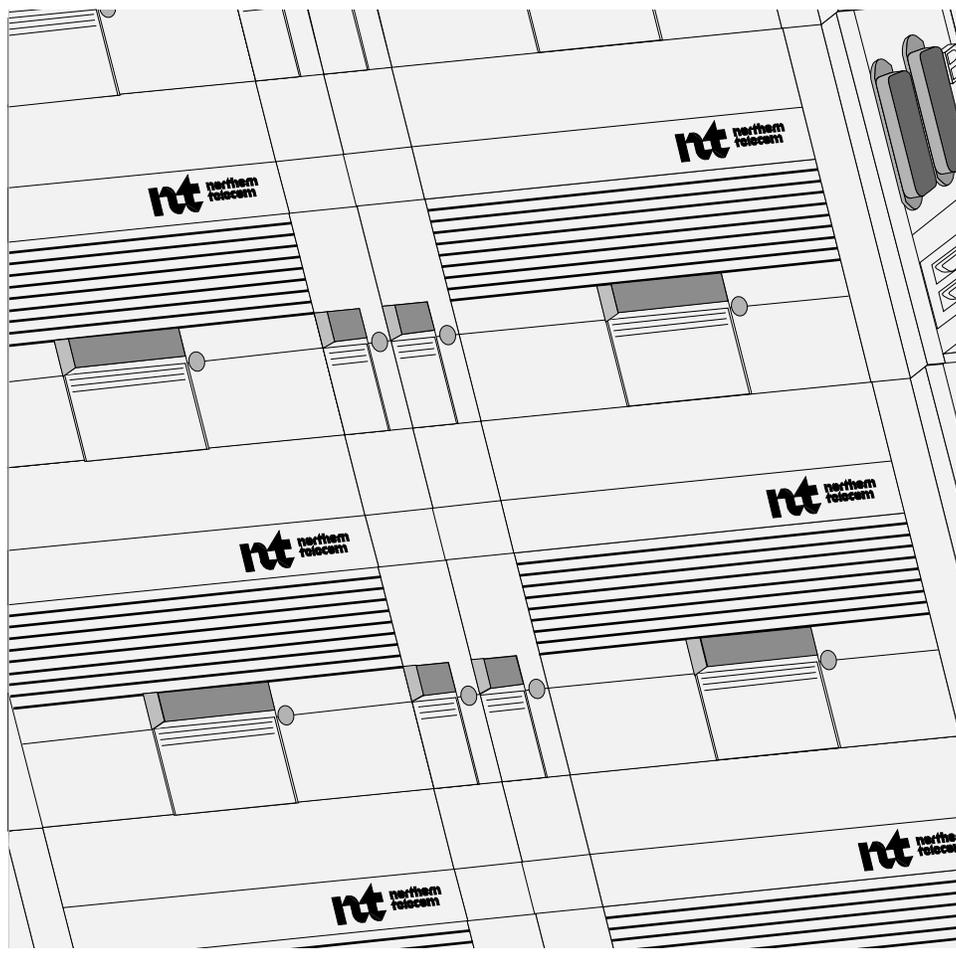SONET Products

AccessNode

Setting Up Your System: VTBM

Powering Up, Commissioning, Provisioning, and Testing

NØRTEL NETWORKS™

SONET Products

AccessNode

Setting Up Your System: VTBM

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- updated or removed all references to NT4K52FA and NT4K52GA
- added information to the "Verifying OPC serial number" procedure

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Overview of setting up a VTBM ring

Major processes in setting up a VTBM ring

There are four major processes in setting up a new virtual tributary bandwidth manager (VTBM) ring, and each major process consists of a set of procedures. The four major processes are as follows and must be performed in this order:

1 Powering up the equipment

2 Commissioning the equipment

3 Provisioning the equipment

4 Testing the equipment

The following NTPs (in *Commissioning and Testing*, Volume 3B) contain optional commissioning and testing procedures that are not required for all systems. Scan these NTPs to determine which procedures you need to meet your company's testing requirements:

• *Optional Commissioning Procedures*, 323-3001-220

• *Site Testing Procedures*, 323-3001-221

• *System Testing Procedures*, 323-3001-222

• *Line Test Interface Commissioning Procedures*, 323-3001-223

• *DS1 Feeder Testing Procedures*, 323-3001-225

Line card testing

After completing these four major processes, you need to test the line cards in the system. The procedures for testing the line cards are not in this manual. For the line card testing procedures refer to *Line Card Testing Procedures,* 323-3001-316, in *Operations, Administration, and Provisioning*, Volume 4B. For line card provisioning procedures, refer to *Line Card Provisioning Procedures*, 323-3001-315, in *Operations, Administration, and Provisioning,* Volume 4B.

Procedures in each major process

Within each of the major processes there are procedures for completing that process, and this manual is organized according to those processes. In the sections on powering up the equipment, commissioning the equipment, and

provisioning the equipment, the procedures are listed in the order in which they must be performed. In the testing process, however, specific procedures do not have to be done in any particular order, but you need to select the procedures that pertain to your situation.

Recording the results of the process

As you perform the procedures, you should record your actions on the forms provided in the appendixes of this manual so that you have a record of your actions. To help you do this, we have provided the following forms:

- System Setup Checklist
- Commissioning Data Record Form
- Synchronous transport signal (STS) Connection Information Form
- Virtual Tributary (VT) Connection Information Form
- The Site Test Results Form

Prerequisites

Before you begin setting up the new VTBM ring, you should do the following:

- Make sure the system is not in service.
- Make sure you have all the equipment you need. Equipment for commissioning is listed in the "Equipment requirements" section of this chapter.
- Plan the network element IDs (NEID) you are assigning to each NE in the system. All NEIDs must be unique within the network.
- Identify the operations controller (OPC) span of control configuration that applies to the system to be commissioned.
- Obtain the OPC user identification (userID) and password for the system line-up and test (SLAT) security level. The default userID is "slat" with password "slat".
- Have the admin security level network element (NE) logon userID and password for each NE to be commissioned. The default user ID is "admin" with password "admin."
- Install a control network cable between local NEs bridged in a single OPC span of control. A control network termination must be installed at each control network port that is not connected. Otherwise failed communications can result between the NE and OPC.
- Obtain a tape or tapes with the correct OPC and NE software loads.
- Make a copy of the Systems Setup Checklist, located in "Appendix A: Commissioning results form" on page 10-1.
- Make copies of your mapper planning worksheets from "Appendix A: Worksheets" in the *Mapper Layouts Planning Guide*, 323-3001-154, in the *Engineering, Configuration, and Ordering Guide*, Volume 1.

Planning network elements

Once an NE number is assigned during commissioning, it cannot be changed without affecting all integrated, universal, and DS1 tandem services. Therefore, it is very important for the NE numbers to be assigned according to a specific numbering plan that adheres to the following rules.

- All NEs in an OPC span of control must have unique numbers. The numbers can run from 1 to 32767.

- All NEs connecting to the same DMS-100 Supernode must have unique NE numbers.

- All NEs across the Network Manager span of control must have unique NE numbers.

- The fiber central office terminal (FCOT) and remote fiber terminal (RFT) in a system must have unique NE numbers.

You should develop a regional numbering scheme, which is larger than the OPC span of control to which the NE belongs, so as to minimize NE renumbering in the event that NEs are later transferred to another OPC span of control, or that OPC spans of control are later consolidated.

Equipment requirements

The following is a list of the equipment required to commission, provision, and test an NE. All tools should be approved for use in the equipment area.

- an operations controller module, NT7E24, placed in slots 5 to 8 of the FCOT BLSR or TN BLSR shelf

- either a VT100-compatible terminal with a 9-pin female to 9-pin male RS-232 cable and VT100 emulation software or a personal computer used as a VT100 terminal emulator. The personal computer must have an RS232 cable (25-pin D-sub miniature male to 9-pin D-sub male).

- a user terminal, Digital Equipment Corporation VT100 or equivalent, with an RS-232 cable with a 25-pin D-subminiature male connector at each end

- two blank tapes for data backup

- two control network terminator plugs

- a null modem 9-pin (male) to 25-pin (female) RS-232 cable, NT7E44

- a digital multimeter, Fluke 85 or equivalent

- an electrically safe stepladder or step stool

- a work light

- a small flat-head screwdriver

Using a laptop computer to emulate a VT100 terminal

In this document, it is assumed that a laptop computer is used to emulate the VT100 terminal. You must meet these requirements:

- Make sure the laptop is configured for use as an OPC terminal as described in *Network Element User Interface Description*, 323-3001-300, and *OPC User Interface Description*, 323-3001-301, in *Operations, Administration, and Provisioning*, Volume 4A.

- Make sure you have a null modem 9-pin (male) to 9-pin (female) RS-232 cable with the following pin connections:

OPC-to-VT100 cable		OPC-to-laptop cable	
9-pin Male (OPC)	**25-pin Female (VT100)**	**9-pin Male (OPC)**	**9-pin Female (laptop)**
1	4	1,6	4
2	2	2	3
3	3	3	2
4	5,6	4	1,6
5	7	5	5
7	8	7	8
6, 8	20	8	7

RS-232 signals

All VT100-compatible terminals used with the OPC should support the following RS-232 signals:

- CD (Carrier Detect)
- TxD (Transmit Data)
- RxD (Receive Data)
- CTS (Clear To Send)
- DSR (Data Set Ready)
- DTR (Data Terminal Ready)
- RTS (Request To Send)

Required processors

	CAUTION
⚠	**Possible loss of OA&P** You must have an NT4K52FB processor in each ABM shelf. Older processors such as NT4K52BD remain in a reboot state until you replace them and reload the AccessNode software. *Note:* If you use the DMS Access interface or DMS-X interface to APC-100, you must use the NT4K52GB processor in each ABM shelf.

Optical attenuators

Throughout this volume references are made to variable optical attenuators (VOA), miniature variable optical attenuators (mVOAs), and fixed optical attenuators. Most of the examples in this volume will show the acronym mVOA; however, if your site uses a variable optical attenuator (VOA), please substitute VOA wherever applicable in the procedures. Fixed optical attenuators are denoted in the appropriate procedures in this volume.

System shelves

There are two types of system shelves, ABM and TBM.

- 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 (CDSs). It can be installed as a fiber central office terminal (FCOT) or a remote fiber terminal (RFT).

- 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.

Processor requirements for ABM and TBM shelves

Before you begin commissioning the system, verify that you have the correct AccessNode processor card (APC) for the ABM or TBM shelf.

Table 1-1
Processor requirements

If you are commissioning this shelf	Then you must use this processor	And the system automatically loads the software with this number
ABM	NT4K52FB (64 Mb) or NT4K52GB (64 Mb for DMS Access or DMS-X interface to APC-100)	ACCL...
TBM	NT4K52BD (24 Mb)	ATBL...
Note 1: Use NT4K52FB for all applications except DMS Access. Use NT4K52GB for all applications including DMS Access and DMS-X interface to APC-100. *Note 2:* You can use the optional NT4K58LA serial I/O card in the upper part of the common equipment shelf, which allows access to the DMSTerm tool.		

Shelf functions

Five ABM and TBM shelf functions are supported on a VTBM ring:

This shelf function	Is used in these applications	For this shelf
RFT BLSR	• AccessNode rings	ABM
FCOT BLSR	• AccessNode rings terminating up to 154 DS1s	• TBM
	• AccessNode terminating DS0 at the office host	• ABM
TN BLSR	• TBM FCOT in a ring configuration that terminates up to 168 DS1s	TBM
	• TransportNode rings that have been converted to AccessNode rings. See note below.	
Note: The TN BLSR shelf function behaves like a TBM shelf. For example, for TN BLSR shelves, the ESI card is in slot 23 instead of slot 19, the DS1 protection mapper is in slot 19 instead of slot 13 and no protection bridges are required.		

Circuits

- Transport DS1s require a DS1/VT mapper at any NE where the transport DS1s are accessed at the DS1 level.
- Transport DS3s are supported in point-to-point and ring topologies and require a DS3 mapper at both the FCOT and RFT.
- Transport STS-1s are supported in TN_BLSR shelves in ring topologies. Connections between STS-1 tributaries and DS1/DS3/OC3 at the FCOT or RFT are supported, as well as other STS-1 tributaries in TN_BLSR shelves.
- DS1 tandem circuits are nonlocally switched or nonswitched 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. DS1 tandem circuits require a DS1/VT mapper at the FCOT or RFT. DS1 tandem circuits are supported in all topologies and applications.

- Digital multiplex switch (GR-303 DMS/MVI) circuits are DS0s from the RFT that exit the FCOT on DS1s and terminate on a digital switch. GR-303 DMS/MVI circuits require a DS1/VT mapper at the FCOT, but GR-303 DMS/MVI and DS1 tandem circuits can use the same mapper. These circuits terminate on line cards at the RFT. GR-303 DMS/MVI circuits are supported in all topologies and applications, except in the UDLC application. Examples are:
    - GR-303 DMS (GR-303 DMS circuits that terminate at a Nortel Networks DMS switch)
    - GR-303 MVI (GR-303 circuits meeting the multivendor interface standard)
    - TR-08 (GR-303 DMS circuits meeting the TR-08 interface standard. TR-08 circuits require a particular DS1/VT mapper unit.)
- Universal digital loop carrier (UDLC) circuits exit the FCOT at the voice frequency level and require line cards at both the FCOT and the RFT. Only point-to-point topologies support UDLC services. UDLC circuits are supported in both UDLC and combined (integrated digital loop carrier [IDLC] plus UDLC) applications.

Equipment cautions and warnings

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

Radio frequency emissions notice

The following regulatory notice applies to the equipment:

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

Static electricity

It is usual for static electrical charges to build up on the body if a person walks a short distance. This buildup of static electricity is sufficient to 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.

CAUTION
Risk of equipment damage
Wear a grounded antistatic wrist strap or equivalent protection when handling circuit packs, to avoid damaging electronic parts.

Handling circuit packs

Units that are sensitive to static electricity are marked in their antistatic shipping bags with the following symbol:

ATTENTION
OBSERVER LES PRECAUTIONS
POUR LA MANIPULATION DES
DISPOSITIFS SENSIBLES AUX
CHARGES STATIQUES

ATTENTION
OBSERVE PRECAUTIONS
FOR HANDLING
ELECTROSTATIC
SENSITIVE DEVICES

To avoid static electrical 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 wearing 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 harmlessly discharged. Alternative antistatic methods include conductive carpet, conductive shoes, or 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

When storing and transporting circuit packs, follow these rules:

- Never transport, stack, or store circuit packs without first replacing them in their antistatic material and original shipping package. This avoids physical damage and accumulation of dirt or dust on gold-plated contacts. Be careful not to damage any parts when inserting the circuit pack into its packaging.

- Avoid storage in areas where the relative humidity can exceed 95% and where the temperature can exceed 70°C, because boards can warp or corrode.

Laser radiation

The 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 upon the characteristics of the laser radiation emitted. 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**
> At all times when handling optical fibers, follow the safety procedures recommended by your company.
>
> 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 procedures carried out during testing require the handling of optical fibers without dust caps, and therefore increase the risk of exposure. Exposure to either visible or invisible laser light could cause eye damage under certain conditions.

The caution label at the right appears on the optical interface card, near the optical connector, and should be complied with.

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

During the splicing of any fiber cable, you may be required to look at the fibers using an eye loupe (a small magnifier). Take the following precautions:

- Prior to starting, power off all laser sources related to those fibers, and make sure the laser sources remain off (whether located at the central office, subscriber premises, or remote location).

- Prior to starting, disconnect any optical test sets from the fibers (whether locally or remotely connected).

- Use only the optical instruments approved by your company.

Repairing optical fibers

When there is an accidental break in the fiber feeder cable, take these steps:

- Notify both central office personnel and field repair personnel of the problem.

- Identify to central office personnel which fibers have been damaged.

- Power off all laser sources related to the damaged fibers (whether located at the central office, subscriber premises, or remote location).

Equipment warning label

The equipment label is located in the top left corner of the back cover. It reads as follows:

> 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.

Powering up the equipment

Use the procedures in this chapter to install and power up the common equipment prior to commissioning.

Procedures in powering up the equipment

To power up the equipment in preparation for commissioning, you must do the following procedures in the order in which they are listed.

Procedure	Page
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Procedure 2-1
Inspecting the network element

Use this procedure to visually inspect the network element (NE).

Note: For proper electromagnetic interference (EMI) protection, the shelf cover must be replaced after you have finished the inspection.

Action

Step	Action
1	Locate the AccessNode bay or remote cabinet.
2	Make sure the bay is not powered. Set all the breakers on the breaker interface panel (BIP) to the 0 position. *The white power light -emitting diode (LED) at the BIP is off and all circuit breakers are in the 0 (zero) position.*
3	Remove the BIP cover.
4	Is the AccessNode equipment installed at a central office and connected to the office alarm system?

If	Then
yes	go to step 5
no	go to step 6

Step	Action
5	Deactivate the visible and audible alarms by locating the type of common-equipment shelf in the bay.

If you have a	Then
TBM shelf	remove the office alarm fuses that are located elsewhere in the central office.
ABM shelf	do nothing because the alarm relay card is not installed on the BIP; therefore, no bay-level alarms can be generated.

—**continued**—

Procedure 2-1 (continued)
Inspecting the network element

Step	Action

6 Remove the remaining cover (or covers) while conducting tests.

If this is a	Then
bay configuration	remove the cover of the common-equipment shelf according to the procedure "Removing the common-equipment shelf cover" in *Routine Maintenance Procedures,* 323-3001-546, in *Maintenance,* Volume 5C.
modular business package (MBP) or modular power package (MPP)	remove the cabinet covers, pedestal grilles, and cover of the common-equipment shelf, according to the procedures "Removing the MBP cabinet covers" and "Removing the common-equipment shelf cover" in *Modular Business Package Cabinet Installation Manual*, 323-3001-206.
Series 800A outside plant cabinet	open the cabinet doors and remove the cover of the common-equipment shelf, according to the procedures "Opening the doors of the Series 800A outside plant cabinet" and "Removing the common-equipment shelf cover" in *Series 800A Outside Plant Cabinet Installation Manual*, 323-3001-210.

7 Examine all shelf backplanes (inside and outside) for warping, cracking, or bent pins. If you are inspecting an NE with an access bandwidth manager (ABM) shelf and copper-distribution shelves (CDSs), then verify that the equipment side remains disconnected from the outside plant subscriber loops (at the protection modules).

> **CAUTION**
> **Risk of equipment damage**
> During initial setup of the system, Nortel Networks recommends that the equipment side remains disconnected from the outside plant subscriber loops (at the protection modules) until the line cards are powered up. For example, when using five-pin protector modules, pull the modules out slightly, to the first detent position.

—continued—

Procedure 2-1 (continued)
Inspecting the network element

Step	Action

8 Check that all cable connections and mechanical connections are secure for each of the following:

- breaker interface panel (BIP)

- common-equipment shelf, including both the main shelf and upper shelf having the input/output (I/O) cards

- cooling unit (bay configuration), blower unit (MBP/MPP), cooling fans (Series 800A outside plant cabinet), or cable organizer panel cooling unit (COPCU on the multiple-shelf enhanced transport bandwidth manager (TBM) bay)

- local craft access panel (LCAP)

- all copper-distribution shelves (CDS) (if installed)

- air filter

- alarm leads (to office alarms, if required)

- ground connections from the AccessNode bay to the office ground system are installed according to the chapter that describes power and ground distribution, in *Site Installation Planning and Engineering*, 323-3001-200, in *Engineering, Configuration, and Ordering Guide,* Volume 1.

> **CAUTION**
> **Risk of processor reboot failure**
> Make sure the I/O cards are correctly installed to prevent processor reboot failure.

9 Finish repairs before going on to the next procedure.

10 Check off this procedure on the System Setup Checklist.

—**end**—

Procedure 2-2
Verifying power at the BIP (TBM shelf)

This procedure verifies that

- power is connected at the breaker interface panel (BIP).
- power is present at the BIP in the correct voltage and polarity.
- voltage is supplied at the two power feeds: once with the BIP circuit breakers open and again with the BIP circuit breakers closed.

This procedure is to be performed only on the first TBM in the bay, and not the second TBM in the bay (if applicable).

Requirements

The following requirements must be met before starting this procedure:

- Installation must be complete for either the −48 V dc power feeds from the central office −48 V dc battery distribution fuse bay (BDFB) or power distribution frame to the BIP at the top of the system frame.
- Make sure that power is not applied to the bay.
- Make sure there are no circuit packs in the shelf. If there are circuit packs in the shelf, they should not be inserted into the backplane connectors.

Action

Step	Action
1	Make sure all circuit breakers at the BIP are in the off (0) position and the power indicator lamp is off.
2	Locate the locking screw in the center of the front section of the BIP. Use the small flat-head screwdriver to release the locking screw by turning it counterclockwise. See Figure 2-1 on page 2-7. Swing open the hinged panel.
3	At the battery distribution fuse bay (BDFB), apply power to both A and B power feeds by inserting the fuses or switching the breakers to the on position.
4	Use the digital multimeter to measure the voltage and polarity of the A feed at the BIP power terminal block. Refer to Figure 2-1 on page 2-7. Record the result on the System Setup Checklist.

BIP Power terminal blocks	Required voltage reading
Across A− and A+	−42 to −56 V
Across B− and B+	−42 to −56 V

—continued—

Procedure 2-2 (continued)
Verifying power at the BIP (TBM shelf)

Step	Action
5	Repeat step 4 for the B feed.
6	Set the A and B circuit breakers to the on (1) position at the BIP.
7	Measure the voltage on the A feed at the BIP power terminal block. Record the result on the System Setup Checklist. *Requirement: The voltage measurement is the same, or nearly the same, as the voltage measured in step 4.*
8	Repeat step 7 for the B feed.
9	Set the A and B circuit breakers to the off (0) position at the BIP.
10	Disconnect power from the A and B feeds at the battery-distribution bay (BDFB).
11	Close the hinged panel on the BIP and reset the locking screw by turning it clockwise with the small flat-head screwdriver.
12	On the System Setup Checklist, subtract the close breaker measurement (step 7) from the open breaker measurement (step 4). Do this for each feed.
13	Check off this procedure on the System Setup Checklist.

<div align="center">

—continued—

</div>

Procedure 2-2 (continued)
Verifying power at the BIP (TBM shelf)

Step	Action

Figure 2-1
TBM BIP power feed connections

PC-10585

To BDFB
(Secure cables to
bay frame using cable ties)

Cable Tie

A+

A-

Cable Ties

B+

B+

B-

Locking
screw

To the OC-12 Shelf
A and B supplies
(Secure cables to bay
frame using cable ties)
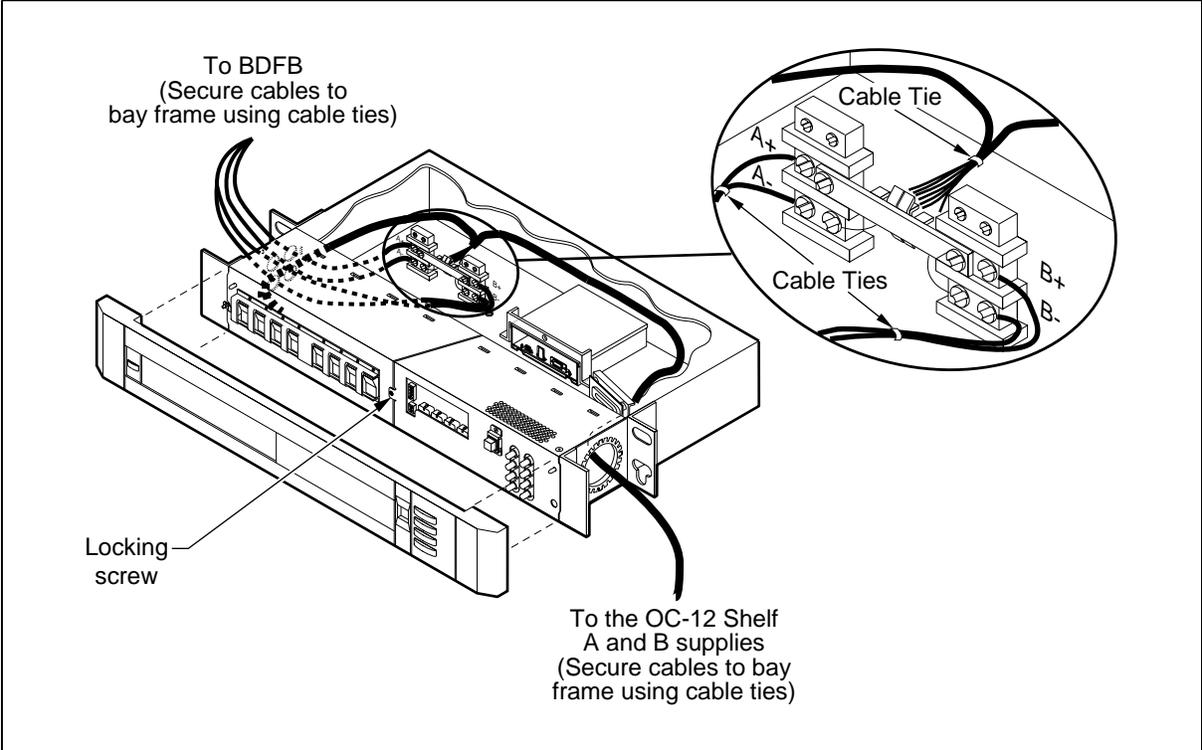
—end—

Procedure 2-3
Verifying power at the BIP (ABM shelf)

Use this procedure to:

- verify that power is connected at the BIP of an ABM shelf in a bay or an MBP arrangement.

- verify that power is present at the BIP in the correct voltage and polarity. No check of voltage is made with the BIP circuit breakers closed because access to power connections is not provided when power cables are connected.

- rewire the CDS circuit breakers on the BIP so that alarms are not generated on unused shelves.

Requirements

The following requirements must be met before starting this procedure:

- Installation must be complete for the −48 V power feeds from the central office (CO), −48 V BDFB, or power distribution frame to the BIP at the top of the system frame.

- Make sure power is not applied to the bay.

- Make sure there are no circuit packs in the shelf. If there are circuit packs in the shelf, the circuit packs should not be inserted into the backplane connectors.

- The power feeds from the dc power source to the BIP are installed.

- The circuit breaker at the dc power source (for each feed) is in the off position (or its fuse is removed). See Table 2-1 for a list of dc power sources.

Table 2-1
dc power sources

Location	dc power source
Central office	−48 V dc BFDB or power distribution frame
Customer	−48 V dc power plant (customer supplied) or optional modular power package (MPP)
Series 800A outside plant cabinet	−48 V dc power supplied by - NT5C06 rectifiers, and - NT6C14 dc distribution shelf

—continued—

Procedure 2-3 (continued)
Verifying power at the BIP (ABM shelf)

Action

Step	Action
1	Make sure all circuit breakers are in the off (0) position and the power indicator lamp at the BIP is off.
2	Apply power to only one battery/return pair (Batt1/Ret1) at the dc power source, by inserting the fuse or switching the breaker to the on position.

| 2 cont. | If this NE is powered by the NT6C14 dc distribution shelf (in a modular power package (MPP) or in an outside plant cabinet) then switch on the circuit breaker CB1 on the dc distribution shelf. Refer to the following table for the dc circuit breaker associated with each BIP feed. |

NT6C14 dc distribution shelf	BIP feed
circuit breaker CB1	Batt1/Ret1
circuit breaker CB2	Batt2/Ret2
circuit breaker CB3	Batt3/Ret3
circuit breaker CB4	Batt4/Ret4

Step	Action
3	Remove the power cable from the Batt1/Ret1 connector, at the right side of the BIP.
4	Connect a digital multimeter across the power cable connector, as shown below. Measure the voltage and polarity. Refer to the document *Modular Business Package Cabinet Installation Manual*, 323-3001-206, for wiring details.

Record the result on the System Setup Checklist.

Required voltage between Batt and Ret: −42 to −56 V dc
Required polarity: Batt (red) is negative, Ret (white) is positive

   a. At an MBP site, if correct results are not obtained, check the power cable connections at the power distribution unit (PDU) in the pedestal base of each cabinet, to make sure that the polarity is correct.

Note: To access the PDU, remove the rear pedestal cover, using the cover removal procedure in *Modular Business Package Cabinet Installation Manual,* 323-3001-206.

| **5** | Disconnect power from the battery/return pair. Open the circuit breaker or remove the fuse at the dc power source. |

—continued—

Procedure 2-3 (continued)
Verifying power at the BIP (ABM shelf)

Step	Action
6	Reinsert the power cable in to the Batt1/Ret1 connector, matching the red wire to the Batt (−) designation on the right side of the BIP, as shown in step 3.
7	Repeat steps 2 through 6 for each of the three remaining battery/return pairs.

Note: When plugging the power cable into the Batt2/Ret2 connector, match the red wire to the Batt (−) designation on the right side of the BIP, as shown for Batt1/Ret1 at step 3. When plugging the power cables into the Batt3/Ret3 and Batt4/Ret4 connectors, match the red wire to the Batt (−) designation on the left side of the BIP.

8 At the dc power source, make sure the power is disconnected from all four battery/return pairs.

If this is	Then go to
an NT4K14BA BIP in a bay that has unequipped CDSs	step 9
not an NT4K14BA BIP in a bay that has unequipped CDSs	step 17

9 Remove the breaker retaining bar between the two rows of breakers by loosening the captive screw on the right side of the bar. Swing the bar up from the right side until the left side disengages.

10 Remove the Pwr breaker associated with the unequipped shelf by lifting out of the way the retaining tabs that hold the breaker.

Use a flat-head (slotted) screwdriver to lift the tab on the bottom of the top breakers and the tab on the top of the bottom breakers.

With the retaining tabs out of the way, pull the breaker out until you gain access to the wire connectors at the back of the breaker.

11 Using a pair of electrician's insulated needle-nose pliers, transfer the connector from the 'Normally closed (alarm)' position to the 'Normally open (alarm)' position.

12 Insert the circuit breaker back into its slot until it snaps into place under the retaining tab.

13 Repeat steps 10 through 12 for the TB breaker for the same CDS.

14 Repeat steps 10 through 13 for the breakers associated with each additional unequipped CDS.

15 Replace the breaker retaining bar by hooking the left side of the bar into place and moving the right side down until the captive screw aligns with the screw hole.

16 Use a flat-head (slotted) screwdriver to fasten the captive screw on the retaining bar into place.

17 Check off this procedure on the System Setup Checklist.

—**end**—

Procedure 2-4
Equipping the ABM, CDS shelves, and BIP with circuit packs

Use this procedure to install common-equipment circuit packs in the ABM shelf and BIP and the CDSs. This includes the following shelf functions: RFT, RFT_BLSR, FCOT, and FCOT_BLSR.

This procedure applies to any network element (NE), whether it is a:
- fiber central office terminal (FCOT)
- remote fiber terminal (RFT)
- MBP
- Series 800A outside plant cabinet

All shelf functions support these mix of tributaries, DS1, DS3, and OC-3. However, due to slot limitations, not all of these can be supported on the same shelf. Refer to *Mapper Layouts Planning Guide*, 323-3001-154, in *Engineering, Configuration, and Ordering Guide*, Volume 1.

Requirements

The following requirements must be met before performing this procedure.
- Make sure the system is not in service.
- Make sure all circuit breakers on the BIP are in the off position.
- Make sure the mapper layout for this system is planned according to the mapper layouts in *Mapper Layouts Planning Guide*, 323-3001-154, in the *Engineering, Configuration, and Ordering Guide*, Volume 1.
- Obtain all the required circuit packs and the mapper layout available for your system.
- Make sure that cabinets or bays and shelves are installed and inspected for damage; that all cables are installed, except for the operations controller (OPC) Ethernet cable, NT4K86L series; and the input and output cards are already installed in the I/O section of the shelf.

Identifying needed circuit packs

This procedure includes the insertion of all possible circuit packs in an ABM shelf. Before beginning, determine what circuit packs are required for the ABM shelf using *Mapper Layouts Planning Guide*, 323-3001-154, in the *Engineering, Configuration, and Ordering Guide*, Volume 1. Skip the steps for inserting circuit packs that are not required for your system.

—continued—

Procedure 2-4 (continued)
Equipping the ABM, CDS shelves, and BIP with circuit packs

Action

Step	Action

1 Put on the antistatic wrist strap. Make sure it is correctly grounded to the electrostatic discharge (ESD) jack on the LCAP.

2 Carefully unwrap the processor (Proc) circuit pack(s) and check it for physical damage. If any Proc is damaged, replace it. Use this approach on all circuit packs.

3 With the top and bottom ejector latches in the closed position, carefully place the processor circuit pack (or packs if a second one is being installed) into slots 17 and 18 in the ABM shelf, but leave the circuit pack(s) disengaged.

Note: A circuit pack is in the disengaged position when the latches are closed and prevent full insertion of the circuit pack. Do not force the disengaged circuit pack when you insert it. Push it only as far as the closed latches allow it to go.

> **CAUTION**
> **Risk of equipment damage**
> Do not install the shelf cover with the circuit packs in the disengaged position, as damage to circuit packs can result.

4 With the latches in the closed position, carefully place the maintenance interface card (MIC) in slot 19 of the ABM shelf and leave it disengaged. The MIC installs in slot 20 in the TBM shelf.

5 Make sure the serial number shown on the right side of the OPC (near the bottom of the motherboard) matches the serial number entered on the Commissioning Data Record form for this NE. See also Procedure 3-5 on page 3-14.

Equipping the ABM shelf with CDSs

6 With the latches in the closed position, carefully place the OPC in slots 5 to 8, but leave it disengaged. If the Ethernet cable is installed, plug its connector into the Ethernet jack on the faceplate of the OPC.

> **CAUTION**
> **Risk of equipment damage**
> The operations controller is very heavy, so handle it carefully to avoid dropping it or damaging equipment guides.

—continued—

Procedure 2-4 (continued)
Equipping the ABM, CDS shelves, and BIP with circuit packs

Step	Action

Equipping the ABM shelf with CDSs

7   With the latches in the closed position, carefully place the OPC in slots 5 to 8, but leave it disengaged. If the Ethernet cable is installed, plug its connector into the Ethernet jack on the faceplate of the OPC.

> ⚠ **CAUTION**
> **Risk of equipment damage**
> The operations controller is very heavy, so handle it carefully to avoid dropping it or damaging equipment guides.

8   Insert the TXC circuit packs with the latches in the closed position. Leave the circuit packs disengaged. The TXC circuit packs are for DFA systems only and install in slots 9 and 10. Only one TXC circuit pack is required at the OPC shelf. It is installed in slot 9.

If this NE is	Then go to
equipped with CDSs	step 9
not equipped with CDSs	step 13

9   With the latches in the closed position, insert the two transport interface cards (TICs) in slots 11 and 14. Leave the TICs disengaged.

10   With the latches in the closed position, insert the two access interface cards (AICs) in slots 13 and 16. Leave the AICs disengaged.

11   With the latches in the closed position, insert the TAC in slot 20. Leave the TAC disengaged.

12   If the integrated remote test unit (IRTU) is required (this card is optional), then, with the latches in the closed position, insert the IRTU in slot 21 of the RFT only. Leave the IRTU disengaged.

Note 1: An IRTU is not required at the OPC shelf site in DFA systems.

Note 2: If the ABM shelf is from an earlier release, the ABM shelf must be modified to accommodate the IRTU. In this case, refer to *System Expansion Procedures*, 323-3001-324, in *Operations, Administration, and Provisioning,* Volume 4C.

If the ABM shelf is	Then go to
to be equipped with any DS1/VT or DS3 mappers	step 13
not to be equipped with any DS1/VT or DS3 mappers	step 15

—continued—

Procedure 2-4 (continued)
Equipping the ABM, CDS shelves, and BIP with circuit packs

Step	Action

⚠ **CAUTION**
Risk of equipment damage
The IRTU requires careful handling. When returning the IRTU for repair, observe all handling and transporting precautions described in Chapter 1 of this document.

Equipping the ABM shelf with DS1/VT or DS3 mappers

13   With the latches in the closed position, insert the DS1/VT and DS3 mapper circuit packs into the correct slot. Leave the circuit packs disengaged. The DS1/VT and DS3 mapper layout forms show where mapper circuit packs should be installed. These forms should have been completed during the planning process, which is described in the *Engineering, Configuration, and Ordering Guide*, Volume 1.

Note: TR-08 services require the working and protection DS1 mappers to be type NT7E04CA. If the mappers are not this type, a circuit pack mismatch alarm occurs. To avoid this alarm, make sure the first NT7E04CA mapper is installed as the protection mapper.

If the bay with the ABM shelf is	Then
not already powered up	• remove the BIP cover, if not already done. • insert the alarm relay card but leave it disengaged. • if the bay is equipped with CDSs, insert the talk battery filter card and engage it into the shelf.
powered up and the BIP cover is removed	go to step 14

14   Check that all circuit packs required for your configuration are present and placed in the correct ABM shelf slots (with the exception of FCOT external synchronization interface (ESI) cards that are installed later).

—**continued**—

Procedure 2-4 (continued)
Equipping the ABM, CDS shelves, and BIP with circuit packs

Step	Action

15   Update the utility card, located in the ABM shelf cover between the two handles. Record information pertinent to your organization's methods and operations.

If this NE is	Then go to
equipped with CDS shelves	step 19
not equipped with CDS shelves	step 16

16   After all circuit packs are installed or placed in the appropriate shelves, remove the antistatic wrist strap you are wearing.

17   Apply shelf slot designation labels (such as DS1/VT mapper) as appropriate.

18   Instructions for inserting line cards are in *Line Card Testing Procedures*, 323-3001-316, in *Operations, Administration, and Provisioning,* Volume 4B.

Inserting Circuit Packs into the CDS Shelves

19   To unlock the left drawer of the first CDS (CDS 1), use a small screwdriver to turn the locking knob (beside the handle) one-quarter turn to the left. Grasp the handle and pull open the drawer.

20   Insert the metallic test access card (MTAC) in the slot labeled MTA A. Make sure the MTAC is engaged.

21   Insert the two narrowband line interface cards (NLICs) in slots LIC A and LIC B. Make sure the NLICs are engaged.

22   Close the left drawer. Unlock the right drawer as you did the left drawer in step 19.

23   Open the right drawer.

24   Insert the MTAC in slot MTA B. Make sure the MTAC is fully engaged.

25   Insert the two NLICs in slots LIC C and LIC D. Make sure the NLICs are fully engaged.

26   Close the right drawer.

27   Insert the CDS power cards in slots CDSP A and CDSP B located between the two line card drawers. To lock each power card in position, use a small screwdriver to turn the locking knob (beside the handle) one-quarter turn or until the dots are aligned.

28   Repeat steps 19 through 27 for CDS 2 to CDS 7, if the shelves are equipped.

29   Check off this procedure on the System Setup Checklist.

—**end**—

Procedure 2-5
Powering up the common equipment (ABM shelf)

Use this procedure when powering up the ABM shelf to verify the following:

- the operation of each circuit breaker, before applying power to all of the common equipment and cooling to the power units

- power connections from the two power feeds to the common-equipment shelf are not reversed and the Processor (Proc) cards, TXC circuit packs, and MIC are powered from both power feeds

Line equipment, including the test access card (TAC) and the CDS, is powered up after you complete commissioning of the basic NE.

Requirements

The following requirements must be met before starting this procedure:

- Make sure the circuit packs for this configuration are installed in the ABM shelf but not engaged according to Procedure 2-4 on page 2-11.

- Make sure power to the BIP is verified according to Procedure 2-3, "Verifying power at the BIP (ABM shelf)" on page 2-8.

⚠	**CAUTION** **Risk of equipment damage** If the common-equipment shelf contains an OPC module and is powered down without first performing the OPC shutdown procedure, then the OPC disk drive can be damaged.

Action

Step	Action

1   Put on the antistatic wrist strap. Make sure it is properly grounded to the ESD jack on the LCAP.

If this is a new ABM shelf on a	Then go to
bay that is not equipped	step 2
previously equipped bay	step 3

2   At the dc power source (battery distribution fuse bay, power distribution panel, or modular business package), close the circuit breakers that supply power to the BIP on this bay.

Procedure 2-5 (continued)
Powering up the common equipment (ABM shelf)

Step	Action

3 On the new ABM common-equipment shelf, fully engage the Proc circuit packs as follows:

   a. Pull open the top and bottom latches on the circuit pack.

   b. Close the latches to rotate the tabs into the shelf grooves and firmly seat the circuit pack on the backplane connector. When the circuit pack is seated, you are able to see that the tabs on the top and bottom latches are positioned opposite the grooves in the shelf.

> **CAUTION**
> **Risk of equipment damage**
> When seating the circuit pack on the backplane pins, do not force the circuit pack, as that can damage the pins. If you have trouble seating the circuit pack, check that it is in the right slot. If it is in the right slot, pull the circuit pack back out, then try again to seat it, pressing gently.

4 Disconnect the B modular power connector on the common-equipment power (CEP) I/O card in slot 55 of the ABM shelf.

5 Fully engage the MIC circuit pack.

6 Close only the CE A circuit breaker associated with the shelf position by moving it to the 1 position. Verify that power is being supplied to the shelf by observing the MIC and Proc LED activity.

Note: It is not the intent of this procedure to make sure specific LEDs light up, but to verify that power is being supplied to the shelf. In fact, the actual LED indicator(s) should be ignored since the system is not yet commissioned.

If	Then go to
there was no LED lamp activity	step 7
at least one LED lamp lit up	step 8

7 Make sure the CEP I/O card in slot 54 is connected to the CE A breaker and that the CEP I/O card in slot 55 is connected to the CE B breaker. Then, repeat steps 6 and 7.

8 After verifying the MIC and Proc LEDs, open the CE A circuit breaker that was closed in the previous step.

9 Reconnect any disconnected CEP I/O card power connectors.

10 Disconnect the A modular power connector on the CEP I/O card in slot 54 of the ABM shelf.

—**continued**—

Procedure 2-5 (continued)
Powering up the common equipment (ABM shelf)

Step	Action

11 Close only the CE B circuit breaker by moving it to the 1 position. Verify that power is being supplied to the shelf by observing the MIC and Proc LED activity.

Note: It is not the intent of this procedure to make sure specific LEDs light up, but to verify that power is being supplied to the shelf. In fact, the actual LED indicator(s) should be ignored since the system is not commissioned.

If	Then go to
there was no LED lamp activity	step 12
at least one LED lamp lit up	step 13

12 Make sure the CEP I/O card in slot 54 is connected to the CE A breaker and that the CEP I/O card in slot 55 is connected to the CE B breaker. Then, repeat steps 6 and 7.

13 Once the MIC and Proc LEDs are verified, open the B circuit breaker that was closed in the previous step.

14 Reconnect the disconnected A CEP I/O card power connector.

15 Close the CE A circuit breaker on the shelf. Wait ten seconds and then close the CE B circuit breaker.

16 Fully engage all remaining circuit packs, one at a time (in no specific order), on the common-equipment shelf. Wait ten seconds between each circuit pack engagement.

CAUTION
Risk of equipment damage
When seating the circuit pack on the backplane pins do not force the circuit pack. Forcing the circuit pack can damage the pins. If you have trouble seating the circuit pack, check that it is in the right slot. If it is in the right slot, pull the circuit pack out of its slot and try to seat it again, pressing gently.

Use the tabs to insert and seat circuit packs.

—**continued**—

Procedure 2-5 (continued)
Powering up the common equipment (ABM shelf)

Step	**Action**

For a new ABM shelf on a bay that is not previously equipped

17 Proceed according to the following tasks:

If the NE is	Then
an RFT mounted in a Series 800A outside plant cabinet	• close both circuit breakers CU A and CU B on the BIP. • remove the cover of the thermostat and write down the thermostat setting. The thermostat is located on the inside right wall of the cabinet when accessed from the front. • turn down the thermostat until all fans start operating. If the fans fail to operate, check the wiring. If you cannot identify the problem, call your Nortel Networks representative. • turn the thermostat to its original setting and reinstall the thermostat cover.

—continued—

Procedure 2-5 (continued)
Powering up the common equipment (ABM shelf)

Step	Action

If the NE is	Then follow the instructions in this column	However, if at an MBP site, follow the instructions in this column
NOT an RFT mounted in a Series 800A outside plant cabinet	• on the ABM BIP, close only the CU A circuit breaker by moving it to the 1 position. *The fans in the cooling unit should start to operate. If the fans do not operate, check that there is power coming from the power source and check the power supply cable for correct polarity.* *If the BIP power LED does not light up when you close the CU A circuit breaker:* • open the CU A circuit breaker by moving it to the 0 position. *If the fans in the cooling unit shut off:* • on the ABM BIP close only the CU B circuit breaker by moving it to the 1 position. *The fans in the cooling unit should start to operate. If the fans do not operate, check that there is power coming from the power source and check the power supply cable for correct polarity.* ***Note:*** The BIP power LED will not light up when you close the CU B circuit breaker. • open the CU B circuit breaker by moving it to the 0 position. *The fans in the cooling unit shut off.*	• turn on the CB1 circuit breaker located on the faceplate of the blower unit on each MBP cabinet. Circuit breaker CB2 is not used. To access the blower unit, remove the front pedestal cover. Refer to the procedure for removing MBP covers in *Modular Business Cabinet Package Installation Manual*, 323-3001-206. • turn off the CB1 circuit breaker located on the faceplate of the blower unit on each MBP cabinet. • turn on the CB1 circuit breaker located on the faceplate of the blower unit on each MBP cabinet. • turn off the CB1 circuit breaker located on the faceplate of the blower unit on each MBP cabinet.

—**continued**—

Procedure 2-5 (continued)
Powering up the common equipment (ABM shelf)

Step	Action
18	On the ABM BIP, close only the circuit breakers labeled CU A and CU B. For an MBP site, turn on the CB1 circuit breaker located on the faceplate of the blower unit on each MBP cabinet.
19	On the BIP, close the cooling unit circuit breakers CU A and CU B.
20	On the breaker interface panel (BIP), close the circuit breaker labeled TBFCE (the talk battery power to the test access card).The breaker interface panel (BIP) is shown below.

PC-16498
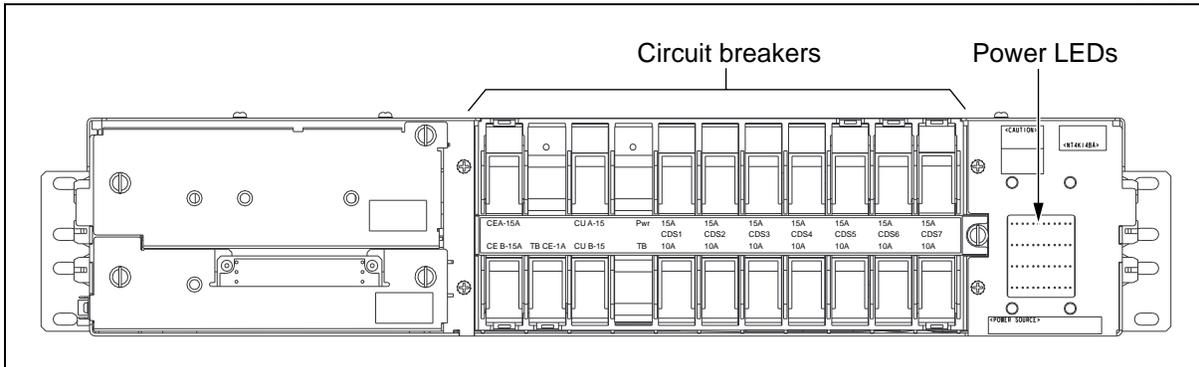
The test access card (TAC) completes self-testing.

If a	Then the circuit pack
green LED is on	is active.
red LED is on	has failed. Check that there is power coming from the power source.

21	Close the circuit breaker labeled Power CDS 1, which provides shelf power to the copper-distribution shelf 1 (CDS 1).
22	Close the circuit breaker labeled TB CDS1, which provides talk battery to CDS 1.
	The circuit packs in CDS 1 start to boot. Narrowband line interface cards (NLICs) complete self-tests and provision all line card slots with the default line card type. If you do not obtain these results, check that there is power coming from the power source to CDS 1.
23	Verify that talk battery is properly connected to the CDS by performing a line card diagnostic.
24	Open the Power CDS1 circuit breaker and the TB CDS1 10A circuit breaker on the BIP.

—continued—

Procedure 2-5 (continued)
Powering up the common equipment (ABM shelf)

Step	Action
25	Repeat steps 20 to 23 for each set of circuit breakers associated with installed CDSs.
26	When the operation of all line equipment circuit breakers is verified as correct, close all circuit breakers on the BIP.

If the NE is	Then
• powered by the optional modular power package (MPP) or • mounted in a Series 800A outside plant cabinet	go to step 27.
• NOT powered by the optional modular power package (MPP) or • NOT mounted in a Series 800A outside plant cabinet	go to step 28.

Step	Action
27	If rectifiers have the ON/RFA LED lit in red, then perform the load-balancing procedure. Refer to Chapter 2 of *Optional Commissioning Procedures*, 323-3001-220, in *Commissioning and Testing*, Volume 3B.
28	Verify that all loss-of-power alarms are cleared.
29	On the ABM BIP, close only the circuit breakers labeled CE A, CE B, CU A, and CU B. For an MBP site, turn on the CB1 circuit breaker located on the faceplate of the blower unit on each MBP cabinet.

Note: Leave all remaining circuit breakers in the open (0) position, including the TB CE. The procedure for powering up line equipment is in *Site Testing Procedures*, 323-3001-221, in *Commissioning and Testing*, Volume 3B, and is performed after NE commissioning is completed. Alarms are generated indicating loss of power in these circuits, but these alarms should automatically clear when the line equipment is powered up.

—**continued**—

Procedure 2-5 (continued)
Powering up the common equipment (ABM shelf)

Step	Action

30   Make sure the fans on the cooling unit are operating and that airflow through the equipment is not obstructed.

If	Then
the shelf has an OPC module in slots 5 to 8	engage it in its backplane connector, using the latches at the top and bottom of the module to lever it into place.
this NE is powered by NT5C06 rectifiers and the NT6C14 dc distribution shelf	go to step 31.
this NE is not powered by NT5C06 rectifiers and the NT6C14 dc distribution shelf	go to step 34.

31   Check all rectifiers for the ON/RFA LED conditions.

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.

32   Check the ammeters of all rectifiers and balance the amperage supplied by all rectifiers.

Note: Balanced load sharing among all rectifiers is difficult to achieve if one or more rectifiers have open sensing leads.

> **CAUTION**
> **Risk of equipment damage**
> If the rectifier voltage is adjusted higher than −56.0 V dc, the powered equipment can be damaged. For example, a rectifier voltage of −58.0 V dc can damage that equipment.

| on any rectifier with a higher current | slowly adjust its FLT potentiometer counterclockwise to decrease its ammeter value towards the average value of all ammeters. |
| on any rectifier with a lower current | slowly adjust its FLT potentiometer clockwise to increase its ammeter value towards the average value of all ammeters. |

—continued—

Procedure 2-5 (continued)
Powering up the common equipment (ABM shelf)

Step	Action
33	Repeat steps 31 and 32 until all rectifier ammeters display approximately the same current level and until all rectifier ON/RFA LEDs are green.
	The digital meter on the faceplate of the dc distribution shelf displays the value of float voltage from all rectifiers.
34	If this is an MBP site equipped with an external battery string, verify that the battery string does the following:
	• supplies uninterrupted power to the MBP cabinets when the commercial ac power source fails, according to the manufacturer's recommended procedures.
	• recharges from the rectifiers, according to the manufacturer's recommended procedures.
35	Check off this procedure on the System Setup Checklist.

—**end**—

Procedure 2-6
Inserting circuit packs (TBM shelf)

Use this procedure to place the common-equipment circuit packs in the TBM shelf at a fiber FCOT. This includes the following shelf functions: FCOT, FCOT_BLSR, and TN_BLSR.

The TN_BLSR shelf function supports DS1, DS3, STS-1, and OC-3 tributaries. The FCOT and FCOT_BLSR shelf functions support DS1, DS3, and OC-3 tributaries. However, due to slot limitations, not all of these can be supported on the same shelf. Refer to *Mapper Layouts Planning Guide*, 323-3001-154, in *Engineering, Configuration, and Ordering Guide*, Volume 1.

Requirements

The following requirements must be met before starting this procedure:

- Make sure all circuit breakers on the BIP are in the off (0) position.

- Make sure that the DS1/DS3/STS-1 mapper layout for this system is planned according to *Mapper Layouts Planning Guide,* 323-3001-154, in the *Engineering, Configuration, and Ordering Guide*, Volume 1.

- Make sure that the bays and shelves are installed and inspected for damage. Input and output cards are already installed in the I/O section, as described in the *Bay in Central Office Installation Manual -ABM*, 323-3001-201, and *Bay in Central Office Installation Manual -TBM*, 323-3001-202. All cables are installed, except the OPC Ethernet cable, NT4K86L series.

> ⚠️ **CAUTION**
> **Service-affecting action**
> Do not place an OC-3 optical pack into slots 17 or 18 if the TBM shelf has any DS1 lines. Doing so may cause DS1 traffic to be lost.
>
> Slots 17 and 18 share the backplane with DS1 protection slots and placing the OC-3 optical pack in these slots interrupts the DS1 clock signals.

—continued—

Procedure 2-6 (continued)
Inserting circuit packs (TBM shelf)

Figure 2-2
TBM/FCOT/FCOT_BLSR circuit pack layout in fiber-fed systems

Note 1: Slots 1 through 4 and 11 through 18 are allocated for DS1/VT or DS3 mappers, or OC-3 tributaries.

Note 2: Slots 30 through 45 are allocated for DS1 IO circuit packs.

Note 3: Slots 9 and 10 are equipped with NT7E01 or NT7E02 in point-to-point systems and with NT7E05 in ring systems.

—**continued**—

Procedure 2-6 (continued)
Inserting circuit packs (TBM shelf)

Before beginning, make sure you have determined what circuit packs are required for the TBM shelf using the *Mapper Layouts Planning Guide,* 323-3001-154, in the *Engineering, Configuration, and Ordering Guide*, Volume 1. The steps below guide you through inserting circuit packs in a TBM shelf. Skip the steps you do not need to perform if the circuit pack is not required for your system.

Action

Step	Action
1	Put on the antistatic wrist strap and make sure it is properly grounded to the ESD jack on the LCAP as shown in Figure 2-3 below.

Figure 2-3
LCAP for the transport bandwidth manager shelf

PC-10602

ESD ground jack
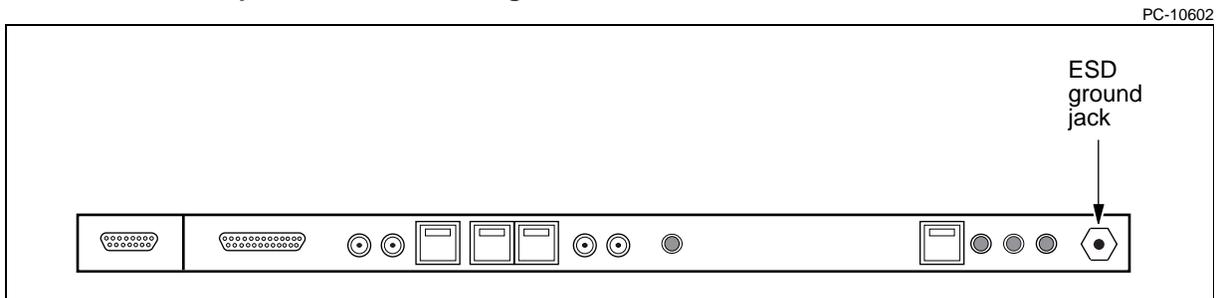
Inserting the processor (Proc) circuit packs

2 Carefully unwrap the Proc circuit packs and check for physical damage. Replace any damaged circuit packs. Do this for all circuit packs.

3 With the top and bottom latches in the closed position, place the Proc circuit pack(s) into slots 21 and 22 in the TBM shelf. Leave the Proc circuit packs(s) disengaged.

Note: A circuit pack is in the disengaged position when the closed latches prevent full insertion of the circuit pack into the back plane slot. Do not force the circuit pack when you insert it. Push the circuit pack only as far as the closed latches allow it to go.

> **CAUTION**
> **Risk of equipment damage**
> Do not install the shelf cover with the circuit packs in the disengaged position as damage to circuit packs can result.

—**continued**—

Procedure 2-6 (continued)
Inserting circuit packs (TBM shelf)

Step	Action

4   With the latches in the closed position, place the MIC in slot 20 of the TBM shelf. Leave the MIC disengaged.

If this NE	Then go to
requires a primary or backup OPC	step 5
uses a modular OPC for commissioning only, this is a temporary installation	step 6

CAUTION
Risk of equipment damage
The OPC is very heavy, so handle it carefully to avoid dropping it or damaging equipment guides.

5   Write down the serial number shown on the right side of the operations controller (OPC) near the bottom of the motherboard. You will need it later in the Commissioning section.

6   With the latches in the closed position carefully place the OPC in slots 5 to 8, but leave it disengaged. If the Ethernet cable is installed, plug its connector into the Ethernet jack on the faceplate of the OPC.

7   With the latches in the closed position, carefully place the two OC-3, or two OC-12, or two OC-12 virtual tributary bandwidth manager (VTBM) interface circuit packs (depending on your configuration) in slots 9 and 10, but leave them disengaged.

If this system has	Then go to
OC-3 tributaries	step 8
DS1/DS3/STS-1 tributaries	step 9

OC-3 tributaries

8   With the latches in the closed position, carefully place the OC-3 tributary circuit packs in the correct slots (1, 11, or 15) on the TBM shelf, but leave the OC-3 tributary circuit packs disengaged. The OC-3 mapper layout form shows where the OC-3 tributary circuit packs should be placed in the TBM shelf.

Note: Optical fibers are connected to the OC-3/OC-12 and OC-3 tributary circuit packs after site testing is completed in *Site Testing Procedures*, 323-3001-221, in *Commissioning and Testing*, Volume 3B.

—**continued**—

Procedure 2-6 (continued)
Inserting circuit packs (TBM shelf)

Step	Action

DS1/DS3/STS-1 tributaries

9   With the latches in the closed position, carefully place each DS1/VT, DS3/STS mapper, or STS-1 interface card into its slot, but leave it disengaged. The DS1/VT, DS3/STS, or STS-1 mapper layout forms show where mapper circuit packs should be installed.

Note: TR-08 services require both working and protection DS1 mappers to be of the type NT7E04CA (or later), otherwise a circuit pack mismatch alarm will occur. To avoid this alarm, make sure the first NT7E04CA mapper is placed in the shelf as the protection mapper.

> **CAUTION**
> If you have a fiber-fed system that is not provisioned for maximum DS1/DS3 capacity and you plan to expand from a DS1 or DS3 configuration to a DS1/DS3 mix configuration in the future, the mappers should be installed in specific slots. This avoids unnecessary removal and re-testing of the circuit packs at a later date.

10   Check that all circuit packs required for your configuration are placed in their correct slots.

Note: Remember that the ESI carrier and cards are installed later during site testing.

11   Update the utility card located in the TBM shelf cover between the handles. Record information pertinent to your system.

12   Check off this procedure on the System Setup Checklist.

—**end**—

Procedure 2-7
Powering up the common equipment (TBM shelf)

To avoid damage to the equipment use this procedure when powering up the TBM shelf. The following list describes the objectives of this procedure:

- verify A and B power supply wiring between the BIP and the common-equipment shelf
- make sure each A and B power supply can independently power the shelf
- verify cooling unit operation where applicable

Requirements

The following requirements must be met before starting this procedure:

- Make sure circuit packs for this configuration are installed according to Procedure 2-6, "Inserting circuit packs (TBM shelf)" on page 2-25 and are still disengaged.
- Verify power to the BIP.

> **CAUTION**
> **Risk of equipment damage**
> If the common-equipment shelf has an OPC module and is powered down without first performing the OPC shutdown procedure, the OPC disk drive could be damaged.

> **CAUTION**
> **Service-affecting action**
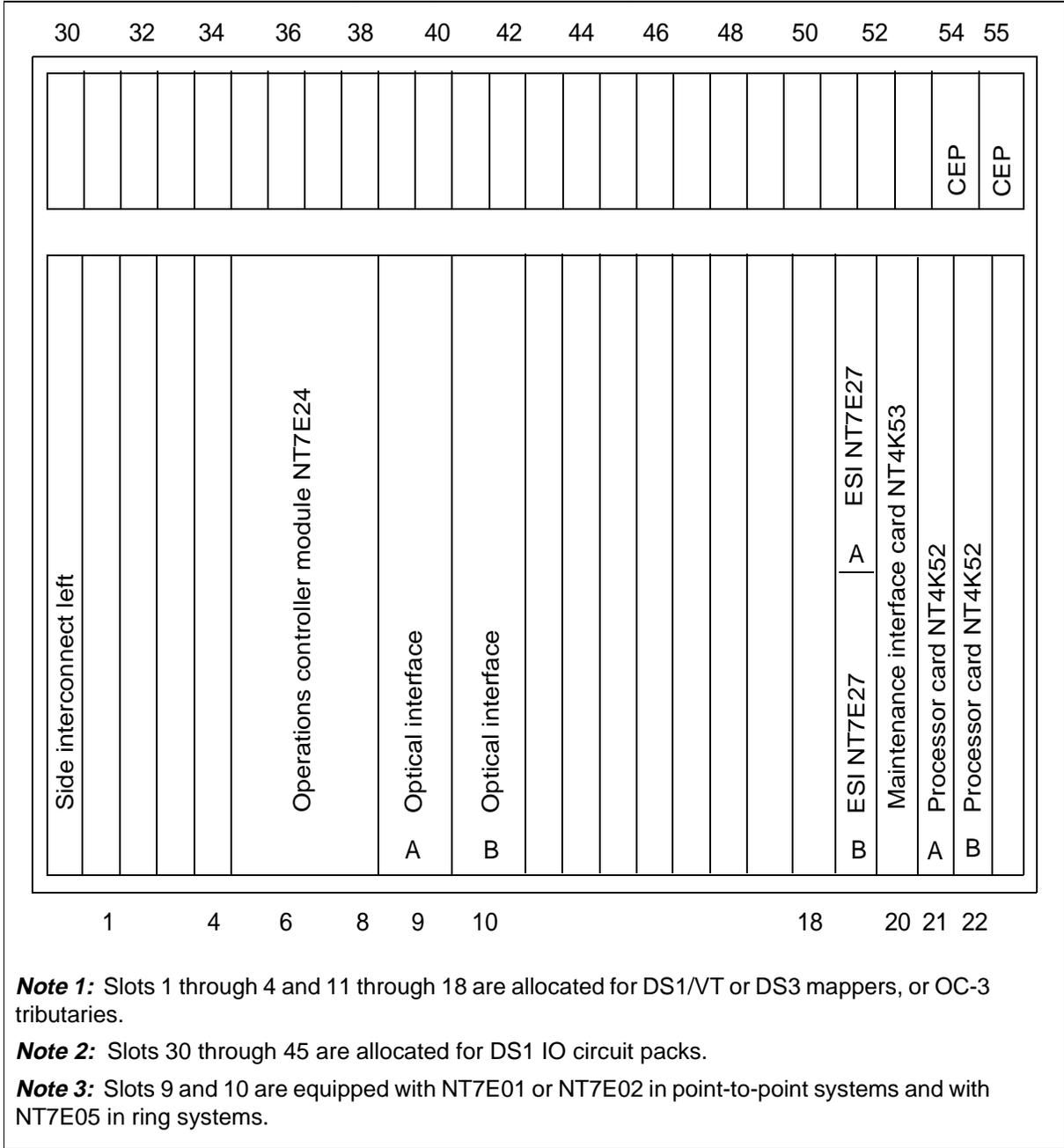> Do not place an OC-3 optical pack into slots 17 or 18 if the TBM shelf has any DS1 lines. Doing so can cause DS1 traffic to be lost.This is because slots 17 and 18 share the backplane with DS1 protection slots and placing the OC-3 optical pack in these slots interrupts the DS1 clock signals.

—continued—

Procedure 2-7 (continued)
Powering up the common equipment (TBM shelf)

Figure 2-4
BIP for the TBM shelf
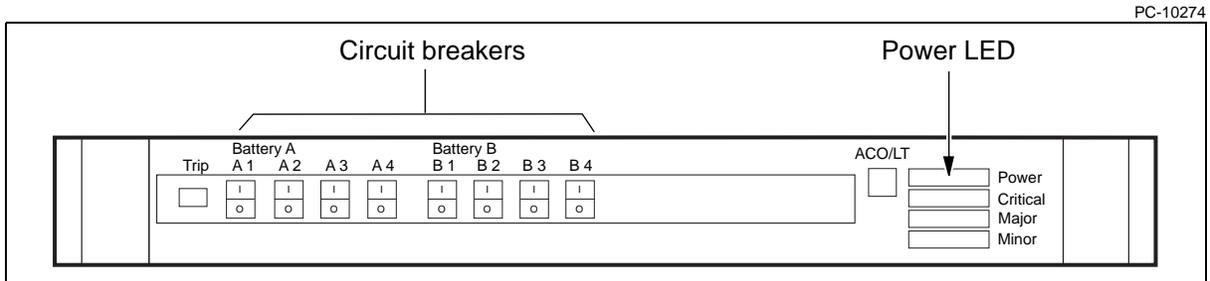
PC-10274

Action

Step	Action

1 Put on the antistatic wrist strap and make sure it is properly grounded to the ESD jack on the LCAP adjacent to the right end-guard as shown in Figure 2-4 above.

If this is a new TBM shelf on a	Then go to
bay that is NOT equipped	step 2
previously equipped bay	step 3

2 At the dc power source (battery distribution fuse bay, power distribution panel or modular power package), close the circuit breakers that supply power to the BIP on this bay.

3 On the new TBM common-equipment shelf, fully engage the Proc circuit packs as follows:

a. Pull open the top and bottom latches on the circuit pack.

b. Close the latches to rotate the tabs into the shelf grooves and firmly seat the circuit pack on the backplane connector.

A circuit pack is engaged when it is fully inserted, with its latches closed.

> **CAUTION**
> **Risk of equipment damage**
> When seating the circuit pack on the backplane pins, do not force the circuit pack, as that can damage the pins. If you have trouble seating the circuit pack, check that it is in the right slot. If it is in the right slot, pull the circuit pack back out, and try again to seat it, pressing gently.

—continued—

Procedure 2-7 (continued)
Powering up the common equipment (TBM shelf)

Step	Action
4	Disconnect the B modular power connector on the common equipment power (CEP) I/O card located in I/O slot 55 of the common-equipment shelf. See Figure 2-5 on page 2-33 for the location of these slots on the shelf.
5	Fully engage the MIC circuit pack.
6	Close only the CE_A circuit breaker associated with the shelf position by moving it to the 1 position. Verify that power is being supplied to the shelf by observing the MIC and Proc LED activity. The shelf position/circuit breaker association is given in the following table and shown in Figure 2-5 on page 2-33.

TBM shelf position	TBM shelf circuit breakers
1	A1 and B1
2	A3 and B3
3	A4 and B4
Note: The cooling unit circuit breakers are designated: A2 and B2.	

Note: It is not the intent of this procedure to make sure specific LEDs light up, but to verify that power is being applied to the shelf. In fact, the actual LED indicator(s) should be ignored since the system is not yet commissioned.

—**continued**—

Procedure 2-7 (continued)
Powering up the common equipment (TBM shelf)

Step   Action

Figure 2-5
Association between the TBM shelf position and the TBM shelf circuit breakers

PC-11382
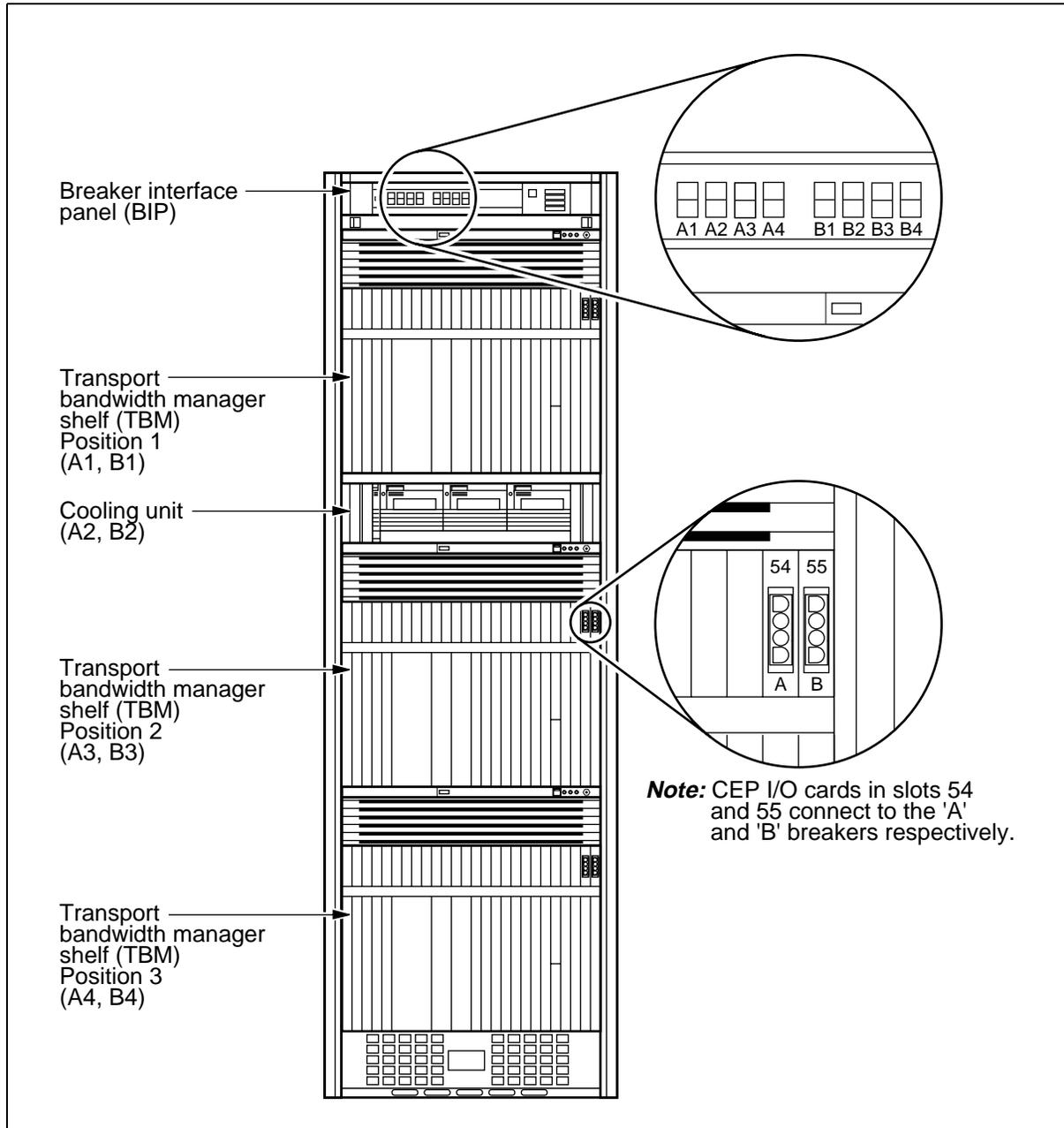
Breaker interface
panel (BIP)

A1 A2 A3 A4   B1 B2 B3 B4

Transport
bandwidth manager
shelf (TBM)
Position 1
(A1, B1)

Cooling unit
(A2, B2)

54   55

Transport
bandwidth manager
shelf (TBM)
Position 2
(A3, B3)

A   B

Note: CEP I/O cards in slots 54
and 55 connect to the 'A'
and 'B' breakers respectively.

Transport
bandwidth manager
shelf (TBM)
Position 3
(A4, B4)

—continued—

Procedure 2-7 (continued)
Powering up the common equipment (TBM shelf)

Step	Action

If	Then go to
there is NO LED lamp activity	step 7
at least one LED lamp lit up	step 9

7 Make sure the CEP I/O card in slot 54 is connected to the CE A breaker and that the CEP I/O card in slot 55 is connected to the CE B breaker. Then repeat steps 6 and 7.

8 Once the MIC and Proc LEDs are verified, open the CE A circuit breaker that was closed in the previous step.

9 Reconnect any disconnected CEP I/O card power connectors.

10 Disconnect the A modular power connector on the CEP I/O card located in I/O slot 54 of the common-equipment shelf.

11 Close only the CE B circuit breaker associated with the shelf position by moving it to the 1 position. Verify that power is being applied to the shelf by observing the MIC and Proc LED activity. See the table below for the circuit breakers associated with each shelf position.

If	Then go to
there is NO LED lamp activity	step 12
at least one LED lamp lit up	step 13

Note: It is not the intent of this procedure to make sure specific LEDs light up, but to verify that power is being applied to the shelf. In fact, the actual LED indicator(s) should be ignored since the system is not yet commissioned.

12 Make sure the CEP I/O card in slot 54 is connected to the CE A breaker and that the CEP I/O card in slot 55 is connected to the CE B breaker. Then repeat steps 11 and 12.

13 Once the MIC and Proc LEDs are verified, open the CE B circuit breaker that was closed in the previous step.

14 Reconnect the disconnected A CEP I/O card power connector.

15 Close the CE A side circuit breaker of the shelf. Ten seconds later, close the CE B side circuit breaker.

—**continued**—

Procedure 2-7 (continued)
Powering up the common equipment (TBM shelf)

Step	Action
16	Fully engage all remaining circuit packs, one at a time, on the common-equipment shelf. Wait approximately ten seconds between each circuit pack engagement.

> **CAUTION**
> **Risk of equipment damage**
> When seating the circuit pack on the backplane pins, do not force the circuit pack, as that can damage the pins. If you have trouble seating the circuit pack, check that it is in the right slot. If it is in the right slot, pull the circuit pack out, and try again to seat it, pressing gently.
>
> Use the tabs to insert and seat circuit packs.

Once all circuit packs are engaged, proceed as follows:

If this is a new TBM shelf on a	Then go to
bay that is NOT previously equipped	step 17
previously equipped bay	step 21

Step	Action
17	On the TBM BIP, close only the A2 circuit breaker by moving it to the 1 position.
	The fans in the cooling unit should start to operate. If the fans do not operate, check for power coming from the power source and check the power supply cable for correct polarity.
18	Open the A2 circuit breaker by moving it to the 0 position.
	The fans in the cooling unit shut off.
19	On the TBM BIP, close only the B2 circuit breaker by moving it to the 1 position.
	The fans in the cooling unit should start to operate. If the fans do not operate, check the power coming from the power source and check the power supply cable for correct polarity.
20	Open the B2 circuit breaker by moving it to the 0 position.
	The fans in the cooling unit shut off.
21	If they are in the open (0) position, close the cooling unit breakers labeled A2 and B2. Make sure the fans on the cooling unit are operating and that the air flow through the equipment is not obstructed.
	Note: Leave all unused circuit breakers in the open (0) position.
22	Check off this procedure on the System Setup Checklist.

—**end**—

Entering system commissioning data

This chapter has the procedures for commissioning a new system and for modifying commissioning data for an existing system.

Procedures in entering system commissioning data

To enter system commissioning data, do the following procedures:

Procedure	Page
3-1 Detecting and removing existing OPC software	3-3
3-2 Installing software on a local OPC and NE from tape	3-6
3-3 Verifying the OPC serial number	3-10
3-4 Sending a load to the processors	3-11
3-5 Entering system-level data	3-14
3-6 Entering network element commissioning data	3-18
3-7 Downloading software to a network element	3-21
3-8 Setting the network element name	3-25
3-9 Verifying circuit packs	3-26

Before you start

Before starting the commissioning process, you must do the following:

- Become familiar with the user interface of the terminal you are using; either VT100-style character-mode or graphical interface. Interface overviews are available in *Network Element User Interface Description*, 323-3001-300, and *OPC User Interface Description*, 323-3001-301, in *Operations, Administration, and Provisioning,* Volume 4A.

- Assign a unique network element identifier (NEID) to each network element (NE) in the system. All NEIDs must be unique within the system.

- Plan your strategy for commissioning the NEs.

- Obtain a tape with all required NE software loads and carry it with you when you commission the NEs.

- If you are using a laptop computer equipped with a battery pack, make sure the pack is fully charged or that you have an AC power adapter.

- Make a copy of the System Setup Checklist located in Appendix A on page 10-1 and Commissioning Data Record Form located in Appendix B on page 11-1 to note the completion of all procedures and record all commissioning data for the NE and the system where it belongs.

Commissioning terminology

Some of the commonly used terms in this chapter are defined below.

Term	Definition
Commissioning	Commissioning is the series of required tasks that bring the system up to a level of steady-state operation.
Span of control	The term "span of control" (SOC) refers to an independently-maintained subset of network elements (NEs) within a system under the control of a single operations controller (OPC).

Commissioning process

The commissioning procedures in this chapter show you how to commission one span of control. If you have a multi-span system, each span of control is commissioned independently. Although each span of control is commissioned independently, all NE identifiers (including operations controller (OPC)identifiers) must be unique within the entire system.

The first step of the commissioning process, definition of system data, can be performed at any Nortel Networks or customer site. However, to commission the NEs, you must go to each site and connect the OPC to each NE. In this case, the primary OPC is taken from site to site.

A written record of all commissioning data should be kept on a copy of the Commissioning Data Record Form, found in "Appendix B: Commissioning data record form" on page 11-1 of this document.

Procedure 3-1
Detecting and removing existing OPC software

Use this procedure to detect if an operations controller (OPC) software load exists on an OPC. This procedure applies to any new or spare OPC that is currently not in use, and is valid only if you have a primary OPC with tape and no backup.

If OPC software exists but it is not the correct load, then you can use this procedure to remove the incorrect OPC software. The OPC database that has all of the commissioning data is not saved by this operation; therefore, this procedure should only be performed on a spare or stored OPC that requires an "initial" software load. Do not use this procedure as part of the process for upgrading the software in an in-service OPC.

When no software exists on the OPC, go to Procedure 3-2, "Installing software on a local OPC and NE from tape" on page 3-6.

Requirements

The following requirements must be met before starting this procedure:

- Make sure a VT100-compatible terminal is connected to OPC port 1 (or port B). Refer to *OPC User Interface Description*, 323-3001-301, and *Data Administration Procedures*, 323-3001-304. Both are in *Operations, Administration, and Provisioning*, Volume 4A.

- Make sure the OPC is installed and the bay is powered up according to the procedures in Chapter 2.

Read the command conventions in *OPC User Interface Description*, 323-3001-301, in *Operations, Administration, and Provisioning*, Volume 4A. In some of the following steps, you enter UNIX commands at the opc> prompt. Enter the text as shown in bold in this procedure and press the **Return** key when you see the ↵ symbol.

> **CAUTION**
> **Enter UNIX commands carefully**
> If you enter a UNIX command incorrectly, it may be difficult to recover from the error. Be sure to read this procedure carefully, to distinguish between similar symbols, such as !, |, and /, or - and =. Commands shown in lower case must be entered in lower case. Contact Nortel Networks if support is required.

Procedure 3-1 (continued)
Detecting and removing existing OPC software

Action

Step	Action

1 Log in to the OPC using the root userID.

The TERM = vt100 prompt is displayed.

Press the **Return** key (↵) to select the VT100 terminal mode.

The opc> prompt is displayed.

2 Check whether the OPC has a software load on it. Enter:

opcui ↵

If the	Then the
OPC response shows that the command is not found	OPC software is NOT loaded. You are finished with this procedure. Go to Procedure 3-2 on page 3-6.
User Session Manager is displayed	OPC software is loaded. Go to step 3.

If the OPC software is loaded

3 Check the OPC software load. Tab to the OPC Status tool and select it by pressing **Ctrl_A** (or Keypad **0**).

4 Examine the contents of the SW Version field. The SW Version field identifies the software version currently running in this OPC.

If the OPC	Then
has the correct software	• Check off this procedure on the System Setup Checklist. • go to Procedure 3-3.
does not have the correct software	go to step 5.

If the existing software is not the desired load

5 Log out of the OPC Status tool and display the User Session Manager by pressing Ctrl_T 0.

The User Session Manager is displayed.

6 Tab to the Logout button and select it.

A confirmation dialog is displayed.

7 Select the Logout button.

The opc> prompt is displayed.

Note: It is essential to completely log out from the OPC user interface. Do not simply select a UNIX shell within the User Session Manager.

—**continued**—

Procedure 3-1 (continued)
Detecting and removing existing OPC software

Step	Action
8	Carefully insert the tape with the current OPC software load into the OPC tape drive, as shown in Figure 3-1 on page 3-9.

> **CAUTION**
> **Risk of equipment damage**
> Forcing the tape into the tape drive can damage the drive and you may not be able to remove the tape. If you cannot insert the tape easily, it could be oriented the wrong way. Refer to Figure 3-1 on page 3-9 for the correct orientation of the tape.

9 Load the "remove OPC load" file, RMOPCLD, from the tape and execute the removal by entering:

cd /tmp ↵

The opc> prompt is displayed. Enter the following:

dd if=/dev/rdt/tape2 bs=20b | tar xf - ↵

You will get a return of records in and records out. The opc> prompt is displayed.

cd install ↵

he opc> prompt is displayed.

rmopcld ↵

A message informing you that you are about to wipe out the OPC load is displayed and prompts you for a confirmation.

y ↵

A message asking you to continue or abort the removal process is displayed.

c ↵

The script removes the existing software load. The OPC reboots.

10 Remove the tape from the OPC tape drive. Refer to Figure 3-1 on page 3-9 for the location of the tape eject button.

11 Check off this procedure on the System Setup Checklist.

—**end**—

Procedure 3-2
Installing software on a local OPC and NE from tape

Use this procedure to perform the initial transfer of OPC software and NE software from tape to a local OPC, before you commission a system and its NEs.

The overall sequence of software delivery is as follows:

- Install OPC software from tape (accomplished in this procedure).
- Install NE software from tape into the OPC (accomplished in this procedure).
- Commission a span of control. This includes downloading software from the OPC to the NE.

Do not use this procedure as part of the process for upgrading the software in an in-service OPC. This procedure applies to a new or spare OPC that is currently not in use, including modular (shelf) primary and backup OPCs.

Requirements

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

- Remove existing software as outlined in Procedure 3-1, "Detecting and removing existing OPC software" on page 3-3.

Additionally, you need:

- a VT100-compatible terminal connected to OPC port 1 (or port B) (See *OPC User Interface Description*, 323-3001-301, and *Data Administration Procedures*, 323-3001-304. Both are in *Operations, Administration, and Provisioning*, Volume 4A.)

The OPC that is to be loaded must be installed and the bay powered up according to the procedures in Chapter 2.

Note 1: Read the command conventions in *OPC User Interface Description*, 323-3001-301, in *Operations, Administration, and Provisioning*, Volume 4A. In some of the following steps, you need to enter UNIX commands at the opc> prompt. Enter the text exactly as shown in bold and press the Return key when you see the ↵ symbol.

Note 2: If you will use the Central User Administration (CUA) tool as part of the installation, see *System Administration Procedures*, 323-3001-302, in *Operations, Administration, and Provisioning*, Volume 4A, for directions to modify the CUA tool.

—continued—

Procedure 3-2 (continued)
Installing software on a local OPC and NE from tape

Action

Step	Action

1   Log in to the OPC using the root userID.

The TERM = (vt100) prompt appears.

Press the **Return** key (↵) to select the VT100 terminal mode.

The opc> prompt appears.

2   Carefully insert the tape with the new OPC software load into the OPC tape drive, as shown on Figure 3-1 on page 3-9.

> **CAUTION**
> **Risk of equipment damage**
> If you force the tape into the tape drive, you can damage the drive and you may not be able to remove the tape. If you cannot easily insert the tape, it may be oriented the wrong way.
> Refer to Figure 3-1 on page 3-9 for the correct orientation of the tape.

> **CAUTION**
> **Enter UNIX commands carefully**
> If you enter a UNIX command incorrectly, it can be difficult to recover from the error. Be sure to read this procedure carefully, to distinguish between similar symbols, such as !, |, and /, or **-** and **=**. Commands shown in lower case must be entered in lower case. Contact Nortel Networks if you need support.

3   To install the OPC software, enter the following:

cd /tmp ↵

The opc> prompt appears. Enter the following:

dd if=/dev/rdt/tape2 bs=20b | tar xf - ↵

You will get a return of records in and records out. The opc> prompt appears.

cd install ↵

The opc>prompt appears.

install_release -f ↵

This tool transfers the OPC software and NE software to the OPC.

4   Now that both the OPC and NE software are installed, remove the tape from the OPC tape drive. Refer to Figure 3-1 on page 3-9 for the location of the tape eject button.

—**continued**—

Procedure 3-2 (continued)
Installing software on a local OPC and NE from tape

Step	Action
5	Commission your OPC (see Procedure 3-5).
6	Enter the following command from the /tmp directory of the OPC:
	setmbr ↵
7	Check off this procedure on the System Setup Checklist.

—continued—

Procedure 3-2 (continued)
Installing software on a local OPC and NE from tape

Step   Action

Figure 3-1
Inserting and ejecting the tape from the OPC (NT7E24BA)

PC-10864

Operations
controller
(OPC)

Tape eject
button

Slide
white tab
open to
protect
data
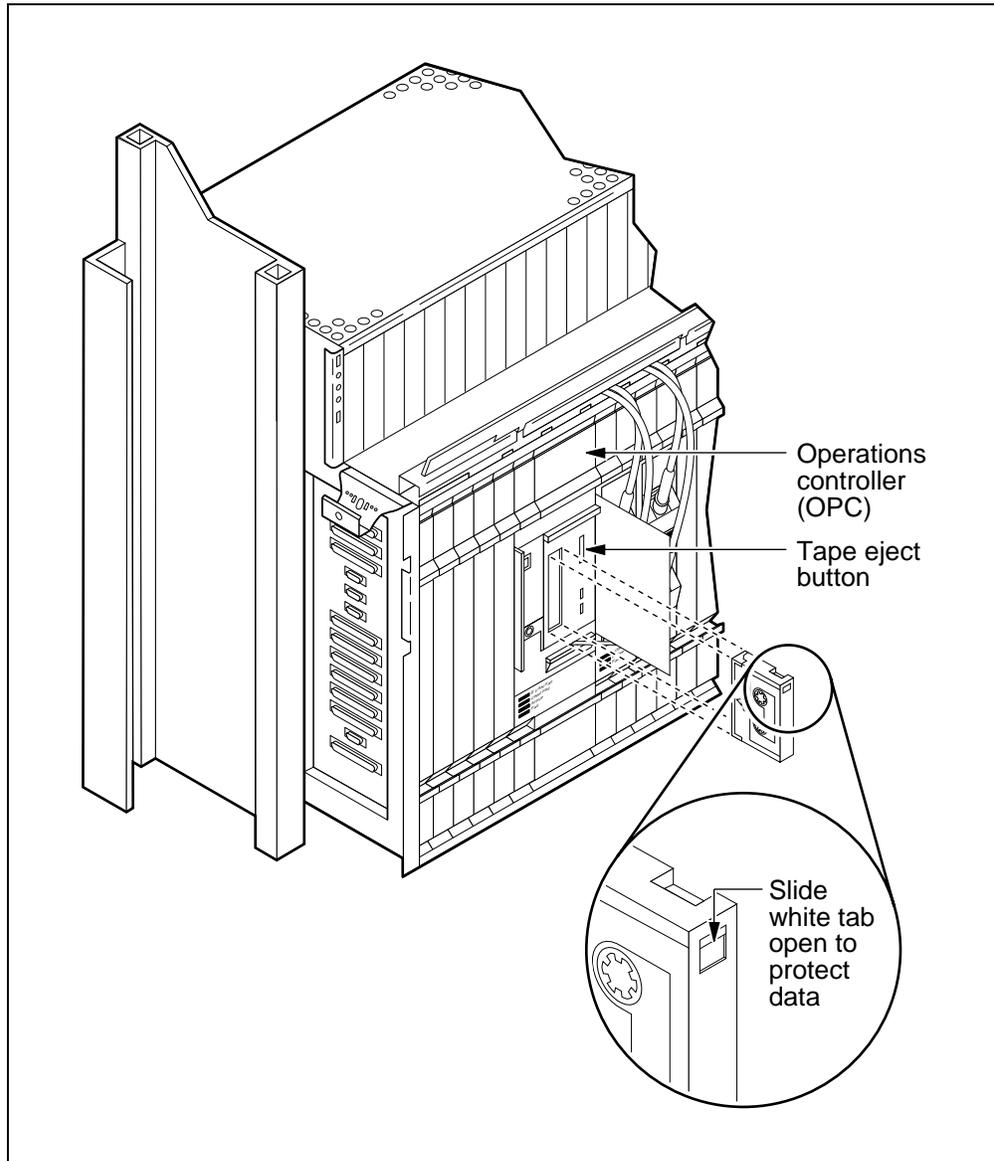
—**end**—

Procedure 3-3
Verifying the OPC serial number

Use this procedure to verify that the operations controller (OPC) serial number viewed online is the same as the OPC serial number you recorded earlier.

Requirements

The following requirements must be met before starting this procedure:

• Retrieve the OPC serial number from your notes.

Action

Step	Action
1	Log in to the OPC and open the Commissioning Manager tool.
	The Commissioning Manager main window is displayed.
2	Read the serial number of the OPC you are logged into, as displayed in the upper right corner of the Commissioning Manager main window.
3	Compare the OPC serial number viewed online with that obtained from the bar code label of the main printed circuit board of the OPC, as recorded in the Commissioning Data Record form. These serial numbers must be identical.
	Note: Ignore the prefix "NNTM" on the OPC serial number label.
4	Close the tool by pressing **Esc** or do the following:
	a. Display the Window menu by pressing **Ctrl_L W** (or Keypad **6**).
	The Window menu is displayed.
	b. Select the Exit command.
	The tool closes and the User Session Manager is displayed.

—end—

Procedure 3-4
Sending a load to the processors

Loading NE software

You can use the Reboot/Load Manager to send loads to the processors in the OPC span of control, either manually or automatically.

Typically, you use the Reboot/Load Manager tool to

- send a software load to a processor.
- upgrade the software release or load, for processors only.
  (To upgrade the OPC and all NEs in the system, see your Nortel Networks representative.)

For further information about the Reboot/Load Manager tool, see the description in *OPC User Interface Description*, 323-3001-301, in *Operations, Administration, and Provisioning*, Volume 4A.

Software loads

The Reboot/Load Manager sends software loads to NEs in two ways:

- manually, when you change the software release or load of a processor
- automatically, when a processor or line card requests to be rebooted (see Procedure 3-7, "Downloading software to a network element" on page 3-21)

  Note: It is recommended that you download processors one at a time. Wait until one download is successful before you initiate another.

To find out which loads are currently installed on the processors in the OPC span of control, enter the **lomui query_loads** command at the OPC prompt.

Requirements and limitations

The Reboot/Load Manager downloads software for individual NEs, one at a time. Therefore, if you are downloading all processors in the OPC span of control, use the Network Upgrade Manager tool.

If you are upgrading the software release (or loads) for the entire system (that is, OPCs and NEs), see your Nortel Networks representative for the appropriate change application procedure (CAP).

Handling and storing digital audio tapes

Keep digital audio tapes (DATs) away from moisture, extreme hot and cold temperatures, and magnetic fields and devices.

—continued—

Procedure 3-4 (continued)
Sending a load to the processors

Electrostatic-sensitive devices can be damaged by electrostatic discharge. Always ground yourself before handling the tape.

Requirements

Use this procedure to manually send a software load to a processor. This procedure allows you to safely test a new load.

Note: This procedure only makes one attempt to transfer a new load to a processor. If this attempt fails, the OPC does not resend the new load that failed. Instead, it sends the default load to the processor.

To perform this procedure, you must meet the following requirements:

- Obtain a userID and password that allow you access to the OPC.
- Read the command conventions for the interface (CMT or graphical) you are using in *OPC User Interface Description*, 323-3001-301, in *Operations, Administration, and Provisioning*, Volume 4A.

Action

Step	Action
1	Log in to the OPC and open the Reboot/Load Manager tool.
	The Reboot/Load Manager main window appears.
2	From the NE list, move to the NE you want, then press **Ctrl_A** (or Keypad **0**).
	The NE is highlighted.
3	Display the list item menu by pressing **Ctrl _L** (or Keypad **Enter**).
	The list item menu appears.
4	In the list, move to the processor you want to load, then press **Ctrl_A** (or Keypad **0**).
	A confirmation dialog appears.
5	To send the load, tab to the OK button, then press **Ctrl_A** (or Keypad **0**).
	The dialog closes and the load is transferred to the processor. The download statistics appear on the Reboot/Load Manager main window.

—**continued**—

Procedure 3-4 (continued)
Sending a load to the processors

Step	Action
6	To close the tool:
	a. Display the window menu by pressing **Ctrl_L W** (or Keypad **6**).
	The window menu appears.
	b. Select the Exit command by pressing the **Spacebar** (or Keypad **0**).
	The tool closes.
7	Check off this procedure on the System Setup Checklist.

—**end**—

Procedure 3-5
Entering system-level data

Use this procedure to commission the OPC and enter information about its span of control.

Requirements

To perform this procedure, the following requirements must be met:

- Make sure the OPC software is loaded in the OPC being used for commissioning (primary OPC) as specified in Procedure 3-2, "Installing software on a local OPC and NE from tape" on page 3-6.

- Connect a VT100-compatible terminal to the OPC according to *Data Administration Procedures*, 323-3001-304, and *OPC User Interface Description*, 323-3001-301, in *Operations, Administration, and Provisioning*, Volume 4A.

- Obtain a userID and password that permits access to the OPC and use the Commissioning Manager and Date tools; the default userID is "slat," and the default password is "slat."

- Obtain all system-level data, including serial numbers of each OPC used in the commissioning process.

  Note: The serial number of an OPC is located at the bottom center of the motherboard, on the right side (looking at the faceplate). The serial number of the OPC you are logged into also is displayed in the upper right corner of the Commissioning Manager main window.

- be familiar with the command conventions for the OPC interface you are using (CMT or graphical) as described in *OPC User Interface Description*, 323-3001-301, in *Operations, Administration, and Provisioning,* Volume 4A.

—continued—

Procedure 3-5 (continued)
Entering system-level data

Action

Step	Action
1	Log in to the primary OPC being used for commissioning.

The User Session Manager is displayed.

For information on logging into the OPC, see *OPC User Interface Description*, 323-3001-301, in *Operations, Administration, and Provisioning*, Volume 4A.

2   Open the Commissioning Manager tool.

For information on opening the Commissioning Manager tool, see *OPC User Interface Description*, 323-3001-301, in *Operations, Administration, and Provisioning*, Volume 4A.

The Commissioning Manager main window is displayed.

Note: The Enable Clear Com'g button is disabled once an OPC is commissioned as a primary OPC.

If the Enable Clear Com'g button is	Then
enabled	• select the Enable Clear Com'g button by pressing Keypad **0.** *A confirmation dialog is displayed.* • tab to the OK button and select it by pressing **Ctrl_A** (or Keypad **0**). *All data is removed from the portable OPC. The arrow (=>) indicator moves to Commission new system.*
disabled	go to step 4.

3   Select the Edit system data button.

The System Commissioning Data dialog appears and the cursor is placed in the Network name field.

The following terms are used in the System Commissioning Data dialog:

Network	refers to the broad collection of multivendor products that are used to service a given administrative region.
System	refers to the cluster of Nortel Networks NEs that are controlled by a single OPC, also known as a span of control.

—continued—

Procedure 3-5 (continued)
Entering system-level data

Step	Action
	Note: The Network number and System ID fields are automatically filled with a default value of 1 and cannot be changed.
4	Optional step. To specify a network name, enter a unique name, up to 32 alphanumeric characters long (for example, "SouthwestRegion01").
5	Optional step. To specify a system name, tab to the System name field and enter a unique name, up to 32 alphanumeric characters long (for example, "CentralBankHeadquarters").
6	Tab to the OPC name field.
	Note: The cursor skips over the System type field. This is because this field is autofilled with the name AccessNode and cannot be changed in this dialog.
7	At the OPC name field, enter a node name for the primary/backup OPC pair. OPC node names must be unique within the system and have the following format:

OPC <xxxx>

    where

      <xxxx>   integers from 0 to 9 or letters from A to Z.

(Example: OPCM011)

8	Tab to the Primary OPC serial number field. The serial number of the OPC you are logged into appears in this field by default. The serial number of the OPC you are logged into is displayed in the upper right corner of the Commissioning Manager main window. However, if you need to, you can change the default serial number in this field for the primary OPC.

Note: The serial number of the modular OPC is located at the bottom center of the motherboard, on the right side (as you look at the faceplate).

OPC serial numbers have the following format:

A<n><hhhhhhh>

    where

        <n>   is a one-digit integer between 0 and 9.

    <hhhhhhh> is a seven-digit hexadecimal number.

(Example: A103e35c3)

Note: If the serial number is not accepted, call Nortel Networks for technical assistance. For a list of the technical assistance telephone numbers, refer to the Technical Support Reference Card located in the front pocket of your NTP.

9	Optional step. To specify an alias for the primary OPC, tab to the Primary OPC alias field and enter a name up to 8 alphanumeric characters long. The default alias is the OPC name followed by P (for primary) or B (for backup).

—continued—

Procedure 3-5 (continued)
Entering system-level data

Step	Action
10	If a backup OPC is present, fill in the Backup OPC serial number field and the Backup OPC alias field the same way as described in steps 8 and 9.
11	Record the data from the System Commissioning Data dialog on the Commissioning Data Record Form located in Appendix B on page 11-1.
12	To complete the entry of system-level commissioning data, tab to the OK button and select it by pressing **Ctrl_A**.

When you select the OK button and the information is entered correctly, the System Commissioning Data dialog is removed and the name of the system being commissioned is displayed on the first line of the main window. The arrow (=>) indicator in the main window moves to Commission new network element.

If	Then
any essential data is missing or entered incorrectly	• an error dialog explaining the nature of the problem is displayed. • the System Commissioning Data dialog remains displayed and fields with missing or erroneous data are marked with an *X*.

Step	Action
13	Enter the following command from the /tmp directory of the OPC: **setmbr** ↵
14	Check off this procedure on the System Setup Checklist.

—**end**—

Procedure 3-6
Entering network element commissioning data

Use this procedure to begin the commissioning of an NE. This procedure should be repeated for every NE in the span of control. The order the NEs are commissioned is not critical.

Requirements

The following requirements must be met before performing this procedure:

- Connect a VT100-compatible terminal to the operations controller (OPC). Refer to *OPC User Interface Description*, 323-3001-301 in *Operations, Administration, and Provisioning*, Volume 4A.

- Obtain a userID and password that permits access to the OPC and use the Commissioning Manager tool.

- Have the shelf type and shelf functions for your system (access bandwidth manager (ABM) or transport bandwidth manager (TBM)).

- Know the NE serial number. This serial number is located on the metal bracket holding the label plate.

- Be familiar with the command conventions for the interface you are using (CMT or graphical) as described in *Network Element User Interface Description*, 323-3001-300, and *OPC User Interface Description*, 323-3001-301, in *Operations, Administration, and Provisioning,* Volume 4A.

Action

Step	Action
1	Select the Commission new network element from the Commissioning Manager main window by pressing **Ctrl_A**. *The Network Element Commissioning Data dialog is displayed.*
2	The cursor should be at the start of the NEID. At this field, enter a number (1 to 32767) that is unique within this system. This number should be assigned according to the NE numbering plan for this system. ***Note:*** The host digital terminal (HDT) in a system must have a unique NE number. In addition, each NE number must not be used with more than one SMA on the same switch. For example, if SMA 0 has 16 HDT systems with NEs numbered 1 through 16, then SMA 1 must have its NE numbers beginning at 17.

—continued—

Procedure 3-6 (continued)
Entering network element commissioning data

Step	Action
3	For the ABM shelf, record the NE number on the "NE:" label located on the label plate of the common equipment shelf. For the TBM shelf, record the NE number on a write-on label. Place the write-on label in the area marked "place NE label here" on the label plate of the common equipment shelf.

Selecting primary or backup OPC

Step	Action
4	Use the arrow keys to locate shelf type ABM or TBM.
5	Press either the **space bar** or the zero (**0**) on the keypad to select the appropriate shelf type. The shelf type is displayed in the field.
6	Tab to the Shelf function field.
7	Press **Ctrl_L /** to select the appropriate shelf function. The shelf function is displayed in the field.
8	Use the arrow keys to locate the shelf function that your equipment needs.
9	Press the **space bar** to select the appropriate shelf function. The selected shelf function is displayed in the field.
10	Record all commissioning data for this NE on the Commissioning Data Record Form located in Appendix B.
11	Enter the information for the transmission rate, shelf serial number, and the software release.

If the NE	Then
has a backup OPC	• tab to the field with the three OPC radio buttons. • move the cursor to the Backup OPC button and select it by pressing **Ctrl_A** (or Keypad **0**). *A mark is displayed between the brackets beside Backup OPC. The button is disabled for the commissioning of subsequent NEs.*
has the primary OPC	• tab to the field with the three OPC radio buttons. • move the cursor to the Primary OPC button and select it by pressing **Ctrl_A** (or Keypad **0**). *A mark is displayed between the brackets beside Primary OPC and the button is disabled for the commissioning of subsequent NEs.*

—**continued**—

Procedure 3-6 (continued)
Entering network element commissioning data

Step	Action

Completing the entry of NE commissioning data

12   To complete the entry of commissioning data for this NE, tab to the OK button and select it by pressing **Alt+Return** (or Keypad **0**).

When you select the OK button and the information is correctly entered, the NE is added to the Commissioned network elements list in the Commissioning Manager main window.

Note: If any essential data is missing or entered incorrectly, an error dialog explaining the problem is displayed. The Network Element Commissioning Data dialog remains displayed with an "X" next to empty data fields or fields with erroneous data.

13   Enter this command at the OPC prompt:

-lomui setNE_release -p <product> -r REL_<xxxx> -n <NE_ID> ↵

    where

    <product>   is the type of NE (access, OC3, OC12)

    <xxxx>   is the number of the current NE release

    <NE_ID>   is the identification number of the NE

    (Example: lomui setNE_release -p access -r REL_1600 -n 101-N 101)

14   Check off this procedure on the System Setup Checklist.

                       —end—

Procedure 3-7
Downloading software to a network element

Use this procedure to monitor the downloading of software from the commissioning OPC to an NE in a new system. Do not use this procedure to upgrade software on an in-service NE.

The software download automatically begins when all of the following are completed:

- the processors are installed in the shelf

- the system and NE commissioning data are loaded on the OPC

- the OPC is connected to the NE (using a control network (CNet) connection or by installing the OPC in the shelf)

When software is downloading, the Reboot Load Manager tool can be used to monitor (but not control) the download.

Requirements

The following requirements must be met before starting this procedure:

- Obtain a userID and password that permits access to the OPC and use the reboot/load manager tool.

- Complete Procedure 3-6, "Entering network element commissioning data" on page 3-18.

- Be familiar with the command conventions for the interface you are using (CMT or graphical) as described in *Network Element User Interface Description*, 323-3001-300, and *OPC User Interface Description*, 323-3001-301, in *Operations, Administration, and Provisioning,* Volume 4A.

Action

Step	Action

1   Connect a user terminal to the OPC being used for commissioning as specified in *OPC User Interface Description*, 323-3001-301 in *Operations, Administration, and Provisioning*, Volume 4A.

If your commissioning OPC is a	Then go to
modular OPC that is engaged and powered up	step 2
modular OPC that is NOT engaged and powered up	step 4

—continued—

Procedure 3-7 (continued)
Downloading software to a network element

Step	Action
2	Log in to the OPC.

For information on the OPC tool, refer to *Data Administration Procedures*, 323-3002-304, in *Operations, Administration, and Provisioning*, Volume 4A. For more information on the Reboot/Load Manager tool, refer to *OPC User Interface Description*, 323-3001-301, in *Operations, Administration, and Provisioning*, Volume 4A.

3 Open the Reboot/Load Manager tool. This tool allows you to monitor the progress of NE software download operations.

The Reboot/Load Manager main window is displayed.

4 The OPC with system and NE commissioning data begins downloading software when the OPC is engaged or connected to the shelf and a Proc circuit pack is installed.

⚠	**CAUTION** **Risk of equipment damage** The following steps involve the handling of circuit packs. Use an antistatic strap (or other static protection device) to protect against damage due to electrostatic discharge.

The download process depends on the OPC being used for commissioning.

If you are down-loading from a	Then
modular OPC (primary or spare) in the same shelf	Engage the modular OPC in its shelf backplane connector, if it is not already engaged. Log in to the OPC and open the Reboot/Load Manager tool (perform steps 2 and 3) if this has not already been done. Go to step 5.
modular OPC (primary) in an adjacent shelf	Connect a control network cable from the adjacent shelf with the commissioning OPC to the NE being commissioned.

5 Review the download progress using the OPC Reboot/Load Manager tool.

The download starts. The yellow initialization (Init) LED lights up on the maintenance interface card (MIC) while the processor card is loading software.

—**continued**—

Procedure 3-7 (continued)
Downloading software to a network element

Step	Action

After several minutes, "In Progress" is displayed in the Reboot/Load Manager main window. "Completed" is displayed in the Download Status field when the download is complete. However, the processor needs a few more minutes to initialize. For the ABM, wait for the red LED on the processor to turn off before proceeding. For the TBM, ignore the LEDs until an Approve command is given in a later procedure.

Note: When an NE is rebooted, the NE requests a database restore from the OPC.

If a database is	Then the
available	backup download is performed.
not available (for instance when an NE is being commissioned for the first time)	NE requests the database backup.
not able to complete the backup	NE begins to autoprovision with internal default values.

For an NE with a TBM shelf, once autoprovisioning is complete, the NE can read but not write to the circuit packs and an alarm is raised indicating the need for approval. Approval is given by issuing the Approve command from any network element user interface (NEUI) screen. Once the Approve command is issued, the NE writes to the circuit packs and a restart begins. At the end of the restart, the database confirms the data is correct.

6   Close the Reboot/Load Manager tool.

   a.   Display the Window menu by pressing **Ctrl_L W** (or Keypad **6**).

   The Window menu is displayed.

   b.   Select the Exit command by pressing the **space bar** (or Keypad **0**).

   The User Session Manager screen returns.

   Note: Steps 7 through 11 apply only to a TBM shelf.

7   Log in to the NEUI. If you do not know how to do this, refer to *Network Element User Interface Description*, 323-3001-300, in *Operations, Administration, and Provisioning*, Volume 4A.

8   Issue the Approve command from any NEUI screen by entering:

approve ↵

The system prompts you for confirmation.

—**continued**—

Procedure 3-7 (continued)
Downloading software to a network element

Step	Action
9	Confirm the command:
	y ↵
	This forces a system restart. The system restarts with the new configuration data.
	Allow sufficient time (up to three minutes) for the NE initialization after the restart is completed.
10	Verify that the Proc card is successfully rebooted.
	The "Database not restored. Type Q APPROVE at NE" alarm should be cleared.
11	Confirm that the Approve command is successful by issuing the command again.
	The request should be denied and the NEUI displays the following message:
	`Not applicable at this time.`
12	Check off this procedure on the System Setup Checklist.

—**end**—

Procedure 3-8
Setting the network element name

This procedure is used to set the name of the NE as defined by the user.

Requirements

Before starting this procedure, the following requirements must be met:

- Log on to the NEUI and at the main menu level.

- Be familiar with the command conventions for the interface you are using, and procedures for connecting to an NE and for logging into the NEUI. A complete tour of the NEUI is available in *Network Element User Interface Description*, 323-3001-300, in *Operations, Administration, and Provisioning*, Volume 4A.

Action

Step	Action
1	Access the System Administration screen by entering: **admin nep** ↵ *The Network Element Profile screen is displayed.Setting the network element name*
2	Set the NE name by entering: **nename <nename>** ↵ **where** <nename> is an ASCII string of up to 13 characters, with the first character being an alpha character. ***Note 1:*** Enter the NE name inside single quotes ('NE name'), otherwise all the text is converted to uppercase. Enter NE name with single quotes if you include spaces or special characters (?, =). ***Note 2:*** If the NE name is to be used in conjunction with TL1 target identifier (TID) and system identifier (SID), the TL1 TID/SID permissible character set must be followed. This character set includes uppercase or lowercase letters A through Z, numbers 0 through 9, and the special characters: dash, underscore, comma, and period. The special characters cannot be the first character in the name. *A screen appears as shown below when the procedure is completed.*
3	Repeat the entire procedure for the ABM shelf.
4	Check off this procedure on the System Setup Checklist.

<div align="center">**—end—**</div>

Procedure 3-9
Verifying circuit packs

Use this procedure to verify that your circuit packs have been installed before provisioning the virtual tributary bandwidth manager (VTBM) ring. If the circuit packs have not been installed, you should install them in this procedure.

Note: When you add a DS1, DS3, STS-1, OC-3, or OC-12 circuit pack group, you must also add the corresponding facilities.

Use this procedure to verify and add the following equipment:

- access interface card (AIC)
- copper-distribution shelf power (CDSP) card
- DS1/VT mapper
- DS3/STS mapper
- external synchronization interface (ESI)
- line interface card (LIC)
- OC-3 interface card
- OC-12 interface card
- OPC
- processor (Proc)
- STS-1 interface card
- transport interface card (TIC)

Action

Step	Action
1	From the Network Element Status screen, display the required equipment screen:

—continued—

Procedure 3-9 (continued)
Verifying circuit packs

Step   Action

If you are provisioning	Then enter	
DS1, DS3, STS-1, OC-3, or OC-12	**eq <type> <group>**↵	
	where	
	<type>	**ds1**, **ds3**, **sts1**, **oc3**, or **oc12**
	<group>	See "Group and slot associations for DS1, DS3, STS-1, OC-3, and OC-12" in *Optional Commissioning Procedures*, 323-3001-220 in *Commissioning and Testing*, Volume 3B.
	The selected equipment screen appears.	
ESI	**eq <type> <group>**↵	
	where	
	<type>	**esi**
	<group>	**g1** (top card) or **g2** (bottom card)
	The selected equipment screen appears.	
TIC, AIC, or Proc	**eq <type> <group>**↵	
	where	
	<type>	**tic**, **aic**, or **proc**
	<group>	**a** or **b**
	The selected equipment screen appears.	
OPC	**eq <type>** ↵	
	where	
	<type >	**opc**
	The selected equipment screen appears.	
LIC or CDSP	**eq <type>; <details> <CDS #> <group>**↵	
	where	
	<type>	type of circuit pack: **lic** or **cdsp**
	<details>	LIC or CDSP details screen: **dtllic or dtlcdsp**
	<CDS #>	number of the copper-distribution shelf housing the equipment: **1** to **7**
	<group>	group number of the equipment: For a LIC: **a, b, c,** or **d** For a CDSP: **a** or **b**
	The selected equipment screen appears.	

—continued—

Procedure 3-9 (continued)
Verifying circuit packs

Step	Action
	If the equipment is not installed, the system response is as follows:

```
The equipment does not exist.
Please select other equipment.
Alternatively, use the add command to create the
equipment.
```

Step	Action
2	Add the circuit pack by entering:
	add↵
3	Repeat steps 1 and 2 for each circuit pack group to be added.
4	Return to the Network Element Status screen by entering:
	fwpui↵
5	Check off this procedure on the System Setup Checklist.

<div align="center">**—end—**</div>

Initial provisioning

This chapter describes how to provision network element (NE) virtual
tributary bandwidth manager (VTBM) ring systems.

Procedures in provisioning

To provision a VTBM ring, do the following procedures in the order in which
they are listed:

Procedure	Page
4-15 Performing a manual NE database backup	4-67
4-16 Transferring data from the primary to the backup OPC	4-69
4-17 Unassigning call reference values	4-71
—end—	

Before starting the provisioning process

Ensure that you have made the following preparations before beginning:

- You have the necessary equipment, as listed in "Equipment requirements."

- You know an operations controller (OPC) user ID and password that allow you to access the OPC Provisioning Manager tool.

- You know the NE userID and password for the admin security level, for each network element to be provisioned (the default userID is "admin" with password "admin").

Procedure 4-1
Adding and configuring a ring

Use this procedure to add a new ring configuration and to add the add-drop multiplexer (ADM) nodes to it using the OPC Configuration Manager tool. Do not use this procedure for adding an additional ADM to an existing ring.

This procedure describes how to do the following:

- add a ring configuration
- configure a ring ADM
- save configuration data to the primary OPC
- save configuration data to the backup OPC

Configuration data for a ring ADM can be edited, but only if the ring is invalid and the configuration data has not been saved (that is, before step 18 in this procedure).

Note: During this procedure, only the buttons and commands needed to add a new ring are available. All other buttons and commands are disabled until you complete the procedure. To end this procedure before saving the configuration data, use the Revert command in the list item menu.

Requirements

Before performing this procedure, you must obtain the following information:

- the network element (NE) ID and name of each ring ADM in the new ring
- the NE IDs of the neighboring ring ADMs
- the automatic protection-switching ID for the ring ADMs
- circuit pack group connections to each neighboring ADM in the ring

> **CAUTION**
> **Risk of synchronization problems**
> Always connect G1 of one ring ADM to G2 of the next ring ADM to avoid synchronization problems.

—continued—

Procedure 4-1 (continued)
Adding and configuring a ring

Before performing this procedure, fill out the following table.

Ring configuration data form

Ring ADM	Automatic protection-switching (APS) ID	g1 neighbor		g2 neighbor	
		NE ID	**CPG**	**NE ID**	**CPG**

An example of a completed ring configuration data form filled out from a ring drawing

Ring ADM	APS ID	g1 neighbor		g2 neighbor	
		NE ID	**CPG**	**NE ID**	**CPG**
27	1	28	g2	29	g1
28	2	29	g2	27	g1
29	3	27	g2	28	g1

Ring drawing (with g1 of each ADM connecting to g2 of the next ADM)

—continued—

Action

Step	Action
1	Log in to the OPC and open the Configuration Manager tool. If you do not know how to do this, see *OPC User Interface Description*, 323-3001-301, in *Operations, Administration, and Provisioning*, Volume 4A.

The Configuration Manager main window appears. Any linear or ring configurations already defined for that OPC span of control are listed. Otherwise, the list area is blank.

Adding a ring configuration

2 To display the list menu, press **Ctrl_L /** (or Keypad **3**).

The list menu appears.

3 Move to the Add command.

A cascade menu appears, displaying the options AccessNode: Ring, AccessNode: Point-to-Point or Help.

4 Using the arrow keys, move to the AccessNode: Ring option, then press **Space** (or Keypad **0**).

Note: The name field is optional.

The Add Configuration dialog appears.

5 In the Name field of the Add Configuration dialog, enter a unique name for the ring configuration. You can enter up to 20 characters.

The Type, Topology, and Rate fields are automatically filled in.

6 Tab to the OK button, then press **Ctrl_A** (or Keypad **0**).

The Configuration Manager: Ring window appears.

7 To select the Configure a ring ADM button, press **Ctrl_A** (or Keypad **0**).

The Configure a Ring ADM dialog appears.

8 Refer to the table on page 4-4 that was filled in for this ring. Each table entry contains the values to be entered below to configure the ring ADM. Each ring ADM in the ring must be configured.

9 In the NE field, press **Ctrl_L /** (or Keypad **3**) to display the chooser menu.

The chooser menu appears.

Procedure 4-1 (continued)
Adding and configuring a ring

Step	Action

Configuring a ring ADM

10 Move to the ring ADM to be added, then press **Space** (or Keypad **0**). The ID appears in the NE field.

If the suggested APS ID is	Then
not correct	**a.** Tab to the Ring ADM APS ID field, then press **Ctrl_L / (**or Keypad **3**) to display the chooser menu. *The chooser menu appears.* **b.** Move to the ring identifier for the new ADM, then press **Space** (or Keypad **0**). *The APS ID appears in the field.*
correct	Go to step 11.

11 Tab to the ADM field (for the G1 neighbor), then press **Ctrl_L /** (or Keypad **3**) to display the chooser menu.

The chooser menu appears.

12 Move to the ADM that connects to the G1 CPG, then press **Space** (or Keypad **0**).

The NE Identifier and name appear in the field.

13 To enter the CPG that connects to the first neighboring ADM, tab to the OC-12 CPG field, then enter either **G1** or **G2**.

14 Tab to the ADM field (for the G2 neighbor), then press **Ctrl_L /** (or Keypad **3**) to display the chooser menu.

The chooser menu appears.

15 Move to the ADM that connects to the G2 CPG, then press **Space** (or Keypad **0**).

The NE identifier and name appear in the field.

16 To enter the CPG that connects to the second neighboring ring ADM, tab to the OC-12 CPG field, then enter either **G1** or **G2**.

17 Tab to the OK button, then press **Ctrl_A** (or Keypad **0**).

*The new ring ADM is added to the Configured Ring ADM list. The arrow at the left side of the window moves down to the **S**ave and send configuration data button.*

If the CPG connections form a closed loop, the Configured ADMs field above the list displays "Valid ring."

Repeat steps 9 through 17 for each ring ADM listed in the table on page 4-4.

—**continued**—

Procedure 4-1 (continued)
Adding and configuring a ring

Step	Action

Saving configuration data to the primary OPC

18   To select the Save and send configuration data button, press **Ctrl_A** (or Keypad **0**).

A confirmation dialog appears.

19   Tab to the Yes button, then press **Ctrl_A** (or Keypad **0**).

A confirmation dialog appears, displaying the results of the operation.

20   To select the Done button, press **Ctrl_A** (or Keypad **0**).

The dialog is removed.

Saving configuration data to the backup OPC

21   To save the revised configuration data to the backup OPC, press **Ctrl_L T** (or Keypad **,**) to display the Options menu.

The Options menu appears.

22   Move to the Transfer data to backup OPC command, then press **Space** (or Keypad **0**).

A confirmation dialog appears.

23   Tab to the Yes button, then press **Ctrl_A** (or Keypad **0**).

A dialog appears, displaying the results of the save operation.

24   To select the Done button, press **Ctrl_A** (or Keypad **0**).

The main window appears.

25   To close the tool, press **Esc**. If you do not know how to close an OPC tool, see *OPC User Interface Description*, 323-3001-301, in *Operations, Administration, and Provisioning*, Volume 4A.

26   Check off this procedure on the System Setup Checklist.

—**end**—

Procedure 4-2
Setting the timing reference source

Use this procedure to change the provisioning of synchronization timing references. You can assign a reference number and a quality level to each timing reference.

Note: Support is not available for synchronization-status messaging from a building-integrated timing source (BITS). Therefore, the quality level for a timing reference from a BITS defaults to stratum traceability unknown (STU). You can override this value by specifying a quality level for the timing source.

User-specified quality levels for timing sources

You must specify the quality level of a timing source in the following situations:

- if the network element cannot read synchronization-status messages (for example, if the network element contains OC-12 networking interface circuit packs rather than OC-12VT manager circuit packs)

- if the timing source comes from equipment that does not support synchronization-status messaging (for example, a BITS or another vendor's equipment)

Note: If the equipment cannot write or read synchronization-status messages, the timing-reference protection screen in the network element user interface allows you to specify the quality level of the line timing received from a SONET signal. If timing-reference protection switching is necessary, your specification informs the network element of the quality of the line timing.

Requirements

Before starting this procedure, you must log on the network element user interface (NEUI) and be at the main menu.

—continued—

Procedure 4-2 (continued)
Setting the timing reference source

Action

Step	Action

1   Determine if the shelf has an external synchronization interface (ESI).

If the shelf	Complete the following
has an ESI	**a.** Access the equipment ESI screen by entering: **eq esi <circuit pack group>**↵ where <circuit pack group> **g1** - top ESI unit **g2** - bottom ESI unit *The equipment ESI screen appears.* **b.** Change the target clock mode by entering: **edittarg holdover**↵ *Note:* Holdover is the preferred clock mode while you change the timing reference resource. However, if the ESI units have never received timing reference signals, set the clock mode to **freerun**.
does not have an ESI	Access the protection screen by entering: **protectn**↵ *The protection screen appears.*

2   If the shelf is DS1-fed:

Access the timing reference protection edit screen by entering:

trefsrc <source>

where

<source>

REFASrc

REFBSrc

—continued—

Procedure 4-2 (continued)
Setting the timing reference source

Step	Action
3	Change the timing reference source and give each source a reference number for tie-break priority if two timing sources have the same quality levels by entering:

source <reference #> <unit> ↵
yes ↵

> where

> <reference #>   **1**, **2**, **3**, or **4**

> <unit>   **bitsa**, **bitsb**, **g1**, **g2**, or **null**
>
>   BITSA and BITSB are not available for single-ended systems.

The desired timing source is assigned to the specified reference number.

Repeat this step for each timing source, as required.

Note 1: You cannot change the timing source of an active reference. To modify its timing source: perform a forced switch on the source so that it switches to the next highest level source, edit the timing source for that particular reference, then release the forced switch after you edit the timing source. Note that a forced switch is nonrevertive.

Note 2: If you are using external timing sources, you must specify the quality level for BITSA and BITSB, because the network element cannot derive the quality level automatically from external sources.

Note 3: If a reference is added to the list of valid reference sources, the quality level of the added reference defaults to the override value of STU-P (traceable to an unknown quality source). However, if a reference is already in the list of valid reference sources, the quality level traces to the last provisioned quality level.

Note 4: You can deprovision a reference source by entering:
source <reference #> null↵
yes↵

—continued—

Procedure 4-2 (continued)
Setting the timing reference source

Step	Action

4   If necessary, specify the quality level of a timing source by entering:

qlevel <reference #> <quality level> ↵
yes ↵

where

<reference #>   **1**, **2**, **3**, or **4**

<quality level>   **ST1**   Stratum 1
                    STU   stratum traceability unknown
                    ST2   Stratum 2
                    ST3   Stratum 3
                    SMC   +/− 20 ppm clock
                    DUS   do not use for synchronization
                    AUTO   reset the quality level to the level received
                                in the synchronization status message

The assigned quality level replaces the existing quality level.

Note 1: If the quality level for a reference is set to AUTO, the quality level initially displayed inherits its value from the S1-byte synchronization-status message. To manually set it to a different quality level, use the level command. When you change a quality level, the screen displays a -P suffix appended to the level (for example, ST1-P).

Note 2: If S1-byte synchronization-status messaging is not to be used, set the quality level to STU.

Note 3: If a source fails, the QLevel field in the ESI Reference Protection screen continues to display the quality level of the source before the failure. For example, if the quality level of a source is STU before the failure, the QLevel field continues to display STU after the failure.

Note 4: All network elements in a VTBM Ring that do not use external timing sources should have the quality level set to AUTO for each timing reference source. This will result in the quality level of the timing source being set to the quality level indicated in the synchronization status message.

—continued—

Procedure 4-2 (continued)
Setting the timing reference source

Step	Action

5 Complete the instructions in the following table.

If the shelf	Complete the following
has an ESI	**a.** Access the equipment ESI screen by entering: **eq <circuit pack group>**↵ where <circuit pack group> **g1**- top ESI unit **g2** - bottom ESI unit *Example:* eq esi g1 *The equipment ESI screen appears.* **b.** Change the target filter mode by entering: **edittarg normal**↵
does not have an ESI	The procedure is complete.

6 Check off this procedure on the System Setup Checklist.

—**end**—

Procedure 4-3
Setting the ESI target clock mode

Use this procedure to change the ESI target clock mode for TBM shelves with ESI. During commissioning, ESI autoprovision is set to the Freerun mode. Under normal operating conditions, the target clock mode is set to Normal. You can set the target clock mode to Freerun or Holdover when you test the ESI synchronization performance (for example, to measure the amount of holdover drift over a period of time).

Changes to the target clock mode cause corresponding changes to the current clock mode. However, the current clock mode may change automatically during various facility or equipment failures.

Action

Step	Action
1	Log in to the NEUI and be at the main menu.
2	Access the ESI Equipment screen by entering:
	equipmnt esi g1 ↵
	The ESI Equipment screen appears.
3	Change the ESI target clock mode by entering:
	edittarg <mode> ↵
	where
	<mode> **normal**, **holdover**, or **freerun**
	Note: Changing the target clock mode of ESI G1 automatically changes the target clock mode of G2 to the same value.
4	Check off this procedure on the System Setup Checklist.

—end—

Procedure 4-4
Setting the network synchronization

Timing of AccessNode systems can be achieved in different ways, as described in *Configuration and Equipment Description*, 323-3001-100, in *Description*, Volume 2A. An ESI may be required at a particular NE, depending on the shelf function, the transport optics, and the application. See *Configuration and Equipment Description*, 323-3001-100, in *Description*, Volume 2A for more information on the supported timing methods.

Note: You must take special precautions with a VTBM ring. To avoid timing loops in the network, you do not configure any network elements in a VTBM ring to extract timing references from each other. Before setting the NE clock source or changing the ESI configuration options, examine the current settings of adjacent NEs.

Requirements

The following requirement must be met before starting this procedure.

- Have access to a VT100-compatible terminal connected to the network element (NE).

Action

Step	Action
1	Log in to the Network Element User Interface (NEUI).
	The Network Element Status screen is displayed.
2	From the Edit Shelf Equipment screen, select the 'txc' clock source:
	Note: For the TBM shelf, enter:
	eq sh; edit; clocksrc esi↵
	y ↵
	Note: For the ABM shelf, enter:
	eq sh; edit; clocksrc `triblinetimed`↵
	y ↵
	The Clock Source field displays the following:
	`TribLineTimed`

—continued—

Procedure 4-4 (continued)
Setting the network synchronization

Step	Action
3	If the new clock source is ESI, display the ESI Equipment screen for the active ESI unit by entering:

equipmnt esi <circuit pack> ↵

    where

    <circuit pack>   active ESI unit: **g1** or **g2**

4	Check off this procedure on the System Setup Checklist.

<div align="center">—**end**—</div>

Procedure 4-5
Setting the ESI external timing reference input parameters

Use this procedure to change the parameters of the ESI timing references (BITSA and BITSB). These signals are received through the ESI cable from an external timing source, such as a BITS.

Requirements

Before starting this procedure, you must log on the NEUI and be at the main menu.

Action

Step	Action
1	To provision the ESI reference facility, access the ESI Facility screen and view the current provisioning options of the facility by entering: **facility esi <timing reference>**↵ where <timing reference> **bitsa** *The ESI Facility screen appears.*
2	Place the facility out of service (OOS) by entering: **chgstate oos** ↵ **yes** ↵ *Note:* Both BITSA and BITSB facilities must be OOS for editing.
3	Display the Edit Facility screen by entering: **edit** ↵ *The ESI Facility screen appears.*

—continued—

Procedure 4-5 (continued)
Setting the ESI external timing reference input parameters

Step	Action

4   To change the ESI BITSA or BITSB parameter for the selected facility, complete the instructions in the following table.

If you are changing this parameter	Then enter
line coding	**lcoding <coding>**↵ where <coding> type of line coding: **b8zs** or **ami** *The value appears in reverse video.*
frame format	**framefmt <format>**↵ where <format> type of frame format: **superframe** (superframe) or **extended** (extended superframe) or **Spacebar** to toggle *The value appears in reverse video.*
signal format	**sigfmt <signal>**↵ where <signal> format of BITS input signal: **ds1** (DS1 signal) or **cc** (composite clock) or **Spacebar** to toggle *The value appears in reverse video.*

5   Return to the ESI facility screen by entering:

quit ↵

6   Restore the facility to service by entering:

chgstate is ↵

7   Repeat steps 1-6 for the **bitsb** timing reference.

8   Check off this procedure on the System Setup Checklist.

—**end**—

Procedure 4-6
Setting the OC-12 VTBM target clock mode

Use this procedure to change the target clock mode of the OC-12 VTBM circuit pack.

When you provision the target clock mode, follow the rules in Table 4-1. If you provision the target mode to a certain value, the system rejects any redundant request to provision the target mode to that value.

Table 4-1
Rules for provisioning the target clock mode

If the current clock mode is	You can select these target modes
acquire	**freerun**
freerun	**freerun** **normal**
normal	**freerun** **holdover**
holdover	**freerun** **holdover** **normal**
Note: If you set the target mode to **normal**, the current mode changes to normal only if a valid timing reference is available.	

Action

Step	Action

1   Log in to the network element user interface (NEUI) and be at the main menu.

2   Access the OC-12 Equipment screen and display the equipment status by entering:

     equipmnt oc12 <circuit pack group>

         where

         <circuit pack group>   **g1** or **g2**

     The Equipment screen showing the equipment status appears.
<div align="center">**—continued—**</div>

Procedure 4-6 (continued)
Setting the OC-12 VTBM target clock mode

Step	Action
3	Change the target clock mode by entering: **edittarg <clock mode>** where <clock mode> **holdover**, **normal**, or **freerun** *Note:* Changing the target clock mode of OC12 G1 automatically changes the target clock mode of G2 to the same value. *A screen indicating the command was successful appears.*
4	Check off this procedure on the System Setup Checklist.

—**end**—

Procedure 4-7
Provisioning synchronization-status messaging

Use this procedure to provision synchronization-status messaging for an OC-12 VTBM system. To use this procedure, you must log in to one network element at a time and repeat the steps in this procedure for each network element in the system.

> *Note:* For more information about synchronization-status messaging, see "Synchronization," in *Configuration and Equipment Description*, 323-3001-100, in *Description*, Volume 2A.

Planning for synchronization-status messaging
Determining how to provision the timing reference source

You must determine how each OC-12 VTBM network element relates to the overall network synchronization plan. For example, determine which offices have BITS/PRS (primary reference source) and which BITS systems require OC-N synchronization references. You must then determine the synchronization configuration of the network elements in the system.

After you determine the network synchronization plan, take the following steps to determine how to set the timing reference sources to agree with the network synchronization plan:

- Decide which signals from the BITS or the OC-12 optical receive interfaces (or both) will be used as timing reference sources for each network element.

- Determine whether you will use the ESI DS1 outputs (G1OUT and G2OUT) to distribute timing.

Timing reference source provisioning requirements

For externally timed network elements, provision both of the ESI inputs (BITSA and BITSB) from the composite clock as timing reference sources. This simplifies engineering and increases the reliability for the restoration of synchronization-status messaging. For better timing survivability, you can provision OC-12 interfaces at externally timed network elements; however, mix provisioning might cause timing loops during fault conditions.

For line-timed network elements that are not connected to a BITS or are externally timed from other equipment, provision two internal sources (OCA and OCB) derived from OC-12 interfaces.

—continued—

Procedure 4-7 (continued)
Provisioning synchronization-status messaging

Line timing without ESI cards

In a VTBM system, you can provision line timing for a network element that does not have ESI cards. Only the following network elements require ESI cards (NT7E27):

- network elements that are externally timed

- network elements that distribute timing

- network elements that require Stratum 3 holdover

During reference failure conditions, network elements with ESI cards provide Stratum 3 holdover capability (±0.37 ppm for 24 hours). Network elements without ESI cards provide SONET minimum clock holdover capability (±4.6 ppm for 24 hours and ±0.37 ppm for the first five minutes). Using S1-byte synchronization-status messaging minimizes the time that a network element stays in SONET minimum clock holdover mode.

Operational considerations

Consider the following information when you provision a network for synchronization-status messaging:

- OC-3 TBM linear systems do not support S1-byte synchronization-status messaging.

- OC-3 and STS-1 tributaries do not support S1-byte reception.

- OC-3 and STS-1 tributaries do not support S1-byte insertion.

- Revertive timing reference protection switching is not supported.

Recommendations

Consider the following recommendations when you upgrade a network to synchronization-status messaging:

- Continue to use asynchronous timing distribution (where it is possible) for situations such as linear systems that transport only asynchronous DS3s.

- Externally time two network elements in a network to make sure that a BITS is always available if one of the BITS clocks fails.

- Use closest-to-the-source or split-timing distribution.

- Provision two internal sources (OCA and OCB) for shelf timing at line-timed network elements without BITS timing.

- Avoid provisioning a mixture of internal and external sources in a VTBM ring, since mix provisioning can cause timing loops.

—continued—

Procedure 4-7 (continued)
Provisioning synchronization-status messaging

In some cases, mix provisioning prevents the system from entering self-timing mode. Figure 4-1 shows the self-timing mode. BITSA and BITSB (external sources) are the only sources provisioned for the externally timed network element (NE 6). If the BITS fails, NE 6 enters holdover self-timing mode and sends the ST3 quality level to the other network elements in the ring.

If you require mix provisioning, study the network's timing subsystem to determine its susceptibility during fault conditions.

Figure 4-1
Self timing mode without mix provisioning
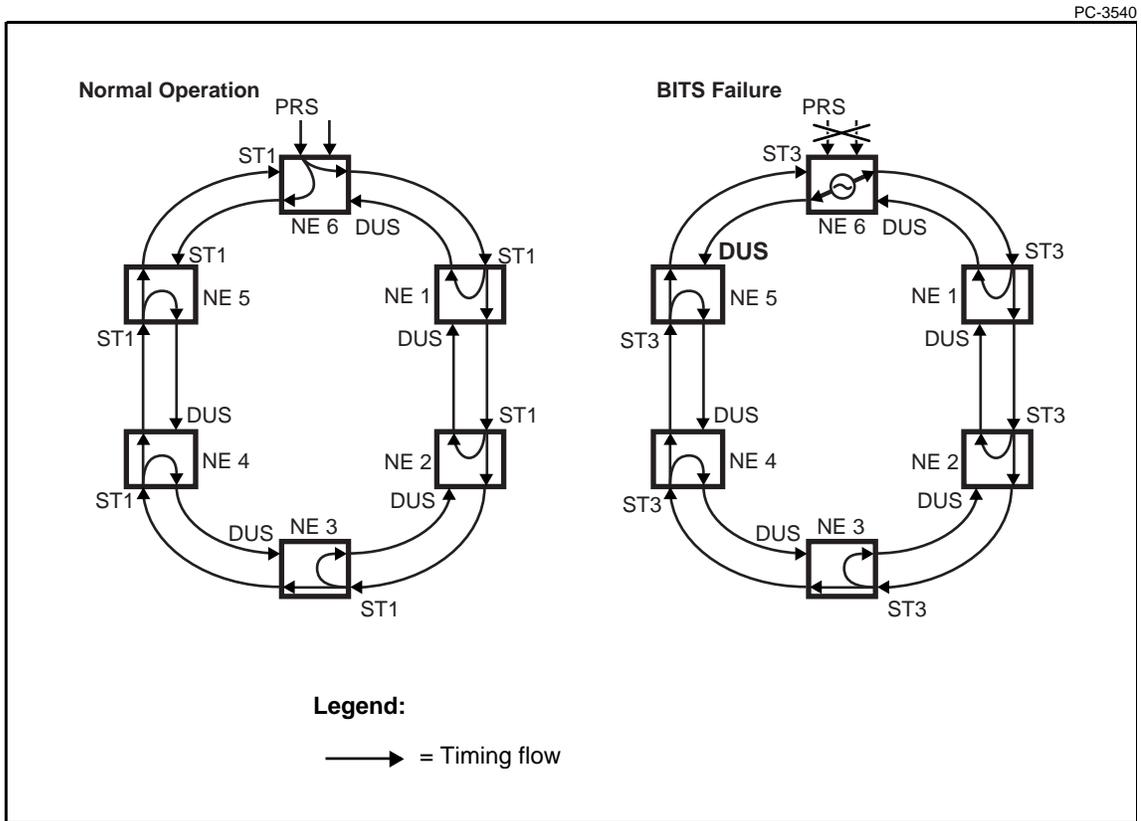
—continued—

Procedure 4-7 (continued)
Provisioning synchronization-status messaging

Requirements

Before you start this procedure, complete the following requirements:

- Make sure the SONET overhead is enabled on both the working and protection OC-12 interfaces if you are provisioning a linear network element.

- Make sure the network elements are running AN14 or higher.

- Log in to the network element user interface.

Note: You must perform this procedure at each network element in the OC-12 system.

Action

Step	Action
1	Set the network element clock source by entering:

eq sh; edit.↵
clocksrc <clock source type>.↵
yes.↵

where

<clock source type>	**ESI** (for VTBM network elements with ESI cards)
	linetimed (for VTBM network elements not necessarily equipped with ESI cards)

Note 1: For OC-12 line-timed network elements, you can set the clock source to ESI or line-timed. If you select ESI, ESI cards aid the line timing. If you select line-timed, the network element does not need to be equipped with ESI cards. The OC-12 VTBM circuit pack (NT7E05) maintains holdover or freerun timing during a synchronization failure.

Note 2: During reference failures, add-drop multiplexer (ADM) network elements without ESI cards enter SONET holdover (±0.37 ppm for the first five minutes and ±4.6 ppm for 24 hours). Network elements with ESI cards maintain Stratum 3 holdover (±0.37 ppm for 24 hours).

Provisioning internal sources

The default assignments for the internal sources are OCA from OC-12 G1 and OCB from OC-12 G2.

—continued—

Procedure 4-7 (continued)
Provisioning synchronization-status messaging

Step	Action
2	Access the Timing Reference Source screen by entering:

pr tp;trefsrc↵

The Timing Reference Source screen appears.

| **3** | Change the OCA source by entering: |

ocasrc <unit>↵

where

<unit>   **g1**

Note: The ocasrc command works only if the source Tracking field on the G1OUT and G2OUT facility screens displays Off.

| **4** | Change the OCB source by entering: |

ocbsrc <unit>↵

where

<unit>   **g2**

Note: The ocbsrc command works only if the Source Tracking field on the G1OUT and G2OUT facility screens displays Off.

Provisioning the ESI inputs (BITSA and BITSB)

| **5** | Access the ESI Facility BITSA/BITSB Edit screen by entering: |

fa esi <unit>↵

where

<unit>   **bitsa** or **bitsb**

| **6** | If the network element is *not* externally timed, put BITSA and BITSB out of service (OOS) by entering: |

chgstate oos↵
yes↵

| **7** | You must change the framing format parameter of BITSA and BITSB if the network element meets the following conditions: |

- The network element is externally timed.
- The network element is connected to a BITS that supplies DS1s with the extended superframe framing format.

—continued—

Procedure 4-7 (continued)
Provisioning synchronization-status messaging

Step	Action

To change the framing format, enter:

sigfmt cc↵

Note: The ESI BITSA/BITSB facility must be out of service before you change the frame format.

Provisioning the timing sources for the network element

8 Complete Procedure 4-2, "Setting the timing reference source," on page 4-8.

Provisioning timing distribution

Note: Unless the network element will provide timing distribution to a TransportNode system, put the ESI DS1 outputs (G1OUT and G2OUT) out of service.

9 Access the ESI Facility G1OUT and G2OUT screens by entering:

fa esi <unit>↵

where

<unit>   **g1out** or **g2out**

10 Complete the instructions in the following table:

If the network element will	Do the following
use DS1s with the extended superframe format to provide timing distribution	Change the framing format by entering: **edit↵** **framefmt extended↵** *Note:* The G1OUT/G2OUT facility must be out of service before you change the framing format.
not provide timing distribution to a BITS	Put G1OUT and G2OUT out of service by entering: **chgstate oos↵** **yes↵**

11 Determine the source for timing distribution.

—**continued**—

Procedure 4-7 (continued)
Provisioning synchronization-status messaging

Step	Action

12   Complete the instructions in the following table:

To provision the timing distribution to follow	Do the following
the best quality-timed OC-12 line	Enter: **srctrack best**↵ **yes**↵ ***Note 1:*** The ESI DS1 output tracks OCA or OCB and their corresponding timing references, which were provisioned at the Timing Reference Source screen in steps 2 through 4, with the best quality synchronization-status message. ***Note 2:*** The Source Tracking field must display Off for this command to work. If the field displays Act, enter **srctrack off**, then enter **srctrack best**.
a fixed OC-12 line	Enter: **source <source>**↵ where <source> **oca** or **ocb** ***Note 1:*** The G1OUT/G2OUT facility must be out of service for this command to work. ***Note 2:*** The Source Tracking field must display Off for this command to work. ***Note 3:*** The timing reference for OCA and OCB is the reference displayed on the Timing Reference Source screen.

—**continued**—

Procedure 4-7 (continued)
Provisioning synchronization-status messaging

Step	Action

Provisioning the threshold AIS generation mode at network elements that will provide timing distribution

> *Note:* For information about threshold generation of alarm indication signals (AIS), see *Configuration and Equipment Description*, 323-3001-100, in *Description*, Volume 2A.

13   At the ESI Facility G1OUT screen and at the ESI Facility G2OUT screen, change the threshold AIS parameter by entering:

thresais <quality level>↵

where

<quality level>   **st2**, **st3**, or **smc** to set the threshold AIS generation mode

null to disable the threshold AIS generation

> *Note:* If the synchronization-status message in the selected OC-12 interface is at or below the provisioned threshold AIS value, this command may raise the ESI Tx AIS minor alarm.

The following screen is an example of a provisioned ESI Facility screen.

PC-2179.3 (R11)

```
                Critical Major minor warning  FailProt Lockout ActProt PrfAlrt
      Network View    .      .     .     .        .       .       .       .
      1 St. John's    .      .     .     .        .       .       .       .
 Edit Fac
  0 Quit      ESI Facility                       Shelf: 1
  2 Select                                        Unit: G1OUT
  3 Query                    State:  OOS
  4
  5 LCoding           Coding Format:  -            Framing Format:  Superframe
  6 FrameFmt          Signal Format:  DS1          Line Build Out:  Short
  7 SigFmt                   Source:  OCA          Source Tracking:  Best
  8 LBO           Timing Reference:  OC12 G1
  9 Source          Threshold AIS:  Stratum 3
 10 SrcTrack
 11 ThresAIS
 12              EDIT:
 13
 14
 15
 16
 17
 18 Help
   NE 1
 Time  13:47  >
```

14   Check off this procedure on the System Setup Checklist.

—**end**—

Procedure 4-8
Upgrading to synchronization-status messaging

Use this procedure to upgrade an OC-12 system without synchronization-status messaging to use S1-byte synchronization-status messaging.

AccessNode systems without synchronization-status messaging normally have two sources (BITSA and BITSB) at externally timed network elements and one source (OCA or OCB) at line-timed network elements. The quality level for all sources is normally set to STU, which disables synchronization-status messaging. When you upgrade a system to synchronization-status messaging, you must do the following:

- Add one extra source at each line-timed network element.
- Change the quality level for all references at each network element.

For better timing survivability, you can provision OC-N interfaces at externally timed network elements.

Because of the synchronization-status messaging protocol adopted in Bellcore document GR-253-CORE, mix provisioning at a network element can create timing loops during fault conditions. The following is an example of mix provisioning:

- source 1 is BITSA
- source 2 is BITSB
- source 3 is OCA

Study the timing subsystem within a network to determine the network's susceptibility to timing loops during fault conditions.

This procedure uses an example of a six-node ring, shown in Figure 4-2 on page 4-29. Table 4-2 on page 4-30 shows the timing references provisioned for the ring before the synchronization upgrade.

—continued—

Procedure 4-8 (continued)
Upgrading to synchronization-status messaging

Figure 4-2
Ring without synchronization-status messaging
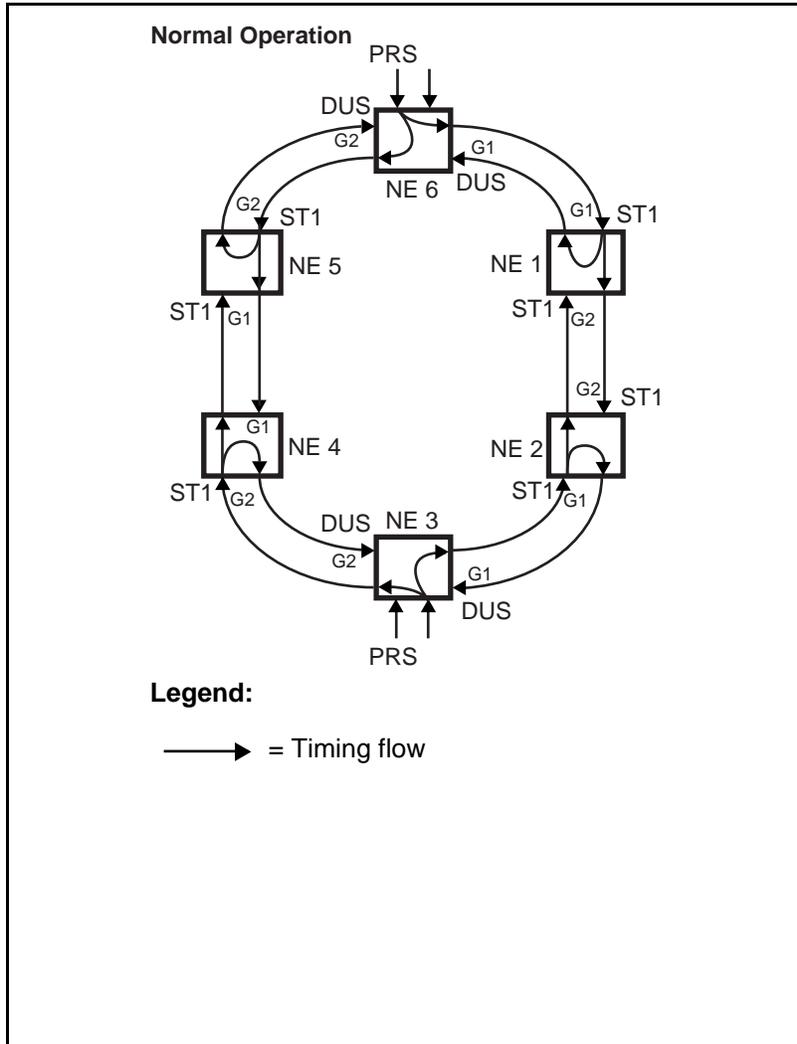
—continued—

Procedure 4-8 (continued)
Upgrading to synchronization-status messaging

Table 4-2
Timing reference sources before the synchronization upgrade

Network element	Primary Source	Secondary Source
1	OCA	-
2	OCA	-
3	BITSA	BITSB
4	OCB	-
5	OCB	-
6	BITSA	BITSB

Table 4-3 shows the sources and quality levels for upgrading the ring in Figure 4-2 on page 4-29 to use synchronization-status messaging.

Table 4-3
Timing reference sources used for the synchronization upgrade

Network Element	Source 1	QLevel	Source2	QLevel	Source 3	QLevel	Source 4	QLevel
1	OC12 G1	Auto	OC12 G2	Auto	Null	-	Null	-
2	OC12 G1	Auto	OC12 G2	Auto	Null	-	Null	-
3	BITSA	ST1	BITSB	ST1	Null	-	Null	-
4	OC12 G2	Auto	OC12 G1	Auto	Null	-	Null	-
5	OC12 G2	Auto	OC12 G1	Auto	Null	-	Null	-
6	BITSA	ST1	BITSB	ST1	Null	-	Null	-

—continued—

Procedure 4-8 (continued)
Upgrading to synchronization-status messaging

Requirements

Before you start this procedure, complete the following requirements:

• Log in to the network element user interface and be at the main menu.

Action

Step	Action
1	Access the Reference Protection Edit screen of network element 3 by entering: **protectn: trefprot**↵ **edit.**↵ *The Reference Protection edit screen appears.*
2	Provision the quality levels for the references at network element 3 by entering: **qlevel 1 st1**↵ **yes.**↵ **qlevel 2 st1**↵ **yes.**↵ *The Reference Protection screen displays the timing reference and corresponding quality levels for network element 3.*
3	To provision the quality levels for the references at network element 6, repeat steps 1 and 2.
4	Access the Reference Protection edit screen of network element 1 by entering: **protectn: trefprot**↵ **edit.**↵ *The Reference Protection edit screen appears.*
5	Provision source 2 for network element 1 by entering: **source 2 g2**↵ **yes.**↵ *Note:* You must have assigned the OC-12 G2 source to OCB at the Timing Reference Source screen.

—**continued**—

Procedure 4-8 (continued)
Upgrading to synchronization-status messaging

Step	Action
6	Provision the quality levels for the references at network element 1 by entering:
	qlevel 1 auto↵
	yes.↵
	qlevel 2 auto.↵
	yes.↵
	The Reference Protection screen displays the timing reference and corresponding quality levels for network element 1.
7	To provision source 2 and the quality levels of the references at network element 2, repeat steps 4 through 6.
8	Access the Reference Protection edit screen of network element 4 by entering:
	protectn: trefprot.↵
	edit.↵
	The Reference Protection edit screen appears.
9	Provision source 2 for network element 4 by entering:
	source 2 g1.↵
	yes.↵
	Note: You must have assigned the OC-12 G1 source to OCA at the Timing Reference Source screen.
10	Provision the quality levels for the references at network element 4 by entering:
	qlevel 1 auto.↵
	yes.↵
	qlevel 2 auto.↵
	yes.↵
11	To provision source 2 and the quality levels for the references at network element 5, repeat steps 8 through 10.

—continued—

Procedure 4-8 (continued)
Upgrading to synchronization-status messaging

Step	Action

Provisioning the sources and threshold AIS for network elements that distribute timing to BITS

The example in Figure 4-2 on page 4-29 assumes that only network element 1 distributes timing. This section provisions network element 1 as follows:

- The derived DS1s (G1OUT and G2OUT) are automatically selected from the OC-12 interface with the best quality synchronization-status message.

- The derived ESI DS1 outputs send an alarm indication signal (AIS) if the best synchronization-status message is at or below the Stratum 2 quality level.

12 At network element 1, access the ESI Facility G1OUT and G2OUT screens by entering:

facility esi <timing reference>↵

  where

  <timing reference>   **g1out** or **g2out**

13 To provision G1OUT and G2OUT to use the best quality timing source, enter:

srctract best↵
yes↵

14 Provision G1OUT and G2OUT for threshold AIS generation by entering:

thresais st2↵

Note: If the synchronization-status message in the selected OC-12 interface is at or below the Stratum 2 level, the thresais command might raise the ESI Tx AIS minor alarm.

—continued—

Procedure 4-8 (continued)
Upgrading to synchronization-status messaging

Step	Action
	Because the other network elements do not distribute timing to BITS, you can put their G1OUT and G2OUT facilities out of service. Putting G1OUT and G2OUT out of service prevents the ESI G1OUT/G1OUT Tx AIS alarm from being raised unnecessarily during OC-12 line or equipment failures.
	Figure 4-3 shows the ring after you upgrade it to synchronization-status messaging.
15	Check off this procedure on the System Setup Checklist.

Figure 4-3
Ring with synchronization-status messaging

PC-3483.1
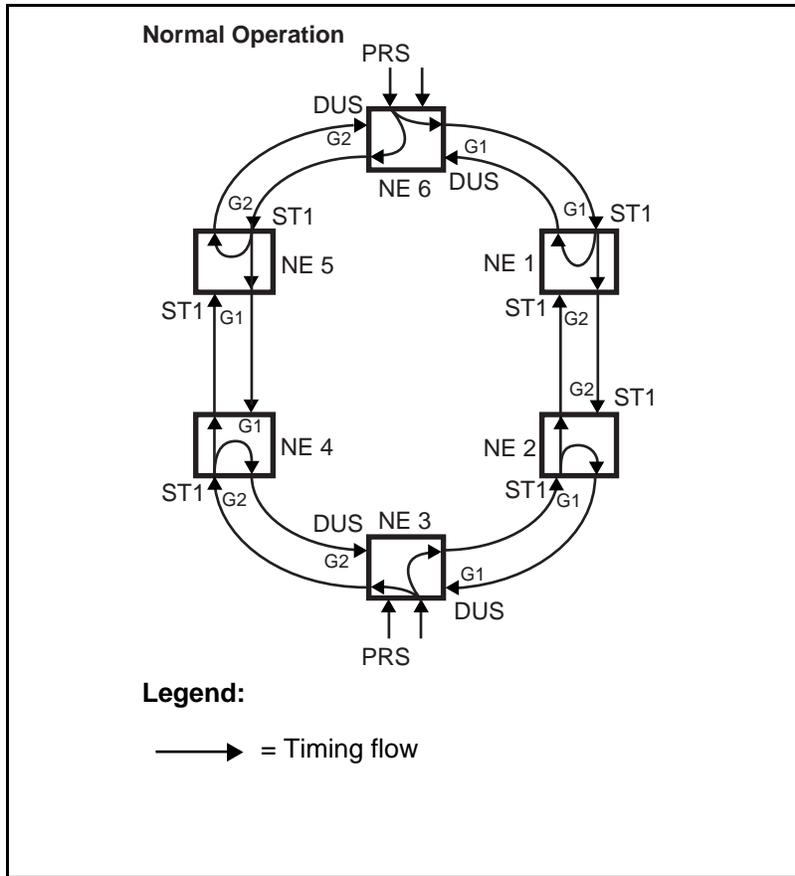
—end—

Procedure 4-9
Provisioning DS1 facility parameters

Use this procedure to provision the parameters for a DS1 transmission facility.

Note: For information on provisioning DS1 facilities between a local digital switch and an S/DMS TransportNode network element (in a single-ended AccessNode configuration with an OC-12 ring), see *S/DMS TransportNode Provisioning and Operations Procedures,* 323-1111-310.

Table 4-4 lists the parameters for provisioning a DS1 facility for GR-303 digital multiplex switch (DMS), GR-303 multivendor interface (MVI), TR-08, tandem and transport DS1s. Use this table to find the command for each parameter based on your equipment.

Note: Use b8zs line coding when provisioning a DS1 facility as an OMC or a virtual line concentration module (VLCM).

Table 4-4
Provisioning DS1 parameters for GR-303 DMS/MVI, VLCM, TR-08, tandem and transport DS1s

Parameter	GR-303 DMS/MVI or VLCM DS1s	TR-08 DS1s	Tandem DS1s	Transport DS1s
line coding	use b8zs	use amizcs	use ami, amizcs or b8zs	use ami, amiczs or b8zs
frame format	use extended superframe (extended)	if associated with span A, use dlc if associated with spans B, C, and D, use superframe	use superframe or extended superframe depending on the circuit order	use superframe or extended superframe
alarm encoding	use ones	use ones	use ones	use ones or zeros
synchronization mode	use bytesynchronous	use bytesynchronous	use bytesynchronous	use asynchronous

Refer to Table 4-5 on page 4-39 for a list of the parameters for provisioning a DS1 facility.

Requirements

Before using this procedure, use the facility records to get the values for each of the DS1 parameters listed in Table 4-4 on page 4-35.

—continued—

Procedure 4-9 (continued)
Provisioning DS1 facility parameters

Action

Step	Action
1	Log in to the FCOT TBM shelf.
2	From the Network Element Status screen, display the DS1 facility provisioning screen by entering:

fa ds1 <group> <port>↵

where

<group>   DS1 group number

<port>   number of the DS1 port: **1** to **14,** or **all**

3	Take the facility out of service by entering:

chgstate oos ↵

y ↵

The state of the facility changes to out of service (00S).

4	To change the parameters, display the Edit Facility screen by entering:

edit ↵

The Edit Facility screen appears.

—**continued**—

Procedure 4-9 (continued)
Provisioning DS1 facility parameters

Step	Action

5　Set or change any or all DS1 facility parameters listed in the following table. Make any number of settings or changes before proceeding to step 6. If you are provisioning for the first time, then provision all the facility parameters.

If provisioning	Then enter	
DS1 facility identifier	**facid\<identifier\>↵**	
	where	
	\<identifier\>	an alphanumeric string up to 38 characters
		Note: Lowercase characters are translated to uppercase. If you want the facility ID to contain mixed case characters or nonalphanumeric characters, such as spaces, hyphens, or slash marks, begin the identifier string with a single quotation mark (').
	The provisioned value appears in reverse video.	
line coding	**lcoding \<type\>↵**	
	where	
	\<type\>	type of line coding: **b8zs**, **ami** or **amizcs**
	The provisioned value appears in reverse video.	
line build-out range	**lbo \< range \>↵**	
	where	
	\<range\>	the line build-out range: **short, medium,** or **long**
	The provisioned value appears in reverse video.	
framing format	**framefmt \<format\>↵**	
	where	
	\<format\>	the framing format: **null, superframe, extended,** or **dlc**
	The provisioned value appears in reverse video.	
—**continued**—		

—**continued**—

Procedure 4-9 (continued)
Provisioning DS1 facility parameters

Step	Action

If provisioning	Then enter
alarm encoding	**alarmenc \<encoding\>**↵ where \<encoding\> type of alarm encoding: **ones** or **zeros** The provisioned value appears in reverse video.
synchronization mode	**synchr \<mode\>**↵ where \<mode\> synchronization mode: **bytesynchronous** or **asynchronous** The provisioned value appears in reverse video. ***Note:*** If you select the wrong type of synchronization for the installed card, the system responds with the following message: "The Synchr command cannot be processed since the current hardware version does not support the requested synchronization mode."
performance monitoring	**pmprov \<status\>**↵ where \<status\> status of the DS1 facility performance monitoring: **enable** or **disable** The provisioned value appears in reverse video.
—**end**—	

6   Return the facility to in service by entering:

chgstate is↵

The state changes to in service (IS).

7   Repeat steps1 through 5 for each DS1 facility (port) to be provisioned and for each DS1 group to be provisioned.

8   Return to the Network Element Status screen by entering:
fwpui↵

9   Check off this procedure on the System Setup Checklist.

—**end**—

Table 4-5 lists the parameters for provisioning a DS1 facility.

Table 4-5
Parameters for DS1s

Parameter and menu command	Setting	Explanation	Default
facility identifier, **facid**		An alphanumeric string up to 38 characters.	no entry
line coding, **lcoding**	ami amizcs b8zs	Line coding is a binary format that allows regenerative repeaters to distinguish valid input from line noise. Alternate mark inversion (AMI) is a format whereby the binary value of 1, represented by a square wave (pulse), alternates between positive and negative polarity. A DS1 signal that uses AMI line coding and appears at a DS1 interface is required to meet specific ones density standards. These standards require that at least one pulse be transmitted within any 8-bit sequence. Since AMI does not provide any form of pulse density assurance, use the AMI line code with applications guaranteed to meet the standards. For example, voice applications meet ones density requirements because of the consistent bit patterns that represent speech. However, computer data applications are not always guaranteed to meet ones density requirements because computer data is highly variable in size and content. AMI zero code suppression (amizcs) accommodates the ones density requirements. AMI zero code suppression requires inserting (at the DS1 source) a "1" in bit 7 of any all-zeros DS0 byte. Bipolar 8-bit zero code substitution (b8zs) accommodates the ones density requirements. This substitution requires inserting two intentional bipolar violations (BPVs) to break up long string of zeros. Use b8zs for most applications, unless connected to NEs that do not support that line code.	ami
line build-out, **lbo**	short medium long	short: 0 to 46 m (0 to 150 ft) medium: 46 to 137 m (150 to 450 ft) long: 137 to 200 m (450 to 655 ft)	short
—continued—			

Table 4-5 (continued)
Parameters for DS1s

Parameter and menu command	Setting	Explanation	Default
frame format, **framefmt**	superframe extended dlc null	Framing provides the orderly organization of the bits in the 1.544 Mb/s DS1 signal. A superframe contains 12 DS1 frames, with the 193rd bit in each frame used as a control bit. These control bits supply frame and signal management. The extended superframe (extended) contains 24 DS1 frames, with the 193rd bit in each frame used as a control bit. Of the 24 control bits,18 bits are reserved for the evaluation of circuit performance and 6 bits provide frame and signal management. The digital loop carrier (DLC) setting is used mainly with TR-08 DS1s associated with span A. The null setting ensures that no framing bits are added.	superframe
alarm encoding, **alarmenc**	ones zeros	When an all 1's signal is received, the facility output can be provisioned to send an all 1's or an all 0's signal on the output port.	ones
synchronization mode, **synchr**	byte-synchronous asynchronous	In synchronous systems, all clocks are locked onto a reference frequency; the elements of the system are synchronized to this external clock. Synchronous systems allow single-state multiplexing and demultiplexing. The result is direct payload visibility. A byte-synchronous setting maps a DS1 into the payload capacity of a VT1.5 SPS so that downstream SONET NEs can identify and access (DS0 visibility) the carried 24 DS0 channels. Asychronous systems require bit stuffing because the bit rates vary from equipment to equipment. Therefore, an asychronous setting has no direct payload visibility.	byte-synchronous
performance monitoring, **pmprov**	enable disable	Enables or disables DS1 facility performance monitoring.	enabled
—end—			

Procedure 4-10
Adding a new host to an RFT

Use this procedure to add a new host switch or a new interface group (IG) to a specific remote fiber terminal (RFT). Two kinds of host switches are supported: GR-303 MVI hosts and GR-303 DMS hosts. Each RFT can have a maximum of five hosts. After five hosts are added, the Add button is disabled.

After you add the host, you can assign DS1s to the host through the Manage Facility Assignments dialog in the Connection Manager tool.

DMS (CSC) host CLLI must be correct and match the DMS CLLI. MVI 303's CLLI is required but does not need to be the switch CLLI.

Incorrect host for DMS (CSC) GR-303 system

You can incorrectly add a host, for example, by misspelling the common language location identifier (CLLI). An association to the host is established, but you cannot provision from this host. To recover, complete the following steps:

1   From the Host Provisioning Manager tool at the OPC:

   a.   Delete the incorrect host.

   b.   Add the correct host.

2   From the DMS-100 host switch, the integrated digital terminal (IDT) must be busied (command **BSY**), off-lined (command **OFFL**), busied again, then returned to service (command **RTS**). Alternatively, both embedded operations channels on the IDT can be busied, then both returned to service.

Action

Step	Action
1	Log in to the OPC and open the Host Provisioning Manager tool. If you do not know how to do this, see the procedures in *OPC User Interface Description*, 323-3001-301, in *Operations, Administration, and Provisioning*, Volume 4A. *The main window of the Host Provisioning Manager tool appears.*
2	To display the chooser menu, press **Ctrl_L /** (or Keypad **3**). *The chooser menu appears showing the RFTs that are in the OPC span of control.*

—continued—

Procedure 4-10 (continued)
Adding a new host to an RFT

Step	Action
3	Use the arrow keys to move to the RFT you want to add a host to, then press **Space** (or Keypad **0**).
	A list of hosts showing the hosts that have been provisioned on the selected RFT appears.
	Note: The Add button is disabled after five hosts have been added.
4	Tab to the Add button.
	The Add new host dialog appears.
5	In the Host Name field, enter the host CLLI (up to a 16-character alphanumeric string) of the host you want to add, then enter the value of the IDT that will be used for the new interface in the IDT field.
	Note: The Host Provisioning Manager does not verify the accuracy of the host name or the IDT.
	For DMS, the Hostname (alphanumeric) and IDT (numeric) fields are information only. For MVI, the two fields require data entry.
	If you make an incorrect entry while provisioning a GR-303 DMS interface, you cannot establish an association between the intended DMS host and the AccessNode, even though the physical connections are in place.
6	Tab to the button (GR-303 DMS or GR-303 MVI) that applies to the type of host interface you are adding, then press **Ctrl_A** (or keypad **0**).
	The selected interface type is marked. This type will appear in the Interface column of the Provisioned Hosts list.
7	Tab to the OK button, then press **Ctrl_A** (or Keypad **0**).
	The new Host CLLI appears in the provisioned hosts list.
8	To close the tool, complete the instructions in the following table:

To	Press
display the window menu	**Ctrl_L W** (or Keypad **6**) *The window menu appears.*
exit	**Space** (or Keypad **0**) *The tool closes.*

Step	Action
9	Check off this procedure on the System Setup Checklist.

—**end**—

Procedure 4-11
Adding an STS connection

Use this procedure to add (provision) a synchronous transport signal (STS) connection, including matched nodes connections. For the connection to carry traffic, you must also install the appropriate equipment and provision the appropriate tributary facilities at each end NE. For details about installing equipment, see the installation procedures in *Bay in Central Office Installation Manual—ABM*, 323-3001-201. For details about provisioning the tributary facilities, see the procedures in this document.

To add a virtual tributary(VT)-managed STS-1 connection and VT1.5 connections, see Procedure 4-12, "Adding a VT connection" on page 4-50.

> *Note:* When pre-provisioning 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 pre-provisioning choices do not appear on the operations controller (OPC) screens until you equip the circuit.

This procedure can be done either before or after the tributary facilities are provisioned.

This procedure applies to both ring and point-to-point configurations. For consistency, screens using a ring configuration are shown. Screens differ slightly for a point-to-point configuration.

Requirements

Before starting this procedure, you must do the following:

- Obtain a userID and password that allow you to access the OPC and open the Connection Manager tool with read/write privileges.

- Ensure that the Configuration Manager tool is closed.

- Prepare a map of the nodes and connections you want to set up. Use the "Appendix C: STS connection information form" on page 12-1 to list the STS connections you want to set up.

- Make sure the tributary type is STS, not DS3, if you are adding a matched node connection. For details on this requirement, see the matched nodes topic in *Configuration and Equipment Description*, 323-3001-100, in *Description*, Volume 2A.

—continued—

Procedure 4-11 (continued)
Adding an STS connection

- Obtain the following connection details:
  - an ID for the new connection; for details on the recommended naming convention, see the examples at the beginning of this procedure
  - the end network element IDs in the connection and their tributaries
  - the secondary gateway NEs, their tributaries, and their protection schemes if it is to be a matched node connection
  - the direction around the ring (required for ring configurations only)
  - the STS channel for the connection

Action

Step	Action
1	Log in to the OPC and open the Connection Manager tool.

If you do not know how to do this, see the procedures in *OPC User Interface Description*, 323-3001-301, in *Operations, Administration, and Provisioning*, Volume 4A.

The Connection Manager main window appears.

⚠️ **CAUTION**
Risk of traffic loss
Failure to repeat changes made on the backup OPC to the primary OPC will result in loss of connection data and may eventually lead to loss of traffic.

2 Tab to the Add button, then press **Ctrl_A** (or Keypad **0**).

The Add Connection dialog appears.

Review the list of STS connections you want to set up.

—**continued**—

Procedure 4-11 (continued)
Adding an STS connection

Step	Action

The example list for this procedure is shown as follows. This list should contain all the information you need to fill out the Add Connection dialog.

PC-22106

Configuration name: *Metro Area Ring*						
Connection ID	STS channel (s)	End NE A	Tributary at End NE A (CPG, slot, STS-1 channel)	End NE Z	Tributary at End NE Z (CPG, slot STS-1 channel)	Route
882-884-STSChan2	*2*	*882 EAST_CO*	*OC-3 G1S-1*	*884 REMOTE4*	*DS1 G5 5*	*Short*

3   In the Connection ID field, enter a unique name for the new connection.

You can enter up to 40 alphanumeric characters in this field. If you do not specify an identifier for a connection, the main window lists the connection without an identifier.

4   Tab to the Configuration field, then press **Ctrl_L /** (or Keypad **3**) to display the chooser menu.

The chooser menu appears, listing the available configurations.

5   Use the down arrow key to move to the configuration you want, then press **Space** (or Keypad **0**).

The configuration name appears in the Configuration field.

6   For ring configurations, tab to the Connection Rate field, then press **Ctrl_L /** (or Keypad **3**) to display the chooser menu.

The chooser menu appears, listing the available configurations.

Note 1: STS-3c connections can be added only for OC-3 tributaries on a virtual tributary bandwidth manager (VTBM) ring.

Note 2: To set up a single connection for an STS-3c signal on a point-to-point SRP system, you must manually connect 3 consecutive STS-1 channels. STS-3c connections are supported only on channels 1 to 3, 4 to 6, 7 to 9, or 10 to 12. Intermediate channels, such as channels 2 and 5, do not support STS-3c connections.

7   Use the down arrow key to move to the connection rate you want, then press **Space** (or Keypad **0**).

The connection rate appears in the Connection Rate field.

—**continued**—

Procedure 4-11 (continued)
Adding an STS connection

Step	Action
8	Tab to the STS-1 Channel field, then press **Ctrl_L /** (or Keypad **3**) to display the chooser menu.
	The chooser menu appears, listing the available STS-1 channels.
9	Use the down arrow key to move to the STS-1 channel you want, then press **Space** (or Keypad **0**).
10	Tab to the End NE A field, then press **Ctrl_L /** (or Keypad **3**) to display the chooser menu.
	The chooser menu appears.
11	Use the down arrow key to move to one of the end network elements for the connection, then press **Space** (or Keypad **0**).
	The network element ID appears in the field.
12	Tab to the Tributary field, then press **Ctrl_L /** (or Keypad **3**) to display the chooser menu.
	The chooser menu appears, listing the available Tributaries.
13	Use the down arrow key to move to the tributary facility information, then press **Space** (or Keypad **0**).
14	Tab to the Group field, then press **Ctrl_L /** (or Keypad **3**) to display the chooser menu.
	The chooser menu appears.
15	Use the down arrow key to move to the group you want, then press **Space** (or Keypad **0**).
	After you fill in the Group field, the Slot field is automatically filled in.
	Note: When you add an STS-1 connection between DS1s to obtain end-to-end continuity, make sure that an odd circuit pack group at one end is connected to an odd circuit pack group at the other end (for example, G5 to G1 or G3 to G7) or that an even circuit pack group at one end is connected to an even circuit pack group at the other end.
16	For OC-3 tributaries, tab to the STS-1 Channel field, then enter the channel information.
	Note: For STS-3c connections on VTBM rings, STS-1 channels 1-3 or 4-6 are displayed.
17	Tab to the End NE Z field and repeat steps 10 to 16 for the other end network element in the connection.

—continued—

Procedure 4-11 (continued)
Adding an STS connection

Step	Action
18	For ring configurations, tab to the Route fields, then select either Short or Long.

Note: If you have any question about which route is short or long, review the Route list in the box in the lower right corner of the screen.

The following is an example of a completed Add Connection dialog.

PC-22109

```
Add Connection
   Connection ID: 882-884-STSChan2
   Configuration: Metro Area Ring        STS-1 Channel: 2
 Connection Rate: STS-1                          Level: STS-Managed
 _____

         End NE A: 882 EAST_CO            End NE Z: 884 REMOTE4
        Trib. Type: OC-3               Trib. Type: DS1
            Group: G1S, G2S                Group: G5
             Slot: 5                        Slot: 5
    STS-1 Channel: 1

     Route: Short (1 hop)            _____
                                     | NEs in Route    Option |
                                     |  882 EAST_CO     G1     |
                                     |  884 REMOTE4     G2     |
                                     |_____|

 [ OK  ♦Return]   [ Apply ♦Y]   [ Preferences ♦U]   [ Cancel ♦Del]
```

19	If you are adding a matched node connection, complete steps 20 through 25 for the Secondary Gateway A, the Secondary Gateway Z, or both gateways. If you are not adding a matched node connection, go to step 27.
20	Tab to the Secondary Gateway button, and press **Ctrl_A**.

The Add Secondary Gateway dialog will open.

21	Tab to the End NE A field, then press **Ctrl_L /** (or Keypad **3**) to display the chooser menu.

The chooser menu appears.

22	Use the down arrow key to move to one of the end network elements for the connection, then press **Space** (or Keypad **0**).

The network element ID appears in the field.

23	Tab to the Group field, then press **Ctrl_L /** (or Keypad **3**) to display the chooser menu.

The chooser menu appears.

—continued—

Procedure 4-11 (continued)
Adding an STS connection

Step	Action
24	Use the down arrow key to move to the group you want, then press **Space** (or Keypad **0**).
	After you fill in the Group field, the Slot field is automatically filled in.
	Note: When you add an STS-1 connection between DS1s to obtain end-to-end continuity, make sure that an odd circuit pack group at one end is connected to an odd circuit pack group at the other end (for example, G5 to G1 or G3 to G7) or that an even circuit pack group at one end is connected to an even circuit pack group at the other end.
25	For OC-3 tributaries, tab to the STS-1 Channel field, then enter the channel information you recorded in step 9.
	Note: For STS-3c connections on VTBM rings, STS-1 channels 1-3 or 4-6 are displayed.
26	Tab to the next field to select either DCW or DCP protection schemes.
27	Tab to the OK button or Apply button, then press **Ctrl_A** (or Keypad **0**).
	Note: The OK button closes the Add Connection dialog after the connection is added successfully. The Apply button leaves the Add Connection dialog open so you can add more connections.
	A confirmation dialog appears if the connection data are correct. If errors exist in the data, an error dialog appears and Xs are placed beside the fields where the errors occurred.
	Correct these fields and select the OK button again.
28	Tab to the Yes button, then press **Ctrl_A** (or Keypad **0**).
	A dialog appears indicating the connection has been added successfully.

—**continued**—

Procedure 4-11 (continued)
Adding an STS connection

Step	Action
29	Tab to the OK button, then press **Ctrl_A** (or Keypad **0**).

The Connection Manager main window appears. The new connection appears in the connection list with a + to the left of the Connection ID to indicate it is a new connection.

30 To close the Connection Manager tool, press **Esc)**, or do the following:

To	Press
display the window menu	**Ctrl_L W** (or Keypad **6**) *The window menu appears.*
exit	**Space** (or Keypad **0**)

If a backup OPC	Then
does not exist	*The User Session Manager appears.*
does exist	*A confirmation dialog appears prompting you to transfer any connection changes to the backup OPC.* Tab to the Yes button, then press **Ctrl_A** (or Keypad **0**). *The User Session Manager appears.*

31 Check off this procedure on the System Setup Checklist.

—**end**—

Procedure 4-12
Adding a VT connection

Use this procedure to add (provision) a VT-managed STS-1 connection and VT1.5 connections to the connection data. For the connection to carry traffic, you must also install the appropriate equipment and provision the appropriate tributary facilities at each end NE. For details on installing equipment, see *System Expansion Procedures*, 323-3001-324, in *Operations, Administration, and Provisioning*, Volume 4C.

To provision VT1.5 connections, you must first add VT-managed STS-1 connections to the connection data.

Note: When you preprovision 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. Preprovisioning choices do not show up on Connection Manager screens until you equip the circuit. Until you equip a circuit, the Connection Manager detail screen shows preprovisioned tributaries as unequipped.

This procedure can be done either before or after the tributary facilities are provisioned.

Requirements

Before starting this procedure, you must:

- Obtain a userID and password that permit access to the OPC and open the Connection Manager tool with read/write privileges.
- Make sure the Configuration Manager tool is closed.
- Prepare a map of the nodes and connections you want to set up. Use the "Appendix D: VT connection information form" on page 13-1 to list the VT-managed STS-1 and VT1.5 connections you want to set up.
- Obtain the following connection details:
  — an ID for the new VT-managed STS-1 and VT1.5 connections
  — the end network element IDs in the connection and their tributaries
  — the STS channel for the connection
  — the VT group and number for the connection
  — the direction around the ring

—continued—

Procedure 4-12 (continued)
Adding a VT connection

Action

Step	Action

1   Log in to the OPC and open the Connection Manager tool.

If you do not know how to do this, see the procedures in *OPC User Interface Description*, 323-3001-301, in *Operations, Administration, and Provisioning, Volume 4A.*

The Connection Manager main window appears.

> ⚠ **CAUTION**
> **Risk of traffic loss**
> Failure to repeat changes made on the backup OPC to the primary OPC will result in loss of connection data and may eventually lead to loss of traffic.

If you are adding	Then
a VT-managed STS-1 connection	go to step 2
a VT1.5 connection	go to step 16

Adding a VT-managed STS-1 connection

2   Tab to the Add button, then press **Ctrl_A** (or Keypad **0**).

The Add Connection dialog appears. By default, the Connection Rate field is filled in as STS-1 and the Level field is filled in as STS-Managed.

Review the list of VT-managed STS-1 and VT1.5 connections you want to set up.

3   In the Connection ID field, enter a unique name for the new connection.

4   Tab to the Configuration field, then press **Ctrl_L /** (or Keypad **3**) to display the chooser menu.

The chooser menu appears, listing the available configurations.

5   Use the down arrow key to move to the configuration you want, then press **Space** (or Keypad **0**).

The configuration name appears in the Configuration field.

6   Tab to the STS-1 Channel field, then enter the channel number.

—**continued**—

Procedure 4-12 (continued)
Adding a VT connection

Step	Action
7	In the Add Connection dialog, tab to the Level field. To display the chooser menu, press **Ctrl_L/** (or Keypad **3**).
	The chooser menu appears.
8	Use the down arrow key to move to the VT-Managed level, then press **Space** (or Keypad **0**).
9	Tab to the End NE A field to display the chooser menu, then press **Ctrl_L /** (or Keypad **3**).
	The chooser menu appears, displaying the available NEs.
10	Use the down arrow key to move to one of the end NEs for the connection, then press **Space** (or Keypad **0**).
	The NE ID appears in the field.
11	Tab to the End NE Z field. Repeat steps 9 and 10 for the other end NE for the connection.
12	Tab to the Route buttons. To move to the correct route, press **Ctrl_A** (or Keypad **0**).
13	Tab to the Apply button, then press **Ctrl_A** (or Keypad **0**).
	A confirmation dialog appears if the connection data are correct. If errors exist in the data, an error dialog appears and Xs are placed beside the fields where the errors occurred.
	Correct these fields and select the OK button again.
	Note: If the connection spans more than one hop, a confirmation dialog appears notifying you of the number of connections that will be provisioned for the specified route.
14	Tab to the Yes button, then press **Ctrl_A** (or Keypad **0**).
	The confirmation dialog closes and another confirmation dialog appears.
15	To select the OK button, press **Ctrl_A** (or **Keypad 0**).
	The Add Connection dialog appears with only the Configuration, Connection Rate and Level fields filled in.

—**continued**—

Procedure 4-12 (continued)
Adding a VT connection

Step	Action

Adding a VT1.5 connection

16   Enter a unique connection ID for the connection. You can enter up to 40 alphanumeric characters.

17   Tab to the Connection Rate to display the chooser menu, then press **Ctrl_L /** (or **Keypad 3**).

The chooser menu appears, displaying the available NEs.

18   Use the down arrow key to move to the VT1.5 rate, then press **Space** (or Keypad **0**).

VT1.5 appears in the field and the Level field is replaced by VT Group and VT Number fields.

19   Continue to enter information in the fields from the list you reviewed in step 2.

Do the following:

If you want to	Then go to
select fields to remain on screen when you add a VT1.5 connection using the Apply button in the Add VT Connection dialog	step 20
add the connection to the connection list and keep the Add Connection dialog open	step 24
add the connection to the connection list and close the Add Connection dialog	step 27

20   Tab to the Preferences button, then press **Ctrl_A** (or Keypad **0**).

The Set Preferences for Apply dialog appears.

21   Use the Tab key to move through the fields.

The Set Preferences for Apply dialog allows you to specify which fields to preserve and which fields to clear in the Add Connection dialog after you provision a connection. This dialog allows flexibility when you provision several connections in succession.

22   To select (to preserve) or deselect (to clear) fields, press **Ctrl_A** (or Keypad **0**).

An asterisk appears beside each field you select and closes beside each field you deselect.

23   Tab to the OK button, then press **Ctrl_A** (or Keypad **0**).

The Add VT Connection dialog reappears.

—**continued**—

Procedure 4-12 (continued)
Adding a VT connection

Step	Action
24	Tab to the Apply button, then press **Ctrl_A** (or Keypad **0**).
	A confirmation dialog appears if the data are correct. If errors exist in the data, an error dialog appears and Xs appear beside the fields where the errors occurred.
	Correct these fields and select the OK button again.
25	Tab to the Yes button, then press **Ctrl_A** (or Keypad **0**).
	The new VT1.5 connection is added to the connection list. The Add VT Connection dialog remains open, ready for you to add another connection. If you selected fields in the Set Preferences for Apply dialog, the data does not clear from these fields.
26	Repeat steps 16 to 19 to add other connections.
27	Tab to the OK button, then press **Ctrl_A** (or Keypad **0**).
	A confirmation dialog appears if the connection data are correct. If errors exist in the data, an error dialog appears and Xs are placed beside the fields where the errors occurred.
	Correct these fields and select the OK button again.
28	Tab to the Yes button, then press **Ctrl_A** (or Keypad **0**).
	Another confirmation dialog appears.
29	To select the OK button, press **Ctrl_A** (or **Keypad 0**).
	The Manage VT Connections dialog appears. The new VT 1.5 connection appears in the connection list with a + to the left of the Connection ID to indicate it is a new connection.
30	Tab to the Done button, then press **Ctrl_A** (or Keypad **0**).
	The Connection Manager main window appears.

—**continued**—

Procedure 4-12 (continued)
Adding a VT connection

Step	Action

31 To close the Connection Manager tool, press **Esc)**, or do the following:

To	Press
display the window menu	**Ctrl_L W** (or Keypad **6**) *The window menu appears.*
exit	**Space** (or Keypad **0**)

If a backup OPC	Then
does not exist	*The User Session Manager appears.* If the configuration contains network elements from another OPC span of control, repeat steps 1 to 31 for the remaining OPCs.
does exist	*A confirmation dialog appears prompting you to transfer any connection changes to the backup OPC.* Tab to the Yes button, then press **Ctrl_A** (or Keypad 0). *The User Session Manager appears.*

32 Check off this procedure on the System Setup Checklist.

—**end**—

Procedure 4-13
Editing a VT connection

Use this procedure to modify an existing VT-managed STS-1 connection or VT1.5 connection. The connection ID can be edited in service.

> **CAUTION**
> **Risk of traffic loss**
> If you edit the facility assignment of an STS-1/OC-3/DS1-TIC VT connection with the facilities in service, traffic will be lost. Ensure the facilities are out of service before editing the facility assignment. See the procedures in this document for more details.

Note: For a translation table that shows how AccessNode lines translate to lines on the DMS-10NA switch, see *Line Card Provisioning Procedures*, 323-3001-315, in *Operations, Administration, and Provisioning*, Volume 4B.

Requirements

Before starting this procedure, you must do the following:

- Make sure the facilities are out of service if you are going to edit the facility assignment.

- Provision a host for GR-303 DS1s if GR-303 facility assignment is desired.

- Obtain a userID and password that allow you to access the OPC and open the Connection Manager tool with read/write privileges.

Action

Step	Action

1 Log in to the OPC and open the Connection Manager tool.

If you do not know how to do this, see the procedures in *OPC User Interface Description*, 323-3001-301 in *Operations, Administration, and Provisioning, Volume 4A*.

The Connection Manager main window appears.

If you want to edit a	Then go to
VT1.5 connection	step 2
VT-managed STS-1 connection	step 26

—continued—

Procedure 4-13 (continued)
Editing a VT connection

Step	Action

Edit a VT1.5 connection

2   To display the Options menu, press **Ctrl_L T**, then press **Shift** +.

The Options menu appears.

3   Move to the **Manage VT connections** command, then press **Space** (or Keypad **0**).

The Manage VT Connections dialog appears.

4   In the Configuration field, press **Ctrl_L /** (or Keypad **3**) to display the chooser menu.

The chooser menu appears, listing the available configurations.

5   Use the down arrow key to move to the configuration you want, then press **Space** (or Keypad **0**).

The configuration name appears in the Configuration field.

6   Tab to the End NE A field, then press **Ctrl_L /** (or Keypad **3**) to display the chooser menu.

The chooser menu appears, displaying the available network elements.

7   Move to one of the end network elements that terminates the VT-managed STS-1 connection, then press **Space** (or Keypad **0**).

The network element ID appears in the field.

8   Tab to the End NE Z field and repeat steps 6 and 7 for the other end network element of the VT-managed STS-1 connection.

The network element ID appears in the field. The VT1.5 connections that have been provisioned appear in the connection list.

9   Tab to the STS-1 Channel field, then enter the STS-1 channel for the connection.

10   Tab to the Route buttons, move to the correct route, then press **Ctrl_A** (or Keypad **0**).

11   Tab to the connection list, then use the arrow keys to move to the VT1.5 connection you want to edit. To display the List item menu, press **Ctrl_L** (or Keypad **Enter**).

The List item menu appears.

12   Move to the Edit command, then press **Space** (or Keypad **0**).

The Edit VT Connection dialog appears.

Note: You cannot edit the Configuration field, the route, the end network elements, the STS-1 channel, or the rate.

—**continued**—

Procedure 4-13 (continued)
Editing a VT connection

Step	Action

13   Do the following:

If you want to	Then go to
change the connection identifier	step 14
change the facility assignment	step 15
save the changes you have made	step 24

14   In the Connection ID field, enter a unique name for the connection.

Go to step 13.

15   Tab to the Facility Assignment field, then press **Ctrl_L /** (or Keypad **3**) to
display the chooser menu.

The chooser menu appears, displaying the available facility assignments.

Note: The Facility Assignment is displayed only for STS-1/OC-3/DS1-TIC
connections.

16   Proceed according to the following task:

If you want to change the	assignment to	Then go to
DS1	tandem service	step 17
	GR-303 DMS or GR-303 MVI service	step 18
	TR-08 service	step 19
	VLCM service	step 20
	Data Direct	step 21
	unassigned	step 23
STS-1/OC-3	GR-303 DMS or GR-303 MVI service	step 18

17   Move to the Tandem command, then press **Space** (or Keypad **0**).

Go to step 13.

18   To change the STS-1/OC-3/DS1 assignment to GR-303 DMS or GR-303 MVI
service:

  a.   Move to the appropriate command, GR-303 DMS**...** or GR-303 MVI**...**,
then press **Space** (or Keypad **0**).

The GR-303 facilities dialog appears.

  b.   Tab to the IG Number field, then press **Ctrl_L /** (or Keypad **3**) to display
the chooser menu.

Note: The host must be defined using the OPC Host Provisioning Manager
tool before the host number appears in the list.

—**continued**—

Procedure 4-13 (continued)
Editing a VT connection

Step	Action

c. Move to the IG number you want, then press **Space** (or Keypad **0**).

The host name appears in the Host Name field, the IDT number appears in the IDT Number field, and a link number appears in the RDT Link Number field.

The host name and IDT number identify the IG to the system.

The RDTLink Number assigned to the DS1 port must match the RDTLink number assigned to the port (SMA port for a DMS) to which it is physically connected. Table RDTINV on the Host contains the RDTLink Number to the port pairings. This number is the next available logical line number for the Host.

d. Tab to the OK button, then press **Ctrl_A** (or Keypad **0**).

Go to step 13.

19 To change the DS1 assignment to TR-08 service:

a. Move to the Assign as TR-08 command, then press **Space** (or Keypad **0**).

The TR-08 facilities dialog appears.

b. Tab to the System Number field, then press **Ctrl_L /** (or Keypad **3**) to display the chooser menu

c. Move to the system number you want, then press **Space** (or Keypad **0**).

The Link Id is filled in with a suggested letter.

If you want to	Then go to
change the suggested Link Id	step 19 d.
accept the Link Id	step 19 f.

d. Tab to the Link Id Number field, then press **Ctrl_L /** (or Keypad **3**) to display the chooser menu.

Note: Only unselected TR-08 links (A, B, C and D) are displayed.

e. Move to the Link Id number you want, then press **Space** (or Keypad **0**).

The A-link is allowed only on TIC subports 1, 5, 9, 13, 17, 21, 25. The first link provisioned in a system must be the A-link, which carries the derived data link (DDL) format. Subsequent links can be B, C, or D.

f. Tab to the OK button, then press **Ctrl_A** (or Keypad **0**).

Go to step 13.

—**continued**—

Procedure 4-13 (continued)
Editing a VT connection

Step	Action
20	To change the DS1 assignment to VLCM service:

a. Use the arrow keys to move to the Assign as VLCM command, then press **Space** (or Keypad **0**).

The Assign as VLCM dialog appears.

b. In the System Number field, press **Ctrl_L** (or Keypad **3**) to display the chooser menu.

c. Use the arrow keys to move to the system number you want, then press **Space** (or Keypad **0**).

Note: You must select system number **1** to **2**.

d. Tab to the Switch Port Number field, then press **Ctrl_L** (or Keypad **3**) to display the chooser menu.

The chooser menu appears.

e. Use the arrow keys to move to the switch port you want, then press **Space** (or Keypad **0**).

The switch port number appears in the Switch Port Number field.

Note 1: Ports 0 and 3 are reserved as signalling links. When you provision port 0 or 3, a dialog appears. The dialog allows you to assign a remote maintenance module (RMM) channel to the signalling link so you can perform line/loop testing.

Note 2: Ports 2 and 5 are not used in AN16.

f. Tab to the OK button, then press **Ctrl_A** (or Keypad **0**).

The DS1 in the facilities list on the main window changes to VLCM.

| **21** | To change the DS1 assignment to Data Direct, move to the Assign as Data Direct command, then press **Space** (or Keypad **0**). |

The Manage Facility Assignments window displays the DS1 assigned as Data Direct.

| **22** | Tab to the OK button, then press **Ctrl_A** (or Keypad **0**). |

The DS1 in the facilities list on the main window changes to Data Direct

| **23** | To remove the DS1 assignment, move to the Unassign command, then press **Space** (or Keypad **0**). |

Go to step 13.

—**continued**—

Procedure 4-13 (continued)
Editing a VT connection

Step	Action
24	Save the changes by doing the following:
	a. Tab to the OK button, then press **Ctrl_A** (or Keypad **0**).
	A confirmation dialog appears.
	b. Tab to the Yes button, then press **Ctrl_A** (or Keypad **0**).
	A confirmation dialog appears.
	c. Tab to the OK button, then press **Ctrl_A** (or Keypad **0**).
	The revised VT1.5 connection is listed in the Manage VT Connections main window with a + to the left of the Connection ID to indicate the connection data has been changed.
25	To close the Manage VT Connections dialog, tab to the Done button, then press **Ctrl_A** (or Keypad **0**).
	The Connection Manager main window appears.

Edit a VT-managed STS-1 connection

Step	Action
26	Move to the VT-managed STS-1 connection you want to edit, then press **Ctrl_L** (or Keypad **Enter**) to display the List item menu.
	The List item menu appears.
27	Move to the Edit command, then press **Space** (or Keypad **0**).
	The Edit Connection dialog appears.
28	In the Connection ID field, enter a unique name for the connection.
29	Tab to the OK button, then press **Ctrl_A** (or Keypad **0**).
	A confirmation dialog appears.
30	Tab to the Yes button, then press **Ctrl_A** (or Keypad **0**).
	A confirmation dialog appears.
31	Tab to the OK button, then press **Ctrl_A** (or Keypad **0**).
	The revised connection is listed in the main window with a + to the left of the connection ID to indicate the connection data has been changed.

—**continued**—

Procedure 4-13 (continued)
Editing a VT connection

Step	Action

32 To close the Connection Manager tool, press **Esc)**, or do the following:

To	Press
display the window menu	**Ctrl_L W** (or Keypad **6**) *The window menu appears.*
exit	**Space** (or Keypad **0**)

If a backup OPC	Then
does not exist	*The User Session Manager appears.*
does exist	*A confirmation dialog appears prompting you to transfer any connection changes to the backup OPC.* Tab to the Yes button, then press **Ctrl_A** (or Keypad **0**). *The User Session Manager appears.*

33 Check off this procedure on the System Setup Checklist.

—**end**—

Procedure 4-14
Saving OPC data to tape

Use this procedure to save OPC data to a backup tape in the OPC tape drive. After you start the save operation, you cannot access any other OPC tool until the operation is canceled or completed. The save operation can take up to 40 minutes to complete depending on the amount of data on the disk.

> **CAUTION**
> **Risk of damage to electrostatic-sensitive devices**
> Electrostatic-sensitive devices can be damaged by electrostatic discharge. Always ground yourself before handling the tape.

You cannot select individual files to be saved. The OPC Save and Restore tool automatically selects and saves the appropriate files. When you open the tool, the "Save to tape" operation is selected by default.

Note: If the Save to tape button at the top of the main window is disabled, the local OPC is inactive, and you cannot perform this procedure.

The tool contains two action buttons:
- Display tape details
- Save OPC data to tape

It is recommended that you select both buttons in the order that they appear.

Requirements

To perform this procedure, you must meet the following requirements:
- Insert the tape in the local OPC tape drive (use a blank tape, or an existing tape designated for commissioning data for this OPC).
- Allow the tape to reach room temperature.

  Note: Never insert a tape that has been stored at temperatures outside the range 10°C to 30°C (50°F to 90°F) until it has reached room temperature.

- Obtain a userID and password that allow you access to the OPC.
- Connect a terminal to the OPC.

—continued—

Procedure 4-14 (continued)
Saving OPC data to tape

- Log in to the OPC.
- Read the command conventions described in *OPC User Interface Description*, 323-3001-301, in *Operations, Administration, and Provisioning*, Volume 4A.

Action

Step	Action
1	Open the OPC Save and Restore tool.
	The OPC Save and Restore main window appears. The Save to tape button is selected and the buttons for saving OPC data to tape appear in the bottom half of the window.
2	Select the Display tape details button by pressing **Ctrl_A** (or Keypad **0**).
	The Tape Details dialog appears. It shows information about the tape.
3	Check the fields in the dialog to confirm that the correct tape is in the tape drive.
	If you inserted the incorrect tape, remove it and insert the correct one.
4	When the correct tape is in the tape drive, select the Done button in the Tape Details dialog by pressing **Ctrl_A** (or Keypad **0**).
	The Tape Details dialog closes. In the OPC Save and Restore tool main window, the arrow moves to the Save OPC data to tape button.
5	Select the Save OPC data to tape button by pressing **Ctrl_A** (or Keypad **0**).
	The Save confirmation dialog appears, prompting you to confirm your request.
6	Tab to the Yes button, then press **Ctrl_A** (or Keypad **0**).
	If the backup tape is blank, a progress dialog appears, indicating that the save operation has been initiated.
	Go to step 7.
	If the backup tape contains data that you are overwriting, a configuration dialog appears.
	Go to step 8.

—continued—

Procedure 4-14 (continued)
Saving OPC data to tape

Step	Action

7   Determine whether you want to continue or cancel the save operation.

If you want to	Then go to
cancel the save operation	step 9
continue with the save operation	step 11 when the completion dialog appears

8   Determine whether the tape contains a data archive or a software load.

If the tape contains a data archive, a dialog prompts you to confirm your request to overwrite the existing data on the tape.

If the tape contains a software load, a dialog prompts you to confirm your request to overwrite the existing data on the tape.

Tab to the OK button, then press **Ctrl_A** (or Keypad **0**).

A progress dialog appears, indicating the progress of the save operation.

If you want to	Then go to
cancel the save operation	step 9
continue with the save operation	step 11 when the completion dialog appears

9   To cancel the save operation, select the Cancel button by pressing **Ctrl_A** (or Keypad **0**).

A confirmation dialog appears, prompting you to confirm your request to cancel the save operation.

10   Tab to the OK button, then press **Ctrl_A** (or Keypad **0**).

Another progress dialog appears that indicates the save operation is being canceled and the tape is being erased.

When you cancel the save operation, a completion dialog appears.

11   To exit the completion dialog, select the Done button by pressing **Ctrl_A** (or Keypad **0**).

The completion dialog closes and the main window appears.

Go to step 12.

—**continued**—

Procedure 4-14 (continued)
Saving OPC data to tape

Step	Action
12	To close the tool:
	a. Display the window menu by pressing **Ctrl_L W** (or Keypad **6**).
	The window menu appears.
	b. Select the Exit command by pressing **Space** (or Keypad **0**).
	The tool closes.
13	Check off this procedure on the System Setup Checklist.

—**end**—

Procedure 4-15
Performing a manual NE database backup

Use this procedure to make a backup copy of the NE database that includes all the provisioning data. If a failure occurs, you can use the backup copy to restore the NE database. A backup is recommended every time a provisioning change is made.

Shelf database backups are stored in the nonvolatile memory of the OPC module.

Two copies of the database are stored: current and backup 1. When you perform a backup, the oldest copy is deleted.

Do backups periodically to make sure the backup has the most recent data. Running backups periodically minimizes the amount of lost data if a failure occurs. If you schedule the backup as a network event, it runs automatically. For details see *System Administration Procedures*, 323-3001-302, in *Operations, Administration, and Provisioning*, Volume 4A.

Requirements

To perform this procedure, you must meet the following requirements:

• Read the command conventions described in *Network Element User Interface Description*, 323-3001-300, in *Operations, Administration, and Provisioning*, Volume 4A.

• Perform this procedure from MAPCI;FWPUI screens.

Action

Step	Action
1	From the Network Element Status screen, display the equipment shelf screen for the selected NE by entering: **equipmnt sh** ↵ *The Shelf Equipment screen appears for the selected NE.*
2	Back up the database by entering: **backupdb** ↵ *The system prompts for confirmation.*

—continued—

Procedure 4-15 (continued)
Performing a manual NE database backup

Step	Action
3	Confirm the backup command by entering:
	y ↵
	The backup process can take up to 5 minutes to complete, depending on system use.
4	Confirm the backup by checking the logs buffer by entering:
	logutil ↵ **open FWDB** ↵
	The FiberWorld Database (FWDB) logs show the status of the database backup and the elapsed time of the backup. An FWDB300-series log indicates a problem with the backup.
5	Check off this procedure on the System Setup Checklist.

—**end**—

Procedure 4-16
Transferring data from the primary to the backup OPC

Use this procedure to transfer the commissioning data from the primary OPC to the backup OPC. This procedure must be performed from the primary OPC. It should be done any time commissioning data is changed on the primary OPC.

Requirements

Before starting this procedure, you must meet the following requirements:

- Attach a terminal to the primary OPC as specified in *OPC User Interface Description*, 323-3001-301, and *Data Administration Procedures*, 323-3001-304. Both documents are in *Operations, Administration, and Provisioning*, Volume 4A.

- Obtain a userID and password that permit access to the OPC and use the Commissioning Manager tool.

- Complete the commissioning of all NEs and transfer the data to the primary OPC.

- Install both primary and backup OPCs in their slot.

- Be familiar with the command conventions for the OPC interface you are using (CMT or graphical) as described in *OPC User Interface Description*, 323-3001-301, and *Data Administration Procedures*, 323-3001-304. Both documents are in *Operations, Administration, and Provisioning*, Volume 4A.

Action

Step	Action
1	Log in to the primary OPC.

For information on the OPC, refer to *OPC User Interface Description,* 323-3001-301, and *Data Administration Procedures,* 323-3001-304. Both documents are in *Operations, Administration, and Provisioning,* Volume 4A.

The User Session Manager is displayed.

—**continued**—

Procedure 4-16 (continued)
Transferring data from the primary to the backup OPC

Step	Action
2	Open the Commissioning Manager tool.
	The Commissioning Manager main window is displayed.
3	Tab to the Transfer Data to Backup OPC button and select it by pressing **Ctrl_A** (or Keypad **0**).
	The confirmation dialog is displayed.
4	Tab to the OK button and select it by pressing **Ctrl_A** (or Keypad **0**).
	The confirmation dialog is removed and the commissioning data is transferred from the primary OPC to the backup OPC. This takes several minutes if you are communicating with the far end of the span. When the process is complete, a notification dialog is displayed.
5	Select the Done button by pressing **Ctrl_A** (or Keypad **0**).
6	Close the Commissioning Manager tool:
	a. Display the Window menu by pressing **Ctrl_L W** (or Keypad **6**).
	The Window menu is displayed.
	b. Select the Exit command by pressing the **Space** (or Keypad **0**).
	You are returned to the User Session Manager.
7	Log out of the OPC.
8	Check off this procedure on the System Setup Checklist.

—**end**—

Procedure 4-17
Unassigning call reference values

Use this procedure to unassign call reference values (CRVs) for MVI switches. This procedure is necessary if you plan to use OPS/INE to assign CRVs rather than using the default settings.

For more information on the MVIPROV CI tool, see *Line Card Provisioning Procedures*, 323-3001-315, in *Operations, Administration, and Provisioning*, Volume 4B.

Requirements

A GR-303 MVI host switch has been added to the remote fiber terminal (RFT) data using the OPC Host Provisioning Manager tool.

Action

Step	Action
1	Log in to the network element user interface.
	The Network Element Status screen appears.
2	Type the following:
	quit all ↵
3	Start the MVIPROV CI tool by entering:
	mviprov ↵
	The MVIPROV prompt appears.

Unassigning call reference and IG values

4	Unassign the call reference values by entering:
	nilcrv <edit method> ↵

where <edit method>		
is:	**slot <shelftype> <shelf #> <slot #> <circuit #>**	
	where:	
	<shelftype>	**CDS**, **ANX**, or **UE**
	<shelf #>	**1** to **7** for CDS, **1** to **28** for ANX, **1** to **7** for UE
	<slot #>	**1** to **96** for CDS, **1** to **48** for ANX, **1** to **16** for UE
	<circuit #>	**1** to **24** for UE, not applicable to CDS or ANX
—continued—		

—continued—

Procedure 4-17 (continued)
Unassigning call reference values

Step   Action

where <edit method>	
or:	**range <shelftype> <start shelf #> <start slot #> <start circuit #> <end shelf #> <end slot #> <end circuit #>**
	where:
	<shelftype> **CDS**, **ANX**, or **UE**
	<start shelf #> **1** to **7** for CDS, **1** to **28** for ANX, **1** to **7** for UE <end shelf #>
	<start slot #> **1** to **96** for CDS, **1** to **48** for ANX, **1** to **16** for <end slot #> UE
	<start circuit #> **1** to **24** for UE, not applicable to CDS or ANX <end circuit #>
	Note: The "start" number must be less than or equal to the corresponding "end" number.
or:	**CRV <CRV #> <IG #>**
	where:
	<CRV #> **1** to **2048**
	<IG #> **1** to **5**
or:	**CRV_range <start CRV #> <end CRV #> <IG #>**
	where:
	<start CRV #> **1** to **2048** <end CRV #>
	<IG #> **1** to **5**
	Note: The "start" number must be less than or equal to the corresponding "end" number.

The edit method and IG appear. Confirmation is requested.

5   Confirm or cancel the command by entering:

y ↵ or **n** ↵

If confirmed, the command is executed.

—continued—

Procedure 4-17 (continued)
Unassigning call reference values

Step	Action

Listing unassigned call reference and IG values

6   List the call reference values by entering:

querynil ↵

The list of unassigned CRVs appears. You can advance to the next screen of information by pressing Return.

Listing the MVIPROV CI commands

7   View the list of MVIPROV CI commands by entering:

help ↵

The list of MVIPROV CI commands appears.

8   Return to the network element user interface by entering:

fwp ↵

—**end**—

Testing network elements

This chapter has the procedures for verifying the common-equipment shelf and the copper-distribution shelves (CDSs) after commissioning and provisioning the network elements.

Procedures in verifying a network element

To verify a network element, do the following procedures in this order:

Procedure	Page
5-1 Verifying the presence of the network element software	5-2
5-2 Powering up the line equipment	5-4
5-3 Testing equipment LEDs and lamps	5-7
5-4 Performing a circuit pack inventory	5-18
5-5 Diagnosing failed circuit packs	5-21
5-6 Verifying redundant common-equipment cards	5-26
5-7 Testing the copper-distribution shelves	5-32

Procedure 5-1
Verifying the presence of the network element software

Use this procedure to test for the presence of the network element (NE) software.

When the NE software is loaded (in the APU (access processing unit) cards), the circuit packs are initialized. Some of the common-equipment cards, especially the transport interface card (TIC) and access interface card (AIC), take well over one minute to initialize after the APUs are loaded. After the circuit packs initialize, each circuit pack is provisioned, then the circuit packs are automatically placed into service.

If the result of the circuit pack initialization is	Then the circuit pack
a green LED light on a circuit pack	is active.
a red LED light on a circuit pack	has failed. Refer to Procedure 5-5 on page 5-21 to diagnose a failed circuit pack.

Note: If the red Temp (temperature) LED on the maintenance interface card (MIC) comes on after the system software is booted, make sure the bay cooling fans are still operating.

Requirements

The following requirements must be met before starting this procedure:

- Connect a terminal to the NE as specified in *Network Element User Interface Description*, 323-3001-300, in *Operations, Administration, and Provisioning*, Volume 4A.

- Obtain a copy of the Site Test Results Form found in "Appendix E: Site test results form" on page 14-1.

Procedure 5-1 (continued)
Verifying the presence of the network element software

Action

Step	Action
1	Log in to the network element user interface (NEUI) with a security level of "ADMIN."
	The Network Element Status screen of the NEUI is displayed.
2	Press the **Return** key twice, then verify that the AccessNode software load is displayed.
3	Record the results of the login using the Site Test Results Form.

—**end**—

Procedure 5-2
Powering up the line equipment

Use this procedure to power up the CDSs and the test access card (TAC).

Requirements

The following requirements must be met before starting this procedure:

- Make sure the common-equipment circuit packs for this configuration are installed.
- Make sure the commissioning of the NE is completed and software is downloaded to the processor card (Proc).
- Confirm the basic NE operation by successfully logging in.
- Obtain one Omega four-wire card, NT4K69, for each CDS to verify talk battery continuity.

Note: Other line cards are not installed. They will be installed after initial system testing is completed. Line card installation is documented in *Line Card Testing Procedures*, 323-3001-316 in *Operations, Administration, and Provisioning*, Volume 4B.

Note: At powerup, any circuit pack with a red LED on may have failed. However, you do not need to take action at this time. Diagnosis of circuit pack failures is performed later in this chapter in Procedure 5-5, "Diagnosing failed circuit packs" on page 5-21.

—continued—

Procedure 5-2 (continued)
Powering up the line equipment

Action

Step	Action

1   On the breaker interface panel (BIP), close the cooling unit circuit breakers CU A and CU B.

2   On the BIP, close the circuit breaker labeled TBFCE (the talk battery power to the test access card). The BIP is shown below.

Circuit breakers   Power LEDs
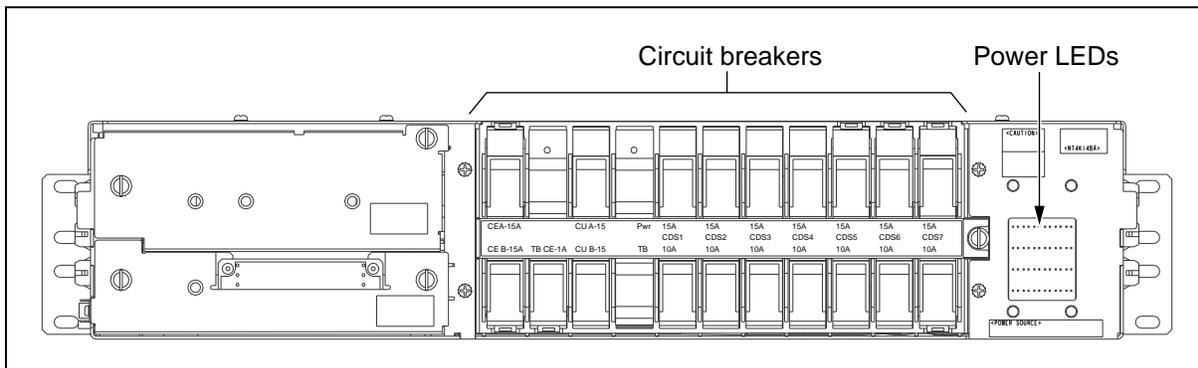
3   The TAC completes self-testing.

If a	Then the circuit pack
green LED is on	is active.
red LED is on	has failed. Check that there is power coming from the power source.

4   Close the circuit breaker labeled Power CDS 1, which provides shelf power to the copper-distribution shelf 1 (CDS 1).

5   Close the circuit breaker labeled TB CDS1, which provides talk battery to copper-distribution shelf 1 (CDS 1).

The circuit packs in CDS 1 start to boot. Narrowband line interface cards (NLICs) complete self-tests and provision all line card slots with the default line card type. If you do not obtain these results, check that there is power coming from the power source to CDS 1 .

6   Verify that the talk battery is properly connected to the CDS by performing a line card diagnostic.

7   Open the Power CDS1 circuit breaker and the TB CDS 1 10A circuit breaker on the BIP.

8   Repeat steps 4 to 7 for each set of circuit breakers associated with installed CDSs.

—**continued**—

Procedure 5-2 (continued)
Powering up the line equipment

Step	Action

9 When the operation of all line equipment circuit breakers is verified as correct, close all circuit breakers on the BIP.

If the NE is	Then
• powered by the optional modular power package (MPP) or • mounted in a Series 800A outside plant cabinet	go to step 10.
• NOT powered by the optional modular power package (MPP) or • NOT mounted in a Series 800A outside plant cabinet	go to step 11.

10 If rectifiers have the ON/RFA LED lit in red, then perform the load-balancing procedure. Refer to *Optional Commissioning Procedures*, 323-3001-220, in *Commissioning and Testing*, Volume 3B.

11 Verify that all loss-of-power alarms are cleared.

12 Make sure the fans on the cooling unit are operating and that air flow through the equipment is not obstructed.

13 Note the completion of this procedure on the Site Test Results Form.

14 Check off this procedure on the System Setup Checklist.

—**end**—

Procedure 5-3
Testing equipment LEDs and lamps

Use this procedure to test all LEDs on the system bay. This procedure applies to the access bandwidth manager (ABM) and transport bandwidth manger (TBM) configurations. The procedures for testing the LEDs depend on the shelf configuration of the system bay.

Requirements

Before testing the LEDs, the following requirements must be met:

- Log in to the NEUI.

- Read the command conventions described in Chapter 1 of *Network Element User Interface Description*, 323-3001-300, in *Operations, Administration, and Provisioning,* Volume 4A.

Action

Step	Action
1	For an ABM shelf configuration, LEDs are tested simultaneously. The test can be initiated from the local craft access panel (LCAP) or from the NEUI.

Note 1: Refer to Figure 5-1 on page 5-8 for an illustration of the LEDs in an ABM shelf configuration.

Note 2: The lamp test function is disabled when the MIC is busy such as during a software download.

Procedure 5-3 (continued)
Testing equipment LEDs and lamps

Figure 5-1
Lamps and LEDs on an ABM shelf configuration

PC-10562

BIP
(card fail LEDs
and breaker
trip lamp)

BIP
(bay power and
alarm lamps or LEDs)

FW-10562

Cooling shelf
(one LED per
fan module)

LCAP
(orderwire and
shelf alarm lamps)

Copper-distribution
shelf
(one LED per
drawer and one LED
per CDSP)

ACO/LT

Note: Open each copper-distribution shelf drawer to inspect LEDs on cards.
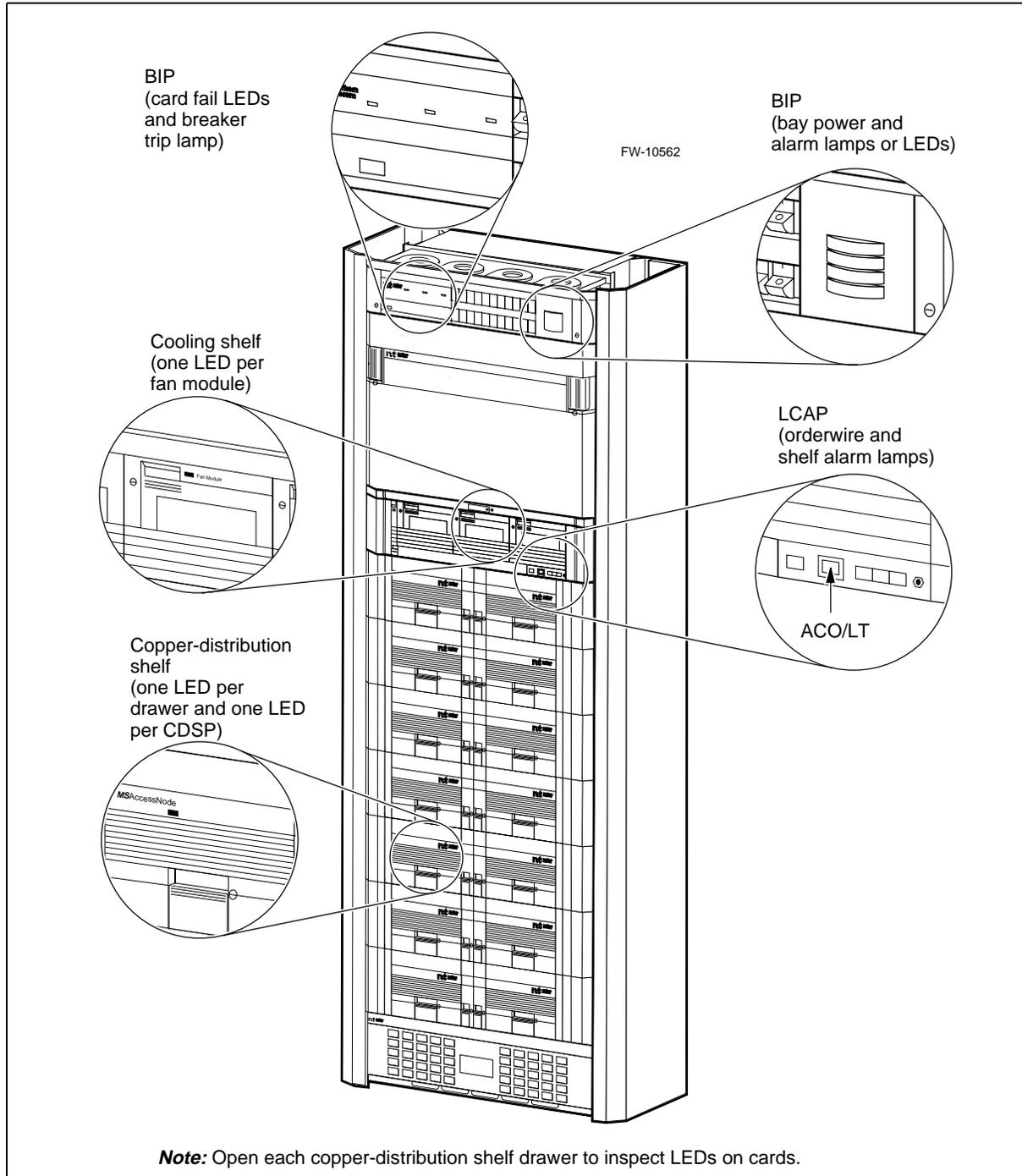
—continued—

Procedure 5-3 (continued)
Testing equipment LEDs and lamps

Step	Action

If the Proc card is active, and the Active LED is on under normal operations conditions. However, if the Proc card is active but the Active LED is off then the following could be happening: a lamp test, when a restart is in progress, or if communications with the standby Proc is down.

When the Proc card is on standby, then the Active LED is off on the Proc card before the other LEDs for the following reasons: when a restart is in progress or if the standby Proc undergoes a restart during the lamptest after other LEDs.

Note: When a lamp test is performed at the remote fiber terminal (RFT), the power filter LED does not light.

2 Press the ACO/LT button (on the LCAP), to test the LEDs on the BIP. If there are any new alarms, the first press of the ACO/LT button disables the audible alarms. Press the button a second time to operate the lamp test.

All LEDs on the BIP light for as long as you hold the button.

If you are testing LEDs for	Then
a TBM configuration	LEDs on the BIP are tested separately from other LEDs on the bay.
BIP LEDs	use the ACO/LT button on the LCAP.
LCAP lamps and circuit pack LEDs	use the ACO/LT button on the LCAP or the lamptest command on the NEUI.

3 Examine the BIP for unlit LEDs and note any that failed.

Note: Refer to Figure 5-1 on page 5-8 for an illustration of the LEDs in an ABM shelf configuration.

4 Test the LCAP and circuit pack LEDs.

If you want to test from the	Then go to
LCAP	step 5
NEUI	step 7

—continued—

Procedure 5-3 (continued)
Testing equipment LEDs and lamps

Step	Action
5	To initiate an LED test from the LCAP, press the ACO/LT button on the LCAP. If there are any new alarms, follow these steps:
	a. Press the ACO/LT button once to disable the audible alarms.
	b. Press the button a second time to operate the lamp test.
	All LEDs light for 30 seconds, with the exception of those listed in step 1. If you are testing a TBM configuration, the LEDs on the BIP do not light up.
	Note: Refer to Figure 5-2 on page 5-11 for an illustration of the LEDs in a TBM shelf configuration.
6	Examine the bay for unlit LEDs and note any that failed.
	The bay and circuit pack LEDs are shown at the end of this procedure.
	If this is an MBP, the top cap LED, at the top left of the external cabinet, is not tested by the ACO/LT button, or by the lamp test command.
	Note: Refer to Figure 5-3 on page 5-12 for an illustration of the LEDs in an MBP configuration.
7	To initiate an LED test from the Network Element Status screen, enter:
	eq sh ↵
	The equipment shelf screen is displayed.
	lamptest ↵
	All LEDs light for 30 seconds with the exception of those listed in the note in step 1. If you are testing a TBM configuration, the LEDs on the BIP do not light up. When a lamp test is performed at the RFT, the power filter LED does not light.

—continued—

Procedure 5-3 (continued)
Testing equipment LEDs and lamps

Figure 5-2
Lamps and LEDs on a TBM shelf configuration

PC-10784
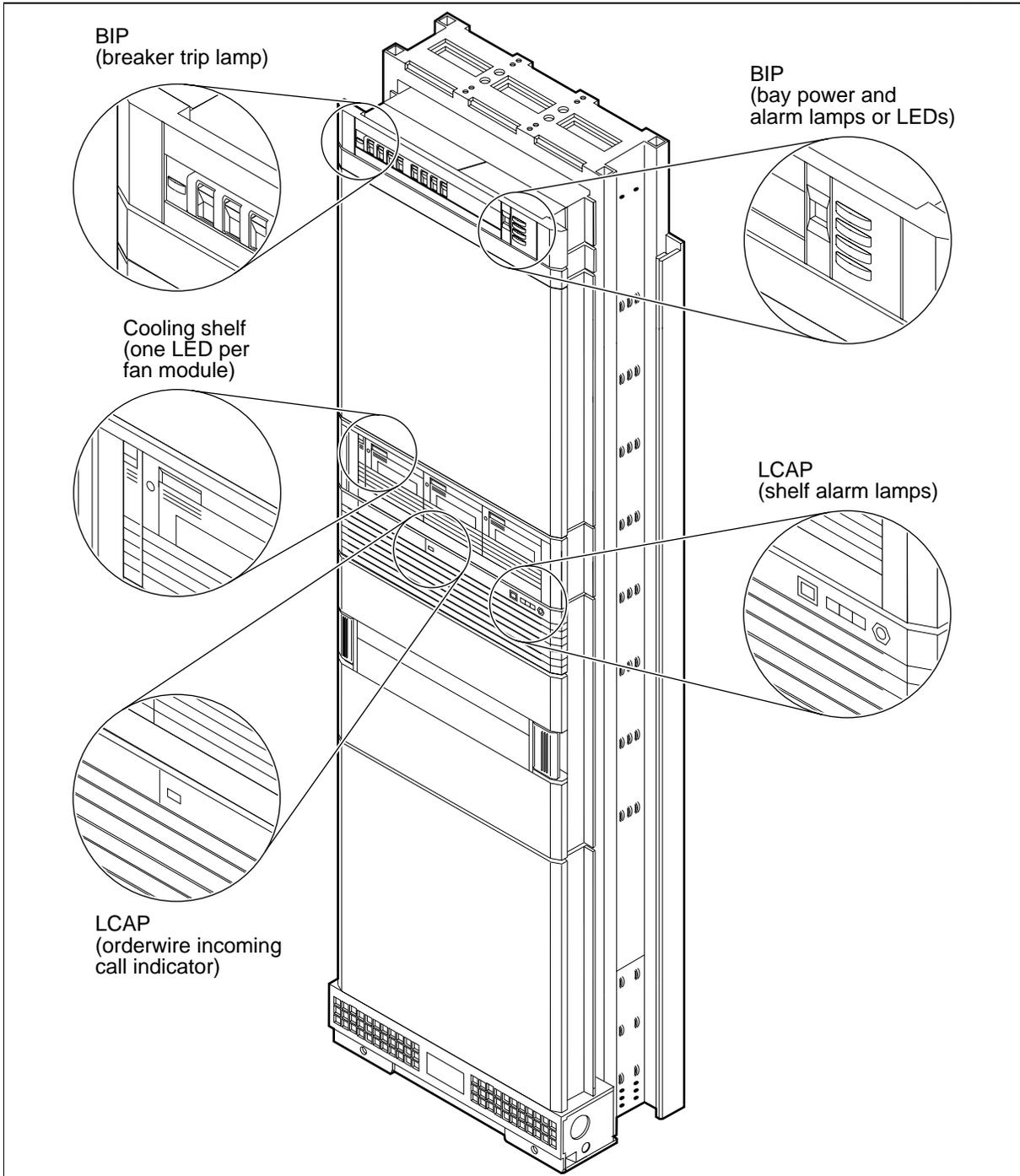
BIP
(breaker trip lamp)

BIP
(bay power and
alarm lamps or LEDs)

Cooling shelf
(one LED per
fan module)

LCAP
(shelf alarm lamps)

LCAP
(orderwire incoming
call indicator)

—continued—

AccessNode   Setting Up Your System: VTBM   323-3001-230   Issue 2.0

Procedure 5-3 (continued)
Testing equipment LEDs and lamps

Figure 5-3
Lamps and LEDs on the modular business package (MBP)

PC-11199

Copper-distribution shelf (one LED per drawer and one LED per CDSP)

LCAP (orderwire and shelf alarm lamps)

BIP (card fail LEDs and breaker trip lamp)

BIP (bay power and alarm LEDs)
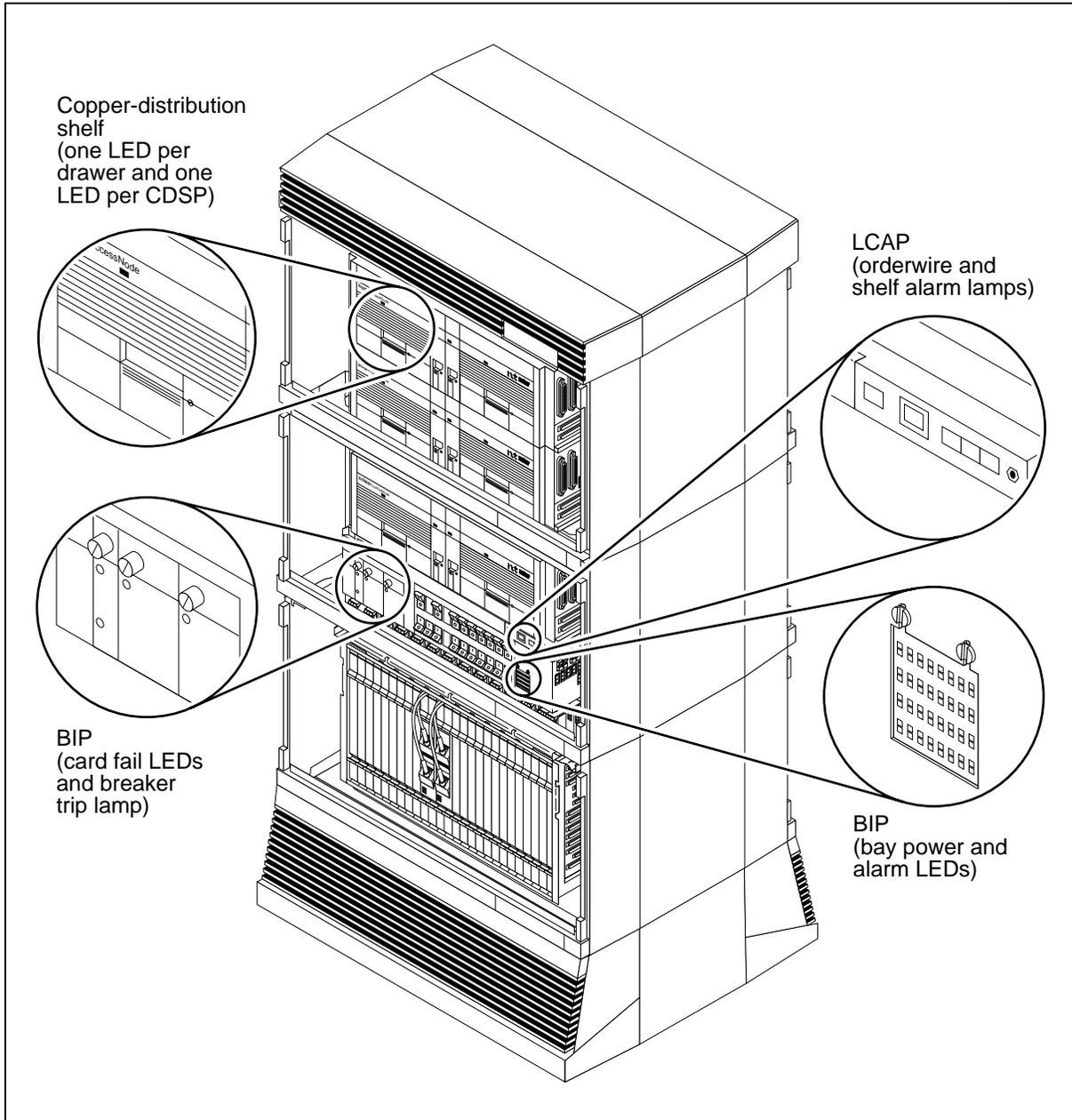
—continued—

Procedure 5-3 (continued)
Testing equipment LEDs and lamps

Step	Action
8	Examine the bay (or cabinet) and circuit packs for unlit LEDs and note any that failed.

Note 1: The bay LEDs are shown in Figure 5-1 on page 5-8 and Figure 5-2 on page 5-11. The MBP LEDs are shown in Figure 5-3 on page 5-12. Circuit pack LEDs are shown in Figure 5-4 on page 5-14 through Figure 5-7 on page 5-17.

If this is an MBP, the top cap LED, at the top left of the external cabinet, is not tested by the ACO/LT button, or by the lamptest command.

Note 2: If the LEDs go off before you have examined all of them, issue the lamptest command again.

If	Then
CDSs are equipped	open each CDS drawer and inspect the MTAC and the narrowband line interface card (NLIC) for lit LEDs.
a circuit pack LED does not light during the lamptest	replace the circuit pack. Refer to *Module Replacement Procedures*, 323-3001-547, in *Maintenance*, Volume 5C.
the LED has failed on a cooling unit	replace the cooling unit.
the LED has failed on the BIP or LCAP	refer to *Routine Maintenance Procedures*, 323-3001-546, in *Maintenance*, Volume 5C. You need to replace the BIP. *Note:* In the ABM shelf, BIP LEDs light only if the alarm relay card is installed.
the LED that shows through the faceplate of a CDS drawer fails	replace the MTAC or MTACII where the LED is mounted.
you use the lamptest command in the NEUI	return to the Network Element Status screen by entering the following command: **quit** ↵

Step	Action
9	Note the completion of the lamp test in the Site Test Results Form with any details about the results.
10	Check off this procedure on the System Setup Checklist.

—continued—

Procedure 5-3 (continued)
Testing equipment LEDs and lamps

Figure 5-4
Processor card (Proc), maintenance interface card (MIC), operations controller (OPC), and external synchronization interface (ESI) card

PC-10582

| Processor card (Proc) | Maintenance interface card (MIC) | Operations controller (OPC) | External synchronization interface (ESI) |
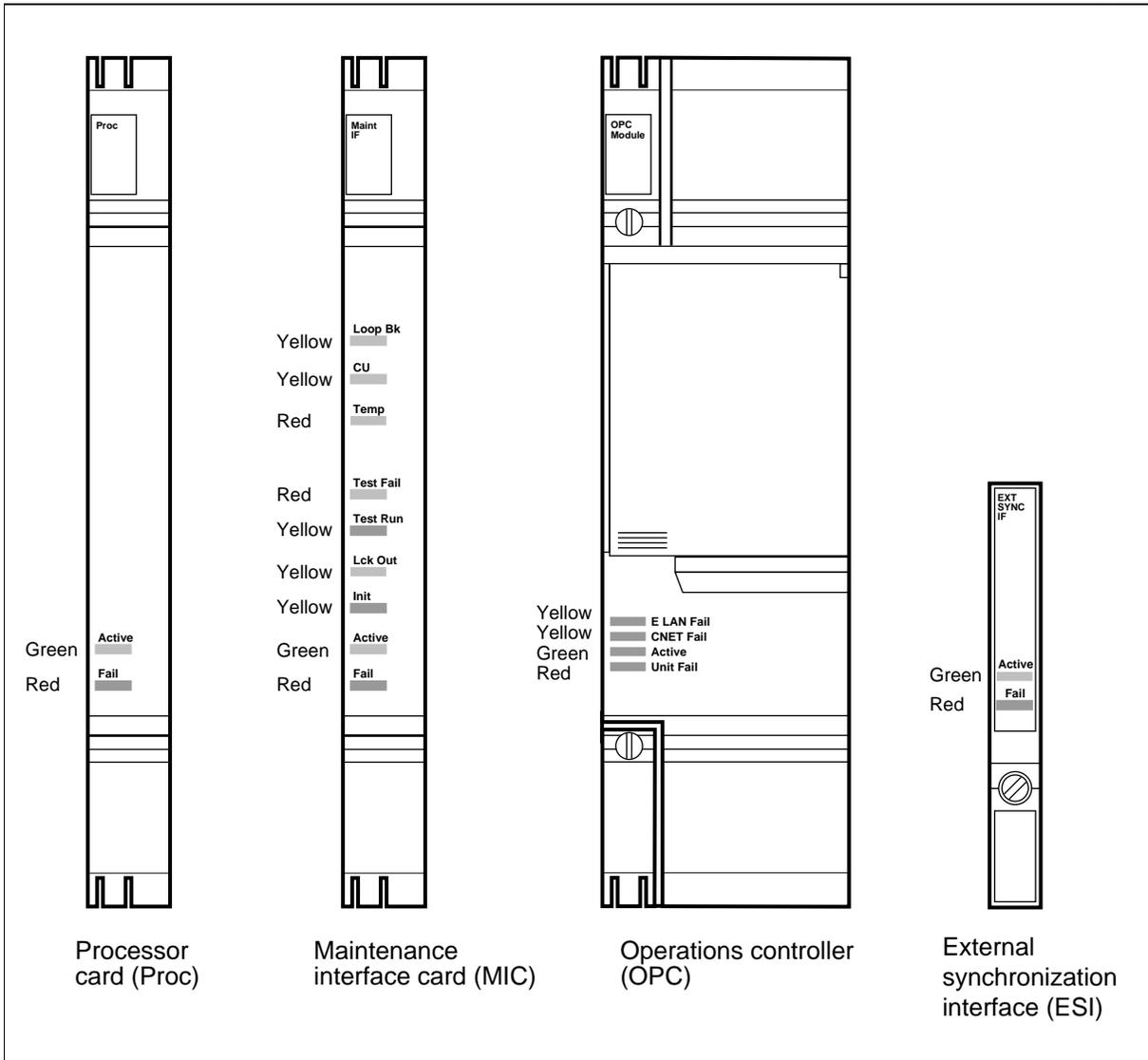
—continued—

Procedure 5-3 (continued)
Testing equipment LEDs and lamps

Figure 5-5
OC-12, DS1/VT mapper, transport interface card (TIC), access interface card (AIC), and test access card (TAC)

PC-10785

| OC-12 | DS1/VT mapper | Transport interface card (TIC) | Access interface card (AIC) | Test access card (TAC) |
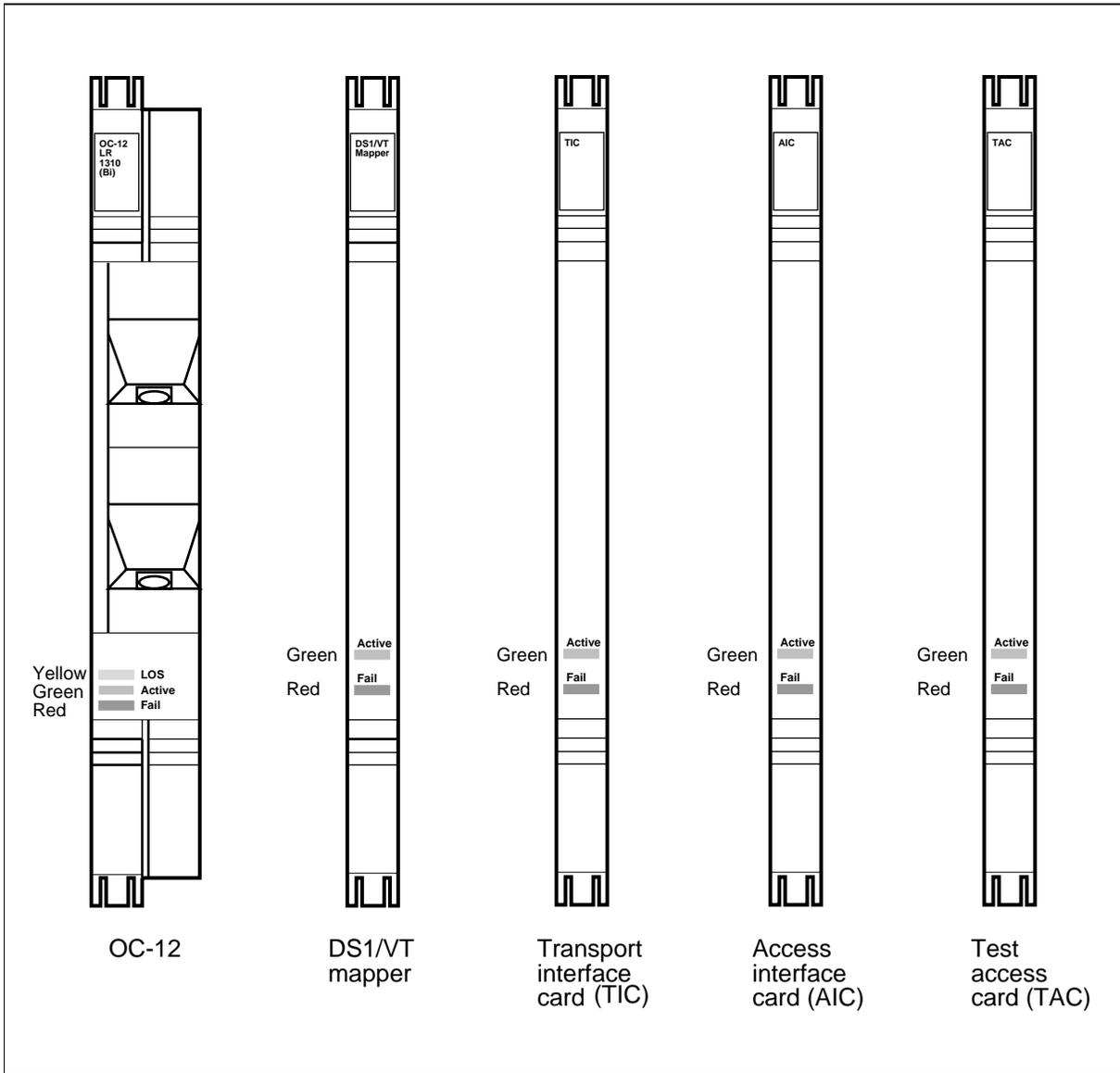
—**continued**—

Procedure 5-3 (continued)
Testing equipment LEDs and lamps

Figure 5-6
Narrowband line interface card (NLIC), metallic test access card (MTAC), and copper-distribution shelf power converter (CDSP) card

Narrowband line
interface card
(NLIC)

Metallic
test access
(MTAC)

Power
converter
(CDSP)
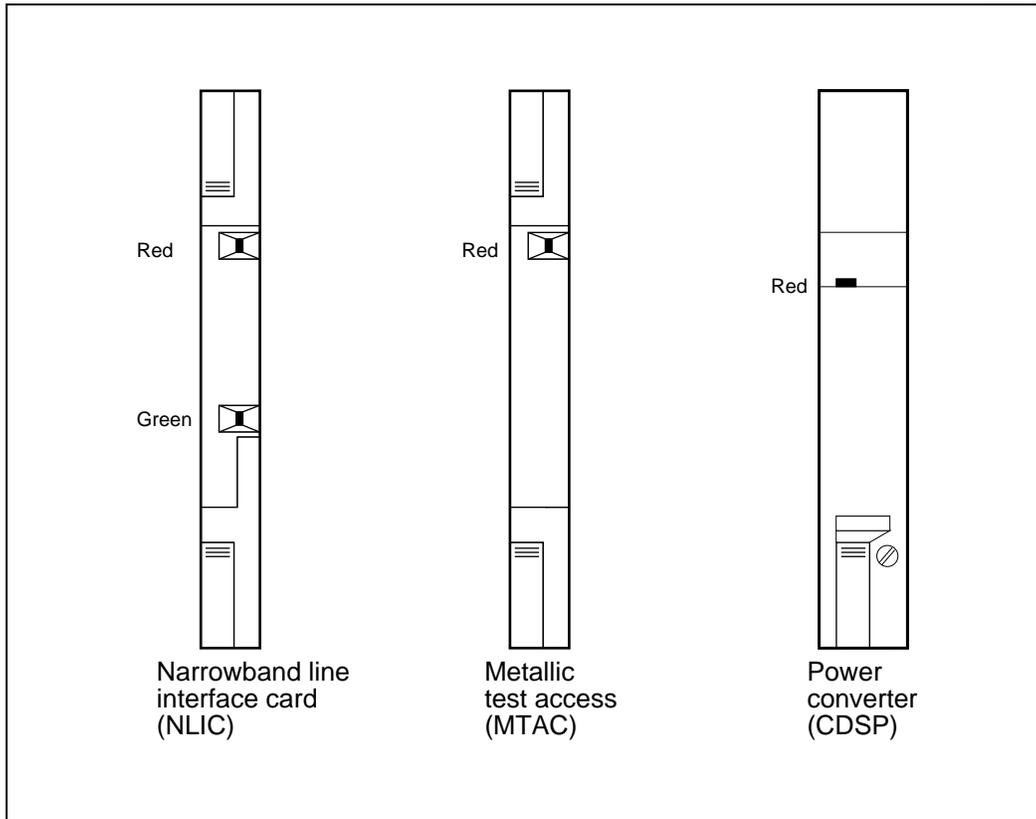
—**continued**—

Procedure 5-3 (continued)
Testing equipment LEDs and lamps

Figure 5-7
DS3 mapper, DS3 protection switch, and integrated remote test unit (IRTU) card

PC-15661

DS3
mapper

DS3
protection
switch

Integrated
remote
test unit
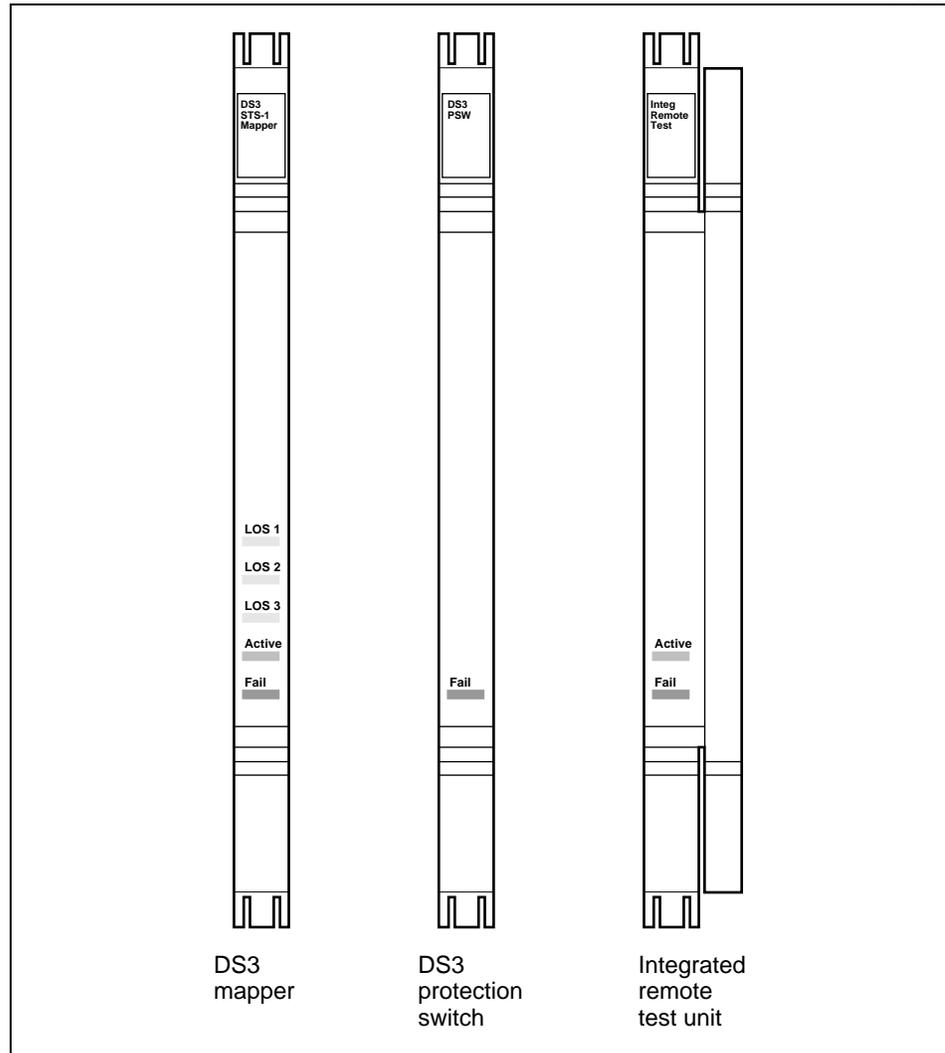
—end—

Procedure 5-4
Performing a circuit pack inventory

Use this procedure to inventory circuit packs on a common-equipment shelf. An inventory is a list of all circuit packs in a shelf, excluding the side interconnect left (SIL) and side interconnect right (SIR) circuit packs. This verifies that the Proc knows what circuit pack is inserted in each slot, and the state of each circuit pack. This procedure applies to either an ABM or TBM shelf, and to the CDS, whether the CDS is mounted in a bay, MBP cabinet, or Series 800A outside plant cabinet.

This procedure also describes how to verify the common cards, such as narrowband line interface cards (NLICs) and metallic test cards (MTACs), in the CDSs associated with an ABM shelf. Listing the line cards in a CDS is described in the document *Line Card Testing Procedures*, 323-3001-316, in *Operations, Administration, and Provisioning,* Volume 4B.

Requirements

The following requirements must be met before starting this procedure:

- Read the command conventions described in chapter 1 of *Network Element User Interface Description*, 323-3001-300, in *Operations, Administration, and Provisioning,* Volume 4A.

Action

Step	Action
1	From the Network Element Status screen, display the Shelf Equipment screen: **eq sh** ↵ *The Shelf Equipment screen is displayed.*
2	Display the Shelf Inventory screen for the common-equipment shelf by entering: **inventry CE** ↵ *The Shelf Inventory screen is displayed.* Enter **f** to scroll forward or **b** to scroll backwards for more than one inventory screen. If a circuit pack is in its slot but is not displayed in the inventory list on the screen, remove the circuit pack and reinsert it. After it goes into service, enter the inventory command again.

—**continued**—

Procedure 5-4 (continued)
Performing a circuit pack inventory

Step	Action

3   If a circuit pack is displayed in the list, review the entry in the circuit pack state (CpkState) field and take the appropriate action listed below:

If CpkState entry is	Then
Blank	do nothing (there is no problem).
Ueq (unequipped)	make sure the circuit pack is properly engaged. This entry is not likely until the slot is provisioned.
Mism (mismatch)	the wrong card is in this slot. Remove the card and put it in its correct slot.
Trbl (trouble)	perform diagnostics.

4   Quit the inventory and shelf screens by entering;

quit 2 ↵

The Network Element Status screen is displayed.

If this configuration	Then
has no CDSs	this procedure is completed. Note the completion of this procedure on the Site Test Results Form.
has CDSs	continue at step 5.

5   To verify the presence of NLICs in the CDSs, enter:

eq lic ↵

The LIC Equipment screen appears.

6   Verify that the cards are displayed for all equipped CDSs and note any of the cards that are not in service (IS).

Note: If TIC A or AIC A is missing or failed, then the LIC-A and LIC-C State fields become Trbl. Similarly, the states of LIC-B and LIC-D are dependent on TIC B and AIC B being present and operational. MTAC A and B are dependent on the test access card (TAC).

—continued—

Procedure 5-4 (continued)
Performing a circuit pack inventory

Step	Action
7	If any circuit pack in the list is OOS, place the circuit pack(s) in service by entering: **dtlic <CDS #> <ID>**↵ **where** <CDS #> is copper-distribution shelf number: one of **1** to **7** <ID> is equipment instance: one of **a**, **b**, **c**, or **d** *The detailed LIC Equipment screen is displayed.* **chgstate is** ↵ *The card does a self-diagnostic and enters the in-service state.*
8	Repeat steps 5 through 7 for MTACs, but at step 5, enter: **eq mtac** ↵ and at step 7 enter: **dtlmtac <CDS #> <ID>**↵ **where** <CDS #> is CDS number: one of **1** to **7** <ID> is equipment instance: one of **a** or **b** *The appropriate detailed MTAC Equipment screen is displayed.*
9	Repeat steps 5 through 7 for CDS power converter cards (CDSPs), but at step 5 enter: **eq cdsp** ↵ and at step 7 enter: **dtlcdsp <CDS #> <ID>**↵ **where** <CDS #> is CDS number: one of **1** to **7** <ID> is equipment instance: one of **a** or **b** *The appropriate detailed CDSP Equipment screen is displayed.*
10	Note the completion of this procedure on the Site Test Results Form.
11	Check off this procedure on the System Setup Checklist.

—**end**—

Procedure 5-5
Diagnosing failed circuit packs

Use this procedure to identify failed circuit packs or to verify the failure of circuit packs when a red LED is on.

Note: To help in diagnosing failed circuit packs, display the logs and log reports for an NE. For the procedures on how to do this, refer to *System Administration Procedures*, 323-3001-302, in *Operations, Administration, and Provisioning*, Volume 4A. Log reports and associated information are described in the *Log Report Manual*, 323-3001-840, in *Maintenance*, Volume 5B.

Requirements

The following requirements must be met before starting this procedure:

- Log in to the NEUI.
- Read the command conventions described in chapter 1 of *Network Element User Interface Description*, 323-3001-300, in *Operations, Administration, and Provisioning,* Volume 4A.

Action

Step	Action

If you are diagnosing a circuit pack in	Then go to
the common-equipment shelf	step 1
a CDS	step 6

When failure is suspected, or when a circuit pack in the common-equipment shelf has a red LED on, you need to perform a diagnostics on the failed circuit pack.

—continued—

Procedure 5-5 (continued)
Diagnosing failed circuit packs

Step	Action
1	Display the appropriate equipment screen by entering:

equipmnt <equipment ID>↵
 where

<equipment ID>   is one of the circuit pack equipment IDs listed in the following table. It is not necessary to test circuit packs in the order given in the table below.

The equipment types and equipment IDs are listed in the table below:

Equipment type	Equipment ID
processor (Proc)	proc a, proc b
maintenance interface card (MIC)	mic
operations controller (OPC)	opc
external synchronization interface (ESI)	esi g1, esi g2
optical interface	oc3 g1, oc3 g2, oc12 g1, oc12 g2
DS1/VT mapper	(see note)
DS3 mapper	(see note)
STS-1 interface card	(see note)
access interface card (AIC)	aic a, aic b
transport interface card (TIC)	tic a, tic b
test access card (TAC)	tac
integrated remote test unit (IRTU)	irtu
Note: The equipment IDs for DS1 and DS3 mappers or STS-1 interface cards consist of the traffic type (DS1, DS3, or STS-1) and the group number associated with that mapper. See Chapter 7 and Chapter 8 for the group numbers for DS1/VT mappers, DS3 mappers, and STS-1 mappers.	

| **2** | If the module to be diagnosed is not already out of service, enter: |

chgstate oos ↵

Confirmation is requested. If you confirm the action, the State field value changes to OOS.

—continued—

Procedure 5-5 (continued)
Diagnosing failed circuit packs

Step	Action

Note: The TIC, AIC, MIC, and Proc cards can be put through self-diagnostics without taking the system out of service. Although you can do OOS diagnostics on all cards as explained above, you can do an in-service diagnostics starting at step 3.

3   Initiate diagnostics by entering:

chgstate is ↵

The system performs an OOS dagnostics on the circuit pack as part of the transition from an OOS state to an in-service (IS) state.

Diagnostics can take a while; it proceeds as a background task. The diagnosis is reported as an update to the circuit pack state, as follows:

OOS-Diagnose   diagnostics in progress

Test fail   diagnostics failed

IS   diagnostics passed

4   If a failure is indicated, remove the defective module and insert a spare module.

Note: If the TAC is indicating a failure, verify that all ground cables are properly connected according to one of the acceptable office grounding schemes described in the chapter "Power and ground distribution" in *Site Installation Planning and Engineering*, 323-3001-200, in the *Engineering, Configuration, and Ordering Guide*, Volume 1.

5   Diagnose any other failed circuit packs. Note the completion of the diagnostics on the common-equipment shelf circuit packs on the Site Test Results Form.

If this configuration contains	Then
no CDSs	you have finished this procedure.
one or more CDSs	continue with step 6.

—**continued**—

Procedure 5-5 (continued)
Diagnosing failed circuit packs

Step	Action
6	Diagnose any other failed circuit packs. Note the completion of the diagnostics on the common-equipment shelf circuit packs on the Site Test Results Form.

If this configuration contains	Then
no CDSs	you have finished this procedure.
one or more CDSs	continue with step 7.

Step	Action
7	If the indicator of a line interface card (LIC), or CDSP circuit pack in a CDS indicates trouble or failure, you should perform out-of-service (OOS) diagnostics on the failed circuit pack. Display the detailed equipment screen for the appropriate circuit pack as follows: If the circuit pack is a LIC, enter: **eq lic** ↵ **dtllic <CDS #> <ID>**↵ If the circuit pack is a CDSP power card, enter the following: **eq cdsp** ↵ **dtlcdsp <CDS #> <ID>**↵

> **where**
>
> <CDS #>   is copper-distribution shelf number: one of **1** to **7**
>
> <ID>   is equipment instance: one of **a**, **b**, **c**, or **d** for LICs, or **a** or **b** for CDSPs

Step	Action
8	If the primary LIC is not functioning, it must be put in an inactive state before placing it out of service for diagnostics. Enter the following: **switch** ↵ *Confirmation is requested.* **y** ↵ *The two LICs exchange primary and inactive status.*
9	At the prompt, enter the following: **chgstate oos**
10	At the prompt enter the following: **chgstate is**
11	Repeat steps 6 through 9 for all failed CDSPs and LICs.
12	If a metallic test access card (MTAC) indicates failure, enter the following: **eq mtac**↵ **dtlmtac <CDS #> <ID>**↵

—continued—

Procedure 5-5 (continued)
Diagnosing failed circuit packs

Step	Action

where

<CDS #>   is copper-distribution shelf number: one of **1** to **7**

<ID>   is equipment instance: one of **a** or **b** for MTACs

13   If the MTAC to be diagnosed is still in service, enter the following:

chgstate oos ↵

Confirmation is requested. If you confirm the action, the State field value changes to OOS.

Note: On an MTAC, out-of-service diagnostics are not automatically conducted during the transition from an OOS state to an IS state. It is necessary to use the "diagnose" command to invoke diagnostics.

14   Start diagnostics, by entering:

diagnose ↵

The system performs out-of-service diagnostics on the MTAC.

Note: When diagnostics are requested on an MTAC and the resources are busy, the diagnostic request is rejected. If diagnostics are requested on an MTAC that is not out-of-service, the diagnostic request is rejected.

Diagnosis runs as a background task. The diagnosis is reported as an update to the state of the circuit pack, as follows:

OOS-Diagnose   diagnostics in progress

Test fail   diagnostics failed

IS   diagnostics passed

15   If a failure is indicated, remove the defective MTAC and insert a spare one.

The new MTAC undergoes self-testing.

Note: The MTAC remains out-of-service after being inserted and passing its self-tests.

If the new MTAC fails or if more than one MTAC fails diagnostics, there can be a higher order problem, such as loose cables, bent pins, TAC fault, or other condition. Refer to the document, *Alarm and Trouble Clearing Procedures*, 323-3001-543, in *Maintenance*, Volume 5A.

16   If the MTAC passes diagnostics, place it back in service by entering:

chgstate is ↵

The MTAC goes in service.

17   Note the completion of diagnostics on the CDS circuit packs on the Site Test Results Form.

18   Check off this procedure on the System Setup Checklist.

—end—

Procedure 5-6
Verifying redundant common-equipment cards

Use this procedure to test the redundancy feature of the common-equipment cards equipped in your configuration. This procedure applies to both ABM and TBM common-equipment shelves.

The following cards are to be checked for redundancy operation:

- Proc, NT4K52
- AIC, NT4K55 (ABM shelf only)
- TIC, NT4K56 (ABM shelf only)
- NLIC, NT4K70 in CDSs

   Note: At the fiber central office terminal (FCOT) site in integrated configurations and the OPC shelf in single-ended configurations, only the processor card can be checked (the AIC, TIC, and LIC cards are not used).

Both AICs are active at all times and carry the same traffic. This is true in each direction. Since no circuit pack switching occurs, a redundancy test of the AICs is not required.

OC-3, OC-12, DS1, DS3, and STS-1 redundancies are verified in protection switching procedures in chapters 7 and 8.

Requirements

The following requirements must be met before starting this procedure:

- Make sure that for each type of card being tested, two cards are installed in the shelf and that they are in service (IS).
- Make sure that the Procs have valid data and their software is initialized.
- Make sure that the AICs are installed and in service so that you can test redundancy of the LICs or the TICs.
- Log in to the NEUI. See *Network Element User Interface Description*, 323-3001-300, in *Operations, Administration, and Provisioning,* Volume 4A.

—continued—

Procedure 5-6 (continued)
Verifying redundant common-equipment cards

Action

Step	Action

Verifying redundancy of the processor (Proc) cards

1   Display the Proc Equipment screen by entering:

eq proc <equipment ID>↵

where

<equipment ID>   **a** or **b**, whichever is on standby

The Proc Equipment screen is displayed.

2   If the data on the two Proc cards is not synchronized, enter:

datasync on ↵

*The Proc Equipment screen indicates when the data is synchronized (the
DataSync State field is set to NotSynced).*

3   Verify the routine exercising of the Proc cards by entering the following:

rexena on ↵

Routine exercising is enabled.

exercise ↵

*The exerciser verifies the ability of the two Proc cards to switch activity,
without actually switching them. A message indicates if the exercise fails to
complete successfully.*

Note: To help in diagnosing failed circuit packs, display the logs and log
reports for a NE. For the procedures on how to do this, refer to *System
Administration Procedures*, 323-3001-302, in *Operations, Administration and
Provisioning*, Volume 4A. Log reports and associated information are
described in the *Log Report Manual*, 323-3001-840, in *Maintenance*, Volume
5B.

4   Verify that the Proc cards can actually switch activity by entering:

switch ↵

y ↵

*If card A was on standby, it becomes active, indicated by the green LED. Card
B goes on standby, indicated when the green LED turns off. If card B was on
standby, it becomes active (green LED on) and card A goes on standby
(green LED off).*

Note: The switch command forces termination of the user interface session.
You will have to log back in to the OPC. See the procedure for logging in to
the OPC in *OPC User Interface Description*, 323-3001-301, in *Operations,
Administration, and Provisioning*, Volume 4A.

—continued—

Procedure 5-6 (continued)
Verifying redundant common-equipment cards

Step	Action

Repeat this step to verify that switching works in both directions.

If failure	Then go to
did NOT occur in routine exercising or in switching activity	step 6
occurred in routine exercising or in switching activity	step 5

5   Perform full diagnostics on the standby unit, by entering:

eq proc <equipment ID>↵

 where

 <equipment ID>   **a** or **b**, depending on the equipment on
                         standby

The Processor Equipment screen is displayed.

chgstate oos ↵

y ↵

The processor card goes out of service (OOS).

chgstate is ↵

The Processor Equipment screen indicates that diagnostics are in progress. The card state changes from OOS to OOS-Diagnose to IS.

If a fault is detected, replace the card and repeat steps 2 through 4.

6   The routine exerciser is still on. To turn the routine exerciser off, enter:

rexena off ↵

Routine exercising is disabled.

Verifying redundancy of the transport interface cards (TICs)

7   Display the TIC Equipment screen for one TIC.

eq tic <equipment ID>↵

 where

 <equipment ID>   **a** or **b**, whichever is on standby

The TIC Equipment screen is displayed.

<div align="center">**—continued—**</div>

Procedure 5-6 (continued)
Verifying redundant common-equipment cards

Step	Action

8   Verify that the TIC cards can actually switch activity by entering:

switch ↵

y ↵

If card A was in IS-Secondary state, it switches to the IS-Primary state and card B switches to the IS-Secondary state.

Repeat this step to verify that switching works in both directions.

If failure	Then go to
did NOT occur during switching	step 10
occurred during switching activity	step 9

9   To perform full diagnostics on the secondary unit, enter:

eq tic <equipment ID>↵

 where

 <equipment ID>   **a** or **b**, depending on the equipment in the secondary
                         state

The TIC Equipment screen is displayed.

chgstate oos ↵

y ↵

The TIC card goes out of service.

chgstate is ↵

The TIC Equipment screen indicates that diagnostics are in progress. When diagnostics are complete, the screen shows that the TIC card is back in service.

If a fault is detected, replace the card and repeat step 8.

                         —continued—

Procedure 5-6 (continued)
Verifying redundant common-equipment cards

Step	Action

Verifying redundancy of the line interface cards (LICs)

10 To display the detailed LIC Equipment screen for a LIC, enter:

eq lic; dtllic <CDS #><equipment ID>↵

 where

<CDS #>   is **1** to **7**

<equipment ID>   is **a**, **b**, **c**, or **d**

Note: Redundant pairs of LICs are as follows:
    a and b are a redundant pair in the left drawer
    c and d are a redundant pair in the right drawer

The LIC Equipment screen is displayed.

11 Verify that the LICs can actually switch activity by entering:

switch ↵

y ↵

If card A was IS-Secondary it switches to IS-Primary and card B switches to IS-Secondary.

12 Repeat step 11 to verify that switching works in both directions.

If failure	Then go to
occurs in any switching activity	step 13 to perform diagnostics on the LICs
does not occur	step 15

—continued—

Procedure 5-6 (continued)
Verifying redundant common-equipment cards

Step	Action

Performing full diagnostics on LICs

13   Perform full diagnostics on the LIC in the secondary state, by entering:

eq lic; dtllic <CDS #><equipment ID>↵

 where

 <CDS #>   is **1** to **7**

 <equipment ID>   is **a**, **b**, **c**, or **d**

The LIC Equipment screen is displayed.

chgstate oos ↵

y ↵

The LIC card is placed out of service.

chgstate is ↵

The LIC Equipment screen indicates that diagnostics are in progress. When diagnostics are complete, the screen shows that the LIC card is back in-service.

If a fault is detected, replace the card.

14   Perform full diagnostics on the second LIC card by repeating steps 11 through 13.

If no fault is detected, continue below.

15   Repeat steps 10 through 12 until you have tested every pair of redundant LICs in the CDSs. There are up to 14 pairs if all CDSs are equipped.

16   Note the completion of this procedure on the Site Test Results Form.

17   Check off this procedure on the System Setup Checklist.

—**end**—

Procedure 5-7
Testing the copper-distribution shelves

Use this procedure to test the following:

- common-equipment cards shared by all line cards in each copper-distribution shelf (CDS)

  — In each CDS there are two drawers and each drawer is equipped with two LICs and one MTAC.

- continuity of the longest paths in each drawer

  — Those that end on the highest-numbered line card slots in each drawer, slots 24 and 48 in the left drawer and slots 72 and 96 in the right drawer.

Inserting a line card results in system activities that test the communication paths and continuity from the common equipment to the line card. These activities include line card self-diagnostics and downloading of line card software.

Line cards do not auto-provision. Procedures for provisioning line cards are in the document *Line Card Provisioning Procedures*, 323-3001-315, in *Operations, Administration, and Provisioning*, Volume 4B. This procedure can be performed without provisioning the line card used for testing.

Requirements

The following requirements must be met before starting this procedure:

- Make sure that the common-equipment cards—TIC, AIC, TAC—are installed and in service in the ABM shelf.

- Make sure that two LICs and one MTAC are installed and in service in each drawer of the CDS.

- Obtain one Omega four-wire line card, NT4K69, for testing.

- obtain access to a VT100-compatible terminal, connected to the NE.

- Verify that one power filter card, NT4K63, is installed in each line card drawer. This card is located at the rear of the drawer, on the inner side, when viewed from the front.

- Log in to the NEUI.

  — If required, see *Network Element User Interface Description*, 323-3001-300, in *Operations, Administration, and Provisioning, Volume 4A.*

—continued—

Layout of copper-distribution shelves and line cards

The CDSs are numbered CDS 1 to CDS 7. Each line card slot is uniquely identified using the CDS number and slot number. The line cards are arranged in two layers: odd-numbered slots are in the bottom layer and even-numbered slots are in the top layer. Even-numbered slots are visible from the top, as shown in Figure 5-8 on page 5-34, or from the side.

To view odd-numbered slots, open one drawer at a time and look at the drawer from the side.

With one drawer open, you can view the slots as follows:

- slots 1 through 24 are visible on the left side of the left line drawer
- slots 25 through 48 are visible on the right side of the left line drawer
- slots 49 through 72 are visible on the left side of the right line drawer
- slots 73 through 96 are visible on the right side of the right line drawer

The numbering and location of CDSs is shown in Figure 5-9 on page 5-35 (bay view), Figure 5-10 and Figure 5-11 on pages 5-36 and 5-37 (modular business package view), and Figure 5-12 on page 5-38 (Series 800A outside plant cabinet view). The first CDS is below the LCAP in the bay arrangement, directly above the BIP in the MBP, and on the bottom left of the Series 800A outside plant cabinet.

Within each CDS, there are two line drawers:

- the left line drawer holds line cards 1 through 48
- the right line drawer holds line cards 49 through 96

Procedure 5-7 (continued)
Testing the copper-distribution shelves

Figure 5-8
Numbering of line card slots in a top view of the copper-distribution shelf (CDSs)

PC-10750

Rear

Left drawer				Right drawer	
LC2	LC48		LC50	LC96	
LC4	LC46		LC52	LC94	
LC6	LC44		LC54	LC92	
LC8	LC42		LC56	LC90	
LC10	LC40		LC58	LC88	
LC12	LC38	CDSP A	LC60	LC86	
LC14	LC36	CDSP B	LC62	LC84	
LC16	LC34		LC64	LC82	
LC18	LC32		LC66	LC80	
LC20	LC30		LC68	LC78	
LC22	LC28		LC70	LC76	
LC24	LC26		LC72	LC74	
LIC A			**LIC C**		
MTA A	**LIC B**		**MTA B**	**LIC D**	

Left drawer   Right drawer

Front

Note 1: The odd-numbered line card slots are not visible from the top, only from the side.

Note 2: The narrowband line-interface cards (LIC A-D) and metallic test access cards (MTA A and B) are full-height common cards.

—continued—

Procedure 5-7 (continued)
Testing the copper-distribution shelves

Figure 5-9
Numbering of copper-distribution shelves in a bay arrangement

PC-10000

Shelf name in FWPUI	Physical shelf position
CE or 1	1
CDS 1	2
CDS 2	3
CDS 3	4
CDS 4	5
CDS 5	6
CDS 6	7
CDS 7	8

Breaker interface panel

Access bandwidth manager (ABM) shelf

Air filter unit (not needed for NT4K18BA/CA)

Cooling unit

Local craft access panel

Copper-distribution shelves

Air filter unit
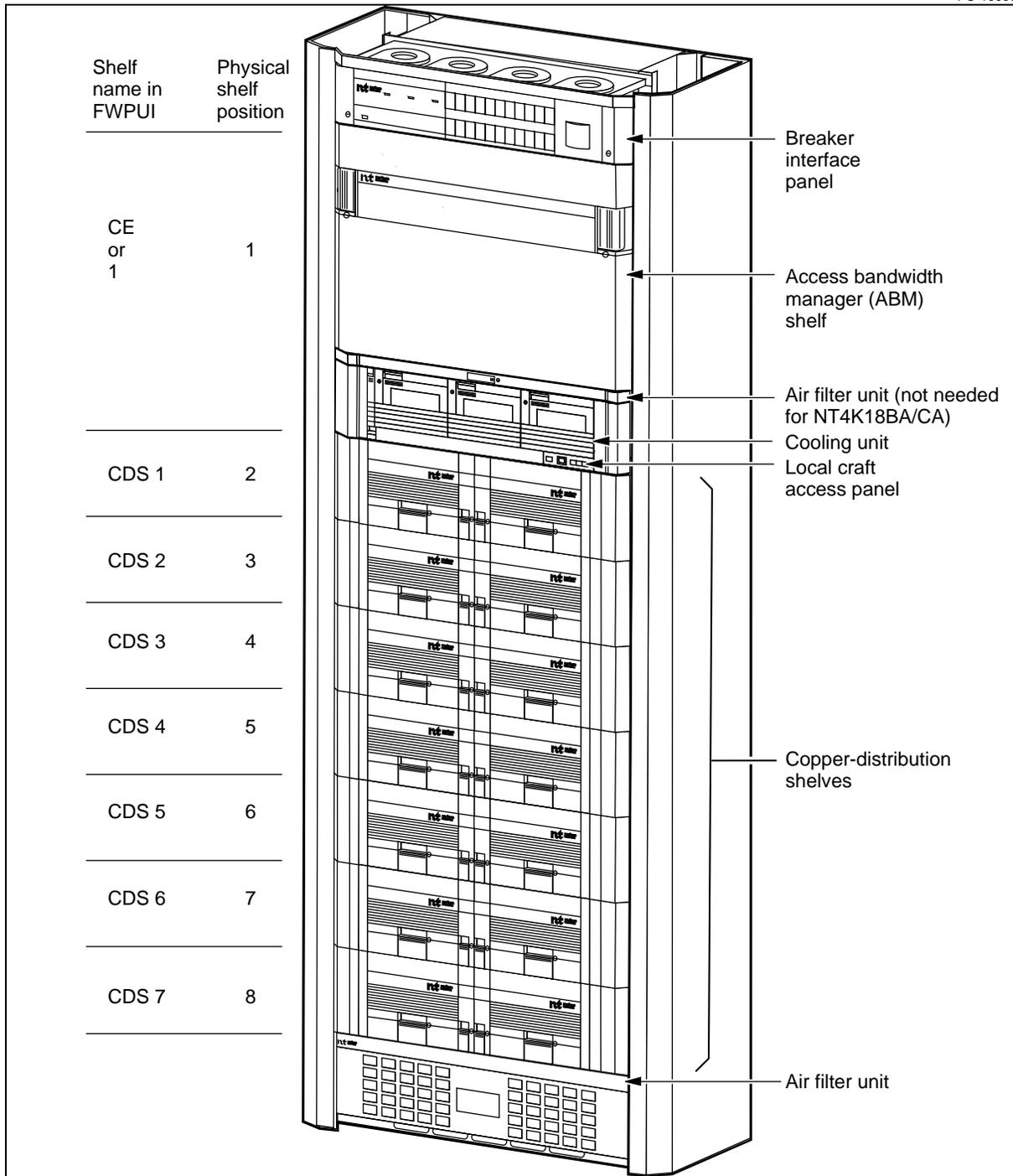
—continued—

Procedure 5-7 (continued)
Testing the copper-distribution shelves

Figure 5-10
Numbering of copper-distribution shelves in a 3/2 MBP cabinet arrangement
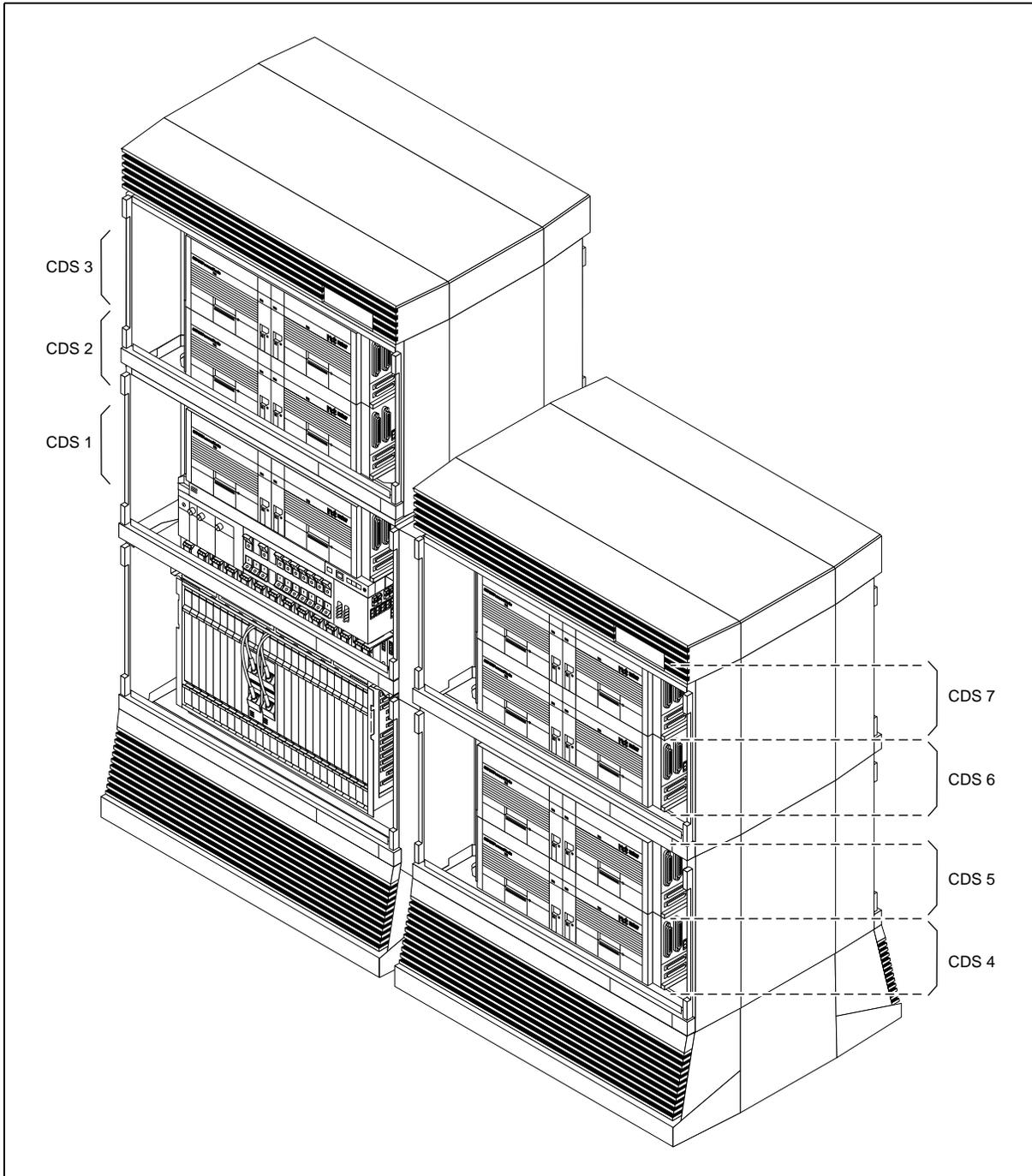
—**continued**—

Procedure 5-7 (continued)
Testing the copper-distribution shelves

Figure 5-11
Numbering of copper-distribution shelves in a 4/1 MBP cabinet arrangement

PC-11008
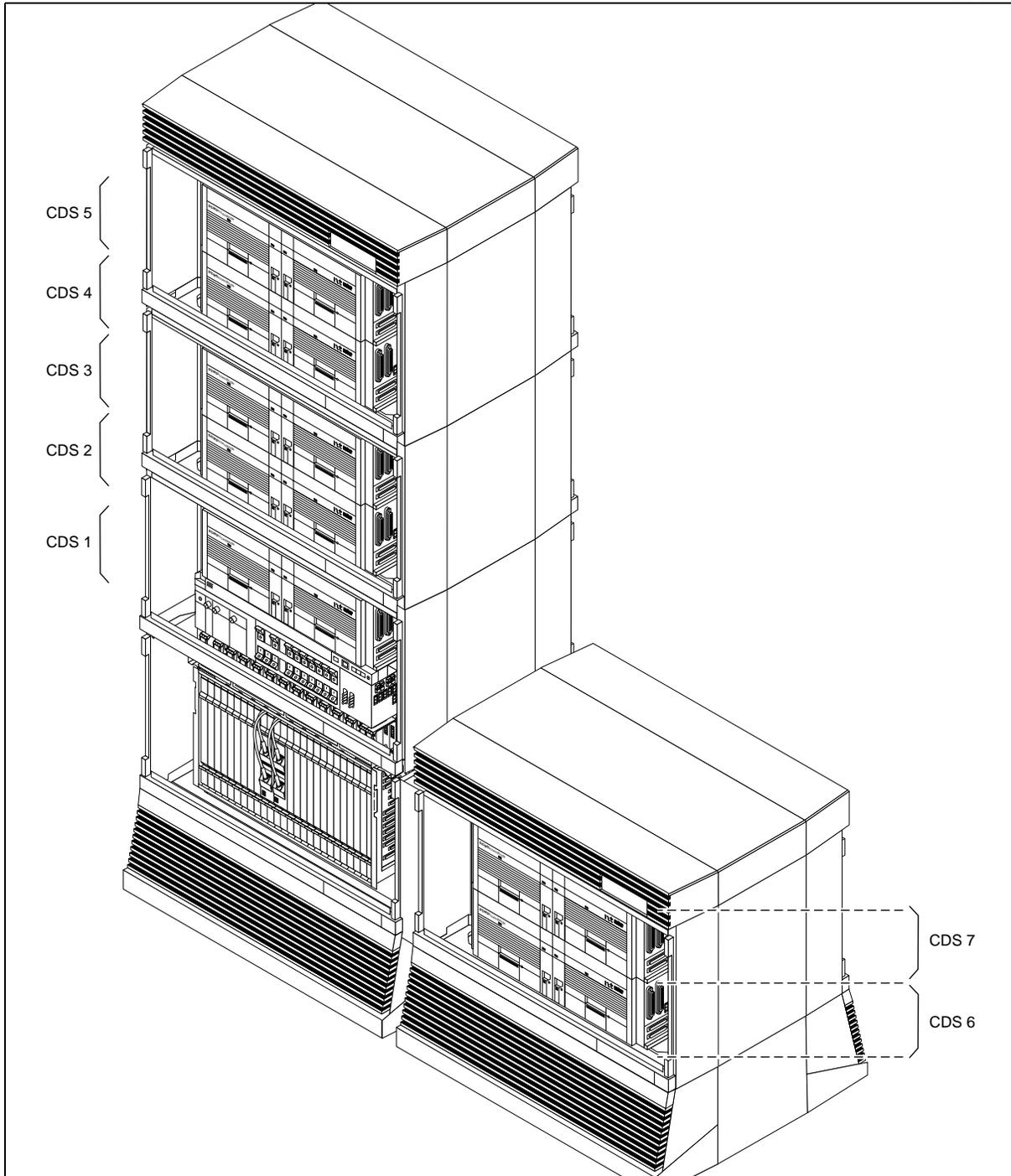
CDS 5

CDS 4

CDS 3

CDS 2

CDS 1

CDS 7

CDS 6

—continued—

Procedure 5-7 (continued)
Testing the copper-distribution shelves

Figure 5-12
Numbering of copper-distribution shelves in a Series 800A outside plant cabinet
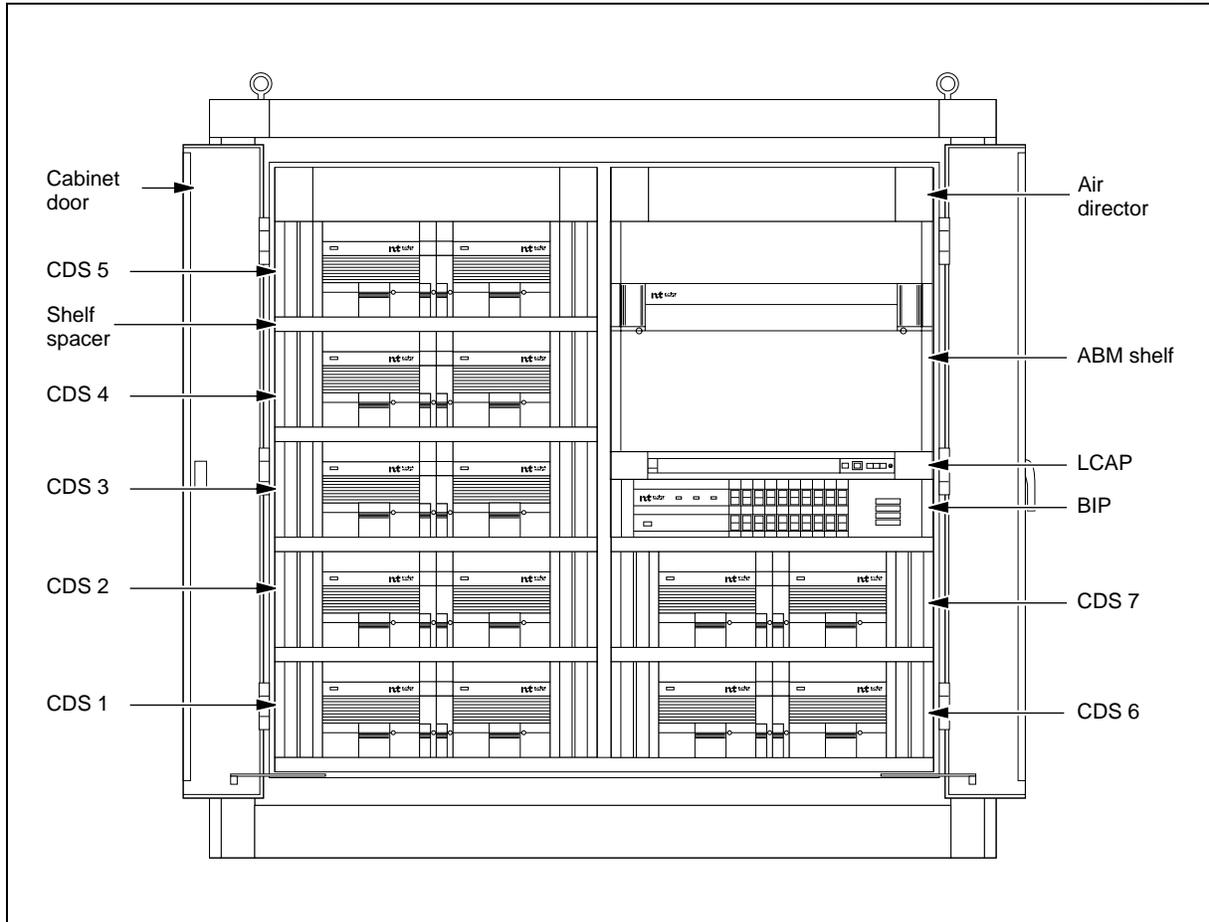
—continued—

Procedure 5-7 (continued)
Testing the copper-distribution shelves

Action

Step	Action

1   Perform a visual inspection of each CDS drawer. Look at each line card connector for bent or broken pins. Repair or replace any damaged equipment.

2   Display the LC Equipment screen and check that the Processor recognizes the line card in its slot. An Omega four-wire line card (NT4K69) is addressed by its even slot number. Enter:

equipmnt lc 1 48 ↵

   where

     lc   is line card

     1   is CDS 1

     48   is slot 48 in the left drawer

The Line Card (LC) Equipment screen appears.

—**continued**—

Procedure 5-7 (continued)
Testing the copper-distribution shelves

Step	Action
3	Insert an Omega four-wire line card (NT4K69) into slots 47/48 of the first CDS (CDS 1). CDS shelf numbering is shown in Figure 5-9 on page 5-35. Slots 47/48 are on the right side of the left drawer, as shown in the drawing below.

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.

Right-hand side view of left drawer
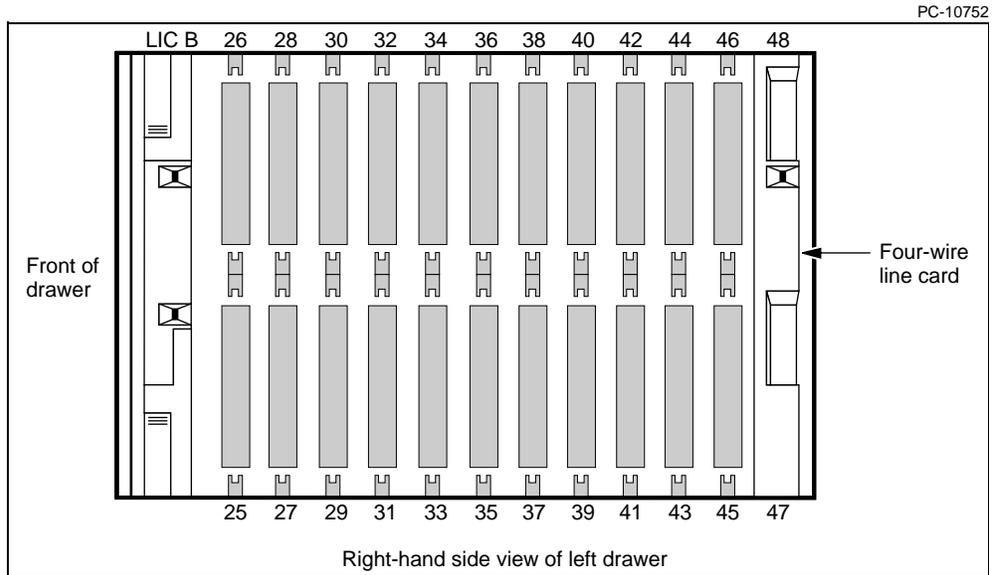
The red indicator (LED) on the line card is on if:

- the line card failed diagnostic tests.
- the slot is provisioned for a different service, incompatible with the line card. If this happens, the line card equipment screen indicates the mismatch as an MISM secondary state.

4 If Ueq (unequipped) is displayed instead of Diag (diagnosis), remove and reinsert the line card.

—continued—

Procedure 5-7 (continued)
Testing the copper-distribution shelves

Step	Action
5	If the line card failed the initial diagnostic tests, run additional diagnostics:
	diagnose ↵
	The following message is displayed in the conversation area: "The Diagnose command has been received. It will be processed. Please refer to LC logs for results."
	Note: The state of the line card must be changed to OOS before the Diagnose command can be used.
6	Check the NE logs for results of line card diagnostics by entering:
	logutil ↵
	LOGUTIL: is displayed in the conversation area, indicating that you have opened the log utility.
	open lc 307 ↵
	If the line card failed diagnostics, log #307 is displayed.
	open lc 602 ↵
	If the line card passed diagnostics, log #602 is displayed.
	You can move through the log list using the forward, back, first, and last commands. For more information on using the log utility, refer to *System Administration Procedures,* 323-3001-302, in *Operations, Administration, and Provisioning*, Volume 4A.
7	Remove the four-wire line card. If the line card failed the diagnostic tests, replace the line card.
8	Repeat steps 3 through 7 with a line card in slots 23/24 in the left drawer of the shelf. Repeat steps 3 through 7 with a line card in slots 71/72, in the right drawer of the shelf. Repeat with a line card in slots 95/96, in the right drawer.
9	Repeat steps 3 through 8 on the remaining CDSs.
10	Note the completion of this procedure on the Site Test Results Form.
11	Check off this procedure on the System Setup Checklist.

—**end**—

Testing optical equipment

This chapter shows you how to verify the system optical equipment at a network element (NE). The optical tests in this chapter do not require DS1 or DS3 equipment.

Procedures in testing optical equipment

To test optical equipment, do the following procedures in this order:

Procedure	Page
6-1 Cleaning optical connectors on patch cords	6-2
6-2 Cleaning optical connectors inside circuit packs	6-13
6-3 Measuring transmitted optical power	6-27
6-4 Verifying optical cable integrity	6-30
6-5 Measuring optical receiver sensitivity	6-38
6-6 Testing optical protection switching	6-48

Procedure 6-1
Cleaning optical connectors on patch cords

Use this procedure to clean low-reflection biconic SPA, ST, FC, and SC types of optical connectors on patch cords.

Clean the connectors

- before you connect the fibers for in-service operation
- when dribbling errors occur during testing or in-service operation

Note: When errors occur during testing or in-service operation, clean the connector mated to the optical mated to the outside of the circuit pack first. If the problem persists, then use Procedure 6-2, "Cleaning optical connectors inside circuit packs" on page 6-13 to clean both the connector inside the circuit pack and the connector sleeve.

Requirements

Before starting this procedure, you must do the following:

- Make sure that the optical interface is not carrying traffic.
- Remove the cover from the shelf. Refer to the procedure for removing the common-equipment shelf cover in *Routine Maintenance Procedures*, 323-3001-546, in *Maintenance*, Volume 5C.

Tools and materials

You must have the following materials to perform this procedure:

- lint-free, fiber-free, 100% polyester wiper (Texwip TX-404 absorbent)
- plastic bottle (Chemotronics or equivalent)
- certified particle grade, filtered through 0.2 (Chemical Supply House Isopropyl Alcohol, regent grade) as needed
- fiber optic inspection microscope kit with 200X magnification or higher fiberscope (Noyes or equivalent)
- wipes premoistened with alcohol (Texwip TX-806 absorbent) as needed
- mini foam swab in static safe package (Coventry, division of Chemtronics Mini Foam Swab P/N 48040);
  OR,
  Adapter cleaning tips (AlcoaFL ACT-1)
- lint-free, antistatic, vinyl gloves (if required)
- self-contained fiber optic connector cleaner, miracreation polyester tape (AlcoaFL FCC-02 PREP)
- alcohol dispenser (Lenline SD-18 or equivalent)
- long-nosed pliers

Procedure 6-1 (continued)
Cleaning optical connectors on patch cords

Action

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 light that can
> blind is present. Keep all optical connectors capped.

> **CAUTION**
> **Risk of service loss**
> This procedure could affect service. When cleaning connectors
> mated to circuit packs, make sure the circuit packs are inactive.

1   Put on gloves, if required.

2   Use the following table to determine your next step:

If you want to clean optical connectors on	Then go to
existing patch cords mated to the circuit pack	step 3
test cords or new patch cords	step 6

Disconnecting the optical patch cord

3   Loosen one of the fiber patch cords from the shelf fiber guides to provide
slack.

4   Disconnect the optical patch cord from the circuit pack.

5   Cover the exposed end of the connector sleeve on the circuit pack with a
clean dust cap.

Note: Use dust caps that have been removed from patch cords. Avoid using
dust caps that have been in a dusty location, such as on the floor or in
pockets.

Inspecting the optical fiber

6   Insert the fiber into the fiberscope adapter to assess the cleanliness of the
connector.

Note: If using a fiberscope with a universal adapter, hold the fiber end firmly
into the scope.

7   Turn on the light in the fiberscope.

8   Adjust the focus until you can identify four different zones. For a diagram of
single mode fiber zones, see Figure 6-1 on page 6-4.

—continued—

Procedure 6-1 (continued)
Cleaning optical connectors on patch cords

Figure 6-1
Definitions of inspection zones for single mode fiber

PC-4130
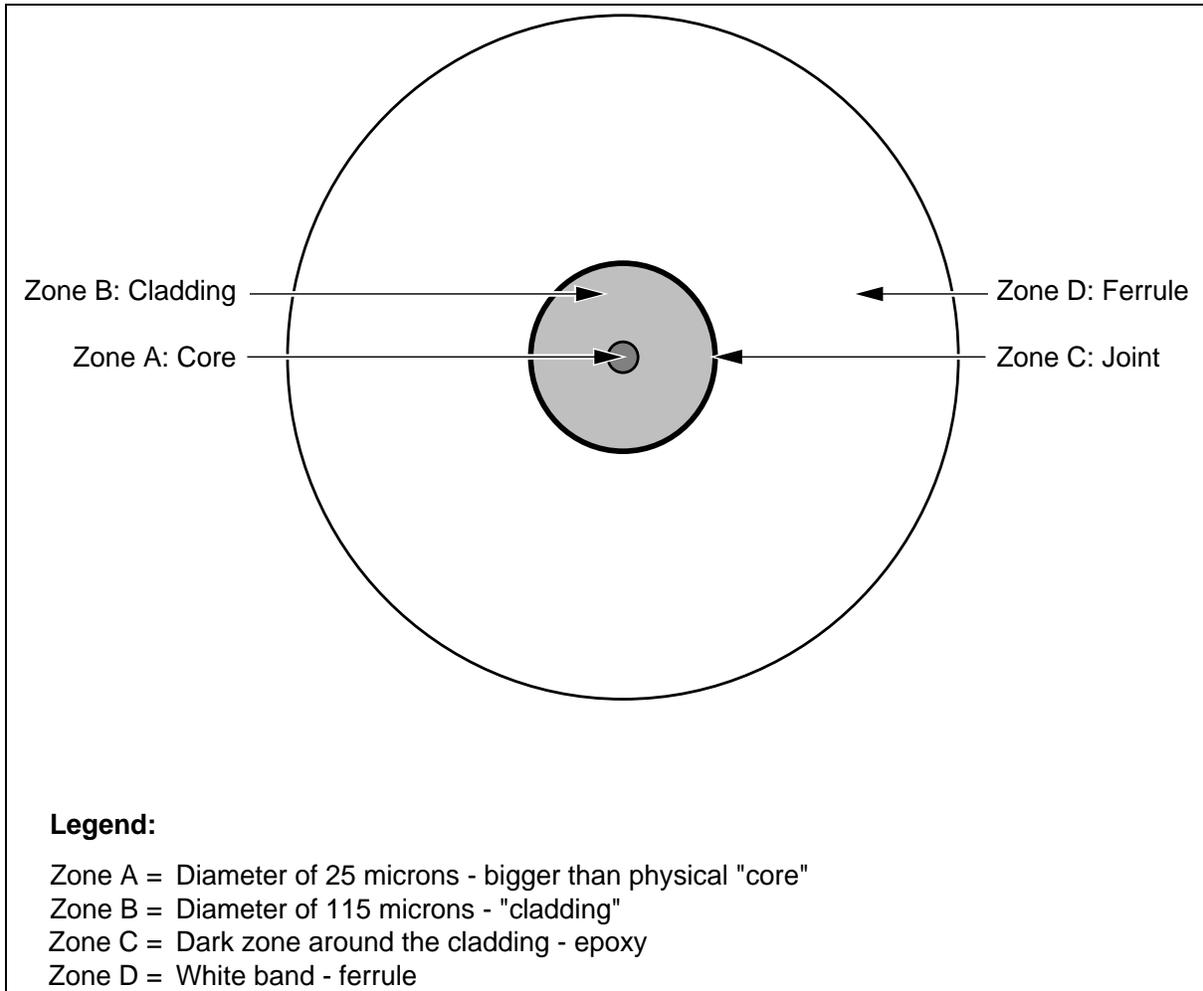
Zone B: Cladding
Zone A: Core
Zone D: Ferrule
Zone C: Joint

Legend:

Zone A = Diameter of 25 microns - bigger than physical "core"
Zone B = Diameter of 115 microns - "cladding"
Zone C = Dark zone around the cladding - epoxy
Zone D = White band - ferrule

—**continued**—

Procedure 6-1 (continued)
Cleaning optical connectors on patch cords

Step	Action

9 Use the following table to determine your next steps:

If the fiberscope shows a	Then follow these steps.
dirty fiber	Remove the connector from the fiberscope. Go to step 10.
clean fiber	Remove the dust cap, and reconnect the patch cord to the faceplate. This procedure is complete.

Note: For examples of clean and dirty fibers, see Figures 6-2 and 6-3 on page 6-6.

Procedure 6-1 (continued)
Cleaning optical connectors on patch cords

Figure 6-2
Dirty fiber

PC-4129
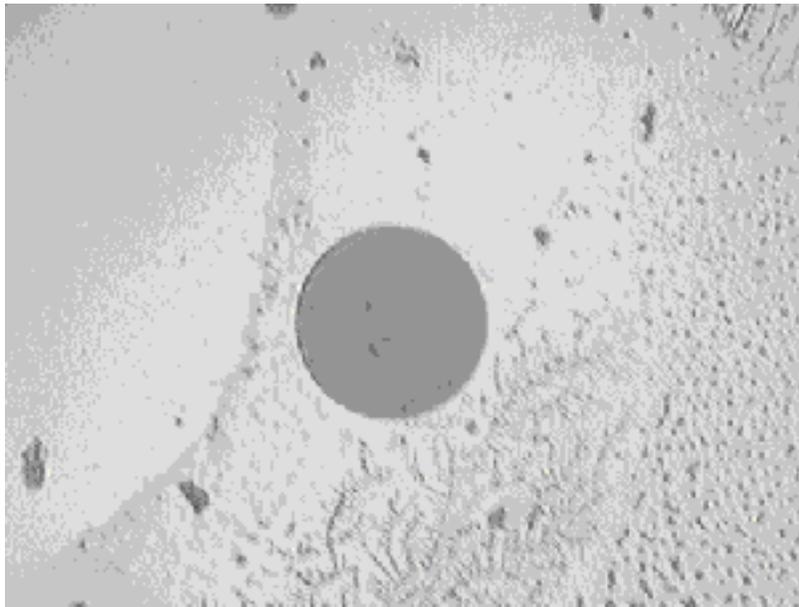
Figure 6-3
Clean fiber

PC-4128
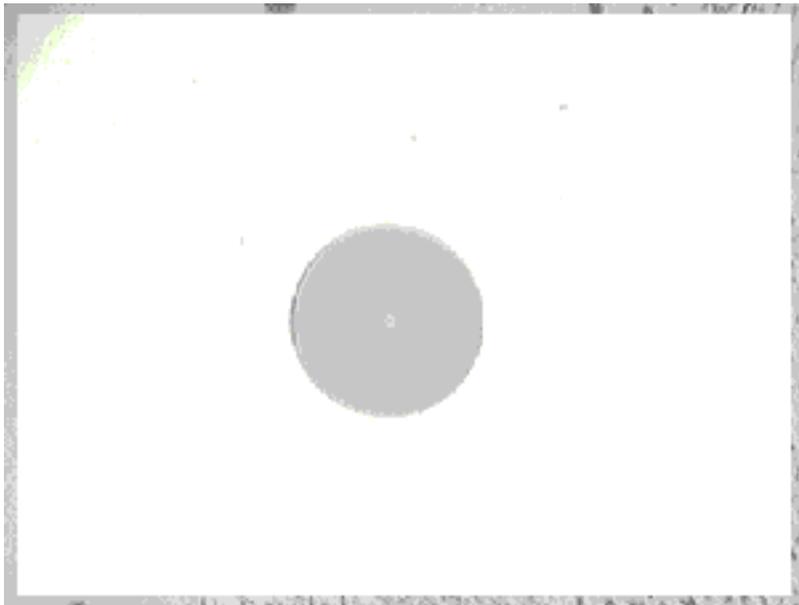
—**continued**—

Procedure 6-1 (continued)
Cleaning optical connectors on patch cords

Step	Action

Cleaning the connector ferrule

10   Take a new, lint-free cloth (TX-404) or pre-moistened cloth (TX-806).

Note 1: Never reuse cleaning cloths. Use new material for each connector. Avoid contamination of the lint-free cloth by unclean surfaces.

Note 2: In the United States, use alcohol wipes and stick cleaners to clean the sides of the ferrule.

> **CAUTION**
> **Risk of contamination**
> After cleaning any part of the ferrule, avoid touching it with your fingers to prevent contaminating the newly cleaned surface.

> **DANGER**
> **Risk of vapor inhalation**
> Always work in a clean and well-ventilated area to avoid inhaling alcohol vapors. Use small amounts of alcohol to clean optical connectors.

11   Use one drop of alcohol to moisten the middle of the lint-free cloth.

12   Put the end face connector in the middle of the wipe cloth. Apply moderate pressure to wipe the ferrule or plug. Rotate the connector along the barrel and the ferrule or plug tip until the ferrule or plug squeaks.

This step removes any contaminants on the ferrule or plug.

13   While the ferrule or plug is still wet with alcohol, use a new and dry lint-free folded cloth (TX-404) to firmly wipe the end face and lateral surface.

This step polishes off any residue remaining on the ferrule tip.

Note: Do not let the alcohol dry on the ferrule. The alcohol can leave a residual film on the surface.

14   Fold a new lint-free cloth (TX404) in half. Place it on a flat, smooth, clean surface. Wipe the end face of the plug in a figure **S** motion on the lint-free cloth to remove any remaining particles. Do not use the same area of the cloth twice.

Note: For more cleanliness, or if you do not have a flat surface, use an Alcoa Prep cartridge cleaner according to the manufacturer's instructions.

15   Insert the connector into the fiberscope. Assess the cleanliness of the connector. If the connector is still dirty, remove the connector from the fiberscope and repeat steps 10 through 13.

Note: If after multiple attempts the fiber is still dirty or scratched, polish or replace the fiber.

—**continued**—

Procedure 6-1 (continued)
Cleaning optical connectors on patch cords

Step	Action
16	If you do not reconnect the fiber immediately, place the connector in a new or clean adapter housing to prevent contaminating the clean surface. ***Note:*** Never place a clean connector in a dirty adapter.
17	Use the following table to determine your next step:

If you are reconnecting	Then go to
Biconic SPA connectors	step 18
ST connectors	step 22
FC connectors	step 26
SC connectors	step 30

Reconnecting a biconic SPA connector

Step	Action
18	Gently insert the plug cone into the coupler. See Figure 6-4.
19	Grasp the strain-relief boot to keep the plug from rotating. Gently screw the plug retainer onto the coupler threads. Do not pull on the cable. Tighten the connection finger-tight.
20	Gently push the strain-relief boot on the second plug to fully seat the plug in the sleeve and to allow free movement of the sleeve within its housing.
21	Go to step 33.

Figure 6-4
Biconic SPA connector assembly

PC-10810
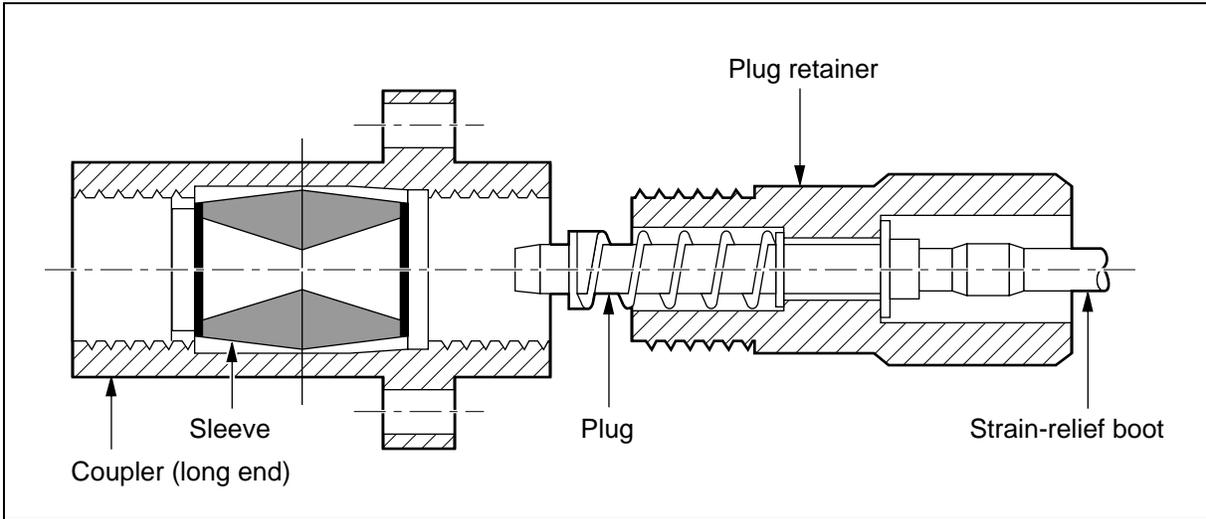
Plug retainer

Sleeve

Coupler (long end)

Plug

Strain-relief boot

—continued—

Procedure 6-1 (continued)
Cleaning optical connectors on patch cords

Step	Action

Reconnecting an ST connector

22   Gently insert the ferrule into the sleeve. Make sure that the guide pin enters the guide slot. See Figure 6-5.

23   Rotate the plug retainer so that the retaining pin enters the retaining groove.

24   Push the connectors together. Gently push the heat-shrink cable to seat the tips of the fiber cables.

25   Go to step 33.

Figure 6-5
ST connector assembly

PC-10809
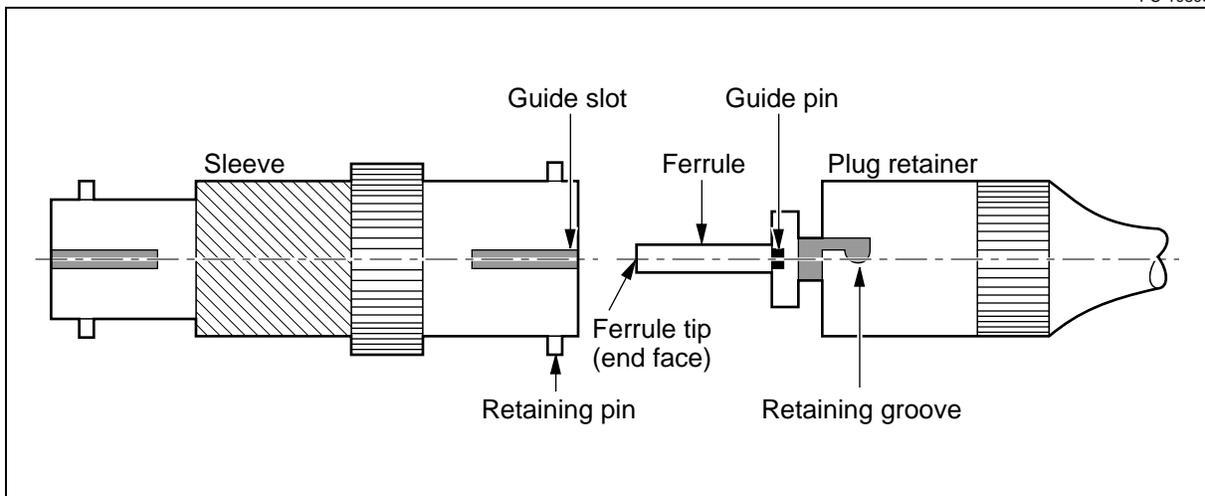
—continued—

Procedure 6-1 (continued)
Cleaning optical connectors on patch cords

Step	Action

Reconnecting an FC connector

26 Gently insert the ferrule into the sleeve. Make sure that the guide pin enters the guide slot. See Figure 6-6.

27 Grasp the heat-shrink cable to prevent the ferrule from rotating. Gently screw the plug retainer onto the sleeve threads. Tighten the connection finger-tight.

28 Gently push the heat-shrink cable onto the plug to seat the tips of the fiber cables.

29 Go to step 33.

Figure 6-6
FC connector assembly

PC-10808
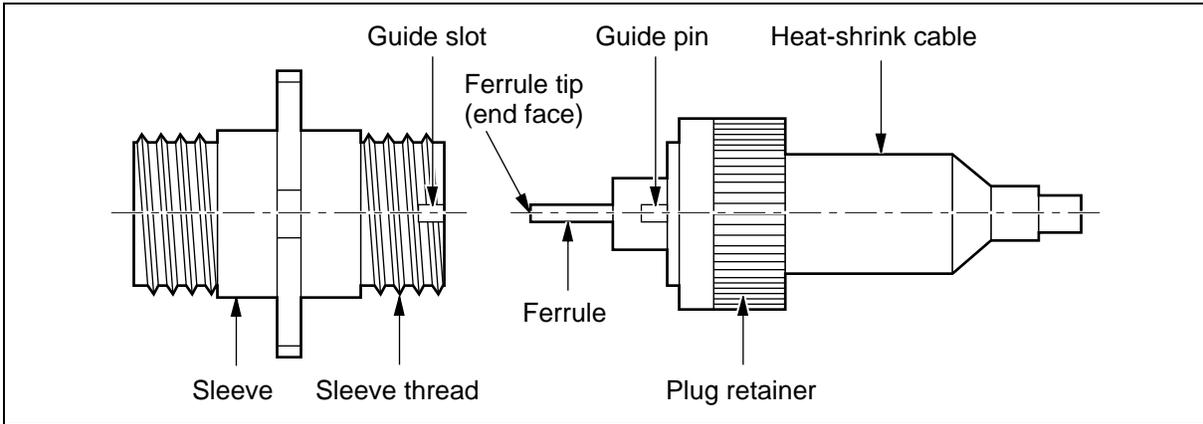
—**continued**—

Procedure 6-1 (continued)
Cleaning optical connectors on patch cords

Step	Action

Reconnecting an SC connector

30   Gently insert the ferrule into the sleeve so the guide pin enters the guide slot. See Figure 6-7.

31   Grasp the plug retainer. Gently push it into the connector to lock.

32   Go to step 33.

Figure 6-7
SC connector assembly

PC-2968 (48, 14)

Connector internal to circuit pack

Plug retainer

Ferrule

Guide pin

Guide slot
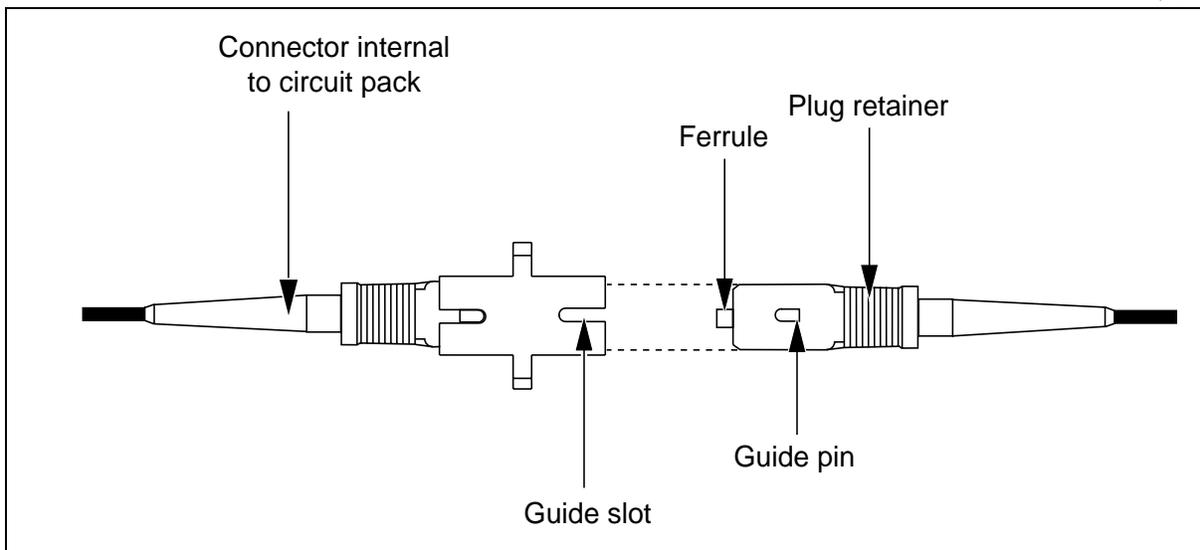
Inserting the circuit pack and reconnecting the optical patch cord

33   Insert the patch cord into the shelf fiber guide.

34   Use the following table to determine your next step:

If cleaning the patch cord connector	Then
solves connectivity problems	this procedure is complete.
does not solve connectivity problems	go to step 35.

35   Repeat steps 10 through 17 until the connector is clean.

—**continued**—

Procedure 6-1 (continued)
Cleaning optical connectors on patch cords

Step	Action

36   Use the following table to determine your next step:

If cleaning the second connector	Then
solves the problem	this procedure is complete.
does not solve the problem	the connectors inside the circuit pack should be cleaned. Go to Procedure 6-2.

37   Check off this procedure on the System Setup Checklist.

—**end**—

Procedure 6-2
Cleaning optical connectors inside circuit packs

Use this procedure to clean biconic SPA, FC, ST, or SC types of optical connectors inside circuit packs.

Note: When errors occur during testing or in-service operation, use Procedure 6-1, "Cleaning optical connectors on patch cords," on page 6-2 to clean the connectors mated to the optical circuit pack. If the problem persists, follow this procedure to clean the connector inside the circuit pack as well as the connector sleeve.

Requirements

Before starting this procedure, you must do the following:

- Make sure that the optical interface is not carrying traffic.

- Remove the cover from the shelf. Refer to the procedure for removing the common-equipment shelf cover in *Routine Maintenance Procedures*, 323-3001-546, in *Maintenance*, Volume 5C.

CAUTION
Risk of damaging circuit packs
Do not touch any components on the printed circuit board. Electrostatic discharge can damage electrostatically sensitive devices. Always ground yourself before handling the circuit pack.

DANGER
Risk of eye injury
At all times when handling optical fibers, follow the safety procedures in Chapter 1 and those recommended by your company.

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

—continued—

Procedure 6-2 (continued)
Cleaning optical connectors inside circuit packs

Tools and materials

You must have the following materials to perform this procedure:

- lint-free, fiber-free, 100% polyester wiper (Texwip TX-404 absorbent)

- plastic bottle (Chemotronics or equivalent)

- certified particle grade, filtered through 0.2 (Chemical Supply House Isopropyl Alcohol, regent grade) as needed

- fiber optic inspection microscope kit with 200X magnification or higher fiberscope (Noyes or equivalent)

- wipes pre-moistened with alcohol (Texwip TX-806 absorbent) as needed

- mini foam swab in static safe package (Coventry, division of Chemtronics Mini Foam Swab P/N 48040);
  OR,
  Adapter cleaning tips (AlcoaFL ACT-1)

- lint-free, antistatic, vinyl gloves (if required)

- self-contained fiber optic connector cleaner, miracreation polyester tape (AlcoaFL FCC-02 PREP)

- alcohol dispenser (Lenline SD-18 or equivalent)

- long-nosed pliers

Action

Step	Action

Disconnecting the optical patch cord and removing the circuit pack from the shelf

1   For each optical connector connected to the circuit pack, loosen the fiber patch cords from the shelf fiber guide to provide sufficient slack.

Note: OC-48 transmit and receive interfaces each have one optical connector. OC-3 and OC-12 interfaces each have two optical connectors.

2   Disconnect all optical patch cords from the circuit pack and cover the ends with dust caps.

—continued—

Procedure 6-2 (continued)
Cleaning optical connectors inside circuit packs

Step	Action

3   Remove the circuit pack from the shelf. For more information on this procedure, see Figure 6-8 on page 6-16 and Figure 6-9 on page 6-17, or refer to *Module Replacement Procedures*, 323-3001-547, in *Maintenance*, Volume 5C.

Procedures in *Module Replacement Procedures*, 323-3001-547, in *Maintenance*, Volume 5C are listed by circuit pack product code. The product codes for OC-3 is NT7E01. The code for OC-12 is NT7E02.

> **CAUTION**
> **Risk of damage to the optical circuit pack**
> Before removing optical circuit packs, make sure you are in a dust-free area and are wearing antistatic lint-free gloves. Extreme caution should be taken to prevent damage to fragile components.

4   Place the circuit pack on a clean antistatic surface.

Disconnecting the fiber inside the circuit pack

5   Use the following table to determine your next step:

If removing	Then go to
Biconic SPA connectors	step 6
ST connectors	step 9
FC connectors	step 12
SC connectors	step 16

—continued—

Procedure 6-2 (continued)
Cleaning optical connectors inside circuit packs

Figure 6-8
Removing or installing a circuit pack

PC-3035
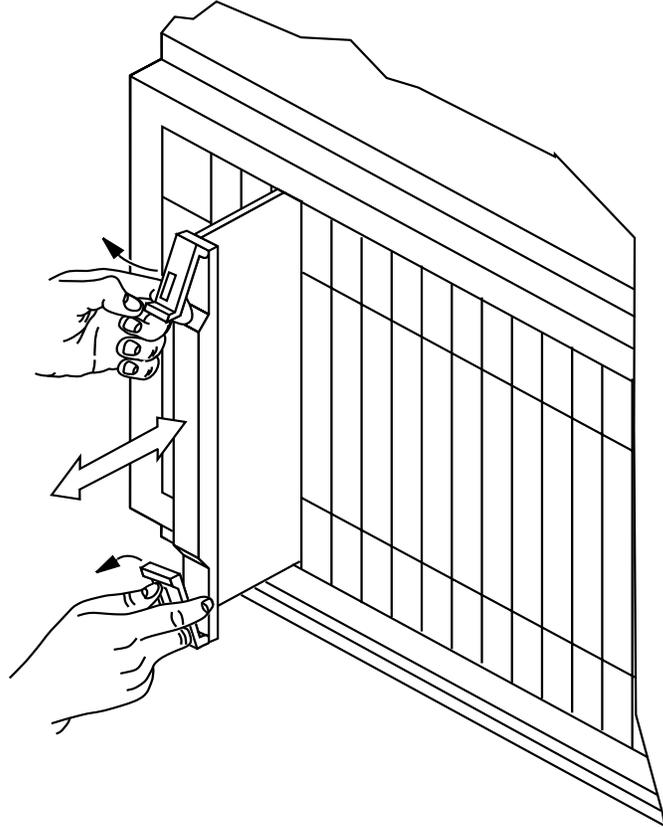
Note 1: Always hold a circuit pack by its latches.

Note 2: To install a circuit pack, insert it into the tracks located in the appropriate shelf slot. To connect the circuit pack, keep both latches open and push the circuit pack all the way into the shelf until you feel the circuit pack engage the backplane connector. Close both latches. To leave the circuit pack unconnected, close both latches and push the circuit pack until the latches are flush with the shelf.

Note 3: To remove a circuit pack from a shelf, open both latches and pull the circuit pack out of the shelf.

> ⚠ **CAUTION**
> **Risk of damaging equipment**
> Do not use excessive force when inserting circuit packs into the shelf.

—continued—

Procedure 6-2 (continued)
Cleaning optical connectors inside circuit packs

Figure 6-9
Optical connectors inside circuit packs

PC-4241 (48, 14)
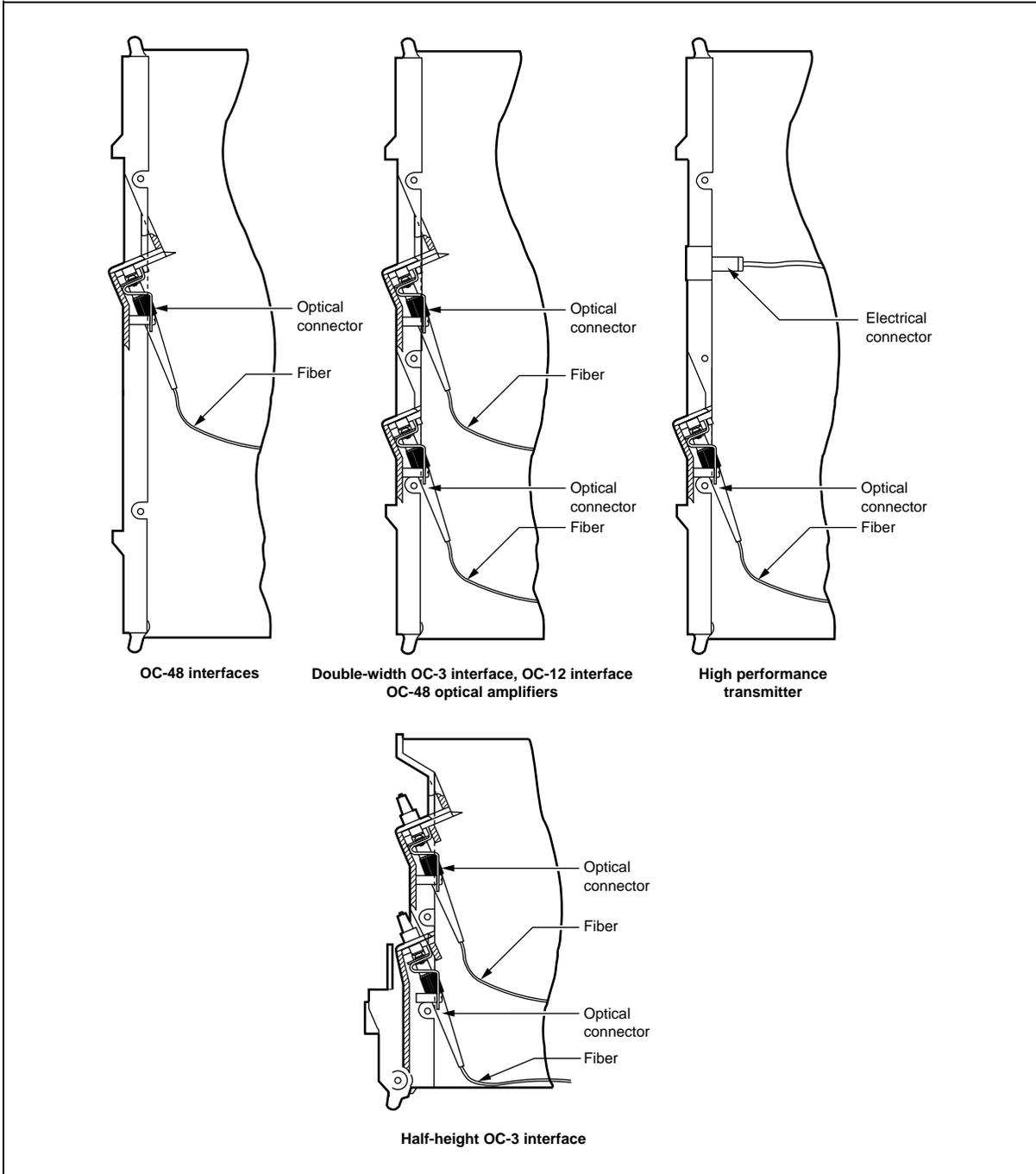
OC-48 interfaces

Double-width OC-3 interface, OC-12 interface
OC-48 optical amplifiers

High performance
transmitter

Half-height OC-3 interface

—continued—

Procedure 6-2 (continued)
Cleaning optical connectors inside circuit packs

Step	Action

Disconnecting a biconic SPA connectors from inside the circuit pack

6   Unscrew the plug retainer from the sleeve. Do not pull on the cable.

        Note: If you cannot unscrew the plug by hand, use long-nosed pliers.

7   Grasp the strain-relief boot. Carefully remove the plug cone from the coupler sleeve. See Figure 6-4 on page 6-8, Figure 6-10 below, and Figure 6-14 on page 6-25.

8   Go to step 21.

Figure 6-10
Disconnecting a biconic SPA connector from inside a circuit pack

PC-3354 (48, 14),
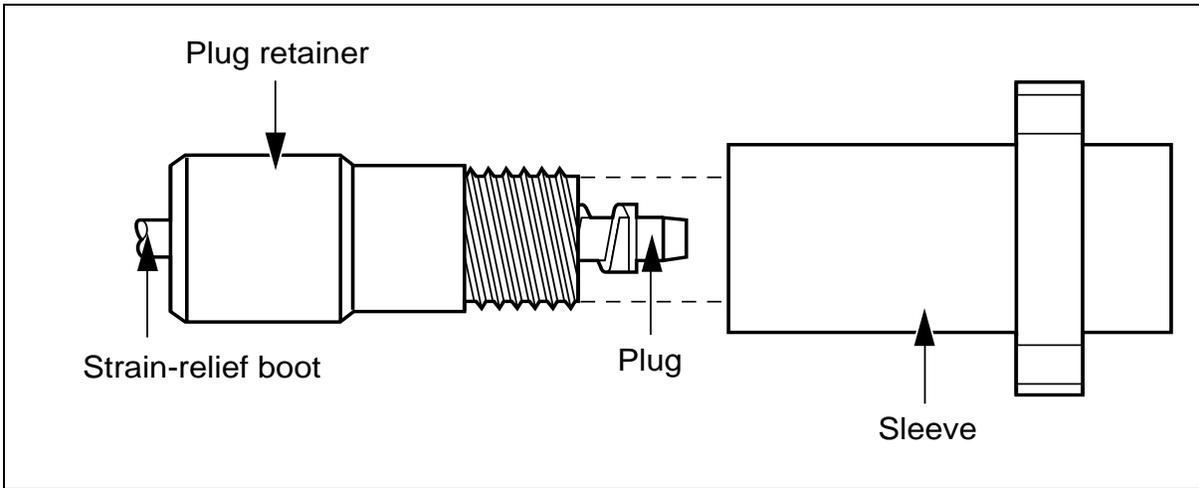
Disconnecting an ST connector from inside a circuit pack

9   Grasp the plug retainer. Gently push and turn the plug retainer to unlock the retaining pin from the retaining groove. See Figure 6-5, Figure 6-11, and Figure 6-15.

        Note: If you cannot unscrew the plug by hand, use long-nosed pliers.

                                  —continued—

Procedure 6-2 (continued)
Cleaning optical connectors inside circuit packs

Step	Action
10	Grasp the heat-shrink cable with fingers. Carefully remove the ferrule from the sleeve.
	Note: For the lower connector of OC-3 and OC-12 interface circuit packs, lift the clip that holds the heat-shrink cable in place before you remove the ferrule. See Figure 6-11.
11	Go to step 21.

Figure 6-11
Disconnecting an ST connector from inside a circuit pack

PC-3353.1 (48, 14)
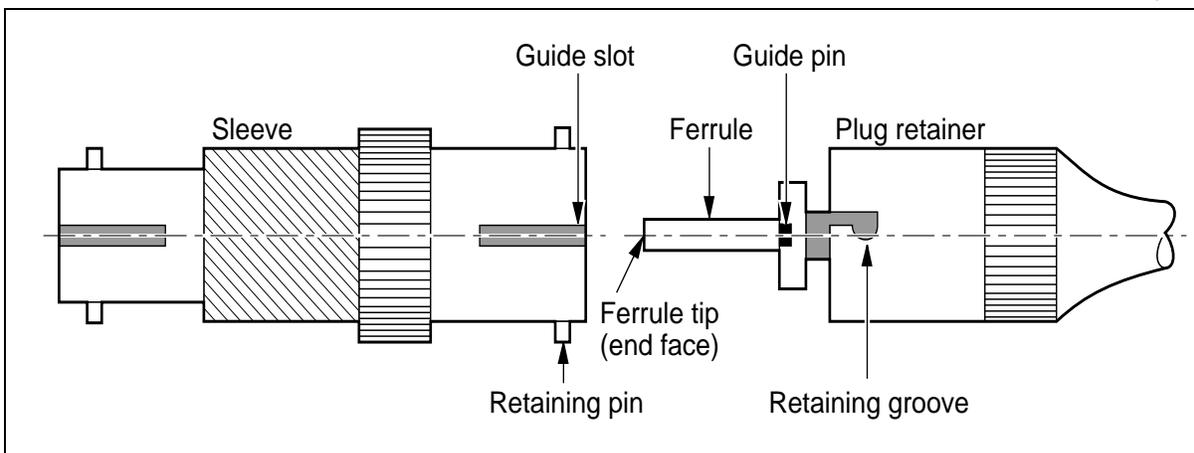
Removing an FC connector from inside the circuit pack

12	Grasp the plug retainer on both sides of the brackets that mount the optical connector assembly to the circuit pack.
	Note 1: If you cannot unscrew the plug by hand, use long-nosed pliers.
	Note 2: For the lower connector of OC-3 and OC-12 interface circuit packs, grasp the heat-shrink cable along its axis.
13	Gently twist and unscrew the plug retainer from the coupler.
	Note: The printed circuit board is very close to the connectors. Twist the plug retainer a bit at a time until it is fully unscrewed.
14	Carefully remove the ferrule from the sleeve.
	Note: For the lower connector of OC-3 and OC-12 interface circuit packs, lift the clip that holds the heat-shrink cable in place before removing the ferrule See Figure 6-12 on page 6-20.
15	Go to step 21.

—**continued**—

Procedure 6-2 (continued)
Cleaning optical connectors inside circuit packs

Step	**Action**

Figure 6-12
Disconnecting an FC connector from inside a circuit pack

PC-3352 (48, 14)
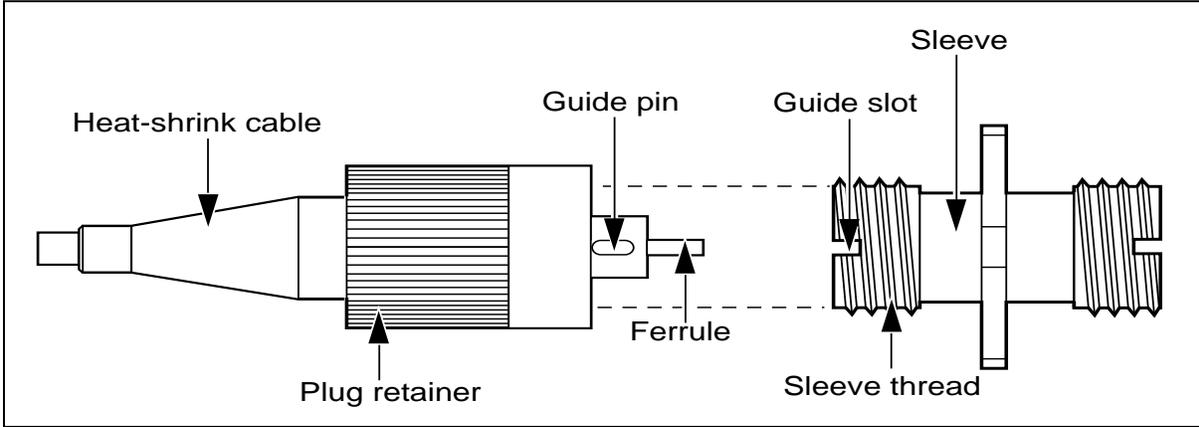
Disconnecting an SC connector from inside a circuit pack

16 Grasp the plug retainer with long-nosed pliers. Do not pull the fiber. Gently pull the plug retainer to unlock it from the connector. See Figure 6-13.

17 With long-nosed pliers, carefully remove the ferrule from the sleeve.

18 Go to step 19.

Figure 6-13
Disconnecting an SC connector from inside a circuit pack

PC-2968 (48, 14)
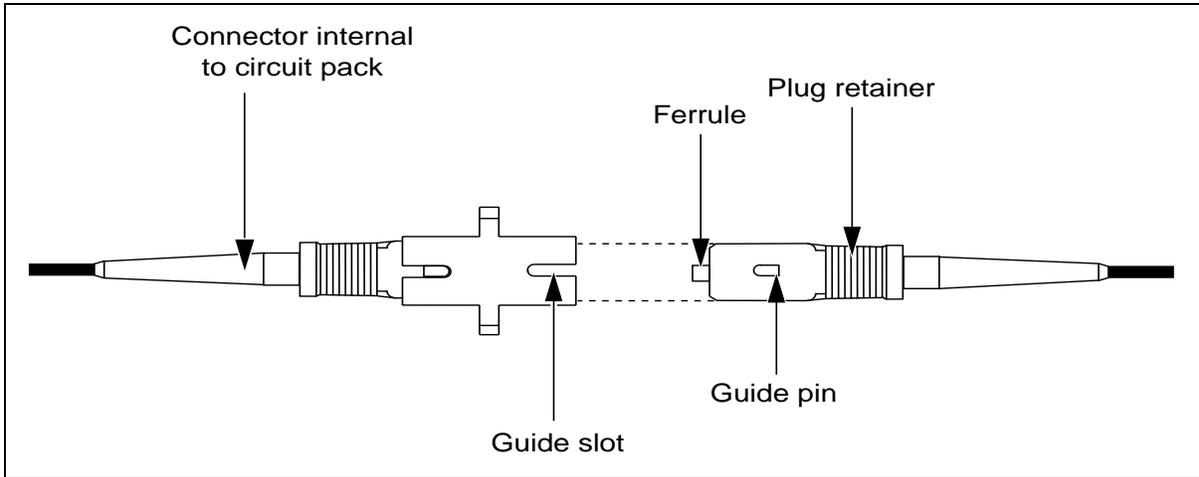
—continued—

Procedure 6-2 (continued)
Cleaning optical connectors inside circuit packs

Step	Action

Cleaning the connector sleeves

> *Note:* Do not clean a connector sleeve with a connector attached.

19   Moisten a new mini foam swab or adapter cleaner tip with alcohol. You can also use alcohol from a pre-moistened wipe (TX-806).

20   Shake off any excess alcohol.

21   Scrub the alignment sleeve with the mini foam swab moistened with alcohol. Use an in-and-out rotating motion to scrub the sleeve.

22   Immediately wipe the sleeve with a new, dry mini foam swab or adapter cleaner tip.

> *Note:* The sleeve can still contain traces of alcohol. Wipe the sleeve a second time with a new, dry foam swab or adapter cleaner tip.

Inspecting the optical fiber

23   Insert the fiber into the fiberscope adapter to assess the cleanliness of the connector.

24   Turn on the light in the fiberscope.

25   Adjust the focus until you can identify four different zones. For a diagram of single mode fiber zones, see Figure 6-1 on page 6-4.

26   Use the following table to determine your next step:

If the fiberscope shows a	Then follow these steps.
dirty fiber	Remove the connector from the fiberscope. Go to step 27.
clean fiber	Reconnect the patch cord to the faceplate. Go to step 50.

> *Note:* For examples of clean and dirty fibers, see Figures 6-2 and 6-3 on page 6-6.

Cleaning the connector ferrule

27   Take a new, lint-free cloth (TX-404) or a pre-moistened cloth (TX-806).

> *Note:* Never reuse cleaning cloths. Use new material for each connector. Avoid contamination of the lint-free cloth by unclean surfaces.

> **DANGER**
> **Risk of vapor inhalation**
> Always work in a clean and well-ventilated area to avoid inhaling alcohol vapors. Use small amounts of alcohol to clean optical connectors.

—continued—

Procedure 6-2 (continued)
Cleaning optical connectors inside circuit packs

Step	Action
28	Moisten the middle of the lint-free cloth with one drop of alcohol.
29	Put the end face connector in the middle of the wipe cloth. Apply moderate pressure to wipe the ferrule or plug. Rotate the connector along the barrel and the ferrule or plug tip until the ferrule or plug squeaks.
	Note: This action removes contaminants on the ferrule or plugs.
30	While the ferrule is still wet with alcohol, firmly wipe its end face and lateral surface with a new and dry lint-free cloth (TX-404).
	Note 1: This action polishes off any residue remaining on the ferrule tip.
	Note 2: Do not let the alcohol dry on the ferrule. The alcohol can leave a residual film on the surface.
31	Fold a new lint-free cloth (TX-404) in half. Place it on a flat, smooth, clean surface. Wipe the end face in a figure S motion on the lint-free cloth to remove any remaining particles. Do not use the same area of the cloth twice.
	Note: For more cleanliness, or if you do not have a flat surface, use an Alcoa Prep cartridge cleaner according to the manufacturer's instructions.
32	Insert the connector into a fiberscope. Assess the cleanliness of the connector. If the connector is still dirty, remove the connector from the magnifier and repeat steps 28 through 32.
	Note: If after multiple attempts the fiber is still dirty or scratched, polish or replace the fiber.
33	If you do not reconnect the fiber immediately, place the connector in a new or clean adapter housing to prevent the ferrule from coming in contact with any contaminants.
	Note: Never place a clean connector in a dirty adapter.

Reconnecting the fiber inside the circuit pack

34   Use the following table to determine your next step:

If reconnecting	Then go to
Biconic SPA connectors	step 35
ST connectors	step 39
FC connectors	step 43
SC connectors	step 47

—**continued**—

Procedure 6-2 (continued)
Cleaning optical connectors inside circuit packs

Step	Action

Reconnecting a biconic SPA connector inside the circuit pack

35   Gently insert the plug cone into the coupler. See Figure 6-4 on page 6-8.

36   Grasp the strain-relief boot to prevent the plug from rotating. Gently screw the plug retainer onto the coupler threads. Do not pull on the cable. Tighten the connection finger-tight.

37   Gently push the strain-relief boot on the second plug to fully seat the plugs in the sleeve and to allow free movement of the sleeve within its housing.

38   Go to step 50.

Reconnecting an ST connector inside the circuit pack

39   Gently insert the ferrule into the sleeve. Make sure that the guide pin enters the guide slot. See Figure 6-5 on page 6-9.

40   Rotate the plug retainer so that the retaining pin enters the retaining groove. Use long-nosed pliers, if necessary.

41   Push the connectors together. Gently push the heat-shrink cable to seat the tips of the fiber cables.

42   Go to step 50.

Reconnecting an FC connector inside the circuit pack

43   Gently insert the ferrule into the sleeve. Make sure that the guide pin enters the guide slot. See Figure 6-6 on page 6-10.

44   Grasp the heat-shrink cable to keep the ferrule from rotating. Gently screw the plug retainer onto the sleeve threads. Use long-nosed pliers, if necessary. Tighten the connection finger-tight.

45   Gently push the heat-shrink cable onto the plug to seat the tips of the fiber cables.

46   Go to step 50.

Reconnecting an SC connector inside the circuit pack

47   Gently insert the ferrule into the sleeve so the guide pin enters the guide slot. See Figure 6-7 on page 6-11.

48   Grasp the plug retainer. Gently push it into the connector to lock. Use long-nosed pliers, if necessary.

49   Go to step 50.

—**continued**—

Procedure 6-2 (continued)
Cleaning optical connectors inside circuit packs

Step	Action

Inserting the circuit pack and reconnecting the optical patch cord

50 Insert the circuit pack into the shelf. For more information on this procedure, refer to *Module Replacement Procedures*, 323-3001-547, in *Maintenance*, Volume 5C.

Note: Procedures in *Module Replacement Procedures* are listed by circuit pack product code. The product code for OC-3 is NT7E01. The code for OC-12 is NT7E02.

51 Reconnect the optical patch cord to the circuit pack. For more information on this procedure, refer to Procedure 6-1, "Cleaning optical connectors on patch cords," on page 6-2.

Note: If cleaning the connectors and connector sleeves does not solve the problem, the fiber patch cord may need to be replaced.

52 Check off this procedure on the System Setup Checklist.

—**continued**—

Procedure 6-2 (continued)
Cleaning optical connectors inside circuit packs

Figure 6-14
OC-3/OC-12 circuit pack with biconic connectors

PC-11167
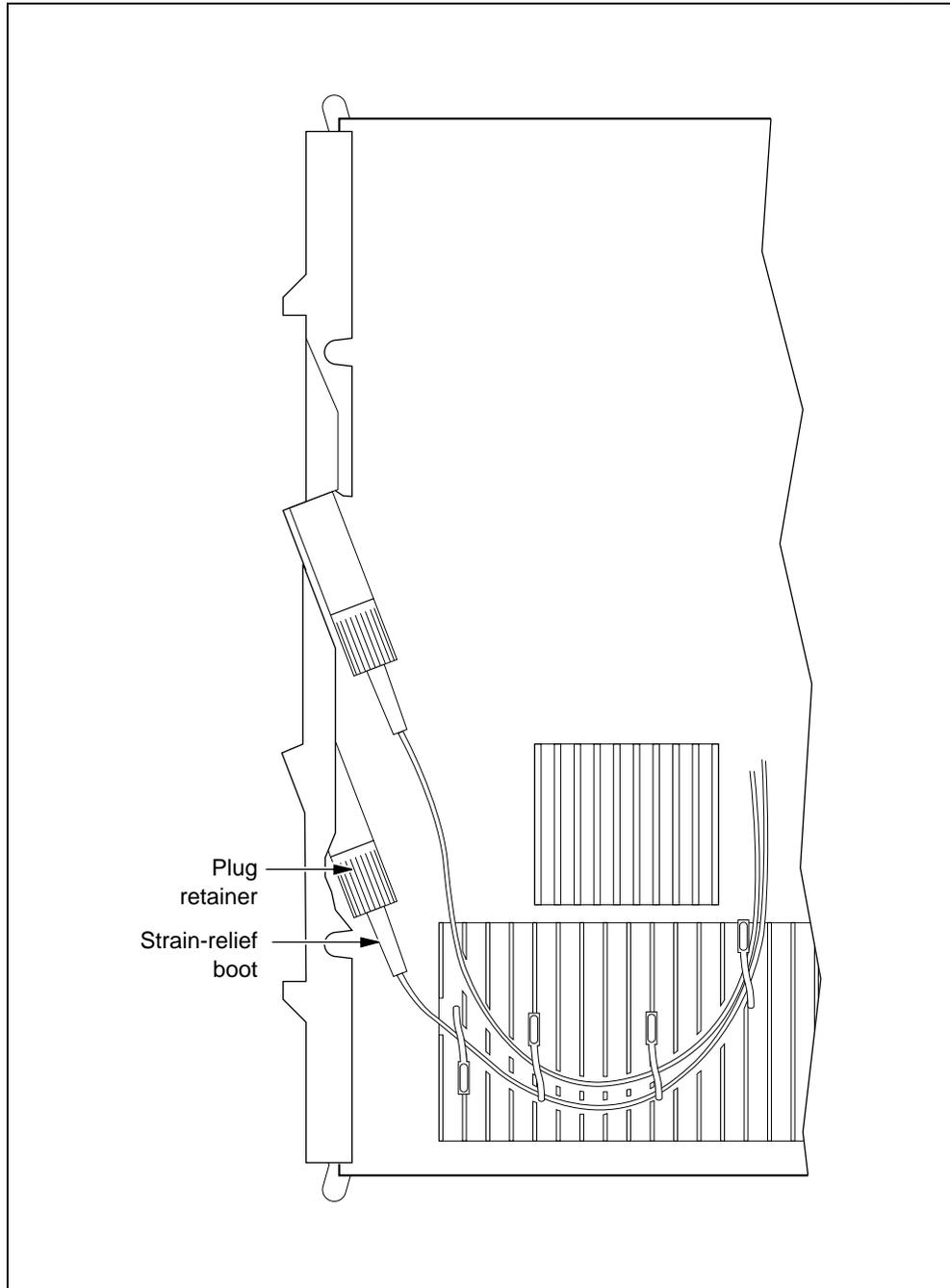
Plug
retainer

Strain-relief
boot

—continued—

Procedure 6-2 (continued)
Cleaning optical connectors inside circuit packs

Figure 6-15
OC-3/OC-12 circuit pack with FC-PC or ST-PC connectors

PC-11166

Plug
retainer

Heat-shrink
cable

Clip holding
heat-shrink
cable
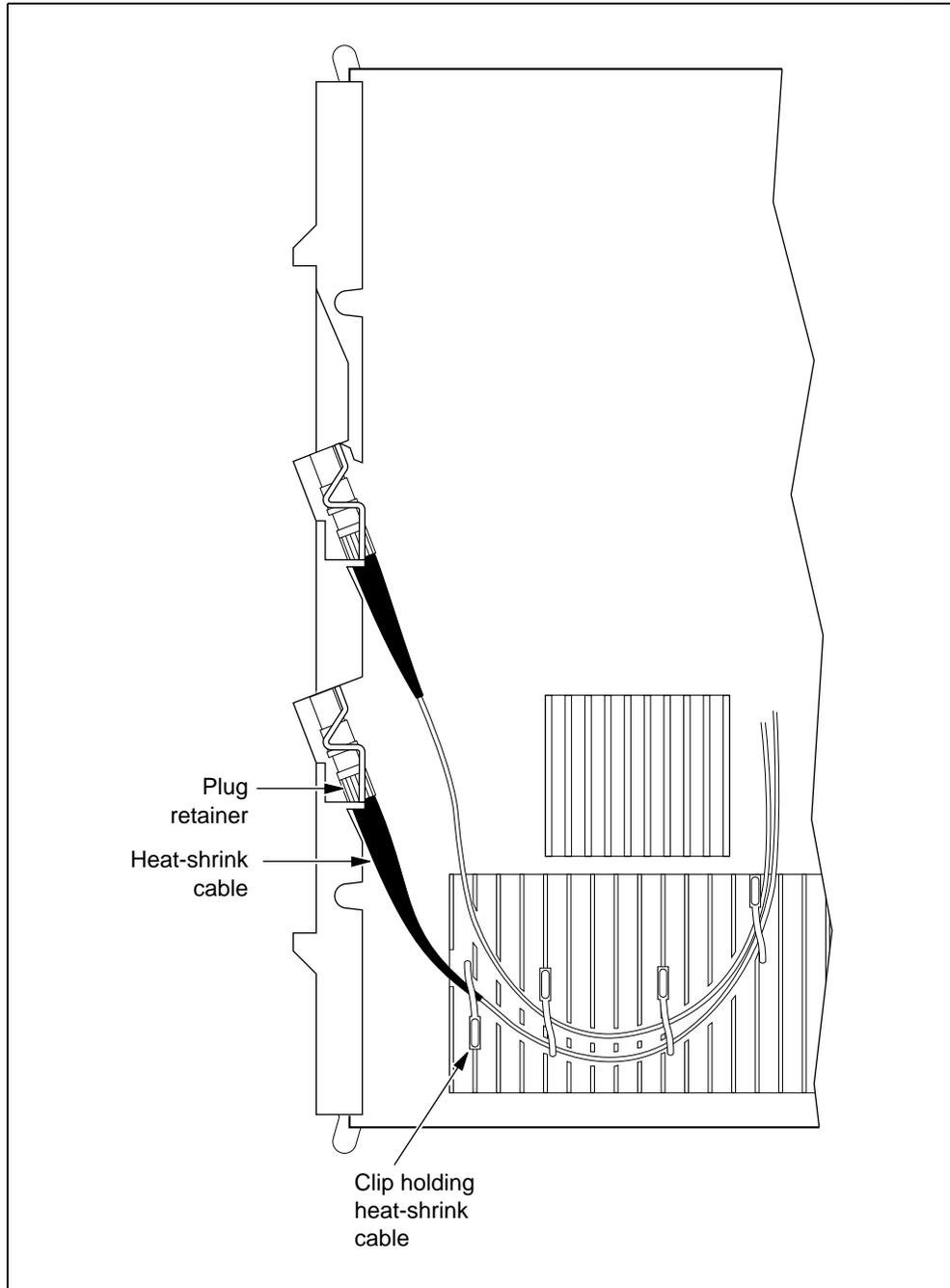
—end—

Procedure 6-3
Measuring transmitted optical power

Use this procedure to verify that the OC-3/OC-12 circuit pack meets the specification for transmitted optical power.

Requirements

The following requirements must be met before starting this procedure:

- Make sure that the facility to be measured is not in service.

- Obtain an optical power meter, 1310/1550 nm with range −50 to +5 dB.

- Obtain one (1) optical test cord, single-mode, 5 m (16 ft) long, as follows:
    - NT7E46AA for biconic connectors
    - NT7E46BA for FC connectors
    - NT7E46CA for ST connectors
    - NT7E46FA for SC connectors

- Make a copy of the Site Test Results Form found in "Appendix E: Site test results form" on page 14-1.

- Calibrate the optical power meter using the manufacturer's instructions.

- Clean all optical connectors as described in Procedure 6-1 on page 6-2.

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

⚠	**CAUTION** **Risk of signal degradation** Clean optical connectors to minimize signal attenuation and test errors caused by impurities. Clean all connectors as described in Procedure 6-1 on page 6-2, prior to insertion in mating sleeves.

⚠	**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 packs.

—continued—

Procedure 6-3 (continued)
Measuring transmitted optical power

Action

Step	Action
1	Select the G1 OC-3/OC-12 optical interface circuit pack you want to test and remove the optical fibers if these are connected.
2	Set the optical power meter to measure the appropriate wavelength of the transmitter, as shown on the circuit pack faceplate.
3	Connect one end of the optical test cord to the optical power meter and the other end to the transmit (Out) optical connector on the G1 OC-3/OC-12 interface circuit pack, as shown below.

PC-10539
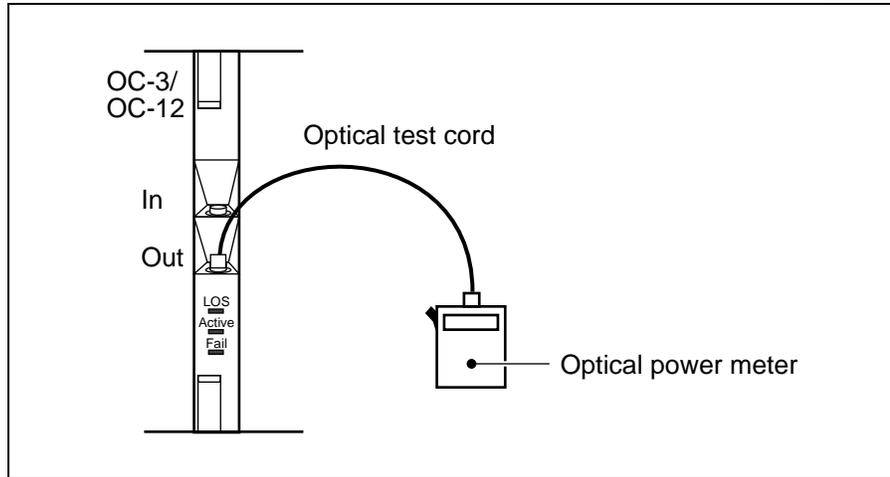
| **4** | Measure the optical power and record the result in "Appendix E: Site test results form" on page 14-1. |

The measured value should meet or exceed (measure closer to zero) the minimum optical power specified in the following table.

—continued—

Procedure 6-3 (continued)
Measuring transmitted optical power

Step   Action

PEC	Module	Minimum transmitter power ($P_{T\,min}$)
NT7E01CA/CB/CC/CD	OC-3 LR	−5.0 dBm
NT7E01DA/DB/DC/DD	OC-3 IR	−15.0 dBm
NT7E02KA/KB/KC/KD	OC-12 LR	−3.0 dBm
NT7E02LA/LB/LC/LD	OC-12 IR	−4.5 dBm
NT7E05AB/AC/AD	OC-12 VTBM LR	−1.5 dBm
NT7E05BB/BC/BD	OC-12 VTBM IR	−15.0 dBm
Note: The above values for the OC-12 VTBM optical interface circuit packs are for a Nortel Networks-to-Nortel Networks proprietary link. For a link meeting the Bellcore Midspan-meet specification, the following minimum values apply.		
NT7E05AB/AC/AD	OC-12 LR VTBM	−3.0 dBm
NT7E05BB/BC/BD	OC-12 IR VTBM	−15.0 dBm

If the requirement is not met, try one or all of the following:

- reseat the optical test cord by reconnecting it.
- clean the optical connectors on both ends of the optical test cord.
- replace the optical test cord.
- reseat the OC-3/OC-12 interface circuit pack.
- replace the OC-3/OC-12 interface circuit pack.

5   Disconnect the optical test cord from the transmit (Out) connector of the circuit pack.

6   Repeat this procedure for the G2 OC-3/OC-12 interface circuit pack.

7   Note the completion of this procedure on the Site Test Results Form.

8   Check off this procedure on the System Setup Checklist.

—**end**—

Procedure 6-4
Verifying optical cable integrity

Use this procedure to verify the integrity of the optical cables connecting the OC-3/OC-12 interface circuit packs to the fiber cross-connect panel.

Note: The term "fiber cross-connect panel" is used in a generic manner to represent any product installed to terminate or cross-connect optical fibers. The testing of your particular product is not included here, but should be documented in the respective product documentation.

Requirements

The following requirements must be met before starting this procedure:

- Obtain an optical power meter and optical test cord (used in Procedure 6-3 on page 6-27).

- Obtain one optical test cord with a miniature variable optical attenuator (mVOA), single-mode, 5 m (16 ft) long as follows:

    - NT7E47AA for biconic connectors
    - NT7E47BA for FC connectors
    - NT7E47CA for ST connectors
    - NT7E47DA for SC connectors

  Note: If the receive fiber has an mVOA, you do not need the optical test cord.

- Make a copy of the Site Test Results Form found in "Appendix E: Site test results form" on page 14-1.

> **CAUTION**
> **Risk of signal degradation**
> Clean optical connectors to minimize signal attenuation and test errors caused by impurities. The procedure for cleaning connectors is given in Procedure 6-1 on page 6-2.

> **CAUTION**
> **Risk of damage to the receiver**
> Make sure the receive fibers are not connected to either OC-3/OC-12 interface circuit pack.

—continued—

Procedure 6-4 (continued)
Verifying optical cable integrity

Action

Step	Action

Verifying the transmit fibers

1   At the system common-equipment shelf, connect the transmit fiber to the transmit (Out) connector of the G1 OC-3 /OC-12 interface circuit pack.

2   At the fiber cross-connect panel, connect the G1 transmit fiber to the optical power meter using the optical test cord (without an mVOA), as shown below. Make sure you are connecting to the right fiber at the fiber cross-connect panel.
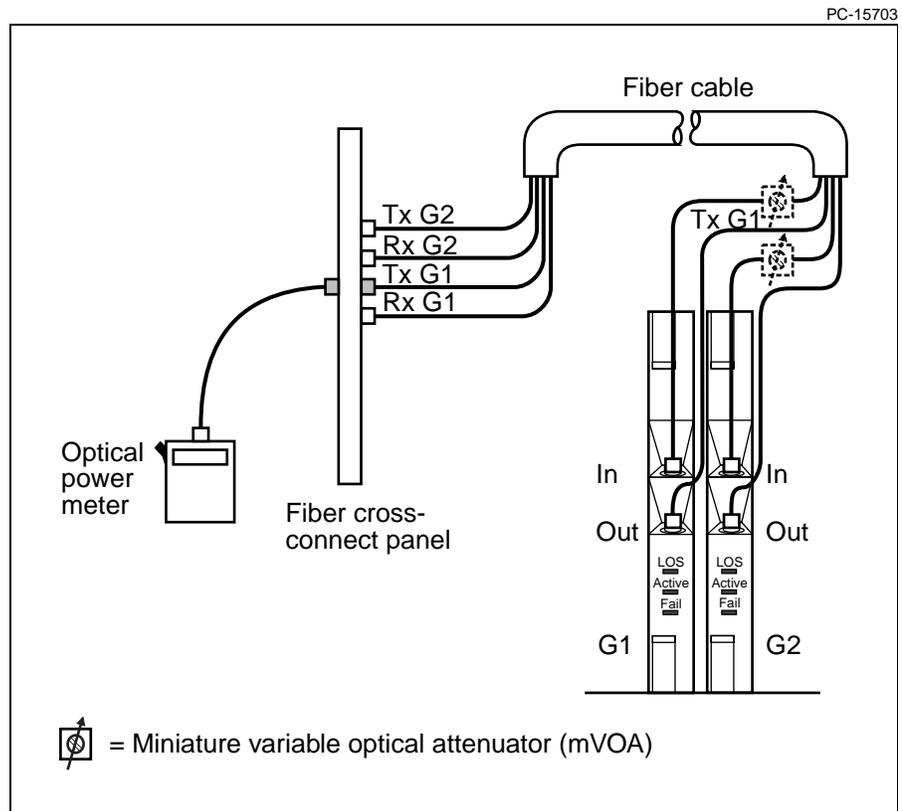
PC-15703

—**continued**—

Procedure 6-4 (continued)
Verifying optical cable integrity

Step	Action
3	Measure the optical power and record the result in "Appendix E: Site test results form" on page 14-1.

The loss in the fiber cable must be 2 dB or less, when compared with the measurement of transmitted power from the previous procedure.
For example, if the transmitted optical power, as measured in Procedure 9-1, step 4 on page 9-6, was −2.8 dBm, then in this step any measurement between −2.8 and −4.8 dBm is acceptable.

If	Then
the requirement is not met	try one or all of the following, then measure the optical power again: • Reseat the optical fiber cable at the Out connector of the OC-3/OC-12 circuit pack and the fiber cross-connect panel. • Reseat the optical test cord at the fiber cross-connect panel and at the optical power meter. • Clean the optical connectors on both ends of the optical test cord. • Replace the optical test cord between the fiber cross-connect panel and the optical power meter; it can be defective. • Replace the optical fiber cable between the Out connector of the OC-3/OC-12 circuit pack and the fiber cross-connect panel; the optical fiber cable may be defective.

Rx fiber with an mVOA

4	If the Rx (receive) fiber has no mVOA, go to step 5. Otherwise, do the following three substeps:

    a.   Create a loopback by disconnecting the optical test cord from the power meter and connecting it to the appropriate Rx port at the fiber cross-connect panel. Make sure you are connecting the correct Tx/Rx ports.

Procedure 6-4 (continued)
Verifying optical cable integrity

Step	Action

PC-15708

Fiber cable

Rx G1

Tx G2
Rx G2
Tx G1
Rx G1

Tx G1

Optical power meter

In   In

Out   Out

LOS   LOS
Active   Active
Fail   Fail

G1   G2

Fiber cross-connect panel

= Miniature variable optical attenuator (mVOA)
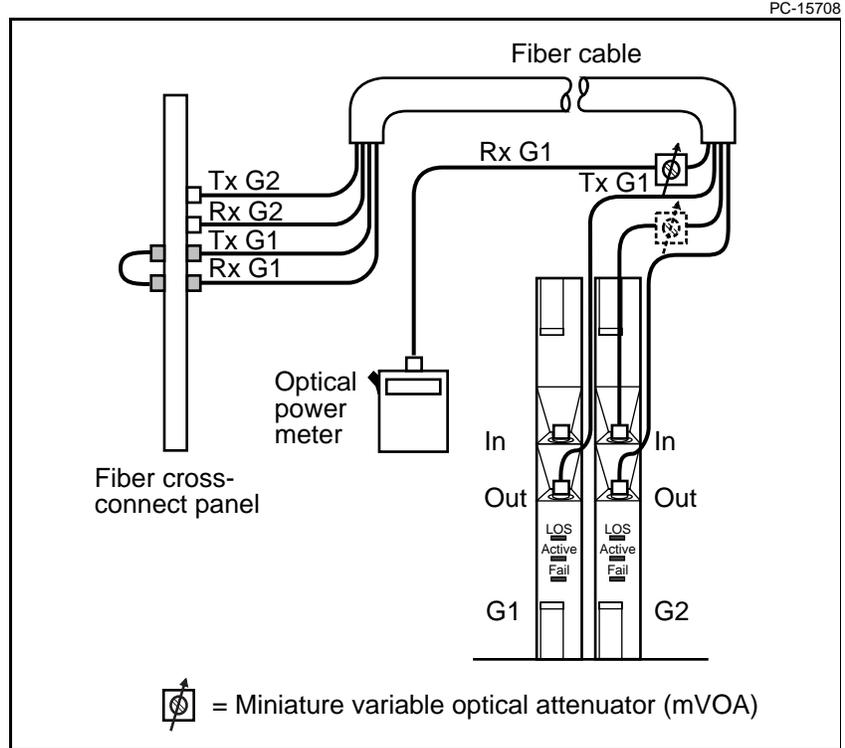
b. Connect the receive fiber at the circuit pack to the optical power meter as shown on the previous page.

> **CAUTION**
> **Risk of damage to the OC-3/OC-12 interface circuit pack**
> Do not connect the OC-3/OC-12 transmit side directly to the OC-3/OC-12 receive side. Some attenuation must exist before a loopback is connected.

c. Go to step 6.

—**continued**—

Procedure 6-4 (continued)
Verifying optical cable integrity

Step	Action

Rx fiber with NO mVOA

5 If the receive fiber does not have an mVOA, then do the following two substeps.

    a. Remove the optical test cord between the power meter and Tx port at the fiber cross-connect panel and replace the optical test cord with an mVOA as shown below.

    b. Go to step 6. If you have a fixed optical attenuator skip to step 7.

PC-15705

—**continued**—

Procedure 6-4 (continued)
Verifying optical cable integrity

Step	Action

6 Verify that the mVOA is working properly by adjusting its attenuation to obtain the required readings on the optical power meter: first adjust for the minimum optical level and then for the maximum optical level (or as close as possible), as listed in the following table for your optical interface circuit pack.

PEC	Module	Minimum to maximum receiver power range ($P_{R\ min}$ to $P_{R\ max}$)
NT7E01CA/CB/CC/CD	OC-3 LR	−34.0 to −10.0 dBm
NT7E01DA/DB/DC/DD	OC-3 IR	−28.0 to −8.0 dBm
NT7E02KA/KB/KC/KD	OC-12 LR	−32.0 to −7.0 dBm
NT7E02LA/LB/LC/LD	OC-12 IR	−24.5 to −4.0 dBm
NT7E05AB/AC/AD	OC-12 VTBM LR	−29.5 to 0 dBm
NT7E05BB/BC/BD	OC-12 VTBM IR	−28.0 to 0 dBm
Note: The above values for the OC-12 VTBM optical interface circuit packs are for a Nortel Networks-to-Nortel Networks proprietary link. For a link meeting the Bellcore Midspan-meet specification, the following minimum values apply.		
NT7E05AB/AC/AD	OC-12 LR VTBM	−28.0 to −8.0 dBm
NT7E05BB/BC/BD	OC-12 IR VTBM	−28.0 to −8.0 dBm

7 Adjust the mVOA to reduce the optical power reading to −20 dBm.

> **CAUTION**
> **Risk of attenuator damage**
> If the attenuation does not change after 1 full turn of the adjustment screw, stop turning in that direction. Instead, turn the screw in the opposite direction to restore the unit to within its operating range.

—**continued**—

Procedure 6-4 (continued)
Verifying optical cable integrity

Step	**Action**

If the Rx fiber	Then go to
has an mVOA	step 11
does not have an mVOA	step 8

8   Use the optical test cord with mVOA to loop back the optical signal. Connect
it between the transmit and receive ports at the fiber cross-connect panel as
shown below.

PC-15704
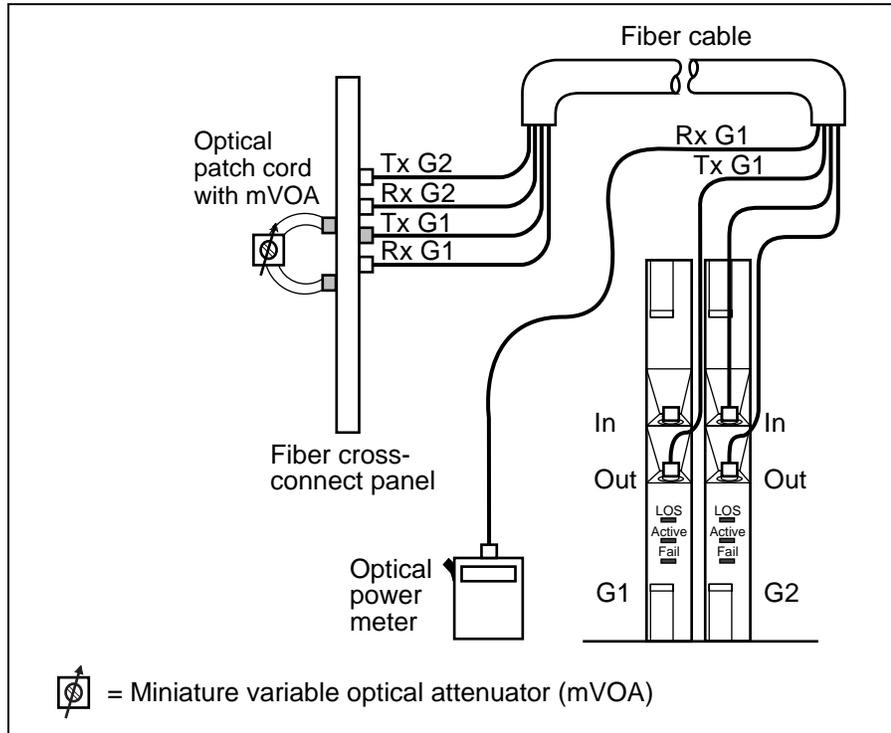
—**continued**—

Procedure 6-4 (continued)
Verifying optical cable integrity

Step	Action
9	At the common-equipment shelf connect the receive fiber to the optical power meter as shown on the previous page.
10	Measure the optical power and record the result on the Site Test Results Form.

The loss in the fiber cable must be 2 dB or less. Refer to the Table on page 6-35.

If	Then
the requirement is not met	try any of the following: • Reseat the optical fiber cable at the optical power meter and at the fiber cross-connect panel. • Reseat both connectors of the optical test cord at the fiber cross-connect panel. • Replace the optical fiber cable between the fiber cross-connect panel and power meter; it is probably defective.

Step	Action
11	Repeat this procedure for the G2 OC-3/OC-12 interface circuit pack.
12	Record the result on the Site Test Results Form.
13	Remove the optical test cord at the fiber cross-connect panel and remove the optical power meter at the receive fiber.
14	Disconnect the transmit fibers from both OC-3/OC-12 circuit packs.

Note: Protect the connectors on the circuit packs and the connectors on the fibers by covering them with clean dust caps. Avoid using dust caps that have been in a dusty location, such as on the floor or in pockets.

Step	Action
15	Check off this procedure on the System Setup Checklist.

—**end**—

Procedure 6-5
Measuring optical receiver sensitivity

Use this procedure to verify OC-3/OC-12 receiver operation at minimum and maximum receiver input levels. This procedure verifies that the network element (NE) receives error-free digital signals when the OC-3/OC-12 input level is adjusted to first a minimum value and then its maximum value.

Note: If the NE under test is equipped with both DS1/VT and DS3/STS mappers or STS-1 interface cards, this procedure, as well as Procedure 6-6, "Testing optical protection switching" on page 6-48, can be omitted. Skip to Procedure 7-4, "Testing DS1 protection switching" on page 7-23.

Requirements

The following requirements must be met before starting this procedure:

- Make sure that the OC-3/OC-12 lockout and DS1 lockout remain in effect and that the DS1 daisy chain and DS1 transmission test set remain connected from the previous procedure.

  Note: For instructions on how to set up the OC-3/OC-12 lockout, see Procedure 7-3, page 7-16. To set up the DS1 lockout, see Procedure 7-3, page 7-18. To set up the daisy chain, see Procedure 7-3, page 7-19.

- Connect a VT100 user terminal to the NE at the local craft access panel (LCAP).

- If required, see *Network Element User Interface Description*, 323-3001-300, in *Operations, Administration, and Provisioning* Volume 4A.

Procedure 6-5 (continued)
Measuring optical receiver sensitivity

The following materials are required to perform this procedure:

- variable optical attenuator (VOA), Hewlett-Packard 8156A (or equivalent), with two optical patch cords
- optical power meter, 1310/1550 nm with range –50 to +5 dB
- one (1) DS1 transmission test set (Tau-Tron S5104 or equivalent)
- NT4K85YA, DS1 chaining test cable, if this NE has a temporary DS1/VT mapper
- two DS3 patch cords, P3Q3B
- thirteen DS1 patch cords, bantam-to-bantam, 1 m (3 ft) for DSX-1 jumpers
- a copy of the Site Test Results Form found in "Appendix E: Site test results form" on page 14-1

To establish traffic continuity, a network element user interface (NEUI) tool is used to set up simple synchronous transport signal-1 (STS-1) connections between the feeder (OC-3/OC-12) optical circuit packs and the DS1 tributaries.

Calibrate the optical power meter using the manufacturer's instructions.

> **CAUTION**
> **Risk of test errors**
> Clean optical connectors as outlined in procedures 6-1 and 6-2 in order to minimize signal attenuation and test errors caused by impurities.

—continued—

Procedure 6-5 (continued)
Measuring optical receiver sensitivity

Action

Step	Action

If STS connections	**Then** start at
are established	step 2
are not set up	step 1

1   Set up STS-1 connections and establish DS1 traffic by entering:

csci
slat <p or **s>** ↵

> where

> **<p>** is used if primary optics are being tested

> **<s>** is used if secondary optics are being tested

Note: Use the query tributary tool (QTRIB) to make sure that the tributary being used for testing is connected to the optic under test.

QTRIB: The QTRIB tool lists all of the equipped tributary circuit packs on an NE. Part of the data is the STS1 to which the tributary is connected. For any tributary it is possible to determine which optics a tributary has been connected with by the SLAT command. Output from QTRIB is in the following format:

PTID	SLOT	CARD	TRIB	PORT	FILL	STS	CPG	VT_STATES
7	11	DSI3	G1	1	all	1	G1	00000000
13	15	DSI1	G9	1	low	4	G1	00003FFF

The PTID column is a composite number based on slot and port number. The CPG column lists the optic CPG to which the tributary is connected. The CPG column lists the optic CPG to which the tributary is connected. The VT_STATES column lists the internal VT state information and is only valid for VT managed tributaries.

Note: To maintain the STS-1 connections, you must remain in the same NEUI in which you typed the above CI commands. If you move from one screen to another, the connections are dropped. If you stay in the same screen you can issue new commands without affecting traffic.

—**continued**—

Procedure 6-5 (continued)
Measuring optical receiver sensitivity

Step	Action
2	Connect the DS1 chaining test cable (NT4K85YA) to the DS1 input and output cards in the upper section of the ABM shelf as follows:

- the cable connector labelled DS1 input card to the DS1 input card
- the cable connector labelled DS1 output card to the DS1 output card

Be sure that the cable is connected properly as shown in Figure 6-16.

3 Connect the DS1 chaining test cable to the transmission test set as follows:

- the plug labeled Test Set (Tx) Out to the transmit side of the test set
- the plug labeled Test Set (Rx) In to the receive side of the test set

Figure 6-16
Connecting the test cable to the DS1 I/O cards

PC-10789

—continued—

Procedure 6-5 (continued)
Measuring transmitted optical power

Step	Action
4	On the DS1 transmission test set, press the Start/Stop button twice (or press stop, then start) to reset the error count to zero.
	The DS1 test set indicates "in process" and displays 0 bit error.
5	Press the Single Bit Error Inject button three times on the DS1 test set.
	The DS1 receiver test set displays 3 bit errors received.
	If the errors are not detected, isolate the fault to the chaining test cable, DS1 input card, or DS1 output card and replace the defective part. Then repeat this step.
6	Leave the daisy chaining test cable in place and record the results of this procedure on the Site Test Results Form.
7	As shown below, connect the output of the VOA to the optical power meter. Then connect the input of the VOA to the transmit (Out) connector of the G1 OC-3/OC-12 circuit pack.

PC-10553
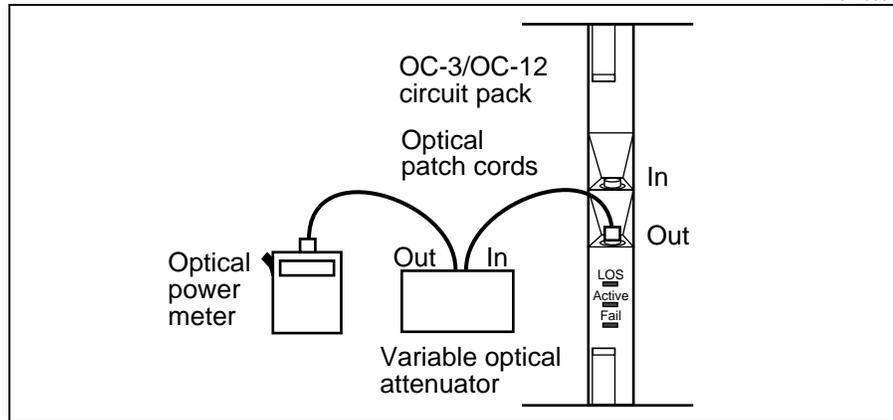
| **8** | Set the VOA for single mode, proper wavelength operation. |

—**continued**—

Procedure 6-5 (continued)
Measuring optical receiver sensitivity

Step	Action

Adjusting for minimum reading of received optical power

9   Adjust the VOA to obtain the minimum reading of received optical power, as listed in the following table for your optical interface circuit pack. The Nortel Networks-to-Nortel Networks proprietary values apply if Nortel Networks equipment is in use at each end.

Product Code (PEC)	Circuit pack name	Minimum received power ($P_{R\ min}$)
NT7E01CA/CB/CC/CD	OC-3 LR	−34.0 dBm
NT7E01DA/DB/DC/DD	OC-3 IR	−28.0 dBm
NT7E02KA/KB/KC/KD	OC-12 LR	−32.0 dBm
NT7E02LA/LB/LC/LD	OC-12 IR	−24.5 dBm
NT7E05AB/AC/AD	OC-12 VTBM LR	−29.5 dBm
NT7E05BB/BC/BD	OC-12 VTBM IR	−28.0 dBm
Note: The above values for the OC-12 VTBM optical interface circuit packs apply to a Nortel Networks-to-Nortel Networks proprietary link (that is when Nortel Networks equipment is in use at both ends). For a link meeting the Bellcore Midspan-meet specification, the following values apply.		
NT7E05AB/AC/AD	OC-12 VTBM LR	−28.0 dBm
NT7E05BB/BC/BD	OC-12 VTBM IR	−28.0 dBm

CAUTION
Risk of damage to the optical receiver
For the NT7E02 OC-12 long-reach (LR) interface circuit pack, received optical power must not exceed the following safe level: −**6.0 dBm**. Refer to optical interface specifications in *Site Installation Planning and Engineering*, 323-3001-200, in the *Engineering, Configuration, and Ordering Guide*, Volume 1.

There are no damage levels for NT7E01 IR and LR, NT7E02 IR, and NT7E05 IR and LR optical interfaces.

—continued—

Procedure 6-5 (continued)
Measuring optical receiver sensitivity

Step	Action
10	As shown below, disconnect the optical patch cord from the optical power meter and connect it to the G1 OC-3/OC-12 receive (In) connector.

PC-10554

OC-3/OC-12
circuit pack

Optical
patch cords

In

Out

Out   In

LOS
Active
Fail

Variable optical
attenuator
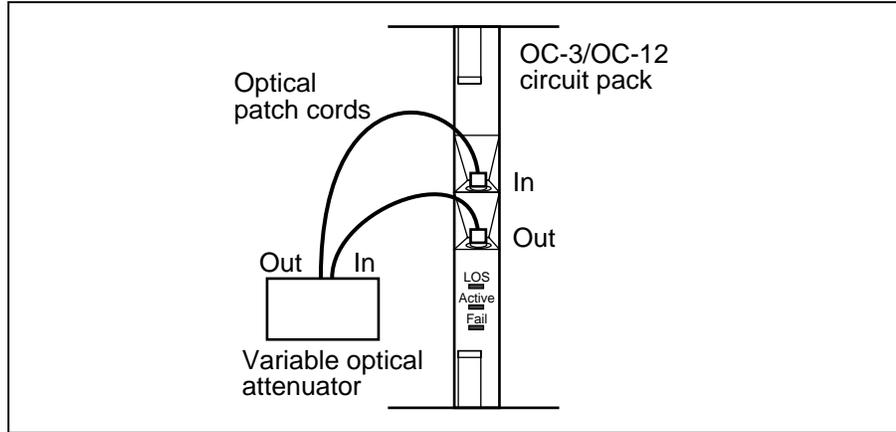
11	On the DS1 test set, press Start/Stop twice to reset the error count to zero.
	The DS1 test set indicates "in process" and displays 0 bit error.
12	Press the Single Bit Error Inject button three times.
	The digital transmission test set indicates 3 bit errors received.
13	Reset the DS1 transmission test set and monitor for one hour.
	It is required that the test set displays 0 bit error.
	If the requirement is not met, try one or both of the following:
	• The DS1/VT synchronous mapper circuit pack could be faulty. Repeat steps 11 through 13, using a different DS1/VT synchronous mapper.
	• The OC-3/OC-12 interface circuit pack could be faulty. Repeat steps 7 through 13, using a different OC-3/OC-12 interface circuit pack.
14	Record the results of this part of the test on the Site Test Results Form.
15	Connect the output of the VOA to the optical power meter. Then connect the input of the VOA to the transmit (Out) connector of the G1 OC-3/OC-12 circuit pack.

—continued—

Procedure 6-5 (continued)
Measuring optical receiver sensitivity

Step	Action

Adjusting the mVOA for maximum reading of received optical power

16   Adjust the mVOA to obtain the maximum acceptable reading of received optical power for your optical interface circuit pack, as listed in the following table.

Product Code (PEC)	Circuit pack name	Maximum received power ($P_{R\ max}$)
NT7E01CA/CB/CC/CD	OC-3 LR	−10.0 dBm
NT7E01DA/DB/DC/DD	OC-3 IR	−8.0 dBm
NT7E02KA/KB/KC/KD	OC-12 LR	−7.0 dBm
NT7E02LA/LB/LC/LD	OC-12 IR	−4.0 dBm
NT7E05AB/AC/AD	OC-12 VTBM LR	0.0 dBm
NT7E05BB/BC/BD	OC-12 VTBM IR	0.0 dBm
Note: The values for the OC-12 VTBM optical interface circuit packs are for a link meeting the Nortel Networks-to-Nortel Networks proprietary link specification. For a Bellcore Midspan-meet specification, the following exceptions apply.		
NT7E05AB/AC/AD	OC-12 VTBM LR	−8.0 dBm
NT7E05BB/BC/BD	OC-12 VTBM IR	−8.0 dBm

—continued—

Procedure 6-5 (continued)
Measuring optical receiver sensitivity

Step	**Action**

> **CAUTION**
> **Risk of increased optical errors**
> Received optical power should not exceed the overload
> levels for optical interfaces meeting Nortel
> Networks-to-Nortel Networks proprietary links:
>
> | NT7E01 OC-3 LR: | −**10.0 dBm** |
> |---|---|
> | NT7E01 OC-3 IR: | −**8.0 dBm** |
> | | |
> | NT7E02 OC-12 LR: | −**7.0 dBm** |
> | NT7E02 OC-12 IR: | −**4.0 dBm** |
> | | |
> | NT7E05 OC-12 VTBM LR: | **0.0 dBm** |
> | NT7E05 OC-12 VTBM IR: | **0.0 dBm** |
>
> The above overload levels also apply to optical interfaces in
> a Bellcore TR-NWT-000253 Midspan-meet specification,
> with the following exceptions:
>
> | NT7E05 OC-12 VTBM LR: | −**8.0 dBm** |
> |---|---|
> | NT7E05 OC-12 VTBM IR: | −**8.0 dBm** |

17 Repeat steps 10 through 14. Monitor the DS1 test set for one minute.

18 Disconnect the optical patch cords from the G1 OC-3/ OC-12 circuit pack.

19 Repeat steps 7 through 17 for the G2 OC-3/OC-12 circuit pack.

20 Disconnect the variable optical attenuator and patch cords from the G2 OC-3/OC-12 interface circuit pack.

21 Log in to the Network Element Status screen and remove the OC-3/OC-12 lockout. Use the substep applicable to your installed circuit packs.

    a. Release the NT7E01/NT7E02 OC-3/OC-12 lockout, by entering:

    pr;dtlprot <oc-n> ↵

     where

     <oc-n>   is the type of optical carrier: **oc3** or **oc12**

    The OC-12 Protection screen is displayed.

    lockout re ↵

    y ↵

    A dot is displayed in the Lockout field for the G1 OC-3/OC-12 unit.

               —continued—

Procedure 6-5 (continued)
Measuring optical receiver sensitivity

Step	Action

b. Release the lockout of the NT7E05 OC-12 VTBM circuit packs, by entering:

pr;dtlprot oc12↵

The OC-12 Protection screen is displayed.

lockout re w g1 ↵

y↵

lockout re w g2 ↵

y↵

Periods replace the asterisks in the LcktW column for circuit packs G1 and G2.

22 Remove the DS1 lockout by entering:

dtlprot ds1 ↵

lockout re <circuit pack group> ↵

where

<circuit pack group>   is the group with an asterisk in the lockout field

y ↵

A dot is displayed in the Lockout field.

If you used	**Then**
the DS1 chaining test cable (with a temporary mapper and I/O cards)	leave it in place for the next procedure.
patch cords to set up a DS1 daisy chain	remove the DS1 daisy chain.

23 Check off this procedure on the System Setup Checklist.

—**end**—

Procedure 6-6
Testing optical protection switching

Use this procedure to verify the following protection switching features of the OC-3/OC-12 interface circuit packs:

- manually switch to the standby unit

- force a switch to the standby unit

- force automatic switching to occur when the OC-3/OC-12 interface circuit pack fails or when the optical signal degrades

- lock out the active unit, inhibiting automatic switching

- forced switching overrides automatic switching, automatic switching overrides manual switching

Alarms	When a protection switch occurs, a minor alarm is generated. You can review these alarms to verify the effectiveness of your actions, in addition to viewing the indications given on the detailed protection screen. During these tests, alarms are generated whenever a circuit pack or a fiber optic patch cable is removed. These alarms should clear when the equipment is reconnected.

Note: If the NE under test is equipped with both DS1/VT and DS3/STS mappers or STS-1 interface cards, this procedure can be omitted. Skip to Procedure 7-4, "Testing DS1 protection switching" on page 7-23.

Requirements

The following requirements must be met before starting this procedure.

- Connect a VT100 user terminal to the NE at the local craft access panel (LCAP). If required, see *Network Element User Interface Description*, 323-3001-300, in *Operations, Administration, and Provisioning*, Volume 4A.

- Calibrate the optical power meter using the manufacturer's instructions.

To establish traffic continuity, an NEUI tool is used to set up simple STS-1 connections between the feeder (OC-3/OC-12) optical interface circuit packs and the DS1 tributaries.

—continued—

Procedure 6-6 (continued)
Testing optical protection switching

The following equipment is required to perform this procedure:

— DS1 transmission test set (Tau-Tron S5104 or equivalent)

— two patch cords

— two optical patch cords with mVOA, NT7E47AA/BA/CA/FA, 5 m long

— optical power meter, 1310/1550 nm with range −50 dB to +5 dB

— a copy of the Site Test Results Form found in "Appendix E: Site test results form" on page 14-1

Action

Step	Action

Setting up optical loopbacks

1 Connect one end of an optical patch cord to the optical power meter.

2 Connect the other end of the attenuated optical patch cord to the transmit (Out) connector of the G1 OC-3/OC-12 interface circuit pack.

3 Adjust the miniature variable optical attenuator (mVOA) to insert about 15 dB loss.

> **CAUTION**
> **Risk of damage to the optical receiver**
> For the NT7E02 OC-12 long-reach (LR) interface circuit pack, received optical power must not exceed the following safe level: − 6.0 dBm. Refer to *Site Installation Planning and Engineering*, 323-3001-200, in *Engineering, Configuration, and Ordering Guide*, Volume 1.
>
> There are no damage levels for NT7E01 IR and LR, NT7E02 IR, and NT7E05 IR and LR optical interfaces.

> **CAUTION**
> **Risk of attenuator damage**
> If the attenuation does not change after one full turn of the adjustment screw, stop turning in that direction. Instead, turn the screw in the opposite direction to restore the unit to within the operating range.

—continued—

Procedure 6-6 (continued)
Testing optical protection switching

Step	Action

⚠ **CAUTION**
Risk of increased optical errors
Received optical power levels should not exceed the
following overload point for optical interfaces in a link
meeting Bellcore TR-NWT-000253 Midspan-meet
specification:

NT7E01 OC-3 LR:	−**10.0 dBm**
NT7E01 OC-3 IR:	−**8.0 dBm**
NT7E02 OC-12 LR:	−**7.0 dBm**
NT7E02 OC-12 IR:	−**4.0 dBm**

The above overload levels also apply to optical interfaces in
a Nortel Networks proprietary link.

4 Disconnect the patch cord from the optical power meter and loop it back to
the receive (In) connector of the G1 OC-3/OC-12 interface circuit pack, as
shown below.

PC-10549
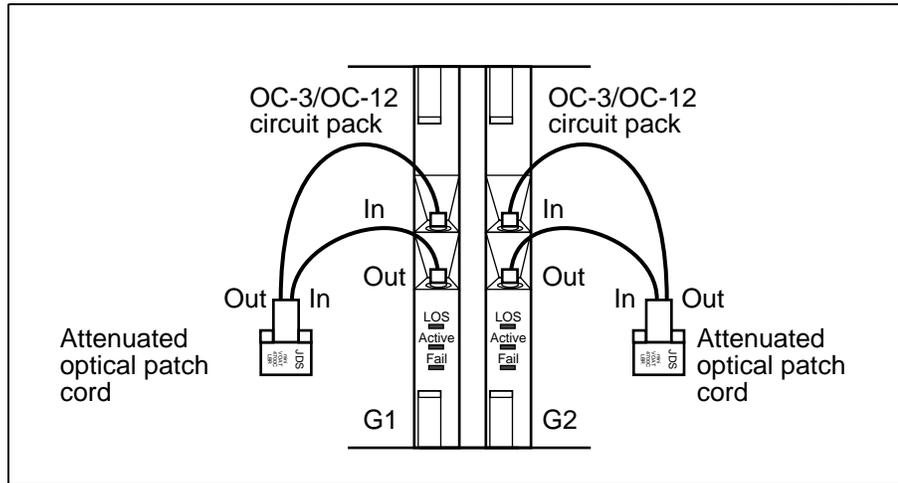
5 Using a second attenuated optical patch cord, repeat steps 1 through 4 for
the G2 OC-3/OC-12 interface circuit pack.

If STS connections	Then go to
are established	step 7
are not set up	step 6

—**continued**—

Procedure 6-6 (continued)
Testing optical protection switching

Step	Action

6 Set up STS-1 connections and establish DS1 traffic by entering:

csci
slat <p or **s>** ↵

where

<p> is used if primary optics are being tested

<s> is used if secondary optics are being tested

Note: Use the QTRIB tool to make sure that the tributary being used for testing is connected to the optic under test.

QTRIB: The QTRIB tool lists all of the equipped tributary circuit packs on an NE. Part of the data is the STS1 to which the tributary is connected. For any tributary it is possible to determine which optics a tributary has been connected with by the SLAT command. Output from QTRIB is in the format shown as follows.

PTID	SLOT	CARD	TRIB	PORT	FILL	STS	CPG	VT_STATES
7	11	DSI3	G1	1	all	1	G1	00000000
13	15	DSI1	G9	1	low	4	G1	00003FFF

The PTID column is a composite number based on slot and port number. The CPG column lists the optic CPG to which the tributary is connected. The CPG column lists the optic CPG to which the tributary is connected. The VT_STATES column lists the internal VT state information and is only valid for VT managed tributaries.

Note: To maintain the STS-1 connections, you must remain in the same NE screen where you entered the CI commands. If you move from one screen to another, the connections are dropped. If you stay in the same screen you can issue new commands without affecting traffic.

Setting up the DS1 transmission test set

7 Connect the DS1 transmission test set to any one DS1 at the cross-connect panel, as shown in Figure 6-17 on page 6-52.

—**continued**—

Procedure 6-6 (continued)
Testing optical protection switching

Step   Action

Figure 6-17
Connecting the DS1 transmission test set

PC-10551
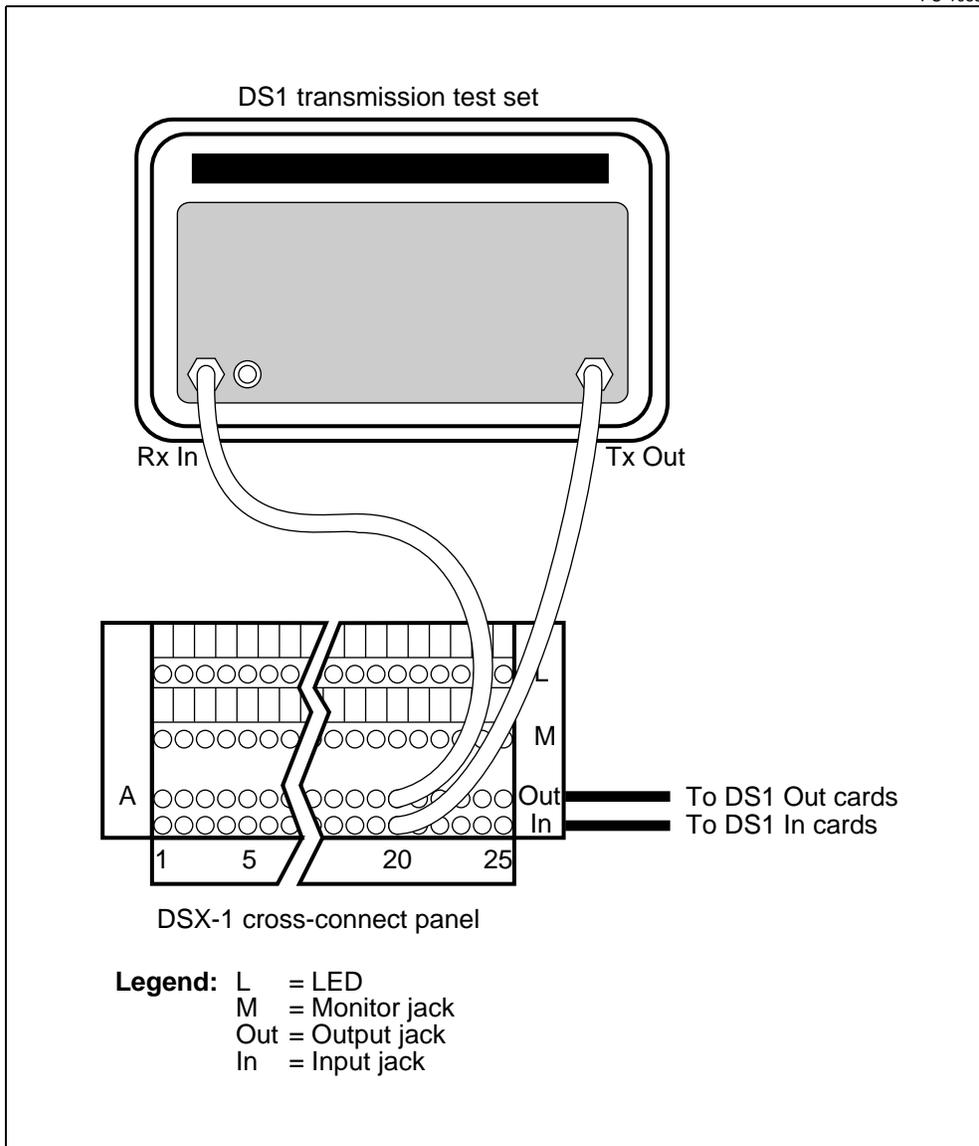
DS1 transmission test set

Rx In   Tx Out

L

M

A   Out   To DS1 Out cards
                                         In   To DS1 In cards

1   5   20   25

DSX-1 cross-connect panel

Legend: L   = LED
             M   = Monitor jack
             Out = Output jack
             In   = Input jack

—continued—

Procedure 6-6 (continued)
Testing optical protection switching

Step	Action

Testing manual switching

8   On the DS1 transmission test set, press the Start/Stop button twice to reset the error count to zero.

The test set displays 0 bit error.

9   Log in to the NE and display the protection status of the OC-3/OC-12 circuit packs, by entering:

pr; dtlprot <oc-n> ↵

 where

 <oc-n>   is the type of optical carrier: oc3 or oc12

Note 1: The OC-3/OC-12 Protection screen is displayed, showing two circuit packs in service: G1 and G2. G1 corresponds to OC-3/OC-12 the circuit pack in slot 9, and G2 corresponds to the circuit pack in slot 10.

Note 2: One circuit pack is active and the other is standby. The green (Active) LED is on for the active circuit pack. Note that in the case of NT7E05 OC-12 virtual tributary bandwidth manager (VTBM) circuit packs, both circuit packs are active.

Note 3: If a circuit pack is locked out, forced to protection, or automatically or manually switched to protection, an asterisk (*) is displayed in the appropriate field. A dot (.) indicates no special activity, that is, normal operation. A dash (-) indicates not applicable.

10   Make sure G2 is the only active circuit pack.

Note: In the case of OC-12 VTBM circuit packs, both circuit packs are initially active.

If G1 is active, operate a manual switch, by entering:

manual op g1 ↵

You are prompted to confirm the command.

y ↵

For OC-12 VTBM, both cards remain active and have green LEDs.

For other OC-3/OC-12, the green (Active) LED turns off at OC-3/OC-12 G1 and lights on G2.

11   On the DS1 transmission test set, press the Start/Stop button twice to reset the error count to zero.

The DS1 test set indicates "in process" and displays 0 bit error.

12   To verify DS1 continuity, press the Single Bit Error Inject button three times on the DS1 test set.

The DS1 transmission test set displays 3 bit errors received.

                                       —continued—

Procedure 6-6 (continued)
Testing optical protection switching

Step	Action

Testing forced switching

13   Force a switch to G1 by entering:

forced op g2 ↵

You are prompted to confirm the command.

y ↵

For both OC-12 VTBM and other OC-3/OC-12, the green (Active) LED on the G1 OC-3/OC-12 interface circuit pack turns on and the green (Active) LED on the G2 circuit pack turns off.

14   To verify DS1 continuity, press the Single Bit Error Inject button three times on the DS1 test set.

The DS1 transmission test set displays 3 bit errors received.

15   Disconnect the optical patch cord from the transmit (Out) connector on the G1 OC-3/OC-12 interface circuit pack as shown below.

PC-10579
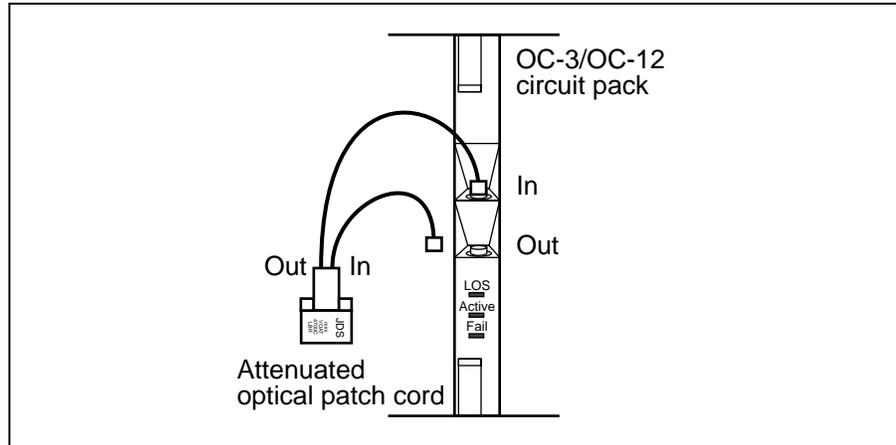
For OC-12 VTBM, G1 and G2 are both active with green LEDs. The OC-12 Protection screen displays an R in the Forced field of G2.

For other OC-3/OC-12, the G1 OC-3/OC-12 interface circuit pack remains active due to the forced switch. As a result, DS1 signal continuity is lost.

The OC-3/OC-12 Protection screen displays an asterisk (*) in the Auto (automatic switch) field of G2 . On G2, the yellow loss-of-signal (LOS) LED turns on. The green (Active) LED on the G1 OC-3/OC-12 interface circuit pack indicates that it is now active.

—**continued**—

Procedure 6-6 (continued)
Testing optical protection switching

Step	Action

16   To verify DS1 signal continuity is lost, press the Start/Stop button on the DS1 transmission test set twice, to reset the error count.

The DS1 transmission test set indicates "in process" and shows a high error count.

17   Release the forced switch, by entering:

forced re g2 ↵

y ↵

For OC-12 VTBM, G1 autoswitches to G2. The OC-12 Protection screen displays an asterisk (*) in the Auto field of G1. G1 active LED light is turned off, and G2 active LED remains on.

For other OC-3/OC12, you make it possible for an automatic switch to occur (from G1 to G2) by releasing the forced switch. G2 becomes active. The green (Active) LED on G2 turns on.

18   Reconnect the optical patch cord to the transmit (Out) connector on OC-3/OC-12 G1.

OC-3/OC-12 G2 remains active.

19   On the DS1 transmission test set, press the Start/Stop button twice to reset the error count to zero.

The DS1 test set indicates "in process" and displays 0 bit error.

20   To verify DS1 continuity, press the Single Bit Error Inject button three times on the DS1 test set.

The DS1 transmission test set displays 3 bit errors received.

Testing automatic switching due to loss of optical signal

21   To cause an AutoSw (automatic switch) of the optical facility, remove the optical patch cord from the transmit (Out) connector on the G2 OC-3/OC-12 interface circuit pack.

For OC-12 VTBM, the OC-12 Protection screen displays an *R in the Auto field of G2. G2 active LED is off.

22   On the DS1 receiver test set, press the Start/Stop button twice to reset the error count to zero.

The DS1 test set indicates "in process" and displays 0 bit error.

23   To verify DS1 continuity, press the Single Bit Error Inject button three times on the DS1 test set.

The DS1 receiver test set displays 3 bit errors received.

—continued—

Procedure 6-6 (continued)
Testing optical protection switching

Step	Action

24 Reconnect the optical patch cord to the transmit (Out) connector of OC-3/OC-12 G1.

For OC-12 VTBM, the OC-12 Protection screen displays a (WR) in the Auto field of G2. Once the wait-to-restore period expires, the G2 active LED is lit.

For other OC-3/OC12, the yellow LOS LED goes off on the G2 OC-3/OC-12 interface. The screen displays a dot (.) in the AutoSw (automatic switch) field for the G2.

Testing lockout

25 Operate a lockout on the OC-3/OC-12 interface circuit packs by entering:

For OC-12 VTBM	For other OC-3/OC-12
lockout op <**work/prot**> <**unit**> ↵ for example: lockout op prot g1	**lockout op** ↵

The screen displays a message warning that the command will affect service and asks you to confirm the command. Enter:

y ↵

For OC-12 VTBM, the OC-12 Protection screen displays an asterisk (*) in the LcktP field for G1. The lockout (LckOut) LED is lit on the maintenance interface card (MIC).

For other OC-3/OC-12, the OC-3/OC-12 Protection screen displays an asterisk in the Lockout field for optical interface G1. A hyphen (-) in the Lockout field for G2 indicates that the lockout does not apply. The lockout (Lck Out) LED is lit on the maintenance interface card (MIC).

26 Simulate a loss of signal by removing the optical patch cord from the transmit (Out) connector of the OC-3/OC-12 G2 (for OC-12 VTBM) or G1 (for other OC-3/OC12).

For OC-12 VTBM, the OC-12 Protection screen remains the same. G1 and G2 both remain active with green LEDs turned on. Traffic does not switch to G1.

For other OC-3/OC-12, the yellow loss-of-signal (LOS) LED on G1 turns on. Traffic does not switch to G1.

—**continued**—

Step	Action
27	To verify that DS1 signal continuity is lost, press the Start/Stop button on the DS1 receiver test set twice, to reset the error count.
	The DS1 receiver test set indicates "in process" and shows a high error count.
28	Release the lockout on the OC-3/OC-12 interface circuit packs, allowing the automatic switch by entering:

For OC-12 VTBM	For other OC-3/OC-12
lockout re <**work/prot**> **<unit>** ↵ for example: lockout re prot g1	**lockout re** ↵

You are prompted to confirm the command.

y ↵

For OC-12, VTBM, the OC-12 Protection screen displays a dot (.) in all protection columns. G1 and G2 both remain active with green LEDs turned on.

For other OC-3/OC-12, the OC-3/OC-12 G2 becomes active and the green (Active) LED turns on. The OC-3/OC-12 Protection screen displays an asterisk (*) in the Auto (automatic switch) field for the G1. The screen displays a dot (.) in the Lockout field for interface circuit pack G2.

Step	Action
29	On the DS1 receiver test set, press the Start/Stop button twice to reset the error count to zero.
	For OC-12 VTBM, the DS1 test set indicates a high error count.
	For other OC-3/OC-12, the DS1 test set indicates "in process" and displays 0 bit error.
30	To verify that DS1 continuity is restored, press the Single Bit Error Inject button three times on the DS1 test set.
	For OC-12 VTBM, the DS1 test set indicates a high error count.
	For other OC-3/OC-12, the DS1 receiver test set displays 3 bit errors received.
31	Reconnect the optical patch cord to the transmit (Out) connector of OC-3/OC-12 G2 (for OC-12 VTBM) or G1 (for other OC-3/OC-12).
	For OC-12 VTBM, the DS1 test set indicates "in process" and displays 0 bit error. The OC-12 Protection screen displays a dot (.) in all protection columns. G1 and G2 both remain active with green LEDs turned on.
	For other OC-3/OC-12, the yellow loss-of-signal (LOS) LED goes off. The screen displays a dot (.) in the Auto (automatic switch) field for the G1.

—continued—

Procedure 6-6 (continued)
Testing optical protection switching

Step	Action
32	On the active OC-3/OC-12 G2, cause a degradation of the optical signal by increasing the attenuation on the NT7E47 attenuated optical patch cord, until an automatic switch occurs.
	The yellow loss-of-signal (LOS) LED on OC-3/OC-12 G2 turns on. The OC-3/OC-12 Protection screen displays an asterisk (*) in the Auto (automatic switch) field of G2. Traffic switches to G1, and its green (Active) LED turns on.
33	On the DS1 receiver test set, press the Start/Stop button twice to reset the error count to zero.
	The DS1 test set indicates in process and displays 0 bit error.
34	To verify that DS1 continuity exists, press the Single Bit Error Inject button three times on the DS1 test set.
	The DS1 receiver test set displays 3 bit errors received.
35	Decrease attenuation on the NT7E47 attenuated optical patch cord, until the signal is restored.
	The yellow LED indicating loss of signal (LOS) turns off when the input signal level increases above the alarm threshold. The OC-3/OC-12 Protection screen displays a dot (.) in the Auto (automatic switch) field of G2.
36	Operate a manual switch to make unit B the active unit once again by entering:
	manual op g1 ↵
	You are prompted to confirm the command.
	y ↵
	The green (Active) LED turns off at OC-3/OC-12 G1 and lights on G2. Traffic switches to G2.
37	On the DS1 receiver test set, press the Start/Stop button twice to reset the error count to zero.
	The DS1 test set indicates "in process" and displays 0 bit error.
38	To verify that DS1 continuity exists with the OC-3/OC-12 B unit as the active unit, press the Single Bit Error Inject button three times on the DS1 test set.
	The DS1 receiver test set displays 3 bit errors received.
39	Record the results of this procedure on the Site Test Results Form.
40	If protection switching requirements are not met, replace the faulty OC-3/OC-12 interface circuit pack.
41	If this NE has a working DS1/VT mapper circuit pack, skip to step 45. If you are using a temporary DS1/VT mapper for testing, continue with step 42.

—**continued**—

Procedure 6-6 (continued)
Testing optical protection switching

Step	Action

42 Take all 14 temporary DS1 facilities out of service for the DS1 circuit pack group and delete them. Do this one by one, by entering:

fa ds1 <circuit pack group> all↵

    where

    <circuit pack group> is **g4**. Refer to Procedure 7-2, step 5 on page 7-11.

chgstate oos ↵

y ↵

The facility goes out of service (OOS).

delete ↵

y ↵

The facility is deleted.

Repeat this step for each facility in the DS1 circuit pack group.

43 Take the DS1 equipment group out of service, and delete it by entering:

eq ds1 <circuit pack group> ↵

    where

    <circuit pack group> is **g4**. Refer to Procedure 7-2, step 5 on page 7-11.

chgstate oos ↵

y ↵

The equipment group goes out of service (OOS).

delete ↵

y ↵

The equipment group is deleted.

44 Remove the DS1 chaining test cable. Remove the DS1 input card from slot 35, and the DS1 output card from slot 37. (Use a small screwdriver to turn the locking screw to the left to unlock the input and output cards.) Remove the DS1/VT mapper card in slot 4.

45 Leave the attenuated optical patch cords connected to the OC-3/OC-12 interface circuit packs. Leave the DS1 test set connected to the DSX-1 cross-connect panel for the next procedure.

46 Check off this procedure on the System Setup Checklist.

                  —end—

Testing DS1 and optical in-bay equipment

The procedures in this chapter guide you through testing DS1 and optical equipment at a network element (NE) supporting DS1 interfaces or a mix of DS1, DS3, STS-1 interfaces. Unless otherwise noted, the tests can be performed by one technician.

These procedures cover local in-bay tests on equipment located at a single NE and can form the basis for customer acceptance tests

If the NE you are testing is not equipped with DS1 or DS3 mappers or STS-1 interface cards, it is recommended that you temporarily install DS3 or STS-1 equipment and perform the procedures in Chapter 8. This is because the DS3 or STS-1 tests can be performed in a shorter period of time than DS1 tests.

> *Note:* For OC-1 equipment installation site testing procedures, see the OC-1 Access Module in *Acceptance Testing*, 323-1001-201.

Procedures in performing DS1 and optical in-bay tests

To perform a DS1 or optical in-bay test, do the following procedures in this order:

Procedure	Page
7-7 Verifying DS1 transmission test set performance	7-7
7-9 Performing initial DS1 provisioning	7-9
7-14 Verifying DS1 signal continuity	7-14
7-23 Testing DS1 protection switching	7-23

DS1/VT mapper capacity

The DS1 capacity of the system is dependent on the configuration as well as the traffic that the system is carrying. For details about the capacity of your specific configuration, see *Mapper Layouts Planning Guide*, 323-3001-154, in *Engineering, Configuration, and Ordering Guide*, Volume 1.

Table 7-1 on page 7-3 shows the association between the groups and slots for DS1/VT, DS3, STS-1, OC-3/OC-12, and OC-12 virtual tributary bandwidth (VTBM) mappers.

Group and slot association matrix

The group number you enter in a command string depends on the shelf type and function, the mapper type, and its slot location. Table 7-1 summarizes the group and slot associations for the different mappers and shelves.

Table 7-1
Group and slot association matrix

Mapper and shelf function		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
DS1	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
DS3	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		
STS-1	TN_BLSR		S	P								G1		G2		G3		G4		
OC-3	ABM tributary	G3		G4		G1S		G2S												
	TBM tributary	G3		G4		G1S		G2S				G5		G6		G7		G8		
	Feeder									G1	G2									
OC-12	Feeder									G1	G2									
OC-12 VTBM	Feeder									G1	G2									
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19

Note: * For DS3 TBM FCOT_BLSR fiber-fed shelves, this group is available only if no DS1s are provisioned for that shelf.

Group and slot associations for DS1 cards

DS1 mappers are in the lower level of the common equipment shelf. DS1 input and output cards are in the upper level.

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

For some tasks, you must also know the slot numbers of the input and output cards. Refer to the following tables to determine the I/O slot(s) for the mapper you need.

If you are provisioning this equipment	For this shelf type	Then refer to
DS1 equipment	ABM	Table 7-2
	TBM	Table 7-3

For DS1 circuit packs, Table 7-2 and Table 7-3 show the association between mappers in the lower level of the common equipment shelf and input/output 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, respectively. 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 mapper and slot associations

DS1 mappers are in the lower level of the common equipment shelf. DS1 input and output cards are in the upper level. Table 7-2 below shows the association between the groups and slots for DS1 mappers. Note that this table shows all of the possible associations and does not imply that all the slots are available for every configuration.

For details on the DS1 capacity of your configuration, refer to *Mapper Layouts Planning Guide*, 323-3001-154, in the *Engineering, Configuration, and Ordering Guide*, Volume 1.

Table 7-2 lists the DS1 circuit pack groups for the access bandwidth manger (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 7-2
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 RFT_BLSR	Group	g1*	g2*	P*	g4*	g5*	g6*	g7	g8											
FCOT	Input slot	30*	31*	34p*	35*	38	39	42	43											
FCOT_BLSR	Output slot	32*	33*	36p*	37*	40	41	44	45											

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.

Note 4: The symbol "g" refer to a group of modules made up of a working DS1 mapper circuit pack and its corresponding DS1 input and output cards.

Table 7-3 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 7-3
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 an 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.

Note 4: The symbol "g" refer to a group of modules made up of a working DS1 mapper circuit pack and its corresponding DS1 input and output cards.

Procedure 7-1
Verifying DS1 transmission test set performance

Use this procedure to verify the performance of the DS1 digital transmission test set. This procedures helps you obtain reliable results when testing.

Requirements

Make sure you have the following items:

- a DS1 transmission test set (Tau-Tron S5104 or equivalent)
- an electrical test cord, bantam-to-bantam, 1 m (3 ft) or equivalent
- a copy of the Site Test Results Form found in "Appendix E: Site test results form" on page 14-1

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

Action

Step	Action
1	Set the Power switch to ON.
2	Set the Transmitter Output controls as follows:

	Frame:	**Frame**
	Pattern:	PRBS (or QRSS)
	DS:	DSX-1

3	Set the Error Inject controls as follows:

	Type:	**Bit**
	Mode:	Err free

4	Connect the bantam-to-bantam test cord between input and output.
5	Set the Measurement Time controls as follows:

	Mode:	**Untimed (or continuous)**
	Start/Stop:	In Proc

—continued—

Procedure 7-1 (continued)
Verify DS1 transmission test set performance

Step	Action
6	Set the Measurements controls as follows:
	Type: Bit
7	Set the Receiver Input controls as follows:
	Frame: **Frame**
	Pattern: PRBS
	Channel: CH1
	DS: DSX-1
8	At the rear of the test set, set the DS1 Output switch to Bipolar (or B8ZS).
9	On the test set, press the Start/Stop button twice to reset the error count to zero.
	The DS1 transmission test set indicates "in process" and displays 0 bit error.
10	Press the Single Bit Error Inject button three times.
	The DS1 transmission test set displays three bit errors.
11	If you did not obtain the required results, check the settings and repeat the test. If necessary, replace the test set.
12	Disconnect the test cord and you are ready to perform tests.
13	Note the completion of this procedure on the Site Test Results Form.
14	Check off this procedure on the System Setup Checklist.

—**end**—

Procedure 7-2
Performing initial DS1 provisioning

Use this procedure for initial provisioning of DS1 facilities (also called ports) when testing system functionality.

DS1 provisioning

In initial (bulk) provisioning, each parameter is set to the same value for all facilities on all DS1 circuit pack groups. The actual values required for correct facility operation should be provisioned after testing is complete, so the system is ready for service.

Auto-provisioning defaults to on so that all circuit pack groups and facilities are automatically provisioned when the circuit packs are installed.

Site tests

When testing a site that is not equipped with DS1s, temporary DS1 equipment must be added and provisioned to permit optical receiver sensitivity testing in Procedure 6-5 on page 6-38. A short test cable, called a DS1 chaining test cable, is used to connect the temporary mapper and its associated DS1 input and output cards.

Note: If the NE you test is not equipped with a DS1/VT synchronous mapper, it is recommended that the DS3 or STS-1 site tests in Chapter 8 be used, as testing can be performed in a shorter period of time.

Requirements

The following requirements must be met before starting this procedure:

- Connect a VT100 user terminal to the NE at the local craft access panel (LCAP) (refer to *Network Element User Interface Description*, 323-3001-300, in *Operations, Administration, and Provisioning*, Volume 4A).

- Have the facility record (or equivalent document) that shows the distance between your system bay and the DS1 cross-connect frame.

  Note: To obtain better test results, provision the DS1 ports with the actual value shown on the facility record.

Procedure 7-2 (continued)
Performing initial DS1 provisioning

If this NE requires temporary DS1 equipment, you need the following:

- one DS1/VT synchronous mapper, NT7E04. For TR-08 services, DS1/VT mapper type NT7E04CA must be used for both the working and protection mappers
- one DS1 input card, NT4K321
- one DS1 output card, NT4K33

Action

Step	Action

If the network element is	Then go to
equipped with a working DS1/VT synchronous mapper circuit pack	step 4
NOT equipped with a working DS1/VT synchronous mapper circuit pack and you want to perform site tests using temporary DS1 equipment	step 1

1   Insert a temporary DS1/VT mapper card into slot 4 in the common-equipment (CE) shelf. Fully engage the card.

The mapper initializes and performs self-tests.

2   Insert the DS1 input card in slot 35 in the upper section of the CE shelf. Lock the card in place with a small flat-head (slotted) screwdriver by turning the locking screw to the right.

3   Insert the DS1 output card in slot 37 in the upper section of the CE shelf. Lock the card in place with a small flat-head screwdriver by turning the locking screw to the right.

4   Log in to the Network Element Status screen.

—**continued**—

Procedure 7-2 (continued)
Performing initial DS1 provisioning

Step	Action
5	Verify that the system recognizes the mapper circuit pack(s) by entering at the user interface:

eq ds1 <circuit pack group> ↵

where

<circuit pack group>	refer to Table 7-2 on page 7-5 for an ABM shelf
	refer to Table 7-3 on page 7-6 for a TBM shelf

The DS1 Equipment screen for the specified circuit pack group is displayed.

6	If the circuit pack group equipment is not provisioned, add it as follows:

add ↵

The circuit pack group is now provisioned.

7	Repeat steps 4 through 6 for each DS1/VT mapper circuit pack installed.
8	Display the All DS1 Facilities screen, by entering:

facility ds1 all ↵

The All DS1 Facilities screen is displayed.

Note: The All DS1 Facilities screen can list up to nine working circuit packs. Ignore any listings for mappers that are not present in your system.

9	Take the facilities out of service, by entering:

chgstate oos ↵

You are prompted to confirm the command.

y ↵

The facilities are placed out of service.

10	Display the DS1 Edit Facility screen by entering:

edit ↵

The DS1 Edit Facility screen for all DS1 facilities is shown below. For each parameter, the default value or a blank is displayed, as appropriate.

—continued—

Procedure 7-2 (continued)
Performing initial DS1 provisioning

Step	Action

11 Enter the appropriate commands and set the parameters to the following
values for testing purposes:

Command	Parameter
lbo (line build-out)	short, medium, or long
lcoding (line coding)	b8zs
framefmt (frame format)	superframe
alarmenc (alarm encoding)	ones
synchr (synchronization)	bytesynchronous

a. To set line build-out parameter, enter:

lbo <build-out> ↵

where

<build-out>	is **short**, **medium,** or **long**. The correct value is determined by the cable length as shown below.
short	less than 46 m (150 ft)
medium	46 to 137 m (150 to 450 ft)
long	137 to 200 m (450 to 655 ft)

Note: If you are using a temporary DS1/VT mapper card, set line build-out to
short.

—continued—

Procedure 7-2 (continued)
Performing initial DS1 provisioning

Step	Action

b. To set the type of line coding to B8ZS, enter:

lcoding b8zs ↵

c. To set the type of framing format to superframe, enter:

framefmt superframe ↵

d. To set the type of alarm encoding, enter:

alarmenc ones ↵

e. To set the synchronization mode to bytesynchronous, enter:

synchr bytesynchronous ↵

The provisioned values are displayed in reverse video.

12 Exit the DS1 Edit Facility screen by entering:

quit ↵

The DS1 Edit Facility screen is displayed again.

13 Put the facilities back into service, by entering:

chgstate is ↵

The facilities go into service.

14 List all the DS1 facilities and verify their individual settings by entering:

query all ↵

The list of DS1 facilities is displayed, showing the facility summary in the conversation area.

15 Quit to the Network Element Status screen by entering:

quit ↵

16 Note the completion of this procedure on the Site Test Results Form.

17 Check off this procedure on the System Setup Checklist.

—**end**—

Procedure 7-3
Verifying DS1 signal continuity

This procedure checks the continuity of each DS1 circuit terminated at the digital system cross connect (DSX-1) panel. All the DS1s of a DS1/VT synchronous mapper circuit pack are daisy-chained with optical patch cords, so the DS1s can be tested in one operation.

Only perform this test when the system is not in service because an optical loopback is used to provide a special test path.

> *Note:* If this NE is equipped with a temporary DS1/VT mapper for testing only, then this procedure can be omitted. Continue with Procedure 6-5 on page 6-38.

The signal path tested is as follows:

- from the input of the first DS1 at the DSX-1 cross-connect panel, through the office cabling and the DS1 input card

- through the DS1/VT synchronous mapper circuit pack and OC-3/OC-12 optical interface circuit pack (transmit side)

- through the optical patch cords and miniature variable optical attenuator (mVOA)

- through the OC-3/OC-12 optical interface circuit pack (receiver side)

- through the DS1 output card and office cabling to the output side of the first DS1 at the DSX-1 cross-connect panel

- through a DS1 optical patch cord to the input of the next DS1

Requirements

The following requirements must be met before starting this procedure.

- Make sure the system is not in service.

  — to establish traffic continuity, a network element user interface (NEUI) tool is used to set up simple synchronous transport signal (STS)-1 connections between the feeder (OC-3/OC-12) optical interface circuit packs and the DS1 tributaries.

- Connect a VT100 user terminal to the NE at the local craft access panel (LCAP).

  — refer to *Network Element User Interface Description*, 323-3001-300, in *Operations, Administration, and Provisioning*, Volume 4A.

—continued—

Procedure 7-3 (continued)
Verifying DS1 signal continuity

The following equipment is required to perform this procedure:

- DS1 transmission test set (Tau-Tron S5104, or equivalent)

- DS1 daisy chaining test cable, or 13 DS1 patch cords, bantam-to-bantam, 1 m (3 ft) used as DSX-1 jumpers, if this NE has working DS1/VT mappers

  Note: The DS1 daisy chaining test cable is used for testing OC-12 receive sensitivity in basic fiber-fed systems serving universal and integrated applications. The testing procedure uses a DS1 test set and a DS1/VT synchronous mapper to generate the signals used to verify that the NE receives error-free signals when the OC-12 optical input level is adjusted first to a typical minimum value and then to its guaranteed minimum value. The cable daisy-chains the fourteen DS1s on the DS1/VT synchronous mapper. If the AccessNode does not contain a DS1/VT synchronous mapper, then in order to perform the test, the tester must temporarily install a mapper, and the associated DS1 input card and DS1 output card.

- two optical patch cords with miniature variable optical attenuator (mVOA), NT7E47AA/BA/CA/FA, 5 m long

—continued—

Procedure 7-3 (continued)
Verifying DS1 signal continuity

Action

Step	Action

Setting up the OC-3/OC-12 (SRP) lockout and loopbacks

1 To prevent the OC-3/OC-12 facility from switching to the standby circuit pack while you are manipulating the optical patch cords, log in to the NE and lock out the optical circuit packs. (Use the substep applicable to your installed circuit packs.)

    a. Lock out the NT7E01/NT7E02 OC-3/OC-12 interface circuit packs, by entering:

    pr;dtlprot <oc-n> ↵

        where

        <oc-n>   is the type of optical carrier: **oc3** or **oc12**

    The OC-3/OC-12 Protection screen is displayed.

    lockout op ↵

    The screen displays a message that the command will force all traffic to the G1 OC-3/OC-12 circuit pack. Confirmation of the command is requested.

    y ↵

    An asterisk is displayed in the Lockout field for the G1 circuit pack.

Setting up the OC-12 (VTBM) lockout and loopbacks

    b. Lock out the NT7E05 OC-12 VTBM circuit packs to prevent optical protection switching during testing, by entering:

    pr;dtlprot oc12 g1 ↵

    The OC-12 Protection screen is displayed.

    lockout p w g1

    y ↵

    Asterisks are displayed in the LcktW column for unit G1.

    c. Repeat step 1b for G2.

2 Connect one end of an attenuated optical patch cord to the optical power meter.

3 Connect the other end of the attenuated optical patch cord to the transmit (OUT) connector of the G1 OC-3/OC-12 interface circuit pack.

4 Adjust the mVOA to insert about 15 dB loss.

                      —continued—

Procedure 7-3 (continued)
Verifying DS1 signal continuity

Step	Action

CAUTION
Risk of damage to the optical receiver
For the NT7E02 OC-12 long-reach (LR) interface circuit
pack, received optical power must not exceed the following
safe level: **–6.0 dBm**. Refer to *Site Installation Planning and
Engineering*, 323-3001-200, in the *Engineering,
Configuration, and Ordering Guide*, Volume 1.

There are no damage levels for NT7E01 IR and LR,
NT7E02 IR, and NT7E05 IR and LR optical interfaces.

CAUTION
Risk of attenuator damage
If the attenuation does not change after one full turn of the
adjustment screw, stop turning in that direction. Instead,
turn the screw in the opposite direction to restore the circuit
pack to within its operating range.

CAUTION
Risk of increased optical errors
Received optical power should not exceed the overload
levels for optical interfaces meeting Nortel
Networks-to-Nortel proprietary links:

NT7E01 OC-3 LR:	−**10.0 dBm**
NT7E01 OC-3 IR:	−**8.0 dBm**
NT7E02 OC-12 LR:	−**7.0 dBm**
NT7E02 OC-12 IR:	−**4.0 dBm**
NT7E05 OC-12 VTBM LR:	**0.0 dBm**
NT7E05 OC-12 VTBM IR:	**0.0 dBm**

These overload levels also apply to optical interfaces in a
Bellcore TR-NWT-000253 Midspan-meet specification, with
the following exceptions:

NT7E05 OC-12 VTBM LR:	−**8.0 dBm**
NT7E05 OC-12 VTBM IR:	−**8.0 dBm**

5   Disconnect the patch cord from the optical power meter and loop it back to
the receive (IN) connector of the G1 OC-3/OC-12 interface circuit pack.

—continued—

Procedure 7-3 (continued)
Verifying DS1 signal continuity

Step	Action

6   Using a second attenuated optical patch cord, repeat steps 2 through 5 for the G2 OC-3/OC-12 interface circuit pack.

Verifying the first working DS1/VT mapper (non-VTBM)

7   To prevent unintended protection switching, lock out the DS1/VT mapper under test, by entering:

dtlprot ds1 ↵

The DS1 Protection screen is displayed.

lockout op <circuit pack group> ↵

where

<circuit pack group>   refer to Table 7-2 on page 7-5 for an ABM shelf

refer to Table 7-3 on page 7-6 for a TBM shelf

y ↵

An asterisk is displayed in the Lockout field for the DS1 group under test.

Note: The slots that can accept DS1/VT mappers are shown in Table 7-1 on page 7-3, along with their corresponding circuit pack groups. Note that this table shows all of the possible slot/group associations. For details about slot locations of a particular configuration, see *Mapper Layouts Planning Guide*, 323-3001-154, in the *Engineering, Configuration, and Ordering Guide*, Volume 1.

If STS connections are	Then
established	go to step 9.
not set up	• set up STS-1 connections. • establish DS1 traffic by going to step 8.

8   To establish DS1 traffic, enter the following:
csci
slat <p or **s>** ↵

where

<p> is used if primary optics are being tested

<s> is used if secondary optics are being tested

Note: Use the query tributary (QTRIB) tool to make sure that the tributary being used for testing is connected to the optic under test.

—**continued**—

Procedure 7-3 (continued)
Verifying DS1 signal continuity

Step	Action

QTRIB: The query tributary (QTRIB) tool lists all of the equipped tributary circuit packs on an NE. Part of the data is the STS-1 to which the tributary is connected. For any tributary it is possible to determine which optics a tributary has been connected with by the SLAT command. Output from QTRIB is in the format shown as follows.

PTID	SLOT	CARD	TRIB	PORT	FILL	STS	CPG	VT_STATES
7	11	DSI3	G1	1	all	1	G1	00000000
13	15	DSI1	G9	1	low	4	G1	00003FFF

The PTID column is a composite number based on slot and port number. The CPG column lists the optic CPG to which the tributary is connected. The CPG column lists the optic CPG to which the tributary is connected. The VT_STATES column lists the internal VT state information and is only valid for VT managed tributaries.

Note: To maintain the STS-1 connections, you must remain in the same NEUI screen where you entered the above CI commands. If you stay in the same screen you can issue new commands without affecting traffic. Moving from one screen to another drops the connections.

Setting up a daisy-chain

9   Daisy-chain all DS1 circuits of the DS1/VT synchronous mapper circuit pack under test described below (see Figure 7-1).

- at the DSX-1 cross-connect panel, use a patch cord to loop the output of the first DS1 to the input of the next DS1.

- daisy-chain in this manner until all DS1s from the circuit pack are included.

- connect the transmit side of the transmission test set to the input of the first DS1. Connect the receive side of the test set to the output of the last DS1.

—**continued**—

Procedure 7-3 (continued)
Verifying DS1 signal continuity

**Figure 7-1
Setting up a daisy chain**

FW-10555

DS1 transmission test set

Tx
(Out)

Rx
(In)

L

M

1

14

A

Out   To DS1 out cards
In   To DS1 in cards

DSX-1 cross-connect panel

Legend
L   - LED
M   - Monitor jack
Out - Output jack
In   - Input jack

—continued—

Procedure 7-3 (continued)
Verifying DS1 signal continuity

Step	Action

10   On the DS1 transmission test set, press the Start/Stop button twice (or press stop, then start) to reset the error count to zero.

The DS1 test set indicates "in process" and displays 0 bit error.

11   Press the Single Bit Error Inject button three times on the DS1 test set.

The DS1 receiver test set displays three bit errors received.

If the errors are not detected, you can isolate the fault (patch cord, cable, or DS1 input or output card) as follows:

- break the daisy chain in half
- connect the DS1 test set to the first short chain and repeat steps 10 and 11
- connect the DS1 test set to the second short chain and repeat steps 10 and 11
- continue in this manner until you have located all faults. Fix the faults.
- rebuild the daisy chain and repeat this step.

12   Record the results of this procedure on the Site Test Results Form.

13   Repeat steps 7 through 12 for each additional working DS1/VT mapper equipped.

Verifying the protection DS1/VT mapper (non-VTBM)

14   To connect the protection DS1/VT synchronous mapper circuit pack for testing, remove the DS1 lockout, and force a protection switch from the DS1/VT mapper currently connected to the test setup. Enter the following:

lockout re <circuit pack group> ↵

> where

> <circuit pack group> is the same as the last one tested

y ↵

forced op <circuit pack group> ↵

> where

> <circuit pack group> is the same as the last one tested

y ↵

Traffic switches to the protection mapper. A dot is displayed in the Lockout field and an asterisk is displayed in the Forced field for the working DS1 group under test.

15   Repeat steps 10 to 12 for the protection DS1/VT synchronous mapper.

—**continued**—

Procedure 7-3 (continued)
Verifying DS1 signal continuity

Step	Action
16	Release the forced switch on the DS1 mapper under test, by entering:
	forced re <circuit pack group> ↵
	where
	<circuit pack group> is the same as the last one tested
	You are prompted to confirm the command.
	y ↵
	Traffic switches to the working DS1/VT mapper. A dot (.) is displayed in the Forced field for the working circuit pack.
17	Maintain the DS1 daisy chain and the OC-3/OC-12 lockout for Procedure 6-5 on page 6-38.
18	Set up again the DS1 lockout (as described in step 7) for the circuit pack group that remains daisy-chained.
19	Remove the optical loopbacks.
20	Check off this procedure on the System Setup Checklist.

—end—

Procedure 7-4
Testing DS1 protection switching

Use this procedure to test protection switching of DS1 facilities on a circuit pack basis at one site. The test sequence verifies that you can:

- manually switch to the protection unit
- lock out a circuit pack and prevent it from switching to protection
- simulate an equipment failure and cause automatic switching to occur
- force a protection switch and override automatic switching

Also, high priority DS1s can override protection of low priority DS1s.

When you cause a protection switch to occur, a minor alarm is generated. You can review these alarms to verify the effectiveness of your actions.

During these tests, alarms are generated whenever a circuit pack is removed from its backplane connector. These alarms should automatically clear when the circuit pack is reengaged.

> *Note:* If this system is not equipped with DS1/VT synchronous mapper circuit packs, do not perform this procedure.

Requirements

The following requirements must be met before starting this procedure:

- To test manual switching, automatic switching, and lockout from switching, make sure you have one working and one protection DS1/VT synchronous mapper circuit pack.
- To test forced switching and priority override, make sure that you have two working and one protection DS1/VT synchronous mapper circuit packs.

The following equipment or material is required to perform this procedure:

- a DS1 transmission test set (Tau-Tron S5104 or equivalent)
- two (2) DS3 patch cords, P3Q3B
- a VT100-compatible terminal, connected to the NE LCAP

—continued—

Procedure 7-4 (continued)
Testing DS1 protection switching

To establish traffic continuity, an NEUI tool is used to set up simple STS-1 connections between the feeder (OC-3/OC-12) optical circuit packs and the DS1/DS3/OC-3 tributaries.

The optical loopback patch cords (NT7E47) remain connected from Procedure 6-6, "Testing optical protection switching" on page 6-48. If you need to make those connections, see steps 1 through 5 starting on page 6-49. The DS1 transmission test set remains connected at the DSX-1 cross-connect panel as described in Procedure 6-6.

> **CAUTION**
> **Risk of attenuator damage**
> If the attenuation does not change after one full turn of the adjustment screw, stop turning in that direction. Instead, turn the screw in the opposite direction to restore the unit to within the operating range.

Action

Step	Action
1	As shown in Figure 7-2 on page 7-25, connect the DS1 transmission test set output to both DS1/VT synchronous mappers at the cross-connect panel. Connect the input of the DS1 transmission test set to the out jack of the first working DS1/VT mapper. See Table 7-1 on page 7-3 and Table 7-2 on page 7-5 for the association between DS1 input/output cards and corresponding circuit pack groups.
2	Press the Start/Stop button twice to reset the error count to zero. *The DS1 receiver test set indicates "in process" and displays 0 bit error.*
3	To verify digital continuity, press the Single Bit Error Inject button three times. *The DS1 receiver test set indicates three bit errors received.*
4	Log in to the Network Element Status screen.

—continued—

Procedure 7-4 (continued)
Testing DS1 protection switching

Figure 7-2
Connecting the DS1 transmission test set to the DSX-1 cross-connect

FW-10557

DS1 transmission test set

Tx Out1   Tx Out2   Rx In

L
M
Out — To DS1 Out cards
In — To DS1 In cards

1   5   20   25

L
M
A   Out — To DS1 Out cards
In — To DS1 In cards

1   5   20   25

DSX-1 cross-connect panel

Legend: L   = LED
M   = Monitor jack
Out = Output jack
In   = Input jack

—continued—

Procedure 7-4 (continued)
Testing DS1 protection switching

Step	Action

5   Display the protection status of the DS1/VT mapper circuit packs by entering:

pr;dtlprot ds1 ↵

The DS1 Protection screen is displayed as shown below.

Note: The screen shows whether a group is locked out, forced to protection, or automatically or manually switched to protection.

- A dot (.) in any field indicates no activity.
- An asterisk (*) indicates that protection is active.
- A dash (-) indicates not applicable.

After causing a switch to protection, look at the display to verify that the switch occurred as expected.

6   Set up STS-1 connections and establish DS1 traffic by entering:

If STS connections	Then go to
are established	step 7
are not set up	step 6

csci
slat <p or **s>** ↵

   where

   <p> is used if primary optics are being tested

   <s> is used if secondary optics are being tested

Note: Use the query tributary (QTRIB) tool to ensure that the tributary being used for testing is connected to the optic under test.

QTRIB: The QTRIB tool lists all of the equipped tributary circuit packs on a NE. Part of the data is the STS-1 to which the tributary is connected. For any tributary it is possible to determine which optics a tributary has been connected with by the SLAT command. Output from QTRIB is in the format shown as follows.

PTID	SLOT	CARD	TRIB	PORT	FILL	STS	CPG	VT_STATES
7	11	DSI3	G1	1	all	1	G1	00000000
13	15	DSI1	G9	1	low	4	G1	00003FFF

—**continued**—

Procedure 7-4 (continued)
Testing DS1 protection switching

Step	Action

The PTID column is a composite number based on slot and port number. The CPG column lists the optic CPG to which the tributary is connected. The CPG column lists the optic CPG to which the tributary is connected. The VT_STATES column lists the internal VT state information and is only valid for VT managed tributaries.

Note: To maintain the STS-1 connections, you must remain in the same NEUI screen where you entered the CI commands. If you move from one screen to another, the connections are dropped. If you stay in the same screen, you can issue new commands without affecting traffic.

Testing manual switching

7   Manually switch the DS1s on the first working DS1/VT mapper to protection.

Note: For simplicity in this procedure, the first working mapper is assumed to be mapper G1 in slot 1. However, since the location and availability of working mappers in a common-equipment shelf depends on the configuration of your system, the NE you are testing may not have a working DS1/VT mapper in slot 1. Therefore, when entering commands, substitute G1 with the group number of the working DS1/VT mapper in your shelf. Table 7-1 on page 7-3 shows the DS1 group numbers and slot associations.

Enter:

manual op g1 ↵

You are prompted to confirm the command.

y ↵

The DS1 Protection screen displays an asterisk (*) in the Manual field for the circuit pack group G1.

8   Press the Start/Stop button twice to reset the error count to zero.

The DS1 receiver test set indicates "in process" and displays 0 bit error.

9   To verify that DS1 continuity is maintained, press the Single Bit Error Inject button three times.

The DS1 receiver test set indicates three bit errors received.

10   Release the manual switch on the first circuit pack by entering:

manual re g1 ↵

You are prompted to confirm the command.

y ↵

The screen displays a dot (.) in the Manual field for the G1 circuit pack group.

11   Press the Start/Stop button twice to reset the error count to zero.

The DS1 receiver test set indicates "in process" and displays 0 bit error.

<center>**—continued—**</center>

Procedure 7-4 (continued)
Testing DS1 protection switching

Step	Action
12	To verify that DS1 continuity is maintained, press the Single Bit Error Inject button three times.
	The DS1 receiver test set indicates three bit errors received.

Testing lockout from switching (and automatic switching override)

Step	Action
13	Operate a lockout on the first working DS1/VT mapper by entering:
	lockout op g1 ↵
	You are prompted to confirm the command.
	y ↵
	The DS1 Protection screen displays an asterisk (*) in the Lckt (lockout) field.
14	Remove the DS1/VT mapper from its backplane connector.
	Because you have locked out the first working mapper, the DS1s cannot be rerouted to the protection mapper. Alarms are generated.
15	To verify that the DS1s are lost, press the Start/Stop button twice on the DS1 receiver test set, to reset the error count.
	The DS1 receiver test set shows a high error count.
16	Release the lockout, allowing the automatic switch to protection by entering:
	lockout re g1 ↵
	y ↵
	When you release the lockout of the first working mapper, the DS1s normally handled by that mapper are rerouted to the protection mapper. The DS1 Protection screen displays an asterisk (*) in the Auto (automatic switch) field. Alarms clear.
17	Press the Start/Stop button twice to reset the error count to zero.
	The DS1 receiver test set indicates "in process" and displays 0 bit error.
18	To verify that DS1 continuity exists, and that the DS1s have been rerouted to the protection mapper, press the Single Bit Error Inject button three times.
	The DS1 receiver test set indicates three bit errors received.
19	Re-engage the first working DS1/VT synchronous mapper.
	After five minutes, the DS1s revert to the first working DS1/VT mapper, and the DS1 Protection screen displays a dot (.) in the Auto (automatic switch) field.
20	Press the Start/Stop button twice to reset the error count to zero.
	The DS1 receiver test set indicates "in process" and displays 0 bit error.

—continued—

Procedure 7-4 (continued)
Testing DS1 protection switching

Step	Action

Testing automatic switching due to loss of DS1 signal

21   To verify that DS1 continuity exists and that the DS1s have reverted to the first working mapper, press the Single Bit Error Inject button three times.

The DS1 receiver test set indicates "in process" and indicates three bit errors received.

22   To simulate circuit pack failure, remove the first working DS1/VT synchronous mapper circuit pack from its backplane connector.

The DS1 Protection screen displays an asterisk (*) in the Auto (automatic switch) field of the G1 circuit pack group. This indicates that the protection mapper has taken over for the disconnected unit.

Note: The DS1s that are normally handled by the failed mapper (that is, the disconnected mapper) continue to enter and exit the common-equipment shelf by way of DS1 input circuit pack and DS1 output circuit pack associated with that mapper. The traffic is rerouted to the protection mapper by way of the DS1 protection bus, which is in the backplane of the shelf.

23   Press the Start/Stop button twice to reset the error count to zero.

The DS1 receiver test set indicates "in process" and displays 0 bit error.

24   To verify that DS1 continuity is maintained, press the Single Bit Error Inject button three times.

The DS1 receiver test set indicates three bit errors received.

25   The next activity depends on the number of working DS1/VT mappers that are installed.

If you have	Then go to
one working DS1/VT mapper	step 62
two or more working DS1/VT mappers	step 26

Testing forced switching (two or more working DS1/VT mappers)

Note: Two working DS1/VT mappers are required to test forced switching as described below. For simplicity, the second working mapper is assumed to be G2 in slot 2 of an ABM shelf. When entering commands, enter the group number of a second working DS1/VT mapper in the shelf. For the group numbers associated with DS1/VT mappers, see Table 7-1 on page 7-3.

—**continued**—

Procedure 7-4 (continued)
Testing DS1 protection switching

Step	Action
26	Override the automatic switch by forcing the DS1s on the second working circuit pack to protection by entering: **forced op g2** ↵ *You are prompted to confirm the command.* **y** ↵ *The DS1 Protection screen displays an asterisk (*) in the Forced field for the G2 circuit pack group. Traffic from the G2 mapper switches to the protection mapper. This displaces the traffic from the G1 mapper. Alarms are generated.*
27	To verify that DS1 traffic from the G1 mapper is lost, press the Start/Stop button twice to reset the error count. *The DS1 receiver test set indicates "in process" and shows a high error count.*
28	At the cross-connect panel, connect the input of the DS1 transmission test set to the output of the G2 mapper.
29	Press the Start/Stop button twice to reset the error count to zero. *The DS1 receiver test set indicates "in process" and displays 0 bit error.*
30	To verify that DS1 continuity for DS1s on the G2 mapper is maintained, press the Single Bit Error Inject button three times. *The DS1 receiver test set indicates three bit errors received.* ***Note:*** The DS1s that are normally handled by the G2 mapper are forced to the protection mapper. The DS1s continue to enter and exit the common-equipment shelf using the DS1 input circuit pack and DS1 output circuit pack associated with that mapper. The traffic is rerouted to the protection mapper using the DS1 protection bus located in the backplane of the shelf.
31	Release the forced switch on the second circuit pack by entering: **forced re g2** ↵ *You are prompted to confirm the command.* **y** ↵ *The screen displays a dot (.) in the Forced field. Alarms clear. The DS1s forced to the protection mapper revert to the G2 mapper. The protection mapper automatically resumes handling the DS1s from the G1 that is still disconnected.*
32	Press the Start/Stop button twice to reset the error count to zero. *The DS1 receiver test set indicates "in process" and displays 0 bit error.*
33	To verify that the DS1s that were forced onto the protection mapper have reverted to the G2 circuit pack, press the Single Bit Error Inject button three times. *The DS1 receiver test set indicates three bit errors received.*

—continued—

Procedure 7-4 (continued)
Testing DS1 protection switching

Step	Action
34	At the cross-connect panel, connect the input of the DS1 transmission test set to the output of the first working mapper.
35	Press the Start/Stop button twice to reset the error count to zero.
	The DS1 receiver test set indicates "in process" and displays 0 bit error.
36	To verify that the protection mapper is again handling the DS1s from the G1 mapper, press the Single Bit Error Inject button three times.
	The DS1 receiver test set indicates three bit errors received.
37	Reinsert the first working DS1/VT mapper.
	The DS1 Protection screen displays a WTR (wait-to-restore) in the Auto (automatic switch) field. After five minutes, the DS1s revert to the G1 working DS1/VT mapper, and the DS1 Protection screen displays a dot (.) in the Auto (automatic switch) field.
38	Press the Start/Stop button twice to reset the error count to zero.
	The DS1 receiver test set indicates "in process" and displays 0 bit error.
39	To verify that DS1 continuity exists and that the DS1s have reverted to the G1 mapper from the protection mapper, press the Single Bit Error Inject button three times.
	The DS1 receiver test set indicates three bit errors received.

Testing priority DS1 switching

Step	Action
40	Review the priorities assigned to the DS1 groups, on the DS1 Protection screen.
41	Display the DS1 Protection Provisioning screen, by entering:
	protprov ↵
	The DS1 Protection Provisioning screen is displayed.
42	Assign a high priority to the first circuit pack group by entering:
	priority g1 high ↵
43	Assign a low priority to the second circuit pack group by entering:
	priority g2 low ↵
44	Return to the DS1 Protection screen and review the priorities assigned to the DS1 groups by entering:
	quit ↵
	The G1 mapper has high priority and the G2 mapper has low priority.
45	Wearing antistatic protection, pull the G2 (low-priority) DS1/VT synchronous mapper out of its backplane connector.
	The DS1s normally handled by the low-priority mapper are rerouted to the protection mapper.

—**continued**—

Procedure 7-4 (continued)
Testing DS1 protection switching

Step	Action
46	At the cross-connect panel, connect the input of the DS1 transmission test set to the low-priority G2 mapper.
47	Press the Start/Stop button twice to reset the error count to zero.
	The DS1 receiver test set indicates "in process" and displays 0 bit error.
48	To verify that DS1 continuity exists and that the DS1s are rerouted from the G2 mapper to the protection mapper, press the Single Bit Error Inject button three times.
	The DS1 receiver test set indicates "in process" and indicates three bit errors received.
49	Now leave the G2 mapper pulled out and pull the G1 (high-priority) mapper out of its backplane connector.
	The DS1s normally handled by the high-priority mapper are rerouted to the protection mapper. The protection mapper cannot continue to handle the DS1s from the low-priority mapper. Consequently, those DS1s are lost.
50	To verify that the DS1s from the G2 mapper are lost, press the Start/Stop button on the DS1 transmission test set twice, to reset the error count.
	The DS1 receiver test set indicates "in process" and indicates a high error count. Alarms are generated. The screen displays an asterisk (*) in the Auto field of the high-priority unit.
51	At the cross-connect panel, disconnect the patch cord from the input of the G2 (low-priority) DS1/VT synchronous mapper and connect it to the input of the G1 (high-priority) DS1/VT synchronous mapper.
52	Press the Start/Stop button twice to reset the error count to zero.
	The DS1 receiver test set indicates "in process" and displays 0 bit error.
53	To verify that DS1 continuity exists and that the DS1s normally handled by the G1 (high-priority) mapper are rerouted to the protection mapper, press the Single Bit Error Inject button three times.
	The DS1 receiver test set indicates "in process" and indicates three bit errors received.
54	Reinsert the G1 (high-priority) DS1/VT synchronous mapper into its backplane connector.
	DS1 traffic is restored to the high-priority mapper. The protection mapper resumes handling the low-priority DS1s from mapper G2. Alarms clear.
55	Press the Start/Stop button twice to reset the error count to zero.
	The DS1 receiver test set indicates "in process" and displays 0 bit error.

—**continued**—

Procedure 7-4 (continued)
Testing DS1 protection switching

Step	Action
56	To verify that DS1 continuity exists and that the protection mapper has resumed handling the DS1s from the G2 (low-priority) mapper, press the Single Bit Error Inject button three times.
	The DS1 receiver test set indicates "in process" and indicates three bit errors received.
57	Reinsert the G2 (low-priority) mapper into its backplane connector.
	The screen displays WTR (wait to restore) for five minutes, and then a dot (.), in the Auto (automatic switch) field. When the G2 mapper goes back into service after the wait-to-restore period, it resumes handling the low-priority DS1s. Alarms clear.
58	At the cross-connect panel, disconnect the patch cord from the input of the G1 mapper and connect it to the input of the G2 mapper.
59	Press the Start/Stop button twice to reset the error count to zero.
	The DS1 receiver test set indicates "in process" and displays 0 bit error.
60	To verify that DS1 continuity exists and that the G2 (low-priority) mapper has resumed handling the low-priority DS1s, press the Single Bit Error Inject button three times.
	The DS1 receiver test set indicates "in process" and indicates three bit errors received.
61	Reassign the original setting priority to the first circuit pack by entering:
	protprov ↵
	The DS1 Protection Provisioning screen is displayed.
	priority g1 ↵
	Reset the G1 mapper priority to its original setting for the group.
62	Record the results of this procedure on the Site Test Results Form.
63	If protection switching did not function as expected, refer to *Alarm and Trouble Clearing Procedures*, 323-3001-543, in *Maintenance*, Volume 5A.
64	Return to the Network Element Status screen by entering:
	fwp ↵
65	Remove all test equipment and patch cords.
66	Check off this procedure on the System Setup Checklist.

—**end**—

Testing DS3, STS-1, and optical in-bay equipment

This chapter describes how to test DS3 or STS-1 and optical equipment at a system network element (NE) supporting DS3 or STS-1 interfaces or a mix of DS1, DS3, and STS-1 interfaces in a point-to-point or ring configuration.

You can test NEs that are not equipped with any DS1/VT or DS3 mappers or STS-1 interface cards by installing temporary DS1, DS3, STS-1 equipment and using the appropriate procedures. However, it is recommended that you use DS3 or STS-1 test procedures since they can be performed in a shorter period of time than the DS1 tests. Because there are no connections to a DSX-3/STS-1 cross-connect panel, digital signal continuity tests are not required. Because there is no protection mapper present, digital protection switching is not required. As a result, only optical receiver sensitivity and optical protection switching tests must be performed on systems not normally equipped with DS1s, DS3s, or STS-1s.

These procedures cover local in-bay tests on equipment located at a single NE and can form the basis for customer acceptance tests. Unless otherwise noted, one technician can perform these tests. End-to-end testing (between two NEs) of optical and digital equipment in a universal configuration is described in *Commissioning and Testing*, Volume 3.

> *Note:* STS-1 tributaries are supported only on a TN_BLSR shelf.

Procedures in testing DS3 or STS-1 and optical equipment

To test DS3 or STS-1 and optical equipment, do the following procedures in this order:

Procedure	Page
8-1 Verifying DS3 transmission test set performance	8-6
8-2 Performing initial DS3 or STS-1 provisioning	8-8
8-3 Verifying DS3 or STS-1 signal continuity	8-12

DS3/STS-1 group and slot associations

DS3 or STS-1 circuit packs are in the lower level of the common equipment shelf. BNC input and output (I/O) cards are in the upper level. With DS3 mappers or STS-1 interface cards, "g1" refers to a group of modules including a working circuit pack and its corresponding three BNC I/O cards. Similarly, "p" refers to the group of modules including the protection circuit pack and the protection switcher cards.

The DS3 or STS-1 capacity of the system is dependent on the shelf type and the DS1, DS3, or STS-1 mix as well as the traffic that your system is carrying. For details about determining the capacity of your configuration, see *Commissioning and Testing*, Volume 3.

Group and slot association matrix

The group number you enter in a command string depends on the shelf type and function, the mapper type, and its slot location. Table 8-1 summarizes the group and slot associations for the different mappers and shelves.

Table 8-1
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
DS1	DS1-fed ABM	G1	G2	P	G4					■	■									■
	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
DS3	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		■
STS-1	TN_BLSR		S	P						■	■	G1		G2		G3		G4		■
OC-3	ABM tributary	G3		G4		G1S		G2S		■	■									■
	TBM tributary	G3		G4		G1S		G2S		■	■	G5		G6		G7		G8		■
	Feeder	■	■	■	■	■	■	■	■	G1	G2	■	■	■	■	■	■	■	■	■
OC-12	Feeder	■	■	■	■	■	■	■	■	G1	G2	■	■	■	■	■	■	■	■	■
OC-12 VTBM	Feeder	■	■	■	■	■	■	■	■	G1	G2	■	■	■	■	■	■	■	■	■
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19

Note: * For DS3 TBM FCOT_BLSR fiber-fed shelves, this group is available only if no DS1s are provisioned for that shelf.

Group and slot associations for DS3 or STS-1 cards

DS3 or STS-1 circuit packs are in the lower level of the common equipment shelf. DS3 or STS-1 input and output cards are in the upper level.

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

For some tasks, you must also know the slot numbers of the input and output cards. Refer to the following tables to determine which I/O slots you need.

If you are provisioning this equipment	For this shelf type	Then refer to
DS3 equipment	ABM	Table 8-2
	TBM	Table 8-3
STS-1 equipment	TBM	Table 8-4

For DS3 or STS-1 circuit packs, Tables 8-2, 8-3, and 8-4 show the association between mappers in the lower level of the common equipment shelf and input/output cards in the upper level.

DS3 I/O numbers

Table 8-2 lists the DS3 circuit pack groups for the access bandwidth manager (ABM) 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 8-2
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		███	███									

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 1 denotes a protection mapper; the symbol "S" in slot 2 denotes a protection switch card.

Note 3: The symbol "g1" is a group of modules that include a working DS3 mapper circuit pack and its corresponding DS3 input circuit pack and DS3 output circuit pack.

Table 8-3 lists the DS3 circuit pack groups for the transport bandwidth manager (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 8-3
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		
		—	—									39		43*		47		51		
TN_BLSR		—	—									40		44*		48		52		

Note 1: * This group is available for FCOT_BLSR shelves that have no DS1s provisioned.

Note 2: The feeder occupies slots 9 and 10. If an OPC is installed, it occupies slots 5 through 8.

Note 3: The symbol "P" in slot 1 denotes a protection mapper; the symbol "S" in slot 2 denotes a protection switch card.

Note 4: The symbol "g1" is a group of modules that include a working DS3 mapper circuit pack and its corresponding DS3 input circuit pack and DS3 output circuit pack.

STS-1 I/O numbers

Table 8-4 lists the STS-1 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 8-4
TBM STS-1 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
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.

Procedure 8-1
Verifying DS3 transmission test set performance

Use this procedure to verify the performance of the DS3 digital transmission test set. This is necessary so that reliable results are obtained when testing.

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

Requirements

The following materials are required:

• a DS3 transmission test set (Tau-Tron S5200 or equivalent)

• two coaxial cable test cords with WECO NE-358 connectors

• a copy of the Site Test Results Form, located in "Appendix E: Site test results form" on page 14-1

Action

Step	Action

DS3 transmission settings

1   Set the Power switch to on.

2   Press and hold the Reset button. Verify that all lamps on the test set are lit.

3   Release the Reset button. Verify that the Remote and Power OFF lamps are not lit.

4   Set the Error Mode controls, as follows:

        Mode Select: Error free

5   Set the DS3 Output controls, as follows:

        Frame: Framed

        Pattern: PRBS

        Level: DSX

—continued—

Procedure 8-1 (continued)
Verifying DS3 transmission test set performance

Step	Action

DS3 reception settings

6   Set the Volume control to the proper level.

7   Set the DS3 Input controls, as follows:

   Frame: Frame

   Pattern: PRBS

   Level: DSX-3

8   Set the Measurements controls, as follows:

   Category: Bit-error measurements

   Function: Bit-error rate, total bit errors

   Time: Untimed

Verify test set performance

9   Connect the test cord between the output and input of the DS3 transmission test set.

10   On the DS3 transmission test set, press the Reset button.

   The DS3 transmission test set displays 0 bit error and 0 bit error rate.

11   On the DS3 transmission test set, press the Single Bit Error Inject button three times.

   The DS3 transmission test set displays 3 bit errors.

12   If you do not obtain the above results, check the settings and the test cord, then repeat the test. If necessary, replace the test set or the test cord.

13   Disconnect the test cord.

14   Connect the output of the DS3 transmission test set to a free DS3 input port at the OC-3/OC-12 shelf (or at the DSX-3 cross-connect panel) and the input of the test set to the corresponding DS3 output port.

15   Note the completion of this procedure on the Site Test Results Form.

16   Check off this procedure on the System Setup Checklist.

—**end**—

Procedure 8-2
Performing initial DS3 or STS-1 provisioning

Use this procedure for initial provisioning of DS3 or STS-1 facilities (also called ports) to test system functionality. In initial (bulk) provisioning, each parameter is set to the same value for all facilities on all DS3 or STS-1 circuit pack groups. The actual values required for correct operation at each facility should be provisioned after testing is complete so that the system is ready for service.

Auto-provisioning defaults to ON. This means that all circuit pack groups and their facilities were provisioned automatically when you installed the circuit packs.

Note: If the NE under test is not equipped with DS3/STS mappers or STS-1 interface cards, there are no connections to a DSX-3/STS-1 cross-connect panel. Therefore, omit this procedure and continue with Procedure 8-3 on page 8-12.

Requirements

The following requirements must be met before starting this procedure:

- Connect a VT100 user terminal to the NE at the local craft access panel (LCAP).

    — If required, refer to *Network Element User Interface Description*, 323-3001-300, in *Operations, Administration, and Provisioning*, Volume 4A.

- Obtain the facility record or equivalent document that shows the distance between your system bay and the DS3 or STS-1 cross-connect panel.

    — To obtain better test results, provision the DS3 or STS-1 ports with the value shown on your facility record.

- Make sure the system is not in service.

If this NE requires temporary DS3 or STS-1 equipment, the following items are needed:

- one DS3/STS mapper circuit pack, NT7E08
- one STS-1 interface card, NT7E09
- one BNC I/O card, NT4K30

<p align="center">—continued—</p>

Procedure 8-2 (continued)
Performing initial DS3 or STS-1 provisioning

Action

Step	Action

If this network element is	Then go to
equipped with a working DS3/STS mapper or STS-1 interface card	step 3
not equipped with a working DS3/STS mapper or STS-1 interface card and you are performing site tests with DS3s/STS-1s	step 1

1 Insert a temporary DS3/STS mapper or STS-1 interface card in an available DS3/STS mapper or STS-1 slot and fully engage the card.

The mapper initializes and performs self-tests.

2 Insert the temporary BNC I/O card into the first corresponding I/O slot in the upper section of the common-equipment (CE) shelf. Lock it in place with a small flat-head (slotted) screwdriver by turning the locking screw to the right.

3 Log in to the Network Element Status screen and verify that the system recognizes the mapper circuit pack(s) by entering at the user interface:

eq <type> <circuit pack group>↵

where

<type>   **ds3** or **sts1**

<circuit pack group>   refer to Table 8-2 on page 8-4 for an ABM shelf

                           refer to Table 8-3 on page 8-5 and Table 8-4 on page 8-5 for a TBM shelf

The equipment screen for the specified circuit pack group is displayed.

4 If the circuit pack group equipment is not provisioned, add it as follows:

add ↵

The circuit pack group is now provisioned.

5 Repeat steps 3 and 4 for each DS3/STS mapper or STS-1 interface card installed.

Procedure 8-2 (continued)
Performing initial DS3 or STS-1 provisioning

Step	Action
6	Display the facility screen for all DS3 or STS-1 facilities by entering: **facility <type> all** ↵ where <type>　　　　　　　**ds3** or **sts1** *The appropriate facility screen is displayed, with all existing DS3 or STS-1 facilities in context.*
7	Take the facilities out of service by entering: **chgstate oos** ↵ *You are prompted to confirm the command.* **y** ↵ *The facilities are placed out of service.*
8	Display the DS3 or STS-1 edit menu by entering: **edit** ↵ *The appropriate edit facility screen for all DS3 or STS-1 facilities appears.*
9	Set the line build-out parameter for testing purposes by entering: **lbo <build-out>**↵ where <build-out>　　is **short** or **long**. The correct value is determined by the cable length, as shown in the following table:

Table 8-5
Line build-out selections

Build-out	Cable RG59B/U	Cables 734 or 728A
Short	0 to 50 m (0 to 164 ft)	0 to 68 m (0 to 225 ft)
Long	50 to 76 m(164 to 250 ft)	68 to 137 m (225 to 450 ft)

Note: If you are using a temporary DS3/STS mapper or STS-1 interface card, set line build-out to short.

The provisioned value is displayed in reverse video.

The default values for the Line Coding, Tx and Rx Parity Correction, and Framing parameters are acceptable for testing purposes.

—**continued**—

Procedure 8-2 (continued)
Performing initial DS3 or STS-1 provisioning

Step	Action
10	Quit out of the DS3 or STS-1 facility edit screen by entering: **quit** ↵
11	Put the facilities back into service by entering: **chgstate is** ↵ *The facilities go into service.*
12	To verify the settings, display the DS3 or STS-1 facility screen by entering: **query all** ↵ *The appropriate facility screen is displayed, showing the facility summary in the conversation area.*
13	Quit to the Network Element Status screen by entering: **quit** ↵
14	Note the completion of this procedure on the Site Test Results Form.
15	Check off this procedure on the System Setup Checklist.

—**end**—

Procedure 8-3
Verifying DS3 or STS-1 signal continuity

Use this procedure to check the continuity of each DS3 or STS-1 circuit terminated at the DSX-3/STS-1 cross-connect panel. All the DS3s/STS-1s of a DS3/STS mapper or STS-1 interface card are daisy-chained, so the DS3s/STS-1s can be tested in one operation.

Do this test when the system is not in service, because an optical loopback is used to provide a continuous optical path.

If this NE is equipped with a temporary DS3/STS mapper or STS-1 interface card for testing only, you do not need to set up a daisy chain. Test by connecting the DS3 or STS-1 test set directly to the temporary DS3 or STS-1 BNC (I/O) card.

The signal path is tested as follows:

- from the input of the first DS3 or STS-1 at the DSX-3/STS-1 cross-connect panel, through the office cabling and the input of the DS3 or STS-1 BNC card

- through the DS3/STS mapper or STS-1 interface card and OC-3/OC-12 interface circuit pack (transmit side)

- through the optical patch cords and miniature variable optical attenuator (mVOA)

- through the OC-3/OC-12 interface (receiver side) circuit pack

- through the output of the BNC I/O card and office cabling to the output side of the first DS3 or STS-1 at the DSX-3/STS-1 cross-connect panel

- through a DS3 or STS-1 test cord to the input of the next DS3 or STS-1, and repeat this list.

—continued—

Procedure 8-3 (continued)
Verifying DS3 or STS-1 signal continuity

Requirements

The following requirements must be met before starting this procedure.

- Make sure that the system is not in service.

    Note 1: To establish traffic continuity, a network element user interface (NEUI) tool is used to set up simple synchronous transport signal (STS)-1 connections between the feeder (OC-3/OC-12) optical circuit packs and the DS1, DS3, STS-1, or OC-3 tributaries.

    Note 2: STS-1 tributaries are supported only on a TN_BLSR shelf.

- Connect a VT100 user terminal to the NE at the LCAP.

    — If required, see "Connecting a local terminal to the network element LCAP" in *Network Element User Interface Description*, 323-3001-300, in *Operations, Administration, and Provisioning*, Volume 4A.

The following equipment is required to perform this procedure:

- a DS3 or STS-1 transmission test set (HP 156 MTS (Cerjac) or equivalent)
- two coaxial cables with proper connectors (BNC-to-BNC)
- up to eight coaxial cables (BNC, 5 m used as DSX-3/STS-1 jumpers, if this network element has working DS3/STS mappers or STS-1 interface cards

    Note: The coaxial cable links the BNC I/O cards in the access or transport bandwidth manager shelf to a digital cross-connect (such as a DSX-3/STS-1) or a DS3 or STS-1 decoupling panel.

- an optical power meter, 1310/1550 nm with a range of −50 to +5 dB
- up to eight optical patch cords with an miniature variable optical attenuator (mVOA), NT7E47AA/BA/CA/FA, 5 m (16 ft) long

—continued—

Procedure 8-3 (continued)
Verifying DS3 or STS-1 signal continuity

Action

Step	Action

Setting up the OC-3/OC-12 lockout and loopbacks

1   To prevent the OC-3/OC-12 facility from switching to the standby circuit pack while you are manipulating the optical patch cords, log into the NE and lockout the optical circuit packs. Use the substep applicable to your installed circuit packs.

a. Lock out the NT7E01/NT7E02 OC-3/OC-12 interface circuit packs by entering:

pr;dtlprot <oc-n>↵

where

<oc-n>   is the type of optical carrier: **oc3** or **oc12**

The OC-3/OC-12 Protection screen is displayed as shown below.

lockout op ↵

The screen displays a message that the command will force all traffic to the OC-3/OC-12 G1 circuit pack and can affect service. Confirmation of the command is requested.

y ↵

An asterisk is displayed in the Lockout field for the G1 circuit pack.

b. Lock out the NT7E05 OC-12 virtual tributary bandwidth manager (VTBM) circuit packs to prevent optical protection switching during testing, by entering:

pr;dtlprot oc12 g1 ↵

The OC-12 Protection screen appears.

lockout op w g1 ↵
y ↵
lockout op w g2 ↵
y ↵

Asterisks are displayed in the LcktW column for circuit packs G1 and G2.

2   Connect one end of an optical patch cord with mVOA to the optical power meter.

—continued—

Procedure 8-3 (continued)
Verifying DS3 or STS-1 signal continuity

Step	Action
3	Connect the other end of the attenuated optical patch cord to the transmit (Out) connector of the G1 OC-3/OC-12 interface circuit pack.

> **CAUTION**
> **Risk of attenuator damage**
> If the attenuation does not change after one full turn of the adjustment screw, stop turning in that direction. Instead, turn the screw in the opposite direction to restore the circuit pack to within the operating range.

4 Adjust the mVOA to insert about 15 dB loss.

> **CAUTION**
> **Risk of receiver damage**
> Received optical power must not exceed −9.0 dBm and −6.0 dBm for the long-reach (LR) OC-3 and OC-12 optical interface circuit packs. Received optical power must not exceed −6.0 dBm and −2.0 dBm for the intermediate-reach (IR) OC-3 and OC-12 optical interface circuit packs.
>
> Refer to *Site Installation Planning and Engineering*, 323-3001-200, in the *Engineering, Configuration, and Ordering Guide*, Volume 1. If the optical loop is short, insert attenuation between the OC-3/OC-12 transmitter and receiver, to limit the received optical power to a safe level (for example, −15 dBm). There are no damage levels for NT7E01 IR and LR, NT7E02 IR and NT7E05 IR, and LR optical interfaces.

> **CAUTION**
> **Risk of damage to the optical receiver**
> For the NT7E02 OC-12 long-reach (LR) interface circuit pack, received optical power must not exceed the following safe level: − **6.0 dBm**. Refer to *Site Installation Planning and Engineering*, 323-3001-200, in the *Engineering, Configuration, and Ordering Guide*, Volume 1. There are no damage levels for NT7E01 IR and LR, NT7E02 IR, and NT7E05 IR and LR optical interfaces.

—continued—

Procedure 8-3 (continued)
Verifying DS3 or STS-1 signal continuity

Step	Action

> **CAUTION**
> **Risk of increased optical errors**
> Received optical power should not exceed the overload levels for optical interfaces meeting Nortel Networks-to-Nortel Networks proprietary links:
>
> | | |
> | --- | --- |
> | NT7E01 OC-3 LR: | −**10.0 dBm** |
> | NT7E01 OC-3 IR: | −**8.0 dBm** |
> | NT7E02 OC-12 LR: | −**7.0 dBm** |
> | NT7E02 OC-12 IR: | −**4.0 dBm** |
> | NT7E05 OC-12 VTBM LR: | **0.0 dBm** |
> | NT7E05 OC-12 VTBM IR: | **0.0 dBm** |
>
> The above overload levels also apply to optical interfaces in a Bellcore TR-NWT-000253 Midspan-meet specification, with the following exceptions:
>
> | | |
> | --- | --- |
> | NT7E05 OC-12 VTBM LR: | −**8.0 dBm** |
> | NT7E05 OC-12 VTBM IR: | −**8.0 dBm** |

5 Disconnect the patch cord from the optical power meter and loop the patch cord back to the receive (In) connector of the G1 OC-3/OC-12 interface circuit pack, as shown below.

PC-10549
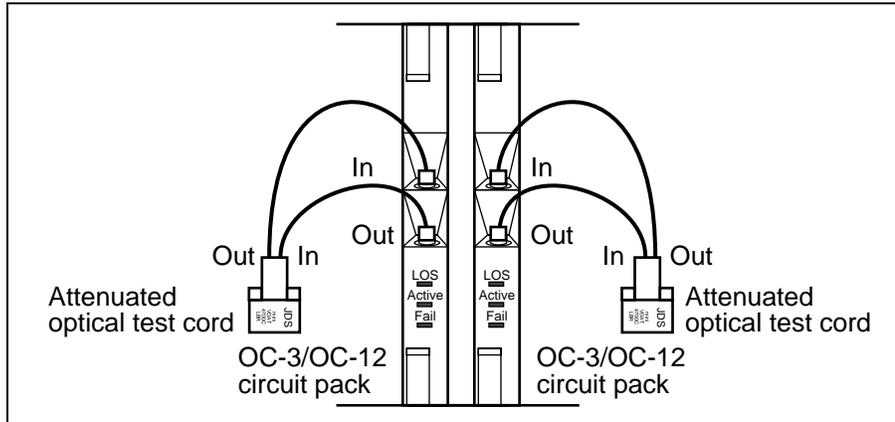
—**continued**—

Procedure 8-3 (continued)
Verifying DS3 or STS-1 signal continuity

Step	Action

6   Using a second attenuated optical patch cord, repeat steps 2 through 5 for the G2 OC-3/OC-12 interface circuit pack.

If STS connections	Then go to
are established	step 8
are not set up yet	step 7

7   Set up STS-1 connections and establish DS3 or STS-1 traffic by entering:

csci
slat <p or **s>** ↵

where

<p> is used if primary optics are being tested

<s> is used if secondary optics are being tested

Note 1: Use the query tributary (QTRIB) tool to make sure the tributary being used for testing is connected to the optic under test.

Note 2: To maintain the STS-1 connections, you must remain in the same NEUI screen where you entered the above CI commands. If you move from one screen to another, the connections are dropped. If you stay in the same screen you can issue new commands without affecting traffic.

—**continued**—

Procedure 8-3 (continued)
Verifying DS3 or STS-1 signal continuity

Step	Action

Verifying the first working DS3/STS mapper or STS-1 interface card

8   To prevent unintended protection switching, lock out the DS3/STS mapper or STS-1 interface card under test, by entering:

dtlprot <type> ↵

    where

    <type>   **ds3** or **sts1**

The appropriate protection screen is displayed as shown below.

lockout op <circuit pack group>↵

    where

    <circuit pack group> refer to Table 8-2 on page 8-4 for an ABM shelf
                                      refer to Table 8-3 or Table 8-4 on page 8-5 for a TBM shelf

y ↵

An asterisk is displayed in the Lockout field for the DS3 or STS-1 group under test.

Note: The slots that can accept DS3/STS mappers or STS-1 interface cards are shown in Table 8-1 on page 8-3, along with their corresponding circuit pack groups.

9   Daisy-chain all DS3 or STS-1 circuits of the DS3/STS mapper or STS-1 interface card under test, as follows:

- At the DSX-3/STS-1 cross-connect panel, use a test cord to loop the output of the first DS3 or STS-1 to the input of the next DS3 or STS-1 (as shown in Figure 8-1 on page 8-19).

- Daisy-chain in this manner until all 3 DS3s/STS-1s for the circuit pack are included.

- Connect the transmit side of the DS3 or STS-1 transmission test set to the input of the first DS3 or STS-1. Connect the receive side of the test set to the output of the last DS3 or STS-1.

—**continued**—

Procedure 8-3 (continued)
Verifying DS3 or STS-1 signal continuity

Step	Action

Figure 8-1
Daisy-chaining DS3 or STS-1 circuits

PC-16203
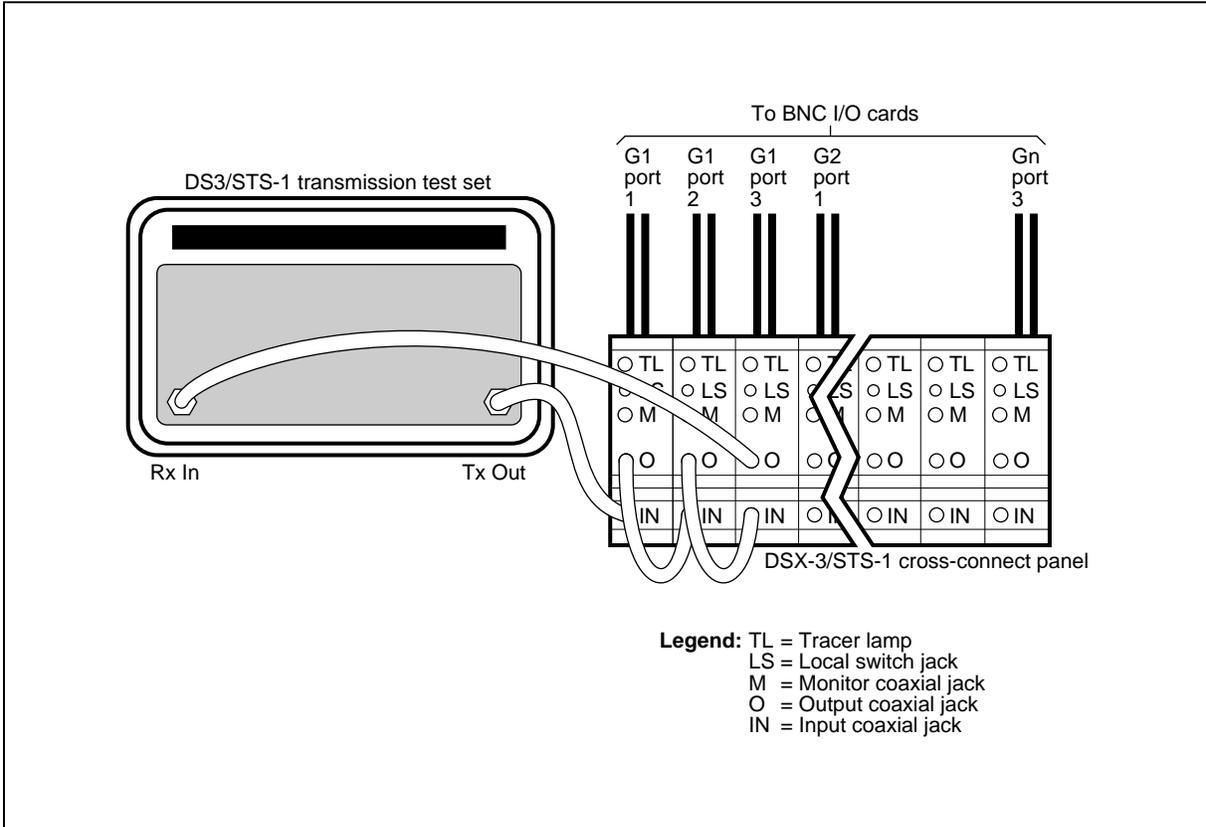
10 On the DS3/STS-1 transmission test set, press the **Start/Stop** button twice (or press stop, then start) to reset the error count to zero.

The DS3/STS-1 test set indicates in process and displays 0 bit error.

—continued—

Procedure 8-3 (continued)
Verifying DS3 or STS-1 signal continuity

Step	Action
11	Press the Single Bit Error Inject button three times on the DS3/STS-1 test set.

The DS3/STS-1 transmission test set displays 3 bit errors received.

If the errors are not detected, you can isolate the fault (patch cord, cable, or BNC1 I/O card) as follows:

- Break the daisy chain in half.
- Connect the DS3/STS-1 test set to the first short chain and repeat steps 10 and 11.
- Connect the DS3/STS-1 test set to the second short chain and repeat steps 10 and 11.
- Continue in this manner until you have located all faults. Fix the faults.
- Rebuild the daisy chain and repeat this step.

12   Record the results of this procedure on the Site Test Results Form.

Verifying additional working DS3/STS mappers or STS-1 interface cards

13   Repeat steps 8 through 12 for each additional DS3/STS mapper or STS-1 interface card.

Verifying the protection DS3/STS mapper or STS-1 interface card

14   To connect the protection DS3/STS mapper or STS-1 interface card for testing, remove the DS3 or STS-1 lockout and force a protection switch from the DS3/STS mapper or STS-1 interface card currently connected to the test setup. Enter:

lockout re <circuit pack group>↵

> where

> <circuit pack group> is the same as the last one tested

y ↵

forced op <circuit pack group>↵

> where

> <circuit pack group> is the same as the last one tested

y ↵

Traffic switches to the protection mapper. A dot is displayed in the Lockout field and an asterisk is displayed in the Forced field for the working DS3 or STS-1 group under test.

—**continued**—

Procedure 8-3 (continued)
Verifying DS3 or STS-1 signal continuity

Step	Action

15 Repeat steps 10 through 12 for the protection DS3/STS mapper or STS-1 interface card.

16 Release the forced switch on the DS3/STS mapper or STS-1 interface card under test by entering:

forced re <circuit pack group>↵

　　where

　　<circuit pack group> is the same as the last one tested

You are prompted to confirm the command.

y ↵

Traffic switches to the working DS3/STS mapper or STS-1 interface card. A dot (.) is displayed in the Forced field for the working circuit pack.

Measuring optical receiver performance

17 Maintain the DS3 or STS-1 daisy chain and the OC-3/OC-12 lockout for the next procedure.

18 Reset the DS3 or STS-1 lockout (as described in step 8) for the circuit pack group that remains daisy-chained.

19 Remove the optical loopbacks.

20 Check off this procedure on the System Setup Checklist.

—**end**—

Testing telemetry and alarms

This chapter shows you how to verify telemetry and alarms at a network element (NE).

Procedures in verifying telemetry and alarms

To verify system telemetry and alarms, do the following procedures in any order:

Procedure	Page
9-1 Verifying the serial telemetry interface	9-3
9-2 Verifying the parallel telemetry input port (ABM shelf)	9-16
9-3 Verifying the parallel telemetry output port (ABM shelf)	9-20
9-4 Testing MBP/MPP power and environmental alarms	9-27
9-5 Testing alarms on the Series 800A outside plant cabinet	9-36
9-6 Testing office alarms (ABM shelf)	9-45
9-7 Verifying the parallel telemetry input port (TBM shelf)	9-50
9-8 Verifying the parallel telemetry output port (TBM shelf)	9-53
9-9 Testing office alarms (TBM shelf)	9-55
9-10 Testing the breaker interface panel modem (TBM shelf)	9-62

Electrical characteristics of parallel telemetry ports

The electrical characteristics of parallel telemetry input and output ports are required for connecting parallel telemetry ports to external equipment. These electrical characteristics are listed in the following table.

Electrical characteristics of input ports	Acceptable conditions
Source input isolation	isolated contacts with no connections to other voltages or grounds
Source input noise or voltage offset	less than 1 V
Total current for 18 outputs	1.8 A maximum
Individual output current	0.1 A maximum (common isolated return connection for 18 outputs)
Voltage polarity of load	negative only
Load voltage	−58 V dc maximum, relative to the return lead

Procedure 9-1
Verifying the serial telemetry interface

Use this procedure to verify the operation of the provisionable serial telemetry TBOS ports (ports 3 and 4). TBOS is a byte-oriented serial telemetry protocol.

Requirements

The following requirements must be met before starting this procedure:

- Make sure that no active alarm is displayed on the breaker interface panel (BIP).

- Make a copy of the Site Test Results Form, located in "Appendix E: Site test results form" on page 14-1.

- Access a VT100-compatible terminal connected to the NE.

- Obtain a TBOS test set, model Tempo KS 22828, list 1; or a laptop computer (Toshiba or equivalent) with:

  — TBOS emulation program

  — an RS422-to-RS232 converter box

  — a Y-shaped split cable with a common serial port connector at one end, and breakout of ports 1 and 2 in two separate connectors at the other end

- Obtain an NT4K86CA serial telemetry cable, 30m (100 ft.), with a 25-pin D-subminiature connector with the pinout given in Table 9-1 on page 9-4.

—continued—

Procedure 9-1 (continued)
Verifying the serial telemetry interface

Table 9-1
Pinout details of the serial telemetry connector and cable (NT4K86CA)

Signal	Pin	Pair	Color	Signal	Pin	Pair	Color
	1		N/C	future	13	6	
	2		N/C	Port 2 Tx-	14	7	O 1R
	3		N/C	Port 2 Tx+	15	7	O 2R
Port 2 Rx-	4	1	BL 1W	Port 2 Rx+	16	1	BL 2W
Port 1 Rx-	5	2	O 1W	Port 1 Rx+	17	2	O 2W
Port 1 Tx-	6	3	G 1W	Port 1 Tx+	18	3	G 2W
	7		N/C		19		N/C
	8		N/C		20		N/C
	9		N/C	future	21	8	
	10		N/C	future	22	8	
future	11	4		future	23	4	
future	12	5		future	24	5	
Note: N/C - No connection							

Note: For access bandwidth manager (ABM) and transport bandwidth
manager (TBM) shelves: TBOS port 3 in the network element user
interface (NEUI) corresponds to port 1 on the serial telemetry connector.
TBOS port 4 in the NEUI corresponds to port 2 on the serial telemetry
connector.

Action

Step	Action

1   Configure the TBOS test set (shown in Figure 9-1 on page 9-5) as follows:

Parameter	Value
Output	RS422A
Data speed	2400
Parity bit	Included

—continued—

Procedure 9-1 (continued)
Verifying the serial telemetry interface

Step	Action

Figure 9-1
Faceplate of the TBOS test set
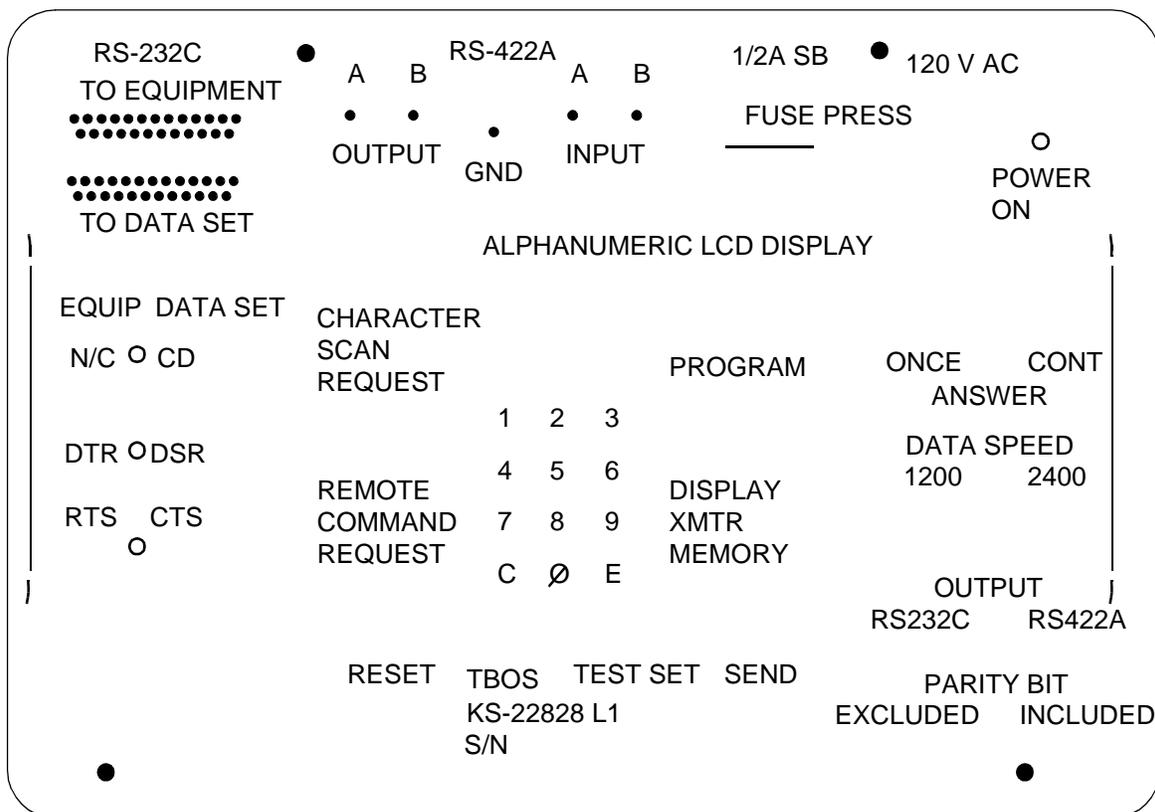
2   Turn ON the power of the TBOS test set.

The power lamp lights up and the LCD screen displays this message: "Self Test." Once the self-test sequence is completed, the following message is displayed on the LCD screen: "Char Scan-Remote CMD?"

3   Log in to the NEUI.

—**continued**—

Procedure 9-1 (continued)
Verifying the serial telemetry interface

Step	Action
4	Display the Interface Ports Status screen and add the E2A TBOS port, by entering:

admin ip ↵

add <port>↵

    where

    <port>   you can enter **3** or **4**

The TBOS Port screen is displayed.

5   If the port state is OOS (out of service), place it in service by entering:

chgstate is ↵

y ↵

6   Assign the telemetry Monitor 3 to Display 1 and turn it on, by entering:

edit ↵

The Edit TBOS menu is displayed on the TBOS Port screen.

display 1 monitor 3 ↵

status 1 on ↵

7   Connect the TBOS test set to the Serial Telemetry connector on the left side of the common-equipment shelf. On the ABM shelf, use connector J06, as shown in Figure 9-2 on page 9-7. On the TBM shelf, use connector J08, as shown in Figure 9-3 on page 9-8.

<p align="center">**—continued—**</p>

Procedure 9-1 (continued)
Verifying the serial telemetry interface

Figure 9-2
Connection of the serial telemetry cable to the ABM shelf

PC-10697
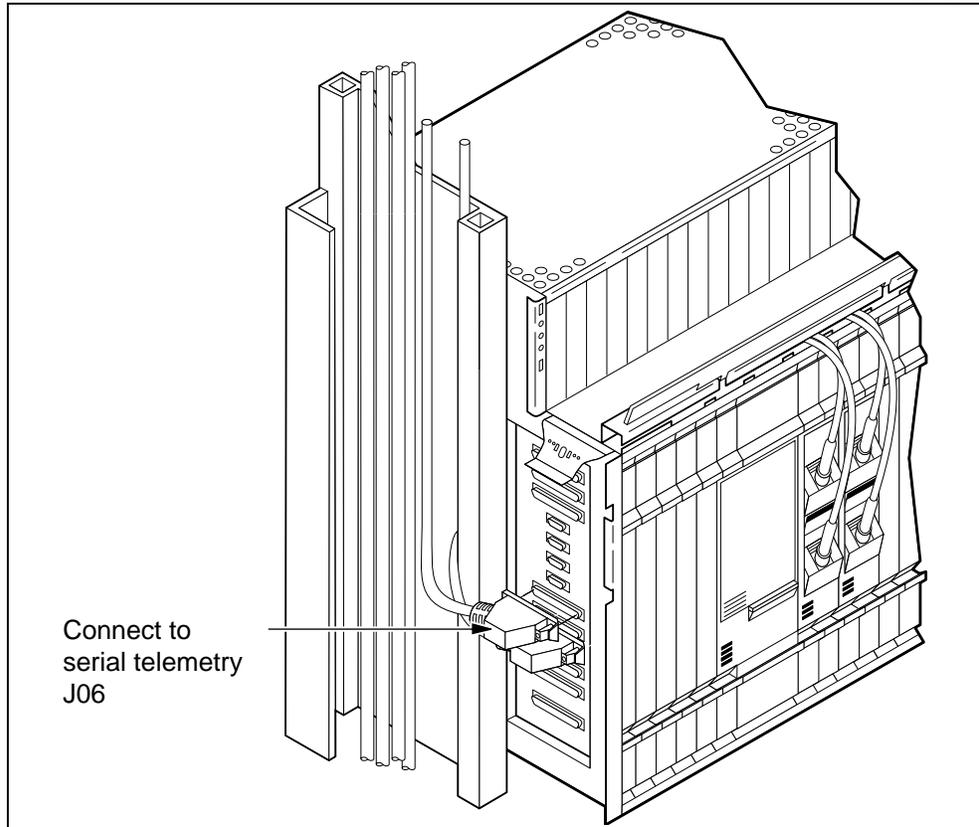
Connect to
serial telemetry
J06

—continued—

Procedure 9-1 (continued)
Verifying the serial telemetry interface

Figure 9-3
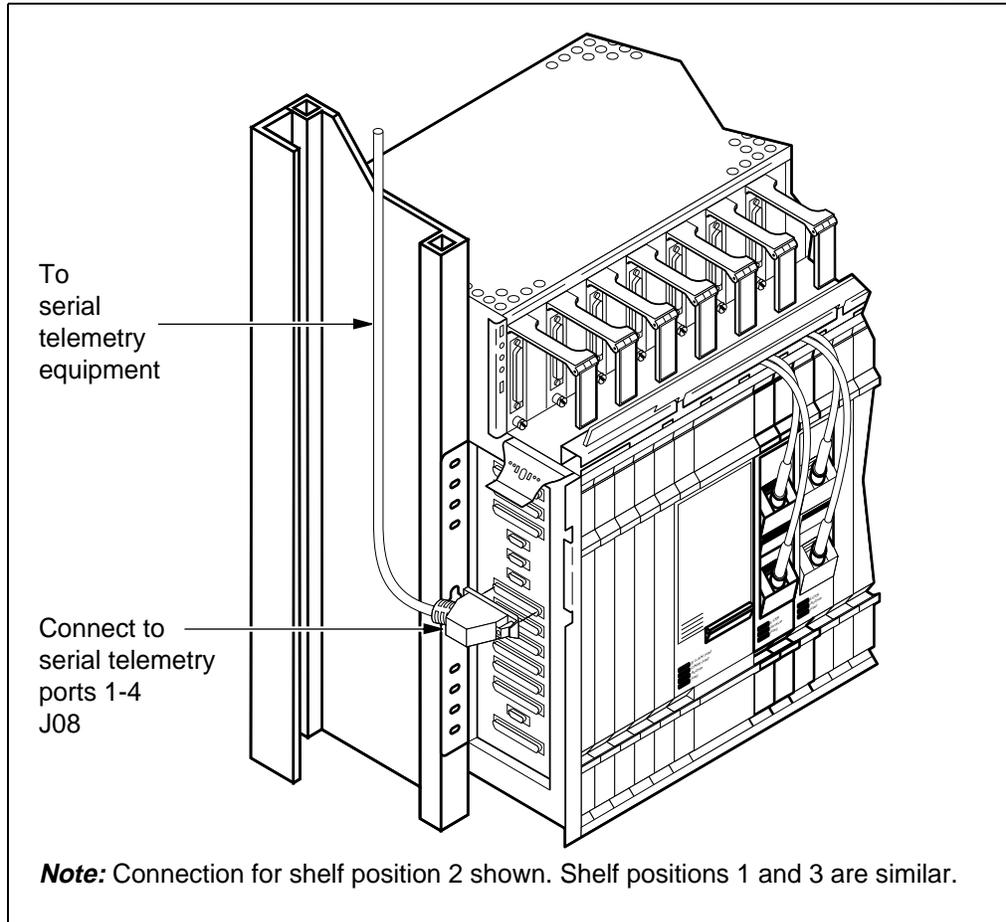**Connection of the serial telemetry cable to the TBM shelf**

PC-10605

To
serial
telemetry
equipment

Connect to
serial telemetry
ports 1-4
J08

Note: Connection for shelf position 2 shown. Shelf positions 1 and 3 are similar.

—**continued**—

Procedure 9-1 (continued)
Verifying the serial telemetry interface

Step	**Action**

8 To simulate an alarm, use the TBOSTEST CI tool, or cause fan 1 to fail.

To use the TBOSTEST CI tool, enter the following on the command line:

tbostest↵

y↵

set 3 1

To cause fan 1 to fail, refer to the following table.

If this is a	Then
bay arrangement	on the middle cooling module (under the common-equipment shelf), use a flat-head (slotted) screwdriver to turn the locking screw to the right. Grasp the handle on the faceplate of the cooling module and pull the module out of its backplane connector, but not out of the shelf.
Modular Business Package (MBP) cabinet	fan 1 is the blower unit in the main cabinet. If not already done, remove the front pedestal cover of the main cabinet. Refer to the procedure for removing MBP covers in the *Modular Business Package Cabinet Installation Manual,* 323-3001-206. Switch OFF the CB1 circuit breaker, located on the faceplate of the blower unit. The CB2 circuit breaker is not used.
Series 800A outside plant cabinet	stop any fan from rotating. To do this, open circuit breakers CU A and CU B on the BIP. When the fan blades stop, insert an object, such as a pencil, to prevent rotation. Then close the breakers CU A and CU B.

A common-equipment alarm is raised, and an alarm LED lights on the BIP.

9 Using the TBOS test set, request Character Scan Display 1, Byte 8.

The value "10000000" is displayed on the LCD screen, indicating that fan 1 failed.

Note: In byte 8, the value of bit 1 is one and the values of bits 2 to 8 are zero. This indicates that an alarm condition is being reported on bit 1. As shown in Table 9-2 on page 9-11, bit 1 indicates that fan 1 has failed.

—continued—

Procedure 9-1 (continued)
Verifying the serial telemetry interface

Step	Action

10 To reverse the condition causing the alarm, use the TBOSTEST CI tool or reverse the condition manually.

To use the TBOSTEST CI tool, enter the following on the command line:

clear 3 1↵

quit↵

To reverse the condition manually, refer to the following table.

If this is a	Then
bay arrangement	push the cooling unit module into its backplane connector. Lock it into place by turning the locking screw to the left.
Modular Business Package (MBP) cabinet	switch ON the circuit breaker CB1, on the faceplate of the blower unit. Re-install the pedestal cover after you have tested TBOS ports 3 or 4 (see step 11). Refer to the procedure for re-installing MBP covers in the *Modular Business Package Cabinet Installation Manual,* 323-3001-206.
Series 800A outside plant cabinet	remove the object preventing the fan from rotating

The common-equipment alarm clears and the alarm LED on the BIP turns off.

11 Test TBOS port 4 by repeating steps 4 through 10. Refer to Table 9-3 on page 9-13 for TBOS port 4 information.

12 Note the completion of this procedure on the Site Test Results Form.

13 Check off this procedure on the System Setup Checklist.

—**end**—

Table 9-2
Serial telemetry alarm points in system monitor display 3—equipment

Point	Byte	Bit	Description
1	1	1	Failure of the DS1 circuit-pack group G1
2	1	2	Failure of the DS1 circuit-pack group G2
3	1	3	Failure of the DS1 circuit-pack group G3
4	1	4	Failure of the DS1 circuit-pack group G4
5	1	5	Failure of the DS1 circuit-pack group G5
6	1	6	Failure of the DS1 circuit-pack group G6
7	1	7	Failure of the DS1 circuit-pack group G7
8	1	8	Failure of the DS1 circuit-pack group G8
9	2	1	Failure of the DS1 protection circuit-pack group
10	2	2	Failure of the DS3 circuit-pack group G1
11	2	3	Failure of the DS3 circuit-pack group G2
12	2	4	Failure of the DS3 circuit-pack group G3
13	2	5	Failure of the DS3 protection circuit-pack group
14	2	6	Not used
15	2	7	Failure of OC-12 or OC-3 circuit-pack group G1
16	2	8	Failure of OC-12 or OC-3 circuit-pack group G2
17	3	1	Circuit-pack failure in slot 1 of the common-equipment shelf
18	3	2	Circuit-pack failure in slot 2 of the common-equipment shelf
19	3	3	Circuit-pack failure in slot 3 of the common-equipment shelf
20	3	4	Circuit-pack failure in slot 4 of the common-equipment shelf
21	3	5	Circuit-pack failure in slot 5 of the common-equipment shelf
22	3	6	Circuit-pack failure in slot 6 of the common-equipment shelf
23	3	7	Circuit-pack failure in slot 7 of the common-equipment shelf
24	3	8	Circuit-pack failure in slot 8 of the common-equipment shelf
25	4	1	Circuit-pack failure in slot 11 of the common-equipment shelf
26	4	2	Circuit-pack failure in slot 12 of the common-equipment shelf
			—continued—

Table 9-2 (continued)
Serial telemetry alarm points in system monitor display 3—equipment

Point	Byte	Bit	Description
27	4	3	Circuit-pack failure in slot 13 of the common-equipment shelf
28	4	4	Circuit-pack failure in slot 14 of the common-equipment shelf
29	4	5	Circuit-pack failure in slot 15 of the common-equipment shelf
30	4	6	Circuit-pack failure in slot 16 of the common-equipment shelf
31	4	7	Circuit-pack failure in slot 17 of the common-equipment shelf
32	4	8	Circuit-pack failure in slot 18 of the common-equipment shelf
33	5	1	Circuit-pack failure in slot 19 of the common-equipment shelf
34	5	2	Circuit-pack failure in slot 20 of the common-equipment shelf
35	5	3	Circuit-pack failure in slot 21 of the common-equipment shelf
36	5	4	Not used
37	5	5	Not used
38	5	6	Not used
39	5	7	Not used
40	5	8	Not used
41	6	1	Not used
42	6	2	Not used
43	6	3	Not used
44	6	4	Not used
45	6	5	Not used
46	6	6	Not used
47	6	7	Not used

Note 1: On a bay arrangement, fan 1 is the left cooling module, fan 2 is the middle cooling module, and fan 3 is the right cooling module.
Note 2: In an MBP arrangement, fan 1 is the blower in the main cabinet, fan 2 is the blower in the expansion cabinet (if equipped), and fan 3 is the blower in the optional MPP cabinet.
Note 3: In a Series 800A cabinet, all fans report fan failure on fan 1 (bit 1 of byte 8).

—**end**—

Table 9-3
Serial telemetry alarm points in system monitor display 4—equipment

Point	Byte	Bit	Description
1	1	1	Metallic failure, DS1 circuit-pack group G1 (See Note)
2	1	2	Metallic failure, DS1 circuit-pack group G2 (See Note)
3	1	3	Metallic failure, DS1 circuit-pack group G3 (See Note)
4	1	4	Metallic failure, DS1 circuit-pack group G4 (See Note)
5	1	5	Metallic failure, DS1 circuit-pack group G5 (See Note)
6	1	6	Metallic failure, DS1 circuit-pack group G6 (See Note)
7	1	7	Metallic failure, DS1 circuit-pack group G7 (See Note)
8	1	8	Metallic failure, DS1 circuit-pack group G8 (See Note)
9	2	1	Metallic failure, DS3 circuit-pack group G1 (See Note)
10	2	2	Metallic failure, DS3 circuit-pack group G2 (See Note)
11	2	3	Metallic failure, DS3 circuit-pack group G3 (See Note)
12	2	4	Not used
13	2	5	Loss of signal or loss of frame, OC-12 or OC-3 circuit-pack group G1
14	2	6	Loss of signal or loss of frame, OC-12 or OC-3 circuit-pack group G2
15	2	7	Signal degrade, OC-12 or OC-3 circuit-pack group G1
16	2	8	Signal degrade, OC-12 or OC-3 circuit-pack group G2
17	3	1	Performance threshold 1 exceeded for DS1 circuit-pack group G1
18	3	2	Performance threshold 1 exceeded for DS1 circuit-pack group G2
19	3	3	Performance threshold 1 exceeded for DS1 circuit-pack group G3
20	3	4	Performance threshold 1 exceeded for DS1 circuit-pack group G4
21	3	5	Performance threshold 1 exceeded for DS1 circuit-pack group G5
22	3	6	Performance threshold 1 exceeded for DS1 circuit-pack group G6
23	3	7	Performance threshold 1 exceeded for DS1 circuit-pack group G7
24	3	8	Performance threshold 1 exceeded for DS1 circuit-pack group G8

—continued—

Table 9-3 (continued)
Serial telemetry alarm points in system monitor display 4—equipment

Point	Byte	Bit	Description
25	4	1	Performance threshold 1 exceeded for DS3 circuit-pack group G1
26	4	2	Performance threshold 1 exceeded for DS3 circuit-pack group G2
27	4	3	Performance threshold 1 exceeded for DS3 circuit-pack group G3
28	4	4	Not used
29	4	5	Performance threshold 1 exceeded for OC-12 or OC-3 circuit-pack group G1
30	4	6	Performance threshold 1 exceeded for OC-12 or OC-3 circuit-pack group G2
31	4	7	Far-end receive fail for OC-12 or OC-3 circuit-pack group G1
32	4	8	Far-end receive fail for OC-12 or OC-3 circuit-pack group G2
33	5	1	Performance threshold 2 exceeded for DS1 circuit-pack group G1
34	5	2	Performance threshold 2 exceeded for DS1 circuit-pack group G2
35	5	3	Performance threshold 2 exceeded for DS1 circuit-pack group G3
36	5	4	Performance threshold 2 exceeded for DS1 circuit-pack group G4
37	5	5	Performance threshold 2 exceeded for DS1 circuit-pack group G5
38	5	6	Performance threshold 2 exceeded for DS1 circuit-pack group G6
39	5	7	Performance threshold 2 exceeded for DS1 circuit-pack group G7
40	5	8	Performance threshold 2 exceeded for DS1 circuit-pack group G8
41	6	1	Performance threshold 2 exceeded for DS3 circuit-pack group G1
42	6	2	Performance threshold 2 exceeded for DS3 circuit-pack group G2
43	6	3	Performance threshold 2 exceeded for DS3 circuit-pack group G3
44	6	4	Not used
45	6	5	Performance threshold 2 exceeded for OC-12 or OC-3 circuit-pack group G1
46	6	6	Performance threshold 2 exceeded for OC-12 or OC-3 circuit-pack group G2
47	6	7	Not used
48	6	8	Not used
			—continued—

Table 9-3 (continued)
Serial telemetry alarm points in system monitor display 4—equipment

Point	Byte	Bit	Description
49	7	1	DS1 terminations indicate alarm indication signal (AIS) detected for DS1 circuit-pack group G1
50	7	2	DS1 terminations indicate alarm indication signal (AIS) detected for DS1 circuit-pack group G2
51	7	3	DS1 terminations indicate alarm indication signal (AIS) detected for DS1 circuit-pack group G3
52	7	4	DS1 terminations indicate alarm indication signal (AIS) detected for DS1 circuit-pack group G4
53	7	5	DS1 terminations indicate alarm indication signal (AIS) detected for DS1 circuit-pack group G5
54	7	6	DS1 terminations indicate alarm indication signal (AIS) detected for DS1 circuit-pack group G6
55	7	7	DS1 terminations indicate alarm indication signal (AIS) detected for DS1 circuit-pack group G7
56	7	8	DS1 terminations indicate alarm indication signal (AIS) detected for DS1 circuit-pack group G8
57	8	1	DS3 terminations indicate alarm indication signal (AIS) detected for DS3 circuit-pack group G1
58	8	2	DS3 terminations indicate alarm indication signal (AIS) detected for DS3 circuit-pack group G2
59	8	3	DS3 terminations indicate alarm indication signal (AIS) detected for DS3 circuit pack group G3
60	8	4	Not used
61	8	5	OC-12 or OC-3 termination indicates alarm indication signal (AIS) detected for circuit-pack group G1
62	8	6	OC-12 or OC-3 termination indicates alarm indication signal (AIS) detected for circuit-pack group G2
63	8	7	Not used
64	8	8	Not used
Note: Metallic failure means that the DS1, DS3, or terminations indicate one of the following: loss of signal, loss of frame, bipolar violations, or high bit error rate.			
—end—			

Procedure 9-2
Verifying the parallel telemetry input port (ABM shelf)

Use this procedure to verify the operation of the parallel telemetry input port of an ABM shelf. This port has the capacity for 11 input points. This procedure also tests continuity through the parallel telemetry cable for the input point tested. See Note 1 on page 9-24 about accessing parallel telemetry points at the ABM BIP wirewrap block.

Requirements

The following requirements must be met before starting this procedure:

- Access a VT100-compatible terminal connected to the network element.
- Make sure that the parallel telemetry cable, NT4K85GX, is installed and terminated.
- Obtain a jumper wire, to connect two pins together.

Action

Step	Action
	Note: Electrical characteristics of parallel telemetry ports, for connecting parallel telemetry ports of external equipment, are listed in Table 9-4 on page 9-17.
1	Log in to the Network Element Status screen. Display the parameters for parallel telemetry port 5, input 1, by entering: **admin ip** ↵ **dtlport 5 1** ↵ *The Telemetry Input Point screen appears.*
2	If the status of the input point is OFF, enter: **edit** ↵ **status on** ↵
3	If the value of the Condition field on the Telemetry Input Point screen is "Active," then you should choose the next input point and repeat steps 1 to 3, until you find an input point that shows an "Inactive" condition.

—continued—

Procedure 9-2 (continued)
Verifying the parallel telemetry input port (ABM shelf)

Step	Action
4	At the office connection or distribution frame where the parallel telemetry cable is terminated, use a jumper wire to tie the pin of the selected input point to ground. The connection of the parallel telemetry cable at the common-equipment shelf is shown in Figure 9-4 on page 9-18.
	If you are testing with input point 1, tie input No. 1 (pin 21, BL 1BK) to ground (frame of bay) (pin 43, O 1V). If you are testing with a different input point, then determine what pins to tie together from Table 9-5 on page 9-19.
5	After tying the two pins together, verify the value of the Condition field on the Telemetry Input Point screen:
	The Condition field has changed to "Active."
6	Disconnect the jumper wire connecting the two pins.
	The value of the Condition field on the Telemetry Input Point screen is now "Inactive."
7	Display the Network Element Status screen by entering:
	quit 3 ↵
	The Network Element Status screen is displayed.
8	Note the completion of this procedure on the Site Test Results Form.
9	Check off this procedure on the System Setup Checklist.

Table 9-4
Electrical characteristics of parallel telemetry ports

| Electrical characteristics of input ports	Acceptable conditions
Source input isolation	isolated contacts with no connections to other voltages or grounds
Source input noise or voltage offset	less than 1 volt
Electrical characteristics of output ports	**Acceptable conditions**
Total current for 18 outputs	1.8 A maximum
Individual output current	0.1 A maximum (common isolated return connection for 18 outputs)
Voltage polarity of load	negative only
Load voltage	−58 Vdc maximum, relative to the return lead

—continued—

Procedure 9-2 (continued)
Verifying the parallel telemetry input port (ABM shelf)

Figure 9-4
Connection of the parallel telemetry cable to the ABM shelf

PC-10058
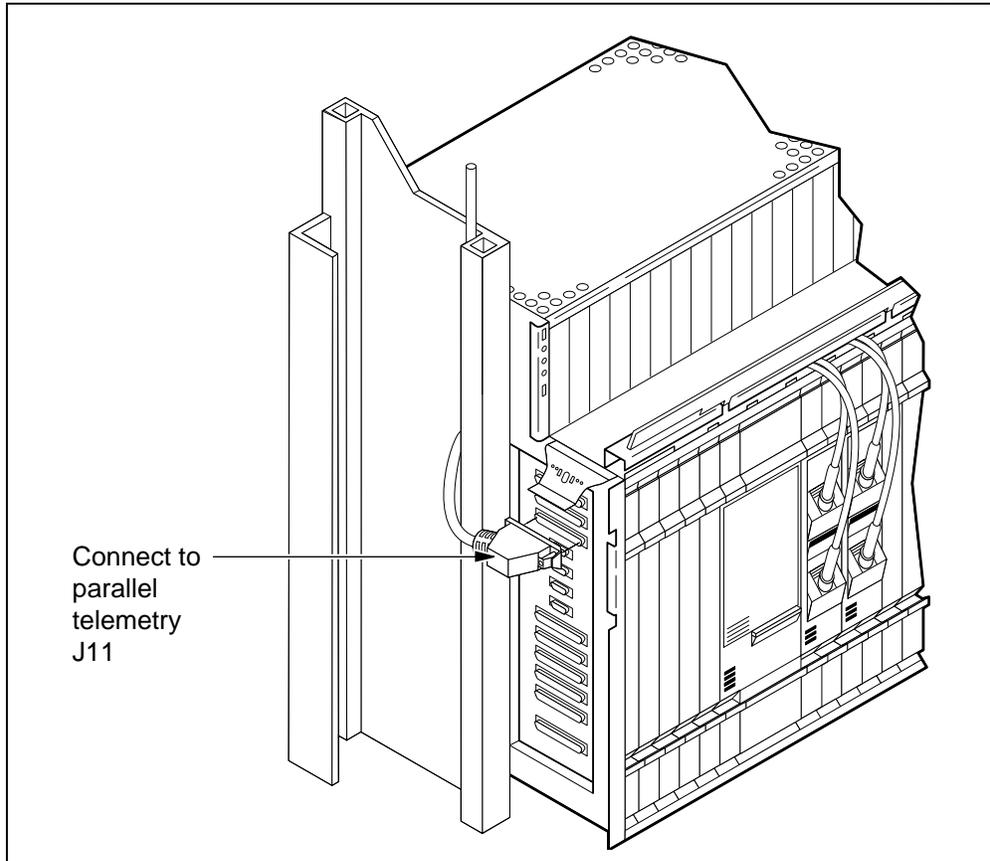
Connect to parallel telemetry J11

—continued—

Procedure 9-2 (continued)
Verifying the parallel telemetry input port (ABM shelf)

Table 9-5
Connector pinout on the parallel telemetry cable (NT4K85GX)

Signal	Pin	Pair	Color	Signal	Pin	Pair	Color
OUT 01	1	1	BL 1W	IN 03	23	12	O 1BK
OUT 02	2	1	W 1BL	IN 04	24	12	BK 1O
OUT 03	3	2	O 1W	IN 05	25	13	G 1BK
OUT 04	4	2	W 1O	IN 06	26	13	BK 1G
OUT 05	5	3	G 1W	IN 07	27	14	BR 1BK
OUT 06	6	3	W 1G	IN 08	28	14	BK 1BR
OUT 07	7	4	BR 1W	IN 09	29	15	S 1BK
OUT 08	8	4	W 1BR	IN 10	30	15	BK 1S
OUT 09	9	5	S 1W	IN 11	31	16	BL 1Y
OUT 10	10	5	W 1S	IN 12	32	16	Y 1BL
OUT 11	11	6	BL 1R	IN 13	33	17	O 1Y
OUT 12	12	6	R 1BL	IN 14	34	17	Y 1O
OUT 13	13	7	O 1R	IN 15	35	18	G 1Y
OUT 14	14	7	R 1O	IN 16	36	18	Y 1G
OUT 15	15	8	G 1R	IN 17	37	19	BR 1Y
OUT 16	16	8	R 1G	IN 18	38	19	Y 1BR
OUT 17	17	9	BR 1R	IN 19	39	20	S 1Y
OUT 18	18	9	R 1BR	IN 20	40	20	Y 1S
OUT Return	19	10	S 1R	IN 21	41	21	BL 1V
OUT Return	20	10	R 1S	IN 22	42	21	V 1BL
IN 01 (Input No. 1)	21	11	BL 1BK	IN Return	43	22	O 1V
IN 02	22	11	BK 1BL	IN Return	44	22	V 1O
Note: Signals IN 12 to IN 22 are for future use.							

—**end**—

Procedure 9-3
Verifying the parallel telemetry output port (ABM shelf)

Use this procedure to verify that the parallel telemetry output port on the ABM shelf is operating correctly. You can do this by assigning one equipment display bit to one output point, causing the equipment to fail, and verifying the change in the output point.

The parallel output port provides alarm or control signals to external processing or display equipment. You are testing continuity to the office termination of the parallel telemetry cable for the selected output point. See Note 1 on page 9-24 about accessing parallel telemetry points at the ABM BIP wirewrap block.

Serial telemetry (TBOS) display map 3, used to map system equipment to output points, is listed in Table 9-2 on page 9-11. It consists of 64 display points, listed in 8 bytes of 8 bits each. You will be failing the left cooling module, which reports fan failure on byte 8, bit 1.

An output point can report one of two conditions: active or inactive. The output point is active when it is receiving an alarm. It is inactive when it is receiving no alarm.

The output point status can be enabled or disabled. In the enabled state, it passes on the condition of the alarm. In the disabled state, it does not.

Requirements

The following requirements must be met before starting this procedure:

- Access a VT100-compatible user terminal connected to the network element.
- Obtain a Digital multimeter, Fluke 85 or equivalent.

—continued—

Procedure 9-3 (continued)
Verifying the parallel telemetry output port (ABM shelf)

Action

Step	Action

Note: Electrical characteristics of parallel telemetry ports, for connecting parallel telemetry ports of external equipment, are listed in Table 9-4 on page 9-17.

1 Select output point 18 of the parallel output port by entering:

admin ip ↵
dtlport 6 18 ↵

The Telemetry Output Point screen is displayed, showing detailed information for output point 18.

2 In substeps 2a. through 2c. you establish a connection between the selected output point and the serial-telemetry alarm point. The function of the serial-telemetry alarm point is to report a failure of fan unit 1. Enter:

edit ↵

The Edit menu is displayed.

   a. Check that the selected output point is not yet related to a serial telemetry alarm point. If the fields Display, Display Byte #, and Display Bit # are blank, skip to substep c. If they are not blank, continue at substep b.

   b. If the output point is already related to an alarm point, delete the relation by entering:

   manmode↵
   y ↵

The Display, Display Byte #, and Display Bit # fields are set to blanks and the description field contains the words "Manual Mode."

   c. Relate the output point in context (output point 18) to the TBOS display bit by entering:

   display monitor 3 ↵
   byte 8 ↵
   bit 1 ↵

You have specified a relation between the output point in context (number 18) and the alarm point (bit 1 in byte 8 in monitor display 3).

3 If the status of the output point is off, enter:

status on ↵
y ↵

The status changes to ON.

4 Make sure the output point is inactive.

—continued—

Procedure 9-3 (continued)
Verifying the parallel telemetry output port (ABM shelf)

Step	Action

When the output point is active then an alarm condition already exists. Try the following, as required, to get the inactive condition:

- Verify that you have correctly associated output point 18 to fan 1. If necessary, refer to Table 9-2 on page 9-11.
- Replace the fan unit.

If this is a	Then
bay arrangement	check that the fan power plug is correctly connected and that all cooling modules are fully inserted.
Modular Business Package (MBP) cabinet	make sure the circuit breaker CB1 on the faceplate of the blower unit on the main cabinet is ON. Remove the front pedestal cover to access the circuit breaker. Refer to the *Modular Business Package Installation Manual,* 323-3001-206 for the MBP cover removal procedure.

5   Test the resistance of output point 18, by connecting the multimeter to pins 18 and 44 of the parallel telemetry cable (pairs R 1BR and V 1O) at the office termination point.

The resistance of the selected output point should be very large, indicating that the output point is open. If you do not get the correct result, there could be a problem with the parallel port, a faulty relay on the alarm relay card in the BIP, or if connected, a fault in office wiring.

6   To cause the condition of the selected output point to become active, cause a failure of fan 1:

If this is a	Then
bay arrangement	fan 1 is located in the left cooling module. Use a flat-head (slotted) screwdriver to turn the locking screw to the right. Grasp the faceplate handle and pull the cooling module out of its backplane connector.
Modular Business Package (MBP) cabinet	fan 1 is the blower unit in the main cabinet. If not already done, remove the front pedestal cover of the main cabinet. Refer to the procedure for removing MBP covers in the *Modular Business Package Installation Manual,* 323-3001-206. Switch OFF the CB1 circuit breaker, located on the faceplate of the blower unit. The CB2 circuit breaker is not used.

—continued—

Procedure 9-3 (continued)
Verifying the parallel telemetry output port (ABM shelf)

Step	Action

7   Use the multimeter to check the resistance of the selected output point as in step 5. The resistance should be nearly zero, indicating that the output point is closed.

If the result is	Then
correct	go to step 9.
NOT correct	• try failing fan unit 3 report on byte 8 bit 3. • repeat steps 6 and 7.

8   Replace the alarm card on the BIP. Proceed as follows:

- Use a small flat-head (slotted) screwdriver to turn the latching screw counterclockwise and pull the card out of its slot.

- Insert the new alarm relay card by pushing it into its slot until the card connector is fully seated in the backplane. Then turn the latching screw clockwise.

- Repeat steps 5 through 7. If this does not solve the problem, call your Nortel Networks representative. If this solves the problem, then continue.

9   Record the test result for the telemetry output port on the Site Test Results Form.

10   Reverse the condition to make the output point active again:

If this is a	Then
bay arrangement	push the left cooling module into its backplane connector. Lock it by turning the locking screw to the left.
Modular Business Package (MBP) cabinet	switch on the circuit breaker CB1, on the faceplate of the blower unit. Re-install the pedestal cover. Refer to the procedure for re-installing MBP covers in the *Modular Business Package Installation Manual,* 323-3001-206.

The Telemetry Output Point screen shows that the output point has returned to the inactive condition.

11   Remove the multimeter and test leads.

12   Display the Network Element Status screen by entering:

quit 3 ↵

The Network Element Status screen is displayed.

13   Check off this procedure on the System Setup Checklist.

—**continued**—

Procedure 9-3 (continued)
Verifying the parallel telemetry output port (ABM shelf)

| Step	Action
14	Note the completion of this procedure on the Site Test Results Form.

Note 1: When testing parallel telemetry points in Procedure 9-2 on page 9-16 or Procedure 9-3 on page 9-20, you can also access the input points 1 to 11 and the output points 15 to 18 at the ABM BIP wirewrap block (refer to Table 9-6 on page 9-26), illustrated in Figure 9-5 on page 9-25. This shows the pinout of the parallel telemetry input and output points on the BIP. Testing at the ABM BIP does not test continuity of the parallel telemetry cable to the office termination point. You may need an electrically-insulated ladder to work at the wirewrap block.

Note 2: You can turn off the audible alarms at the RFT by shortening pins 27 and 30.

—**continued**—

Procedure 9-3 (continued)
Verifying the parallel telemetry output port (ABM shelf)

Figure 9-5
Wirewrap pins on the ABM BIP

PC-16497
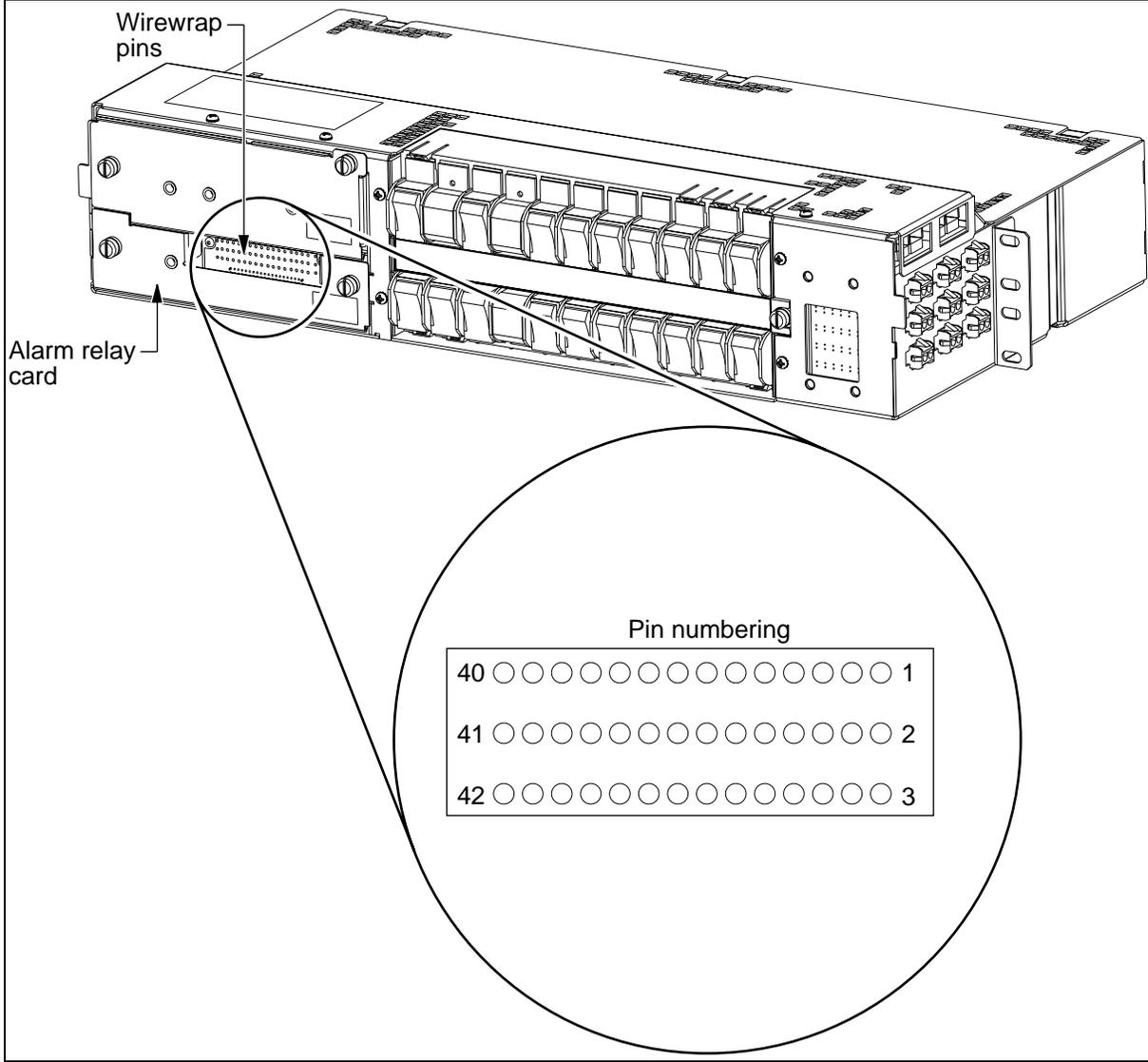
—**continued**—

Procedure 9-3 (continued)
Verifying the parallel telemetry output port (ABM shelf)

Table 9-6
Wire-wrap block pin-out details on the ABM BIP

Pin layout 3 rows of 14 pins

Pin	Signal	Pin	Signal	Pin	Signal
1	E2A In 01	2	E2A In Return	3	E2A In 02
4	E2A In 03	5	E2A In Return	6	E2A In 04
7	E2A In 05	8	E2A In Return	9	E2A In 06
10	E2A In 07	11	E2A In Return	12	E2A In 08
13	E2A In 09	14	E2A In Return	15	E2A In 10
16	E2A In 11	17	E2A In Return	18	E2A In Return
19	E2A Out 15	20	E2A Out Return	21	E2A Out 16
22	E2A Out 17	23	E2A Out Return	24	E2A Out 18
25	CO OW Line Tip	26	Ext OW Bell DCR	27	Ext ACO Sw
28	CO OW Line Ring	29	Ext OW Bell Return	30	Ext ACO Return
31	CR Audible	32	MJ Audible	33	MN Audible
34	CR Audible NO 1	35	MJ Audible NO 1	36	MN Audible NO 1
37	CR Visible	38	MJ Visible	39	MN Visible
40	CR Visible NO 1	41	MJ Visible NO 1	42	MN Visible NO 1

CO	central office	ACO	alarm cutoff	WW	wirewrap
OW	orderwire	NO	normally open		
CR	critical	MJ	major	MN	minor

Note: The default output signals (Out 15 to 18) can be provisioned for any output alarm indicators. The visible and audible alarm connections for Critical (CR), Major (MJ), and Minor (MN) are normally open in the non-alarmed state.

—**end**—

Procedure 9-4
Testing MBP/MPP power and environmental alarms

Use this procedure to test the continuity from alarm scan points on the modular business package (MBP) and optional modular power package (MPP) to the alarm reporting feature of the NEUI.

Requirements

The following requirements must be met before starting this procedure:

- Access a VT100-compatible terminal connected to the network element.

- Obtain a hot-air blower, such as a hair dryer, for cabinet temperature test.

- Obtain a small flat-head (slotted) screwdriver, for adjusting a potentiometer when testing the MPP low voltage alarm.

- Obtain a multimeter, for testing ac fail and testing repeater alarms (if either of these is connected by the customer; can also be used to test the MPP low voltage alarm, but is not essential).

Note: On a new system, some alarm descriptions reported in FiberWorld product user interface (FWPUI) are quite generic until they are datafilled. Also, some alarms are not reported at the correct severity level. To obtain the alarm responses in this procedure, you must provision the alarm text and severity level shown in Table 9-7 on page 9-34. To do this, refer to "Setting parallel telemetry parameters" in *System Administration Procedures*, 323-3001-302, in *Operations, Administration, and Provisioning*, Volume 4A.

Action

Step	Action
1	Log in to FWPUI.
2	Display the Active Alarms screen, and check the active alarms:

al ↵

A list of active alarms is displayed.

To make sure the alarms to be tested are not already being reported, use the "update" command to refresh the list of active alarms.

—**continued**—

Procedure 9-4 (continued)
Testing MBP/MPP power and environmental alarms

Step	Action
3	To test the fan fail alarm, perform the following substeps:

a. Open the CB1 circuit breaker on the blower unit of the main cabinet. It is located in the pedestal and is accessible from the front, with PDU cover removed.

FWPUI reports a fan failed alarm.

b. Close the CB1 circuit breaker.

FWPUI indicates that the fan fail alarm is no longer active.

c. Repeat substeps a and b for each installed cabinet.

4 When all cabinet doors are closed, they each maintain a pressure switch in the closed position and no alarm is reported.

When any door is open, its pressure switch is in the half-open position and it reports an alarm. When the doors are removed, alarms are suppressed by pulling each pressure switch into the fully-open position.

If the cabinet doors are	Then perform the following substeps
closed	a. Open one MBP cabinet door (remove a front panel). *FWPUI reports a door open alarm.* b. Close the cabinet door (reinstall the front panel). *FWPUI indicates that the door open alarm is no longer active.* c. Repeat substeps a. to b. for other cabinet doors.
open	a. Make sure all door switches are in the fully-open position by pulling each switch out to this position. b. Press in the "open door switch" for one cabinet door to its middle position, to cause an alarm. *FWPUI reports a door open alarm.* c. Press the switch in to the closed position and hold it there for about 15 seconds and check that the door open alarm is longer active. If you are working alone, it could be easier to install the cabinet door to hold the switch in the closed position while checking FWPUI. d. Pull the switch out to the fully-open position. e. Repeat substeps b. to d. for other cabinet doors.

—continued—

Procedure 9-4 (continued)
Testing MBP/MPP power and environmental alarms

Step	Action
5	The fan speed controller operates the cooling fans at one of two normal speeds (low and high). The speed of the cooling unit depends on the temperature within the enclosure. When the middle temperature sensor at the top of the cabinet exceeds a preset threshold, the fans begin to operate at a higher speed. As soon as the temperature goes back below the preset threshold value, low speed operation is automatically restored.

If	Then
power to the blower unit is interrupted for less than three seconds (such as CB2 breaker trip/restored)	it disables the fan speed controller operations, causing the fans to operate at a high speed. This simulates a fan speed controller failure and is used to test the reporting of a fan speed controller failed alarm.

If a fan speed controller failure alarm is indicated in the FWPUI, use the following information to determine what cabinet has the failed equipment:

The top cap LED on the	is on only when
MPP cabinet	the MPP cabinet has the fan speed controller failure.
adjacent cabinet	the adjacent cabinet has the fan speed controller failure.
main equipment cabinet	*ANY* system alarm is generated.
Note: Exception is if the top cap LED on the main cabinet is the only top cap LED that is on, then the main cabinet has the fan speed controller failure.	

To test alarm reporting of a fan speed controller failure, perform the following substeps:

a. On the blower unit of the main cabinet, momentarily open the CB1 circuit breaker. Open the circuit breaker and close it again within a second. It is located in the pedestal and is accessible from the front, with PDU cover removed.

The cooling fans speed up. FWPUI reports a fan speed controller failed alarm.

b. Enable the fan speed controller by interrupting power to the blower unit for more than three seconds. Open the circuit breaker CB1 on the blower unit and close it after five seconds.

FWPUI indicates that the fan speed controller failed alarm is no longer active. The fans operate at low speed.

—continued—

Procedure 9-4 (continued)
Testing MBP/MPP power and environmental alarms

Step	Action

6 The middle temperature sensor in the top of each cabinet triggers the fan speed controller to increase fan speed when cabinet temperature exceeds a preset threshold, thereby increasing the cabinet airflow.

To test the fan speed controller operation, perform the following substeps:

a. Hold a hot air blower (such as a hair dryer) in the vicinity of the middle temperature sensor in the top of the main cabinet. Be careful to not overheat the equipment.

When the cabinet temperature increases to 45°C (113°F), the fans in the blower unit speed up.

b. Remove the hot air blower and allow the temperature to drop.

When the cabinet temperature drops below 42°C (108°F), the fans in the blower unit slow down.

c. Repeat substeps a. and b. above for each installed cabinet.

7 The left and right high temperature sensors in the top of each cabinet report an alarm when cabinet temperature exceeds a preset threshold. This threshold is at a higher temperature than the fan speed controller threshold.

To test the high temperature alarm, perform the following substeps:

a. Hold a hot-air blower (such as a hair dryer) near the temperature sensor on the left side at the top of the main cabinet. Be careful to not overheat the equipment.

FWPUI reports a high temperature alarm.

b. Remove the hot air blower and allow the temperature to drop. (Wait about one minute.)

FWPUI indicates that the high temperature alarm is no longer active.

c. Repeat substeps a. and b., but this time, test the temperature sensor on the right side at the top of the main cabinet.

d. Repeat substeps a. to c. for each installed cabinet.

If your system is	Then
not equipped with an MPP cabinet	go to step 12.
equipped with an MPP cabinet	continue at step 8.

Testing the MPP alarms

8 To test the LVA alarm generated by the MPP, perform the following substeps:

a. On the NT6C14JA dc distribution shelf, move the Normal/Bypass switch to the Bypass position.

—**continued**—

Procedure 9-4 (continued)
Testing MBP/MPP power and environmental alarms

Step	Action

b. If you need to confirm that you are reducing the voltage, connect a voltmeter to the test points (−48 V and ground) on the dc distribution shelf faceplate and monitor the voltmeter when performing the next substep. The dc distribution panel meter still reads the correct operating voltage.

c. Use a small screwdriver to adjust the Test Adjust potentiometer in a counterclockwise direction.

The low-voltage (LV) Alarm LED turns on, and after a few seconds, the MPP low dc voltage alarm is reported in FWPUI.

d. Remove the alarm condition by adjusting the Test Adjust potentiometer in a clockwise direction.

The LV alarm LED turns off, and FWPUI indicates that the low voltage alarm is no longer active.

e. Move the Normal/Bypass switch on the dc distribution shelf to the Normal position.

9 To test the MPP fuse alarm, perform the following substeps:

a. Open circuit breaker 7 (CB7) (repeater equipment power) on the dc distribution shelf.

FWPUI reports an MPP fuse alarm.

b. Close the circuit breaker.

FWPUI indicates that the MPP fuse alarm is no longer active.

10 To test the MPP minor alarm, perform the following substeps:

Note: Battery backup must be present to perform this test, as well as the MPP major alarm test (in step 11), and the ac fail alarm test (in step 13).

a. Turn OFF the dc output breaker on one rectifier in the MPP.

FWPUI reports an MPP minor alarm.

b. Turn ON the dc output breaker on the rectifier.

FWPUI indicates that the MPP minor alarm is no longer active.

11 To test the MPP major alarm, perform the following substeps:

a. Turn OFF the dc output breaker on two rectifiers in the MPP.

FWPUI reports an MPP major alarm. The MPP minor alarm is also reported.

b. Turn ON the dc output breaker on the two rectifiers.

FWPUI indicates that the MPP major and minor alarms are no longer active.

—continued—

Procedure 9-4 (continued)
Testing MBP/MPP power and environmental alarms

Step	Action
12	The ac fail sensing device is wired by the customer to the BIP wirewrap block pins 1 and 2. Refer to Scan Point 1 in Table 9-7 on page 9-34, for details about the wiring of the ac fail alarm (AC FA).

Note: To test the ac fail alarm, the sensing device must be wired, and battery backup must be present.

If the ac fail alarm is	Then go to
not wired or the battery backup is not present	step 17
wired and battery backup is present	step 13

13 To test the ac fail alarm, perform the following substeps:

a. Open the ac power circuit breaker for one ac power feed.

FWPUI reports an ac fail alarm. BIP wirewrap pins 1 and 2 indicate a closed circuit condition.

b. Close the ac power circuit breaker for the ac feed.

FWPUI indicates that the ac fail alarm is no longer active. BIP wirewrap pins 1 and 2 indicate an open circuit condition.

c. Repeat step 13 for each remaining ac power feed.

If DS1 repeaters are	Then go to
NOT installed	step 17
installed	step 14

14 To test the repeater (RPTR) fuse alarm, perform the following substeps:

a. Open the dc power circuit breaker on the repeater equipment.

FWPUI reports a RPTR fuse failure alarm. BIP wirewrap pins 13 and 14 indicate a closed circuit condition.

b. Close the dc circuit breaker.

FWPUI indicates that the RPTR fuse failure alarm is no longer active. BIP wirewrap pins 13 and 14 indicate an open circuit condition.

15 To test the RPTR loss-of-signal alarm, perform the following substeps:

a. Disconnect the communication cable connected to the receive side of the repeater equipment.

FWPUI reports a RPTR LOS alarm. BIP wirewrap pins 15 and 14 indicate a closed circuit condition.

b. Reconnect the communication cable to the receive side of the repeater equipment.

FWPUI indicates that the RPTR LOS alarm is no longer active. BIP wirewrap pins 15 and 14 indicate an open circuit condition.

—**continued**—

Procedure 9-4 (continued)
Testing MBP/MPP power and environmental alarms

Step	Action
16	To test the RPTR error alarm, perform the following substeps:

a. Insert sufficient attenuation in the receive path to degrade the repeater signal.

FWPUI reports a RPTR ERR alarm. BIP wirewrap pins 16 and 17 indicate a closed circuit condition.

b. Remove the added attenuation from the receive path.

FWPUI indicates that the RPTR ERR alarm is no longer active. BIP wirewrap pins 16 and 17 indicate an open circuit condition.

Logging out

17 Log out of FWPUI:

logout ↵

The login session is terminated.

18 Note the completion of this procedure on the Site Test Results Form.

19 Check off this procedure on the System Setup Checklist.

—**end**—

Table 9-7
MBP and MPP scan points (E2A inputs and some internal scan points)

Scan point	E2A signal name	Signal Name	Alarm label	Alarm severity	MPP J15 conn pin	BIP wirewrap pin
1	XE2AR01	AC FA	ac failed *	Minor	14	1
AC FA: This external scan point is activated by a monitoring device wired to BIP wirewrap pins 1 and 2. Installed by the customer, the monitoring device consists of form-C dry relay contacts installed to monitor ac power input. The relay contacts are normally open; they report an alarm by closing.						
2	XE2AR02	LVA	low battery *	Major	3	3
LVA: This is an internal scan point provided from the optional MPP cabinet.						
3	XE2AR03	Remote ACO				4
4	XE2AR04	DOALM	door open	Major	7	6
DOALM: The door alarm can be connected to the BIP wirewrap pin 6 from an external scan point. The MPP door is an internal scan point provided in parallel by the MBP PDU. This scan point reports to distribution point 4 on the parallel output port.						
5	XE2AR05	FSCALM	fan-speed controller failed	Minor		7
FSCALM: This is an internal scan point indicating that the fan speed controller has failed in one of up to three MBP/MPP cabinets. The cabinet containing the failed equipment is indicated by an illuminated top cap LED. This scan point reports to distribution point 5 on the parallel output port.						
6	XE2AR06	MPP FA	MPP fuse alarm	Major	5	9
MPP FA: This is an internal scan point activated when a circuit breaker on the MPP dc distribution shelf is tripped, indicating a fault load condition. This scan point reports to distribution point 6 on the parallel output port.						
7	XE2AR07	MPP MN	MPP minor alarm	Minor	1, 12	10
MPP MN: This is an internal scan point indicating failure of one rectifier in an MPP equipped with the NT6C14JA distribution shelf.						
8	XE2AR08	MPP MJ	MPP major alarm	Major	2, 13	12
MPP MJ: This is an internal scan point indicating failure of two or more rectifiers in an MPP equipped with the NT6C14JA distribution shelf.						
—continued—						

Table 9-7 (continued)
MBP and MPP scan points (E2A inputs and some internal scan points)

Scan point	E2A signal name	Signal Name	Alarm label	Alarm severity	MPP J15 conn pin	BIP wirewrap pin
9	XE2AR09	RPTR FA	repeater fuse failed	Major		13
RPTR FA: The repeater fuse alarm indicates that one or more repeaters have an open power fuse. Wired by the customer to BIP wirewrap pins 13 and 14, this external scan point must be able to drive form-C dry relay contacts which are normally open; they report an alarm by closing.						
10	XE2AR10	RPTR LOS	repeater loss-of-service	Major		15
RPTR LOS: The repeater loss-of-signal alarm indicates than one or more repeaters is receiving a loss-of-signal indication from the span. Wired by the customer to BIP wirewrap pins 15 and 14, this external scan point must be able to drive form-C dry relay contacts which are normally open; they report an alarm by closing.						
11	XE2AR11	RPTR ERR	repeater error	Minor		16
RPTR ERR: The repeater error alarm indicates that one or more repeaters is receiving excessive bipolar variations. Wired by the customer to BIP wirewrap pins 16 and 17, this external scan point must be able to drive form-C dry relay contacts which are normally open; they report an alarm by closing.						
		High Temp alarm	high temp *	Major		
The High Temp alarm is an internal scan point activated when the temperature in an MBP or MPP cabinet exceeds a pre-set threshold.						
LGND	XE2ARRET	Alarm reference (logic ground)				2, 5, 8, 11, 14, 17, 18
The MPP connector J15 is located on the back of the dc distribution shelf, and provides an external access point for some of the MBP/MPP alarm signals.						
*The alarm label on this E2A input is already provisioned as shown.						
—**end**—						

Procedure 9-5
Testing alarms on the Series 800A outside plant cabinet

Use this procedure to test the continuity from alarm scan points on the Series 800A outside plant cabinet to the alarm reporting feature of the NEUI.

Requirements

The following requirement must be met before starting this procedure:

• Access a VT100-compatible terminal connected to the network element.

You need the following equipment and materials:

• a hot-air blower, such as a hair dryer, for cabinet high temperature test

• a can of spray coolant (no ozone-depleting materials allowed), for cabinet low temperature test

• a small flat-head (slotted) screwdriver, for adjusting a potentiometer when testing the low voltage alarm

• a multimeter, for testing ac fail and testing repeater alarms (if either of these is connected by the customer); can also be used when testing the low voltage alarm, but is not essential

Note: On a new system, some alarm descriptions reported in FWPUI are quite generic until they are datafilled. To obtain the alarm responses in this procedure, you must provision the alarm text and severity level shown in Table 9-8 on page 9-43. To do this, refer to "Setting parallel telemetry parameters" in *System Administration Procedures*, 323-3001-302, in *Operations, Administration, and Provisioning*, Volume 4A.

Action

Step	Action
1	Log in to FiberWorld product user interface (FWPUI).
	If you do not know how to do this, see *Network Element User Interface Description,* 323-3001-300, in *Operations, Administration, and Provisioning*, Volume 4A.

—continued—

Procedure 9-5 (continued)
Testing alarms on the Series 800A outside plant cabinet

Step	Action

2   Display the Active Alarms screen, and check the active alarms:

al ↵

update ↵

A list of active alarms is displayed.

Note: Before beginning the ceiling fan test in the following step, make sure the equipment fan shelves 1 and 2 do not have Fail LEDs lit. One shelf is located between shelves 3 and 4 (if four or more are installed), and the other shelf is located between the BIP and common-equipment shelf. These fan shelves run continuously when CU breakers A and B are closed.

3   There are two banks of ceiling fans in the cabinet: front and back. The ceiling fans turn ON when cabinet temperature exceeds about 18°C (64°F) and they turn OFF when cabinet temperature is reduced to 13°C (55°F).

To test fan operation (not the precise temperature thresholds), open the right swing frame and locate the Honeywell thermostat on the right side panel.

If the	Then perform
ceiling fans are OFF	substep a and then substep b
fans are ON	substep b first and substep a last

a.   Operate a hot air blower aimed at the thermostat.

Fans turn ON.

b.   Operate a can of compressed coolant aimed at the thermostat.

Fans turn OFF.

4   To test the ceiling fan fail alarm, all ceiling fans in the cabinet must be on. If the ceiling fans are not on, no alarm is generated.

To turn the ceiling fans on, use a hair dryer to heat up the Honeywell thermostat located on the side of the cabinet. The temperature to turn on and off the ceiling fans, differs by 2°C between the two banks. Once all the ceiling fans are on, perform the following substeps:

a.   Open the CU A and CU B circuit breaker on the BIP to stop the fans. At the prompt enter:

update ↵

FWPUI reports open breaker alarms.

b.   After the ceiling fans have stopped, insert an object, such as a pencil, into the blade area of any fan to prevent it from turning.

—**continued**—

Procedure 9-5 (continued)
Testing alarms on the Series 800A outside plant cabinet

Step	Action
	c. Close the CU A and CU B circuit breakers. At the prompt enter: **update** ↵ *FWPUI reports a fan failed alarm. FWPUI indicates that the open breaker alarms are no longer active.*
	d. Remove the pencil. At the prompt enter: **update** ↵ *The stopped fan begins turning, and FWPUI indicates that the fan fail alarm is no longer active.*
5	Make sure there is no active open door alarm. ***Note:*** When all cabinet doors are correctly closed, they each maintain a pressure switch in the closed position, and no alarm is reported. When any door is open and its pressure switch is in the half-open position, it reports an alarm. When a door is open and its pressure switch is pulled into the fully-open position, alarms are suppressed. To check that the door switches are operating, open all doors on the cabinet, and proceed as follows: **a.** Make sure the open doors have their switches in the fully-open position by pulling each switch out to this position. **b.** Press in the "open door switch" for one cabinet door to its middle position, to cause an alarm. At the prompt enter: **update** ↵ *FWPUI reports a door open alarm.* **c.** Press the switch into the closed position and hold it there for about 15 seconds and check that the door open alarm is not longer active. At the prompt enter: **update** ↵ If you are working alone, it is easier to close the cabinet door to hold the switch in the closed position while checking FWPUI. **d.** Pull the switch out to the fully-open position. **e.** Repeat substeps b. to d. for other open cabinet doors.
6	The high temperature sensor, located in the left top of the cabinet, reports an alarm when cabinet air temperature exceeds a preset threshold. ***Note:*** "Left top" orientation is from the front of the cabinet, facing the common equipment shelf and copper distribution shelves (CDSs). The repeater equipment and power plant are accessible from the rear of the cabinet.

—**continued**—

Procedure 9-5 (continued)
Testing alarms on the Series 800A outside plant cabinet

Step	Action

Test the bay high temperature alarm using the following substeps:

a. Open the left front swing frame and locate the high temperature sensor at the top of the cabinet, left of center. Operate a hot air blower aimed at the sensor until the BIP critical alarm lamp lights. Be careful to not overheat the equipment. At the prompt enter:

update ↵

FWPUI reports a high temperature alarm.

b. Remove the hot air blower and allow the temperature to drop. The critical alarm lamp at the BIP should extinguish. At the prompt enter:
update ↵

After about one minute, FWPUI indicates that the high temperature alarm is no longer active.

7   The low temperature sensor reports an alarm when cabinet air temperature drops below a preset threshold. It is visible on the right lower inside wall of the cabinet, just below the large Honeywell thermostat, when standing at the front of the cabinet.

To test the low temperature alarm, perform the following substeps:

a. Open the right swing frame and locate the low temperature sensor on the right inside wall of the cabinet. Operate a can of compressed coolant aimed at the sensor until the alarm banner screen of FWPUI increments. To monitor the increment, enter:

update ↵

FWPUI reports a low temperature alarm.

b. Remove the coolant spray and allow the temperature to rise. Wait until the alarm banner screen of FWPUI decrements by one (about one minute). To monitor the decrement, enter:

update ↵

FWPUI indicates that the low temperature alarm is no longer active.

8   To test the low-voltage alarm (LVA), perform the following substeps:

a. On the NT6C14JA dc distribution shelf, move the Normal/Bypass switch to the Bypass position.

b. If you need to confirm that you are reducing the voltage, connect a voltmeter to the test points (−48 V and ground) on the dc distribution shelf faceplate and monitor the voltmeter when performing the next substep. The dc distribution panel meter still reads the correct operating voltage, but does not register the test adjust pot change.

—continued—

Procedure 9-5 (continued)
Testing alarms on the Series 800A outside plant cabinet

Step	Action
	c. Use a small screwdriver to adjust the Test Adjust potentiometer in a counterclockwise direction until the LV Alarm LED is on. At the prompt enter:
	update ↵
	After a few seconds, the low dc voltage alarm is reported in FWPUI.
	d. Remove the alarm condition by adjusting the Test Adjust potentiometer in a clockwise direction until the LV Alarm LED is off (this takes a few seconds), and FWPUI indicates that the low voltage alarm is no longer active. To check that the alarm is no longer active, at the prompt enter:
	update ↵
	e. Move the Normal/Bypass switch on the dc distribution shelf to the Normal position.
9	Test the fuse alarm using the following substeps:
	a. On the dc distribution shelf, open the 10-ampere circuit breaker that protects the repeater 1 and DSX equipment. At the prompt enter:
	update ↵
	FWPUI reports a fuse alarm.
	b. Close the circuit breaker. At the prompt enter:
	update ↵
	FWPUI indicates that the fuse alarm is no longer active.
10	Test the power (PWR) minor alarm using the following substeps:
	Note: Battery backup must be present to perform this test as well as the PWR major alarm test (in step 11).
	a. Turn OFF the dc output breaker on one rectifier. At the prompt enter:
	update ↵
	FWPUI reports a PWR minor alarm.
	b. Turn ON the dc output breaker on the rectifier. At the prompt enter:
	update ↵
	FWPUI indicates that the PWR minor alarm is no longer active.
11	Test the PWR major alarm using the following substep:
	a. Turn OFF the dc output breaker on two rectifiers. At the prompt enter:
	update ↵
	FWPUI reports a PWR major alarm. (The PWR minor alarm is also reported.)

—**continued**—

Procedure 9-5 (continued)
Testing alarms on the Series 800A outside plant cabinet

Step	Action

12 To test the repeater (RPTR) fuse alarm, perform the following substeps:

a. Open the dc power circuit breaker on the repeater equipment. At the prompt enter:

update ↵

b. Turn ON the dc output breaker on the two rectifiers. At the prompt enter:

update ↵

FWPUI indicates that the PWR major and minor alarms are no longer active.

If DS1 repeaters are	Then go to
NOT installed	step 15
installed	step 12c

FWPUI reports a RPTR fuse failure alarm. BIP wirewrap pins 13 and 14 indicate a closed circuit condition.

c. Close the dc circuit breaker. At the prompt enter:

update ↵

FWPUI indicates that the RPTR fuse failure alarm is no longer active. BIP wirewrap pins 13 and 14 indicate an open circuit condition.

13 Make sure the repeater equipment is error free and functioning. To test the RPTR loss-of-signal alarm, perform the following substeps:

a. Disconnect the communication cable connected to the receive side of the repeater equipment. At the prompt enter:

update ↵

FWPUI reports a RPTR LOS alarm. BIP wirewrap pins 15 and 14 indicate a closed circuit condition.

b. Reconnect the communication cable to the receive side of the repeater equipment. At the prompt enter:

update ↵

FWPUI indicates that the RPTR LOS alarm is no longer active. BIP wirewrap pins 15 and 14 indicate an open circuit condition.

—continued—

Procedure 9-5 (continued)
Testing alarms on the Series 800A outside plant cabinet

Step	Action
14	Make sure the repeater equipment is error free and functioning. Test the RPTR error alarm using the following substeps:
	a. Insert sufficient attenuation in the receive path to degrade the repeater signal. At the prompt enter:
	update ↵
	FWPUI reports a RPTR ERR alarm. BIP wirewrap pins 16 and 17 indicate a closed circuit condition.
	b. Remove the added attenuation from the receive path. At the prompt enter:
	update ↵
	FWPUI indicates that the RPTR ERR alarm is no longer active. BIP wirewrap pins 16 and 17 indicate an open circuit condition.
15	Log out of FWPUI:
	log ↵
	The login session is terminated.
16	Keep the VT100 terminal connected to the network element LCAP. You need it in the following procedures.
17	Note the completion of this procedure on the Site Test Results Form.
18	Check off this procedure on the System Setup Checklist.

—**end**—

Table 9-8
Series 800A outside plant cabinet scan points (E2A inputs and some internal scan points)

Scan point	E2A signal name	Signal Name	Alarm label	Alarm severity	BIP wirewrap pin
1	XE2AR01	AC FA	ac failed *	Minor	1
AC FA: This external scan point is activated by a monitoring device wired to BIP wirewrap pins 1 and 2. Installed by the customer, the monitoring device consists of form-C dry relay contacts installed to monitor ac power input. The relay contacts are normally open; they report an alarm by closing.					
2	XE2AR02	LVA	low battery *	Major	3
LVA: This is an internal scan point provided from the dc distribution shelf of the Series 800A cabinet.					
3	XE2AR03	Remote ACO			4
4	XE2AR04	DOALM	door open	Major	6
DOALM: The door alarm is connected to the BIP wirewrap pin 6 from the door switches located on the cabinet frame.					
5	XE2AR05	LOTMP	low temperature	Warning	7
LOTMP: The Low Temp alarm is an internal scan point activated when the air temperature at the sensor (located on the right sidewall of the cabinet, below the thermostat, looking from the front) drops below a pre-set threshold.					
6	XE2AR06	FA	fuse alarm	Major	9
FA: This is an internal scan point activated when a circuit breaker on the dc distribution shelf or the battery breaker panel (BB) is tripped, indicating a fault load condition.					
7	XE2AR07	PWR MN	PWR minor alarm	Minor	10
PWR MN: This is an internal scan point indicating failure of one rectifier when the NT6C14JA dc distribution shelf is equipped.					
8	XE2AR08	PWR MJ	PWR major alarm	Major	12
PWR MJ: This is an internal scan point indicating failure of two or more rectifiers when the NT6C14JA dc distribution shelf is equipped.					
9	XE2AR09	RPTR FA	repeater fuse failed	Major	13
—continued—					

Table 9-8 (continued)
Series 800A outside plant cabinet scan points (E2A inputs and some internal scan points)

Scan point	E2A signal name	Signal Name	Alarm label	Alarm severity	BIP wirewrap pin
RPTR FA: The repeater fuse alarm indicates that one or more repeaters have an open power fuse. Wired by the customer to BIP wirewrap pins 13 and 14, this external scan point must be able to drive form-C dry relay contacts which are normally open; they report an alarm by closing.					
10	XE2AR10	RPTR LOS	repeater loss-of-service	Major	15
RPTR LOS: The repeater loss-of-signal alarm indicates than one or more repeaters is receiving a loss-of-signal indication from the span. Wired by the customer to BIP wirewrap pins 15 and 14, this external scan point must be able to drive form-C dry relay contacts which are normally open; they report an alarm by closing.					
11	XE2AR11	RPTR ERR	repeater error	Minor	16
RPTR ERR: The repeater error alarm indicates that one or more repeaters is receiving excessive bipolar variations. Wired by the customer to BIP wirewrap pins 16 and 17, this external scan point must be able to drive form-C dry relay contacts which are normally open; they report an alarm by closing.					
		High Temp alarm	high temp *	Major	
The High Temp alarm is an internal scan point activated when the air temperature at the sensor (located on the ceiling of the cabinet, a the top left, looking from the front) exceeds a pre-set threshold.					
LGND	XE2ARRET	Alarm reference (logic ground)			2, 5, 8, 11, 14, 17, 18
*The alarm label on this E2A input is already provisioned as shown.					
—**end**—					

Procedure 9-6
Testing office alarms (ABM shelf)

Use this procedure to test the generation of office alarms in an ABM shelf. Testing verifies that minor, major, and critical alarm signals to the office alarm system are correct. It also verifies the alarm cut-off (ACO) feature that turns off the audible office alarms.

Note: You are using an operations controller (OPC) tool to generate the alarms. Since alarms survive warm restarts, if a warm restart occurs during this procedure, simply re-enter the tool and quit. Alarms are automatically cleared when you exit the tool.

Requirements

The following requirement must be met before starting this procedure:

• Access a VT100 terminal connected to the NE.

The following materials are required:

• a digital multimeter, Fluke 85 or equivalent

• two optical patch cords with miniature variable optical attenuator (mVOA), NT7E47AA/BA/CA/FA, 5 m long

• an electrically-insulated ladder, to reach the wirewrap block

	CAUTION **Risk of traffic loss** Do not attempt to create alarms by removing active circuit packs. Use only channels not carrying live traffic.
	CAUTION **Risk of static damage** Use an antistatic wrist strap. Refer to the safety guidelines in Chapter 1.

—continued—

Procedure 9-6 (continued)
Testing office alarms (ABM shelf)

Action

Step	Action

1 Start this procedure with an alarm-free bay by extinguishing all existing alarms.

The bay is alarm-free if the alarm lamps (critical, major, and minor) on the BIP are not lit. The breaker interface panel (BIP) is shown in Figure 9-5 on page 9-25.

2 Remove the cover from the BIP.

3 Insert the alarm relay card, if it is removed, to avoid office alarms.

Note: The alarm relay card fits in the slot just to the right of the wirewrap pins (in the BIP). See Figure 9-8 on page 9-51.

4 Before raising any alarms, use a multimeter to check the condition of the office alarm relay contacts, on pins of the office alarm wirewrap block. They should all be open, which indicates a non-active state, as shown in the table below. For the pin layout of the wirewrap block, see Table 9-6 on page 9-26.

critical alarm	visual	pins 37 and 40	open
	audible	pins 31 and 34	open
major alarm	visual	pins 38 and 41	open
	audible	pins 32 and 35	open
minor alarm	visual	pins 39 and 42	open
	audible	pins 33 and 36	open

If the correct results are not obtained, replace the alarm relay card.

5 From the command interpreter (CI) level of the user interface, or from any FWPUI screen, access the FiberWorld Alarm Test CI (fwaltsci) tool by entering:

fwaltsci ↵

The "fwaltsci" prompt is displayed.

6 Raise a minor alarm by entering:

raise minor ↵

At the BIP, the alarm lamps light. If office alarm connections are already wirewrapped, office alarm lamps light and office alarm bells ring.

—**continued**—

Procedure 9-6 (continued)
Testing office alarms (ABM shelf)

Step	Action

7   Check the state of the office alarm relay contacts again. For the pin layout of the wirewrap block, see Table 9-6 on page 9-26.

critical alarm	visual	pins 37 and 40	open
	audible	pins 31 and 34	open
major alarm	visual	pins 38 and 41	open
	audible	pins 32 and 35	open
minor alarm	visual	pins 39 and 42	closed
	audible	pins 33 and 36	closed

8   Test audible alarm cutoff by pressing the alarm cut-off/lamp test (ACO/LT) button on the local craft access panel (LCAP). Then check the state of the office alarm relay contacts again.

critical alarm	visual	pins 37 and 40	open
	audible	pins 31 and 34	open
major alarm	visual	pins 38 and 41	open
	audible	pins 32 and 35	open
minor alarm	visual	pins 39 and 42	closed
	audible	pins 33 and 36	open

At the BIP, the alarm lamps light. If office alarm connections are wirewrapped already, office alarm lamps light and office alarm bells stop ringing.

If the correct results are not obtained, try the following:

- check for unexpected alarms that may have been generated while testing
- check the connections to the office alarm system, if connected
- replace the alarm relay card

9   Remove the minor alarm by entering:

clear minor ↵

The BIP alarm lamps go off, if there are no other alarms on the bay.

10   Create a major alarm by entering:

raise major ↵

At the BIP, the alarm lamps light. If office alarm connections are wirewrapped already, office alarm lamps light and office alarm bells ring.

—**continued**—

Procedure 9-6 (continued)
Testing office alarms (ABM shelf)

Step	Action
11	Repeat steps 7 and 8. Check the state of the office alarm relay contacts as follows:

critical alarm	visual	pins 37 and 40	open
	audible	pins 31 and 34	open
major alarm	visual	pins 38 and 41	closed
	audible	pins 32 and 35	closed
minor alarm	visual	pins 39 and 42	open
	audible	pins 33 and 36	open

12 Press the ACO/LT button on the LCAP. Then check the state of the office alarm relay contacts as follows:

critical alarm	visual	pins 37 and 40	open
	audible	pins 31 and 34	open
major alarm	visual	pins 38 and 41	closed
	audible	pins 32 and 35	open
minor alarm	visual	pins 39 and 42	open
	audible	pins 33 and 36	open

If the correct results are not obtained, try the options listed in step 8.

13 Remove the major alarm by entering:

clear major ↵

The BIP alarm lamps go off, if there are no other alarms on the bay.

14 Create a critical alarm by entering:

raise critical ↵

At the BIP, the alarm lamps light. If office alarm connections are wirewrapped already, office alarm lamps light and office alarm bells ring.

—**continued**—

Procedure 9-6 (continued)
Testing office alarms (ABM shelf)

Step	**Action**

15   Check the state of the office alarm relay contacts as follows:

critical alarm	visual	pins 37 and 40	closed
	audible	pins 31 and 34	closed
major alarm	visual	pins 38 and 41	open
	audible	pins 32 and 35	open
minor alarm	visual	pins 39 and 42	open
	audible	pins 33 and 36	open

16   Press the ACO/LT button on the LCAP. Then check the state of the office alarm relay contacts as follows:

critical alarm	visual	pins 37 and 40	closed
	audible	pins 31 and 34	open
major alarm	visual	pins 38 and 41	open
	audible	pins 32 and 35	open
minor alarm	visual	pins 39 and 42	open
	audible	pins 33 and 36	open

If the correct results are not obtained, try the options listed in step 8.

17   Remove the critical alarm by entering:

clear critical ↵

The BIP alarm lamps go off, if there are no other alarms on the bay.

18   Quit from the "fwaltsci" tool by entering:

quit ↵

19   Reinstall the BIP cover.

20   Record the results on the Site Test Results Form.

21   Check off this procedure on the System Setup Checklist.

—**end**—

Procedure 9-7
Verifying the parallel telemetry input port (TBM shelf)

Use this procedure to verify the operation of the parallel telemetry input port on a TBM shelf.

Requirements

The following requirements must be met before starting this procedure:

- Access a VT100-compatible terminal connected to the network element.
- Make sure that the parallel telemetry cable, NT4K85GX, is installed and terminated.
- Obtain a jumper wire, to connect two pins together.

Note: Electrical characteristics of parallel telemetry ports for connecting external equipment parallel telemetry ports are listed in Table 9-4 on page 9-17.

Action

Step	Action
1	Access the system administration screen and display parallel telemetry port 5 input 1 parameters: **admin ip** ↵ **dtlport 5 1** ↵ *The Telemetry Input Point screen appears.*
2	Verify that Status is ON, otherwise, enable port 5 input 1: **edit** ↵ **status on** ↵ **quit**↵
3	Connect telemetry cable (NT4K85GX) to the TBM shelf (see Figure 9-8 on page 9-51) and tie IN 01 (input No. 1, pin 21, color BL 1BK) at the other end of the cable to ground (frame of bay) (IN Return). See Table 9-9 on page 9-52 for connector pinout and color code.
4	Verify that IN 01 (input No. 1) is active (as shown on user interface screen). *"Condition: Active" is displayed on the Network Element User Interface (NEUI) screen.*
5	Disconnect IN 01 (input No. 1) from ground.
6	Note the completion of this procedure on the Site Test Results Form.
7	Check off this procedure on the System Setup Checklist.

—continued—

Procedure 9-7 (continued)
Verifying the parallel telemetry input port (TBM shelf)

Figure 9-8
Connection of the parallel telemetry cable to the TBM shelf

PC-10607

To external telemetry equipment

Connect to parallel telemetry J12

Note: Connection for shelf position 2 shown. Shelf positions 1 and 3 are similar.
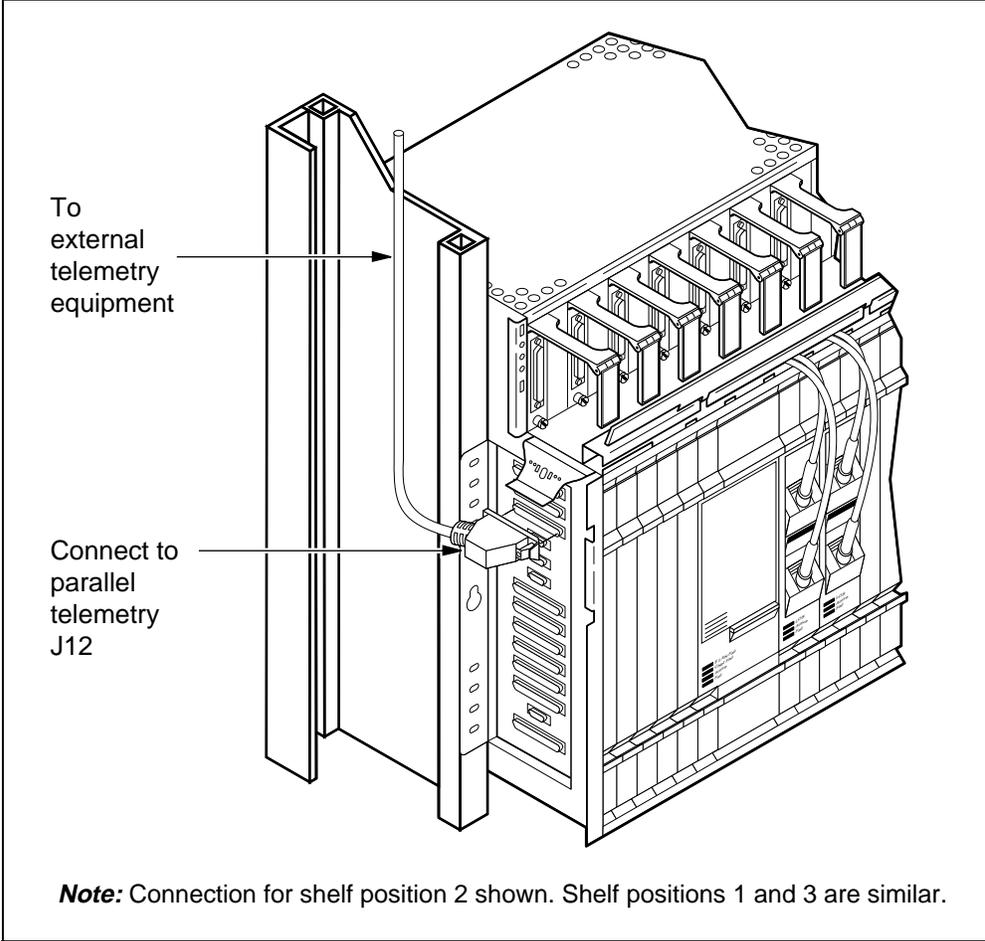
—continued—

Procedure 9-7 (continued)
Verifying the parallel telemetry input port (TBM shelf)

Table 9-9
Connector pinout on the parallel telemetry cable (NT4K85GX)

Signal	Pin	Pair	Color	Signal	Pin	Pair	Color
OUT 01	1	1	BL 1W	IN 03	23	12	O 1BK
OUT 02	2	1	W 1BL	IN 04	24	12	BK 1O
OUT 03	3	2	O 1W	IN 05	25	13	G 1BK
OUT 04	4	2	W 1O	IN 06	26	13	BK 1G
OUT 05	5	3	G 1W	IN 07	27	14	BR 1BK
OUT 06	6	3	W 1G	IN 08	28	14	BK 1BR
OUT 07	7	4	BR 1W	IN 09	29	15	S 1BK
OUT 08	8	4	W 1BR	IN 10	30	15	BK 1S
OUT 09	9	5	S 1W	IN 11	31	16	BL 1Y
OUT 10	10	5	W 1S	IN 12	32	16	Y 1BL
OUT 11	11	6	BL 1R	IN 13	33	17	O 1Y
OUT 12	12	6	R 1BL	IN 14	34	17	Y 1O
OUT 13	13	7	O 1R	IN 15	35	18	G 1Y
OUT 14	14	7	R 1O	IN 16	36	18	Y 1G
OUT 15	15	8	G 1R	IN 17	37	19	BR 1Y
OUT 16	16	8	R 1G	IN 18	38	19	Y 1BR
OUT 17	17	9	BR 1R	IN 19	39	20	S 1Y
OUT 18	18	9	R 1BR	IN 20	40	20	Y 1S
OUT Return	19	10	S 1R	IN 21	41	21	BL 1V
OUT Return	20	10	R 1S	IN 22	42	21	V 1BL
IN 01 (Input No. 1)	21	11	BL 1BK	IN Return	43	22	O 1V
IN 02	22	11	BK 1BL	IN Return	44	22	V 1O
Note: Signals IN 12 to IN 22 are for future use.							

—**end**—

Procedure 9-8
Verifying the parallel telemetry output port (TBM shelf)

Use this procedure to verify the operation of the parallel telemetry output port on the TBM shelf.

Requirements

The following requirements must be met before starting this procedure:

- Access a VT100-compatible terminal connected to the network element.
- Obtain a parallel telemetry cable, NT4K85GX.
- Obtain a jumper wire, to connect two pins together.

    Note: Electrical characteristics of parallel telemetry ports, for connecting parallel telemetry ports to external equipment, are listed in Table 9-4 on page 9-17.

Action

Step	Action
1	Access the system administration screen and display parallel telemetry port 6 output 18 parameters: **admin ip** ↵ **dtlport 6 18** ↵ *The Telemetry Output Point screen appears.*
2	Access the Edit screen by entering: **edit** ↵
3	Verify that Status is ON. If not, enable port 6 output 18 by entering: **status on** ↵
4	Select the display type, byte and bit: **display monitor 2** ↵ **byte 8** ↵ **bit 5** ↵

—continued—

Procedure 9-8 (continued)
Verifying the parallel telemetry output port (TBM shelf)

Step	Action
5	Remove a fan unit to activate a common equipment failure alarm.
	The Condition field on the user interface screen changes to Active.
6	Connect the telemetry cable (NT4K85GX) to the TBM shelf (see Figure 9-8 on page 9-51) and connect the jumper wire between pin 18 and pin 44 of telemetry cable.
	Output 18 transitions from an open circuit to a closed circuit.
	Table 9-9 on page 9-52 shows the connector pinout.
7	Reinsert the fan unit.
8	Note the completion of this procedure on the Site Test Results Form.
9	Check off this procedure on the System Setup Checklist.

<div align="center">**—end—**</div>

Procedure 9-9
Testing office alarms (TBM shelf)

Use this procedure to test the TBM shelf alarm reporting and proper connections to the office alarms (bells, aisle lamps).

Note: Use an OPC tool to generate the alarms. Since alarms survive warm restarts, if a warm restart occurs during this procedure, simply reenter the tool and quit (alarms are automatically cleared when you exit the tool).

Requirements

The following requirements must be met before starting this procedure:

- Make sure the bay is be in an alarm-free state.
- Obtain a digital multimeter (for example, Fluke 85).
- Access a VT100 terminal connected to the NE.

	CAUTION
⚠	**Risk of traffic loss** Do not attempt to create alarms by removing active circuit packs. Use only channels not carrying live traffic.
	CAUTION
	Risk of static damage Use an antistatic wrist strap. Refer to the safety guidelines in Chapter 1.

—continued—

Procedure 9-9 (continued)
Testing office alarms (TBM shelf)

Action

Step	Action
1	Remove the BIP snap-on cover and open the right-hand side hinged cover to access the alarm wirewrap board (see Figure 9-9 on page 9-57). See Figure 9-10 on page 9-58 for wirewrap functions on the TBM BIP.
2	From the command interpreter (CI) level of the user interface, or any FWPUI screen, access the FiberWorld Alarm Test CI (fwaltsci) tool by entering:

fwaltsci ↵

The "fwaltsci" prompt is displayed.

3	Raise a minor alarm by entering:

raise minor ↵

The office minor alarm bell rings (if connected), the office minor alarm lamp lights (if connected) and the BIP minor alarm lamp lights.

4	Connect the multimeter to the following wirewrap pins (see Figure 9-9 on page 9-57) and verify the following conditions:

> E5 and E17 are open.
>
> E6 and E18 are open.
>
> E29 and E17 are shorted together.
>
> E30 and E18 are shorted together.
>
> E11 and E23 are open.
>
> E12 and E24 are open.
>
> E35 and E23 are shorted together.
>
> E36 and E24 are shorted together.

5	Press, then release the BIP alarm cutoff/lamp test (ACO/LT) push button.

The office minor alarm bell stops (if connected), the office minor alarm amp remains lit (if connected) and BIP minor alarm lamp remains lit.

Procedure 9-9 (continued)
Testing office alarms (TBM shelf)

Figure 9-9
Physical view of the wirewrap board on the TBM BIP

PC-10790
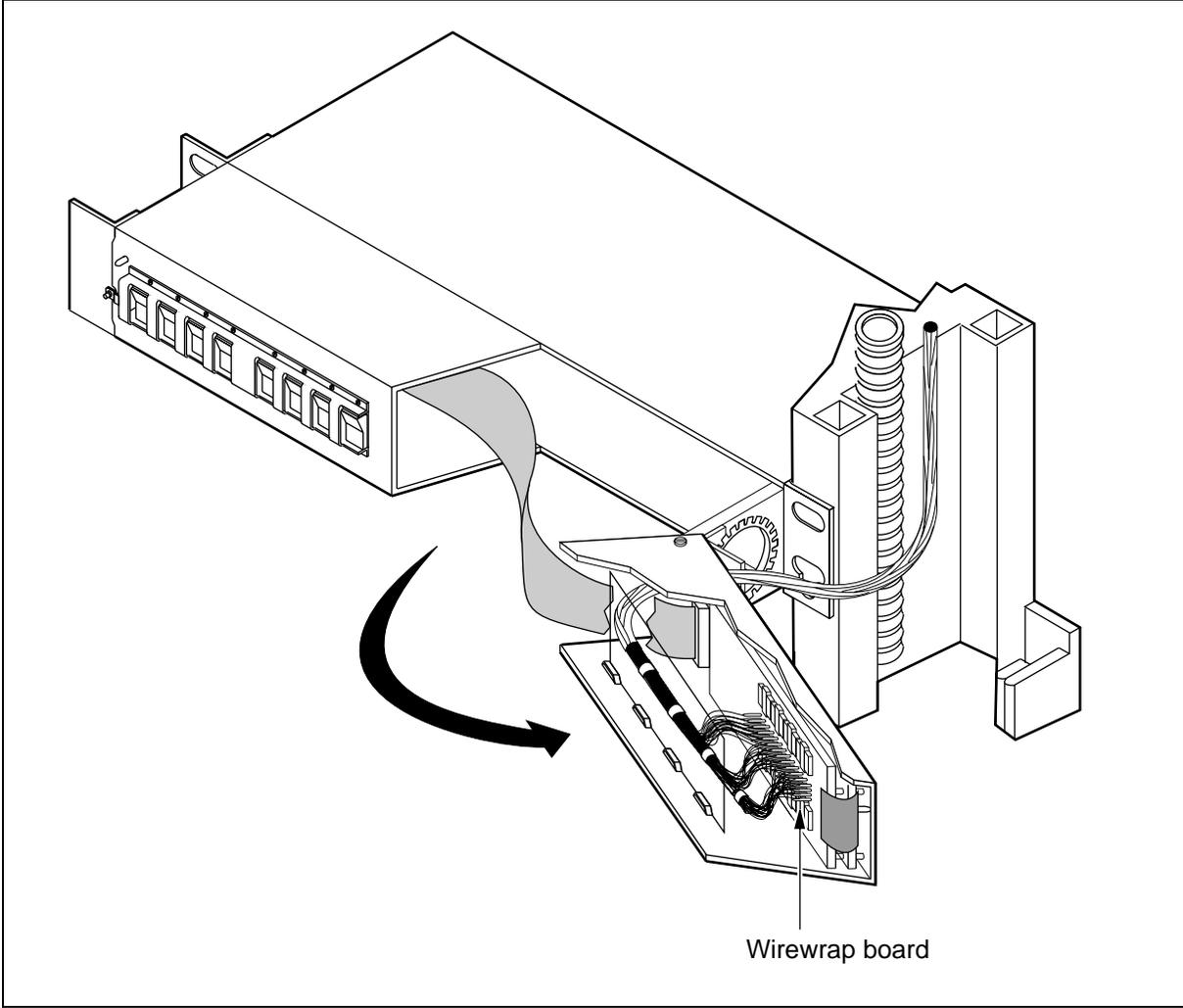
Wirewrap board

—continued—

Procedure 9-9 (continued)
Testing office alarms (TBM shelf)

Figure 9-10
Wirewrap block functions on the TBM BIP

PC-10256

E1	E2	E3	E4	E5	E6	E7	E8	E9	E10	E11	E12
●	●	●	●	●	●	●	●	●	●	●	●
Visual Critical NC	Visual Critical NC	Visual Major NC	Visual Major NC	Visual Minor NC	Visual Minor NC	Audible Critical NC	Audible Critical NC	Audible Major NC	Audible Major NC	Audible Minor NC	Audible Minor NC
E13	E14	E15	E16	E17	E18	E19	E20	E21	E22	E23	E24
●	●	●	●	●	●	●	●	●	●	●	●
Visual Critical COM	Visual Critical COM	Visual Major COM	Visual Major COM	Visual Minor COM	Visual Minor COM	Audible Critical COM	Audible Critical COM	Audible Major COM	Audible Major COM	Audible Minor COM	Audible Minor COM
E25	E26	E27	E28	E29	E30	E31	E32	E33	E34	E35	E36
●	●	●	●	●	●	●	●	●	●	●	●
Visual Critical NO	Visual Critical NO	Visual Major NO	Visual Major NO	Visual Minor NO	Visual Minor NO	Audible Critical NO	Audible Critical NO	Audible Major NO	Audible Major NO	Audible Minor NO	Audible Minor NO
E37	E38	E39	E40	E41	E42	E43	E44	E45	E46	E47	E48
●	●	●	●	●	●	●	●	●	●	●	●
Battery Return	Battery Return	Battery Return	Battery Return	Remote ACO Note 2	Remote ACO Note 2	Battery Return	Battery Return	Battery Return	Battery Return	Battery Return	Battery Return

Legend:

ACO = Alarm cutoff

COM = Common connection

NC = Normally closed connection when there is no alarm condition.

NO = Normally open connection when there is no alarm condition.

Note 1: Common connections (com) pins are actually shorted together. For example, pins E13 and E14, E15 and E16, E17 and E18, and so on, are physically shorted together.

Note 2: When either pin E41 or E42 is momentarily connected to battery return, an ACO of the audible alarm is acivated. Audible alarm points can be cut off by momentary application of a ground to either remote ACO input.

Note: You can turn off the audible alarms at the remote fiber terminal (RFT) by momentarily applying a ground to either pin E41 or E42.

—continued—

Procedure 9-9 (continued)
Testing office alarms (TBM shelf)

Step	Action
6	Connect the multimeter to the following wirewrap pins and verify the following conditions:

> E5 and E17 are open.
>
> E6 and E18 are open.
>
> E29 and E17 are shorted together.
>
> E30 and E18 are shorted together.
>
> E11 and E23 are now shorted together.
>
> E12 and E24 are now shorted together.
>
> E35 and E23 are now open.
>
> E36 and E24 are now open.

7   Clear the minor alarm by entering:

clear minor ↵

The minor alarm lamps (office and BIP) should extinguish and the office minor alarm contacts should return to their normal (no alarm) states.

8   Make sure the bay is alarm-free. Raise a major alarm by entering:

raise major ↵

The office major alarm bell rings (if connected), the office major alarm lamp lights (if connected), and the BIP major alarm lamp lights.

9   Connect the multimeter to the following wirewrap pins and verify the following conditions:

> E3 and E15 are open.
>
> E4 and E16 are open.
>
> E27 and E15 are shorted together.
>
> E28 and E16 are shorted together.
>
> E9 and E21 are open.
>
> E10 and E22 are open.
>
> E33 and E21 are shorted together.
>
> E34 and E22 are shorted together.

10   Press and release the BIP alarm cutoff/lamp test (ACO/LT) push button.

Office major alarm bell stops ringing (if connected), office major alarm lamp is still lit (if connected), and BIP major alarm lamp remains lit.

—**continued**—

Procedure 9-9 (continued)
Testing office alarms (TBM shelf)

Step	Action
11	Connect the multimeter to the following wire-wrap pins and verify the following conditions:
	E3 and E15 are open.
	E4 and E16 are open.
	E27 and E15 are shorted together.
	E28 and E16 are shorted together.
	E9 and E21 are now shorted together.
	E10 and E22 are now shorted together.
	E33 and E21 are now open.
	E34 and E22 are now open.
12	Clear the major alarm by entering:
	clear major ↵
	The major alarm lamps (office and BIP) should extinguish and the office alarm contacts should return to normal (no alarm) states.
13	Make sure the bay is alarm-free. Raise a critical alarm by entering:
	raise critical ↵
	The office critical alarm bell rings (if connected), the office critical alarm lamp lights (if connected), and the BIP critical alarm lamp lights.
14	Connect the multimeter to the following wirewrap pins and verify the following conditions:
	E1 and E13 are open.
	E2 and E14 are open.
	E25 and E13 are shorted together.
	E26 and E14 are shorted together.
	E7 and E19 are open.
	E8 and E20 are open.
	E31 and E19 are shorted together.
	E32 and E20 are shorted together.
15	Press and release the BIP alarm cutoff/lamp test (ACO/LT) push button.
	The office critical alarm bell stops ringing (if connected), the office critical alarm lamp is still lit (if connected), and the BIP critical alarm lamp remains lit.

—**continued**—

Procedure 9-9 (continued)
Testing office alarms (TBM shelf)

Step	Action
16	Connect the multimeter to the following wire-wrap pins and verify the following conditions:

> E1 and E13 are open.
>
> E2 and E14 are open.
>
> E25 and E13 are shorted together.
>
> E26 and E14 are shorted together.
>
> E7 and E19 are now shorted together.
>
> E8 and E20 are now shorted together.
>
> E31 and E19 are now open.
>
> E32 and E20 are now open.

Step	Action
17	Clear the critical alarm by entering:

clear critical ↵

The critical alarm lamps (office and BIP) should extinguish and the office alarm contacts should return to normal (no alarm) states.

Step	Action
18	Quit from the "fwaltsci" tool by entering:

quit ↵

Step	Action
19	Reinstall the BIP cover.
20	Record the results on the Site Test Results Form.
21	Check off this procedure on the System Setup Checklist.

—**end**—

Procedure 9-10
Testing the breaker interface panel modem (TBM shelf)

Use this procedure to test the modem inside the BIP of the TBM shelf. Refer to Figure 9-11 on page 9-65.

Requirements

The following requirements must be met before starting this procedure:

- Make sure a modem is installed in the TBM BIP and the BIP modem cable is connected to port 1 on the TBM shelf.
- Access a VT100-compatible terminal, a connecting cable, and a second modem.

Action

Step	Action
1	Connect a 9-pin to 25-pin straight cable between the BIP modem and the VT100 terminal. The terminal is used to view the status of the modem.
2	Enter the following to view the status of the modem S0 register. This determines the number of rings after which the modem answers a call:
	Enter:
	at ↵
	The modem response displayed on the terminal is OK.
	Enter:
	ats0? ↵
	The modem returns the programmed number of rings. This value ranges from 000 to 255. If the S0 register is set to 000, the modem will not answer calls.
3	Set the S0 register to 1 ring by entering:
	ats0=001
	Check that the modem has updated the S0 register by entering:
	ats0?
	The terminal displays 001. The modem answers on the first ring.

—continued—

Procedure 9-10 (continued)
Testing the breaker interface panel modem (TBM shelf)

Step	Action
4	Disconnect the 9-pin to 25-pin terminal cable for the VT100 terminal from the DB-9 connector on the BIP modem. Connect the BIP modem cable to the DB-9 connector on the BIP modem. The other end of the BIP modem cable is connected to port 1 on the TBM shelf.
5	Log in to the network element (NE) with the BIP modem.
	If you do not know how to do this, refer to the procedure "Logging in to the network element, and logging out" in *Network Element User Interface Description*, 323-3001-300, in the *Operations, Administration, and Provisioning,* Volume 4A.
6	Make sure the baud rate for user interface port 1 is set to 2400, by entering:
	admin ip↵
	dtlport 1 ↵
	chgstate oos ↵
	y ↵
	edit ↵
	baudrate 2400 ↵
	quit
	chgstate is ↵
7	By dialing in through a second modem at 2400 baud, perform a remote user interface login. If you do not know how to do this, refer to *Network Element User Interface Description*, 323-3001-300, in the *Operations, Administration, and Provisioning,* Volume 4A. Make sure the communication is correctly established. Refer to the following tables for remote terminal and remote modem settings.

—continued—

Procedure 9-10 (continued)
Testing the breaker interface panel modem (TBM shelf)

Step	Action

For an external modem, use the following modem parameters:

Parameter	Value
Enable DTR recognition	ON
Provide word result codes	ON
Send result codes	ON
Echo commands	OFF
Auto-answer	ON
Carrier detect	ON
RJ-11 jack	ON
Enable commands	OFF

Configure the remote terminal for VT100 emulation and use the following parameters:

Parameter	Value
emulation	VT100
data bits	8
stop bits	1
parity	none
echo	no local echo (full duplex)
baud rate	2400 (default for modem port)

8 Log out from the NEUI and then remove the modem connection.

9 If desired, verify the BIP modem automatic baud rate detection capability by dialing in at 1200 baud. To establish and test the connection, perform steps 6 though 8 using 1200 baud instead of 2400 baud.

Note: Although the BIP internal modem has automatic baud rate detection capability, user interface port 1 must be provisioned for the proper baud rate upon transmission speed modifications or system startup.

10 Note the completion of this procedure on the Site Test Results Form.

11 Check off this procedure on the System Setup Checklist.

—continued—

Procedure 9-10 (continued)
Testing the breaker interface panel modem (TBM shelf)

Figure 9-11
Connecting the user interface cable to the 9-pin connector on the BIP modem
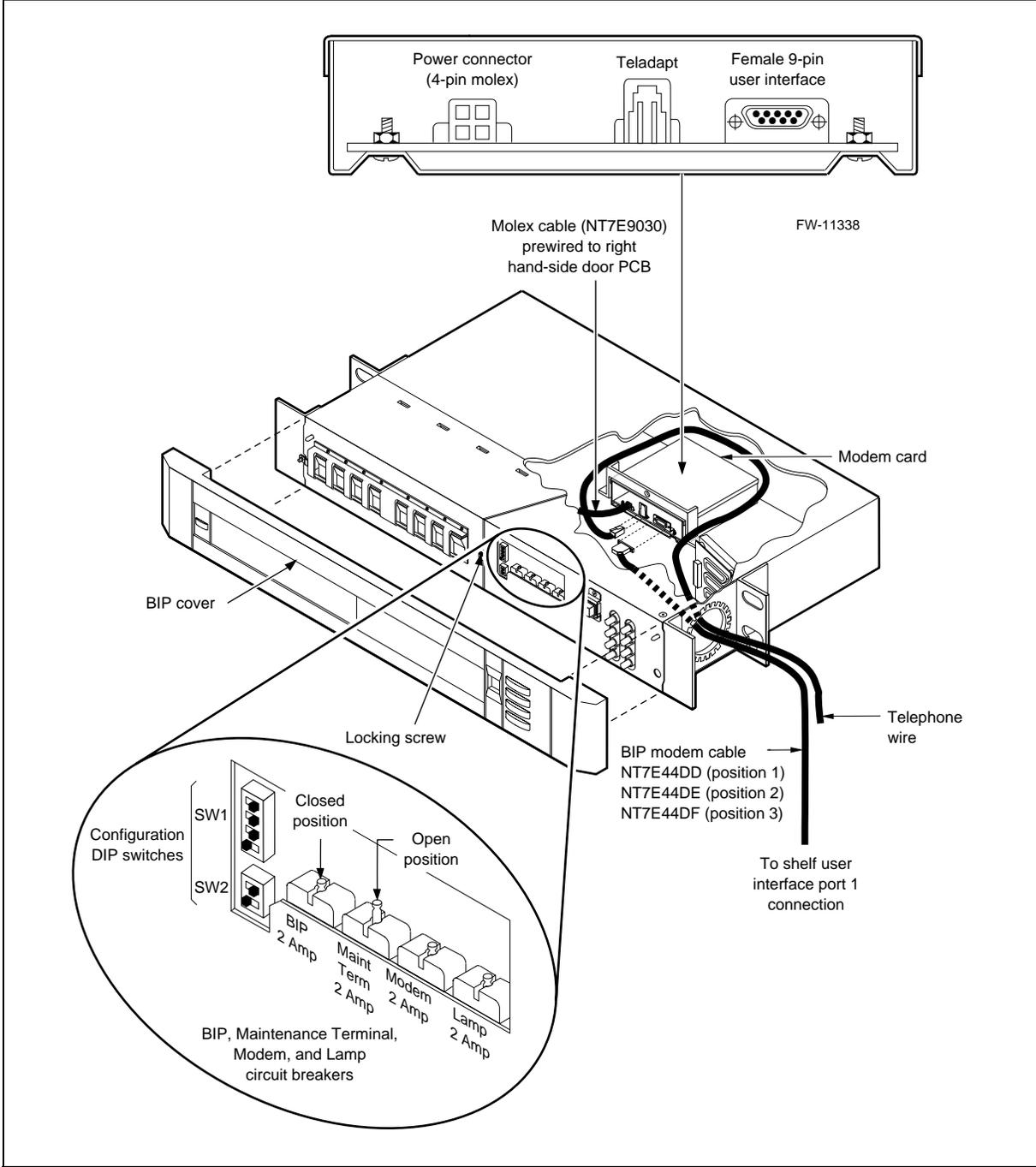
—**end**—

Appendix A:
System setup checklist

This appendix has the master copy of the System Setup Checklist. The System Setup Checklist lists the procedures that must be performed and the order in which these procedures should be performed for your configuration.

The System Setup Checklist is five pages long. Each page is on a right-hand page, suitable for photocopying. Complete one copy of the checklist in this chapter for each network element (NE) in the system. Insert your measured values as indicated in the form.

You can also use the System Setup Checklist to record the completion of each procedure. If a procedure cannot be successfully completed, list details of any problems you encountered on a separate sheet of paper and attach it to the System Setup Checklist.

SONET Products

System Setup Checklist

Page 1 of 5

System name: _____

System configuration: _____

OPC span of control system name: _____

OPC name: _____

OPC serial number _____

Customer: _____

Project: _____

COEO/Customer #: _____

Fiber World Product Release _____

Tested by: _____

Date: _____

System Setup Checklist (continued)		Page 2 of 5
Procedure and items tested		**Results**
NE name: _____		
NE location: _____		NEID: _____ _____
NE shelf function: _____ (FCOT, RFT)		Shelf serial number:
NE shelf type: _____ (ABM, TBM)		_____ _____
Procedure 2-1	Inspecting the network element	pass _____
Procedure 2-2	Verifying power at the BIP (TBM shelf) (if applicable) battery1/return1 (RFT) battery2/return2 (RFT) battery3/return3 (RFT) battery4/return4 (RFT)	(required: −42 to −56 V dc) _____ V dc _____ V dc _____ V dc _____ V dc
Procedure 2-3	Verifying power at the BIP (ABM shelf)	pass _____
Procedure 2-4	Equipping the ABM, CDS shelves, and BIP with circuit packs	pass _____
Procedure 2-5	Powering up the common equipment (ABM shelf)	pass _____
Procedure 2-6	Inserting circuit packs (TBM shelf)	
Procedure 2-7	Powering up the common equipment (TBM shelf)	
Procedure 3-1	Detecting and removing existing OPC software	pass _____
Procedure 3-2	Installing software on a local OPC and NE from tape	pass _____
Procedure 3-3	Verifying the OPC serial number	pass _____
Procedure 3-4	Sending a load to the processors	pass _____
Procedure 3-5	Entering system-level data	pass _____
Procedure 3-6	Entering network element commissioning data	pass _____
Note: Attach a copy of your system's configurations from the *Mapper Layouts Planning Guide*, 323-3001-154, in the *Engineering, Configuration, and Ordering Guide*, Volume 1.		
—continued—		

System Setup Checklist (continued)		Page 3 of 5
Procedure and items tested		**Results**
Procedure 3-7	Downloading software to a network element	pass _____
Procedure 3-8	Setting the network element name	pass _____
Procedure 3-9	Verifying circuit packs	pass _____
Procedure 4-1	Adding and configuring a ring	pass _____
Procedure 4-2	Setting the timing reference source	pass _____
Procedure 4-3	Setting the ESI target clock mode	pass _____
Procedure 4-4	Setting the network synchronization	pass _____
Procedure 4-5	Setting the ESI external timing reference input parameters	pass _____
Procedure 4-6	Setting the OC-12 VTBM target clock mode	pass _____
Procedure 4-7	Provisioning synchronization-status messaging	pass _____
Procedure 4-8	Upgrading to synchronization-status messaging	pass _____
Procedure 4-9	Provisioning DS1 facility parameters	pass _____
Procedure 4-10	Adding a new host to an RFT	pass _____
Procedure 4-11	Adding an STS connection	pass _____
Procedure 4-12	Adding a VT connection	pass _____
Procedure 4-13	Editing a VT connection	pass _____
Procedure 4-14	Saving OPC data to tape	pass _____
Procedure 4-15	Performing a manual NE database backup	pass _____
Procedure 4-16	Transferring data from the primary to the backup OPC	pass _____
Procedure 4-17	Unassigning call reference values	pass _____
—continued—		

System Setup Checklist (continued)		Page 4 of 5
Procedure and items tested		**Results**
Procedure 5-1	Verifying the presence of the network element software	pass _____
Procedure 5-2	Powering up the line equipment	pass _____
Procedure 5-3	Testing equipment LEDs and lamps	pass _____
Procedure 5-4	Performing a circuit pack inventory	pass _____
Procedure 5-5	Diagnosing failed circuit packs	pass _____
Procedure 5-6	Verifying redundant common-equipment cards	pass _____
Procedure 5-7	Testing the copper-distribution shelves	pass _____
Procedure 6-1	Cleaning optical connectors on patch cords	pass _____
Procedure 6-2	Cleaning optical connectors inside circuit packs	pass _____
Procedure 6-3	Measuring transmitted optical power	pass _____
Procedure 6-4	Verifying optical cable integrity	pass _____
Procedure 6-5	Measuring optical receiver sensitivity	pass _____
Procedure 6-6	Testing optical protection switching	pass _____
Procedure 7-1	Verifying DS1 transmission test set performance	pass _____
Procedure 7-2	Performing initial DS1 provisioning	pass _____
Procedure 7-3	Verifying DS1 signal continuity	pass _____
Procedure 7-4	Testing DS1 protection switching	pass _____
Procedure 8-1	Verifying DS3 transmission test set performance	pass _____
Procedure 8-2	Performing initial DS3 or STS-1 provisioning	pass _____
Procedure 8-3	Verifying DS3 or STS-1 signal continuity	pass _____
—continued—		

System Setup Checklist (continued)	Page 5 of 5
Procedure and items tested	**Results**
Procedure 9-1 Verifying the serial telemetry interface	pass _____
Procedure 9-2 Verifying the parallel telemetry input port (ABM shelf)	pass _____
Procedure 9-3 Verifying the parallel telemetry output port (ABM shelf)	pass _____
Procedure 9-4 Testing MBP/MPP power and environmental alarms	pass _____
Procedure 9-5 Testing alarms on the Series 800A outside plant cabinet	pass _____
Procedure 9-6 Testing office alarms (ABM shelf)	pass _____
Procedure 9-7 Verifying the parallel telemetry input port (TBM shelf)	pass _____
Procedure 9-8 Verifying the parallel telemetry output port (TBM shelf)	pass _____
Procedure 9-9 Testing office alarms (TBM shelf)	pass _____
Procedure 9-10 Testing the breaker interface panel modem (TBM shelf)	pass _____
—end—	

Appendix B:
Commissioning data record form

This appendix has a blank copy of the Commissioning Data Record Form, suitable for photocopying. Use a copy of this form to keep a permanent record of all commissioning data.

Note: Photocopy these blank pages and keep them for future use.

Commissioning Data Record Form				Page 1 of 2	
System-level commissioning data					
Network name:				Primary OPC	Backup OPC
System name:		Serial #			
System type:		Alias			
OPC name:		Time zone			
Remote OPC commissioning data					
	Primary OPC		Backup OPC		
OPC Name	Serial #	Alias	Serial #	Alias	
Network element commissioning data					
NE #	Shelf type Shelf function	Transm. rate	Shelf serial # Software rel.	NE name NE location	Time zone
—continued—					

Commissioning Data Record Form (continued)					Page 2 of 2
NE #	Shelf type Shelf function	Transm. rate	Shelf serial # Software rel.	NE name NE location	Time zone
—end—					

Appendix C:
STS connection information form

This appendix has a blank copy of the STS Connection Information Form, suitable for photocopying. Use a copy of this form list the STS connections you want to set up.

Note: Photocopy this blank form and keep it for future use.

STS Connection Information Form

Configuration name					
Connec-tion ID	**STS channel(s)**	**End NE A**	**Tributary at End NE A** (CPG and slot)	**End NE Z**	**Tributary at End NE Z** (CPG and slot)
Configuration name					

Appendix D:
VT connection information form

This appendix has a blank copy of the VT Connection Information form, suitable for photocopying. Use a copy of this form to list the VT-managed STS-1 and VT1.5 connections you want to set up.

Note: Photocopy this blank form and keep it for future use.

VT Connection Information Form

Configuration name					
STS connec-tion ID	**STS channel**	**VT connec-tion ID**	**VT group and number**	**End NE A**	**Tributary at End NE A** (CPG and slot)

Appendix E:
Site test results form

A master copy of the Site Test Results Form is in this appendix. Use this form to record the completion of each test.

> *Note:* You may not have to do all the tests on the Site Tests Results form. You may also test in a different order than the order found on the Site Tests Results form.

The Site Tests Results form is six pages long. Each page is on a right-hand page so that the form can be copied. This form should be completed for both the fiber central office terminal (FCOT) and remote fiber terminal (RFT).

If you have completed a test and it is working as required, insert a check mark in the "pass _____" field. Or, insert your measured value, if this is indicated in the form.

If a test is not successfully completed, please list pertinent details on a separate sheet of paper.

SONET Products

Site Test Results Form

Page 1 of 6

System: _____

Location name: _____

Location type:
(CO or remote) _____

Shelf type
(ABM or TBM) _____

Customer: _____

Project: _____

COEO/Customer #: _____

FiberWorld Product Release _____

Tested by: _____

Date: _____

Site Test Results Form (continued)	Page 2 of 6
Procedure and items tested	**Results**
Verifying basic network element operation (Login to network element from OPC)	pass _____
Setting the offset from Greenwich Mean Time	_____ min (Apr-Oct) _____ min (Oct-Apr)
Enabling and disabling the TIC/STS-1 and VT1.5 alarms	pass _____
Powering up the line equipment	pass _____
Testing equipment LEDs and lamps	pass _____
Performing a circuit pack inventory	pass _____

Diagnosing failed circuit packs
     common-equipment shelf
     copper-distribution shelf
	
	 pass _____
	 pass _____

Verifying redundant common-equipment cards • verifying processor redundancy • verifying TIC redundancy • verifying LIC redundancy	pass _____ pass _____ pass _____ CDS1 pass _____ CDS2 pass _____ CDS3 pass _____ CDS4 pass _____ CDS5 pass _____ CDS6 pass _____ CDS7 pass _____
Testing the copper-distribution shelves	CDS1 pass _____ CDS2 pass _____ CDS3 pass _____ CDS4 pass _____ CDS5 pass _____ CDS6 pass _____ CDS7 pass _____
—continued—	

Site Test Results Form (continued)	Page 3 of 6
Procedure and items tested	**Results**
Measuring transmitted optical power Requirement, minimum tx optical power: long reach OC-3 unit: -5.0 dBm intermediate reach OC-3 unit: -15.0 dBm long reach OC-12 unit: -3.0 dBm intermediate reach OC-12 unit: -4.5 dBm OC-3/OC-12 unit reach (LR/IR): _____ PEC: _____	actual tx opt. power: G1 OC-3/OC-12 –_____ dBm G2 OC-3/OC-12 –_____ dBm

Verifying optical cable integrity
 	
Requirement:
tx cable is within 2 dB of actual tx opt. power
rx cable is within 4 dB of actual tx opt. power
 	
        tx cable from G1 OC-3/OC-12 :
        rx cable to G1 OC-3/OC-12 :
        tx cable from G2 OC-3/OC-12 :
        rx cable to G2 OC-3/OC-12 :
	
	– _____ dBm
	– _____ dBm
	– _____ dBm
	– _____ dBm

Verify DS1 transmission test set performance (if applicable)	pass _____
Perform initial DS1 provisioning (if applicable) Line build-out (short, medium, or long):	pass _____ _____

Verify DS1 signal continuity (if applicable)
        DS1/VT mapper in slot # _____
        DS1/VT mapper in slot # _____
        DS1/VT mapper in slot # _____
        DS1/VT mapper in slot # _____
        DS1/VT mapper in slot # _____
        DS1/VT mapper in slot # _____
        DS1/VT mapper in slot # _____
        DS1/VT mapper in slot # _____
	
	pass _____
	pass _____
	pass _____
	pass _____
	pass _____
	pass _____
	pass _____
	pass _____

—continued—	

Site Test Results Form (continued)	Page 4 of 6
Procedure and items tested	**Results**
Measuring optical receiver sensitivity	
At minimum level of G1 OC-3/OC-12 in slot # 9	_____ errors
_____ dB G2 OC-3/OC-12 in slot #10	_____ errors
At maximum level of G1 OC-3/OC-12 in slot # 9	_____ errors
_____ dB G2 OC-3/OC-12 in slot #10	_____ errors
Testing optical protection switching (using DS1s) (if applicable)	
Manual switching	pass _____
Automatic switching (signal loss)	pass _____
Forced switching (and override of automatic switching)	pass _____
Lockout from switching	pass _____
Automatic switch (signal degrade)	pass _____
Testing DS1 protection switching (if applicable)	
Manual switching	pass _____
Automatic switching (signal loss)	pass _____
Forced switching (an override of automatic switching)	pass _____
Lockout from switching	pass _____
Automatic switch (signal degrade)	pass _____
Priority switching	pass _____
Verifying DS3 transmission test set performance	pass _____
Performing initial DS3 provisioning (if applicable)	pass _____
Line build-out (short, medium, or long):	_____
Verifying DS3/STS-1 signal continuity (if applicable)	
DS3/STS mapper or STS-1 interface card in slot # _____	pass _____
DS3/STS mapper or STS-1 interface card in slot # _____	pass _____
DS3/STS mapper or STS-1 interface card in slot # _____	pass _____
DS3/STS mapper or STS-1 interface card in slot # _____	pass _____
—continued—	

Site Test Results Form (continued)	Page 5 of 6
Procedure and items tested	**Results**
Measuring optical receiver sensitivity	
At minimum level of G1 OC-3/OC-12 in slot # 9	_____ errors
_____ dB G2 OC-3/OC-12 in slot #10	_____ errors
At maximum level of G1 OC-3/OC-12 in slot # 9	_____ errors
_____ dB G2 OC-3/OC-12 in slot #10	_____ errors
Testing optical protection switching (using DS3s/STS-1s) (if applicable)	
Manual switching	pass _____
Automatic switching (signal loss)	pass _____
Forced switching (and override of automatic switching)	pass _____
Lockout from switching	pass _____
Automatic switch (signal degrade)	pass _____
Setting up the external synchronization interface (FCOT only)	pass _____
Setting the ESI timing reference parameters (FCOT only)	pass _____
Verifying the serial telemetry interface	pass _____
Verifying the parallel telemetry input port	pass _____
Verifying parallel telemetry output port	pass _____
Testing MBP/MPP power and environmental alarms (if applicable)	pass _____
Testing alarms on the Series 800A outside plant cabinet (if applicable)	pass _____
—continued—	

Site Test Results Form (continued)	Page 6 of 6
Procedure and items tested	**Results**
Testing office alarms	
minor office alarms, audible and visible	pass _____
major office alarms, audible and visible	pass _____
critical office alarms, audible and visible	pass _____
Testing the breaker interface panel modem (TBM shelf) (if applicable)	pass _____
Perform a manual NE database backup (if applicable)	pass _____
Save OPC data to tape (if applicable)	pass _____
Verifying OC-3 tributary SONET test set performance	pass _____
Optical interface receiver sensitivity tests	pass _____
DS1 switching tests	pass _____
DS3 switching tests	pass _____
Connecting the network element to the system	pass _____
Setting up synchronization end-to-end	pass _____
Provisioning DS1s for an integrated configuration (FCOT only)	pass _____
Provisioning a new host for an RFT	pass _____
Assigning a service for a DS1	pass _____
Installing the shelf cover	pass _____
Closing the doors of the Series 800A outside plant cabinet, or Installing the MBP cabinet covers	pass _____
—end—	

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Setting Up Your System: VTBM

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