Q3B
- thirteen electrical test cords, bantam-to-bantam connectors, 1 m (3 ft), used as DSX-1 jumpers
- a System Expansion Test Results form

*Note:* The DS1 transmission test set must be set up as described in Procedure 2-1, “Verifying DS1 transmission test set performance,” on page 2-2.



#### **DANGER**

##### **Risk of injury or damage**

Read “Warnings and safety precautions” in “About this document” to minimize any risk to personnel and equipment.

—continued—

Procedure 2-5 (continued)

**Testing continuity on a new DS1/VT mapper for GR-303 DMS or tandem DS1s**



**CAUTION**

**Risk of service loss**

Do not use the 3 in 24 or 1 in 8 test patterns if you are testing DS1s using loopbacks, and your system is provisioned for all of the following:

- Superframe frame format
- alternate mark inversion (AMI) line coding
- bytesynchronous synchronization mode

If you use these patterns, traffic is not restored if you remove the loopback and re-insert it. To restore traffic, place the facility out of service, then back in service.

**Action**

| Step | Action  |
|------|---|
| 1    | <p>Log in to the central office network element.<br/><i>The Network Element Status screen appears.</i></p>  |
| 2    | <p>Display the Detail Protection screen for DS1/VT mapper circuit packs by entering:<br/><b>pr;dtlprot ds1</b> ↵<br/><i>The DS1 Protection screen appears.</i></p>  |
| 3    | <p>Impose a lockout on the new DS1/VT mapper circuit pack (so that it cannot be protected) by entering:<br/><b>lockout op &lt;circuit pack group&gt;</b> ↵<br/>where<br/><b>&lt;circuit pack group&gt;</b> group number associated with the new mapper circuit pack. See "Group and slot associations for DS1, DS3, STS-1, OC-3, and OC-12" on page 1-27.</p> <p><i>You are prompted to confirm the command.</i><br/>Enter:<br/><b>y</b> ↵<br/><i>The DS1 protection screen displays an asterisk (*) in the Lockout field for the mapper.</i></p> |

—continued—

Procedure 2-5 (continued)

**Testing continuity on a new DS1/VT mapper for GR-303 DMS or tandem DS1s**

---

| <b>Step</b> | <b>Action</b>   |
|-------------|---|
| <b>4</b>    | <p>On the DS1 Facility screen, take the DS1 facilities out of service by entering:<br/><b>facility ds1 &lt;circuit pack group&gt; all</b> ↵</p> <p>where<br/>&lt;circuit pack group&gt; group from step 3</p> <p><i>The DS1 Facility screen appears.</i></p> <p>Enter:<br/><b>chgstate oos</b> ↵</p> <p><i>You are prompted to confirm the command.</i></p> <p>Enter:<br/><b>y</b> ↵</p> <p><i>The screen displays a message indicating that the command has been completed successfully.</i></p>   |
| <b>5</b>    | <p>Set up a local DS1 loopback for all DS1s on this circuit pack group by entering:<br/><b>loopback op fac</b> ↵</p> <p><i>The following message appears:</i></p> <p>The Loopback command was successful in all cases.</p>  |
| <b>6</b>    | <p>Complete the following instructions to daisy-chain all DS1 circuits of the DS1/VT mapper circuit pack being tested.</p> <ol style="list-style-type: none"><li>At the DSX-1 cross-connect panel, use a test cord to loop the output of the first DS1 to the input of the next DS1.</li><li>Daisy-chain in this manner until all DS1s on the circuit pack are included.</li><li>Connect the transmit side of the transmission test set to the input of the first DS1. Connect the receiver side of the test set to the output of the last DS1.</li></ol> |

Figure 2-6 on page 2-25 illustrates the daisy chain.

—continued—

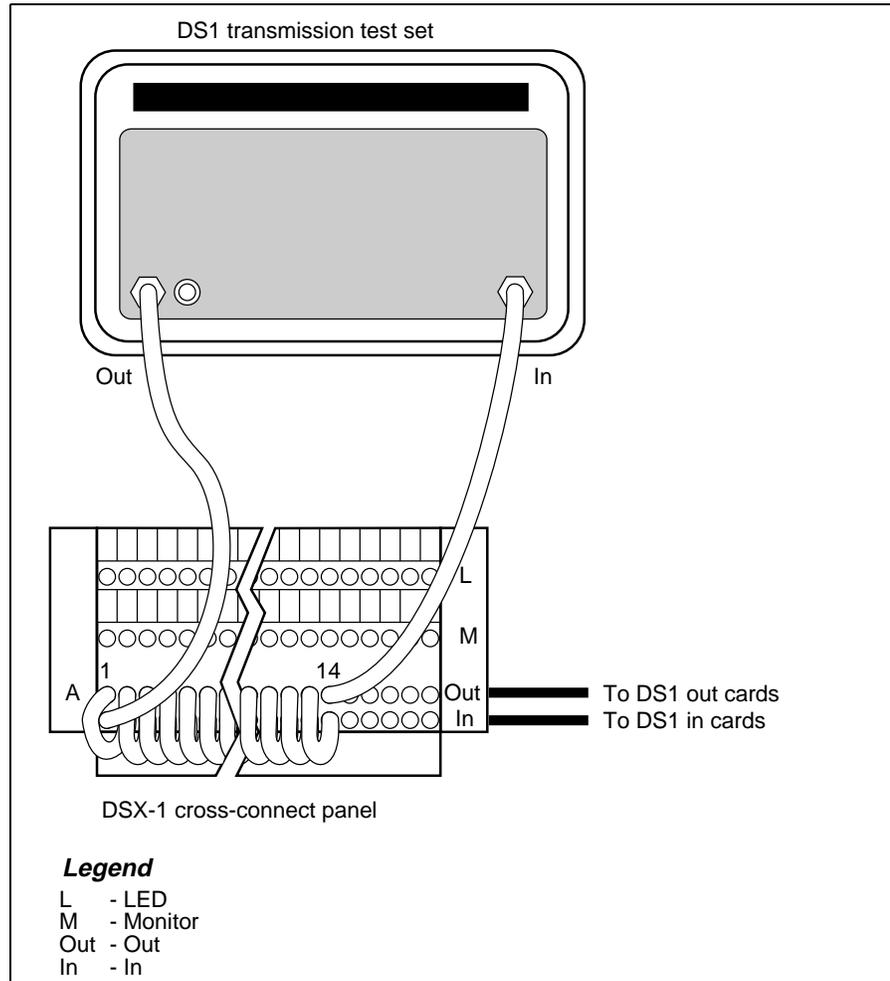
Procedure 2-5 (continued)

**Testing continuity on a new DS1/VT mapper for GR-303 DMS or tandem DS1s**

**Step Action**

**Figure 2-6  
Daisy chain for DS1 circuits for GR-303 DMS or tandem DS1s**

FW-10555



—continued—

Procedure 2-5 (continued)

**Testing continuity on a new DS1/VT mapper for GR-303 DMS or tandem DS1s**

---

| <b>Step</b> | <b>Action</b>   |
|-------------|---|
| 7           | Press the <b>Start/Stop</b> button 2 times to reset the error count to zero.<br><i>The receiver test set indicates "in process" and displays 0 bit errors.</i>  |
| 8           | Press the <b>Single-bit error inject</b> button 3 times.<br><i>The test set indicates "in process" and displays 3 errors.</i><br><br>If the continuity requirement is not met, perform the following substeps in the order they are listed until the problem is resolved. <ol style="list-style-type: none"><li>Check the test set and the connections from the DSX-1 cross-connect to the DS1 In and DS1 Out cards, then repeat steps 7 and 8.</li><li>Replace any faulty DS1 input card or DS1 output card, then repeat steps 7 and 8. Installing cards in the I/O section is described in <i>Bay in Central Office Installation Manual for ABM</i>, 323-3001-201.</li><li>Replace the DS1/VT mapper circuit pack, then repeat steps 7 and 8. See <i>Module Replacement Procedures</i>, 323-3001-547, in <i>Maintenance</i>, Volume 5C.</li></ol> |
| 9           | Press the <b>Start/Stop</b> button 2 times to reset the error count to zero. Monitor the error count for 1 hour and record the results in the System Expansion Test Results form.<br><i>The test set displays 0 errors.</i><br><br><b>Note:</b> If the bit-error requirement is not met, isolate and fix any problems as suggested in step 8, then repeat steps 7 through 9.  |
| 10          | Remove the daisy chain patch cords and the test cords to the DS1 transmission test set.   |
| 11          | Remove the local DS1 loopback by entering:<br><b>loopback re ↵</b><br><i>The following message appears:</i><br>The Loopback command was successful in all cases.  |

—continued—

---

Procedure 2-5 (continued)

**Testing continuity on a new DS1/VT mapper for GR-303 DMS or tandem DS1s**

---

| <b>Step</b> | <b>Action</b>  |
|-------------|--|
| <b>12</b>   | <p>Release the lockout of the new mapper by entering:</p> <pre><b>dtlprot</b> ↵<br/><b>lockout re &lt;circuit pack group&gt;</b> ↵</pre> <p>where</p> <p>&lt;circuit pack group&gt; group from step 3</p> <p><i>You are prompted to confirm the command.</i></p> <p>Enter:</p> <pre><b>y</b> ↵</pre> <p><i>The DS1 protection screen displays a dot (.) in the Lockout field for the mapper.</i></p> |
| <b>13</b>   | <p>Log out of the user interface.</p> <p><b>Note:</b> Leave the facilities out of service.</p>   |
| <b>14</b>   | <p>When you are ready to add traffic, provision the facility and put it into service. See <i>Provisioning and Operations Procedures</i>, 323-3001-310, in <i>Operations, Administration, and Provisioning</i>, Volume 4B.</p>  |

—end—

## Procedure 2-6 Transferring an existing OPC to another shelf

---

Use this procedure to move an in-service operations controller (OPC) from one common-equipment shelf to another. The procedure includes the following tasks:

- removing an in-service OPC from an access bandwidth manager (ABM) common-equipment shelf
- installing the OPC in another fiber central office terminal (FCOT) under the same span of control so that it continues to serve the same network elements

Use this procedure when slots 5 through 8 in an ABM common-equipment shelf are occupied by an OPC, but one or more of the slots is needed for DS1 or DS3 equipment.

*Note:* This procedure refers to the ABM common-equipment shelf in which the OPC currently resides as shelf A and to the common-equipment shelf to which the OPC is being moved as shelf B.



**DANGER**

**Risk of injury or damage**

Read “Warnings and safety precautions” in “About this document” to minimize any risk to personnel and equipment.



**CAUTION**

**Do not perform any actions that can affect service.**

Follow this procedure carefully to minimize any risk of loss of service.

—continued—

---

Procedure 2-6 (continued)

### Transferring an existing OPC to another shelf

---

## Requirements

### Required central office activities

This procedure requires the following activities at the central office:

- backing up the data from each network element within the OPC span of control to the OPC database
- backing up the OPC database to tape
- editing the network element commissioning data for shelf A
- completing the following operations to transfer the OPC:
  - deleting the OPC equipment using the Fiberworld product user interface (FWPUI) for shelf A
  - shutting down and removing the OPC equipment on shelf A
  - installing the OPC on shelf B
- testing the OPC on shelf B for proper functioning
- editing the network element commissioning data for shelf B

### Required conditions

This procedure requires the following conditions:

- The OPC clock battery is charged, and the OPC time and date are correct, so that the OPC time and date will not have to be reset after the transfer.
- Shelf B is either an ABM or a TBM (transport bandwidth manager) shelf.
- Shelf B is commissioned, tested, and ready for service.
- Shelves A and B are served by the OPC located in shelf A and are connected by a control network (CNET) cable.
- The system type in the commissioning system-level data is, and must remain, AccessNode.
- The OPC slots in shelf B are empty and not already provisioned. If this is not the case, refer to deprovisioning procedures in *Provisioning and Operations Procedures*, 323-3001-310, in *Operations, Administration, and Provisioning*, Volume 4B, and to removal procedures in *Module Replacement Procedures*, 323-3001-547, in *Maintenance*, Volume 5C.

—continued—

Procedure 2-6 (continued)

**Transferring an existing OPC to another shelf**

---

**Required equipment and materials**

The following equipment and materials are required:

- one blank tape to back up the OPC database before the configuration is changed
- a VT100-compatible terminal connected to OPC port 1 on shelf A (see setup and login procedures in *Network Element User Interface Description*, 323-3001-300, in *Operations, Administration, and Provisioning*, Volume 4A)
- the existing Commissioning Data Record form for the OPC, which should be on file for this network element

**Action**

---

**Step    Action**

---

This procedure is divided into the following sections:

- Backing up data
- Editing commissioning data for shelf A
- Transferring the OPC
- Testing the OPC on shelf B
- Editing commissioning data for shelf B

Complete all sections from “Backing up data” through “Editing commissioning data for shelf B.” Do not pause between sections.

**Backing up data**

- 1        For each network element within the OPC span of control, log in to FWPUI and back up the network element’s data to the OPC database.  
  
See the procedures for logging in to a network element from the OPC in *Network Element User Interface Description*, 323-3001-300, in *Operations, Administration, and Provisioning*, Volume 4A, and for performing a manual backup of a network element database in *Data Administration Procedures*, 323-3001-304, in *Operations, Administration, and Provisioning*, Volume 4A.
- 2        Prepare a backup tape of the OPC database.  
  
See the procedures for saving OPC data to tape in *Data Administration Procedures*, 323-3001-304, in *Operations, Administration, and Provisioning*, Volume 4A.  
  
Go to step 3.

—continued—

---

 Procedure 2-6 (continued)

**Transferring an existing OPC to another shelf**


---

| Step | Action |
|------|--------|
|------|--------|

**Editing commissioning data for shelf A**

- |           |  |
|-----------|--|
| <b>3</b>  | Log in to the OPC and open the Commissioning Manager tool.<br><i>The Commissioning Manager main window appears.</i>  |
| <b>4</b>  | Select the network element representing shelf A from the list of network elements, then press <b>Ctrl_L</b> (or Keypad <b>Enter</b> ) to display the List item menu.   |
| <b>5</b>  | To select the <b>Edit</b> option in the List item menu, press <b>Spacebar</b> (or Keypad <b>0</b> ).<br><i>The Network Element Commissioning Data dialog for shelf A appears.</i>  |
| <b>6</b>  | Tab to the field containing the 3 OPC radio buttons.   |
| <b>7</b>  | Move to the <b>no OPC</b> button, then press <b>Ctrl_A</b> (or Keypad <b>0</b> ).<br><i>A mark appears between the brackets beside no OPC.</i>   |
| <b>8</b>  | Record the change in commissioning data for this network element on the Commissioning Data Record form.  |
| <b>9</b>  | To complete the entry of commissioning data, tab to the <b>OK</b> button, then press <b>Ctrl_A</b> (or Keypad <b>0</b> ).<br><i>If you select OK and have entered the information correctly, the dialog is removed.</i>  |
|           | <b>Note:</b> If any essential data is missing or entered incorrectly, an error dialog explaining the nature of the problem appears. In addition, the Network Element Commissioning Data dialog remains displayed, and each field that needs data or contains erroneous data displays an X. |
| <b>10</b> | Close the Commissioning Manager tool.<br>Go to step 11.  |

—continued—

Procedure 2-6 (continued)

**Transferring an existing OPC to another shelf**

**Step Action**

**Transferring the OPC**

- 11 Open the network element login tool and log in to FWPUJ for shelf A.
- 12 In FWPUJ at shelf A, place the OPC equipment out of service by entering:  
**eq opc** ↵  
*The OPC Equipment screen appears.*  
Enter:  
**chgstate oos** ↵  
**y** ↵  
*The OPC Equipment is placed out of service.*
- 13 Delete the OPC equipment by entering:  
**del** ↵  
*The OPC Equipment is deleted (deprovisioned) from shelf A.*
- 14 Log out of FWPUJ for shelf A and close the OPC network element login tool.
- 15 Shut down and remove the OPC equipment on shelf A.  
See the procedure for shutting down an OPC in *Commissioning and Testing*, Volume 3.



**CAUTION**

**Electrostatic sensitive devices**

Avoid touching any components on the printed circuit board. Electrostatic discharge can damage electrostatic-sensitive devices. Use antistatic protection before handling the circuit pack.



**DANGER**

**Risk of injury or damage**

The OPC module is heavy. To avoid personal injury or equipment damage, use two hands to support the module when you remove it.

- 16 Install the OPC in slots 5 to 8 of shelf B.  
*The OPC may take up to 15 minutes to initialize. When it is ready, the login prompt (login:) appears at the user terminal. The OPC autoprovisions on shelf B and sets up an association with each network element under its control.*  
Go to step 17.

—continued—

---

 Procedure 2-6 (continued)

**Transferring an existing OPC to another shelf**


---

| Step | Action |
|------|--------|
|------|--------|

**Testing the OPC on shelf B**

- |    |  |
|----|--|
| 17 | Connect the VT100-compatible terminal to OPC Port 1 on shelf B.  |
| 18 | Log in to the OPC and open the Reboot/Load Manager tool.<br><i>The Reboot/Load Manager main window appears.</i><br><b>Note:</b> Login may be denied because the OPC may not be active yet. If this happens, wait at least 3 minutes, then repeat this step.  |
| 19 | To make sure this OPC has an association with every network element within its span of control, verify that no question marks (?) appear in the margin to the left of any network element.<br><br><i>A question mark to the left of a network element indicates loss of association between the OPC and the network element. It may take 5 to 10 minutes for the association to come up. When it does, the question mark disappears.</i><br><br>If a question mark remains after 10 minutes, try one or more of the following actions: <ul style="list-style-type: none"> <li>• Check the CNET cable to the adjacent common-equipment shelf.</li> <li>• Log in to the network element (shelf B) and perform a remote login to the OPC (in FWPUI, quit to the CI level, and use the <b>rlogin</b> command).</li> <li>• Call your Northern Telecom representative.</li> </ul> Go to step 20. |

**Editing commissioning data for shelf B**

- |    |  |
|----|--|
| 20 | Open the Commissioning Manager tool.<br><i>The OPC Commissioning Manager main window appears.</i>  |
| 21 | Select the network element representing shelf B from the list of network elements, then press <b>Ctrl_L</b> (or Keypad <b>Enter</b> ) to display the list item menu.         |
| 22 | To select the <b>Edit</b> option in the list menu, press <b>Spacebar</b> (or Keypad <b>0</b> ).<br><i>The Network Element Commissioning Data dialog for shelf B appears.</i> |
| 23 | Tab to the field containing the 3 OPC radio buttons.   |
| 24 | Move to the <b>Primary OPC</b> button, then press <b>Ctrl_A</b> (or Keypad <b>0</b> ).<br><i>A mark appears between the brackets next to Primary OPC.</i>                    |
| 25 | Record the change in commissioning data for this network element on the Commissioning Data Record form.  |

—continued—

Procedure 2-6 (continued)

**Transferring an existing OPC to another shelf**

---

| <b>Step</b> | <b>Action</b>   |
|-------------|---|
| <b>26</b>   | To complete the entry of commissioning data, tab to the <b>OK</b> button, then press <b>Ctrl_A</b> (or Keypad <b>0</b> ).<br><i>If you select OK and have entered the information correctly, the dialog is removed.</i><br><b>Note:</b> If any essential data is missing or entered incorrectly, an error dialog explaining the nature of the problem appears. In addition, the Network Element Commissioning Data dialog remains displayed, and each field that needs data or contains erroneous data displays an X. |
| <b>27</b>   | Close the Commissioning Manager tool.   |
| <b>28</b>   | Save the OPC database to tape. See the procedure for saving OPC data to tape in <i>Data Administration Procedures</i> , 323-3001-304, in <i>Operations, Administration, and Provisioning</i> , Volume 4A.   |
| <b>29</b>   | Log out of the OPC. See the procedure for logging out of the OPC in <i>OPC User Interface Description</i> , 323-3001-301, in <i>Operations, Administration, and Provisioning</i> , Volume 4A.   |

—end—

## Procedure 2-7

### Testing DS1 facilities on a DS1-fed system

Use this procedure to test the DS1 facilities on an existing DS1-fed system.

| If you are testing                              | Then the procedure  |
|---|---|
| all DS1 facilities on a new DS1/VT mapper       | tests continuity and the bit-error rate between the DS1/VT mapper and the cross-connect panel for all 14 DS1 facilities on the mapper. The facility loopback capability of the mapper card and daisy-chaining the DS1 facilities at the cross-connect point test all facilities in one operation.   |
| a new DS1 facility on an existing DS1/VT mapper | tests continuity and the bit-error rate of a single DS1 facility added to an existing DS1/VT mapper. If operations that affect service (change of state and loopback) are performed on the new DS1 facility only, no daisy chain of DS1 facilities occurs at the cross-connect point.<br><br><b>Note:</b> The procedure tests the new facility without disturbing service on existing DS1 facilities. |

In this procedure, test equipment is connected to the DS1 cross-connect panel at the remote fiber terminal (RFT) or at the central office. If the panel is at the RFT, the procedure is a site test only. If the panel is at the central office, the procedure is an end-to-end test.

—continued—

## Requirements

Before you begin this procedure, you must do the following:

- make sure DS1 facilities have been provisioned to correspond with the appropriate terminating equipment
- know how to log in to and out of the network element user interface, both locally and remotely. See *Network Element User Interface Description*, 323-3001-300, in *Operations, Administration, and Provisioning*, Volume 4A.

The following equipment is required:

- a VT100-compatible terminal connected to the RFT by one of the following methods:
  - directly at the local craft access panel
  - by modem connection
  - by remote login through the operations controller (OPC)
- one DS1 transmission test set, Tau-Tron S5104, or equivalent
- two electrical test cords, P3Q3B
- thirteen electrical test cords, bantam-to-bantam connectors, 1 m (3 ft), used as DSX-1 jumpers (not required if you are testing only one DS1 facility)



### **DANGER**

#### **Risk of injury or damage**

Read “Warnings and safety precautions” in “About this document” to minimize any risk to personnel and equipment.



### **CAUTION**

#### **Risk of service loss**

Do not use the 3 in 24 or 1 in 8 test patterns if you are testing DS1s using loopbacks, and your system is provisioned for all of the following:

- Superframe frame format
- alternate mark inversion (AMI) line coding
- bytesynchronous synchronization mode

If you use these patterns, traffic is not restored if you remove the loopback and re-insert it. To restore traffic, place the facility out of service, then back in service.

—continued—

---

Procedure 2-7 (continued)  
**Testing DS1 facilities on a DS1-fed system**

---

## Action

| Step | Action   |
|------|--|
| 1    | Log in to the RFT user interface.<br><i>The Network Element Status screen appears.</i>   |
| 2    | Display the Detail Protection screen for DS1/VT mapper circuit packs by entering:<br><b>pr;dtlprot ds1</b> ↵<br><i>The DS1 Protection screen appears.</i>  |
| 3    | Impose a lockout on the new DS1/VT mapper circuit pack by entering:<br><b>lockout op &lt;circuit pack group&gt;</b> ↵<br>where<br><b>&lt;circuit pack group&gt;</b> group number associated with the DS1/VT mapper slot being provisioned. See “Group and slot associations for DS1, DS3, STS-1, OC-3, and OC-12” on page 1-27.<br><br><i>You are prompted to confirm the command.</i><br>Enter:<br><b>y</b> ↵<br><i>The DS1 protection screen displays an asterisk (*) in the Lockout field for the mapper.</i> |

—continued—

Procedure 2-7 (continued)

**Testing DS1 facilities on a DS1-fed system**

---

**Step    Action**

---

- 4**      Display the DS1 Facility screen for the new facility or facilities.  
If you are testing one DS1 facility, enter:  
**facility ds1 <circuit pack group> <port> ↵**  
          where  
          <circuit pack group>    group from step 3  
          <port>                    number of the new DS1 facility on this mapper:  
  **1 to 14**

If you are testing all DS1 facilities, enter:  
**facility ds1 <circuit pack group> all ↵**  
          where  
          <circuit pack group>    group from step 3

*The DS1 Facility screen appears.*

|   |   |
|---|---|
|  | <p><b>CAUTION</b><br/><b>Do not perform any actions that can affect service.</b><br/>Follow this procedure carefully to minimize any risk of loss of service.</p> |
|---|---|

- 5**      Take one DS1 or all of the DS1 facilities out of service by entering:  
**chgstate oos ↵**  
*You are prompted to confirm the command.*  
Enter:  
**y ↵**  
*The screen displays a message indicating that the command has been completed successfully.*
- 6**      Set up a DS1 facility loopback for one or all DS1 facilities on this circuit pack group by entering:  
**loopback op fac ↵**  
*One of the following two messages appears:*  
The Loopback command was successful.  
or  
The Loopback command was successful in all cases.

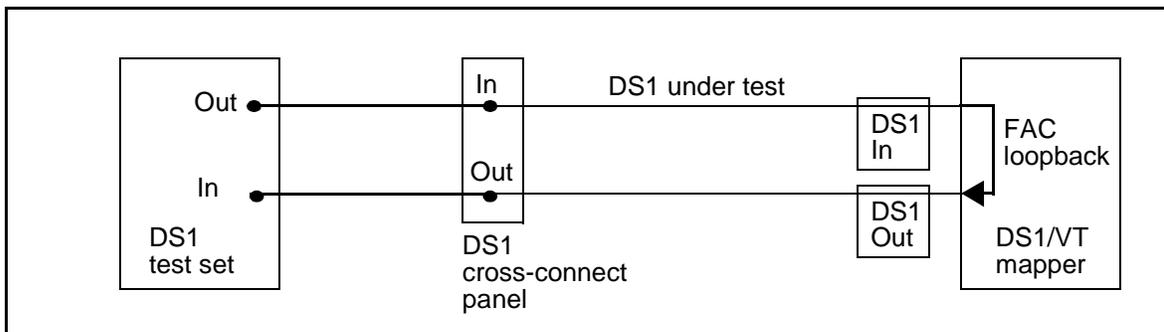
—continued—

Procedure 2-7 (continued)  
**Testing DS1 facilities on a DS1-fed system**

| Step | Action   |
|------|--|
| 7    | Verify the DS1 transmission test set as described in Procedure 2-1, "Verifying DS1 transmission test set performance," on page 2-2. Leave the test set powered up. |
| 8    | To connect the test equipment, complete the instructions in the following table:   |

| If you are testing                            | Then   |
|---|--|
| one DS1 facility on an existing DS1/VT mapper | see Figure 2-7 and connect the equipment as follows: <ol style="list-style-type: none"> <li>a. Connect a test cord from the Out jack of the test set to the In jack of the DS1 facility at the DS1 cross-connect panel.</li> <li>b. Connect a second test cord at the DS1 cross-connect panel from the Out jack of the DS1 facility to the In jack of the test set.</li> </ol>   |
| all DS1 facilities on a new DS1/VT mapper     | see Figure 2-8 on page 2-40 and connect the equipment as follows <ol style="list-style-type: none"> <li>a. Connect a test cord from the Out jack of the test set to the In jack of the first DS1 facility.</li> <li>b. Connect a second test cord from the Out jack of the last DS1 facility to the In jack of the test set.</li> <li>c. Connect 13 test cords in a daisy chain: the first test cord from the Out jack of the first DS1 facility to the In jack of the second DS1 facility. Continue in this manner until the thirteenth test cord is connected from the Out jack of the thirteenth DS1 facility to the In jack of the last DS1 facility.</li> </ol> |

**Figure 2-7**  
 Layout for testing one DS1 facility



—continued—

2-40 Adding DS1s

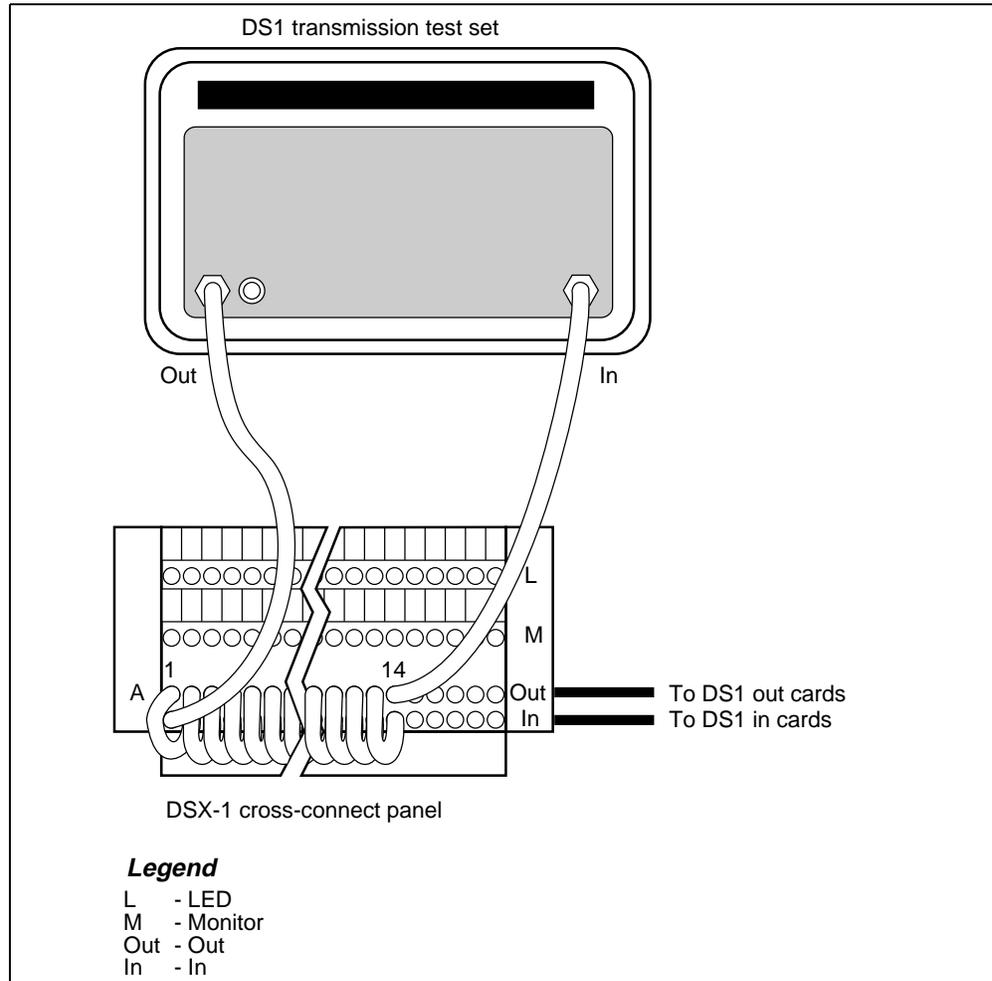
Procedure 2-7 (continued)

Testing DS1 facilities on a DS1-fed system

Step Action

Figure 2-8  
Daisy-chaining all DS1 facilities at the DS1 cross-connect panel

FW-10555



—continued—

## Procedure 2-7 (continued)

## Testing DS1 facilities on a DS1-fed system

| Step | Action   |
|------|--|
| 9    | <p>Press the <b>Start/Stop</b> button 2 times to reset the error count to zero.</p> <p><i>The receiver test set indicates "in process" and displays 0 bit errors.</i></p>  |
| 10   | <p>Press the <b>Single-bit error inject</b> button 3 times.</p> <p><i>The test set indicates "in process" and displays 3 errors.</i></p> <p>If the continuity requirement is not met, complete the following substeps in order until the problem is resolved.</p> <ol style="list-style-type: none"> <li>Check the test set and the connections from the DS1 cross-connect panel to the DS1 In and DS1 Out cards, then repeat steps 9 and 10.</li> <li>If you are testing only one DS1 facility, use a different spare DS1 port on this DS1/VT mapper, then repeat steps 9 and 10.</li> <li>Remove the lockout from protection and perform a manual protection switch on this circuit pack group to isolate the problem to the DS1/VT mapper. If necessary, replace the DS1/VT mapper circuit pack. See <i>Module Replacement Procedures</i>, 323-3001-547, in <i>Maintenance</i>, Volume 5C. Restore the lockout from protection, then repeat steps 9 and 10.</li> <li>For a new DS1/VT mapper with no DS1 facilities in service, replace the DS1 In card or DS1 Out card, then repeat steps 9 and 10. Installing cards in the I/O section is described in <i>Bay in Central Office Installation Manual for ABM</i>, 323-3001-201.</li> </ol> |
| 11   | <p>Press the <b>Start/Stop</b> button 2 times, to reset the error count to zero.</p> <p>If you have daisy-chained all DS1 facilities, monitor the error count for 1 hour and record the results in the System Expansion Results form.</p> <p>If you testing only one DS1 facility, monitor the error count for 3 hours and record the results in the System Expansion Test Results form.</p> <p><i>The test set displays 0 errors.</i></p> <p><b>Note:</b> If the bit-error requirement is not met, isolate and fix any problems as suggested in step 10. Repeat steps 9 through 11.</p>   |
| 12   | <p>Remove the test cords connected to the DS1 transmission test set and the DS1 cross-connect panel.</p>   |
| 13   | <p>Remove the DS1 facility loopbacks by entering:</p> <p><b>loopback re ↵</b></p> <p><i>One of the following two messages appears:</i></p> <p>The Loopback command was successful.<br/>or<br/>The Loopback command was successful in all cases.</p>  |

—continued—

Procedure 2-7 (continued)

**Testing DS1 facilities on a DS1-fed system**

---

| <b>Step</b> | <b>Action</b>  |
|-------------|--|
| <b>14</b>   | Release the lockout by entering:<br><b>dtlprot</b> ↵<br><b>lockout re &lt;circuit pack group&gt;</b> ↵<br>where<br><b>&lt;circuit pack group&gt;</b> group from step 3<br><br><i>You are prompted to confirm the command.</i><br>Enter:<br><b>y</b> ↵<br><i>The DS1 protection screen displays a dot (.) in the Lockout field for the DS1/VT mapper.</i> |
| <b>15</b>   | Log out of the user interface.<br><b>Note:</b> Leave the new DS1 facilities out of service. Leave any traffic-carrying facilities in service.  |
| <b>16</b>   | When you are ready to add traffic, provision each facility and put it into service. See <i>Provisioning and Operations Procedures</i> , 323-3001-310, in <i>Operations, Administration, and Provisioning</i> , Volume 4B.  |

—end—

---

# Adding DS3s

---

This chapter describes how to add and test new DS3 facilities on an existing DS3/STS mapper. The network element is in service and carrying live traffic.

## How to use this chapter

To use procedures in this chapter, refer to the document task list in Chapter 1, “Overview of system expansion,” locate the task you need, and perform the sequence of given procedures.

## Chapter task list

This chapter includes the following procedures. If you cannot successfully complete a procedure, contact your next level of support.

| Procedure | Task   | See      |
|-----------|--|----------|
| 3-1       | Adding DS3 equipment to an existing system             | page 3-2 |
| 3-2       | Activating/deactivating a DS3 facility                 | page 3-4 |
| 3-3       | Verifying DS3 transmission test set performance        | page 3-5 |
| 3-4       | Testing a new facility on an in-service DS3/STS mapper | page 3-7 |

## Procedure 3-1 Adding DS3 equipment to an existing system

---

Use this procedure to install a new DS3/STS mapper circuit pack and corresponding DS3 input/output (I/O) cards and cables at the fiber central office terminal (FCOT) and the remote fiber terminal (RFT) before you add transport DS3s.

**Note:** Before you insert the DS3/STS mapper, you must equip all three DS3 I/O interface cards, even if you are putting only one DS3 facility in service. A later procedure places the DS3 I/O interface cards that are not carrying traffic out of service and deletes them. Do not equip DS3 I/O interface cards in the shelf if the associated mapper is not inserted.

### Requirements

The following equipment and materials are required:

- to add a working mapper
  - DS3/STS mapper (NT7E08)
  - DS3 I/O cards (NT4K30, three for each mapper)
  - DS3 I/O cables
- to add DS3 protection if it is not already installed
  - DS3/STS mapper (NT7E08)
  - DS3 protection switch (NT4K60) circuit pack
- facility record indicating the slot locations for each circuit pack. For DS3 slot planning and equipping rules, see *Mapper Layouts Planning Guide*, 323-3001-154, in *Engineering, Ordering, and Configuration*, Volume 1.

Installing the I/O cards and DS3 cables is described in the applicable installation manual.



**DANGER**

**Risk of injury or damage**

Read “Warnings and safety precautions” in “About this document” to minimize any risk to personnel and equipment.

—continued—

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Procedure 3-1 (continued)  
**Adding DS3 equipment to an existing system**

---

## Action

---

| Step | Action   |
|------|--|
| 1    | To protect the units from damage, put on the antistatic wrist strap. Connect the cord to the electrostatic discharge (ESD) jack on the local craft access panel (LCAP).                                |
| 2    | Run connectorized DS3 cables according to the appropriate installation manual.   |
| 3    | In the top section of the access bandwidth manager (ABM) shelf, insert 3 DS3 I/O cards (NT4K30) into the corresponding slots of the associated DS3/STS mapper. See the applicable installation manual. |
| 4    | Insert the required DS3/STS mappers (NT7E08) into the appropriate slots of the shelf. See <i>Commissioning and Testing</i> , Volume 3, for configuration information.                                  |
| 5    | If it is not already installed, insert the protection switcher (NT4K60) into slot 2.   |

—end—

---

## Procedure 3-2

# Activating/deactivating a DS3 facility

---

Use this procedure to activate (place in service) or deactivate (place out of service) a DS3 facility during provisioning.

To avoid alarms, you should deactivate, then delete, all DS3 facilities that will not be assigned traffic. You can add the facility at a later date when it is required.

For maintenance or provisioning (such as initiating a DS3 loopback or changing the line build-out), place the DS3 facility out of service (OOS). You can reactivate the facility when you finish the provisioning or maintenance.

### Action

---

| Step                 | Action   |                      |  |        |                        |
|----------------------|--|----------------------|--|--------|------------------------|
| 1                    | Log in to the network element user interface at the main menu.   |                      |  |        |                        |
| 2                    | Access the Facility screen and select the facility by entering:<br><b>facility DS3 &lt;circuit pack group&gt; &lt;port&gt; ↵</b><br>where<br><table><tr><td>&lt;circuit pack group&gt;</td><td>circuit pack group for the mapper on which a facility is being provisioned. See “Group and slot associations for DS1, DS3, STS-1, OC-3, and OC-12” on page 1-27.</td></tr><tr><td>&lt;port&gt;</td><td><b>1, 2, 3, or all</b></td></tr></table>                         | <circuit pack group> | circuit pack group for the mapper on which a facility is being provisioned. See “Group and slot associations for DS1, DS3, STS-1, OC-3, and OC-12” on page 1-27. | <port> | <b>1, 2, 3, or all</b> |
| <circuit pack group> | circuit pack group for the mapper on which a facility is being provisioned. See “Group and slot associations for DS1, DS3, STS-1, OC-3, and OC-12” on page 1-27.   |                      |  |        |                        |
| <port>               | <b>1, 2, 3, or all</b>   |                      |  |        |                        |
| 3                    | <i>The facility screen appears.</i><br>Activate or deactivate the facility by entering:<br><b>chgstate &lt;target state&gt; ↵</b><br>where<br><table><tr><td>&lt;target state&gt;</td><td><b>is</b> (in service) or <b>oos</b> (out of service)</td></tr></table><br><i>If you change state from IS to OOS, the system prompts for confirmation (yes or no).</i><br>Confirm the change to OOS by entering:<br><b>yes ↵</b><br><p style="text-align: center;">—end—</p> | <target state>       | <b>is</b> (in service) or <b>oos</b> (out of service)  |        |                        |
| <target state>       | <b>is</b> (in service) or <b>oos</b> (out of service)  |                      |  |        |                        |

---

---

## Procedure 3-3

# Verifying DS3 transmission test set performance

---

Use this procedure to verify the performance of a digital transmission test set. Verification is necessary to obtain reliable results during tests.

### Requirements

The following materials are required:

- DS3 transmitter test set
- DS3 receive test set
- electrical test cord, NE-P2BJ, 2.4 m (8 ft)

This procedure describes settings for Tau-Tron test sets. Other brands of test sets use similar settings.

### Action

---

| Step | Action  |
|------|---|
| 1    | Set the Power switch to <b>On</b> .   |
| 2    | Press and hold the <b>Reset</b> button. Verify that all lamps on the test set are lit.                      |
| 3    | Release the <b>Reset</b> button. Verify that the Remote and Power Off lamps are not lit.                    |
| 4    | Set the Error Mode controls as follows:<br>Mode Select: <b>Error free</b>                                   |
| 5    | Set the DS3 Output control as follows:<br>Frame: <b>Framed</b><br>Pattern: <b>PRBS</b><br>Level: <b>DSX</b> |

—continued—

Procedure 3-3 (continued)

**Verifying DS3 transmission test set performance**

---

| <b>Step</b> | <b>Action</b>  |
|-------------|--|
| <b>6</b>    | Set the Power switch to <b>On</b> .  |
| <b>7</b>    | Set the Volume control to the proper level.  |
| <b>8</b>    | Set the DS3 input controls as follows:<br>Frame: <b>Framed</b><br>Pattern: <b>PRBS</b><br>Level: <b>DSX</b>                              |
| <b>9</b>    | Set the Measurement control as follows:<br>Category: <b>Bit-error measurements</b><br>Function: <b>Bit-error rate, total bit errors</b>  |
| <b>10</b>   | Connect the NE-P2BJ test cord between the transmitter test set output and the receive test set input.                                    |
| <b>11</b>   | On the DS3 receive test set, press the <b>Reset</b> button.<br><i>The DS3 receive test set displays 0 errors and 0 bit-error rate.</i>   |
| <b>12</b>   | On the DS3 transmitter test set, press the <b>Single-bit error</b> button 3 times.<br><i>The DS3 receive test set displays 3 errors.</i> |
| <b>13</b>   | If you did not obtain the required results, check the settings and repeat the test. If necessary, replace the test set.                  |
| <b>14</b>   | Verify each input and output on the test set.  |
| <b>15</b>   | Disconnect the test cord.<br><i>You are ready to perform tests.</i>  |

—end—

---

## Procedure 3-4

# Testing a new facility on an in-service DS3/STS mapper

---

Use this procedure to verify end-to-end continuity of a DS3 facility on a DS3/STS mapper that is in service and is carrying live traffic.

A single technician at a network element can conduct this procedure using the internal loopback feature of the DS3/STS mapper and a remote login.

### Requirements

To perform this procedure, you must know how to log in to the network element user interface and how to log in to a far-end element from the local network element. See *Network Element User Interface Description*, 323-3001-300, in *Operations, Administration, and Provisioning*, Volume 4A.

The following test equipment and materials are required:

- one VT100-compatible user terminal that is connected to the network element user interface port

**Note:** You must use a terminal connected directly to the local network element user interface port. This procedure cannot be performed using the operations controller (OPC) network element login tool.

- a DS3 transmitter test set
- a DS3 receiver test set
- two coaxial test cords, NT3E60AA
- a System Expansion Test Results form

**DANGER****Risk of eye damage**

Avoid direct exposure to laser beam or fiber. Invisible light that can blind is present. Keep all optical connectors capped.

—continued—

Procedure 3-4 (continued)

**Testing a new facility on an in-service DS3/STS mapper**

---

**Action**

---

| <b>Step</b>          | <b>Action</b>  |                      |  |        |            |
|----------------------|--|----------------------|--|--------|------------|
| 1                    | Log in to the network element user interface.  |                      |  |        |            |
| 2                    | Log in to the far-end network element from the local network element by entering:<br><b>rlogin &lt;far-end ne&gt;</b> ↵  |                      |  |        |            |
| 3                    | Set up a far-end loopback for the new DS3 facility by entering:<br><b>facility ds3 &lt;circuit pack group&gt; &lt;port&gt;</b> ↵<br><b>chgstate oos</b> ↵<br><br>where<br><br><table><tr><td>&lt;circuit pack group&gt;</td><td>DS3 mapper on which a facility is being tested. See "Group and slot associations for DS1, DS3, STS-1, OC-3, and OC-12" on page 1-27.</td></tr><tr><td>&lt;port&gt;</td><td>1, 2, or 3</td></tr></table><br><i>Confirmation is requested.</i><br>Enter:<br><b>yes</b> ↵<br><b>loopback op term</b> ↵<br><i>This command performs the far-end loopback for the desired facility.</i> | <circuit pack group> | DS3 mapper on which a facility is being tested. See "Group and slot associations for DS1, DS3, STS-1, OC-3, and OC-12" on page 1-27. | <port> | 1, 2, or 3 |
| <circuit pack group> | DS3 mapper on which a facility is being tested. See "Group and slot associations for DS1, DS3, STS-1, OC-3, and OC-12" on page 1-27.   |                      |  |        |            |
| <port>               | 1, 2, or 3   |                      |  |        |            |
| 4                    | At the DSX-3 cross-connect panel, connect the DS3 transmitter test set to the "in" side of the DS3 port. Connect the DS3 receiver test set to the "out" side of the same port.   |                      |  |        |            |
| 5                    | Press the <b>Reset</b> button on the DS3 receiver test set to reset the error count.<br><i>The DS3 test set displays 0 errors.</i>   |                      |  |        |            |

—continued—

---

Procedure 3-4 (continued)

**Testing a new facility on an in-service DS3/STS mapper**

---

| <b>Step</b> | <b>Action</b>  |
|-------------|--|
| <b>6</b>    | <p>Press the <b>Single-bit error inject</b> button 3 times on the DS3 transmitter test set.</p> <p><i>The DS3 test set displays 3 errors.</i></p> <p>If the requirements are not met, complete the following substeps until the problem is resolved.</p> <ol style="list-style-type: none"><li>Check the digital test set and its connections to the DSX-3 cross-connect.</li><li>Replace the DS3/STS mapper at the near end.</li><li>Replace the DS3/STS mapper at the far end.</li></ol> |
| <b>7</b>    | <p>Press the <b>Reset</b> button on the DS3 test set to reset the error count. Monitor the error count for 1 hour and record the results in the System Test Results form.</p> <p><i>The DS3 test set records 0 errors.</i></p>   |
| <b>8</b>    | <p>When testing is complete, remove the test equipment at the DSX-3 cross-connect panel.</p>   |
| <b>9</b>    | <p>Release the far-end loopback by entering:</p> <pre><b>loopback re</b> ↵<br/><b>chgstate is</b> ↵</pre>  |
| <b>10</b>   | <p>Log out of the network element user interface.</p>  |

—end—



---

# Adding STS-1s

---

This chapter describes how to add and test new STS-1 facilities. The network element is in service and carrying live traffic.

## How to use this chapter

To use procedures in this chapter, refer to the document task list in Chapter 1, “Overview of system expansion,” locate the task you need, and perform the sequence of given procedures.

## Chapter task list

This chapter includes the following procedures. If you cannot successfully complete a procedure, contact your next level of support.

| Procedure | Task   | See      |
|-----------|--|----------|
| 4-1       | Adding STS-1 equipment to an existing system                 | page 4-2 |
| 4-2       | Activating/deactivating an STS-1 facility                    | page 4-4 |
| 4-3       | Verifying STS-1 transmission test set performance            | page 4-5 |
| 4-4       | Testing a new facility on an in-service STS-1 interface card | page 4-6 |

## Procedure 4-1

# Adding STS-1 equipment to an existing system

---

Use this procedure to install a new STS-1 interface card and corresponding BNC input/output (I/O) cards and cables at the near-end TN\_BLSR shelf.

**Note:** Before you insert the STS-1 circuit pack, you must equip all three BNC I/O interface cards, even if you are putting only one STS-1 facility in service. A later procedure places the BNC I/O interface cards that are not carrying traffic out-of-service and deletes them. Do not equip BNC I/O interface cards in the shelf if the associated mapper is not inserted.

### Requirements

The following equipment and materials are required:

- to add a working mapper
  - STS-1 interface card (NT7E09)
  - BNC I/O cards (NT4K30, three for each mapper)
  - BNC I/O cables
- to add STS-1 protection if it is not already installed
  - STS-1 protection switch (NT4K60BA) circuit pack
- facility record indicating the slot locations for each circuit pack. For STS-1 slot planning and equipping rules, see *Mapper Layouts Planning Guide*, 323-3001-154, in *Engineering, Ordering, and Configuration*, Volume 1.

Installing the BNC I/O cards and BNC cables is described in the applicable installation manual.



**DANGER**

**Risk of injury or damage**

Read “Warnings and safety precautions” in “About this document” to minimize any risk to personnel and equipment.

—continued—

---

Procedure 4-1 (continued)

**Adding STS-1 equipment to an existing system**

---

**Action**

---

| <b>Step</b> | <b>Action</b>   |
|-------------|---|
| 1           | To protect the units from damage, put on the antistatic wrist strap. Connect the cord to the electrostatic discharge (ESD) jack on the local craft access panel (LCAP).   |
| 2           | Run BNC cables according to the appropriate installation manual.  |
| 3           | In the top section of the transport bandwidth manager (TBM) shelf, insert 3 BNC I/O cards (NT4K30) into the corresponding slots of the associated STS-1 interface card. See the applicable installation manual. |
| 4           | Insert the required STS-1 interface cards (NT7E09) into the appropriate slots of the shelf. For configuration information, see <i>Commissioning and Testing</i> , Volume 3.                                     |
| 5           | If it is not already installed, insert the protection switcher (NT4K60BA) into slot 2.  |

—end—

---

## Procedure 4-2

# Activating/deactivating an STS-1 facility

---

Use this procedure to activate (place in service) or deactivate (place out-of-service) an STS-1 facility during provisioning.

To avoid alarms, you should deactivate, then delete, all STS-1 facilities that will not be assigned traffic. You can add the facility at a later date when it is required.

For maintenance or provisioning (such as initiating an STS-1 loopback or changing the line build-out), place the STS-1 facility out-of-service (OOS). You can reactivate the facility when you finish the provisioning or maintenance.

### Action

---

| Step | Action   |
|------|--|
| 1    | Log in to the network element user interface at the main menu.   |
| 2    | Access the STS1 Facility screen and select the facility by entering:<br><b>facility sts1 &lt;circuit pack group&gt; &lt;port&gt; ↵</b><br>where<br><b>&lt;circuit pack group&gt;</b> circuit pack group for the mapper on which a facility is being provisioned. See “Group and slot associations for DS1, DS3, STS-1, OC-3, and OC-12” on page 1-27.<br><b>&lt;port&gt;</b> <b>1, 2, 3, or all</b><br><br><i>The facility screen appears.</i> |
| 3    | Activate or deactivate the facility by entering:<br><b>chgstate &lt;target state&gt; ↵</b><br>where<br><b>&lt;target state&gt;</b> <b>is</b> (in service) or <b>oos</b> (out-of-service)<br><br><i>If you change state from IS to OOS, the system prompts for confirmation (yes or no).</i><br>Confirm the change to OOS by entering:<br><b>yes ↵</b>  |

—end—

---

## Procedure 4-3

# Verifying STS-1 transmission test set performance

---

Use this procedure to verify the performance of a digital transmission test set. Verification is necessary to obtain reliable results during tests.

### Requirements

The following materials are required:

- STS-1 transmitter/receiver test set
- electrical test cord (BNC coaxial cable 75  $\frac{3}{4}$ )

This procedure describes settings for the HP 156 MTS (Cerjac) test sets. Other brands of test sets use similar settings.

### Action

---

| Step | Action  |
|------|---|
| 1    | Connect a BNC coaxial cable to the Tx port of the STS-1 signal on the HP 156 MTS. |
| 2    | Connect a BNC coaxial cable to the Rx port of the STS-1 signal on the HP 156 MTS. |
| 3    | Turn on the power for the HP 156 MTS test set.                                    |
| 4    | Use the <b>Field</b> button to select Auto Setup from the main menu.              |
| 5    | Press <b>Enter</b> .  |

*The test set should not display any alarms. You are ready to perform tests.*

—end—

## Procedure 4-4

# Testing a new facility on an in-service STS-1 interface card

---

Use this procedure to verify end-to-end continuity of an STS-1 facility on an STS-1 interface card that is in-service and is carrying live traffic.

Two technicians are needed to conduct this procedure: one at the near-end and one at the far-end.

### Requirements

To perform this procedure, you must know how to log in to the network element user interface and how to log in to a far-end element from the local network element. See *Network Element User Interface Description*, 323-3001-300, in *Operations, Administration, and Provisioning*, Volume 4A.

The following test equipment and materials are required:

- one VT100-compatible user terminal, connected to the network element user interface port

**Note:** You must use a terminal connected directly to the local network element user interface port. This procedure cannot be performed using the operations controller (OPC) network element login tool.

- an STS-1 transmitter/receiver test set
- two coaxial test cords, NT3E60AA
- a System Expansion Test Results form



#### **DANGER**

##### **Risk of eye damage**

Avoid direct exposure to laser beam or fiber. Invisible light that can blind is present. Keep all optical connectors capped.

—continued—

---

 Procedure 4-4 (continued)

**Testing a new facility on an in-service STS-1 interface card**


---

**Action**

| Step | Action   |
|------|--|
| 1    | Log in to the network element user interface.  |
| 2    | Log in to the far-end network element from the local network element by entering:<br><b>rlogin &lt;far-end ne&gt;</b> ↵  |
| 3    | Ask the person at the far-end to do a physical loopback by connecting the input to the output for the desired STS-1 facility.  |
| 4    | At the STS-1 cross-connect panel, connect the STS-1 transmitter test set to the “in” side of the STS-1 port. Connect the STS-1 receiver test set to the “out” side of the same port.   |
| 5    | Press the <b>Reset</b> button on the STS-1 receiver test set to reset the error count.<br><i>The STS-1 test set displays 0 errors.</i>   |
| 6    | Press the <b>Single-bit error inject</b> button 3 times on the STS-1 transmitter test set.<br><i>The STS-1 test set displays 3 errors.</i><br>If the requirements are not met, complete the following substeps until the problem is resolved. <ol style="list-style-type: none"> <li>a. Check the digital test set and its connections to the STS-1 cross-connect.</li> <li>b. Replace the STS-1 interface card at the near end.</li> <li>c. Replace the STS-1 interface card at the far end.</li> </ol> |
| 7    | Press the <b>Reset</b> button on the STS-1 test set to reset the error count. Monitor the error count for 1 hour and record the results in the System Test Results form.<br><i>The STS-1 test set records 0 errors.</i>  |
| 8    | When testing is complete, remove the test equipment at the STS-1 cross-connect panel.  |
| 9    | Ask the person at the far-end to remove the physical loopback.   |
| 10   | Log out of the network element user interface.   |

—end—



---

## Converting a DS1 system to a DS1/DS3/STS-1 mix system

---

This chapter describes how to convert an in-service DS1 configuration to a mixed DS1/DS3/STS-1 configuration. Converting from a DS1 system to a DS1/DS3/STS-1 mix system requires moving some DS1/VT mapper circuit packs to other slots before you add DS3/STS mappers or STS-1 interface cards. For example, you must move DS1/VT mappers in slot 1 and 2 of the fiber central office terminal (FCOT) access bandwidth manager (ABM) shelf to make space for the DS3/STS mapper and DS3 protection circuit packs.

**Note:** STS-1 tributaries are supported only on a TN\_BLSR shelf.

Prepare the DS1/DS3/STS-1 growth plan as described in *Mapper Layouts Planning Guide*, 323-3001-154, in *Engineering, Configuration, and Ordering*, Volume 1.

### How to use this chapter

To use procedures in this chapter, see the document task list in “Overview of system expansion” on page 1-1, locate the task you need, and perform the sequence of given procedures.

**Note:** The system must be in service and carrying traffic. After you temporarily place the DS1s you are moving out of service, follow these procedures carefully to avoid causing unexpected loss of service.

## Chapter task list

This chapter includes the following procedures. If you cannot successfully complete a procedure, contact your next level of support.

| <b>Procedure</b> | <b>Task</b>   | <b>See</b> |
|------------------|---|------------|
| 5-1              | Removing DS1/VT mapper equipment  | page 5-3   |
| 5-2              | Moving a DS1/VT mapper (GR-303 or DS1 tandem) and preserving the odd/even order     | page 5-4   |
| 5-3              | Moving a DS1/VT mapper (GR-303 or DS1 tandem) without preserving the odd/even order | page 5-10  |

## Procedure 5-1 Removing DS1/VT mapper equipment

Use this procedure to remove DS1/VT mapper equipment and associated input and output (I/O) cards and cables from the common equipment shelf. For transport DS1 mappers, you must perform this procedure at both the near-end and the far-end.

### Requirements

You must delete the DS1 equipment using the network element user interface before you remove the equipment. See the appropriate installation manual.

A slotted screwdriver is required to remove DS1 I/O cards.



#### CAUTION

##### Unexpected loss of service

Work with care in the cable areas to avoid damage and unexpected loss of service.

### Action

| Step | Action   |
|------|--|
| 1    | To protect the units from damage, put on the antistatic wrist strap and connect the cord to the electrostatic discharge (ESD) jack on the local craft access panel (LCAP).   |
| 2    | Remove the required DS1/VT mappers (NT7E04) from the appropriate slots of the shelf.   |
| 3    | Using a slotted screwdriver, remove the following DS1 I/O cards corresponding to the DS1/VT mapper being removed: <ul style="list-style-type: none"> <li>• one DS1 input card (NT4K32)</li> <li>• one DS1 output card (NT4K33) or two DS1 protection bridge cards (NT4K31).</li> </ul> |
| 4    | If you are adding DS3 equipment, see “Adding DS3 equipment to an existing system” on page 3-2. If you are adding STS-1 equipment, see “Adding STS-1 equipment to an existing system” on page 4-2.  |
| 5    | If you are permanently removing the DS1 equipment and will not be reusing the cables, remove the cables. See the appropriate installation document.  |

—end—

## Procedure 5-2

### Moving a DS1/VT mapper (GR-303 or DS1 tandem) and preserving the odd/even order

---

This procedure is one of two procedures for moving existing DS1/VT mappers to a spare slot on the same fiber central office terminal (FCOT) or TN\_BLSR common equipment shelf. Both procedures apply to topologies that are being expanded from DS1-only service to mixed DS1, DS3, and STS-1 service. Both procedures are for moving DS1/VT mappers that provide GR-303 or DS1 tandem services. Use this procedure if you will be preserving odd/even mapper pairs. Use the procedure “Moving a DS1/VT mapper (GR-303 or DS1 tandem) without preserving the odd/even order” on page 5-10 if you will not be preserving odd/even mapper pairs.

This procedure depends on the following assumptions:

- The DS1 facilities will be restored to the mapper in the new slot location, just as they were before the change.
- The same input/output (I/O) cables will be connected to the I/O cards in the new I/O slot locations.
- You are preserving the odd/even order of the mapper pairs.

#### Odd/even mapper pairs

You preserve the odd/even order if you move mappers from slots 1 and 2 to slots 5 and 6. Similarly, you preserve the order if you move only one mapper from an odd slot to an odd slot or from an even slot to an even slot.

Odd/even slot pairs are:

- access bandwidth manager (ABM) shelf: 1/2, 3/4, 5/6, and 7/8
- transport bandwidth manager (TBM) shelf: 1/2, 3/4, 5/6, 13/14, 15/16, and 17/18

**Note:** For more information about mapper pairs, see *Mapper Layouts Planning Guide*, 323-3001-154, in *Engineering, Configuration, and Ordering*, Volume 1. For more information about group and slot associations, see “Group and slot associations for DS1, DS3, STS-1, OC-3, and OC-12” on page 1-27.

If you move an odd/even pair of mappers and preserve the odd/even order of the new mapper pair, you can make the move without deleting GR-303 DS0 circuits. This is because you have not disturbed the VT assignment of GR-303 DS1s within the STS-1.

—continued—

Procedure 5-2 (continued)

**Moving a DS1/VT mapper (GR-303 or DS1 tandem) and preserving the odd/even order**

**Note 1:** To make space for DS3 protection equipment, you must remove the DS1/VT mappers in odd/even pairs. For example, if you plan to place the DS3/STS mapper and protection switch circuit pack in slots 1 and 2, you must move the DS1/VT mappers in slots 1 and 2. See chapter 2 for additional mapper layout and planning information.

**Note 2:** To make space for STS-1 protection equipment, you must remove the DS1/VT mappers in odd/even pairs. For example, if you plan to place the STS-1 protection switcher and protection interface card in slots 2 and 3, you must move the DS1/VT mappers in slots 3 and 4. See chapter 2 for additional mapper layout and planning information.

**Note 3:** The system remains in service during this procedure.



**CAUTION**

**This operation affects service. All GR-303 calls in progress are dropped, and DS1 tandem circuits are temporarily deleted.**

Perform this procedure during a period of low traffic. Obtain proper permissions before you take any facilities or equipment out of service. Make sure you are removing the right equipment.

**Requirements**

This procedure requires a user ID and password access to the following user interfaces and user interface tools:

- FiberWorld product user interface (FWPUI) for the network element being changed
- operations controller (OPC) user interface (Facility Assignment Manager and the STS Connection Manager tools)

**Note:** For details on how to use these tools, see *System Administration Procedures*, 323-3001-302, in *Operations, Administration, and Provisioning*, Volume 4A.

- Maintenance and administration position (MAP) may be required to provision facilities for the DMS SuperNodes on which the GR-303 DS1s terminate. For additional details on the MAP tables that may be affected, see *SMA Translations Guide*, 297-2741-350 (BCS36) or *XPM Translations Reference Manual*, 297-8321-815 (NA002).

—continued—

5-6 Converting a DS1 system to a DS1/DS3/STS-1 mix system

---

Procedure 5-2 (continued)

**Moving a DS1/VT mapper (GR-303 or DS1 tandem) and preserving the odd/even order**

---

**Action**

---

| <b>Step</b> | <b>Action</b>  |
|-------------|--|
| 1           | Log in to the remote fiber terminal (RFT) network element user interface, then enter:<br><b>quit all</b> ↵<br><i>The CI prompt appears.</i>  |
| 2           | To view all of the line card slots, enter:<br><b>sysmon</b> ↵<br><b>lcstats</b> ↵<br><i>The listing begins for line cards.</i><br>To stop the listing, enter:<br><b>stop</b> ↵<br>Record all of the line card slots associated with DS1 tandem circuits.<br>Enter:<br><b>fwp</b> ↵<br><i>The Network Element Status screen appears.</i>                              |
| 3           | Log into the near-end network element user interface by entering:<br><b>fa ds1 &lt;circuit pack group&gt; all</b> ↵<br>where<br><b>&lt;circuit pack group&gt;</b> group for the slot being vacated. See “Group and slot associations for DS1, DS3, STS-1, OC-3, and OC-12” on page 1-27.<br><br><i>The DS1 Facilities screen for the circuit pack group appears.</i> |
| 4           | To view and record the provisioning of all DS1 facilities on the DS1/VT mapper being moved, enter:<br><b>query all</b> ↵<br><i>A list of all DS1 facilities on this circuit pack group appears showing the provisioned values of DS1 parameters for each facility.</i><br>Press <b>Return</b> to scroll forward in the list.   |
| 5           | At the OPC user interface, use the Facility Assignment Manager tool to view and record the assignment of all DS1 facilities on the DS1/VT mapper being moved. See Facility Assignment Manager procedures in <i>Provisioning and Operations Procedures</i> , 323-3001-310, in <i>Operations, Administration, and Provisioning</i> , Volume 4B.                        |

—continued—

Procedure 5-2 (continued)

**Moving a DS1/VT mapper (GR-303 or DS1 tandem) and preserving the odd/even order**

| Step | Action   |
|------|--|
| 6    | At the near-end network element user interface, add the new DS1 circuit pack group and, using the information recorded in step 3, provision all of the DS1 facilities on the new DS1 circuit pack group. See <i>Operations and Provisioning Procedures</i> , 323-3001-310, in <i>Operations, Administration, and Provisioning</i> , Volume 4B. |
| 7    | If spare DS1/VT mapper, DS1 input, and DS1 output cards are available, install them in the new slot locations, but do not move the DS1 I/O cables yet. See Procedure 2-2, "Adding DS1 equipment" on page 2-4.<br><b>Note:</b> If spare equipment is not available, skip this step.   |
| 8    | At the OPC user interface, use the Provisioning Manager tool to delete all DS1 tandem circuits recorded in step 2. See Provisioning Manager procedures in <i>Line Card Provisioning Procedures</i> , 323-3001-315.   |

|   |  |
|---|--|
|  | <p><b>CAUTION</b><br/> <b>The following steps drop the GR-303 calls in progress.</b><br/>                 Perform these steps when the volume of calls is low.</p> |
|---|--|

|    |   |
|----|---|
| 9  | At the OPC user interface, use the Configuration Manager tool to make sure Connection Services is <i>enabled</i> . See Connection Services procedures in <i>Provisioning and Operations Procedures</i> , 323-3001-310, in <i>Operations, Administration, and Provisioning</i> , Volume 4B.  |
| 10 | At the OPC user interface, use the Connection Manager tool to re-assign the STS-1 pipe between TIC port 1 and the newly assigned odd/even slot pair.<br><i>The system responds with a warning that a delay in dial tone will occur.</i>   |
| 11 | At the OPC user interface, use the Facility Assignment Manager tool to verify that the GR-303 and DS1 tandem DS1 assignments have been preserved. See Facility Assignment Manager procedures in <i>Provisioning and Operations Procedures</i> , 323-3001-310, in <i>Operations, Administration, and Provisioning</i> , Volume 4B. |

—continued—

**5-8** Converting a DS1 system to a DS1/DS3/STS-1 mix system

Procedure 5-2 (continued)

**Moving a DS1/VT mapper (GR-303 or DS1 tandem) and preserving the odd/even order**

| <b>Step</b> | <b>Action</b>   |
|-------------|---|
| <b>12</b>   | Complete the instructions in the following table based on whether you used spare DS1 equipment in step 7. |

| <b>If you</b>                         | <b>Then</b>  |
|---------------------------------------|--|
| did not use spare equipment in step 7 | <p><b>a.</b> Remove the DS1/VT mapper and the DS1 I/O cards for the DS1 circuit pack group to be deleted.<br/><i>See Provisioning and Operations Procedures, 323-3001-310, in Operations, Administration, and Provisioning, Volume 4B.</i></p> <p><b>b.</b> Disconnect, but do not remove, the DS1 I/O cables.<br/><i>See Provisioning and Operations Procedures, 323-3001-310, in Operations, Administration, and Provisioning, Volume 4B.</i></p> <p><b>c.</b> Install the DS1/VT mapper and the DS1 I/O cards in the newly provisioned slot locations.</p> <p><b>d.</b> Connect the DS1 cables to the DS1 I/O cards in the new DS1 circuit pack group.<br/><i>See Procedure 2-2, "Adding DS1 equipment," on page 2-4.</i></p> |
| used spare equipment in step 7        | <p>Connect the DS1 cables to the DS1 I/O cards in the new DS1 circuit pack group.<br/><i>See Procedure 2-2, "Adding DS1 equipment," on page 2-4.</i></p>   |

—continued—

Procedure 5-2 (continued)

**Moving a DS1/VT mapper (GR-303 or DS1 tandem) and preserving the odd/even order**

| Step | Action   |
|------|--|
| 13   | <p>Make sure all newly provisioned DS1 facilities are in service by entering:</p> <p><b>fa ds1 &lt;circuit pack group&gt; all ↵</b></p> <p>where</p> <p>&lt;circuit pack group&gt; group for the slot being added. See "Group and slot associations for DS1, DS3, STS-1, OC-3, and OC-12" on page 1-27.</p> <p><i>The DS1 Facilities screen for the circuit pack group appears.</i></p> <p>Enter:</p> <p><b>query all ↵</b></p> <p><i>A list of all DS1 facilities on this circuit pack group shows the provisioned values of DS1 parameters and the in-service state for each facility.</i></p> <p>Press <b>Return</b> to scroll forward in the list.</p> |
| 14   | To make sure GR-303 call processing is now possible, place a telephone call to a subscriber line terminating on the RFT.   |
| 15   | Reprovision the DS1 tandem circuits using the information recorded in step 2. See <i>Line Card Provisioning Procedures</i> , 323-3001-315, in <i>Operations, Administration, and Provisioning</i> , Volume 4B.   |
| 16   | <p>Check to make sure all alarms have cleared by entering:</p> <p><b>al; dtlals ↵</b></p> <p><i>The Detailed Alarms screen displays the list of active alarms.</i></p>   |
| 17   | At the near-end network element user interface, delete the DS1 facilities and equipment associated with the DS1 circuit pack group being removed. See <i>Provisioning and Operations Procedures</i> , 323-3001-310, in <i>Operations, Administration, and Provisioning</i> , Volume 4B.  |
| 18   | If spare DS1 equipment was used in step 7, remove the DS1/VT mapper and the DS1 I/O cards which accommodated the DS1 facilities deleted in step 17. See Procedure 5-1, "Removing DS1/VT mapper equipment," on page 5-3.  |

—end—

## Procedure 5-3

### Moving a DS1/VT mapper (GR-303 or DS1 tandem) without preserving the odd/even order

---

This procedure is one of two procedures for moving existing DS1/VT mappers to a spare slot on the same fiber central office terminal (FCOT) or TN\_BLSR common equipment shelf. Both procedures apply to topologies that are being expanded from DS1-only service to mixed DS1, DS3, STS-1 service. Both procedures are for moving DS1/VT mappers that provide GR-303 or DS1 tandem services. Use this procedure if you will *not* be preserving odd/even mapper pairs. Use the procedure “Moving a DS1/VT mapper (GR-303 or DS1 tandem) and preserving the odd/even order” on page 5-4 if you will be preserving odd/even mapper pairs.

**Note:** An example of not preserving the odd/even pair order is moving a mapper from slot 1 to slot 4.

This procedure depends on the following assumptions:

- the DS1 facilities will be restored to the mapper in the new slot location, just as they were before the change.
- the same input/output (I/O) cables will be connected to the I/O cards in the new I/O slot locations
- you are *not* preserving the odd/even order of the mapper pairs

#### Odd/even mapper pairs

Odd/even slot pairs are:

- access bandwidth manager (ABM) shelf: 1/2, 3/4, 5/6, and 7/8
- transport bandwidth manager (TBM) shelf: 1/2, 3/4, 5/6, 13/14, 15/16, and 17/18

**Note:** For more information about mapper pairs, see *Mapper Layouts Planning Guide*, 323-3001-154, in *Engineering, Configuration, and Ordering*, Volume 1. For more information about group and slot associations, see “Group and slot associations for DS1, DS3, STS-1, OC-3, and OC-12” on page 1-27.

If you move a mapper from an odd to an even slot, you must delete and re-add all GR-303 lines within the mapper. This is also true if you move one mapper from an even slot to an odd slot. In any case, you *must* delete DS1 tandem circuits and add them again after the move.

—continued—

Procedure 5-3 (continued)

**Moving a DS1/VT mapper (GR-303 or DS1 tandem) without preserving the odd/even order**

**Note 1:** To make space for DS3 protection equipment, you must remove the DS1/VT mappers in odd/even pairs. For example, if you plan to place the DS3/STS mapper and protection switch circuit pack in slots 1 and 2, you must move the DS1/VT mappers in slots 1 and 2. See Chapter 2 for additional mapper layout and planning information.

**Note 2:** To make space for STS-1 protection equipment, you must remove the DS1/VT mappers in odd/even pairs. For example, if you plan to place the STS-1 protection switcher and protection interface card in slots 2 and 3, you must move the DS1/VT mappers in slots 3 and 4. See chapter 2 for additional mapper layout and planning information.

**Note 3:** The system remains in service during this procedure.



**CAUTION**

**This operation affects service. All GR-303 calls in progress are dropped, and DS1 tandem circuits are temporarily deleted.**

Perform this procedure during a period of low traffic. Obtain proper permissions before you take any facilities or equipment out of service. Make sure you are removing the right equipment.

**Requirements**

This procedure requires a user ID and password access to the following user interfaces and user interface tools:

- FiberWorld product user interface (FWPUI) for the network element being changed, and operations controller (OPC) user interface (Facility Assignment Manager and the STS Connection Manager tools).

**Note:** For details on how to use these tools, see *System Administration Procedures*, 323-3001-302, in *Operations, Administration, and Provisioning*, Volume 4A.

- Maintenance and administration position (MAP) may be required to provision facilities for the DMS SuperNodes on which the GR-303 DS1s terminate. For additional details on the MAP tables that may be affected, see *SMA Translations Guide*, 297-2741-350 (BCS36) or *XPM Translations Reference Manual*, 297-8321-815 (NA002).

—continued—



Procedure 5-3 (continued)

**Moving a DS1/VT mapper (GR-303 or DS1 tandem) without preserving the odd/even order**

| Step     | Action   |
|----------|--|
|          | <p><b>g.</b> Delete all line terminations, one by one, by entering:</p> <p style="padding-left: 40px;"><b>del rdt x y z w ↵</b></p> <p style="padding-left: 80px;">where</p> <p style="padding-left: 120px;">x, y, z, and w as in substep c</p>  |
| <b>2</b> | If the DS1/VT mapper has GR-303 DS1s, use the integrated digital terminal (IDT) screen of the DMS SuperNode MAP to busy out the IDT associated with the near-end.  |
| <b>3</b> | <p>If the DS1/VT mapper has DS1 tandem circuits on it, complete the following substeps:</p> <p><b>a.</b> View and record the circuit provisioning details for each DS0 circuit on each DS1 tandem port.</p> <p style="padding-left: 40px;">Use the OPC Provisioning Manager tool, described in <i>Line Card Provisioning Procedures</i>, 323-3001-315, in <i>Operations, Administration, and Provisioning</i>, Volume 4B, or obtain the circuit assignment records maintained by your network administrator and make sure they contain the necessary details.</p> <p><b>b.</b> Use the Provisioning Manager tool to delete all DS1 tandem circuits provisioned on the DS1/VT mapper.</p> |
| <b>4</b> | <p>Use the Facility Assignment Manager under the Prov Admin menu on the OPC to complete the following substeps:</p> <p><b>a.</b> View and record the DS1 port assignments for the DS1/VT mapper.</p> <p><b>b.</b> Unassign the mapper's DS1 ports.</p> <p style="padding-left: 40px;">See Facility Assignment Manager procedures in <i>Provisioning and Operations Procedures</i>, 323-3001-310, in <i>Operations, Administration, and Provisioning</i>, Volume 4B.</p>  |
| <b>5</b> | Log in to the near-end network element user interface.   |
| <b>6</b> | <p>Use FWUI at the near-end network element to complete the following substeps for the DS1/VT mapper:</p> <p><b>a.</b> Record the provisioning details for each DS1 facility, so that you can restore them later.</p> <p><b>b.</b> Take the DS1 facilities out of service.</p> <p><b>c.</b> Delete the DS1 facilities.</p> <p><b>d.</b> Take the DS1 equipment out of service.</p> <p><b>e.</b> Delete the DS1 equipment.</p> <p style="padding-left: 40px;">See <i>Provisioning and Operations Procedures</i>, 323-3001-310, in <i>Operations, Administration, and Provisioning</i>, Volume 4B, for deleting facilities and equipment.</p>  |

—continued—

## 5-14 Converting a DS1 system to a DS1/DS3/STS-1 mix system

---

Procedure 5-3 (continued)

### Moving a DS1/VT mapper (GR-303 or DS1 tandem) without preserving the odd/even order

---

| Step | Action  |
|------|---|
| 7    | Remove the DS1/VT mapper from the old slot and insert it into the new slot. See <i>Module Replacement Procedures</i> , 323-3001-547, in <i>Maintenance</i> , Volume 5C.   |
| 8    | Determine which I/O cards to remove and where to move them. See the mapper layout tables in Chapter 1, which show the associations between I/O slots in the upper part of the common-equipment shelf and the DS1/VT mapper slots in the lower part of the common-equipment shelf.   |
| 9    | Move the I/O cards from the old I/O slots to the new I/O slots and reconnect the DS1 cables.<br><br>See <i>Bay in Central Office Installation Manual for ABM</i> , 323-3001-201, or <i>Bay in Central Office Installation Manual—TBM</i> , 323-3001-202, for DS1 cable installation details.  |
| 10   | Use the STS Connection Manager under the Prov Admin menu on the OPC to perform the following substeps: <ol style="list-style-type: none"><li>Enable Connection Services if you have not already enabled it.</li><li>Delete the STS connection from transport interface card (TIC) port #1 on the far-end terminal.</li><li>Add the new STS connection between TIC port #1 on the far-end terminal and the DS1/VT mapper on the near-end terminal.</li></ol> See Connection Services procedures in <i>Provisioning and Operations Procedures</i> , 323-3001-310, in <i>Operations, Administration, and Provisioning</i> , Volume 4B. |
| 11   | From the Facility Assignment Manager, assign the GR-303 or DS1 tandem function (or both) to the DS1 ports. Use the DS1 mapper information you recorded in step 4.   |
| 12   | From the FWPUJ at the near-end, add the DS1 facilities and reprovision them for GR-303 or DS1 tandem (or both). Use the record you created in step 6. See <i>Operations and Provisioning Procedures</i> , 323-3001-310.   |
| 13   | Test the DS1 facilities using Procedure 2-5, "Testing continuity on a new DS1/VT mapper for GR-303 DMS or tandem DS1s" on page 2-22.  |
| 14   | If the DS1/VT mapper had DS1 tandem circuits on it, restore (add) these circuits using the Provisioning Manager tool. See the data record created in step 3. Remember to enter the slot number that the DS1 mapper now occupies.  |
| 15   | If the DS1/VT mapper has GR-303 DS1s, use the IDT screen of the DMS SuperNode MAP to place the IDT associated with the near-end back in service.  |

—continued—

Procedure 5-3 (continued)

**Moving a DS1/VT mapper (GR-303 or DS1 tandem) without preserving the odd/even order**

| Step | Action   |
|------|--|
| 16   | <p>For GR-303 services, use the DMS SuperNode MAP and complete the following substeps to provision all of the subscriber line terminations that you deleted in step 1.</p> <p>a. Add all the line terminations viewed in step 1 by entering:</p> <pre>add &lt;info&gt; ↵   where   &lt;info&gt;  information listed for the line in TABLE LNINV during            step 1</pre> <p><b>Note:</b> The STATUS of some lines may have been displayed as WORKING; when you add them again, enter the STATUS as HASU. For example, for a loop-start plain old telephone service (POTS) line, enter:</p> <pre>add rdt 12 0 1 6 rdtlsg npdgp hasu n nl n nil ↵</pre> <p>b. Add the information obtained for each line in step 1b, using servord or Table Control.</p> <p>For example, for a loop-start POTS line, in servord, enter:</p> <pre>new \$ 6212016 lfr nillata 0 rdt 12 0 1 6 dgt \$ ↵</pre> <p style="text-align: center;">—end—</p> |



---

# Converting a DS3 system to a DS1/DS3/STS-1 mix system

---

This chapter describes how to convert an in-service DS3 configuration to a mixed DS1/DS3/STS-1 configuration. If you convert from a DS3 system to a DS1/DS3/STS-1 mix system, you must replace some DS3 circuit packs with DS1 or STS-1 interface cards.

To prepare the DS1/DS3/STS-1 growth plan and determine the DS1 input and output cards to remove, see *Mapper Layouts Planning Guide*, 323-3001-154, in the *Engineering, Configuration, and Ordering Guide*, Volume 1.

## How to use this chapter

To use procedures in this chapter, see the document task list in Chapter 1, “Overview of system expansion,” locate the task you need, and perform the sequence of given procedures.

**Note:** During the conversion, the system remains in service. You will temporarily take the DS3s out-of-service. (See the task list at the front of the document for the sequence.) Follow these procedures carefully to avoid unexpected service loss.

## Chapter task list

This chapter includes the following procedure. If you cannot successfully complete the procedure, contact your next level of support.

| Procedure | Task                              | See      |
|-----------|-----------------------------------|----------|
| 6-1       | Removing DS3/STS mapper equipment | page 6-2 |

## Procedure 6-1 Removing DS3/STS mapper equipment

---

Use this procedure to remove DS3/STS mapper equipment and associated I/O cards and cables from the common equipment shelf. This procedure must be performed at both the fiber central office terminal (FCOT) and the remote fiber terminal (RFT).

### Requirements

To delete the DS3 equipment before you remove it, you must know how to use the network element user interface. For more information, see *Network Element User Interface Description, 323-3001-300, in Operations, Administration, and Provisioning, Volume 4A.*

The following tools and materials might be required:

- diagonal cutters or sidecutters (flush-cutting)
- flat-bladed screwdriver
- cable ties



#### **CAUTION**

##### **Loss of service/Equipment damage**

Work with care in the cable areas to avoid damage and unexpected loss of service.

### Action

---

| <b>Step</b> | <b>Action</b>   |
|-------------|---|
| 1           | To protect the units from damage, put on the antistatic wrist strap and connect the cord to the electrostatic discharge (ESD) jack on the local craft access panel (LCAP).                                  |
| 2           | Remove the required DS3/STS mappers (NT7E08) from the shelf.  |
| 3           | For every DS3/STS mapper, up to 3 BNC I/O cards (NT4K30) are in the corresponding slots in the top section of the common equipment shelf. Use the screwdriver to remove them.                               |
| 4           | If you are adding DS1 equipment, see Procedure 2-2, "Adding DS1 equipment," on page 2-4. If you are adding STS-1 equipment, see Procedure 4-1, "Adding STS-1 equipment to an existing system," on page 4-2. |
| 5           | If you are permanently removing the DS3 equipment and not are reusing the cables, remove the cables. See the appropriate installation document.   |

—end—

---

# Converting a DS1/DS3/STS-1 mix system to a DS3-only or DS1-only mix system

---

This chapter describes how to convert an in-service DS1/DS3/STS-1 mix configuration to a DS3-only or DS1-only configuration. If you convert from a DS1/DS3/STS-1 mix system to a DS3-only or DS1-only system, you must replace some STS-1 interface cards with DS1 or DS3 circuit packs.

## How to use this chapter

To use procedures in this chapter, see the document task list in Chapter 1, “Overview of system expansion,” locate the task you need, and perform the sequence of given procedures.

*Note:* During the conversion, the system remains in service. You will temporarily take the DS1s/DS3s/STS-1s out-of-service. (See the task list at the front of the document for the sequence.) Follow these procedures carefully to avoid unexpected service loss.

## Chapter task list

This chapter includes the following procedure. If you cannot successfully complete the procedure, contact your next level of support.

| Procedure | Task                               | See      |
|-----------|------------------------------------|----------|
| 7-1       | Removing STS-1 tributary equipment | page 7-2 |

## Procedure 7-1 Removing STS-1 tributary equipment

---

Use this procedure to remove STS-1 tributary equipment and associated I/O cards and cables from the common equipment shelf. This procedure must be performed at both the near-end network element and the far-end network element.

### Requirements

To delete the STS-1 equipment before you remove it, you must know how to use the network element user interface. For more information, see *Network Element User Interface Description, 323-3001-300, in Operations, Administration, and Provisioning, Volume 4A*.

The following tools and materials might be required:

- diagonal cutters or sidecutters (flush-cutting)
- flat-bladed screwdriver
- cable ties



#### **CAUTION**

##### **Loss of service/Equipment damage**

Work with care in the cable areas to avoid damage and unexpected loss of service.

### Action

---

| <b>Step</b> | <b>Action</b>   |
|-------------|---|
| 1           | To protect the units from damage, put on the antistatic wrist strap and connect the cord to the electrostatic discharge (ESD) jack on the local craft access panel (LCAP).                              |
| 2           | Remove the required STS-1 interface cards (NT7E09) from the shelf.  |
| 3           | For every STS-1 interface card, up to 3 BNC I/O cards (NT4K30) are in the corresponding slots in the top section of the common equipment shelf. Use the screwdriver to remove them.                     |
| 4           | If you are adding DS1 equipment, see Procedure 2-2, "Adding DS1 equipment," on page 2-4. If you are adding DS3 equipment, see Procedure 3-1, "Adding DS3 equipment to an existing system," on page 3-2. |
| 5           | If you are permanently removing the STS-1 equipment and not are reusing the cables, remove the cables. See the appropriate installation document.   |

—end—

---

# Adding OC-3 tributaries

---

This chapter shows how to add OC-3 tributaries to an existing OC-12 system.

## How to use this chapter

To use procedures in this chapter, review the document task list in Chapter 1, “Overview of system expansion,” locate the task you need, and complete the sequence of given procedures.

## Chapter task list

This chapter includes the following procedures. If you cannot successfully complete these procedures, contact your next level of support.

| Procedure | Task  | See      |
|-----------|---|----------|
| 8-1       | Preparing to add an OC-3 tributary                | page 8-2 |
| 8-2       | Removing existing DS1 mappers                     | page 8-3 |
| 8-3       | Removing existing DS3 mappers                     | page 8-4 |
| 8-4       | Removing existing STS-1 interface cards           | page 8-5 |
| 8-5       | Adding an OC-3 tributary                          | page 8-6 |
| 8-6       | Upgrading an unprotected OC-3 to a protected OC-3 | page 8-8 |

**Note:** You must have one of the following circuit packs to support an OC-3 concatenated (OC-3c) tributary: NT7E05AF/AG/AH or NT7E05BF/BG/BH.

## Procedure 8-1

### Preparing to add an OC-3 tributary

---

Use this procedure to verify that the system is ready for you to add an OC-3 tributary.

#### Action

---

| Step | Action  |
|------|---|
| 1    | Verify that there are no alarms on system.  |
| 2    | Verify that all network elements are associated with a single operations controller (OPC).  |
| 3    | Identify any DS1 or DS3 mappers that need to be removed to accommodate the OC-3 circuit packs. See "Group and slot associations for DS1, DS3, STS-1, OC-3, and OC-12" on page 1-27. |
| 4    | Remove service from any DS1 or DS3 mappers that need to be removed.   |

—end—

## Procedure 8-2

# Removing existing DS1 mappers

Use this procedure to remove DS1 mappers that occupy the slots for the OC-3 tributary.

### Requirements

Before you start this procedure, do the following:

- Remove service from any DS1 mappers that need to be removed.
- Log in to the network element user interface at the main menu.

The following tools and materials might be required:

- diagonal cutters or sidecutters (flush-cutting)
- flat-bladed screwdriver
- cable ties



#### CAUTION

Work with care in the cable areas to avoid damage and unexpected loss of service.

### Action

| Step | Action   |
|------|--|
| 1    | Delete any DS1 facilities that occupy the slots for the OC-3 tributary. For information about deleting a facility, see <i>Provisioning and Operations Procedures</i> , 323-3001-310, in <i>Operations, Administration, and Provisioning</i> , Volume 4B. |
| 2    | Delete the DS1 equipment for the facilities you just removed. For information about deleting a circuit pack group, see <i>Provisioning and Operations Procedures</i> , 323-3001-310, in <i>Operations, Administration, and Provisioning</i> , Volume 4B. |
| 3    | To protect the units from damage, put on the antistatic wrist strap and connect the cord to the electrostatic discharge jack on the local craft access panel .   |
| 4    | Remove the required DS1 mappers from the shelf.  |
| 5    | For every DS1 mapper, two DS1 I/O cards are in the corresponding slots in the top section of the common equipment shelf. Use the screwdriver to remove them.   |
| 6    | If you are permanently removing the equipment and are not reusing the cables, remove the cables. See the appropriate installation document.  |

—end—

## Procedure 8-3 Removing existing DS3 mappers

---

Use this procedure to remove DS3 mappers that occupy the slots for the OC-3 tributary.

### Requirements

Before you start this procedure, do the following:

- Remove service from any DS1 mappers that need to be removed.
- Log in to the network element user interface at the main menu.

The following tools might be required:

- diagonal cutters or sidecutters (flush-cutting)
- flat-bladed screwdriver
- cable ties



#### **CAUTION**

Work with care in the cable areas to avoid damage and unexpected loss of service.

### Action

---

| <b>Step</b> | <b>Action</b>  |
|-------------|--|
| 1           | Delete any DS3 facilities that occupy the slots for the OC-3 tributary. For information about deleting a facility, see <i>Provisioning and Operations Procedures</i> , 323-3001-310, in <i>Operations, Administration, and Provisioning</i> , Volume 4B. |
| 2           | Delete the DS3 equipment for the facilities you just removed. For information about deleting a circuit pack group, see <i>Provisioning and Operations Procedures</i> , 323-3001-310, in <i>Operations, Administration, and Provisioning</i> , Volume 4B. |
| 3           | To protect the units from damage, put on the antistatic wrist strap and connect the cord to the electrostatic discharge jack on the local craft access panel .   |
| 4           | Remove the required DS3 mappers from the shelf.  |
| 5           | For every DS3 mapper, up to three I/O cards are in the corresponding slots in the top section of the common equipment shelf. Use the screwdriver to remove them.   |
| 6           | If you are permanently removing the DS3 equipment and are not reusing the cables, remove the cables. See the appropriate installation document.  |

—end—

## Procedure 8-4

# Removing existing STS-1 interface cards

Use this procedure to remove STS-1 interface cards that occupy the slots for the OC-3 tributary.

### Requirements

Before you start this procedure, do the following:

- Remove service from any DS1 mappers that need to be removed.
- Log in to the network element user interface at the main menu.

The following tools might be required:

- diagonal cutters or sidecutters (flush-cutting)
- flat-bladed screwdriver
- cable ties



#### CAUTION

Work with care in the cable areas to avoid damage and unexpected loss of service.

### Action

| Step | Action   |
|------|--|
| 1    | Delete any STS-1 facilities that occupy the slots for the OC-3 tributary. For information about deleting a facility, see <i>Provisioning and Operations Procedures</i> , 323-3001-310, in <i>Operations, Administration, and Provisioning</i> , Volume 4B. |
| 2    | Delete the STS-1 equipment for the facilities you just removed. For information about deleting a circuit pack group, see <i>Provisioning and Operations Procedures</i> , 323-3001-310, in <i>Operations, Administration, and Provisioning</i> , Volume 4B. |
| 3    | To protect the units from damage, put on the antistatic wrist strap and connect the cord to the electrostatic discharge jack on the local craft access panel .   |
| 4    | Remove the required STS-1 interface cards from the shelf.  |
| 5    | For every STS-1 interface card, up to three I/O cards are in the corresponding slots in the top section of the common equipment shelf. Use the screwdriver to remove them.   |
| 6    | If you are permanently removing the STS-1 equipment and are not reusing the cables, remove the cables. See the appropriate installation document.  |

—end—

## Procedure 8-5 Adding an OC-3 tributary

---

Use this procedure to add an OC-3 facility to existing equipment. The facility must be out of service before you perform this procedure.

*Note:* A facility can not be added if the equipment does not exist.

### Requirements

Read the command conventions for the network element user interface (NEUI) in *Network Element User Interface Description, 323-3001-300*, in *Operations, Administration, and Provisioning, Volume 4A*.

Read the command conventions for the operations controller (OPC) user interface in *OPC User Interface Description, 323-3001-301*, in *Operations, Administration, and Provisioning, Volume 4A*.

### Action

---

| Step | Action |
|------|--------|
|------|--------|

---

- |   |  |
|---|--|
| 1 | Insert the OC-3 circuit packs into the slots that you have chosen.<br>ABM                      slot <b>1, 5</b> (working unit)<br>TBM                      slot <b>1, 5, 11, 15</b> (working unit) |
|---|--|

*The system automatically adds the facilities and the equipment for the OC-3 circuit pack you inserted.*

**Note:** The Rx loss of signal alarm appears until you connect the fiber into the OC-3 circuit pack.

- |   |   |
|---|---|
| 2 | Display the Network Element Status screen by entering:<br><b>fwpu</b> ↵ |
|---|---|

—continued—

---

 Procedure 8-5 (continued)  
**Adding an OC-3 tributary**


---

**Step    Action**


---

**3**    To finish the addition of the OC-3 tributary, perform the following tasks:

| <b>To perform this task</b>   | <b>See this NTP</b>                           |              |
|---|---|--------------|
| Site testing  | <i>Commissioning and Testing</i>              | Volume 3     |
| Provision STS-1 connections   | <i>Operations and Provisioning Procedures</i> | 323-3001-310 |
| Provision a section data communications channel (SDCC) (if you are installing a single-ended AccessNode or other SDCC equipment at the other end of the OC-3 tributary) | <i>Operations and Provisioning Procedures</i> | 323-3001-310 |
| Test end-to-end operations  | <i>Commissioning and Testing</i>              | Volume 3     |

—end—

## Procedure 8-6

# Upgrading an unprotected OC-3 to a protected OC-3

---

Use this procedure to upgrade an unprotected OC-3 to a protected OC-3.

### Requirements

Read the command conventions for the network element user interface (NEUI) in *Network Element User Interface Description*, 323-3001-300, in *Operations, Administration, and Provisioning*, Volume 4A.

### Action

---

| Step | Action  |
|------|---|
| 1    | Display the Network Element Status screen by entering:<br><b>fwpu</b> .<br>↓  |
| 2    | Insert the OC-3 circuit pack into the slots that you have chosen.<br><i>The system automatically adds the facilities and the equipment for the OC-3 circuit pack you inserted.</i><br><b>Note:</b> The Rx loss of signal alarm is displayed until you connect the fiber into the OC-3 circuit pack. |
| 3    | Add the equipment for the OC-3 by entering:<br><b>eq oc3 &lt;group&gt;</b> .<br>↓<br><br>where<br><br><group>                    group defined in "Group and slot associations for DS1, DS3, STS-1, OC-3, and OC-12" on page 1-27.  |
| 4    | Display the detail protection screen by entering:<br><b>pr;dtlprot oc3 &lt;group&gt;</b> .<br>↓<br><br>where<br><br><group>                    group from step 3  |

—continued—

---

 Procedure 8-6 (continued)

**Upgrading an unprotected OC-3 to a protected OC-3**


---

- | Step | Action   |
|------|--|
| 5    | Display the protection provisioning screen by entering:<br><b>protprov</b> ↵   |
| 6    | Verify that the protection exerciser is not disabled. If it is disabled, enable it by entering:<br><b>protexer disabled</b>                              |
| 7    | Verify that the switch mode (swmode) is set to bidirectional. If it is set to unidirectional, change it to bidirectional by entering:<br><b>swmode</b> ↵ |
| 8    | Return to the Network Element Status screen by entering:<br><b>fwpui</b> ↵   |
| 9    | To finish adding the OC-3 tributary, complete the following tasks:   |

| To perform this task   | See this NTP                                  |              |
|--|---|--------------|
| Site testing   | <i>Commissioning and Testing</i>              | Volume 3     |
| Provision STS-1 connections  | <i>Operations and Provisioning Procedures</i> | 323-3001-310 |
| Provision a section data communication channel (SDCC) (if you are installing a single-ended AccessNode at the end of the OC-3 tributary) | <i>Operations and Provisioning Procedures</i> | 323-3001-310 |
| Test end-to-end operations   | <i>Commissioning and Testing</i>              | Volume 3     |

—end—



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# Equipping and testing copper-distribution shelves

---

This chapter describes how to do the following tasks:

- install common-equipment cards in copper-distribution shelves (CDS) that have been added to an existing network element
- test the CDSs after you install the common-equipment cards

**Note:** The network element is in service and continues to carry live traffic during these procedures.

If CDSs have already been installed and tested, for example during the initial installation, the next step is to provision and test the line cards. See *Line Card Provisioning Procedures*, 323-3001-315, and *Line Card Testing Procedures*, 323-3001-316, in *Operations, Administration, and Provisioning*, Volume 4B.

**Note:** For information about installing Universal Edge 9000 (UE9000) shelves, see the *UE9000 Installation Quick Reference Guide*. For information about testing UE9000 shelves, see the *UE9000 Voice OAM&P User Guide*.

## How to use this chapter

To use procedures in this chapter, refer to the document task list in Chapter 1, “Overview of system expansion,” locate the task you need, and perform the given procedures.

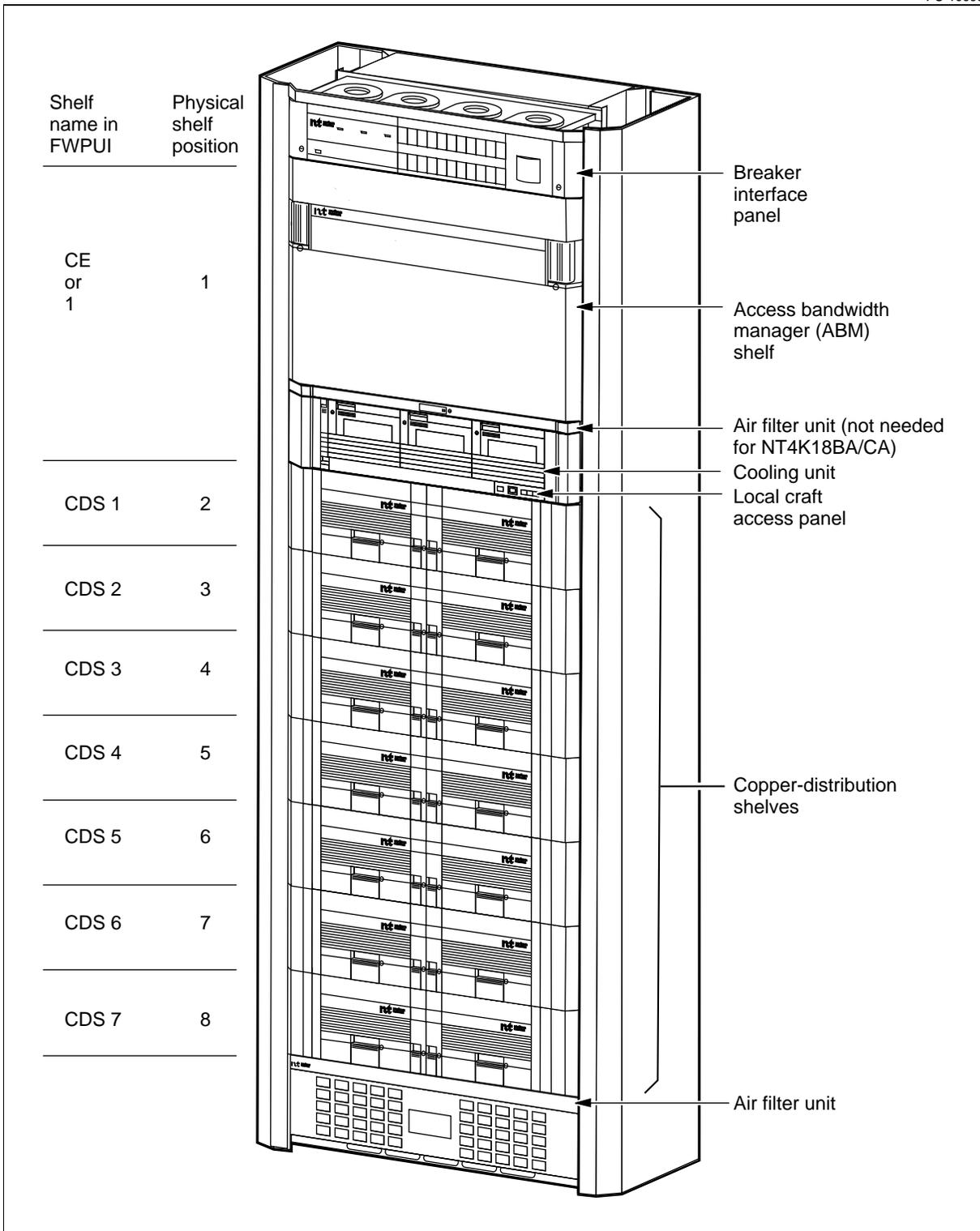
## Chapter task list

This chapter includes the following procedures. If you cannot successfully complete these procedures, contact your next level of support.

| <b>Procedure</b> | <b>Task</b>  | <b>See</b> |
|------------------|--|------------|
| 9-1              | Installing common-equipment circuit packs in a copper-distribution shelf | page 9-7   |
| 9-2              | Testing a copper-distribution shelf                                      | page 9-12  |
| 9-3              | Diagnosing failed NLIC circuit packs                                     | page 9-23  |
| 9-4              | Diagnosing failed CDSP circuit packs                                     | page 9-26  |
| 9-5              | Diagnosing failed MTAC circuit packs                                     | page 9-28  |

**Figure 9-1**  
**Numbering of copper-distribution shelves (ABM bay arrangement)**

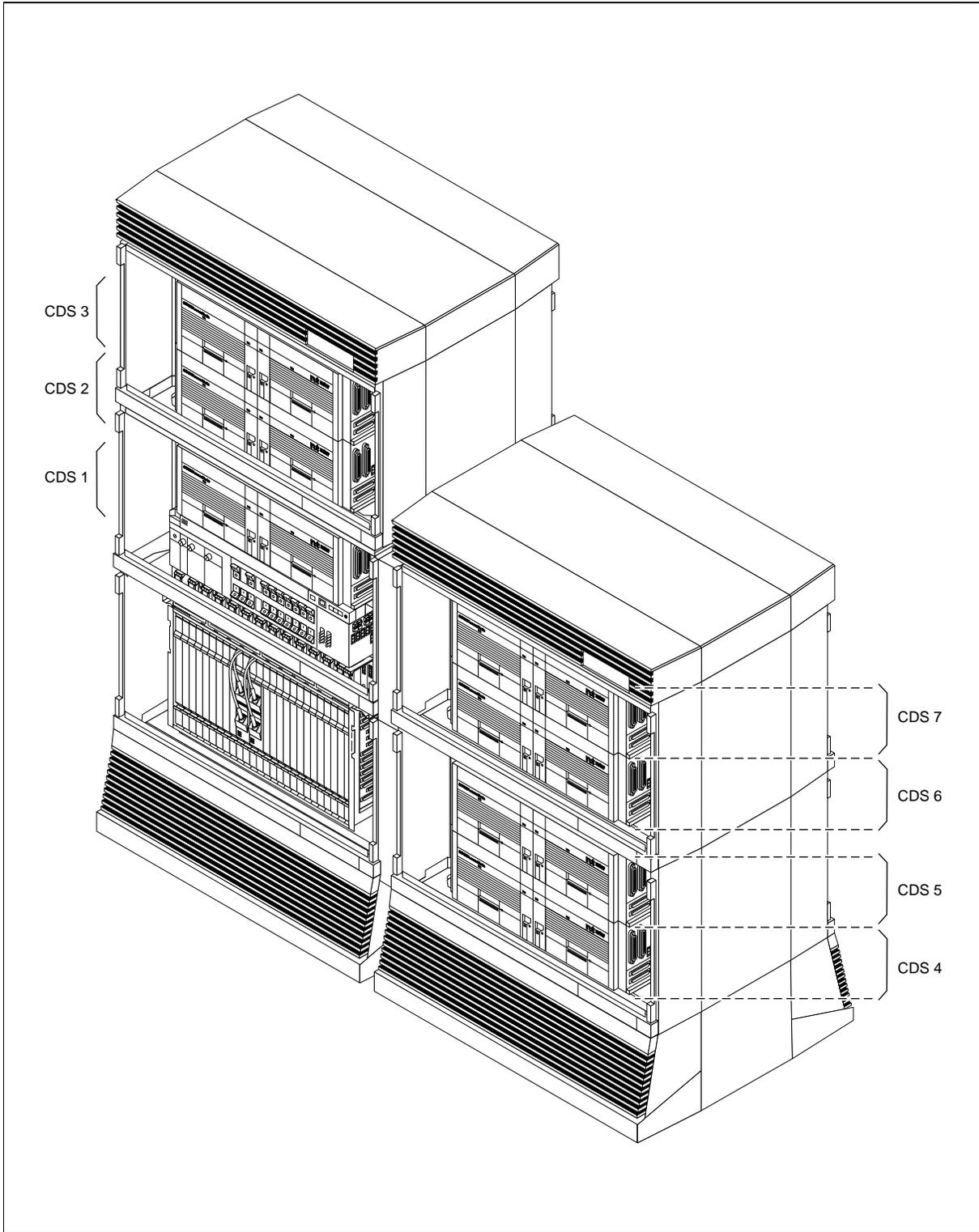
PC-10000



9-4 Equipping and testing copper-distribution shelves

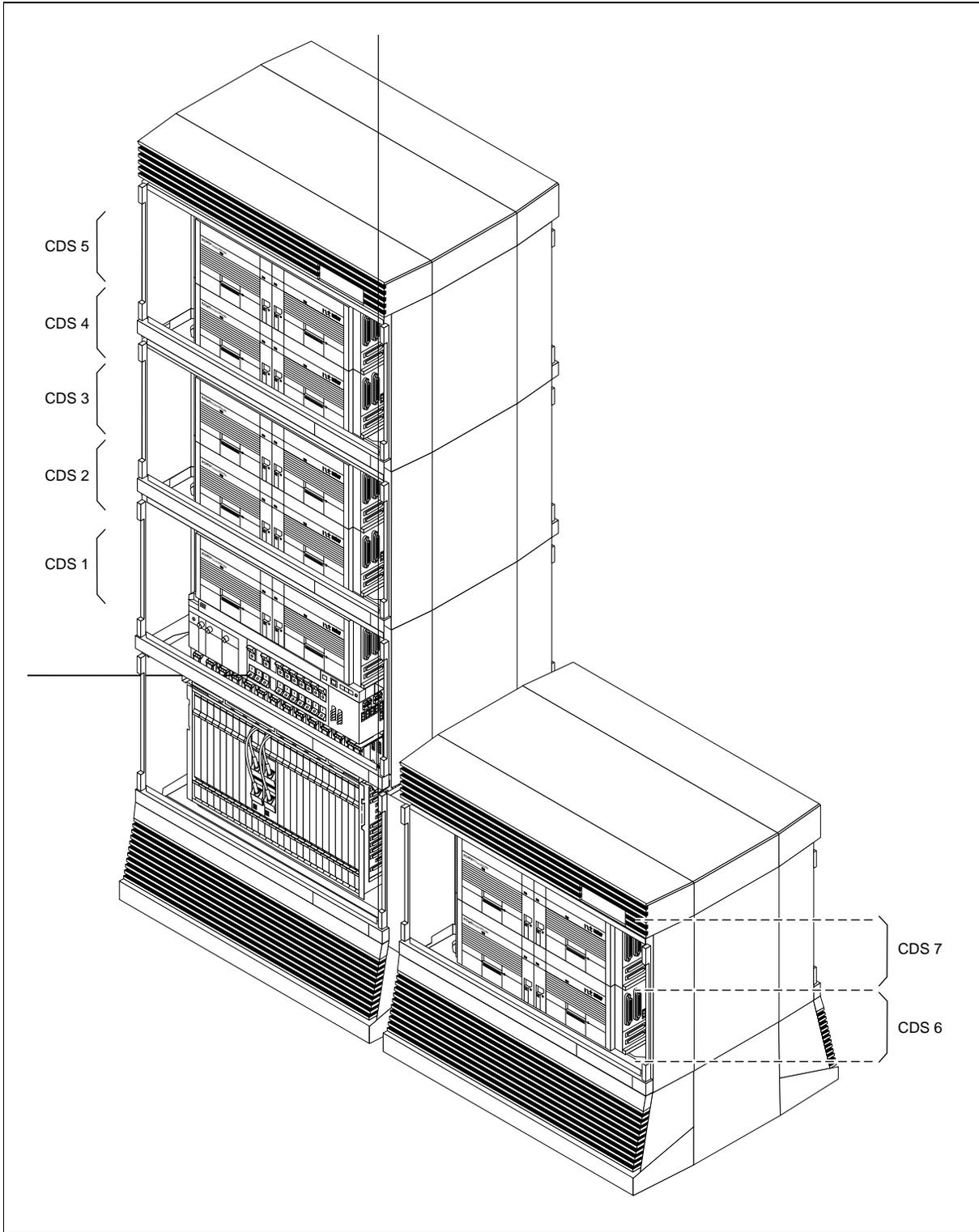
Figure 9-2  
Numbering of copper-distribution shelves in a 3/2 MBP cabinet arrangement

PC-10849



**Figure 9-3**  
**Numbering of copper-distribution shelves in a 4/1 MBP cabinet arrangement**

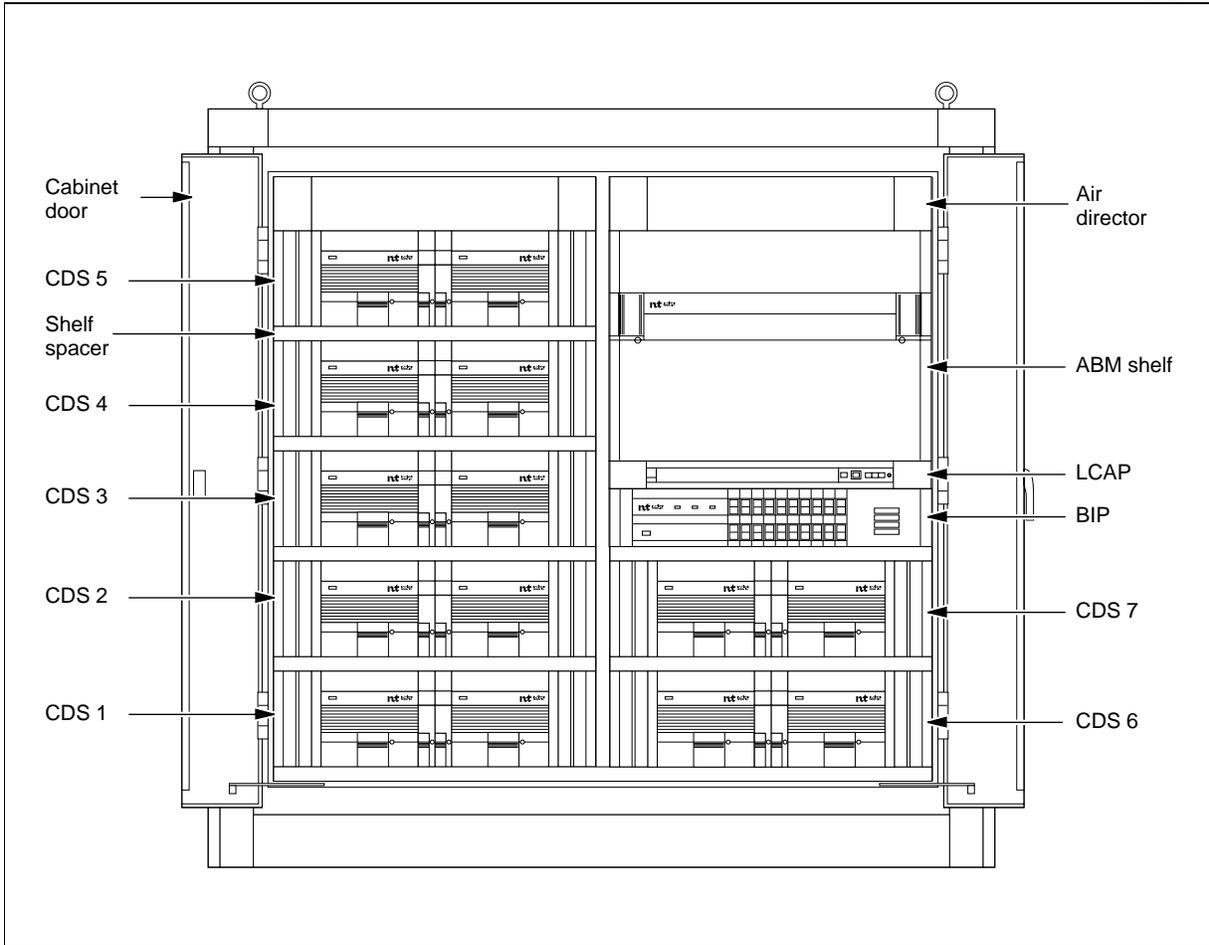
PC-11008



9-6 Equipping and testing copper-distribution shelves

**Figure 9-4**  
**Numbering of copper-distribution shelves in a Series 800A outside plant cabinet**

PC-10990



---

## Procedure 9-1

# Installing common-equipment circuit packs in a copper-distribution shelf

---

Use this procedure for the initial installation of common-equipment circuit packs in a copper-distribution shelf (CDS).

Figure 9-1 on page 9-3 illustrates the CDS arrangement in a bay. Figure 9-2 on page 9-4 and Figure 9-3 on page 9-5 show examples of the modular business package (MBP) arrangements of CDSs. Figure 9-4 on page 9-6 shows the CDS arrangement in a Series 800A outside plant cabinet.

## Requirements

Before you start this procedure, verify the following:

- that the CDSs are already be installed and cabled. If they are not, install and cable a new CDS according to the document that applies to your arrangement.
- that a power filter card, NT4K63, is already installed at the rear of each line drawer. In the left drawer, look for the NT4K63 card on the right side of the midplane. In the right drawer, look on the left side of the midplane.

The following tools and materials are required:

- two CDS power cards (CDSP), NT4K62AA
- two metallic test access cards (MTACs), NT4K73AA
- four line interface cards (LICs), NT4K70AA
- a screwdriver, flat blade 1/4 in. wide

**DANGER****Risk of injury or damage**

Read “Warnings and safety precautions” in “About this document” to minimize any risk to personnel and equipment.

—continued—

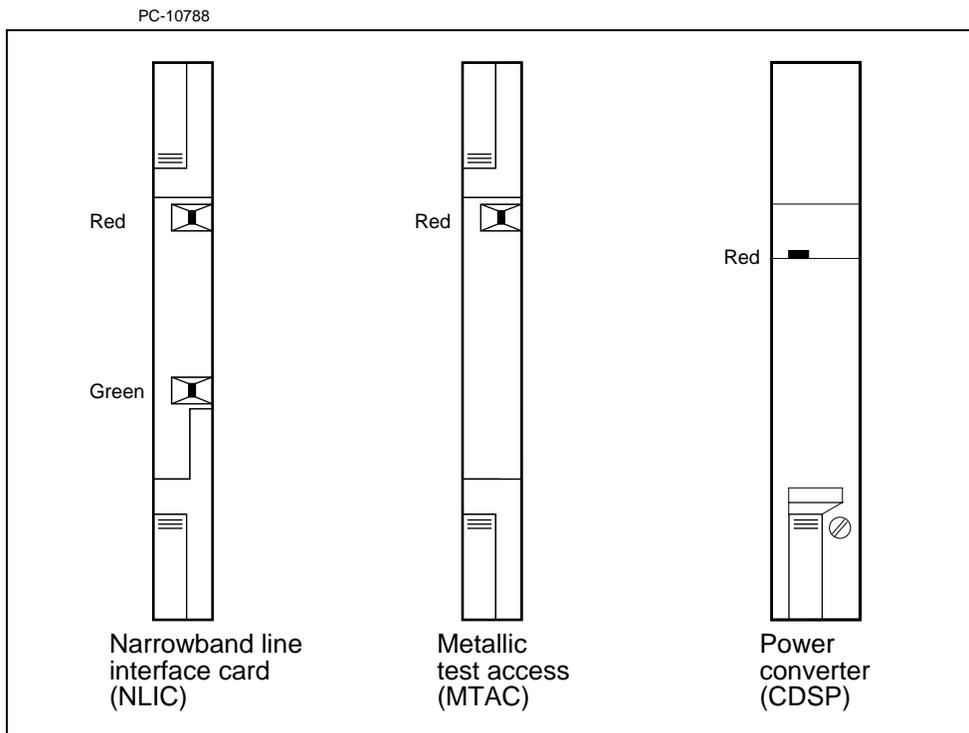


Procedure 9-1 (continued)

**Installing common-equipment circuit packs in a copper-distribution shelf**

**Step Action**

**Figure 9-6**  
**Locations of the locking handles on common-equipment circuit packs**



- 4 Use the screwdriver to unlock the left drawer of the CDS by turning the locking knob (beside the handle) one quarter turn to the right.
- 5 Lower the handle at the bottom of the drawer faceplate and pull the drawer open.

—continued—

**9-10** Equipping and testing copper-distribution shelves

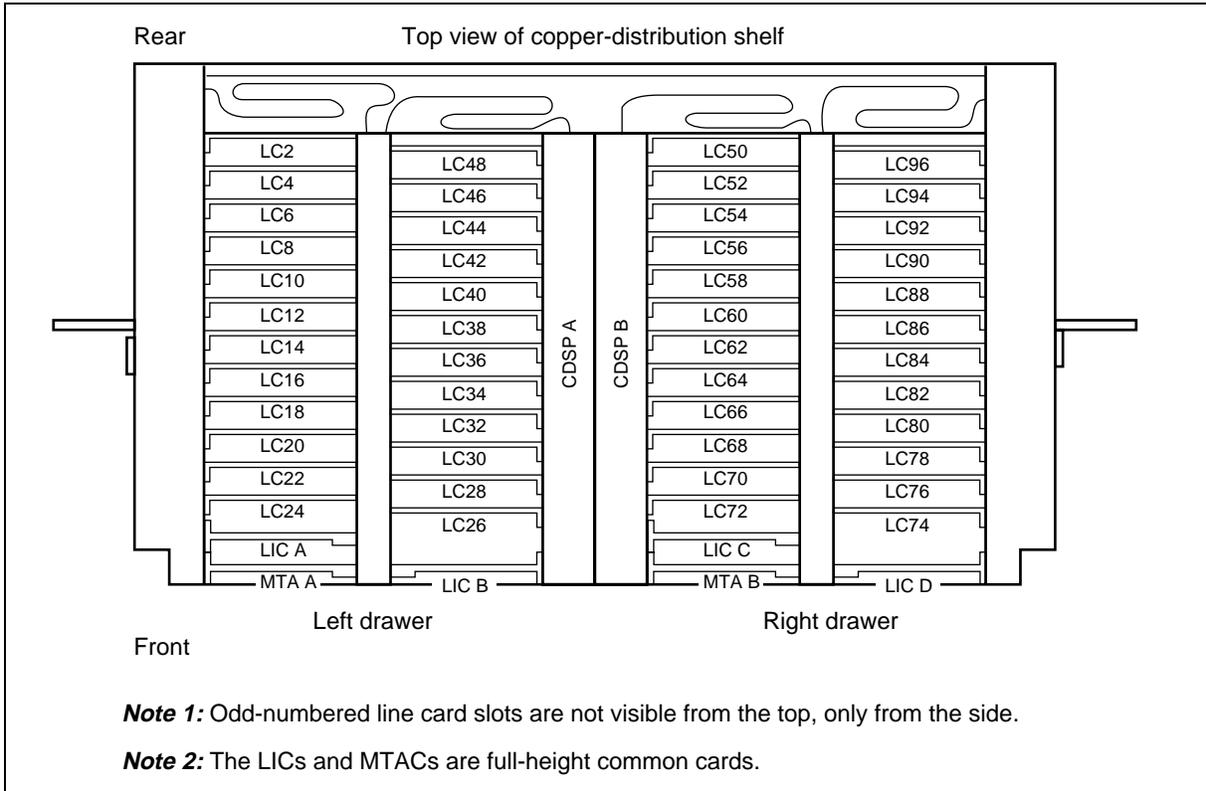
Procedure 9-1 (continued)

**Installing common-equipment circuit packs in a copper-distribution shelf**

- | Step     | Action  |
|----------|---|
| <b>6</b> | <p>Fully insert the metallic test access card (MTAC) into the MTA A slot as follows:</p> <ol style="list-style-type: none"> <li><b>a.</b> Open the handles at the top and bottom of the card.</li> <li><b>b.</b> Keeping the handles open, carefully insert the card fully into slot MTA A in the line drawer.</li> <li><b>c.</b> Release the handles.</li> </ol> <p>Figure 9-7 shows the locations for the common-equipment circuit packs inside the drawer.</p> |

**Figure 9-7**  
Locations of the circuit packs inside a line drawer

PC-10750



- 7** Fully insert the two line interface cards (LIC) into slots LIC A and LIC B.
- 8** Close the left line drawer, leave it unlocked, and open the right line drawer. Unlock the right drawer by following the instructions in step 4.
- 9** Fully insert the MTAC into slot MTA B.

—continued—

Procedure 9-1 (continued)

**Installing common-equipment circuit packs in a copper-distribution shelf**

---

| <b>Step</b> | <b>Action</b>                                       |
|-------------|---|
| 10          | Fully insert the two LICs in slots LIC C and LIC D. |
| 11          | Close the right drawer, leaving it unlocked.        |

—end—

## Procedure 9-2

# Testing a copper-distribution shelf

---

Use this procedure to test a copper-distribution shelf (CDS) that has been added to a network element. This procedure includes the following tests of new equipment in the CDS:

- lamp test
- inventory of common cards
- redundant operation of the line interface card (LIC)
- continuity to line card slots 23/24, 47/48, 71/72, and 95/96

Repeat this procedure for each CDS you are adding to the bay.

### Requirements

The following tools and materials are required:

- CDS common-equipment circuit packs that are equipped and tested
- VT100-compatible terminal connected to the network element
- flat-bladed screwdriver
- pair of electrician’s insulated needle-nose pliers for adjustments to the breaker interface panel (BIP) alarm contacts
- one NT4K67 4-wire line card for line drawer continuity tests



#### **DANGER**

##### **Risk of injury or damage**

Read the warnings and precautions in “Warnings and safety precautions” in “About this document” to minimize any risk to personnel and equipment.



#### **CAUTION**

##### **Risk of damage to equipment**

During initial setup of AccessNode, Northern Telecom recommends that the equipment side remain disconnected from the outside plant subscriber loops (at the protection modules) until the line cards are installed and powered up. For example, when using 5-pin protector modules, pull the modules out to the first detent position.

—continued—

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 Procedure 9-2 (continued)

**Testing a copper-distribution shelf**


---

**Action**


---

| Step | Action |
|------|--------|
|------|--------|

---

This procedure is divided into the following sections:

- Preparing for the tests
- Adjusting BIP breaker alarm contacts
- Testing the lamps and LEDs
- Taking inventory of common cards in a CDS
- Verifying the redundancy of line interface cards
- Checking continuity to line card slots

Complete all of the sections from “Preparing for the tests” through “Checking continuity to line card slots.” Do not pause between sections.

**Preparing for the tests**

- 1 Make sure that both of the circuit breakers for the CDS are switched to the On or 1 position.  
 For example, copper-distribution shelf 7 has two circuit breakers on the breaker interface panel (BIP): one above the “CDS 7” label and one below the label.  
**Note:** If the alarm contacts for the circuit breakers for this CDS were previously adjusted to the normally open [NO] position to prevent alarms while the CDS was not in use, alarms were generated when you closed the circuit breakers. Disregard such alarms, since this procedure changes the normally open alarm condition to normally closed and clears the alarms.
- 2 Raise the handle on the left line drawer of the new CDS and pull the drawer open.
- 3 Open the right line drawer in the same way.
- 4 To verify that the shelf is powered up, inspect the narrow-band line interface cards (NLIC) in each drawer.  
*The active card has a green LED.*
- 5 Log in to the network element user interface. See *Network Element User Interface Description*, 323-3001-300, in *Operations, Administration, and Provisioning*, Volume 4A, for instructions.

—continued—

9-14 Equipping and testing copper-distribution shelves

Procedure 9-2 (continued)

**Testing a copper-distribution shelf**

- | Step | Action  |
|------|---|
| 6    | Check for BIP power alarms by entering:<br><b>al; listalms</b> ↵<br><i>The Alarms screen appears, listing the newest alarms first. Scroll through the list to determine whether BIP power alarms have been generated.</i> |

| If power alarms         | Then          |
|-------------------------|---------------|
| have not been generated | go to step 16 |
| have been generated     | go to step 7  |

**Adjusting BIP breaker alarm contacts**

- 7 Switch the 2 circuit breakers for this CDS to the Off or 0 position.  
*The BIP power alarms temporarily clear.*

|  |  |
|--|--|
|  | <b>DANGER</b><br><b>Risk of injury</b><br>Work with caution at the BIP to prevent potential personal injury. |
|--|--|

- 8 To remove the breaker retaining bar between the 2 rows of breakers, loosen the captive screw on the right side of the bar and swing the bar up from the right side until the left side disengages.
- 9 Remove the Pwr breaker associated with the new CDS by lifting the retaining tabs (holding the breaker out of the way) as follows:
- a. Use a screwdriver to lift the tab on the bottom of the top breaker or on the top of the bottom breaker.
  - b. With the retaining tabs out of the way, pull the breaker out until you can gain access to the wire connectors at the back of the breaker.
- 10 Make sure the alarm wire connector is at the “Normally closed (alarm)” position, as shown in Figure 9-8. If the connector is not in the correct position, use a pair of electrician’s insulated needle-nose pliers to transfer the connector from the “Normally open (alarm)” position to the “Normally closed (alarm)” position.  
*BIP power alarms are temporarily generated.*

—continued—

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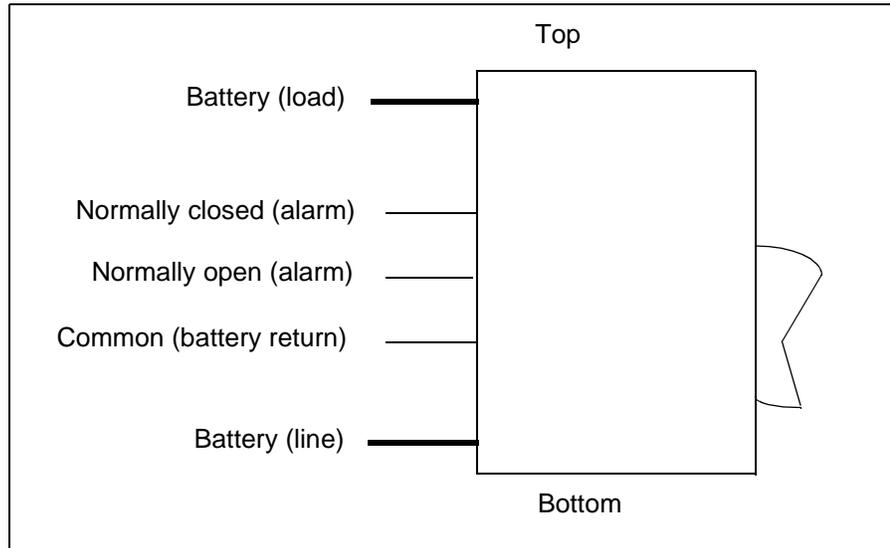
 Procedure 9-2 (continued)

**Testing a copper-distribution shelf**


---

| Step | Action |
|------|--------|
|------|--------|

**Figure 9-8**  
**Normally closed alarm position**



- |           |   |
|-----------|---|
| <b>11</b> | Insert the circuit breaker back into its slot until it snaps into place under the retaining tabs.   |
| <b>12</b> | Repeat steps 9 through 11 for the TB breaker for the same CDS.  |
| <b>13</b> | Replace the breaker retaining bar by hooking the left side of the bar into place, then swinging the right side down until the captive screw aligns with the screw hole. |
| <b>14</b> | Use a slotted screwdriver to fasten the captive screw on the retaining bar into place.  |
| <b>15</b> | Switch the 2 BIP breakers associated with the new CDS to the On or 1 position.  |

*BIP power alarms clear.*

To continue the procedure, go to step 16.

—continued—

9-16 Equipping and testing copper-distribution shelves

Procedure 9-2 (continued)

**Testing a copper-distribution shelf**

**Step Action**

**Testing the lamps and LEDs**

**16** Initiate a lamp test by pressing the **ACO/LT** button on the local craft access panel (LCAP).

*The LEDs should light on the following items:*

- the faceplate of each line drawer
- the faceplates of the 2 CDS power cards
- the metallic test access cards and the line interface cards inside each drawer

**Note:** If all of the LEDs go off before you have examined them, press the **ACO/LT** button again.

**17** If an LED does not light on a circuit pack, use one of the following procedures to take corrective action:

| <b>If the LED does not light for this circuit pack</b> | <b>Then follow this procedure</b>                   |
|--|---|
| NLIC   | Procedure 9-3, Diagnosing failed NLIC circuit packs |
| CDSP   | Procedure 9-4, Diagnosing failed CDSP circuit packs |
| MTAC   | Procedure 9-5, Diagnosing failed MTAC circuit packs |

To continue the procedure, go to step 18.

—continued—

Procedure 9-2 (continued)  
**Testing a copper-distribution shelf**

**Step Action**

**Taking inventory of common cards in a CDS**

**18** Complete the instructions in the following table to look at the equipment screen for each equipment type and verify the existence of the common cards installed in the CDSs.

Verify that the cards appear for all equipped CDSs and record which cards, if any, are not in service (IS). Table 9-1 on page 9-19 lists each common card in a CDS along with the card type and the instance displayed on the user interface screen.

| <b>To verify</b>     | <b>Enter</b>   | <b>And for any circuit pack in the list that is out of service, complete the following:</b>   |
|----------------------|--|---|
| line interface cards | <b>eq lic</b> ↵<br><i>An LIC Equipment summary screen appears.</i> | <b>a.</b> Enter <b>dtllic &lt;CDS #&gt; &lt;ID&gt;</b> ↵<br>where<br><CDS#> CDS number: <b>1</b> to <b>7</b><br><ID> equipment instance: <b>a, b, c,</b> or <b>d</b><br><i>The appropriate detailed LIC Equipment screen appears.</i><br><b>b.</b> Enter <b>chgstate is</b> ↵<br><i>The card performs self-diagnostics and enters the in-service state.</i> |
| —continued—          |  |   |

—continued—

9-18 Equipping and testing copper-distribution shelves

Procedure 9-2 (continued)

**Testing a copper-distribution shelf**

**Step Action**

| To verify             | Enter  | And for any circuit pack in the list that is out of service, complete the following:  |
|-----------------------|--|---|
| metallic access cards | <p><b>eq mtac</b> ↵<br/> <i>A MTAC Equipment summary screen appears.</i></p> | <p><b>a.</b> Enter <b>dtlmtac &lt;CDS #&gt; &lt;ID&gt;</b> ↵<br/>           where<br/>           &lt;CDS#&gt; CDS number: <b>1 to 7</b><br/>           &lt;ID&gt; equipment instance: <b>a or b</b><br/> <i>The appropriate detailed MTAC Equipment screen appears.</i></p> <p><b>b.</b> Enter <b>chgstate is</b> ↵<br/> <i>The card performs self-diagnostics and enters the in-service state.</i></p> |
| CDS power cards       | <p><b>eq cdsp</b> ↵<br/> <i>A CDSP Equipment summary screen appears.</i></p> | <p><b>c.</b> Enter <b>dtlcdsp &lt;CDS #&gt; &lt;ID&gt;</b> ↵<br/>           where<br/>           &lt;CDS#&gt; CDS number: <b>1 to 7</b><br/>           &lt;ID&gt; equipment instance: <b>a or b</b><br/> <i>The appropriate detailed CDSP Equipment screen appears.</i></p> <p><b>d.</b> Enter <b>chgstate is</b> ↵<br/> <i>The card performs self-diagnostics and enters the in-service state.</i></p> |
| —end—                 |  |   |

—continued—

Procedure 9-2 (continued)

**Testing a copper-distribution shelf****Step Action****Table 9-1  
Common equipment cards for a CDS**

| Card name                 | Type and instance                |
|---------------------------|----------------------------------|
| line interface card       | lic a<br>lic b<br>lic c<br>lic d |
| metallic test access card | mtac a<br>mtac b                 |
| CDS power card            | cdsp a<br>cdsp b                 |

To continue the procedure, go to step 19.

**Verifying the redundancy of line interface cards**

**19** To display the detailed line interface card screen for an NLIC, enter:

**eq lic; dtlic <CDS #> <ID> ↵**

where

<CDS #> CDS number: 1 to 7

<ID> equipment instance: a, b, c, or d

*The LIC Equipment screen appears.*

**Note:** Redundant pairs of line interface cards are as follows:

- Cards a and b are a redundant pair in the left drawer.
- Cards c and d are a redundant pair in the right drawer.

**20** To verify that the NLIC cards can actually switch activity, enter:

**switch ↵**

**y ↵**

*If card A was on standby, it becomes active and card B goes on standby. If card B was on standby, it becomes active and card A goes on standby. Similarly, if card C was on standby, it becomes active and card D goes on standby; and if card D was on standby, it becomes active and card C goes on standby.*

**21** Repeat step 20 to verify that switching works in both directions.

—continued—

**9-20** Equipping and testing copper-distribution shelves

---

Procedure 9-2 (continued)

**Testing a copper-distribution shelf**

---

- | <b>Step</b> | <b>Action</b>   |
|-------------|---|
| <b>22</b>   | If the switch activity was unsuccessful, complete one of the procedures in the following table to perform full diagnostics on the standby unit. If you detect a fault, replace the card and repeat steps 19 through 21 of this section. |

| <b>If the LED does not light for this circuit pack</b> | <b>Then follow this procedure</b>                   |
|--|---|
| NLIC   | Procedure 9-3, Diagnosing failed NLIC circuit packs |
| CDSP   | Procedure 9-4, Diagnosing failed CDSP circuit packs |
| MTAC   | Procedure 9-5, Diagnosing failed MTAC circuit packs |

To continue the procedure, go to step 23.

**Checking continuity to line card slots**

- 23** Insert a 4-wire line card into slots 47/48 of the CDS as shown in Figure 9-9. Slots 47/48 are in the left drawer.

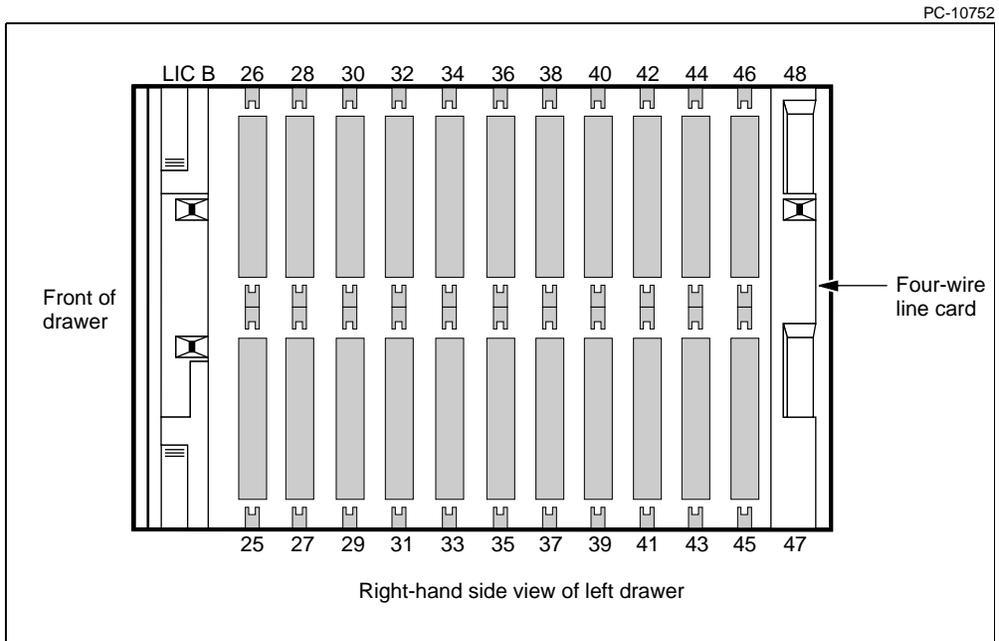
*The processor identifies the line card type, downloads diagnostic software, and performs basic diagnostic tests. If the line card passes testing, the processor downloads an operational software load to the line card. (This is a service-independent load.)*

—continued—

Procedure 9-2 (continued)  
**Testing a copper-distribution shelf**

**Step Action**

**Figure 9-9**  
**CDS left drawer slots**



**24** To check that the processor recognizes the line card in its slot, enter:

**equipmnt lc 1 48 ↵**

where

lc line card

1 CDS 1

48 slot 48 in the left drawer

—continued—

9-22 Equipping and testing copper-distribution shelves

---

Procedure 9-2 (continued)

**Testing a copper-distribution shelf**

---

| <b>Step</b> | <b>Action</b>   |
|-------------|---|
|             | <p><i>A line card Equipment screen appears.</i></p> <p><i>The red LED on the line card can be lit if:</i></p> <ul style="list-style-type: none"><li>• <i>the line card failed diagnostic tests</i></li><li>• <i>a talk battery is not supplied</i></li><li>• <i>the slot was pre-provisioned for a service for which this line card is incompatible, in which case the line card equipment screen will indicate a mismatch (MISM)</i></li></ul> |
| <b>25</b>   | <p>If the line card failed the insertion self-tests, run additional diagnostics by entering:</p> <p><b>diagnose</b> ↵</p> <p>For information about diagnosing line card faults, see <i>Line Card Testing Procedures</i>, 323-3001-316, in <i>Operations, Administration, and Provisioning</i>, Volume 4B.</p>   |
| <b>26</b>   | <p>Remove the line card.</p>  |
| <b>27</b>   | <p>Repeat steps 23 through 26 of this section with the line card in the following slots:</p> <ul style="list-style-type: none"><li>• slots 23/24 in the left drawer</li><li>• slots 71/72 in the right drawer</li><li>• slots 95/96 in the right drawer</li></ul> <p>If necessary, use Figure 9-7 on page 9-10 to locate slots 24, 72, and 96.</p>  |

—end—

## Procedure 9-3

# Diagnosing failed NLIC circuit packs

Use this procedure to diagnose common-equipment circuit packs in a copper-distribution shelf (CDS) or to verify the failure of a circuit pack with a red LED. This procedure describes how to diagnose narrow-band line interface card (NLIC) circuit packs.

### Requirements

This procedure requires a VT100-compatible terminal connected to the network element



#### **DANGER**

##### **Risk of injury or damage**

Read “Warnings and safety precautions” in “About this document” to minimize any risk to personnel and equipment.

### Action

| Step | Action  |
|------|---|
| 1    | Log in to FWPI.   |
| 2    | Display the detailed equipment screen for the NLIC by entering:<br><b>eq lic</b> ↵<br><b>dtlic &lt;CDS #&gt; &lt;ID&gt;</b> ↵<br>where<br><CDS #>      copper-distribution shelf number: <b>1</b> to <b>7</b><br><ID>            equipment instance: <b>a, b, c,</b> or <b>d</b><br>(NLICs a and b are in the left line drawer, and NLICs c<br>and d are in the right line drawer.) |

*The detailed LIC Equipment screen appears.*

**Note:** LIC pairs provide redundancy within each line drawer. The active LIC has a Primary status, and the inactive LIC has a Secondary status.

—continued—

Procedure 9-3 (continued)

**Diagnosing failed NLIC circuit packs**

**Step Action**

**3** Complete the instructions in the following table to place the NLIC out of service (OOS).

**Note:** An NLIC must be inactive before you can place it out of service.

| If the NLIC is the        | Complete the following   |
|---------------------------|--|
| primary (active) unit     | <p><b>a.</b> Switch activity to change the unit to a secondary status by entering:<br/> <b>switch</b> ↵<br/> <i>Confirmation is requested.</i><br/>                     Enter:<br/> <b>y</b> ↵<br/> <i>The two NLICs exchange primary and secondary status.</i></p> <p><b>b.</b> Change the status to OOS by entering:<br/> <b>chgstate oos</b>↵<br/> <i>Confirmation is requested.</i><br/>                     Enter:<br/> <b>y</b> ↵<br/> <i>The value of the State field changes to OOS.</i></p> |
| secondary (inactive) unit | <p>Change the status to OOS by entering:<br/> <b>chgstate oos</b>↵<br/> <i>Confirmation is requested.</i><br/>                     Enter:<br/> <b>y</b> ↵<br/> <i>The value of the State field changes to OOS.</i></p>   |

—continued—

---

Procedure 9-3 (continued)

**Diagnosing failed NLIC circuit packs**

---

- | <b>Step</b> | <b>Action</b>  |
|-------------|--|
| <b>4</b>    | <p>Initiate diagnostics on the NLIC by entering:</p> <p><b>chgstate is</b> ↵</p> <p><i>The system performs out-of-service diagnostics on the NLIC as part of the transition from OOS to IS.</i></p> <p><i>Diagnosis can take a while. It proceeds as a background task. The progress and final diagnosis are reported as updates to the state of the circuit pack. For a circuit pack that passes diagnostics, states similar to the following are displayed:</i></p> <pre>OOS-DIAGNOSE OOS IS</pre> <p><i>The following is a sample message for a circuit pack that fails diagnostics:</i></p> <pre>IS-Trbl-TOTAL-FAIL</pre> <p><i>Different responses might be provided, depending on which part has failed.</i></p> |
| <b>5</b>    | <p>If failure is indicated, replace the defective NLIC.</p>  |
| <b>6</b>    | <p>Repeat this procedure for each NLIC circuit pack you want to diagnose.</p>  |

—end—

---

## Procedure 9-4

# Diagnosing failed CDSP circuit packs

---

Use this procedure to diagnose common-equipment circuit packs in a copper-distribution shelf (CDS) or to verify the failure of a circuit pack with a red LED. This procedure describes how to diagnose copper-distribution shelf power (CDSP) converter circuit packs.

### Requirements

This procedure requires a VT100-compatible terminal connected to the network element



**DANGER**

**Risk of injury or damage**

Read “Warnings and safety precautions” in “About this document” to minimize any risk to personnel and equipment.

### Action

---

| Step | Action |
|------|--------|
|------|--------|

---

- |   |  |
|---|--|
| 1 | Log in to FWPUJ.   |
| 2 | Display the detailed equipment screen for the CDSP by entering:<br><b>eq cdsp</b> ↵<br><b>dtlcdsp &lt;CDS #&gt; &lt;ID&gt;</b> ↵<br>where<br><b>&lt;CDS #&gt;</b> CDS number: <b>1 to 7</b><br><b>&lt;ID&gt;</b> equipment instance: <b>a or b</b> |
| 3 | If the module is in service (IS), enter:<br><b>chgstate oos</b> ↵<br><i>Confirmation is requested.</i><br>Enter:<br><b>y</b> ↵<br><i>The State field value changes to out of service (OOS).</i>  |

—continued—

---

Procedure 9-4 (continued)

**Diagnosing failed CDSP circuit packs**

---

| <b>Step</b> | <b>Action</b>   |
|-------------|---|
| <b>4</b>    | <p>Initiate diagnostics on the CDSP by entering:</p> <p><b>chgstate is</b> ↵</p> <p><i>The system performs out-of-service diagnostics on the CDSP as part of the transition from OOS to an IS.</i></p> <p><i>Diagnosis can take a while. It proceeds as a background task. The progress and final diagnosis are reported as updates to the state of the circuit pack. For a circuit pack that passes diagnostics, states similar to the following are displayed:</i></p> <pre>OOS-DIAGNOSE OOS IS</pre> <p><i>The following is a sample message for a circuit pack that fails diagnostics:</i></p> <pre>IS-Trbl-TOTAL-FAIL</pre> <p><i>Different responses might be provided, depending on which part has failed.</i></p> |
| <b>5</b>    | <p>If failure is indicated, replace the defective CDSP.</p>   |
| <b>6</b>    | <p>Repeat this procedure for each CDSP circuit pack you want to diagnose.</p>   |

—end—

## Procedure 9-5 Diagnosing failed MTAC circuit packs

---

Use this procedure to diagnose common-equipment circuit packs in a copper-distribution shelf (CDS) or to verify the failure of a circuit pack with a red LED. This procedure describes how to diagnose a metallic test access card (MTAC)

### Requirements

The following equipment is required:

- a working test access card (TAC) installed in slot 20 of the access bandwidth manager (ABM) shelf
- a VT100-compatible terminal connected to the network element



#### **DANGER**

#### **Risk of injury or damage**

Read “Warnings and safety precautions” in “About this document” to minimize any risk to personnel and equipment.

### Action

---

| <b>Step</b> | <b>Action</b> |
|-------------|---------------|
|-------------|---------------|

---

- |          |   |
|----------|---|
| <b>1</b> | Log in to FWPI.   |
| <b>2</b> | Display the detailed equipment screen for the MTAC by entering:<br><b>eq mtac</b> ↵<br><b>dtlmtac &lt;CDS #&gt; &lt;ID&gt;</b> ↵<br>where<br><b>&lt;CDS #&gt;</b> CDS number: <b>1</b> to <b>7</b><br><b>&lt;ID&gt;</b> equipment instance: <b>a</b> or <b>b</b><br>(MTAC a is in the left line drawer, and MTAC b is in the right line drawer) |

—continued—

---

 Procedure 9-5 (continued)

**Diagnosing failed MTAC circuit packs**


---

| Step | Action   |
|------|--|
| 3    | <p>If the MTAC is in service (IS), enter:</p> <p><b>chgstate oos</b> ↵</p> <p><i>Confirmation is requested.</i></p> <p>Enter:</p> <p><b>y</b> ↵</p> <p><i>The State field value changes to OOS.</i></p> <p><b>Note:</b> On an MTAC, out-of-service diagnostics are not automatically conducted during the transition from an OOS to an IS state. You must use the “diagnose” command to start diagnostics. Diagnostics use test resources on the test access card.</p>   |
| 4    | <p>Initiate diagnostics on the MTAC by entering:</p> <p><b>diagnose</b> ↵</p> <p><i>Confirmation is requested.</i></p> <p>Enter:</p> <p><b>y</b> ↵</p> <p><i>The system performs out-of-service diagnostics on the MTAC.</i></p> <p><b>Note:</b> The diagnostic request is rejected if the resources are busy (the MTAC is in service).</p> <p><i>Diagnosis can take a while. It proceeds as a background task. The progress and final diagnosis are reported as updates to the state of the circuit pack. For a circuit pack that passes diagnostics, states similar to the following are displayed:</i></p> <pre>OOS-DIAGNOSE OOS</pre> <p><i>The following is a sample message for a circuit pack that fails diagnostics:</i></p> <pre>OOS-Trbl-TOTAL-FAIL</pre> <p><i>Different responses might be provided, depending on which part has failed.</i></p> |
| 5    | <p>If failure is indicated, replace the defective MTAC.</p> <p><i>The new MTAC undergoes self-tests. If it passes, it goes in service.</i></p> <p>If the new MTAC fails, or if more than one MTAC fails diagnostics, a higher order problem (such as loose cables, bent pins, TAC fault, or other condition) might exist. See <i>Alarm and Trouble Clearing Procedures</i>, 323-3001-543, in <i>Maintenance</i>, Volume 5A.</p>  |

—continued—

## 9-30 Equipping and testing copper-distribution shelves

---

Procedure 9-5 (continued)

### Diagnosing failed MTAC circuit packs

---

- | Step | Action  |
|------|---|
| 6    | If the MTAC passes diagnostics, place it back in service by entering:<br><b>chgstate is</b> ↵<br><i>The MTAC goes in service.</i> |
| 7    | Repeat this procedure for each MTAC circuit pack which you want to diagnose.  |

—end—

---

# Expanding the MBP system

---

This chapter describes procedures for adding and testing new equipment in the modular business package (MBP). The MBP is a cabinet arrangement of an AccessNode remote fiber terminal (RFT) located on the customer's premises.

The rules for expanding an MBP system are defined in *Engineering and Ordering Information*, 323-3001-032, in the *Engineering, Configuration, and Ordering Guide*, Volume 1.

## Adding a field expansion module or an expansion cabinet

If you are adding a copper distribution shelf or a T1 repeater and digital system cross-connect (DSX) shelf to an MBP system, you might need to install additional common equipment to accommodate the new shelf. To add a new field expansion module (FEM) or an MBP expansion cabinet, follow the procedures in *Modular Business Package Installation Manual*, 323-3001-206.

## How to use this chapter

To use procedures in this chapter, refer to the document task list in Chapter 1, “Overview of system expansion,” locate the task you need, and perform the sequence of given procedures.

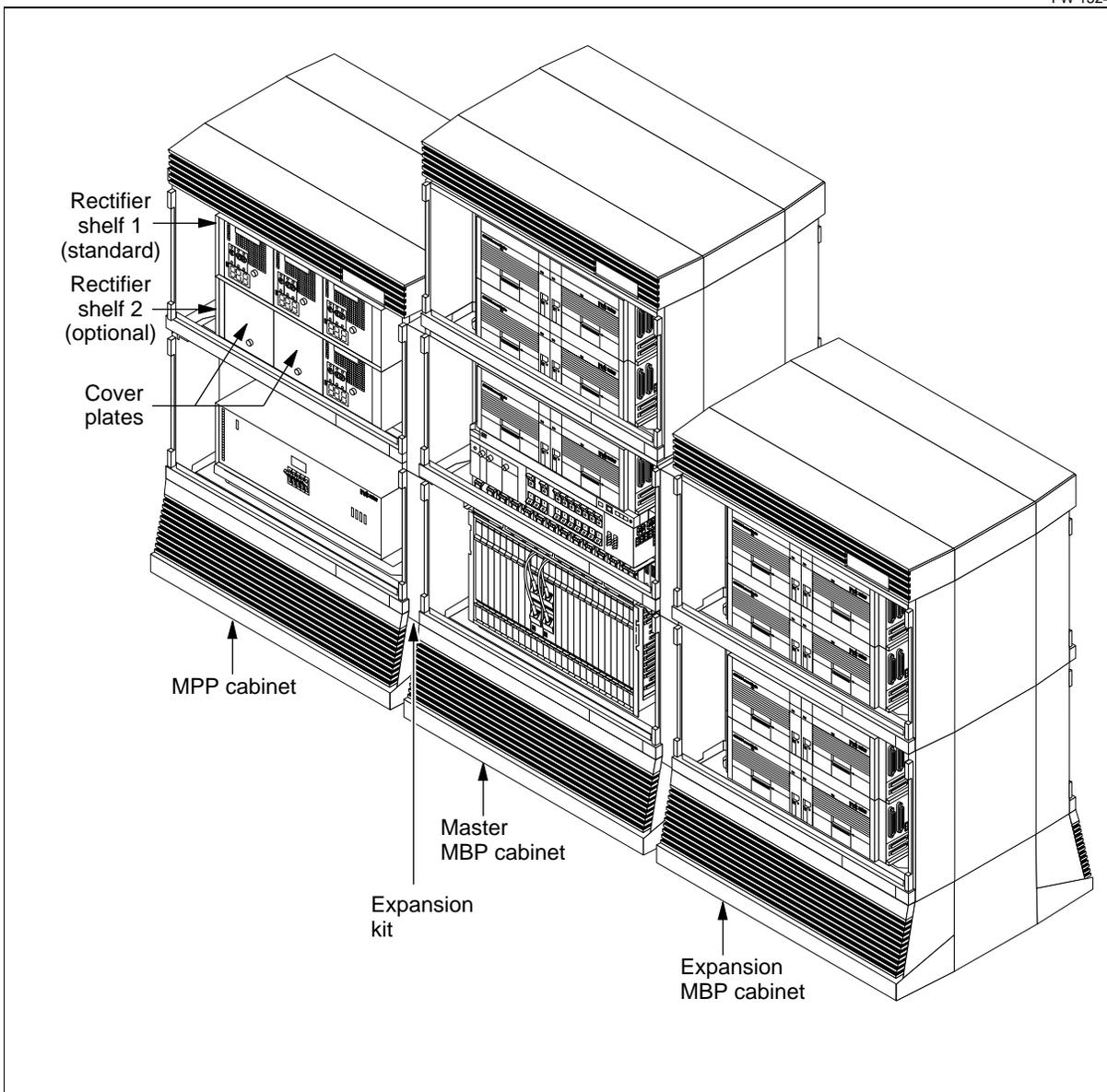
## Chapter task list

This chapter includes the following procedures. If you cannot successfully complete these procedures, contact your next level of support.

| Procedure | Task  | See       |
|-----------|---|-----------|
| 10-1      | Installing a new rectifier in an existing MPP cabinet | page 10-3 |
| 10-2      | Verifying a new rectifier in an existing MPP cabinet  | page 10-9 |

**Figure 10-1**  
**Modular business package cabinet arrangement**

FW 15240

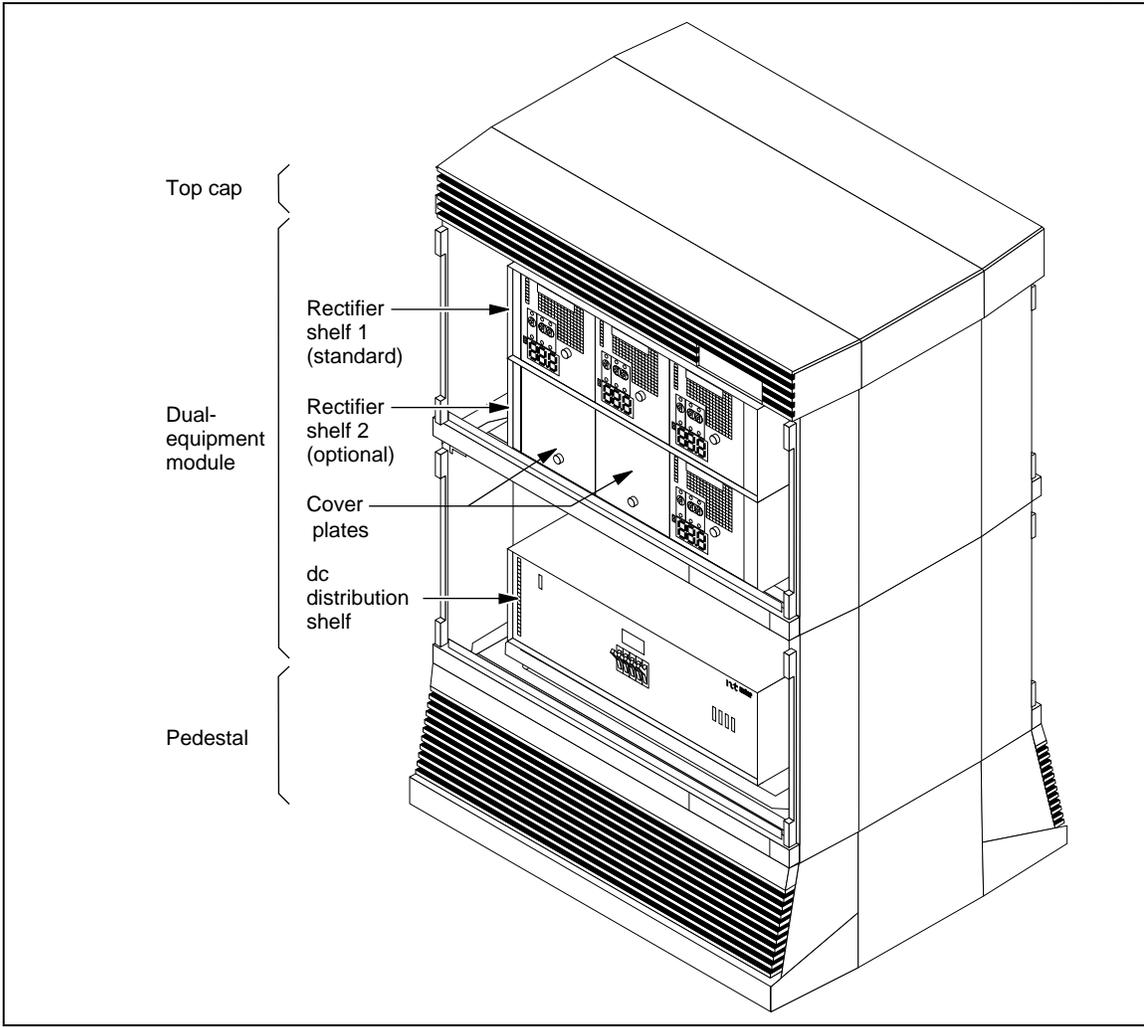


# Procedure 10-1 Installing a new rectifier in an existing MPP cabinet

Use this procedure to install a new NT5C06CA rectifier in the NT5C10CC-1 rectifier shelf of the modular power package (MPP) cabinet. The MPP cabinet provides dc power to the modular business package (MBP) system. The MPP can contain up to four rectifiers on two rectifier shelves, as illustrated in Figure 10-2.

**Figure 10-2**  
Rectifier shelves in the modular power package

PC-15242



—continued—

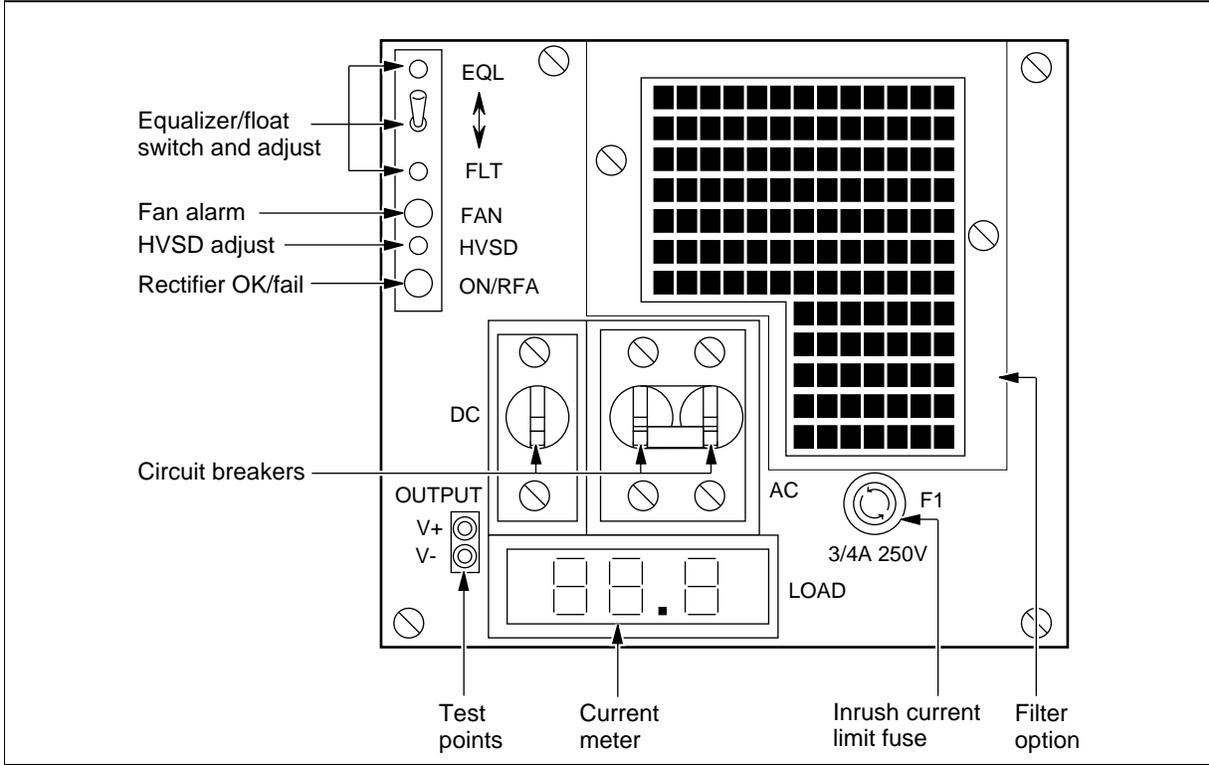
10-4 Expanding the MBP system

Procedure 10-1 (continued)

Installing a new rectifier in an existing MPP cabinet

Figure 10-3 shows the NT5C06CA rectifier.

Figure 10-3  
NT5C06CA rectifier, front view

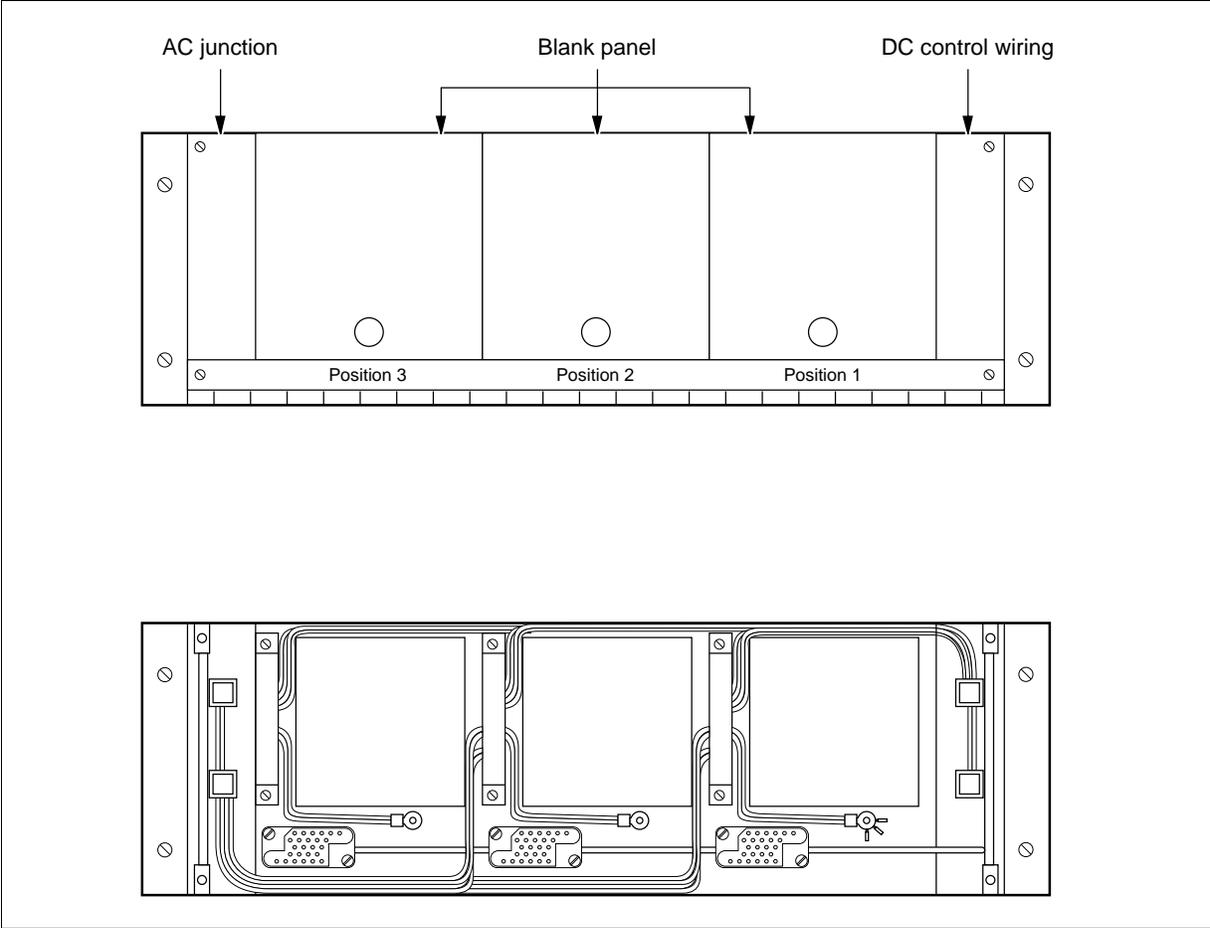


—continued—

Procedure 10-1 (continued)  
**Installing a new rectifier in an existing MPP cabinet**

Figure 10-4 shows the NT5C10CC-1 rectifier shelf with and without blank panels.

**Figure 10-4**  
**NT5C10CC-1 rectifier shelf**



—continued—

Procedure 10-1 (continued)

**Installing a new rectifier in an existing MPP cabinet**

---

**Requirements**

This procedure requires a small, flat-bladed screwdriver to loosen captive screws.



**DANGER**

**Risk of injury or damage**

Read “Warnings and safety precautions” in “About this document” to minimize any risk to personnel and equipment.



**CAUTION**

**Risk of service interruption**

Do not switch the ac circuit breakers to the OFF position. If you do, you interrupt service on the AccessNode equipment.

**Action**

---

**Step    Action**

---

- 1      Remove the MPP cabinet cover and, if necessary, the dual equipment module (DEM) separator bar.
- 2      For a new (empty) rectifier shelf, inspect all physical electrical connections from the commercial ac power panel to the MPP rectifier shelf to make sure they are correct and tight.
- 3      On the rectifier shelf to which you are adding a rectifier, release the clamping bar by loosening the two captive screws at the front of the shelf. Swing the clamping bar downward, as shown in Figure 10-5 on page 10-7.

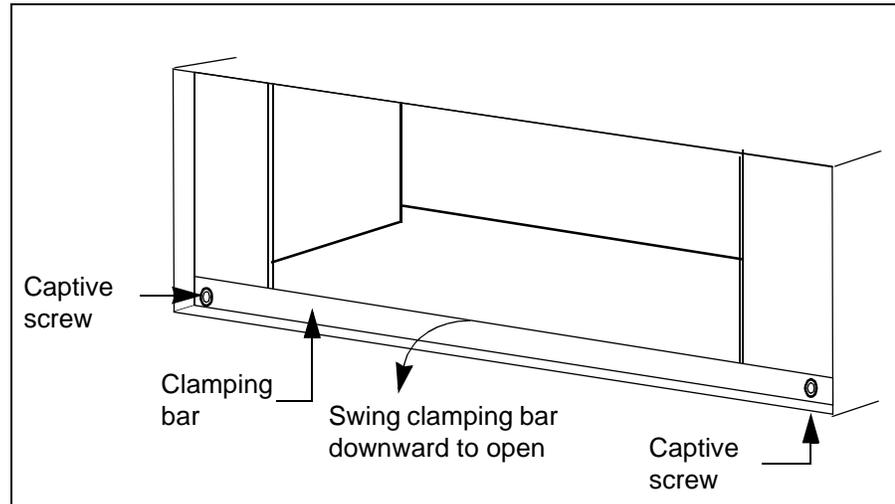
—continued—

Procedure 10-1 (continued)

**Installing a new rectifier in an existing MPP cabinet**

**Step Action**

**Figure 10-5**  
**Clamping bar on the rectifier shelf**



- 4 To remove a blank panel from the rectifier shelf, complete the following substeps:
  - a. Lift the blank panel (each panel has a hole punched near the bottom to simplify removal) until its lower tabs clear the bottom of the shelf.
  - b. Pull the bottom of the blank panel out slightly (away from the shelf) and lower it until its upper tabs clear the top of the shelf.
  - c. Store the blank panel under the rectifier shelf.

**Note:** Figure 10-4 on page 10-5 shows a shelf with 3 blank panels in place.
- 5 Verify that the circuit breakers of the rectifier are in the OFF (down) position.
- 6 Carefully slide the new rectifier into position on the shelf so that its rear connector engages the shelf connector. Figure 10-6 on page 10-8 shows the signals connector on the rectifier shelf.
- 7 Swing the clamping bar upward and tighten the captive screws.

—continued—

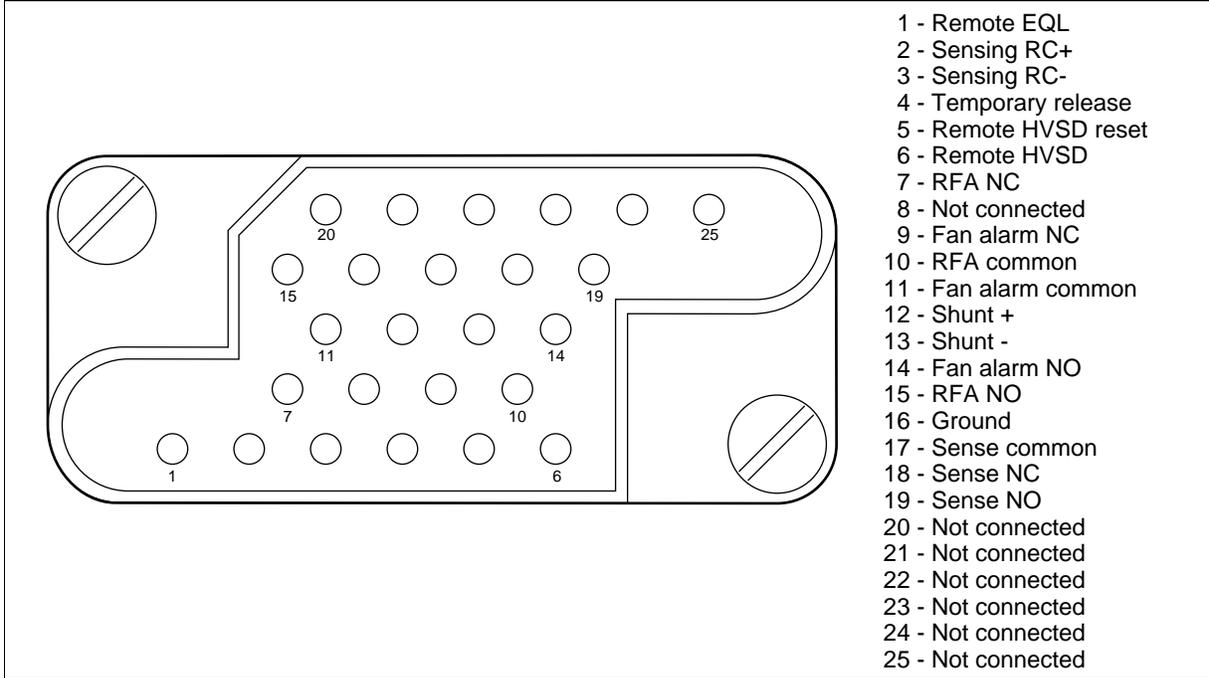
10-8 Expanding the MBP system

Procedure 10-1 (continued)

Installing a new rectifier in an existing MPP cabinet

Step Action

Figure 10-6  
Signals connector on the rectifier shelf



—end—

## Procedure 10-2

### Verifying a new rectifier in an existing MPP cabinet

Use this procedure to adjust and verify the NT5C06CA rectifiers in an NT5C10CC-1 rectifier shelf of the modular power package (MPP) cabinet. The MPP supplies dc power to the modular business package (MBP) system.

Figure 10-1 on page 10-2 shows the MBP system, including the MPP cabinet. Figure 10-3 on page 10-4 shows the NT5C06CA rectifier.

**Note 1:** You obtain the best adjustment results when each rectifier supplies at least 10 amperes

**Note 2:** If the rectifier shelf already contains one or more working rectifiers, ac power is already supplied to the shelf. For a new rectifier shelf, power is not yet extended to the shelf from the ac source.



#### **DANGER**

##### **Risk of injury or damage**

Read “Warnings and safety precautions” in “About this document” to minimize any risk to personnel and equipment.



#### **CAUTION**

##### **Risk of service interruption**

Do not switch the ac circuit breakers of an *existing* rectifier to the OFF position. If you do, you interrupt service on the AccessNode equipment.

## Requirements

Be sure the new rectifier was installed according to Procedure 10-1, “Installing a new rectifier in an existing MPP cabinet,” on page 10-3 and be sure that the *new* rectifier’s ac and dc circuit breakers (on the rectifier faceplate) are in the OFF position.

Obtain the required settings for float voltage (FLT), equalize voltage (EQL), and high voltage shutdown (HVSD) from your battery vendor or power engineer. See Table 10-1 on page 10-10 for sample settings.

The following tools are required:

- digital multimeter (for example, Fluke 85)
- small, flat-bladed screwdriver to adjust potentiometers

—continued—

Procedure 10-2 (continued)

**Verifying a new rectifier in an existing MPP cabinet**

---

*Note:* Voltage setting requirements are subject to change without notice. Consult the battery manufacturer’s documentation for the latest voltage settings for your system.

**Table 10-1**  
**Rectifier and power plant voltage settings**

| Battery manufacturer | Float       | Equalize    | HVSD        | LVA         | LVD         |
|----------------------|-------------|-------------|-------------|-------------|-------------|
| Gates 6V             | -55.0 ± 0.1 | -55.5 ± 0.1 | -56.0 ± 0.1 | -47.0 ± 0.1 | -42.5 ± 0.1 |
| Eagle Picher 12V     | -54.7 ± 0.1 | -55.4 ± 0.1 | -56.0 ± 0.1 | -47.0 ± 0.1 | -42.5 ± 0.1 |
| Yuasa 12V            | -54.0 ± 0.1 | -54.0 ± 0.1 | -56.0 ± 0.1 | -47.0 ± 0.1 | -42.5 ± 0.1 |

**Action**

This procedure is divided into the following sections:

- Preparing for verification
- Powering up the rectifier
- Adjusting high voltage shutdown
- Adjusting float voltage
- Adjusting EQL voltage
- Switching power off and verifying other rectifiers
- Verifying load sharing

Complete all of the sections from “Preparing for verification” through “Verifying load sharing.” Do not pause between sections.

---

| Step | Action |
|------|--------|
|------|--------|

---

**Preparing for verification**

- 1 Set the EQL switch on the dc distribution shelf to the OFF position. (It must remain OFF throughout this procedure.) Figure 10-7 on page 10-11 shows the dc distribution shelf.

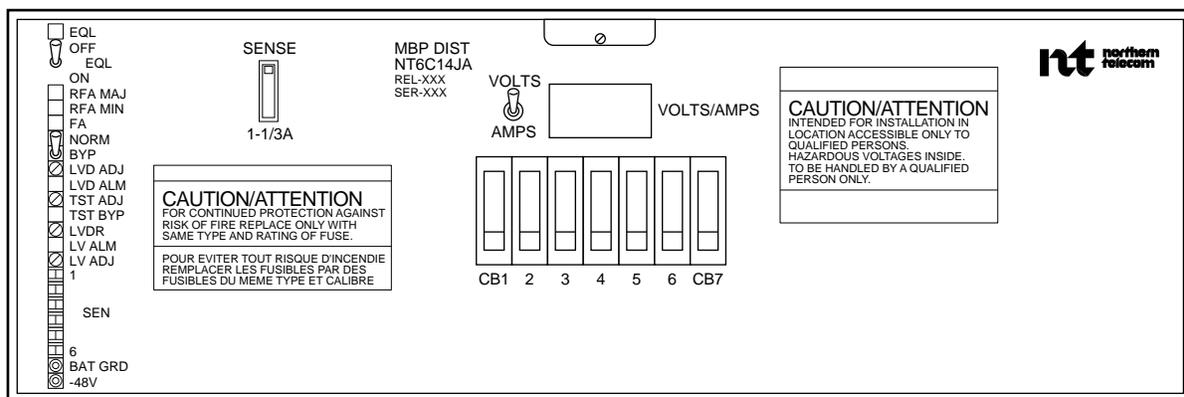
—continued—

Procedure 10-2 (continued)  
**Verifying a new rectifier in an existing MPP cabinet**

**Step Action**

**Figure 10-7**  
**NT6C14JA dc distribution shelf (front view)**

PC-11100



- For the new rectifier, set the associated SENSE DIP switch on the faceplate of the dc distribution shelf to the OFF position.

**Note:** OFF corresponds to local sensing mode, while ON corresponds to remote sensing mode. The following table shows the SENSE DIP switch positions on the dc distribution shelf and the corresponding rectifier positions. Figure 10-2 on page 10-3 shows the number of the rectifier shelf. As you stand at the front of the cabinet, rectifiers are numbered from right to left.

| Rectifier designations and corresponding SENSE DIP switch positions (viewed from the front of the MPP cabinet) |                                      |                                      |                                      |
|--|--------------------------------------|--------------------------------------|--------------------------------------|
| <b>Rectifier shelf 1:</b>  | RECT3:<br>SENSE switch<br>position 3 | RECT2:<br>SENSE switch<br>position 2 | RECT1:<br>SENSE switch<br>position 1 |
| <b>Rectifier shelf 2:</b>  | blank                                | blank                                | RECT1:<br>SENSE switch<br>position 4 |

- For a new rectifier shelf, insert its fuse or switch its main circuit breaker to the ON position at the commercial ac power panel.

—continued—

Procedure 10-2 (continued)

**Verifying a new rectifier in an existing MPP cabinet**

---

**Step Action**

---

- 4** Note the location and labels of the various LEDs, breakers, switches, test points, and adjusting potentiometers. See Figure 10-3 on page 10-4 for an illustration of the NT5C06CA rectifier.
- To continue the procedure, go to step 5.

**Powering up the rectifier**

- 5** Switch the ac circuit breaker on the rectifier under test to the ON position.
- The rectifier ON/RFA LED is red. After 15 seconds, it turns green.*
- If the ON/RFA LED fails to turn green, turn off the ac circuit breaker on the rectifier. Verify that the inrush fuse (F1) and the 220 V ac supply are working properly. If they are working, replace the rectifier.
- Note:** If output current is lower than 0.1 A, the MPR25 rectifier ON/RFA LED is red.
- 6** Switch the dc circuit breaker of the rectifier to the ON position.
- To continue the procedure, go to step 7.

**Adjusting high voltage shutdown**

- 7** Connect the digital multimeter across the V+ and V– OUTPUT test points on the rectifier under test.

|   |  |
|---|--|
|  | <p><b>CAUTION</b><br/><b>Risk of equipment damage.</b></p> <p>If you adjust the rectifier voltage to exceed –56.0 V dc (for example, –58 V dc), you might damage the AccessNode equipment.</p> |
|---|--|

- 8** While monitoring the dc voltage on the multimeter, slowly adjust the float voltage (FLT) potentiometer clockwise to increase the float voltage.
- Stop the adjustment when one of the following situations occurs:
- a high voltage shutdown (HVSD)
  - the multimeter display of -56.0 V dc
  - the maximum voltage adjustment is reached with the FLT potentiometer

*When HVSD occurs, the ON/RFA LED turns red. HVSD should occur at –56.0 +/- 0.1 V dc. Shutdown causes the internal rectifier protection circuit to inhibit rectifier output; circuit breakers do not trip.*

**Note:** If the –56.0 V dc level cannot be reached by adjusting the FLT potentiometer alone, boost the rectifier output voltage by adjusting the EQL potentiometer clockwise while holding the EQL–FLT switch in the EQL position.

—continued—

Procedure 10-2 (continued)

**Verifying a new rectifier in an existing MPP cabinet****Step Action**

- 9 Complete the instructions in the following table based on the results from step 8.

| If shutdown                                | Then   |
|--|--|
| did not occur when -56.V dc was reached    | <p><b>a.</b> Reduce the HVSD threshold by turning the HVSD potentiometer counterclockwise until the rectifier shuts down.</p> <p><b>b.</b> To verify the -56.0 V dc shutdown, reduce the rectifier voltage by turning the FLT potentiometer one turn counterclockwise.</p> <p><b>c.</b> Repeat step 8.</p> |
| occurred before the -56.0 V dc was reached | <p><b>a.</b> Increase the HVSD threshold by turning the HVSD potentiometer fully clockwise.</p> <p><b>b.</b> Repeat step 8.</p>  |
| occurred at -56.0 V dc (as desired)        | Go to step 10.   |

**Adjusting float voltage**

- 10 Using the digital multimeter, measure the dc voltage across the V+ and V– OUTPUT test points on the faceplate of the rectifier.

**CAUTION****Risk of equipment damage.**

If you adjust the rectifier voltage to exceed –56.0 V dc (for example, –58 V dc), you might damage the AccessNode equipment.

- 11 Slowly adjust the FLT potentiometer to set the float voltage to the desired value (clockwise to increase, counterclockwise to decrease).

To continue the procedure, go to step 12.

**Adjusting EQL voltage**

- 12 Hold the EQL–FLT switch in the EQL position.
- 13 Measure the EQL voltage level across the V+ and V– OUTPUT test points of the rectifier.
- 14 Slowly adjust the EQL potentiometer to set the equalize voltage to the desired value (clockwise to increase, counterclockwise to decrease).

—continued—

Procedure 10-2 (continued)

**Verifying a new rectifier in an existing MPP cabinet**

---

**Step Action**

---

- 15** Release the EQL–FLT switch to the FLT position.  
To continue the procedure, go to step 16.

**Switching power off and verifying other rectifiers**

- 16** Switch the rectifier dc circuit breaker to the OFF position.  
**17** Switch the rectifier ac circuit breaker to the OFF position.  
**18** If you have installed more than one new rectifier, repeat step 5 through step 17. Repeat these steps for each new rectifier.  
To continue the procedure, go to step 19.

**Verifying load sharing**

- 19** Switch the SENSE DIP switches on the dc distribution shelf for the new rectifiers to the On position.  
**20** Switch the rectifier ac circuit breakers to the On position.  
**21** Switch the rectifier dc circuit breakers to the On position.  
*When all installed rectifiers are set to the same voltage, all of the ON/RFA LEDs are green.*  
**22** Check the ON/RFA LED conditions of all of the rectifiers.  
If any rectifier ON/RFA LED is red, slowly adjust its FLT potentiometer slightly clockwise until the ON/RFA LED turns green.  
**Note:** When the adjusted output voltage of a rectifier is lower than that of the other rectifiers, its ON/RFA LED is red because its output current drops below 0.1 A.  
**23** Check the ammeters of all rectifiers and balance the amperage supplied by all rectifiers.



**CAUTION**

**Risk of equipment damage.**

If you adjust the rectifier voltage to exceed –56.0 V dc (for example, –58 V dc), you might damage the AccessNode equipment.

On a rectifier with a higher current, slowly adjust its FLT potentiometer counterclockwise to decrease its ammeter value toward the middle value of all ammeters.

On a rectifier with a lower current, slowly adjust its FLT potentiometer clockwise to increase its ammeter value toward the middle value of all ammeters.

—continued—

---

Procedure 10-2 (continued)

**Verifying a new rectifier in an existing MPP cabinet**

---

| <b>Step</b> | <b>Action</b>  |
|-------------|--|
| <b>24</b>   | Repeat steps 22 and 23 until all rectifier ammeters display approximately the same current level and all rectifier ON/RFA LEDs are green.<br><br><i>The digital meter on the faceplate of the dc distribution shelf displays the value of float voltage from all rectifiers.</i><br><br><b>Note:</b> Balanced load sharing among all rectifiers is difficult to achieve if one or more rectifiers have open sensing leads. |
| <b>25</b>   | Record the voltage setting limits and store the information for future reference.  |
| <b>26</b>   | Reinstall the MPP cabinet cover and the DEM separator bar.   |

—end—



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# Adding an IRTU

---

This chapter describes how to add an integrated remote test unit (IRTU) to an existing access bandwidth manager (ABM) shelf.

## How to use this chapter

To use procedures in this chapter, see the document task list in Chapter 1, “Overview of system expansion,” locate the task you need, and perform the sequence of given procedures.

## Chapter task list

This chapter includes the following procedure. If you cannot successfully complete the procedure, contact your next level of support.

| Procedure | Task                                    | See       |
|-----------|---|-----------|
| 11-1      | Modifying the ABM shelf to add the IRTU | page 11-2 |

## Procedure 11-1

# Modifying the ABM shelf to add the IRTU

---

Use this procedure to modify the NT4K10AA access bandwidth manager (ABM) shelf at the remote fiber terminal (RFT) and insert an integrated remote test unit (IRTU) into slot 21. You do not need this procedure if the ABM shelf is NT4K10AA release 7 or newer. Earlier releases of the ABM shelf (such as release 5) must be modified before you can install the IRTU circuit pack.

Modifying an active system requires a coordinated effort between a craftsperson at the RFT and a craftsperson at the fiber central office terminal (FCOT) or operations controller (OPC) to complete the following operations:

- record the status and the provisioning of the system before the retrofit
- remove the test access card (TAC), maintenance interface card (MIC), and Proc B to gain access to the rear card guides adjacent to slot 22
- modify the card guide of slot 22 by removing two bridges and four break-away extension tabs

The procedure includes diagnostics of the replaced equipment. You need about 45 minutes to complete the procedure.

**Note 1:** This procedure is not needed for an ABM shelf at the FCOT unless the shelf is to be reused at the RFT.

**Note 2:** You cannot perform this procedure while the external synchronization interface (ESI) is installed.

### Emergency recovery actions

Perform this procedure during low traffic periods. You can complete the procedure without interrupting service, but maintenance activities are unavailable during this interval.

The procedure includes steps to minimize the following service-affecting hazards:

- loss of DS1 protection switching, a low risk service-affecting hazard
- removal of the standby processor, a low risk service-affecting hazard

If an emergency is threatened or occurs during this procedure, take the following steps to avoid or minimize loss of service:

- If a DS1 channel fails, re-insert the MIC.
- If the active processor fails, re-insert the second processor if it was removed.

—continued—

Procedure 11-1 (continued)

### Modifying the ABM shelf to add the IRTU



#### CAUTION

##### Loss of DS1 protection

Removing the MIC makes DS1 protection switching inoperative; therefore, if a DS1 protection switch is in effect, it is dropped. Before removing the MIC, display the DS1 detailed protection screen and make sure a DS1 protection switch is not active.

Traffic is not affected during this procedure, but removing the MIC and TAC suspends the following functions:

- DS1 protection switching
- local craft access
- serial and parallel telemetry scan points
- common-equipment LEDs
- time-of-day clock
- performance-monitoring clock
- serial data terminal equipment port (DTE) modem
- external alarm drivers
- line card local long diagnostics and remote diagnostics

For details, see *Module Replacement Procedures*, 323-3001-547, in *Maintenance*, Volume 5C.

#### Expected alarms

Placing most circuit packs out of service and removing them does not generate alarms; however, if you remove Proc B, an alarm indicates loss of processor redundancy.

Using the protection exerciser generates the following two alarms (with severities of minor and warning). No action is necessary to clear these alarms.

```

ListAlms
Alm Cls Sh  Type  Unit      Reason
267 Eqp CE  DS1   G1       Protection switch complete w, nsa
266 Eqp CE  DS1   G1       Manual switch request m, nsa
For details of an alarm, use AlmRpt or the DtlAlm screen.

```

—continued—

Procedure 11-1 (continued)

**Modifying the ABM shelf to add the IRTU**

---

*Note:* If you insert the IRTU and the test access card (TAC) simultaneously, the TAC downloads, but the IRTU does not. While the TAC is downloading, the network element user interface displays the state of the IRTU as “Parent equipment unavailable.” When the TAC has finished downloading, the IRTU downloads, and the “Parent equipment unavailable” message clears.

## Requirements

Complete the following tasks before starting the procedure:

- Notify the customer.
- Record the agreed upon start time and equipment restoration time on the Test Results Form at the end of this procedure.

## Tools and test equipment

The following tools and test equipment are required:

- medium flat-bladed screwdriver
- pliers, short-nose skinning, T-2291
- portable computer with communications software or a VT100-compatible terminal
- blank digital audio tape (DAT)
- designating kit, R2315
- remover ink, 2 oz, S-8446
- light
- step ladder or stool
- wrist ground strap
- safety glasses
- power knife
- small cutters
- one NT7E39AA filler card, A0373397

(Installation toolroom identification numbers are included where available.)

—continued—

---

 Procedure 11-1 (continued)

**Modifying the ABM shelf to add the IRTU**


---

**Preparation and materials**

The following preparations and materials are required for this procedure:

- two craftpersons (one at the RFT and one at the FCOT)
- three userIDs and passwords (one for the root OPC and two for the network elements)
- telephone communications between the FCOT and the RFT (You cannot use AccessNode orderwire.)

**Action**

This procedure is divided into the following sections:

- System status recording
- ABM shelf modification
- System lineup and test

Complete all of the sections from “System status recording” through “System lineup and test.” Do not pause between sections.

---

**Step    Action**


---

**System status recording**

**Note:** This section takes approximately 15 minutes.

- 1 Clear any alarms on the system before proceeding.


**CAUTION**
**Risk of complications due to existing alarm conditions**

To avoid problems caused by existing alarms, make sure the system is free of alarms before proceeding.

- 2 Back up the network element databases. See *Data Administration Procedures*, 323-3001-304, in *Operations, Administration, and Provisioning*, Volume 4A for the appropriate procedure.
- 3 Transfer the system data to the OPC tape. See *Data Administration Procedures*, 323-3001-304, *Operations, Administration, and Provisioning*, Volume 4A for the procedure.
- 4 Obtain a copy of the line card provisioning from the customer for later reference.

—continued—

Procedure 11-1 (continued)

**Modifying the ABM shelf to add the IRTU**

---

| Step | Action |
|------|--------|
|------|--------|

|   |  |
|---|--|
| 5 | From the MAPCI;FWPUI screen, exercise the processor card by entering:<br><b>eq proc a ; exercise ↵</b> |
|---|--|

Proceed if the exercise is successful.

**Note:** If Proc B will also be removed, Proc A must be active, and Proc B must be on standby.

To continue the procedure, go to step 6.

**ABM shelf modification**

**Note:** This section takes approximately 20 minutes. The person at the FCOT monitors the screen for alarms to compensate for the inoperative visual alarm indicator at the RFT when its MIC is removed.

|   |   |
|---|---|
| 6 | Have the person at the FCOT log in to the far end network element (RFT), using the HMI Terminal (FCOT) or the OPC terminal. See <i>Network Element User Interface Description</i> , 323-3001-300, in <i>Operations, Administration, and Provisioning</i> , Volume 4A. |
|---|---|

|   |  |
|---|--|
| 7 | From the FCOT, place the RFT Proc B, MIC, and TAC out of service. See <i>Module Replacement Procedures</i> , 323-3001-547, in <i>Maintenance</i> , Volume 5C, for the appropriate procedure. |
|---|--|

|   |   |
|---|---|
| 8 | Wait for the ACTIVE light to go off, indicating that the MIC (slot 19) and the TAC (slot 20) are out of service. Remove both cards and place them in a safe location. |
|---|---|

|   |   |
|---|---|
| 9 | If additional working space is required to reach the rear card guides, remove the processor card from slot 18 (Proc B). |
|---|---|

|    |   |
|----|---|
| 10 | Insert the NT7E39AA filler card in the left-most slot (18 or 19) to protect the working processor during the procedure. For additional space, you can remove the faceplate of the NT7E39AA. |
|----|---|



**CAUTION**

**Risk of equipment damage**

Use care to avoid damaging adjacent circuit packs.

|    |  |
|----|--|
| 11 | Using the flat blade screw driver, remove the 2 bridges (plastic inserts) between slots 21 and 22 (1 upper and 1 lower bridge piece). The bridges will pop out without damage. Discard the pieces. See Figure 11-1 on page 11-9 and Figure 11-2 on page 11-10. |
|----|--|

—continued—

Procedure 11-1 (continued)

**Modifying the ABM shelf to add the IRTU**

- | Step  | Action   |   |   |    |    |
|---|--|---|---|----|----|
| 12  | <p>Using the pliers, twist and remove the left tab extensions (4) on the slot 22 guides, and discard the pieces.</p> <p>The four tabs are at the top front, top rear, bottom front, and bottom rear. These parts have a score line to facilitate this modification. Avoid applying force to any electronics or connector pins in the area.</p>   |   |   |    |    |
| 13  | Use the cutters or knife to remove any large burrs remaining on the card guide. Check the filter below the shelf for broken pieces.  |   |   |    |    |
| 14  | Remove the filler card (NT7E39AA). Install the MIC into slot 19, the TAC into slot 20, and the Proc B into slot 18 if it was removed. When you finish, tell the FCOT or OPC craftsperson that the cards are installed.   |   |   |    |    |
| 15  | <p>Update the shelf release label on the flip-up panel at the front of the shelf. Using the designation kit, re-stamp the label with the updated release shown below:</p> <table border="1" style="margin-left: 40px;"> <thead> <tr> <th style="text-align: left;">Old release</th> <th style="text-align: left;">New release</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">05</td> <td style="text-align: center;">07</td> </tr> </tbody> </table> | Old release   | New release   | 05 | 07 |
| Old release   | New release  |   |   |    |    |
| 05  | 07   |   |   |    |    |
| 16  | From the FCOT, place the RFT MIC and TAC in service if either or both are not already in service.  |   |   |    |    |
| <table border="1" style="width: 100%;"> <tr> <td style="text-align: center; vertical-align: middle;">  </td> <td style="padding-left: 10px;"> <p><b>CAUTION</b><br/> <b>Risk of IRTU damage</b><br/>           The IRTU requires careful handling. Observe all handling and transporting precautions described in “Warnings and safety precautions” in “About this document.”</p> </td> </tr> </table> |  |  | <p><b>CAUTION</b><br/> <b>Risk of IRTU damage</b><br/>           The IRTU requires careful handling. Observe all handling and transporting precautions described in “Warnings and safety precautions” in “About this document.”</p> |    |    |
|    | <p><b>CAUTION</b><br/> <b>Risk of IRTU damage</b><br/>           The IRTU requires careful handling. Observe all handling and transporting precautions described in “Warnings and safety precautions” in “About this document.”</p>  |   |   |    |    |
| 17  | At the RFT, carefully install the IRTU in slot 21 if the circuit pack is available.  |   |   |    |    |
| 18  | <p>After loading the IRTU circuit pack software, perform the following procedures in <i>Commissioning and Testing</i>, Volume 3, to verify the IRTU:</p> <ul style="list-style-type: none"> <li>• Test the lamps and LEDs.</li> <li>• Inventory the circuit packs.</li> <li>• Diagnose failed circuit packs (if necessary).</li> </ul>   |   |   |    |    |
| 19  | <p>Test the functionality of the IRTU. See <i>Commissioning and Testing</i>, Volume 3. To continue the procedure, go to step 20.</p>   |   |   |    |    |

—continued—

## 11-8 Adding an IRTU

---

Procedure 11-1 (continued)

### Modifying the ABM shelf to add the IRTU

---

| Step | Action |
|------|--------|
|------|--------|

---

#### System lineup and test

**Note:** This section takes approximately 10 minutes. This section contains all testing requirements to ensure the modified system is functional.

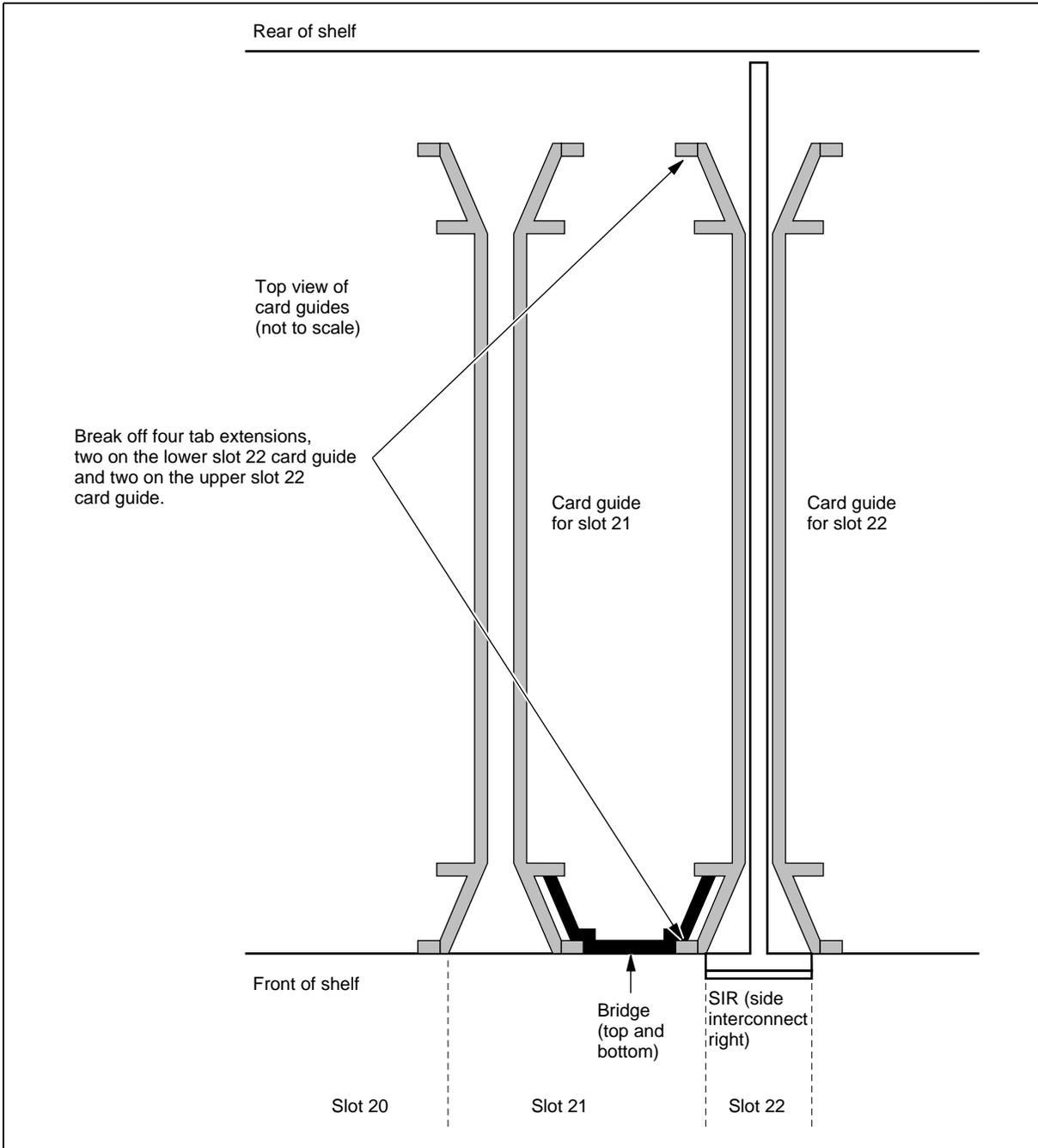
- |    |   |
|----|---|
| 20 | Verify that the system is alarm-free.   |
| 21 | Clear any alarms using the appropriate NTP procedures.  |
| 22 | Verify that no line cards are in a trouble state (all FCOT and RFT line cards). Return to CI by entering:<br><b>quit all</b> ↵<br><i>The CI prompt appears.</i><br>Enter:<br><b>sysmon</b> ↵<br><b>lcstats shelf &lt;CDS shelf&gt;</b> ↵<br><br>where<br><br><CDS shelf> <b>1 to 7</b><br><br><i>A list of slots appears, displaying the equipped slots, their card types, and the card states.</i> |
| 23 | Test DS1 protection switching at the RFT by verifying that a manual protection switch can be operated and released.   |
| 24 | Take a line card out of service and perform a long diagnostic on the line card.   |
| 25 | Check the log reports in log class LC602 to verify the success of the diagnostic. Open the log utility by entering:<br><b>logutil; start</b> ↵  |
| 26 | Place the line card back in service.  |
| 27 | If the Proc B was removed, exercise it. From the MAPCI;FWPUI enter:<br><b>eq proc b; exercise</b> ↵   |
| 28 | Determine if the action was successful.   |
| 29 | To stop the logutil output, enter:<br><b>stop</b> ↵   |
| 30 | Fill out the Test Results Form.   |

—continued—

Procedure 11-1 (continued)  
**Modifying the ABM shelf to add the IRTU**

**Figure 11-1**  
**ABM shelf modification (top view)**

PC-11193



—continued—

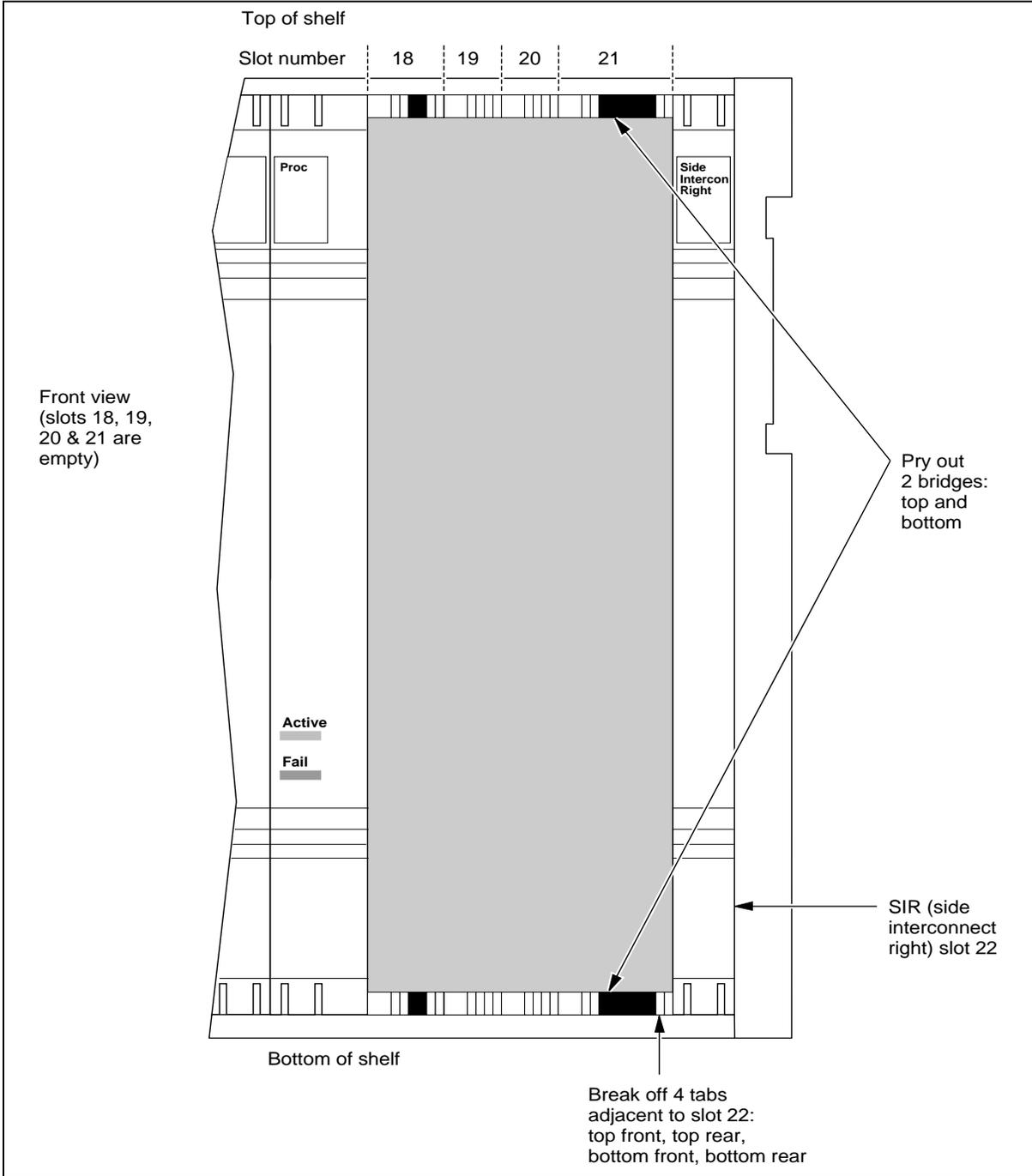
11-10 Adding an IRTU

Procedure 11-1 (continued)

Modifying the ABM shelf to add the IRTU

Figure 11-2  
ABM shelf modification (front view)

PC-11194



—end—

|   |             |
|---|-------------|
| <b>SONET Products</b><br><b>AccessNode</b><br><b>ABM Shelf Modification Test Results Form</b> | Page 1 of 2 |
|---|-------------|

|                            |       |
|----------------------------|-------|
| Customer                   | _____ |
| Project                    | _____ |
| COEO/Customer #            | _____ |
| AccessNode system          | _____ |
| Central Office location    | _____ |
| FCOT ID                    | _____ |
| Remote location            | _____ |
| RFT ID                     | _____ |
| Start time                 | _____ |
| Equipment restoration time | _____ |
|                            |       |
| Tested by                  | _____ |
| Date                       | _____ |
| Customer approval          | _____ |



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# Adding a backup OPC

---

This chapter describes how to add a backup operations controller (OPC) to a fiber central office terminal (FCOT) common-equipment shelf. This procedure applies to a common-equipment shelf under the span of control of a primary OPC in a nearby FCOT shelf. The two FCOT shelves must be close enough to be connected by a control network (CNET) cable.

## How to use this chapter

To use procedures in this chapter, see the document task list in Chapter 1, “Overview of system expansion,” locate the task you need, and perform the sequence of given procedures.

## Chapter task list

This chapter contains the following procedure. If you cannot successfully complete the procedure, contact your next level of support.

| Procedure | Task                | See       |
|-----------|---------------------|-----------|
| 12-1      | Adding a backup OPC | page 12-2 |

## Procedure 12-1 Adding a backup OPC

---

Use this procedure to add a backup operations controller (OPC) to an in-service AccessNode system. This procedure adds a backup OPC to an existing subnetwork with at least two fiber central office terminals (FCOT) under the span of control of one primary OPC. OPCs are installed in FCOTs only, not in remote fiber terminals (RFT).

If the two FCOTs are commissioned under the spans of control of two different OPCs, this procedure cannot be used to add a backup OPC.

**Note:** For purposes of this procedure, the access bandwidth manager (ABM) or transport bandwidth manager (TBM) shelf with the primary OPC is referred to as shelf A, and the ABM or TBM shelf receiving the backup OPC is referred to as shelf B.

This procedure involves the following activities:

- saving network element (NE) and OPC data to tape
- installing the backup OPC
- verifying the software in the backup OPC and installing it as necessary
- verifying the date and time of the backup OPC and adjusting them as necessary
- editing system level and network element level commissioning data
- transferring data from the primary to the backup OPC
- verifying primary and backup OPC operations
- saving new network element and OPC data to tape



### **DANGER**

#### **Risk of injury or damage**

Read the “Warnings and safety precautions” in “About this document” to minimize any risk to personnel and equipment.



### **CAUTION**

#### **Do not perform any actions that can affect service.**

Follow this procedure carefully to minimize any risk of loss of service.

—continued—

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Procedure 12-1 (continued)  
**Adding a backup OPC**

---

## Requirements

The following requirements must be met before you begin this procedure:

- Both FCOT shelves must be commissioned under the span of control of the same primary OPC. (If FCOT shelf B is a new network element, first commission it using the procedure for adding a new network element to an existing span of control. See *Commissioning and Testing*, Volume 3.)
- Shelf B must be near shelf A, within reach of the control network (CNET) cable.
- Slots 5 to 9 of shelf B must be spare slots to accommodate the backup OPC.
- A terminal capable of running a graphical user interface session must be connected to the primary OPC, or a VT100-compatible terminal must be connected to port B on the backup OPC.
- You must have a userID and password that access OPC system line-up and test (SLAT) and Admin tools, including: Commissioning Manager, Remote OPC login, Remote OPC Software Installation, and OPC Status.
- You must know how to do the following:
  - log in to the OPC
  - open and close OPC tools
  - log in to a network element from the OPC

*Note:* See *OPC User Interface Description*, 323-3001-301, and *Network Element User Interface Description*, 323-3001-300, in *Operations, Administration, and Provisioning*, Volume 4A.
- You must have access to the following Nortel Networks Technical Publications referred to in this procedure:
  - *Bay in Central Office Installation Manual—ABM*, 323-3001-201, or *Bay in Central Office Installation Manual—TBM*, 323-3001-202
  - *Commissioning and Testing*, Volume 3
  - *Data Administration Procedures*, 323-3001-304, in *Operations, Administration, and Provisioning*, Volume 4A

—continued—

Procedure 12-1 (continued)  
**Adding a backup OPC**

---

**Required tools and materials**

This procedure requires the following tools and materials:

- one spare operations controller module, NT7E24
- one control network cable, NT7E44JC/JK, if not already installed
- two CNET termination connector assemblies, NT7E5072
- one or two blank digital audio tapes (DAT), NT7E24TA or equivalent
- the existing Commissioning Data Record Form on file for this OPC

**Action**

---

| <b>Step</b> | <b>Action</b>  |
|-------------|--|
| 1           | <p>For each network element within the primary OPC span of control, log in to FWPU and back up its data to the primary OPC database.</p> <p>See the procedure for manually backing up a database in <i>Data Administration Procedures</i>, 323-3001-304, in <i>Operations, Administration, and Provisioning</i>, Volume 4A.</p>  |
| 2           | <p>Prepare a backup tape of the primary OPC database.</p> <p>See the procedure for saving OPC data to tape in <i>Data Administration Procedures</i>, 323-3001-304, in <i>Operations, Administration, and Provisioning</i>, Volume 4A.</p>  |
| 3           | <p>Install the backup OPC in its FCOT common-equipment shelf (shelf B in this procedure).</p> <p>See the procedure for inserting circuit packs in <i>Commissioning and Testing</i>, Volume 3.</p>  |
| 4           | <p>If it is not already connected, connect a CNET cable (NT7E44JC/JK) between shelves A and B. Connect two CNET termination connector assemblies (NT7E5072) to the unused control network port on the side interconnect left (SIL) circuit pack of each FCOT shelf.</p> <p>See <i>Bay in Central Office Installation Manual for ABM</i>, 323-3001-201, or <i>Bay in Central Office Installation Manual—TBM</i>, 323-3001-202.</p>  |
| 5           | <p>Verify that the backup OPC is equipped with the same software load as the primary OPC or with a compatible software load. Use one of the following methods:</p> <ul style="list-style-type: none"><li>• If your terminal can run a graphical user interface session, log in to the primary OPC and use the Remote OPC Login tool. See the procedure for logging in to a remote OPC in <i>OPC User Interface Description</i>, 323-3001-301, in <i>Operations, Administration, and Provisioning</i>, Volume 4A.</li></ul> |

—continued—

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 Procedure 12-1 (continued)  
 Adding a backup OPC
 

---

| Step | Action   |
|------|--|
|      | <ul style="list-style-type: none"> <li>• If you have a VT100-compatible terminal, use one of the following methods:               <ul style="list-style-type: none"> <li>— log in using the <code>rlogin &lt;opc_name&gt;</code> command</li> <li>— connect the terminal directly to port B on the backup OPC. Open the OPC Status tool. See the procedures for connecting the terminal, logging into the OPC, and opening an OPC tool in <i>OPC User Interface Description</i>, 323-3001-301, in <i>Operations, Administration, and Provisioning</i>, Volume 4A.</li> </ul> </li> </ul> <p><b>Note:</b> If necessary, use the Remote OPC Software Installation tool to install the correct software load. See <i>Commissioning and Testing</i>, Volume 3.</p> |
| 6    | Verify that the backup OPC time and date match the primary OPC time and date. You must log in to the backup OPC to perform this step. See the procedure for setting the time zone, date, or time in <i>Commissioning and Testing</i> , Volume 3.   |
| 7    | On the primary OPC, open the Commissioning Manager tool.<br><i>The Commissioning Manager main window appears.</i>  |
| 8    | Tab to the <b>Edit System Data</b> button, then press <b>Ctrl_A</b> (or Keypad <b>0</b> ).<br><i>The System Data Commissioning dialog appears.</i>   |
| 9    | Tab to the <b>Backup OPC serial number</b> field, then type the serial number of the backup OPC.<br><br>As you are looking at the faceplate, the serial number is at the bottom center of the motherboard, on the right side. The serial number also appears in the upper right corner of the Commissioning Manager main window. OPC serial numbers have the following format:<br><b>Anhhhhhhh</b><br>where <b>n</b> is a positive integer, and <b>h</b> is a hexadecimal number. (Example: <b>A1b3e01be</b> )<br><b>Note:</b> If this serial number is not accepted, call your Nortel Networks technical support person.  |
| 10   | To specify an alias for the backup OPC, tab to the <b>Backup OPC alias</b> field, then type a name up to 8 alphanumeric characters long. This step is optional, since the default alias is the OPC name followed by B for backup.  |
| 11   | To complete the entry of system data, tab to the <b>OK</b> button, then press <b>Ctrl_A</b> (or Keypad <b>0</b> ).<br><i>If the information is correct, the name of the system being commissioned appears on the first line of the main window.</i>  |

—continued—

Procedure 12-1 (continued)  
**Adding a backup OPC**

---

| <b>Step</b> | <b>Action</b>   |
|-------------|---|
|             | <p><b>Note:</b> If essential data is incorrect, an error dialog explaining the problem appears. The System Data Commissioning dialog remains displayed, and X marks the fields containing erroneous data.</p>   |
| <b>12</b>   | Tab to the list of network elements commissioned in this system in the Commissioning Manager main window, select the network element representing shelf B, then press <b>Ctrl_L</b> (or Keypad <b>Enter</b> ) to display the List item menu.  |
| <b>13</b>   | To select the <b>Edit</b> option in the List item menu, press <b>Spacebar</b> (or Keypad <b>0</b> ).  |
|             | <p><i>The following dialog message appears:</i></p> <p>The NE selected has NE connectivity assignments. Only modifications to the Serial number, OPC selection, and Transmission rate are allowed unless connectivity is removed.</p> <p>Tab to the <b>OK</b> button, then press <b>Ctrl_A</b> (or Keypad <b>0</b>).</p> <p><i>The Network Element Commissioning Data dialog for shelf B appears.</i></p>   |
| <b>14</b>   | Tab to the field containing the 3 OPC radio buttons.  |
| <b>15</b>   | Move to the <b>Backup OPC</b> button, then press <b>Ctrl_A</b> (or Keypad <b>0</b> ).   |
|             | <p><i>A mark appears between the brackets beside Backup OPC.</i></p>  |
| <b>16</b>   | Tab to the <b>OK</b> button, then press <b>Ctrl_A</b> (or Keypad <b>0</b> ) to confirm the changes and close the Network Element Commissioning Data dialog.   |
| <b>17</b>   | Record the change in commissioning data for this network element on the Commissioning Data Record form.   |
| <b>18</b>   | Synchronize the data between the primary and backup OPCs.   |
|             | <p>See the procedure for transferring data from the primary to the backup OPC in <i>Commissioning and Testing</i>, Volume 3.</p>  |
| <b>19</b>   | To verify that the backup OPC has been integrated into the span of control of the primary OPC, complete the following substeps:   |
|             | <ol style="list-style-type: none"><li>a. Verify communication between the primary and backup OPCs.<br/>If necessary, see the procedure in <i>Commissioning and Testing</i>, Volume 3. (This procedure shuts down the primary OPC and allows it to reboot.)</li><li>b. Open the Commissioning Manager tool. Check the network element list in the main window and verify that the backup OPC appears in the OPC column for the network element in which it is installed.</li><li>c. Open the OPC status tool on the backup OPC and verify that the backup OPC status is either active or inactive.</li></ol> |

—continued—

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Procedure 12-1 (continued)  
**Adding a backup OPC**

---

| <b>Step</b> | <b>Action</b>  |
|-------------|--|
|             | <p>d. Temporarily remove the CNET connection. Verify that the backup OPC becomes active within 3 minutes and that the OPC establishes association with the network elements that remain under its control. Reconnect the CNET connection.</p>  |
| <b>20</b>   | <p>For the network element containing the backup OPC, log in to FWPUI and back up its data to the primary OPC database. See the procedures for performing a manual NE database backup in <i>Data Administration Procedures</i>, 323-3001-304, in <i>Operations, Administration, and Provisioning</i>, Volume 4A.</p> |
| <b>21</b>   | <p>Prepare another backup tape of the OPC database that includes the new commissioning data. See the procedures for saving OPC data to tape in <i>Data Administration Procedures</i>, 323-3001-304, in <i>Operations, Administration, and Provisioning</i>, Volume 4A.</p>   |

—end—



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# Expanding optical bandwidth

---

This chapter provides a procedure for expanding the optical bandwidth of the fiber central office terminal to remote fiber terminal (FCOT-to-RFT) optical feeder from the OC-3 rate to the OC-12 rate.

## How to use this chapter

To use procedures in this chapter, see the document task list in Chapter 1, “Overview of system expansion,” locate the task you need, and perform the sequence of given procedures.

## Chapter task list

This chapter includes the following procedure. If you cannot successfully complete the procedure, contact your next level of support.

| Procedure | Task                                  | See       |
|-----------|---------------------------------------|-----------|
| 13-1      | Upgrading a system from OC-3 to OC-12 | page 13-2 |

## Procedure 13-1

# Upgrading a system from OC-3 to OC-12

---

Use this procedure to upgrade the optical carrier rate on an in-service AccessNode system from OC-3 to OC-12. Perform this procedure when you need to expand the system beyond a 3 STS-1 capacity or when you need flexibility in STS-1 assignments.

If you have any problems during the execution of this procedure, such as a step fails or an unexpected result is observed, call your support group or the Nortel Networks help line.

### Procedure summary

This procedure is divided into the following sections:

#### **Preparing the upgrade**

This section involves preparing the site for the upgrade, logging into the system, and verifying that no OC-3 protection is active.

#### **Ensuring that traffic is on channel G1**

The first channel to be upgraded is G2. This section ensures that traffic is running on G1.

#### **Upgrading channel G2**

The upgrade of the optical channel G2 involves the following tasks:

- deprovisioning and removing the G2 optics cards
- changing the transmission rate to OC-12 at the operations controller (OPC)
- installing the new OC-12 G2 cards

#### **Upgrading channel G1**

The upgrade of the optical channel G1 involves the following tasks:

- switching the traffic to the channel G2
- deprovisioning and removing the G1 optics cards
- installing the new OC-12 G1 cards

#### **Completing the upgrade**

This section details the steps to make the network element user interface display OC-12 instead of OC-3 and to perform OPC data synchronization.

—continued—

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 Procedure 13-1 (continued)

**Upgrading a system from OC-3 to OC-12**


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As shown in the following table, the time required to complete this procedure is approximately one hour and 45 minutes for each point-to-point system (fiber central office terminal to remote fiber terminal [FCOT-RFT] pair). You must repeat the procedure for each system to be upgraded.

| Subtask                                | Time              |
|--|-------------------|
| Preparing the upgrade                  | 30 min            |
| Ensuring that traffic is on channel G1 | 5 min             |
| Upgrading the channel G2               | 20 min            |
| Upgrading the channel G1               | 20 min            |
| Completing the upgrade                 | 30 min            |
| <b>Total Time Required</b>             | <b>1 h 45 min</b> |

**Note 1:** Because optical channel protection is lost for most of the procedure, you must complete the procedure as quickly as is *safely* possible.

**Note 2:** If at any point this procedure generates alarms that this document does not specify as normal, service them immediately *only* if they prevent you from continuing the procedure.

**Note 3:** During this procedure, you must switch the traffic from one optical channel to the other. As a result, 2 traffic hits of less than 50 ms occur. An additional traffic hit of less than 50 ms occurs if the traffic is currently running on the G2 OC-3 channel.

**Note 4:** Throughout this procedure, the optical channels are referred to as G1 and G2. The G1 channel corresponds to the optical card in slot 9 of the common equipment shelf, and the G2 channel corresponds to the card in slot 10.

**Note 5:** This procedure refers to the network element user interface at the FCOT as the local NE and refers to the network element user interface at the RFT as the remote NE.

—continued—

Procedure 13-1 (continued)

**Upgrading a system from OC-3 to OC-12**

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**Requirements**

**Required Materials**

This procedure requires the following materials at both the FCOT site and the RFT site:

- 2 NT7E02LA/LB/LC/LD optics cards or
- NT7E02KA/KB/KC/KD OC-12 optics cards

**Required Tools**

The following table lists the required tools and describes the sites (FCOT or RFT) at which they are required:

| Quantity    | Tool  | Site  |
|-------------|---|-------|
| 1           | screwdriver, long, flat-bladed  | both  |
| as required | antistatic wrist strap  | both  |
| 1           | VT100-compatible terminal   | local |
| as required | NT7E44RA or RB cable for a VT100 terminal to OPC port 1 connection or<br>NT7E44FA or FB cable for a VT100 terminal to UI port 2 connection<br><br>See <i>Network Element User Interface Description</i> , 323-3001-300, in Operations, Administration, and Provisioning, Volume 4A, for VT100 terminal connections. | local |
| 1           | optical power meter (for example, OPTIKON model 17XTA) and necessary optical patchcord to measure transmit output power   | both  |

—continued—

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Procedure 13-1 (continued)

### Upgrading a system from OC-3 to OC-12

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#### Other requirements

The following conditions are required for the upgrade:

- You must know how to use both the OPC and the network element user interfaces, including:
  - procedures for viewing logs and alarms
  - procedures for opening and closing OPC tools
  - procedures for logging in and out of the network element user interface and the OPC user interface, both locally and remotely

*Note:* If necessary, see *Network Element User Interface Description*, 323-3001-300, and *OPC User Interface Description*, 323-3001-301, in *Operations, Administration, and Provisioning*, Volume 4A.

- You must inform all OPC users and surveillance personnel about the procedure before you begin.
- You must verify that the system is alarm-free, that the primary OPC is active, and that the backup OPC (if any) is inactive.
- You must verify that all associations between the OPC and the network elements being upgraded are active.
- You must verify that the OC-3 optic cards are release 4 or higher. An upgrade with a lower release of the OC-3 card is not supported.
- Craftpersons must be available at both sites during the entire procedure to complete the upgrade. All steps are performed at the FCOT, and some are repeated at the RFT.
- You must have an OPC userID with a system line-up and test (SLAT) security level.
- You must have users with network element userIDs with admin security level at both network elements being upgraded.

Before you start the procedure, make sure you have done the following:

- read and understood the procedure
- checked all of the requirements and met them
- placed a copy of AccessNode procedures at each network element
- gathered all the equipment needed for the upgrade

—continued—

Procedure 13-1 (continued)

**Upgrading a system from OC-3 to OC-12**

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**DANGER**

**Risk of eye damage**

At all times when handling optical fibers, follow the safety procedures recommended by your company. Avoid direct exposure to laser beam or fiber. Invisible laser light can blind. Keep all optical connectors capped.



**CAUTION**

**Risk of equipment damage**

Observe precautions for handling electrostatic-sensitive devices. To avoid damaging electronic parts, wear a grounded antistatic wrist strap or equivalent protection when you handle circuit packs.

—continued—

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 Procedure 13-1 (continued)

**Upgrading a system from OC-3 to OC-12**


---

**Action**

This procedure is divided into sections. Complete each section in order, beginning with “Preparing the upgrade” and ending with “Updating the transmission rate at the OPC.” Do not pause between sections.

---

**Step    Action**


---

**Preparing the upgrade**

- 1     At the FCOT, put on the antistatic wrist strap and attach it to the electrostatic discharge (ESD) jack on the shelf.
- 2     To remove the shelf cover, turn the right locking screw clockwise 90° and turn the left locking screw counterclockwise 90°. Open both latches and pull to remove the cover.
- 3     Repeat steps 1 and 2 at the remote NE.
- 4     At the FCOT, log into the OPC as SLAT.

*The User Session Manager screen appears.*

**Note:** If you were already logged in to the OPC before starting this procedure, make sure the Event Browser is not open. This tool cannot detect transmission rate changes and would display erroneous data.

- 5     Open the **NE Login Manager**.

*The NE Login Manager screen appears.*

- 6     Select the local NE from the Available Nodes list and select **Login**. Enter the correct userid and password.

*The Network Element Status screen appears.*

- 7     At the local NE, select the OC-3 protection screen by entering:

**protectn** ↵

**dtlprot oc3 g1** ↵

Make sure the OC-3 Protection screen does not show the following conditions in any of the Lockout, Forced, ProtOscCtl, Autosw, or Manual fields:

- fail (F)
- request pending (R)
- denied (D)
- wait to restore (W)
- active switch (\*)

Check that both G1 and G2 have IS (in service) in the State field.

—continued—

13-8 Expanding optical bandwidth

Procedure 13-1 (continued)

**Upgrading a system from OC-3 to OC-12**

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**Step Action**

---

- 8** Display the configuration of the switching mode (bidirectional or unidirectional) by entering the following commands at the local NE:
- protectn** ↵  
**protprov** ↵
- Record the switching mode and the route diversity in the following table to use later in the procedure.

| NE        | Switching mode | Route diversity | Switch mode |
|-----------|----------------|-----------------|-------------|
| Local NE  |                |                 |             |
| Remote NE |                |                 |             |

- 9** Use the NE Login Manager tool to select the remote NE from the Available Nodes list, then select **Login**. Enter the correct userid and password.
- The remote NE user interface screen appears.*
- Repeat steps 7 and 8 for the remote NE.
- Note:** The switch mode and the route diversity of the local and the remote NEs must match.
- To continue with this procedure, go to step 10.

**Ensuring that the traffic is on channel G1**

**Note:** Traffic must be running on the G1 optical channel before you start the upgrade.

- 10** At the local NE, enter:
- protectn** ↵  
**dtlprot oc3 g1** ↵
- If the Traffic Rx field for the G1 optic indicates Off, you must switch the traffic from G2 to G1 by entering:
- manual op g2** ↵  
**yes** ↵
- The Traffic Rx field for the G1 optics indicates "On," meaning that the traffic has switched to G1 Rx.*
- Note:** A traffic hit of less than 50 ms takes place.

—continued—

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 Procedure 13-1 (continued)

**Upgrading a system from OC-3 to OC-12**


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- | Step | Action  |
|------|---|
| 11   | <p>If the switching mode is unidirectional (identified in step 8 of “Preparing the upgrade” on page 13-8), make sure the that the G1 at the remote NE is receiving the traffic. At the remote NE, enter:</p> <pre>protectn ↵ dtlprot oc3 g1 ↵</pre> <p>If the Traffic Rx field for the G1 optic indicates “Off”, you must switch the traffic from G2 to G1 by entering:</p> <pre>manual op g2 ↵ yes ↵</pre> <p><i>The Traffic Rx field for the G1 optics indicates “On,” meaning that the traffic has switched to G1 Rx.</i></p> <p><b>Note:</b> A traffic hit of less than 50 ms takes place.</p> <p>To continue with this procedure, go to step 12.</p> |

**Upgrading channel G2**

- Note:** In the following steps, the OC-3 channel G2 (slot 10) is upgraded to OC-12.
- |    |   |
|----|---|
| 12 | <p>At the OC3 detail protection screen of the local NE, enter:</p> <pre>lockout op ↵ yes ↵</pre> <p><i>An asterisk (*) appears under Lockout. A lockout request alarm is raised.</i></p> <p><b>Note:</b> If the switching mode is unidirectional, enter this command at the remote NE also.</p>   |
| 13 | <p>The following commands are required before you remove the optics card. At the local NE, put the local facility out of service by entering:</p> <pre>facility oc3 g2 ↵ chgstate oos ↵ yes ↵</pre> <p><i>The following alarms are normal:</i></p> <ul style="list-style-type: none"> <li>- Lockout request</li> <li>- Tx AIS ESI G2 (if ESI is used)</li> <li>- Rx AIS (for OC-3 G2 at the remote NE)</li> </ul> |

—continued—

## 13-10 Expanding optical bandwidth

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Procedure 13-1 (continued)

### Upgrading a system from OC-3 to OC-12

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| Step | Action   |
|------|--|
| 14   | <p>At the remote NE, put the remote facility out of service by entering:</p> <pre>facility oc3 g2 ↵ chgstate oos ↵ yes ↵</pre> <p><i>The Rx AIS alarm clears.</i></p> <p><b>Note:</b> To continue deprovisioning the G2 optical channel, you must enter commands at the local NE.</p>  |
| 15   | <p>At the local NE, delete the facility by entering:</p> <pre>facility oc3 g2 ↵ delete ↵ yes ↵</pre> <p><i>The facility state field indicates Null.</i></p>  |
| 16   | <p>At the local NE, put the equipment out of service by entering:</p> <pre>equipmnt oc3 g2 ↵ chgstate oos ↵ yes ↵</pre> <p>Delete the equipment by entering:</p> <pre>delete ↵ yes ↵</pre> <p><i>The equipment state field indicates Null. The lockout request clears.</i></p> <p><b>Note:</b> To complete the deprovisioning of the G2 optical channel, you must enter commands at the remote NE.</p> |
| 17   | <p>At the remote NE, delete the facility by entering:</p> <pre>facility oc3 g2 ↵ delete ↵ yes ↵</pre> <p><i>The facility state field indicates Null.</i></p>   |
| 18   | <p>At the remote NE, put the equipment out of service by entering:</p> <pre>equipmnt oc3 g2 ↵ chgstate oos ↵ yes ↵</pre> <p>Delete the equipment by entering:</p> <pre>delete ↵ yes ↵</pre> <p><i>The equipment state field indicates Null. The following remaining alarm is normal: Tx AIS ESI G2 (if ESI is used).</i></p>   |

—continued—

Procedure 13-1 (continued)  
**Upgrading a system from OC-3 to OC-12**

**Step Action**



**DANGER**

**Risk of eye damage**

At all times when handling optical fibers, follow the safety procedures recommended by your company. Avoid direct exposure to laser beam or fiber. Invisible laser light can blind. Keep all optical connectors capped.



**CAUTION**

**Possible loss of service**

Do not remove the G1 unit until you have completely installed the G2 unit. No protection is available until you install the G2 unit.

- 19** At both the local and remote sites, disconnect the optical patchcords (pigtailed) from the receive and transmit connectors of the G2 unit. Cover all exposed connectors with caps to prevent contamination.
- 20** At both the local and remote NEs, remove the G2 unit (slot 10) from the shelf.
- 21** To change the transmission rate to OC-12 at the OPC, open the Commissioning Manager tool of the OPC and select the local NE from the Commissioned network elements list.
- 22** Select the **edit** option from the list item menu.  
*The Network Element Commissioning Data window opens.*
- 23** Tab to the **Transmission rate** field, then select the **OC-12** option from the chooser menu.
- 24** Tab to the **OK** button, then select it.  
*A warning dialog asks you to confirm the transmission rate change.*  
 To confirm the change, tab to the **Yes** button, then select it.  
*A transmission rate mismatch OC-3 G1 alarm is reported at the local NE.*
- 25** Select the remote NE in the Commissioned network elements list, then repeat steps 22 through 24.
- 26** Close the Commissioning Manager.
- 27** At both the local and remote NEs, install the OC-12 unit in the shelf (slot 10). Firmly push the unit all the way into its position and into the backplane connector.  
*The following alarms are normal:*  
 - Rx loss of signal (for OC-12 G2 at both the local and remote NE)  
 - Transmission Rate Mismatch OC3 G1 (at both the local and remote NE)  
 - Circuit pack reach mismatch (if applicable)

—continued—

**Upgrading a system from OC-3 to OC-12**

**Step Action**

- Firmware version mismatch (if applicable)
- Tx AIS ESI G2 (if ESI is used)
- SDCC link 6 failure alarm

SDCC alarms are raised if route diversity is On.

**Note:** The green LED of the new OC-12 card (G2) may come on even if it is not carrying traffic; however, the user interface correctly shows that OC-3 G1 is carrying the traffic.



**DANGER**

**Risk of eye damage**

At all times when handling optical fibers, follow the safety procedures recommended by your company. Avoid direct exposure to laser beam or fiber. Invisible laser light can blind. Keep all optical connectors capped.

**28** Measure the transmit output power of the new OC-12 cards at both the local and remote site.

If necessary, see *Commissioning and Testing*, Volume 3.

*The measured power should exceed the value specified in the following table.*

| Networking optics module | Requirement                   |
|--------------------------|-------------------------------|
| NT7E02LA/LB/LC/LD        | -4.5 dBm (intermediate reach) |
| NT7E02KA/KB/KC/KD        | -3.0 dBm (long reach)         |

**29** Reconnect the optical patchcord to the transmit (out) connector at both the local and remote site.

**Note:** After this step, the OC-12 cards for the G2 optical channel are in place at both the local and remote NEs, and the corresponding patchcords are plugged into the transmit (Out) connector on each card.

**30** At both the local and remote NEs, measure the received input power from the Rx fiber patchcord. If necessary, adjust the received power with a variable optical attenuator.

See *Commissioning and Testing*, Volume 3.

**Note:** The measured power should exceed the ( $P_{R \text{ min}}$ ) value for the given unit and should NOT exceed the overload level. See the following table for the minimum and maximum values.

—continued—

Procedure 13-1 (continued)  
**Upgrading a system from OC-3 to OC-12**

**Step Action**

**Table 13-1**  
**Minimum and maximum power requirements**

| Networking optics module                  | $P_{r \text{ min}}$ requirement | Overload requirement |
|---|---------------------------------|----------------------|
| NT7E02LA/LB/LC/LD<br>(intermediate reach) | -24.5 dBm                       | -4.0 dBm             |
| NT7E02KA/KB/KC/KD<br>(long reach)         | -32.0 dBm                       | -7.0 dBm             |



**CAUTION**

**Risk of damage to the optical receiver**

For the NT7E02 OC-12 long reach (LR) interface unit, received optical power must not exceed the safe level of **-6.0 dBm** (-5.0 dBm is excessive)

Damage levels do not apply to the NT7E01 IR and LR, NT7E02 IR, and NT7E05 IR and LR optical interfaces.

- 31** At both the local and remote NEs, reconnect the optical patchcord to the receiver connector of the units.  
*This should clear the Rx loss of signal and Tx AIS ESI G2 alarms on G2 for both the local and remote NE.*
- 32** At the local NE, verify that the G2 OC-12 facility has been automatically provisioned successfully by entering:  
**facility oc12 g2 ↵**  
*The facility state field should indicate IS (in service).*  
 Enter the same command at the remote NE and verify that the facility state field also indicates that the facility is in service.  
**Note:** Now that you have upgraded the optical units for one channel, some alarms are cleared. Some alarms might remain because the optical rates in channels G1 and G2 are different.  
 To continue with this procedure, go to step 33.

—continued—

**Upgrading a system from OC-3 to OC-12**

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| <b>Step</b> | <b>Action</b> |
|-------------|---------------|
|-------------|---------------|

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**Upgrading channel G1**

- Note:** The following steps upgrade the OC-3 channel G1 (slot 9) to OC-12.
- 33** At the OC3 Protection screen of the local NE, enter:  
**lockout re** ↵  
**yes** ↵  
*A dot (.) appears under Lockout. The lockout alarm clears.*  
**Note:** If the switching mode is unidirectional, enter this command at the remote NE also.  
**Note:** When traffic switches to the G2 optical channel, a traffic hit of not less than 50 ms takes place.
- 34** At the local NE, operate a manual switch by entering:  
**protectn** ↵  
**dtlprot oc3 g1** ↵  
**manual op g1** ↵  
**yes** ↵  
*The OC3 Protection screen displays an R under the Manual field for unit G1. The Manual Switch Request alarm is generated.*  
**Note:** If the switching mode is unidirectional, repeat this step at the remote NE also.
- 35** Verify that the Traffic Rx state and the Traffic Tx state are both On for the G2 circuit pack (meaning that the traffic was successfully switched to the G2 channel). At the local NE, enter:  
**facility oc12 g2** ↵  
*The OC12 Facility screen indicates IS-Rx Active-Tx Active in the State field.*
- 36** Repeat step 35 at the remote NE.
- 37** At the OC3 Protection screen of the local NE, enter:  
**manual re g1** ↵  
**yes** ↵  
*A dot (.) appears under the Manual field for unit G1. The protection switch alarm clears.*  
**Note:** If the switching mode is unidirectional, enter this command at the remote NE also.
- 38** The following commands are required before you remove the optics card. At the local NE, put the facility out of service by entering:  
**facility oc3 g1** ↵  
**chgstate oos** ↵  
**yes** ↵

—continued—

Procedure 13-1 (continued)  
**Upgrading a system from OC-3 to OC-12**

| Step | Action   |
|------|--|
|      | <p><i>The following alarms are normal:</i></p> <ul style="list-style-type: none"> <li>- Tx Rate Mismatch</li> <li>- Circuit pack reach mismatch (if applicable)</li> <li>- Firmware version mismatch (if applicable)</li> <li>- Tx AIS ESI G1 (if ESI is used)</li> <li>- Rx AIS (for OC-3 G1 at the remote NE)</li> </ul> |
| 39   | <p>At the remote NE, put the remote facility out of service by entering:</p> <pre>facility oc3 g1 ↵ chgstate oos ↵ yes ↵</pre> <p><i>The Rx AIS alarm clears.</i></p>  |
|      | <p><b>Note:</b> To deprovision the G1 optical channel at the local NE, you must enter the following commands at the local NE.</p>  |
| 40   | <p>At the local NE, delete the facility by entering:</p> <pre>facility oc3 g1 ↵ delete ↵ yes ↵</pre> <p><i>The facility state field indicates Null.</i></p>  |
| 41   | <p>At the local NE, put the equipment out of service by entering:</p> <pre>equipmnt oc3 g1 ↵ chgstate oos ↵ yes ↵</pre> <p>Delete the equipment by entering:</p> <pre>delete ↵ yes ↵</pre> <p><i>The equipment state field indicates Null.</i></p>   |
|      | <p><i>The following alarms are cleared:</i></p> <ul style="list-style-type: none"> <li>- Tx Rate Mismatch</li> <li>- Circuit pack reach mismatch (if applicable)</li> <li>- Firmware version mismatch (if applicable)</li> <li>- OC3 Manual Switch Request</li> </ul>  |
|      | <p><b>Note:</b> To deprovision the G1 optical channel at the remote NE, you must enter the following commands at the remote NE.</p>  |
| 42   | <p>At the remote NE, delete the facility by entering:</p> <pre>facility oc3 g1 ↵ delete ↵ yes ↵</pre> <p><i>The facility state field indicates Null.</i></p>   |

—continued—

Procedure 13-1 (continued)

**Upgrading a system from OC-3 to OC-12**

---

**Step Action**

---

**43** At the remote NE, put the equipment out of service by entering:

**equipmnt oc3 g1 ↵**  
**chgstate oos ↵**  
**yes ↵**

Delete the equipment by entering:

**delete ↵**  
**yes ↵**

*The equipment state field indicates Null. The following alarm is normal: Tx AIS ESI G1 (if ESI is used).*



**DANGER**

**Risk of eye damage**

At all times when handling optical fibers, follow the safety procedures recommended by your company. Avoid direct exposure to laser beam or fiber. Invisible laser light can blind. Keep all optical connectors capped.



**CAUTION**

**Possible loss of service**

Do not remove the G1 unit until you have completely installed the G2 unit. No protection is available until you install the G2 unit.

**44** At both the local and remote sites, disconnect the optical patchcords from the receive and transmit connectors of the unit. Cover both the patchcords and the circuit pack connectors with the appropriate caps.

**45** At both the local and remote NEs, remove the unit (slot 9) from the shelf.

**46** At both local and remote NEs, install the OC-12 unit in the shelf (slot 9). Firmly push the unit all the way into the backplane connector.

*The following alarms are normal:*

- Rx loss of signal (for OC-12 G1 at both the local and remote NE)
- Tx AIS ESI G1 (if ESI is used)

**47** at both the local and remote NEs, measure the transmit output power of the new OC-12 cards, as performed in step 28 on page 13-12 in the section "Upgrading channel G2". The measured power should exceed the value specified in the table in step 28.

**48** At both the local and remote NEs, reconnect the optical patchcord to the transmit (Out) connector of the unit.

—continued—

Procedure 13-1 (continued)

**Upgrading a system from OC-3 to OC-12**

| Step | Action  |
|------|---|
|      | <p><b>Note:</b> After this step, both OC-12 cards for the G1 optical channel are in place, and the corresponding patchcords are plugged in to the transmit (Out) connector on each card.</p>  |
| 49   | <p>At both the local and remote NEs, measure the received input power coming from the Rx fiber patchcord, as performed in step 30 on page 13-12 in the section “Upgrading channel G2”.</p> <p>Adjust the received power with a variable optical attenuator if necessary.</p> <p><b>Note:</b> The measured power should exceed the (<math>P_{R \min}</math>) value for the given unit, and should <i>NOT</i> exceed the overload level. See Table 13-1 on page 13-13 for the values.</p> <div style="border: 1px solid black; padding: 10px; margin: 10px 0;"> <div style="display: flex; align-items: center;">  <div> <p><b>CAUTION</b></p> <p><b>Risk of damage to the optical receiver</b></p> <p>For the NT7E02 OC-12 long reach (LR) interface unit, received optical power must not exceed the safe level of <b>– 6.0 dBm</b> (–5.0 dBm is excessive).</p> <p>Damage levels do not apply to the NT7E01 IR and LR, NT7E02 IR, and NT7E05 IR and LR optical interfaces.</p> </div> </div> </div> |
| 50   | <p>Reconnect the optical patchcord to the receiver connector of the units at both the local and remote NEs.</p> <p><i>The Rx loss of signal and Tx AIS ESI G1 alarms on G1 appear for both the local and remote NE. See Alarm and Trouble Clearing, 323-3001-543, in Maintenance, Volume 5A, to clear these alarms.</i></p>   |
| 51   | <p>At the local NE, verify that the G1 OC-12 facility has been automatically provisioned successfully by entering:</p> <p><b>facility oc12 g1 ↵</b></p> <p><i>The facility state field indicates IS (in service).</i></p> <p>Enter the same command at the remote NE and verify that the remote NE facility is in service.</p>  |
| 52   | <p>At the local NE, switch the traffic to the newly provisioned channel by entering:</p> <p><b>protectn ↵</b><br/> <b>dtlprot oc12 ↵</b><br/> <b>manual op g2 ↵</b><br/> <b>yes ↵</b></p> <p><b>Note:</b> If the switching mode is unidirectional, repeat these commands at the remote NE user interface.</p>   |

—continued—

Procedure 13-1 (continued)

**Upgrading a system from OC-3 to OC-12**

**Step Action**

**53** Restart the FWPI session to update the rate by entering:

**quit all** ↵

**fwp** ↵

*The Network Element Status screen appears.*

To continue the procedure, go to step 54.

**Updating the timing reference source**

**54** Verify if it is necessary to update the timing reference source screen to show **OC12** instead of **OC3**. At the local NE *only*, enter:

**protectn** ↵

**treffprot** ↵

**treffsrc** ↵

*OCA and OCB timing reference sources are shown as OC3 or OC12.*

**55** If the timing reference sources are shown as **OC12**, go to step 61 of this section on page 13-20.

If the timing reference sources are shown as **OC3**, enter the following command at the local network element *only*:

**eq esi g1** ↵

*The ESI Equipment screen appears, or a message appears indicating that ESI equipment is not provisioned.*

**56** Complete the steps in the following table:

| If   | Then   |
|--|--|
| <p>NO ESI equipment is provisioned</p> <p>or</p> <p>the current filter mode is Freerun</p>         | <p><b>a.</b> At the local NE <i>only</i>, select the second ESI group by entering:</p> <p><b>select g2</b> ↵</p> <p><i>ESI G2 is placed in context.</i></p> <p><b>b.</b> If G2 equipment is provisioned or the current filter group is <i>NOT</i> Freerun, at the local NE <i>only</i>, enter:</p> <p><b>edittarg holdover</b> ↵</p> <p><i>ESI is placed in holdover mode.</i></p> |
| <p>ESI equipment is provisioned</p> <p>or</p> <p>the current filter mode is <i>NOT</i> Freerun</p> | <p>At the local NE <i>only</i>, enter:</p> <p><b>edittarg holdover</b> ↵</p> <p><i>ESI is placed in holdover mode.</i></p>   |

—continued—

Procedure 13-1 (continued)  
**Upgrading a system from OC-3 to OC-12**

| Step | Action   |
|------|--|
| 57   | <p>Display the timing reference source screen again to make sure it displays <b>OC12</b> instead of <b>OC3</b>. At the local NE <i>only</i>, enter:</p> <pre>protectn ↵ trefprot ↵ trefsrc ↵</pre> <p><i>The Timing Reference Source screen appears.</i></p>   |
| 58   | <p>Determine from the screen if the OCA timing reference source is set to OC3 G1 or G2. Reset the OCA timing reference source to the same optics (G1 or G2) by entering:</p> <pre>ocasrc &lt;optics group&gt; ↵ yes ↵</pre> <p>where</p> <p>&lt;optics group&gt;    <b>g1</b> or <b>g2</b>, as displayed for OCA</p> |

**CAUTION**

**Reset the OCA reference source to the same optics (G1 or G2) presently displayed at the user interface.** This change has no impact on the system, but makes the user interface display **OC12** instead of **OC3**.

|    |  |
|----|--|
| 59 | <p>Determine from the screen if the OCB timing reference source is presently set to OC3 G1 or G2. Reset the OCB timing reference source to the same optics (G1 or G2) by entering:</p> <pre>ocbsrc &lt;optics group&gt; ↵ yes ↵</pre> <p>where</p> <p>&lt;optics group&gt;    <b>g1</b> or <b>g2</b>, as displayed for OCB</p> |
|----|--|

**CAUTION**

**Reset the OCB reference source to the same optics (G1 or G2) presently displayed at the user interface.** This change has no impact on the system, but makes the user interface display **OC12** instead of **OC3**.

—continued—

Procedure 13-1 (continued)

**Upgrading a system from OC-3 to OC-12**

---

| <b>Step</b>                                      | <b>Action</b>   |
|--|---|
| <b>60</b>  | <p>If ESI is in holdover mode, set the ESI target filter mode back to normal. At the local NE <i>only</i>, enter:</p> <pre>eq esi &lt;g1 or g2&gt; ↵<br/>edittarg normal ↵</pre> <p><b>Note:</b> Perform these commands for only one of the ESI cards, G1 or G2. The target filter mode changes for both cards.</p>   |
| <b>61</b>  | <p>At the local NE <i>only</i>, back up the database by entering:</p> <pre>equipmnt sh ↵<br/>backupdb ↵<br/>yes ↵</pre> <p><i>A database backup is performed.</i></p> <p>To continue the procedure, go to step 62.</p>  |
| <b>Updating the transmission rate at the OPC</b> |   |
|  | <p><b>Note:</b> You must change the transmission rate from OC-3 to OC-12 at the OPC.</p>  |
| <b>62</b>  | <p>To change the transmission rate from OC-3 to OC-12, open the Configuration Manager tool of the OPC.</p>  |
| <b>63</b>  | <p>In the configuration list, move the cursor to the OC-3 configuration being upgraded, then press <b>Ctrl_L</b> (or Keypad <b>Enter</b>).</p> <p><i>The list item menu appears.</i></p>  |
| <b>64</b>  | <p>Move to the <b>Edit Configuration</b> command, then press <b>Space</b> (or Keypad <b>0</b>).</p> <p><i>The Configuration Manager: Point-to-Point window appears in the edit mode.</i></p>  |
| <b>65</b>  | <p>To change the transmission rate:</p> <ol style="list-style-type: none"><li>Tab to the <b>Rate</b> buttons.</li><li>Use the arrow keys to move to the required rate, then press <b>Ctrl_A</b> (or Keypad <b>0</b>).</li></ol> <p><i>A confirmation message appears.</i></p> <ol style="list-style-type: none"><li>Tab to the <b>Yes</b> button, then press <b>Ctrl_A</b> (or Keypad <b>0</b>).</li></ol> <p><i>The required rate is selected.</i></p> |
| <b>66</b>  | <p>Tab to the <b>Save Configuration</b> button, then press <b>Ctrl_A</b> (or Keypad <b>0</b>).</p> <p><i>An information dialog appears stating that the configuration data has been saved.</i></p>  |
| <b>67</b>  | <p>To close the dialog, press <b>Ctrl_A</b> (or Keypad <b>0</b>) to select the <b>OK</b> button.</p> <p><i>The Configuration Manager: Point-to-Point window appears in the edit mode.</i></p>   |

—continued—

Procedure 13-1 (continued)

**Upgrading a system from OC-3 to OC-12**

| Step | Action  |
|------|---|
| 68   | To close the Configuration Manager: Point-to-Point window and display the window menu, press <b>Ctrl_L W</b> (or Keypad <b>6</b> ).<br><i>The window menu appears.</i>  |
| 69   | To select the <b>Exit</b> command, press <b>Space</b> (or Keypad <b>0</b> ).<br><i>A confirmation dialog appears (if applicable).</i>   |
| 70   | To transfer the new configuration data to the backup OPC, tab to the <b>Yes</b> button, then press <b>Ctrl_A</b> (or Keypad <b>0</b> ).<br><i>A confirmation dialog appears.</i>  |
| 71   | Tab to the <b>Yes</b> button, then press <b>Ctrl_A</b> (or Keypad <b>0</b> ). (If you want to cancel your request, select the <b>No</b> button.)<br><i>The Configuration Manager main window appears with the edited configuration displayed in the configuration list.</i><br><b>Note:</b> You might receive a warning dialog that the backup OPC is unavailable and to try again later. The new configuration is saved to the primary OPC and listed in the configuration list.   |
| 72   | To close the Configuration Manager tool: <ol style="list-style-type: none"> <li>a. To display the window menu, press <b>Ctrl_L W</b> (or Keypad <b>6</b>).<br/><i>The window menu appears.</i></li> <li>b. To select the <b>Exit</b> command, press <b>Space</b> (or Keypad <b>0</b>).<br/><i>The tool disappears.</i></li> </ol>   |
| 73   | Verify that no alarms remain from this procedure.<br><b>Note:</b> If you replaced the optics cards with cards having a different reach (such as from intermediate reach to long reach), then a “circuit pack reach mismatch” alarm might remain for unit G2. To clear the alarm, perform the following actions at both the local and the remote site: <ul style="list-style-type: none"> <li>• change the state of OC-12 G2 to out-of-service (OOS)</li> <li>• attach antistatic protection</li> <li>• remove the OC-12 G2 card</li> <li>• wait for at least 15 seconds and reinsert the card</li> <li>• remove the antistatic protection</li> <li>• change the state of OC-12 G2 to in-service (IS), if it is not already IS</li> </ul> <i>The “circuit pack reach mismatch” alarm clears.</i> |
| 74   | Log out of all user interface sessions.<br><i>The system is now fully upgraded from OC-3 to OC-12.</i>  |

—end—



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## DS1-fed AccessNode procedures

---

This chapter contains the procedures for the growth of DS1-fed AccessNode (DFA) systems. Procedures in this chapter describe how to perform the following tasks:

- expand the operations maintenance channel (OMC) bandwidth to provide a faster software download path to the DFA remote fiber terminal (RFT)
- reduce the OMC bandwidth (required when you want to add another DFA RFT to the operations controller [OPC] span of control, but all OMC channels are used)
- move the OMC (required when the DS1 facility where the OMC resides is needed for traffic)

### How to use this chapter

To use procedures in this chapter, see the document task list in Chapter 1, “Overview of system expansion,” locate the task you need, and perform the sequence of given procedures.

### Chapter task list

This chapter contains the following procedures. If you cannot successfully complete these procedures, contact your next level of support.

| Procedure | Task                                     | See       |
|-----------|--|-----------|
| 14-1      | Adjusting the OMC bandwidth              | page 14-3 |
| 14-2      | Moving an OMC link to a new DS1 facility | page 14-8 |

## Operations maintenance channel

The operations maintenance channel (OMC) is a two-way path for operations, administration, maintenance, and provisioning. One OMC is required from the operations controller (OPC) to each DFA RFT unless a control network (CNET) connection supplies a communication link. Arrangements using a CNET connection are described in *Configuration and Equipment Description*, 323-3001-100, in *Description*, Volume 2A.

An OMC requires three to six DS0 channels on a dedicated DS1 facility. Each OMC requires a dedicated DS1 facility, even if two OMCs are terminated on the same DFA RFT. (You can provision two OMCs to protect against DS1 facility failure.) At the RFT, the OMC can be assigned to any one of the 14 DS1 ports on a DS1/VT mapper in slot 1 or 2, or to port 1 on the mapper in slot 4. At the OPC shelf, probably only one working mapper will be equipped, since the OPC supports a maximum of 10 OMCs.

Increasing the OMC bandwidth permits faster downloading of software from the OPC to the DFA RFT. However, because six DS0s match the communication path capacity through the processor card, exceeding a bandwidth of six DS0s is ineffective.

Decreasing the bandwidth of existing OMCs releases OMC capacity at the OPC, permitting the addition of more DFA RFTs (up to 10) to the OPC span of control. However, reducing the OMC bandwidth below three DS0s impairs the performance of software downloads. OMCs from all DFA RFTS in the OPC span of control are limited to a total of 31 DS0 channels.

---

## Procedure 14-1

# Adjusting the OMC bandwidth

---

Use this procedure to increase or decrease the bandwidth of the operations maintenance channel (OMC) while maintaining the DS1 facility assignment.

This procedure accommodates bandwidth adjustments by deleting the old OMC link, then adding a new OMC link (on the same DS1 facility) with the desired bandwidth. This approach temporarily loses the association between the operations controller (OPC) and the remote fiber terminal (RFT). To adjust the OMC bandwidth without losing the association between the OPC and the RFT, perform Procedure 14-2, “Moving an OMC link to a new DS1 facility,” on page 14-8.

### Requirements

This procedure requires the following equipment and personnel:

- Because this procedure is performed directly from the network element user interface, you need one of the following configurations:
  - a VT100-compatible terminal connected to the local craft access panel (LCAP) port at both the central office and at the DFA RFT
  - a terminal connected to the modem port of the network element (This is also a direct connection for this procedure.)
- To minimize the time that association between the OPC and RFT is lost, you need two technicians, one at the central office and one at the RFT, to coordinate this procedure.

You must know how to do the following:

- check log and alarm messages
- connect a VT100-compatible terminal to the LCAP
- log in to and out of the network element user interface

**Note:** See *Network Element User Interface Description*, 323-3001-300, in *Operations, Administration, and Provisioning*, Volume 4A, for instructions.

—continued—

Procedure 14-1 (continued)  
**Adjusting the OMC bandwidth**

---

**Action**

---

| <b>Step</b> | <b>Action</b>   |         |              |      |       |     |      |   |               |   |    |   |      |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |    |              |  |  |  |  |
|-------------|---|---------|--------------|------|-------|-----|------|---|---------------|---|----|---|------|---|--------------|--|--|--|--|---|--------------|--|--|--|--|---|--------------|--|--|--|--|---|--------------|--|--|--|--|---|--------------|--|--|--|--|---|--------------|--|--|--|--|---|--------------|--|--|--|--|---|--------------|--|--|--|--|----|--------------|--|--|--|--|
| 1           | Log in to the network element user interface at the OPC shelf.  |         |              |      |       |     |      |   |               |   |    |   |      |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |    |              |  |  |  |  |
| 2           | Activate the OMC command interpreter (OMCCI) by entering:<br><b>quit all</b> ↵<br><i>The CI prompt appears.</i><br>Enter:<br><b>omcci</b> ↵<br><i>The OMCCI: prompt appears.</i>  |         |              |      |       |     |      |   |               |   |    |   |      |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |    |              |  |  |  |  |
| 3           | Display the list of OMCs and record the information about the OMC link that is being adjusted. Enter:<br><b>omc query all</b> ↵<br><i>A listing appears, similar to the following example:</i>  |         |              |      |       |     |      |   |               |   |    |   |      |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |    |              |  |  |  |  |
|             | <table><thead><tr><th>Channel</th><th>Connected to</th><th>#DS0</th><th>State</th><th>D/L</th><th>Name</th></tr></thead><tbody><tr><td>1</td><td>DS1 G1 Port 1</td><td>3</td><td>IS</td><td>*</td><td>OMC1</td></tr><tr><td>2</td><td>Not Assigned</td><td></td><td></td><td></td><td></td></tr><tr><td>3</td><td>Not Assigned</td><td></td><td></td><td></td><td></td></tr><tr><td>4</td><td>Not Assigned</td><td></td><td></td><td></td><td></td></tr><tr><td>5</td><td>Not Assigned</td><td></td><td></td><td></td><td></td></tr><tr><td>6</td><td>Not Assigned</td><td></td><td></td><td></td><td></td></tr><tr><td>7</td><td>Not Assigned</td><td></td><td></td><td></td><td></td></tr><tr><td>8</td><td>Not Assigned</td><td></td><td></td><td></td><td></td></tr><tr><td>9</td><td>Not Assigned</td><td></td><td></td><td></td><td></td></tr><tr><td>10</td><td>Not Assigned</td><td></td><td></td><td></td><td></td></tr></tbody></table> | Channel | Connected to | #DS0 | State | D/L | Name | 1 | DS1 G1 Port 1 | 3 | IS | * | OMC1 | 2 | Not Assigned |  |  |  |  | 3 | Not Assigned |  |  |  |  | 4 | Not Assigned |  |  |  |  | 5 | Not Assigned |  |  |  |  | 6 | Not Assigned |  |  |  |  | 7 | Not Assigned |  |  |  |  | 8 | Not Assigned |  |  |  |  | 9 | Not Assigned |  |  |  |  | 10 | Not Assigned |  |  |  |  |
| Channel     | Connected to  | #DS0    | State        | D/L  | Name  |     |      |   |               |   |    |   |      |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |    |              |  |  |  |  |
| 1           | DS1 G1 Port 1   | 3       | IS           | *    | OMC1  |     |      |   |               |   |    |   |      |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |    |              |  |  |  |  |
| 2           | Not Assigned  |         |              |      |       |     |      |   |               |   |    |   |      |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |    |              |  |  |  |  |
| 3           | Not Assigned  |         |              |      |       |     |      |   |               |   |    |   |      |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |    |              |  |  |  |  |
| 4           | Not Assigned  |         |              |      |       |     |      |   |               |   |    |   |      |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |    |              |  |  |  |  |
| 5           | Not Assigned  |         |              |      |       |     |      |   |               |   |    |   |      |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |    |              |  |  |  |  |
| 6           | Not Assigned  |         |              |      |       |     |      |   |               |   |    |   |      |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |    |              |  |  |  |  |
| 7           | Not Assigned  |         |              |      |       |     |      |   |               |   |    |   |      |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |    |              |  |  |  |  |
| 8           | Not Assigned  |         |              |      |       |     |      |   |               |   |    |   |      |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |    |              |  |  |  |  |
| 9           | Not Assigned  |         |              |      |       |     |      |   |               |   |    |   |      |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |    |              |  |  |  |  |
| 10          | Not Assigned  |         |              |      |       |     |      |   |               |   |    |   |      |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |    |              |  |  |  |  |

**Note:** Step 4 causes a temporary loss of association between the RFT and the OPC unless a second OMC exists between them. Any active operations cease, then resume when the association is restored. Customer traffic is not affected.

—continued—

---

 Procedure 14-1 (continued)  
**Adjusting the OMC bandwidth**


---

| Step | Action |
|------|--------|
|------|--------|

|   |   |
|---|---|
| 4 | Delete the existing OMC link by entering: |
|---|---|

```
omc delete <channel> ↵
```

where

<channel>            OMC link number: **1 to 10**

*The system displays a warning message and requests your confirmation of the action.*

```
Warning: This action will delete the selected Operations
Maintenance Channel. If confirmed, OAM&P data
communications WILL BE DISRUPTED.
```

```
Please confirm ("Yes" or "No"):
```

```
Enter:
```

```
y ↵
```

*The system displays the following message:*

```
Success. Link has been deleted.
```

|   |   |
|---|---|
| 5 | Add a new OMC link with the new bandwidth using the same "channel" and "connected to" values of the OMC link that you deleted. Enter: |
|---|---|

```
omc add <channel> <connected to> <bandwidth> <link_name> ↵
```

where

<channel>            OMC link number: **1 to 10**

<connected to>    DS1 facility, requires two values:  
circuit pack group number (cpg#): **g1, g2, or g4**  
and facility port number:  
**1 to 14** if cpg # is g1 or g2, **1** if cpg # is g4

<bandwidth>        quantity of DS0 channels in this OMC: **3, 4, 5, or 6**

<link\_name>        text string up to 20 characters

*The following response appears:*

```
Success. Link <channel> has been added.
```

**Note:** By default, the first link added to a location is the software download channel. If the default or existing assignment for the software download channel is acceptable, go to step 7.

—continued—

Procedure 14-1 (continued)  
**Adjusting the OMC bandwidth**

---

| Step        | Action  |           |                             |             |                                 |
|-------------|---|-----------|-----------------------------|-------------|---------------------------------|
| 6           | <p>To change the OMC link for the software download channel, enter:</p> <p><b>omc setdlchan &lt;channel or link_name&gt; ↵</b></p> <p>where</p> <table><tr><td>&lt;channel&gt;</td><td>OMC link number: 1 to 10</td></tr><tr><td>&lt;link_name&gt;</td><td>text string up to 20 characters</td></tr></table> <p><i>The following response appears:</i></p> <p>Success. Download channel is set.</p>                                       | <channel> | OMC link number: 1 to 10    | <link_name> | text string up to 20 characters |
| <channel>   | OMC link number: 1 to 10  |           |                             |             |                                 |
| <link_name> | text string up to 20 characters   |           |                             |             |                                 |
| 7           | <p>To verify the changes, enter:</p> <p><b>omc query all ↵</b></p> <p><i>A listing appears, similar to the example in step 3. Verify that the OMC is in service (IS).</i></p>   |           |                             |             |                                 |
| 8           | <p>Quit OMCCI at both network elements by entering:</p> <p><b>quit ↵</b></p>  |           |                             |             |                                 |
| 9           | <p>Check for OMC fail alarms by entering:</p> <p><b>fwp ↵</b></p> <p><i>The Network Element Status screen appears.</i></p> <p>Enter:</p> <p><b>al; listalms ↵</b></p> <p><i>A list of active alarms appears.</i></p> <p>Review the list and correct any alarm conditions. See <i>Alarm and Trouble Clearing Procedures</i>, 323-3001-543, in <i>Maintenance</i>, Volume 5A.</p>   |           |                             |             |                                 |
| 10          | <p>To verify the new OMC link, display the COMM Fac Port screen by entering:</p> <p><b>fa comm omc &lt;port #&gt; ↵</b></p> <p>where</p> <table><tr><td>&lt;port #&gt;</td><td>OMC channel number: 1 to 10</td></tr></table> <p><i>The COMM Fac Port screen appears for the specified OMC link. It displays a confirmation similar to the following example:</i></p> <p>Status: UP<br/>Connected to: DS1 G1 Port 1</p> <p>—continued—</p> | <port #>  | OMC channel number: 1 to 10 |             |                                 |
| <port #>    | OMC channel number: 1 to 10   |           |                             |             |                                 |

Procedure 14-1 (continued)  
**Adjusting the OMC bandwidth**

---

| <b>Step</b> | <b>Action</b>  |
|-------------|--|
| <b>11</b>   | Perform steps 1 through 10 to adjust the OMC bandwidth at the DFA RFT. Make sure the bandwidth is the same at both ends of the OMC link. |
| <b>12</b>   | Log out of the network element user interface at both network elements.<br><i>The user interface sessions are terminated.</i>            |

—end—

## Procedure 14-2

# Moving an OMC link to a new DS1 facility

---

Use this procedure to reassign an operations maintenance channel (OMC) link between the operations controller (OPC) shelf and one of its DS-1 fed AccessNode (DFA) remote fiber terminals (RFTs). This procedure reassigns the OMC link to another DS1 facility between the same two network elements. This change may be required when growth on the RFT requires the OMC DS1 facility to be reassigned for customer traffic. This procedure also accommodates OMC bandwidth adjustments.

The approach used in this procedure does not affect the association between the OPC and the RFT. It maintains the association by adding a new OMC link to a new DS1 facility, then deleting the old OMC link.

If you must maintain the association between the OPC and the DFA RFT, add a temporary OMC before you delete the old OMC. Adding a temporary OMC requires sufficient spare OMC DS0 capacity and a spare link number at the OPC shelf. As an alternative, you can temporarily reroute an existing link from a DFA RFT at the OPC shelf to the DFA RFT being adjusted. If you cannot add a second OMC, the association to the OPC shelf is lost when you disconnect the old DS1 facility.

### Requirements

If you are working in a remote user interface session, you cannot delete the OMC designated as the lowload channel. In addition, you cannot place the DS1 or TIC/VT facility containing this OMC out of service. To perform these actions, you must select one of the following:

- connect a VT100-compatible terminal directly to the local access craft panel (LCAP) port at the DFA RFT (at step 9)
- connect a terminal to the modem port of the network element to establish a direct connection

Before you start this procedure, review it thoroughly and answer the following questions:

- Are you adding a new OMC temporarily or permanently?
- Are you deleting the old OMC now or later?
- Have you determined the DS1 facility (port number) assignments and DS1 parameter values?
- Have you determined the OMC link number, bandwidth, and link name, in accordance with your overall OMC link plan for this OPC span of control?

—continued—

---

 Procedure 14-2 (continued)

**Moving an OMC link to a new DS1 facility**


---

- Have you determined the changes needed (or not needed) at each network element? For example, if you are moving the DS1 facility at the DFA RFT but maintaining the bandwidth, then you need to change a DS1 facility cross-connection at the RFT or central office, but you do not need to reprovision the OMC link at the OPC shelf.

You must know how to do the following:

- check log messages
- connecting a VT100-compatible terminal to the LCAP,
- log in to and out of the OPC user interface and the remote network element user interface
- open and close OPC tools

*Note:* See *Network Element User Interface Description*, 323-3001-300, and *OPC User Interface Description*, 323-3001-301, in *Operations, Administration, and Provisioning*, Volume 4A, for more information.

## Action

---

| Step | Action |
|------|--------|
|------|--------|

---

- |   |   |
|---|---|
|   | <i>Note:</i> If you are moving the OMC to a new facility on the DFA RFT end only, and the OMC link arrangements on the OPC shelf are not affected, skip steps 1 through 8 and step 13 at the OPC shelf. |
| 1 | Log in to the OPC user interface, then establish a remote login session to the network element user interface at the OPC shelf.   |
| 2 | Activate the OMC command interpreter (OMCCI) by entering:<br><b>omcci</b> ↵<br><i>The OMCCI : prompt appears.</i>   |

—continued—

Procedure 14-2 (continued)

**Moving an OMC link to a new DS1 facility**

---

**Step Action**

---

- 3** Add a new OMC on the desired DS1/VT mapper by entering:  
**omc add <channel> <connected to> <bandwidth> <link\_name> ↵**

where

- |                |   |
|----------------|---|
| <channel>      | OMC link number: <b>1 to 10</b>   |
| <connected to> | DS1 facility, requires two values:<br>circuit pack group number (cpg#): <b>g1, g2, or g4</b><br>and facility port number:<br><b>1 to 14</b> if cpg # is g1 or g2, <b>1</b> if cpg # is g4 |
| <bandwidth>    | quantity of DS0 channels in this OMC: <b>3, 4, 5, or 6</b>  |
| <link_name>    | text string up to 20 characters   |

*The following response appears:*

Success. Link <channel> has been added.

**Note:** For the OMC to work, provision its bandwidth with the same value at both the OPC shelf and the DFA RFT.

- 4** To move the software download channel to the link number added in step 3, enter:

**omc setdlchan <channel or link\_name> ↵**

where

- |             |                       |
|-------------|-----------------------|
| <channel>   | channel from step 3   |
| <link_name> | link name from step 3 |

*The following response appears:*

Success. Download channel is set.

—continued—

---

 Procedure 14-2 (continued)

**Moving an OMC link to a new DS1 facility**


---

- | Step    | Action   |         |              |      |       |     |      |   |               |   |    |   |      |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |    |              |  |  |  |  |
|---------|--|---------|--------------|------|-------|-----|------|---|---------------|---|----|---|------|---|--------------|--|--|--|--|---|--------------|--|--|--|--|---|--------------|--|--|--|--|---|--------------|--|--|--|--|---|--------------|--|--|--|--|---|--------------|--|--|--|--|---|--------------|--|--|--|--|---|--------------|--|--|--|--|----|--------------|--|--|--|--|
| 5       | <p>To verify the changes, query the OMC assignments by entering:</p> <p><b>omc query all</b> ↵</p> <p><i>A listing appears, similar to the following example.</i></p> <p>Verify that the OMC state is in service (IS).</p> <table border="1"> <thead> <tr> <th>Channel</th> <th>Connected to</th> <th>#DS0</th> <th>State</th> <th>D/L</th> <th>Name</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>DS1 G1 Port 1</td> <td>3</td> <td>IS</td> <td>*</td> <td>OMC1</td> </tr> <tr> <td>2</td> <td>Not Assigned</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>3</td> <td>Not Assigned</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>4</td> <td>Not Assigned</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>5</td> <td>Not Assigned</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>6</td> <td>Not Assigned</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>7</td> <td>Not Assigned</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>8</td> <td>Not Assigned</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>9</td> <td>Not Assigned</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>10</td> <td>Not Assigned</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> | Channel | Connected to | #DS0 | State | D/L | Name | 1 | DS1 G1 Port 1 | 3 | IS | * | OMC1 | 2 | Not Assigned |  |  |  |  | 3 | Not Assigned |  |  |  |  | 4 | Not Assigned |  |  |  |  | 5 | Not Assigned |  |  |  |  | 6 | Not Assigned |  |  |  |  | 7 | Not Assigned |  |  |  |  | 8 | Not Assigned |  |  |  |  | 9 | Not Assigned |  |  |  |  | 10 | Not Assigned |  |  |  |  |
| Channel | Connected to   | #DS0    | State        | D/L  | Name  |     |      |   |               |   |    |   |      |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |    |              |  |  |  |  |
| 1       | DS1 G1 Port 1  | 3       | IS           | *    | OMC1  |     |      |   |               |   |    |   |      |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |    |              |  |  |  |  |
| 2       | Not Assigned   |         |              |      |       |     |      |   |               |   |    |   |      |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |    |              |  |  |  |  |
| 3       | Not Assigned   |         |              |      |       |     |      |   |               |   |    |   |      |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |    |              |  |  |  |  |
| 4       | Not Assigned   |         |              |      |       |     |      |   |               |   |    |   |      |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |    |              |  |  |  |  |
| 5       | Not Assigned   |         |              |      |       |     |      |   |               |   |    |   |      |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |    |              |  |  |  |  |
| 6       | Not Assigned   |         |              |      |       |     |      |   |               |   |    |   |      |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |    |              |  |  |  |  |
| 7       | Not Assigned   |         |              |      |       |     |      |   |               |   |    |   |      |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |    |              |  |  |  |  |
| 8       | Not Assigned   |         |              |      |       |     |      |   |               |   |    |   |      |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |    |              |  |  |  |  |
| 9       | Not Assigned   |         |              |      |       |     |      |   |               |   |    |   |      |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |    |              |  |  |  |  |
| 10      | Not Assigned   |         |              |      |       |     |      |   |               |   |    |   |      |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |    |              |  |  |  |  |
| 6       | Check for OMC fail alarms and take any necessary corrective action.  |         |              |      |       |     |      |   |               |   |    |   |      |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |    |              |  |  |  |  |
| 7       | <p>Quit OMCCI by entering :</p> <p><b>quit</b> ↵</p> <p><i>The FWUI prompt appears.</i></p>  |         |              |      |       |     |      |   |               |   |    |   |      |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |    |              |  |  |  |  |
| 8       | <p>Provision a new DS1 facility to carry the new OMC link. See <i>Provisioning and Operations Procedures</i>, 323-3001-310, in <i>Operations, Administration, and Provisioning</i>, Volume 4B.</p> <p><b>Note:</b> When you add a new or temporary OMC link, make sure the DS1 provisioning is the same at the OPC shelf and at the DFA RFT for the following parameters: byte synchronous, line coding, and frame format.</p>   |         |              |      |       |     |      |   |               |   |    |   |      |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |    |              |  |  |  |  |
| 9       | Establish a remote login session to the DFA RFT and perform steps 2 through 8 at the DFA RFT.  |         |              |      |       |     |      |   |               |   |    |   |      |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |    |              |  |  |  |  |
| 10      | Cross-connect the new OMC DS1 facility at the RFT to the new OMC DS1 facility at the OPC shelf.  |         |              |      |       |     |      |   |               |   |    |   |      |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |   |              |  |  |  |  |    |              |  |  |  |  |

—continued—

## 14-12 DS1-fed AccessNode procedures

---

Procedure 14-2 (continued)

### Moving an OMC link to a new DS1 facility

---

| Step | Action |
|------|--------|
|------|--------|

---

11 To verify the new OMC link, enter:

**fa comm omc <port #>** ↵

where

<port #> OMC channel number: **1 to 10**

*The COMM Fac Port screen appears for the specified OMC link. It displays a confirmation similar to the following example:*

Status: UP

Connected to: DS1 G1 Port 1

12 To verify that the new DS1 facility is in service without alarms, enter:

**fac DS1 <circuit pack group> <port #>** ↵

where

<circuit pack group> circuit pack group number (cpg#): **g1, g2, or g4**

<port #> OMC channel number: **1 to 10**

*The DS1 Facility screen appears, showing the status of the new facility.*

13 Repeat steps 11 and 12 at the OPC shelf.

14 This step is optional. You can retain the original OMC link until you need it elsewhere or you can delete the original OMC link, by entering:

**omc delete <channel>** ↵

where

<channel> OMC link number: **1 to 10**

*The system displays a warning message and requests confirmation of the action.*

Warning: This action will delete the selected Operations Maintenance Channel. If confirmed, OAM&P data communications WILL BE DISRUPTED.

Please confirm ("Yes" or "No"):

Enter:

**y** ↵

*The system displays a success or failure response.*

Success. Link has been deleted.

—continued—

---

Procedure 14-2 (continued)

**Moving an OMC link to a new DS1 facility**

---

| <b>Step</b> | <b>Action</b>   |
|-------------|---|
| 15          | If you deleted an OMC link, delete the DS1 Facility that carried it. See <i>Provisioning and Operations Procedures</i> , 323-3001-310, in <i>Operations, Administration, and Provisioning</i> , Volume 4B.  |
| 16          | If either the new or deleted DS1 facility is on circuit pack group 1 or 2 (on a DS1/VT mapper in slot 1 or 2), use the Facility Assignment Manager tool on the OPC to identify the OMC function of the new facility or to unassign any deleted facilities.<br>See <i>Provisioning and Operations Procedures</i> , 323-3001-310, in <i>Operations, Administration, and Provisioning</i> , Volume 4B, for Facility Assignment Manager procedures. |
| 17          | Log out of the network element user interface.<br><i>The user interface session is terminated.</i>  |

—end—



---

# Adding ESI cards

---

This chapter contains procedures for provisioning and testing synchronization requirements at a network element, as well as guidelines for choosing the method of synchronization.

## How to use this chapter

To use procedures in this chapter, see the document task list in Chapter 1, “Overview of system expansion,” locate the task you need, and perform the sequence of given procedures.

## Chapter task list

This chapter contains the following procedures. If you cannot successfully complete these procedures, contact your next level of support.

| Procedure | Task  | See        |
|-----------|---|------------|
| 15-1      | Installing ESI equipment                            | page 15-4  |
| 15-2      | Testing ESI clock mode                              | page 15-13 |
| 15-3      | Verifying protection switching of timing references | page 15-16 |
| 15-4      | Verifying ESI facilities for timing distribution    | page 15-20 |
| 15-5      | Verifying ESI equipment protection                  | page 15-22 |

## Guidelines for adding ESI

You must synchronize network elements in an AccessNode system to maintain a consistent rate and quality of data transfer. Synchronization can be achieved in different ways. Typically, a high quality timing source, such as a building integrated timing supply (BITS), supplies the necessary DS1 timing signal to one network element. Other network elements derive their timing from the first network element, depending on the network topology. Use the following guidelines to determine the method of synchronization at a network element:

- A point-to-point system requires an external synchronization interface (ESI) at the fiber central office terminal (FCOT). The remote fiber terminal (RFT) is looptimed; that is, the RFT derives its timing from the optical line connected to the FCOT.
- A virtual tributary bandwidth manager (VTBM) ring system requires ESI equipment in at least one FCOT to accept an external timing source (for example, a BITS). The other network elements in the ring use line timing and do not require ESI equipment; however, you can equip an ESI at other FCOTs to improve holdover stability.

To improve network performance if an externally timed node fails, Nortel Networks recommends that you externally time two of the nodes in the ring from a BITS. If only one node is externally timed, Nortel Networks recommends that the other node be ESI line-timed.

**Note:** The stability in holdover mode is improved from SONET clock stability (+/- 4.6 ppm for 24 hours) to Stratum 3 stability (+/- 0.37 ppm for 24 hours) when an ESI is added.

- ESIs are not installed in any RFT. Software does not permit an ESI at the RFT, and slot 21 is normally used for an integrated remote test unit (IRTU), NT4K57.
- ESI equipment is required in any FCOT that distributes timing to external equipment.

For more information on methods of synchronization and ESI functionality, see NTPs throughout *Description*, Volume 2.



### CAUTION

#### Risk of traffic outage

Formation of a timing loop may cause a traffic outage. When you provision timing sources, make sure that a timing loop is not formed. See the Network Synchronization chapter in *Configuration and Equipment Description*, 323-3001-100, in *Description*, Volume 2A, for advice about avoiding timing loops.

---

**Default settings**

When you power up a new system equipped with ESI equipment, the settings for shelf timing and ESI are as follows:

|  |                                |
|--|--------------------------------|
| Network element clock source                     | freerun                        |
| BITSA  | in service                     |
| BITSB  | in service                     |
| Input timing reference source 1                  | BITSA                          |
| Input timing reference source 2                  | BITSB                          |
| ESI target clock mode                            | normal                         |
| ESI timing reference line-coding format          | B8ZS                           |
| ESI timing reference frame format                | superframe (SF)                |
| DS1 output timing reference line-coding format   | B8ZS                           |
| DS1 output timing reference frame format         | superframe (SF)                |
| G1OUT  | in service                     |
| G2OUT  | in service                     |
| ESI timing distribution source                   | OCA for G1OUT<br>OCB for G2OUT |
| DS1 output timing reference line build-out (LBO) | short                          |

## Procedure 15-1 Installing ESI equipment

---

Use this procedure to install the external synchronization interface (ESI) carrier and circuit packs in an access-bandwidth manager (ABM) or a transport-bandwidth manager (TBM) shelf at a fiber central office terminal (FCOT). This procedure also describes how to install the ESI cable, which is required if the node is to be timed from an external source, or if the node is to distribute timing to external equipment.

**Note:** Leave ESI facilities out of service at the end of the procedure.

ESI equipment operates in a 1+1 protection mode. If your installation does not include the second ESI unit, you must install the single unit in the upper position in the ESI carrier. In this case, disregard those steps that refer to the standby ESI (ESI equipment group g2).

### Requirements

This procedure requires the AccessNode network element to be out of service.

The following equipment and materials are required:

- one ESI carrier circuit pack, NT7E19
- one or two ESI cards, NT7E27
- one ESI cable (if ESI facilities are being added), NT4K86EA/B/C/D/E
- a Site Test Results form
- a VT100-compatible terminal connected to the network element

You must know how to log in to the operations controller (OPC) and the network element user interfaces and how to open and close OPC tools (see *Network Element User Interface Description*, 323-3001-300, and *OPC User Interface Description*, 323-3001-301, in *Operations, Administration, and Provisioning*, Volume 4A).



#### **DANGER**

#### **Risk of injury or damage**

Read “Warnings and safety precautions” in “About this document” to minimize any risk to personnel and equipment.

—continued—

---

 Procedure 15-1 (continued)  
**Installing ESI equipment**


---

**Note:** You must install the ESI units at least 4 hours before you run any tests. This ensures the stability of the tests by giving ESI timing components a chance to adjust to ambient environmental conditions.

## Action

| Step  | Action   |                          |            |                                 |                     |   |              |
|---|--|--------------------------|------------|---------------------------------|---------------------|---|--------------|
| 1   | Proceed according to the need for the ESI cable and facilities: <table border="1" style="margin-left: 20px;"> <thead> <tr> <th style="text-align: left;">If you are adding ESI to</th> <th style="text-align: left;">Then go to</th> </tr> </thead> <tbody> <tr> <td>improve holdover stability only</td> <td>step 5 on page 15-9</td> </tr> <tr> <td>use an external timing source or to distribute timing to external equipment</td> <td>step 2 below</td> </tr> </tbody> </table> | If you are adding ESI to | Then go to | improve holdover stability only | step 5 on page 15-9 | use an external timing source or to distribute timing to external equipment | step 2 below |
| If you are adding ESI to  | Then go to   |                          |            |                                 |                     |   |              |
| improve holdover stability only   | step 5 on page 15-9  |                          |            |                                 |                     |   |              |
| use an external timing source or to distribute timing to external equipment | step 2 below   |                          |            |                                 |                     |   |              |
| 2   | Install the NT7E86 ESI interface cable. Connect one end of the cable to the 25-pin external synchronization connector on the side interconnect to the left of the common-equipment shelf.<br>Use connector J12 in an ABM shelf, as shown in Figure 15-1 on page 15-6, or use connector J13 in a TBM shelf, as shown in Figure 15-2 on page 15-7.   |                          |            |                                 |                     |   |              |
| 3   | If you are routing cable along the frame upright, secure the cable to the frame with cable ties.   |                          |            |                                 |                     |   |              |

—continued—

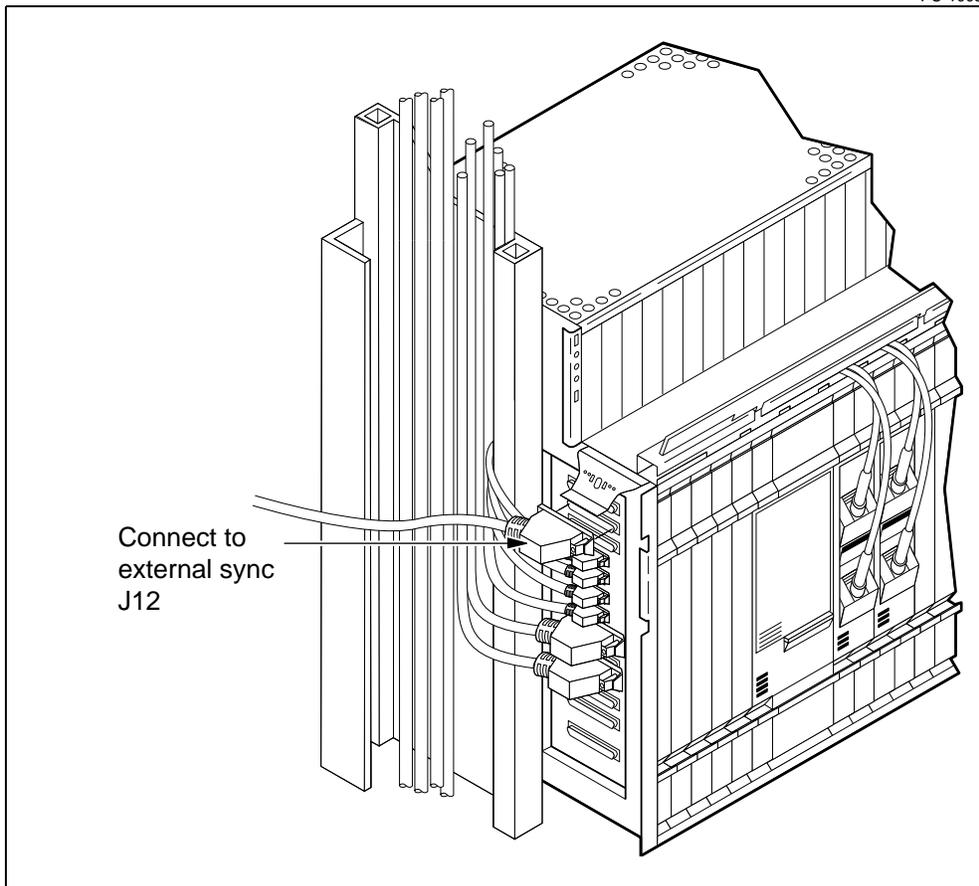
## 15-6 Adding ESI cards

### Procedure 15-1 (continued) Installing ESI equipment

| Step | Action |
|------|--------|
|------|--------|

**Figure 15-1**  
**Connecting the external synchronization cable in an ABM shelf**

PC-10056



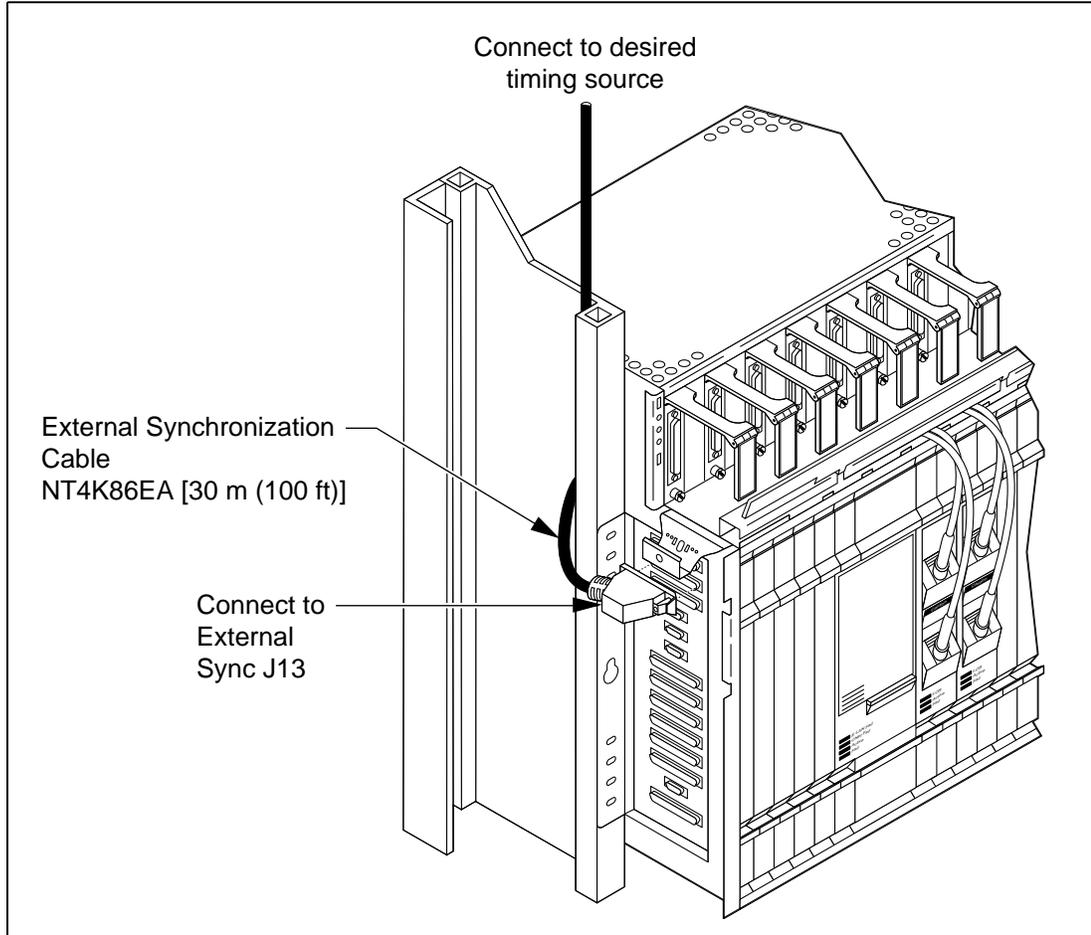
—continued—

Procedure 15-1 (continued)  
Installing ESI equipment

Step Action

Figure 15-2  
Connecting the external synchronization cable in a TBM shelf

PC-1846



—continued—

**15-8** Adding ESI cards

Procedure 15-1 (continued)  
**Installing ESI equipment**

- | Step | Action  |
|------|---|
| 4    | Connect the nonconnectorized end of the cable to the external equipment (either to a building integrated timing source [BITS] or to other equipment receiving timing from this node).<br><br>See the cable color codes and assignments in Table 15-1. |

**Table 15-1**  
**External synchronization wiring table (NT4K86EA cable)**

| Pin | Function                        | Color         | Pin | Function                         | Color         |
|-----|---------------------------------|---------------|-----|----------------------------------|---------------|
| 1   | BITSA (Tip)                     | W/BL          | 14  | BITSA (Ring)                     | BL/W          |
| 2   | frame ground                    | —             | 15  | frame ground                     | —             |
| 3   | BITSB (Tip)                     | W/O           | 16  | BITSB (Ring)                     | O/W           |
| 4   | frame ground                    | —             | 17  | frame ground                     | —             |
| 5   | G1OUT (Tip),<br>top ESI unit    | W/G           | 18  | G1OUT (Ring),<br>top ESI unit    | G/W           |
| 6   | frame ground                    | —             | 19  | frame ground                     | —             |
| 7   | G2OUT (Tip),<br>bottom ESI unit | W/BR          | 20  | G2OUT (Ring),<br>bottom ESI unit | BR/W          |
| 8   | frame ground                    | —             | 21  | frame ground                     | —             |
| 9   | future                          | not connected | 22  | future                           | not connected |
| 10  | frame ground                    | —             | 23  | frame ground                     | —             |
| 11  | future                          | not connected | 24  | future                           | not connected |
| 12  | frame ground                    | —             | 25  | frame ground                     | —             |
| 13  | spare                           | not connected |     |                                  |               |

—continued—

---

 Procedure 15-1 (continued)  
**Installing ESI equipment**


---

- | Step | Action  |
|------|---|
| 5    | Log in to the network element user interface.<br><i>The Network Element Status screen appears.</i>  |
| 6    | During installation of the ESI equipment, set the shelf clock timing source to freerun by entering:<br><b>eq sh; edit ↵</b><br><i>The Edit menu of the Shelf Equipment screen appears.</i><br>Enter:<br><b>clocksrc freerun ↵</b><br><b>yes ↵</b><br><i>The Clock Source field value is set to Freerun.</i> |
| 7    | Log in to the OPC user interface.<br><i>The User Session Manager window appears.</i>  |
| 8    | Move to the Alarm Monitor tool, then press <b>Ctrl_A</b> (or Keypad <b>0</b> ).<br><i>The Alarm Monitor tool opens.</i><br><br>Use the Alarm Monitor tool to observe the alarms generated as the ESI circuit packs are installed in the shelf.  |
| 9    | To protect the circuit packs from damage, put on an antistatic wrist strap and connect the cord to the electrostatic discharge (ESD) jack on the local craft access panel (LCAP).   |

**CAUTION****Risk of damaging circuit packs**

Avoid touching any components on the printed circuit board. Electrostatic discharge can damage electrostatic-sensitive devices. Always ground yourself before handling the circuit pack.

—continued—

## 15-10 Adding ESI cards

### Procedure 15-1 (continued) Installing ESI equipment

| Step | Action |
|------|--------|
|------|--------|

**10** Install the NT7E19 external synchronization carrier, as follows:

- a. With its latches in the open position, push the external synchronization carrier all the way into its slot.

| If the shelf is                | Then the ESI card goes into slot |
|--------------------------------|----------------------------------|
| an ABM shelf                   | 21                               |
| a TBM shelf in an FCOT_BLSR NE | 19                               |
| a TBM shelf in a TN_BLSR NE    | 23                               |

- b. Lock the external synchronization carrier by pressing the bottom latch downward and the top latch upward until the latches are horizontal and you feel each latch click or lock in position. Figure 15-3 on page 15-11, shows latch 2 in place and latch 1 in the locking movement.

**11** Pull back the hinged external synchronization carrier designation label and fully insert the first NT7E27 ESI card into the upper carrier position.

*Expected alarms are:*

- Timing reference interface fail
- BITSA Loss of signal
- BITSB Loss of signal

*The ESI card G1 self-tests and requests a software load. The ESI facilities BITSA, BITSB, and G1OUT are created and provisioned with default values.*

**12** If a second ESI card is provided, wait 10 seconds and insert the second ESI card into the lower carrier position.

*The following alarm is added to the alarm list:*

ESI G2 TAIS

*The ESI card G2 self-tests and requests a software load. The ESI facility G2OUT is created and provisioned with default values.*

**13** If a red LED lights on a card, the ESI card may have failed. See *Module Replacement Procedures, 323-3001-547*, in *Maintenance, Volume 5C* for the procedure on checking and possibly replacing a troubled ESI card.

**14** Lock each ESI card in place. Using a flat-head (slotted) screwdriver, turn the locking screw on the faceplate of each ESI card clockwise 45°.

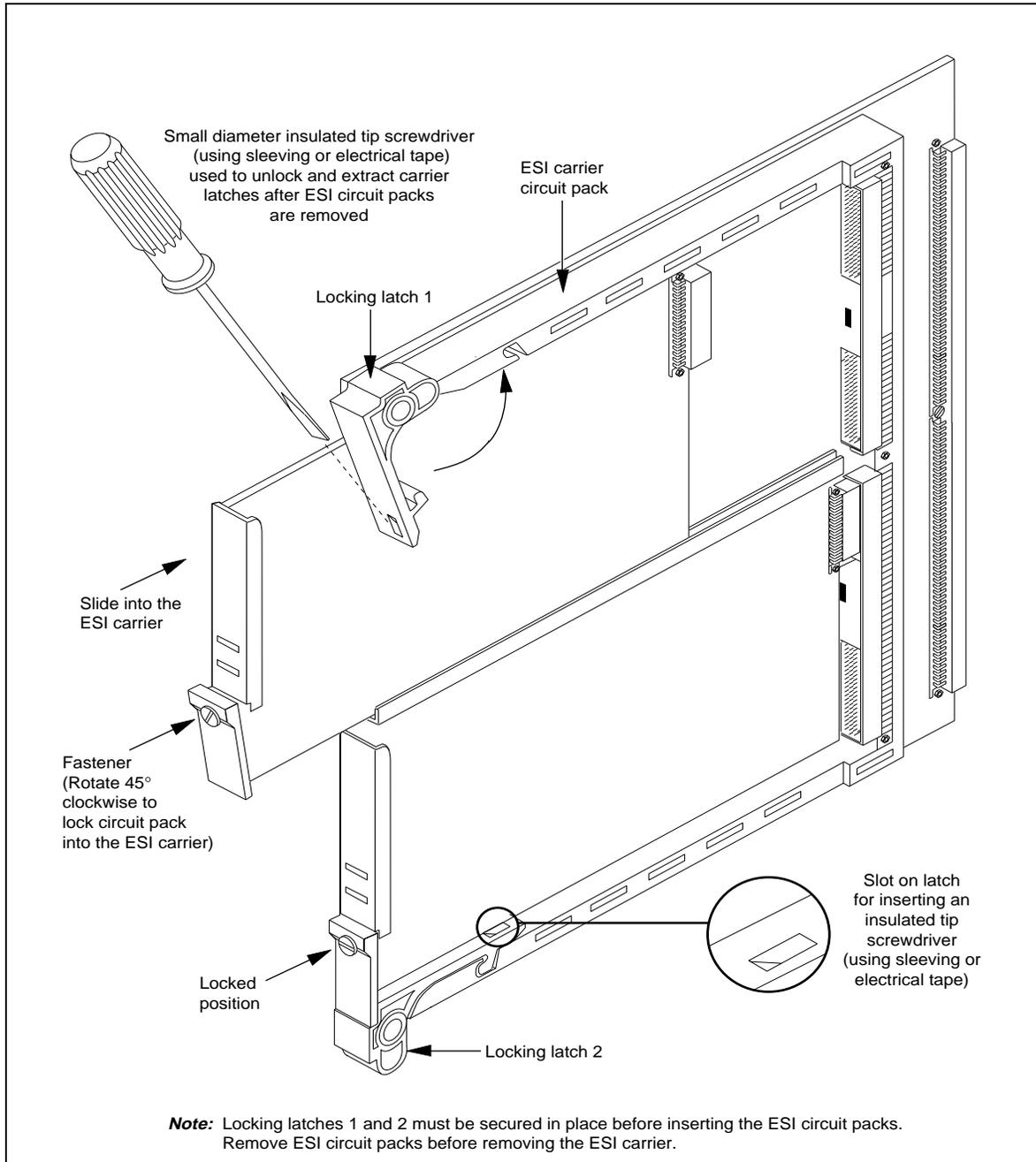
—continued—

Procedure 15-1 (continued)  
**Installing ESI equipment**

**Step Action**

**Figure 15-3**  
**ESI carrier installation**

PC-1972



—continued—

## 15-12 Adding ESI cards

---

### Procedure 15-1 (continued) Installing ESI equipment

---

| Step | Action   |
|------|--|
| 15   | <p>At the network element user interface, verify that the ESI equipment is recognized by entering:</p> <pre>eq esi &lt;circuit pack group&gt; ↵</pre> <p>where</p> <p>&lt;circuit pack group&gt; is <b>g1</b> or <b>g2</b></p> <p><i>An ESI Equipment screen appears.</i></p>  |
| 16   | <p>Verify that each ESI unit is autoprovioned. The state of the units should be IS (in service). One unit should have a status of Active. The second unit, if present, should have a status of Standby.</p> <p>If an ESI unit did not autoprovion properly, reseal the unit. If it still does not autoprovion, replace it.</p> |
| 17   | <p>Place the ESI equipment in Freerun mode during setup by entering:</p> <pre>edittarg freerun ↵</pre> <p><i>The target timing mode changes to Freerun. The current timing mode changes to Freerun shortly afterward.</i></p> <p><b>Note:</b> Changing the timing mode in one ESI group (G1 or G2) changes both units.</p>     |
| 18   | <p>To suppress unwanted alarms, place ESI facilities out of service until they are needed by entering:</p> <pre>fa esi &lt;unit&gt; ↵ chgstate oos ↵ yes ↵</pre> <p>where</p> <p>&lt;unit&gt; <b>bitsa, bitsb, g1out, g2out</b></p> <p>Repeat this step for each ESI facility.</p> <p>—end—</p>                                |

## Procedure 15-2

### Testing ESI clock mode

---

Use this procedure to verify external synchronization interface (ESI) clock modes and to set the ESI target clock mode to normal. This procedure verifies that the ESI current clock mode progresses properly (from normal to holdover to normal) when timing sources fail and are then restored.

#### Requirements

Before starting this procedure, you must:

- ensure that the shelf clock source is set to freerun as instructed in step 6 on page 15-9
- log on to the network element user interface and be at the main menu
- know how to use the VT100-type network element user interface (see *Network Element User Interface Description*, 323-3001-300, in *Operations, Administration, and Provisioning*, Volume 4A)

#### Action

| Step | Action   |
|------|--|
| 1    | <p><b>Note:</b> Follow steps 1 through 4 to verify that the ESI equipment will automatically enter holdover clock mode if all timing sources become unavailable.</p> <p>Access the Edit Reference Protection screen, by entering:<br/> <b>pr; trefprot</b> ↵<br/> <b>edit</b> ↵</p> <p>Note the value in the level field for each timing source, then defeat each available timing source by entering:<br/> <b>qlevel &lt;#&gt; dus</b> ↵</p> <p>where</p> <p>&lt;#&gt;      reference number of the timing source</p> |

—continued—

Procedure 15-2 (continued)

**Testing ESI clock mode**

---

| <b>Step</b> | <b>Action</b>   |
|-------------|---|
| 2           | <p>Access the ESI equipment screen and determine if the current timing mode is holdover or freerun by entering:</p> <p><b>eq esi &lt;circuit pack group&gt; ↵</b></p> <p>where</p> <p>&lt;circuit pack group&gt;   <b>g1 or g2</b></p> <p><b>Note:</b> ESI enters Holdover after a failure if the timing mode was Fast or Normal immediately before the failure. ESI enters Freerun after a failure if the timing mode was Freerun or Acquire immediately before the failure.</p> |
| 3           | <p>Access the Edit Reference Protection screen by entering:</p> <p><b>trfprot ↵</b><br/><b>edit ↵</b></p> <p>Restore each of the timing sources by entering:</p> <p><b>qlevel &lt;#&gt; &lt;level&gt;↵</b></p> <p>where</p> <p>&lt;#&gt;                      reference number of the timing source</p> <p>&lt;level&gt;                  original quality level</p> <p><i>The first source that you restore becomes the active source.</i></p>                                   |
| 4           | <p>Access the ESI equipment screen and verify that the current timing mode is once again Normal by entering:</p> <p><b>eq esi &lt;circuit pack group&gt; ↵</b></p> <p>where</p> <p>&lt;circuit pack group&gt;   <b>g1 or g2</b></p> <p><b>Note:</b> The current timing mode might go through the Acquire and Fast states before reaching the Normal state.</p>  |

—continued—

---

Procedure 15-2 (continued)  
**Testing ESI clock mode**

---

- | <b>Step</b> | <b>Action</b>  |
|-------------|--|
| <b>5</b>    | <p>Manually change the target timing mode of the currently selected ESI unit to Holdover by entering:</p> <pre>eq esi &lt;circuit pack group&gt; ↵<br/>edittarg holdover ↵</pre> <p>where</p> <p>&lt;circuit pack group&gt;   <b>g1</b> or <b>g2</b></p> <p><i>The target timing mode of both ESI units changes to Holdover.</i></p> <p><b>Note:</b> In Holdover mode, the ESI unit uses the last known source to maintain the phase and frequency of the shelf timing signal. This mode is valid for up to 24 hours. Manually placing the ESI units in Holdover mode has the same effect as removing the ESI timing sources or a failure in the local building-integrated timing supply (BITS).</p> |
| <b>6</b>    | <p>Verify that the target timing mode and current timing mode of the ESI units change from Normal to Holdover.</p>   |
| <b>7</b>    | <p>Verify that no automatic switches are pending by entering:</p> <pre>trefprot ↵</pre> <p><i>The Reference Protection screen displays a dot (.) in the AutoSw column for all timing references.</i></p>   |
| <b>8</b>    | <p>Provision ESI clock mode to Normal. See <i>Operations and Provisioning Procedures</i>, 323-3001-310, in <i>Operations, Administration, and Provisioning</i>, Volume 4B, as necessary.</p>   |
| <b>9</b>    | <p>Record the completion of this procedure on the Site Test Results Form.</p>  |

—end—

## Procedure 15-3

# Verifying protection switching of timing references

---

Use this procedure to test protection switching between timing references. This procedure test automatic, manual, and forced protection switching.

### Requirements

Before starting this procedure, you must do the following:

- make sure the shelf clock source is set to freerun and a lockout on optical protection switching is operated (see the instructions on page 15-9)
- provision the priority and quality of the timing references
- log on to the network element user interface and be at the main menu
- know how to use the VT100-type network element user interface (see *Network Element User Interface Description, 323-3001-300, in Operations, Administration, and Provisioning, Volume 4A*)

### Action

---

| Step | Action |
|------|--------|
|------|--------|

---

Steps 1 through 6 test automatic protection switching among timing sources. External synchronization interface (ESI) equipment can receive up to 4 timing sources: 2 external timing sources and 2 line timing sources.

**Note 1:** The external timing sources are designated BITSA and BITSB.

**Note 2:** The line timing sources are designated by the names of the circuit-pack groups that handle the signals from which the timing derives; for example, G1 and G2.

To test automatic protection switching among timing sources, you must defeat the timing sources, one at a time. You must always defeat the active timing source.

- 1 Access the Reference Protection screen by entering:  
**pr; trefprot ↵**

*The Reference Protection screen appears.*

—continued—

Procedure 15-3 (continued)  
**Verifying protection switching of timing references**

- | Step                      | Action  |    |            |                       |        |                           |        |
|---------------------------|---|----|------------|-----------------------|--------|---------------------------|--------|
| 2                         | <p>Access the Edit Reference Protection screen by entering:<br/> <b>edit ↵</b></p> <p>Record the value in the level field for the active timing source, then defeat the active timing source by entering:<br/> <b>qlevel &lt;#&gt; DUS ↵</b></p> <p style="padding-left: 40px;">where</p> <p style="padding-left: 80px;"><b>&lt;#&gt;</b>      reference number of the currently active timing source</p>   |    |            |                       |        |                           |        |
| 3                         | <p>Verify that an automatic protection switch has occurred, causing the highest-quality alternative timing source to become the active source.</p> <p>Is the currently active timing source the last timing source that you have not defeated?</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">If</th> <th style="text-align: left;">Then go to</th> </tr> </thead> <tbody> <tr> <td>it is the last source</td> <td>step 4</td> </tr> <tr> <td>it is not the last source</td> <td>step 2</td> </tr> </tbody> </table>   | If | Then go to | it is the last source | step 4 | it is not the last source | step 2 |
| If                        | Then go to  |    |            |                       |        |                           |        |
| it is the last source     | step 4  |    |            |                       |        |                           |        |
| it is not the last source | step 2  |    |            |                       |        |                           |        |
| 4                         | <p>On the Edit Reference Protection screen, restore the highest-quality source that you have defeated by entering:<br/> <b>qlevel &lt;#&gt; &lt;level&gt;↵</b></p> <p style="padding-left: 40px;">where</p> <p style="padding-left: 80px;"><b>&lt;#&gt;</b>      reference number of the timing source</p> <p style="padding-left: 80px;"><b>&lt;level&gt;</b>      original quality level</p> <p style="padding-left: 40px;"><i>The restored source becomes the single available alternative timing source. It does not become the active source because automatic protection switching among timing sources is nonrevertive.</i></p> <p>Verify that the restored source has become the single available alternative timing source, but has not become the active timing source.</p> |    |            |                       |        |                           |        |
| 5                         | <p>At the Edit Reference Protection screen, record the value in the level field for the active timing source, then defeat the active timing source by entering:<br/> <b>qlevel &lt;#&gt; DUS ↵</b></p> <p style="padding-left: 40px;">where</p> <p style="padding-left: 80px;"><b>&lt;#&gt;</b>      reference number of the currently active timing source</p>   |    |            |                       |        |                           |        |

—continued—

Procedure 15-3 (continued)

**Verifying protection switching of timing references**

---

| <b>Step</b> | <b>Action</b> |
|-------------|---------------|
|-------------|---------------|

---

*An automatic protection switch occurs, causing the single available alternative timing source to become the active source.*

Verify that the timing source you restored in step 4 has become the active timing source.

**6** Restore each one of the timing sources by entering:

**qllevel <#> <level>** ↵

where

<#> reference number of the timing source

<level> original quality level

*The sources become available alternative timing sources. None of the restored sources becomes the active source because automatic protection switching among timing sources is nonrevertive.*

**7** Return to the Reference Protection screen by entering:

**quit** ↵

**8** Perform a timing reference manual switch on the active timing source by entering:

**manual op <#>** ↵

**yes** ↵

where

<#> timing reference number **1, 2, 3, or 4**

*The protection switch causes the standby source to become the active source.*

**9** Perform a timing reference manual switch in the other direction by entering:

**manual op <#>** ↵

**yes** ↵

where

<#> alternative timing source to the source specified in step 8

*The protection switch causes the standby source to become the active source.*

—continued—

---

 Procedure 15-3 (continued)

**Verifying protection switching of timing references**


---

| Step | Action  |
|------|---|
| 10   | Perform a timing reference forced switch on the active timing source by entering:<br><b>forced op &lt;#&gt; ↵</b><br><b>yes ↵</b><br>where<br><#>        timing reference number <b>1,2, 3, or 4</b><br><br><i>The protection switch causes the standby source to become the active source.</i>             |
| 11   | Release the timing reference forced switch by entering:<br><b>forced re &lt;#&gt; ↵</b><br><b>yes ↵</b><br>where<br><#>        timing reference number from step 10   |
| 12   | Perform a timing reference forced switch in the other direction by entering:<br><b>forced op &lt;#&gt; ↵</b><br><b>yes ↵</b><br>where<br><#>        alternative timing source to the source specified in step 10<br><br><i>The protection switch causes the standby source to become the active source.</i> |
| 13   | Release the timing reference forced switch by entering:<br><b>forced re &lt;#&gt; ↵</b><br><b>yes ↵</b><br>where<br><#>        alternative timing source from step 9  |
| 14   | Record the completion of this procedure on the Site Test Results Form.<br><p style="text-align: center;">—end—</p>  |

## Procedure 15-4

# Verifying ESI facilities for timing distribution

---

Use this procedure to verify that outgoing external synchronization interface (ESI) facilities provide a signal suitable for synchronizing external equipment. The procedure tests the ability of the ESI units to distribute timing to an external device in either Superframe or Extended Superframe format.

### Requirements

Before starting this procedure, you must do the following:

- provision the ESI facilities for timing distribution
- have a DS1 test set and connecting cable for connecting to the ESI facility
- have a DS1 or DS3 test set and connecting cable for monitoring the continuity of tributary traffic

### Action

---

| Step | Action   |
|------|--|
| 1    | Monitor tributary traffic with a DS1 or DS3 test set.  |
| 2    | View the current ESI timing reference output settings by entering:<br><b>facility esi &lt;facility&gt;</b> ↵<br>where<br><b>&lt;facility&gt; g1out or g2out</b><br><br>Verify that the frame format is Superframe for both timing reference outputs. |
| 3    | Connect the G1 OUT signal to the Rx input of a DS1 test set. This signal is carried on pins 5 and 18 of the ESI cable attached to the External Sync port of the SIL, as shown in Table 15-1 on page 15-8.  |
| 4    | Set the DS1 test set input parameters to all-ones, SF, and B8ZS.<br>Verify that the DS1 test set synchronizes to the ESI reference output.   |

—continued—

---

 Procedure 15-4 (continued)

**Verifying ESI facilities for timing distribution**


---

| Step | Action   |
|------|--|
| 5    | <p>Change the reference output frame format to extended superframe (ESF). To do this, you must remove the facility from service by entering:</p> <p><b>chgstate oos</b> ↵<br/> <b>yes</b> ↵</p> <p><i>The DS1 test set detects DS1 alarm indication signal (AIS).</i></p> <p><b>Note:</b> When the optical source supplied to OCA or OCB disappears, such as when an optics card fails, unframed AIS is inserted on the ESI outgoing facility. This occurs when source tracking on the ESI outgoing facility is off. However, if source tracking is set to Best or Act, then AIS might not be inserted or might be inserted only briefly. For a description of tracking options, see the timing reference and synchronization procedures in <i>Provisioning and Operations Procedures</i>, 323-3001-310, in <i>Operations, Administration, and Provisioning</i>, Volume 4B.</p> <p>Now, change the reference output frame format to ESF, by entering:</p> <p><b>edit</b> ↵<br/> <b>framefmt</b> ↵</p> <p><b>Note:</b> The framefmt command toggles between superframe and ESF.</p> <p>Exit the edit screen by entering:</p> <p><b>quit</b> ↵</p> |
| 6    | <p>Place the reference output facility back in service (IS) by entering:</p> <p><b>chgstate is</b> ↵<br/> <b>yes</b> ↵</p>   |
| 7    | <p>On the DS1 test set, change the frame format to ESF for the Rx input connected.</p> <p><i>The DS1 test set synchronizes to this reference output.</i></p> <p>Verify that none of the preceding steps affect traffic or generate unexpected alarms.</p>  |
| 8    | <p>To return the reference output facility frame format to Superframe, if that is the desired operational mode, repeat steps 5 and 6.</p>  |
| 9    | <p>Disconnect the test set and reconnect the G1OUT signal to its normal termination.</p>   |
| 10   | <p>Repeat this procedure for ESI facility G2 OUT, if it is equipped.</p>   |

—end—

## Procedure 15-5

# Verifying ESI equipment protection

Use this procedure to verify that the standby external synchronization interface (ESI) circuit pack automatically takes over when the active ESI circuit pack fails. Forced and manual switching and lockout are also tested. Perform this procedure only if two ESI circuit packs are equipped on the shelf.

### Requirements

Before starting this procedure, you must do the following:

- complete Procedure 15-1, “Installing ESI equipment”
- make sure a DS1 test set is available for monitoring performance
- log in to the network element user interface and be at the main menu
- know how to use the VT100-type network element user interface (see *Network Element User Interface Description*, 323-3001-300, in *Operations, Administration, and Provisioning*, Volume 4A)

### Action

| Step | Action  |
|------|---|
| 1    | Display the ESI Protection screen by entering:<br><b>pr; dtlprot esi</b> ↵<br><i>The ESI Protection screen appears.</i>   |
| 2    | Look at the ESI cards to see if the active LED on ESI G1 card is On. Look at the ESI protection screen to see whether ESI G1 or G2 is the active unit, then complete the instructions in the following table: |

| If the active unit is | Then  |
|-----------------------|---|
| G2                    | Operate a manual switch on ESI G2 by entering<br><b>manual op g2</b> ↵<br><b>yes</b> ↵<br><i>The active LED on the ESI G1 card is On.</i><br><i>The ESI Protection screen indicates that G1 is now active and G2 is on standby.</i> |

—continued—

Procedure 15-5 (continued)  
**Verifying ESI equipment protection**

**Step Action**

| If the active unit is | Then   |
|-----------------------|--|
| G1                    | Operate a manual switch on ESI G1 by entering <b>manual op g1</b> ↵<br><b>yes</b> ↵<br><i>The active LED on the ESI G2 card is On.</i><br><i>The ESI Protection screen indicates that G2 is now active and G1 is on standby.</i><br><b>Note:</b> The manual switch is nonrevertive and does not need to be released. |

- 3** Operate a forced switch by entering:  
**forced op g2** ↵  
**yes** ↵  
*The active LED on the ESI G1 card is ON.*  
*The ESI Protection screen indicates that G1 is now active and G2 is on standby. There screen displays an asterisk (\*) under the Forced switch field for the G2 unit.*
- 4** Operate a lockout on the ESI G1 unit by entering:  
**lockout op g1** ↵  
**yes** ↵  
*The active LED on the ESI G1 card remains On.*  
*The ESI Protection screen indicates that G1 is still active, an asterisk (\*) appears under the Lckt switch field for G1, and a request (R) replaces the asterisk (\*) in the Forced switch field for G2.*
- 5** Release the lockout by entering:  
**lockout re g1** ↵  
**yes** ↵  
*The active LED on the ESI G1 card remains On.*  
*The ESI Protection screen indicates that G1 is still active, replaces the asterisk (\*) under the Lckt switch field for G1 with a period (.), and replaces the request (R) in the Forced switch field with an asterisk (\*) for G2.*
- 6** Release the forced switch by entering:  
**forced re g2** ↵  
**yes** ↵  
*The active LED on the ESI G1 card remains On.*  
*The ESI Protection screen indicates that G1 remains active and G2 is on standby. A period replaces the asterisk (\*) in the Forced switch field for G2.*  
**Note:** The Forced switch is nonrevertive, but it does need to be released.

—continued—

**Verifying ESI equipment protection**

---

**Step Action**

---

- 7 To protect the circuit packs from damage, put on an antistatic wrist strap and connect the cord to the electrostatic discharge (ESD) jack on the local craft access panel on top of the OC-3/OC-12 TBM shelf.



**CAUTION**

**Risk of damaging circuit packs**

Avoid touching any components on the printed circuit board. Electrostatic discharge can damage electrostatic-sensitive devices. Always ground yourself before handling the circuit pack.

- 8 Using a slotted screwdriver, unlock the locking screw of the ESI G1 unit by turning the screw counterclockwise 45°.

Disengage the unit from the backplane connector.

*The ESI Protection screen displays an asterisk (\*) under the AutoSw field for the ESI G1 unit, and the G2 unit is now active. The active LED on the ESI G2 unit is On.*

- 9 Reengage the ESI G1 unit and lock it in place by turning the locking screw clockwise 45°.

*The ESI Protection screen indicates that G2 remains active and G1 is on standby. A period replaces the asterisk in the AutoSw switch field for G2.*

- 10 Repeat steps 8 and 9 to switch automatically from ESI unit G2 to ESI unit G1.

- 11 Ensure that the network element is error-free, then remove the antistatic wrist strap.

—end—

---

## Adding a new GR-303 MVI host switch

---

In an existing AccessNode system, adding a new GR-303 MVI host switch requires coordination at both ends to successfully implement traffic and control connections.

### Chapter task list

This chapter includes the following procedure. If you cannot successfully complete the procedure, contact your next level of support.

| Procedure | Task   | See       |
|-----------|--|-----------|
| 16-1      | Verifying connections at the RFT and the host switch | page 16-2 |

---

## Procedure 16-1

# Verifying connections at the RFT and the host switch

---

References to other procedures aid in provisioning and testing the AccessNode remote fiber terminal (RFT) end. Refer to switch documentation for provisioning (datafill) and testing at the switch user interface. Following this procedure, samples of Digital Multiplex System (DMS) SuperNode provisioning are given.

### Requirements

The following operating conditions are prerequisites to this procedure:

- both host switch and RFT are in service
- the RFT is alarm free
- the transport interface cards (TICs) are in service at the RFT

### Action

| Step | Action   |
|------|--|
| 1    | Identify the GR-303 MVI host switch by adding it to RFT data, using the operations controller (OPC) Host Provisioning Manager tool.  |
| 2    | Add DS1 facilities for switched traffic and for control channels: embedded operations channels (EOCs) and timeslot management channels (TMCs).   |
| 3    | Assign DS1 facilities to host switches, using OPC Connection services.   |
| 4    | Provision DS1 facility datafill at both ends, using matching transmission parameter values.  |
| 5    | Provision matching link access protocol–D channel (LAPD) link datafill at both ends for EOCs and TMCs. (Refer to <i>Provisioning and Operations Procedures</i> , 323-3001-310, in <i>Operations, Administration, and Provisioning</i> , Volume 4B for information on steps 1 through 5.)   |
| 6    | Cross-connect DS1 facilities between the RFT and the host switch.  |
| 7    | If required, use the MVIPROV CI tool to change the following assignments to RFT slots (refer to <i>Line Card Provisioning Procedures</i> , 323-3001-315, in <i>Operations, Administration, and Provisioning</i> , Volume 4B): <ul style="list-style-type: none"> <li>• call reference values (CRVs)</li> <li>• MVIPOTS, MVICOIN, MVIMPY, or MVIUVG services</li> </ul> <p><b>Note:</b> You may also provision the host switch using TL1 commands (refer to <i>Provisioning GR-303 services using TL1 commands</i>, in <i>TL1 Interface Description</i>, 323-3001-190).</p> |
| 8    | Provision line card services at the local digital switch. (Refer to switch documentation for service provisioning required at the GR-303 MVI switch.)  |

—continued—

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Procedure 16-1 (continued)

**Verifying connections at the RFT and the host switch**

---

| <b>Step</b> | <b>Action</b>   |
|-------------|---|
| <b>9</b>    | Connect phones and verify dial tone. Place a call from the RFT to another line.<br>If dial tone is not present, verify the following: <ul style="list-style-type: none"><li>• ensure datafill in the AccessNode matches datafill in the switch</li><li>• verify all connections are properly terminated</li></ul>   |
| <b>10</b>   | Verify path protection switching of EOC and TMC channels, initiated first from the RFT, then from the host switch. (For manual switching from the RFT, refer to <i>Protection Switching Procedures</i> , 323-3001-311, in <i>Operations, Administration, and Provisioning</i> , Volume 4B. Refer to switch documentation for procedures at the switch end.) |
| <b>11</b>   | Ensure call processing works over the second TMC, by listening for dial tone and placing a call to another line.  |
| <b>12</b>   | Provision a GR-303 MVI service line card to report events as alarms (instead of logs). (Refer to <i>Line Card Provisioning Procedures</i> , 323-3001-315, in <i>Operations, Administration, and Provisioning</i> , Volume 4B.)  |
| <b>13</b>   | Create an alarm by pulling the line card.   |
| <b>14</b>   | Check the OPC alarm monitor, then verify that the alarm is reported to its host switch. (For instructions on using the OPC alarm monitor, refer to <i>Network Surveillance Procedures</i> , 323-3001-510, in <i>Maintenance</i> , Volume 5C.)   |
| <b>15</b>   | Reinsert the line card. Verify that alarms clear.   |
| <b>16</b>   | Reprovision the line card to report events as logs, if desired. (Refer to <i>Line Card Provisioning Procedures</i> , 323-3001-315, in <i>Operations, Administration, and Provisioning</i> , Volume 4B.)   |
| <b>17</b>   | Perform the line card diagnostic test from the #5ESS. (Refer to switch documentation for the procedure.)  |
| <b>18</b>   | Select the RFT interface used for line and loop testing. (Refer to <i>Commissioning and Testing</i> , Volume 3.)  |
| <b>19</b>   | If the test bypass pair is used for testing, perform the bypass pair diode protocol test from the #5ESS. (Refer to switch documentation for the procedure.)   |

—end—

**Examples of GR-303 MVI provisioning for DMS SuperNode**

GR-303 MVI services are provisioned in the same way as GR-303 DMS services. A few examples follow.

In the RDT inventory table RDTINV, define the network element as **gentmc** (generic TMC) instead of **rft**. For example:

For GR-303 MVI:

```
ne35 1 0 35 sma 1 35 ne35 $ $ gentmc 2 671 n y $ (1 13) (2 14) $
n stdln s $ (network_ID 1) (system_ID 1)
(networkelement_ID 35) (equipment_ID 1) $ Y ↵
```

For GR-303 DMS:

```
ne35 1 0 34 sma 5 35 ne35 $ $ rft 1 7 1 96 y $ (1 4) (2 5) $
n stdln s $ (network_ID 1) (system_ID 1)
(networkelement_ID 35) (equipment_ID 1) $ ↵
```

Use the line inventory table LNINV to associate an RDTLSG service with the call reference value (CRV). In the following example, CRV# 610 is filled in the shelf and slot number fields, as 6 10:

```
add ne35 1 0 6 10 rdtlsg stdln hasu n nl n nil ↵
```

The entered data is displayed in the LNINV table as follows:

| LEN             | CARDCODE | PADGRP | STATUS  | GND | BNV | MNO | CARDINFO |
|-----------------|----------|--------|---------|-----|-----|-----|----------|
| MVI1 01 0 06 10 | RDTLSG   | STDLN  | WORKING | N   | NL  | N   | NIL      |

For GR-303 MVI, 06 10 in the data above refers to absolute line card # 610. For GR-303 DMS, 06 10 refers to shelf 6 slot 10.

Use the service order tool SERVORD to assign a directory number to the service. For example:

```
new $ 4351610 1fr 0 ne35 1 0 6 10 dgt $ ↵
```

---

## Appendix A: System Expansion Test Results form

---

This appendix includes a blank copy of the System Expansion Test Results form. The form is suitable for photocopying.

Record your test results on the System Expansion Test Results form.

If you have successfully completed a test where the Results column shows “pass,” insert a check mark to indicate you have completed it. Otherwise, leave it blank.

If a test does not complete successfully, please list pertinent details on a separate sheet of paper.



## AccessNode System Expansion Test Results form

Page 1 of 3

- use this form to record the test results for new equipment added to an existing system
- procedures are in *System Expansion Procedures*, 323-3001-324

System: \_\_\_\_\_ Location: \_\_\_\_\_

Tester: \_\_\_\_\_ Date: \_\_\_\_\_

| Procedure and items tested   | Pass (→) | Results |
|--|----------|---------|
| - Planning and recording mapper layouts. Refer to <i>Mapper Layouts Planning Guide</i> , 323-3001-154. |          |         |
| 2-1 Verifying DS1 transmission test set performance  |          |         |
| 2-2 Adding DS1 equipment<br>mapper slot number _____   |          |         |
| 2-3 Testing a new DS1 transport facility on an in-service DS1/VT mapper                                |          |         |
| 2-4 Testing continuity on a new DS1/VT mapper for transport DS1s                                       |          |         |
| 2-5 Testing continuity on a new DS1/VT mapper for GR-303 DMS or tandem DS1s                            |          |         |
| 2-6 Transferring an existing OPC to another shelf  |          |         |
| 2-7 Testing DS1 facilities on a DS1-fed system   |          |         |
| 3-1 Adding DS3 equipment to an existing system<br>mapper slot number _____                             |          |         |
| 3-2 Activating/deactivating a DS3 facility   |          |         |
| 3-3 Verifying DS3 transmission test set performance  |          |         |
| 3-4 Testing a new facility on an in-service DS3/STS mapper   |          |         |
| 4-1 Adding STS-1 equipment to an existing system   |          |         |
| 4-2 Activating/deactivating an STS-1 facility  |          |         |
| 4-3 Verifying STS-1 transmission test set performance  |          |         |
| 4-4 Testing a new facility on an in-service STS-1 interface card                                       |          |         |
| 5-1 Removing DS1/VT mapper equipment   |          |         |
| 5-2 Moving a DS1/VT mapper (GR-303 or DS1 tandem) and preserving the odd/even order                    |          |         |
| 6-1 Removing DS3/STS mapper equipment  |          |         |



| AccessNode System Expansion Test Results form |   | Page 2 of 3 |         |
|---|---|-------------|---------|
| Procedure and items tested                    |   | Pass (→)    | Results |
| 7-1   | Removing STS-1 tributary equipment  |             |         |
| 8-1   | Preparing to add an OC-3 tributary  |             |         |
| 8-2   | Removing existing DS1 mappers   |             |         |
| 8-3   | Removing existing DS3 mappers   |             |         |
| 8-4   | Removing existing STS-1 interface cards   |             |         |
| 8-5   | Adding an OC-3 tributary  |             |         |
| 8-6   | Upgrading an unprotected OC-3 to a protected OC-3   |             |         |
| 9-1   | Installing common-equipment circuit packs in a copper-distribution shelf  |             |         |
| 9-2   | Testing a copper-distribution shelf <ul style="list-style-type: none"> <li>• lamp test</li> <li>• verify common cards in the CDS</li> <li>• access to line card slots 24, 48, 72, and 96</li> </ul> |             |         |
| 9-3   | Diagnosing failed NLIC circuit packs  |             |         |
| 9-4   | Diagnosing failed CDSP circuit packs  |             |         |
| 9-5   | Diagnosing failed MTAC circuit packs  |             |         |
| 10-1  | Installing a new rectifier in an existing MPP cabinet<br>added rectifier number _____   |             |         |
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| 12-1  | Adding a backup OPC   |             |         |
| 13-1  | Upgrading a system from OC-3 to OC-12   |             |         |
| 14-1  | Adjusting the OMC bandwidth   |             |         |
| 14-2  | Moving an OMC link to a new DS1 facility  |             |         |



| AccessNode System Expansion Test Results form |  | Page 3 of 3 |         |
|---|--|-------------|---------|
| Procedure and items tested                    |  | Pass (➡)    | Results |
| 15-1  | Installing ESI equipment                               |             |         |
| 15-2  | Testing ESI clock mode                                 |             |         |
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| 15-5  | Verifying ESI equipment protection                     |             |         |
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| -   | Installing the shelf and cabinet covers, if applicable |             |         |



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SONET Products

## **AccessNode**

### System Expansion Procedures

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