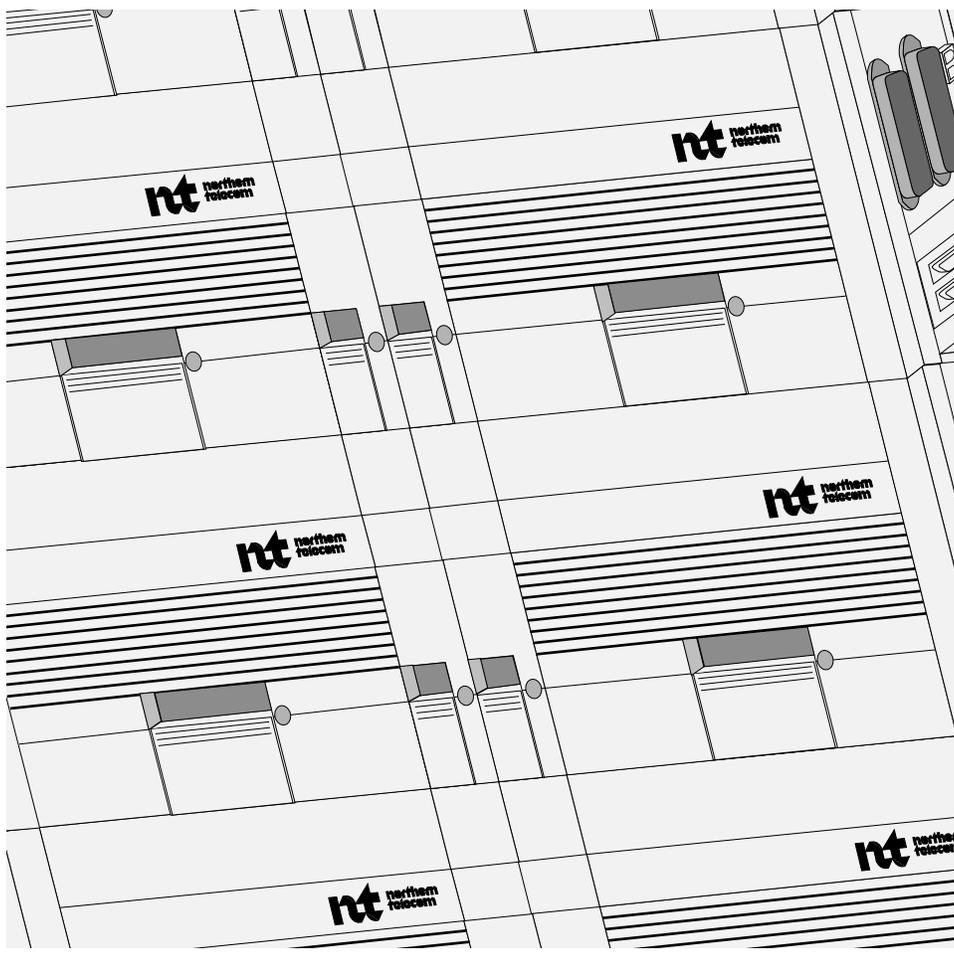SONET Products

AccessNode

DS1 Feeder Testing Procedures

Issue 2.0   June 1999

SONET Products

AccessNode

DS1 Feeder Testing Procedures

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AN17 Standard Issue 2.0 of the document. TR-08 was added to this release.

February 1999

AN16 Standard Issue 1.0 of the document. For this issue, the following updates were made:

- Updated cooling unit illustration in chapter 2
- Updated BIP information in chapters 2 and 4
- Added TBOSTEST information to chapter 4
- Updated screen information in chapters 4 and 6
- Deleted all references to FST in the book

June 1998

AN15 Standard 01.01 release of the document. AD2000-compliant screens added to Chapter 6.

September 1997

AN14 Standard 01.01 release of the document.

July 1996

AN12 Standard 01.01 release of the document.

November 1995

AN11 Standard release of the document.

April 1995

AN10 Standard release of the document.

Contents

About this document

Use this document to conduct in-bay (site) and end-to-end (system) tests on system equipment in copper-fed applications. Use the procedures in this document to test DS1 equipment, common equipment, copper-distribution shelves (CDSs), and system integrity.

> *Note:* Detailed line card testing is described in *Line Card Testing Procedures*, 323-3001-316 in *Operations, Administration, and Provisioning*, Volume 4B.

Audience

Maintenance technicians and experienced installers from Nortel Networks or other telephone operating companies should use this document.

How to use this document

Use this document to perform the site and system testing procedures for a DS1-fed system (DFA). These procedures must be performed on each network element (NE) after it is commissioned. To help provide an overview of the DS1 testing process, flowcharts and document task lists are provided in Chapter 1.

AD2000 Readiness

The latest software release ensures smooth transition to year 2000 for AccessNode and AccessNode Express products. Specifically:

- The transition from December 31, 1999 to January 1, 2000 is smooth and does not affect service or any equipment OAM&P activities.

- Year 2000 is recognized as a leap year.

- The system correctly interprets a "YY" date entry (for any date between 1995-1-1 and 2036-12-31). For example, a YY=25 entry is interpreted as 2025, not as 1925.

This book contains AD2000-compliant screen captures.

Warnings and safety precautions

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

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

Samples of danger and caution warnings follow.

	DANGER **Risk of personal injury** A danger warning informs the reader of a risk of personal injury.

	CAUTION **Risk of service interruption or equipment damage** A caution warning informs the reader of a risk of service interruption or equipment damage.

	DANGER **Risk of electric shock** This warning advises you of a possible electrical hazard. When you see this warning, proceed with care, to avoid personal injury.

OPC Procedures

The operations controller (OPC) procedures in this document (although character-mode terminal (CMT) based) can be performed from a graphical terminal, however you must substitute the CMT keystrokes that are provided in the procedures with the graphical equivalent.

References in this document

This document refers to the following documents:

Engineering, Configuration, and Ordering Guide, Volume 1

- *Mapper Layouts Planning Guide*, 323-3001-154
- *Line Card Applications and Special Services Engineering*, 323-3001-155
- *Site Installation Planning and Engineering*, 323-3001-200

Description, Volume 2A

- *Alarms and Surveillance Description,* 323-3001-104

Commissioning and Testing, Volume 3A

- *Setting Up Your System: VTBM,* 323-3001-230
- *Setting Up Your System: DFA,* 323-3001-235
- *Setting Up Your System: Point-to-Point,* 323-3001-240
- *Setting Up Your System: Single-Ended,* 323-3001-245

Commissioning and Testing, Volume 3B

- *Optional Commissioning Procedures,* 323-3001-220
- *Site Testing Procedures*, 323-3001-221

Operations, Administration, and Provisioning, Volume 4A

- *Network Element User Interface* 323-3001-300
- *OPC User Interface Description*, 323-3001-301
- *System Administration Procedures*, 323-3001-302
- *Data Administration Procedures*, 323-3001-304

Operations, Administration, and Provisioning, Volume 4B

- *Provisioning and Operations Procedures*, 323-3001-310
- *Line Card Provisioning Procedures*, 323-3001-315
- *Line Card Testing Procedures*, 323-3001-316

Operations, Administration, and Provisioning, Volume 4C

- *System Expansion Procedures*, 323-3001-324

Maintenance, Volume 5A

- *Alarm and Trouble Clearing Procedures*, 323-3001-543

Maintenance, Volume 5C

- *Network Surveillance Procedures*, 323-3001-510

- *Routine Maintenance Procedures*, 323-3001-546

- *Module Replacement Procedures*, 323-3001-547

To test a remote fiber terminal installed in a Modular Business Package (MBP), the following additional documents are required:

Installation documents

- *Modular Business Package Installation Manual,* 323-3001-206

- *Bay in Central Office Installation Manual—ABM*, 323-3001-201

- *Bay in Central Office Installation Manual—TBM*, 323-3001-202

MPR25/MPR15 (NT5C06)

- *Switch Mode Rectifier,* 169-2071-500

To test an RFT installed in a Series 800A outside plant cabinet (OSP), the following document is required:

- *Series 800A Outside Plant Cabinet Installation Manual*, 323-3001-210

Overview of DS1 feeder testing

This chapter provides an overview for site testing a new DS1-fed (DFA) system that includes flow charts and tasks lists. Site testing a network element (NE) can only be performed after the NE is commissioned. For commissioning an NE, refer to the appropriate Setting Up Your System guide, in *Commissioning and Testing*, Volume 3:

- S*etting Up Your System: VTBM*, 323-3001-230
- *Setting Up Your System: DFA*, 323-3001-235
- *Setting Up Your System: Point-to-Point*, 323-3001-240
- *Setting Up Your System: Single-Ended*, 323-3001-245

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 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 PRECAUTION
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 goldplated 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 degrees C, because boards may 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.

CAUTION
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 S/DMS 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 and field-repair personnel of the problem.

- Identify to central-office personnel what fibers are damaged.

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

Putting a system into service

Use the following steps to put an installed system into service.

- Inspect the equipment, install the circuit packs, power up the NE and load the software. Refer to *Optional Commissioning Procedures*, 323-3001-220, in *Commissioning and Testing*, Volume 3B for these steps.

- Commission the system and each NE. This provides each NE with a unique identity and gives the operations controller (OPC) NE identification for the network elements in the OPC span of control. Refer to *Optional Commissioning Procedures*, 323-3001-220, in *Commissioning and Testing*, Volume 3B for these steps.

- Perform site tests on every commissioned NE to verify that the NEs are operational in isolation. Site testing is described in this document.

- Prepare for system integration, such as backing up commissioning data, and connecting the copper cables to each tested NE as described in Chapter 5 of this document.

- Set up end-to-end synchronization and perform system integrity tests. These procedures are found in *Commissioning and Testing*, Volume 3.

- To make the tested system ready for service, provision the customer services and test the line cards. Provisioning is described in *Provisioning and Operations Procedure*s, 323-3001-310, in *Operations, Administration, and Provisioning,* Volume 4B. Line card testing for NEs is described in *Line Card Testing Procedures*, 323-3001-316, in *Operations, Administration, and Provisioning,* Volume 4B.

Other testing documents in the library include the following:

- *System Expansion Procedures*, 323-3001-324, in *Operations, Administration, and Provisioning,* Volume 4C, is used to test new functionality on an in-service system.

- *Routine Maintenance Procedures*, 323-3001-546, in *Maintenance,* Volume 5C, is used to test equipment on a routine basis.

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.

Task lists and flowcharts for DS1 feeder testing

Use the flowcharts and task lists on the following pages to guide you through site testing your system.

Figure 1-1
Flowchart for site testing a remote fiber terminal (RFT) in a DFA system

Verify the RFT	Refer to the task list on page 1-6.
↓	
Perform DS1 in-bay tests	
↓	
Perform telemetry and alarm tests	
↓	
Prepare the RFT for system integration	
↓	
Perform system testing procedures	
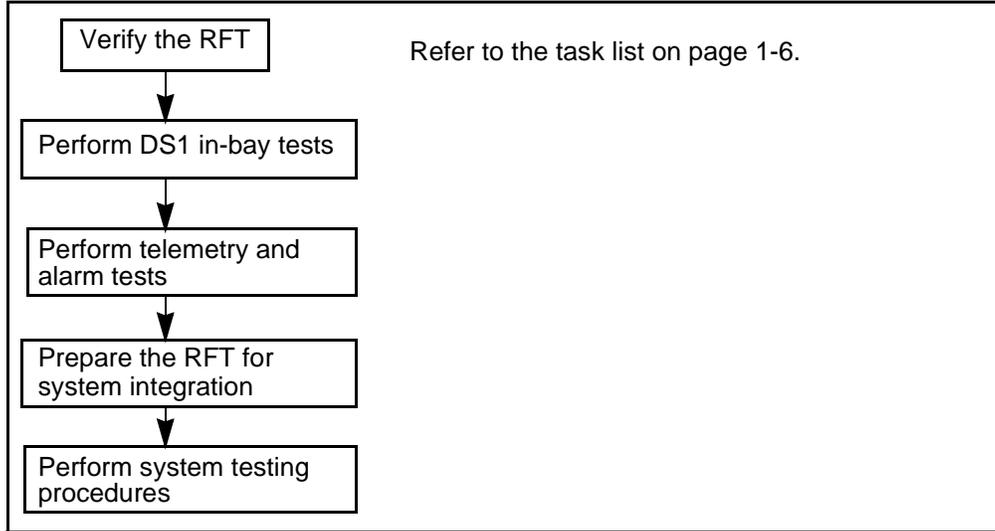
Table 1-1
Task list for site testing a remote fiber terminal (RFT) in a DFA system or an OPC shelf

If you want to perform this task	Then perform these procedures	Found in the NTP or on the following page
Verify the RFT	Procedure 2-1 Enable and disable TIC/STS-1 and VT1.5 alarms	page 2-2
	Procedure 2-2 Power up the line equipment (skip procedure for OPC shelves)	page 2-7
	Procedure 2-3 Test lamps and LEDs	page 2-10
	Procedure 2-4 Perform circuit pack inventory	page 2-18
	Procedure 2-5 Diagnose failed circuit packs	page 2-23
	Procedure 2-6 Verify redundant common-equipment cards	page 2-28
—continued—		

Table 1-1 (continued)
Task list for site testing a remote fiber terminal (RFT) in a DFA system or an OPC shelf

If you want to perform this task	Then perform these procedures	Found in the NTP or on the following page
	Procedure 2-7 Test the copper-distribution shelves (skip procedure for OPC shelves)	page 2-34
	Procedure 2-8 Verify DS1 signal continuity (skip procedure for OPC shelves)	page 2-41
Perform DS1 in-bay tests	Procedure 3-1 Verify DS1 transmission test set performance	page 3-3
	Procedure 3-2 Perform initial DS1 provisioning	page 3-5
	Procedure 3-3 Test DS1 cables and input/output cards	page 3-9
	Procedure 3-4 Test DS1 protection switching	page 3-14
	Procedure 3-5 Test DS1 signal continuity	page 3-22
Perform DS1 in-bay tests (continued)	Procedure 3-6 Test TXC protection switching	page 3-26
Perform telemetry and alarm tests	Procedure 4-1 Verify the serial telemetry interface	page 4-3
	Procedure 4-2 Verify the parallel telemetry input port - ABM	page 4-13
	Procedure 4-3 Verify the parallel telemetry output port - ABM	page 4-17
	Procedure 4-4 Test the MBP/MPP power and environmental alarms (if applicable)	page 4-25
	Procedure 4-5 Test alarms on the Series 800A outside plant cabinet (if applicable)	page 4-34
	Procedure 4-6 Test the office alarms - ABM	page 4-43
—continued—		

Table 1-1 (continued)
Task list for site testing a remote fiber terminal (RFT) in a DFA system or an OPC shelf

If you want to perform this task	Then perform these procedures	Found in the NTP or on the following page
Prepare the OPC shelf for system integration	Procedure 5-1 Connect the network element to the system	page 5-3
	Procedure 5-2 Test TXC synchronization	page 5-5
	Procedure 5-3 Set the TXC timing reference parameters	page 5-8
	Procedure 5-4 Back up and restore the NE database to the OPC	page 5-13
	Procedure 5-5 Verify OPC data backup and restoration	page 5-17
	Procedure 5-6 Verify communication between primary and backup OPCs	page 5-20
	Procedure 5-7 Test remote network telemetry	page 5-22
—end—		

Verifying the network element

Use this chapter to verify the common-equipment shelf and the copper-distribution shelves (CDSs) (if equipped). Perform these procedures after the network element (NE) is commissioned.

How to use this chapter

Before proceeding with this chapter, refer to the flowcharts and task lists in Chapter 1 to identify the procedures that must be completed in this chapter.

Chapter task list

The following table lists the topics in this chapter. These topics are the procedures that you follow to help you verify the network element.

Topic	See
Enabling and disabling TIC STS-1 and VT1.5 alarms	page 2-2
Powering up the line equipment	page 2-7
Testing lamps and LEDs	page 2-10
Performing a circuit pack inventory	page 2-18
Diagnosing failed circuit packs	page 2-23
Verifying redundant common-equipment cards	page 2-28
Testing the copper-distribution shelves	page 2-34
Verifying DS1 signal continuity	page 2-41

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

Procedure 2-1
Enabling and disabling TIC STS-1 and VT1.5 alarms

Use this procedure to enable or disable synchronous transport signal-1 (STS-1) and virtual tributary 1.5 (VT1.5) facility alarms that are associated with the transport interface card (TIC) facility.

The default STS-1s are assigned as follows for a point-to-point configuration:

Point to point configuration for a	Then use the following STS-1 assignment
GR-303 DMS/MVI configuration	STS-1 #1
UDLC configuration	STS-1 #2
TR-08 configuration systems (1–7)	STS-1 #1
TR-08 configuration systems (8–21)	STS-1 #2 and STS-1 #3
combined configuration	STS-1 #1 and STS-1 #2

The default STS-1s are assigned as follows for a DS1-fed AccessNode (DFA) configuration:

DS1-fed AccessNode (DFA) configuration for	Then use the following STS-1 assignment
GR-303 DMS/MVI, TR-08, DS1 tandem and Operations Maintenance Channel (OMC) links	STS-1 #1
additional OMC links only	STS-1 #2

The VT1.5s are assigned as follows:

Configuration for a	Then the following VT1.5s are used with the STS-1
GR-303 DMS/MVI configuration	up to 28 VT1.5s on STS-1 #1
UDLC configuration	up to 28 VT1.5s on STS-1 #2
TR-08 configuration	up to 28 VT1.5s on STS-1 #1

In a TR-08 configuration, VT1.5s 1, 5, 9, 13, 17, 21, and 25 are used for the "A" span on STS-1 #1. This corresponds to DS1 ports 1, 5, 9, and 13 on DS1 card #1 and DS1 ports 3, 7, and 11 on DS1 card #2 respectively.

—continued—

Procedure 2-1 (continued)
Enabling and disabling TIC STS-1 and VT1.5 alarms

Note 1: Disable alarms associated with unused STS-1s and VT1.5s.As an alternative to disabling alarms for unused VT1.5s, you can take the VT1.5s out of service. This prevents unnecessary alarms from being raised.

Note 2: Refer to *Provisioning and Operations Procedures*, 323-3001-310, in *Operations, Administration, and Provisioning*, Volume 4B, for details.

Requirements

Before starting this procedure, you must:

- read the command conventions described in *Network Element User Interface Description*, 323-3001-300 in the *Operations, Administration, and Provisioning,* Volume 4A

- connect a VT100-compatible terminal to the network element (NE) as specified in *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 TIC Facility Screen for the STS-1 that requires alarms to be provisioned: **fa tic <sts #>**↵ **where** <sts #> is the number of the STS-1 facility: **1** to **6**. *The TIC Facility Screen is displayed for the selected STS-1.*
2	Display the Facility Alarm Provisioning Screen: **almprov** ↵ *The TIC Facility Alarm Provisioning Screen is displayed.*
3	Set the STS-1 facility alarm point on or off by entering the following: **editstat <alarm #> <status>** ↵ **where** <alarm #> is the alarm point number. See Table 2-1 for a complete list of alarms. <status> is the status of the alarm point: **on** or **off**. See Table 2-1 for defaults.

—continued—

Procedure 2-1 (continued)
Enabling and disabling TIC STS-1 and VT1.5 alarms

Step	Action

Table 2-1
STS-1 Facility Alarm Points

#	Alarm point	Default
1	STS-1 Rx unequipped	on
2	STS-1 Rx RFI	on
3	STS-1 Rx path trace failure	on
4	STS-1 signal label mismatch	on

If you set an alarm point to off, the system prompts for confirmation.

Enter the following to confirm:

y ↵

The screen is updated with the new alarm point settings in reverse video.

4   Repeat step 3 for each alarm to be provisioned. When all the required alarms are provisioned, continue with step 5.

5   Return to the TIC Facility Screen by entering the following:

quit ↵

6   Display the alarm provisioning screen for the VT1.5 subport(s) to be provisioned:

subptsel <first VT1.5 #> <last VT1.5 #>↵

> **where**
>
> <first VT1.5 #>   is the number of the first VT1.5 requiring alarms to be provisioned: **1** to **28**.
>
> <last VT1.5 #>   is the number of the last VT1.5 requiring alarms to be provisioned: **1** to **28**.

Note: If a single VT1.5 is to be provisioned, then the first VT1.5 # is the same as the last VT1.5 #.

The TIC Subport Facility Screen is displayed for the selected VT1.5 facility.

7   Enter the following to display the TIC Alarm Provisioning Screen:

almprov ↵

The TIC Subport Alarm Provisioning Screen is displayed.

—continued—

Procedure 2-1 (continued)
Enabling and disabling TIC STS-1 and VT1.5 alarms

Step	Action

8 Set the VT1.5 facility alarm point to on or off:

editstat <alarm #> <status> ↵

    where

       <alarm #>   is the alarm point number.
                   See Table 2-2 for a complete list of alarms.

       <status>   is the status of the alarm point: **on** or **off**.
                   For defaults see Table 2-2.

Table 2-2
VT 1.5 facility alarm points

#	Alarm point	Default
1	VT Rx unequipped	on
2	VT Rx loss of pointer	on
3	VT Rx AIS	on
4	VT RFI	on
5	TR-08 Sys 1 far end major	on
6	TR-08 Sys1 Rx fail	on
7	TR-08 Sys 1 loss of Rx DDL	on
8	PRI Link OOS	on

Enter the following to confirm setting the alarm point to off:

y ↵

The screen is updated with the new alarm point settings in reverse video.

                —continued—

Procedure 2-1 (continued)
Enabling and disabling TIC STS-1 and VT1.5 alarms

Step	Action

9   Select the next VT1.5 subport(s) to be provisioned:

select <first VT1.5 #> <last VT1.5 #>↵

    where

      <first VT1.5 #>   is the number of the first VT1.5 requiring alarms to be provisioned: **1** to **28**.

      <last VT1.5 #>   is the number of the last VT1.5 requiring alarms to be provisioned: **1** to **28**.

Note: If a single VT1.5 is to be provisioned, then the first VT1.5 number is the same as the last VT1.5 number.

The TIC Subport Alarm Provisioning screen is displayed for the selected VT1.5 facility.

10   Repeat steps 8 and 9 until all the VT1.5s are provisioned with the required alarm settings. When all VT1.5s are provisioned, continue with step 11.

11   Display the TIC Facility screen by entering the following:

quit 2 ↵

12   Does another STS-1 require alarms to be provisioned?

If	Then go to
yes	step 13
no	step 15

13   Select the alarm provisioning screen for the next STS-1 to be provisioned:

select <sts-1 #>; almprov↵

 where

 <sts-1 #>   is the number of the next STS-1 to be provisioned: **1** to **6**.

The TIC Facility screen is displayed for the selected STS-1.

14   Repeat from step 2. When each STS-1 and its associated VT1.5 alarms are provisioned, continue at step 15.

15   Return to the Network Element Status screen by entering:

fwpui ↵

16   Note the completion of this procedure on the DS1 Feeder Test Results Form.

                  —end—

Procedure 2-2
Powering up the line equipment

Use this procedure to power up the copper-distribution shelves (CDS) and the test access card (TAC). The breaker interface panel (BIP) is shown below.

PC-16498
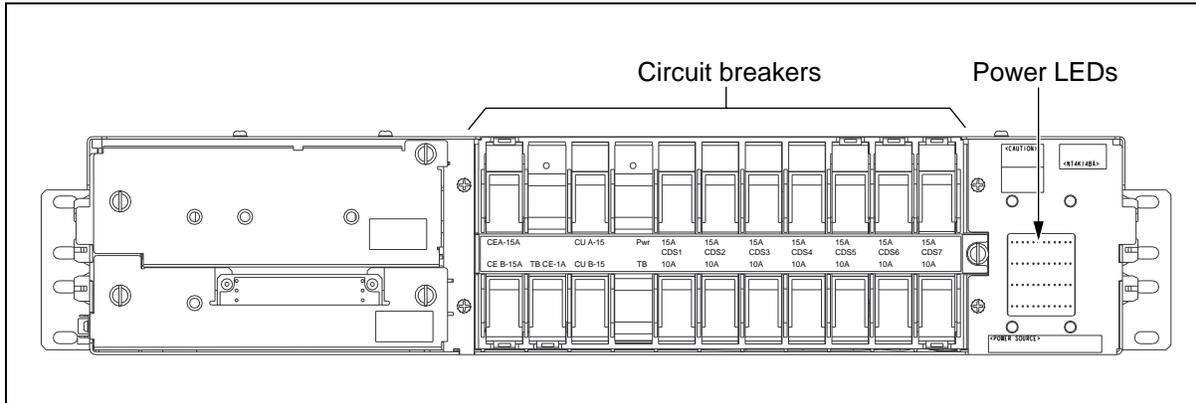
Requirements

Before starting this procedure, you must:

- make sure the system is not in service.

- install the common-equipment circuit packs for this configuration.

- make sure the network element (NE) commissioning is completed and software is downloaded to the processor card. Basic NE operation is confirmed by successful login.

- make sure one (1) Omega 4-wire card, NT4K69 is installed to verify talk battery continuity to each CDS. Other line cards are not installed. These line cards are 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.

- have a copy of the DS1 Feeder Test Results Form, located in "Appendix A: DS1 Feeder Test Results Form" on page 6-1.

> ⚠ **DANGER**
> **Risk of injury or damage**
> Read the warnings and precautions in Chapter 1 to minimize any risk to personnel and equipment.

Note: At powerup, any circuit pack with a red LED on could have failed. It is not necessary to take action at this time. Diagnosis of circuit-pack failures is found in Procedure 2-5 on page 2-23.

—continued—

Procedure 2-2 (continued)
Powering up the line equipment

Action

Step	Action

1   On the 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 (TAC).

The test access card (TAC) and IRTU card (if equipped) requests a software load from the OPC and loads successfully. If you do not obtain this result, check that there is power coming from the power source.

If the following LED lights up on a circuit pack	Then the circuit pack
green LED	is active
red LED	has failed

3   Close the circuit breaker labeled Pwr CDS1 15A. This provides shelf power to CDS 1.

4   Close the circuit breaker labeled TB CDS1 10A. This provides talk battery to CDS 1.

The circuit packs in CDS 1 start to boot. Line interface cards (LICs) complete self-tests. If you do not obtain these results, check that there is power coming from the power source to CDS 1.

5   Do a line card diagnostic to verify that the talk battery is correctly connected to the CDS. To do this, perform steps 2 through 7 of Procedure 2-7 beginning on page 2-38.

6   Open the Pwr CDS1 15A circuit breaker and the TB CDS1 10 A circuit breaker on the BIP.

7   Repeat steps 2 through 5 for each set of circuit breakers associated with unused CDSs.

8   When the proper operation of all line equipment circuit breakers is verified, close all circuit breakers on the BIP.

If	Then
• the bay is equipped with an NT4K14BA BIP and, • the wire connectors for the breakers associated with unequipped CDSs are changed to the 'Normally open (alarm)' position	all circuit breakers associated with unused CDSs must be open to prevent alarms.

9   Verify that all loss-of-power alarms are cleared.

—**continued**—

Procedure 2-2 (continued)
Powering up the line equipment

Step	Action
10	Make sure the fans on the cooling unit are operating and that air flow through the equipment is not obstructed.
11	Note the completion of this procedure on the DS1 Feeder Test Results Form.

—**end**—

Procedure 2-3
Testing lamps and LEDs

Use this procedure to test all lamps and light emitting diodes (LEDs) on the system bay.

Requirements

Before starting this procedure, you must:

- connect a VT100-compatible terminal to the network element (NE). Refer to *Network Element User Interface Description*, 323-3001-300 in *Operations, Administration, and Provisioning,* Volume 4A.

- have a copy of the DS1 Feeder Test Results Form, located in "Appendix A: DS1 Feeder Test Results Form" on page 6-1.

- have available spare bulbs, if any have failed.

> **DANGER**
> **Risk of injury or damage**
> Read the warnings and precautions in Chapter 1 to minimize any risk to personnel and equipment.

Action

Step	Action

1   For an ABM shelf configuration, lamps and LEDs are tested simultaneously. For location of the lamps and LEDs on the ABM shelf refer to Figure 2-1 on page 2-13. This test can be initiated from the local craft access panel (LCAP) or from the network element user interface (NEUI).

If you are testing from the	Then go to
LCAP	step 2
NEUI	step 4

Note 1: The lamptest function is disabled when the maintenance interface card (MIC) is busy, such as during a software download.

Note 2: For location of the lamps and/or LEDS on the circuit packs refer to Figure 2-2 on page 2-14 through Figure 2-5 on page 2-17.

—continued—

Procedure 2-3 (continued)
Testing lamps and LEDs

Step	Action

Note 3: The green (Active) LED on the Processor (Proc) card that is on standby comes on under normal operating conditions but may not light during a lamp test.

If	Then
a restart is in progress or communication to the standby processor is down	the green (Active) LED on the Proc card does not light
the active processor undergoes a restart	the (Active) LED on the standby Proc card may turn off before other LEDs
the standby processor undergoes a restart during the lamp test	the (Active) LED on the standby Proc card may turn off after other LEDs

2   Press the alarm cutoff/local test (ACO/LT) button (on the LCAP) to initiate a lamp and LED test from the LCAP. If there are any new alarms, the first press of the ACO/LT button disables the audible alarms. A second press of the button is needed to operate the lamptest.

All lamps and LEDs light for 30 seconds, with the exception of those listed in step 1.

3   Examine the bay for unlit lamps and LEDs and note any that have failed.

The bay lamps and circuit pack LEDs are shown at the end of this procedure.

If this is a modular business package (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.

4   To initiate a lamp and LED test from the Network Element Status screen, enter the following:

eq sh ↵

The equipment shelf screen is displayed. Enter the following:

lamptest ↵

The following response appears on the screen:

```
Lamp test command successful.
```

All lamps and LEDs light for 30 seconds with the exception of those listed in step 1.

—continued—

Procedure 2-3 (continued)
Testing lamps and LEDs

Step	Action
5	Examine the bay for unlit lamps and LEDs and note any that failed.
	The bay lamps 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 lamptest command.
	Note: If the lamps and LEDs go off before you have examined all of them, issue the lamptest command again.
6	If CDSs are equipped, open each CDS drawer and inspect the metallic test access card (MTAC) and the narrowband line interface card (NLIC) for lit LEDs.
7	If a circuit pack LED does not light during the test, replace the circuit pack. See *Module Replacement Procedures*, 323-3001-547 in *Maintenance, Volume 5C*.
8	If the LED has failed on a cooling unit, replace the cooling unit.
9	If a lamp has failed on the BIP or LCAP, see *Routine Maintenance Procedures*, 323-3001-546 in *Maintenance*, Volume 5C.
	Note: In the ABM shelf, BIP lamps light only if the alarm relay card is installed.
10	If the LED showing through the faceplate of a CDS drawer has failed, replace the MTAC where the LED is mounted.
11	If you used the lamp test command in the NEUI, return to the Network Element Status screen by entering the following:
	quit ↵
12	Note the completion of the lamptest in the DS1 Feeder Test Results Form as well as any necessary details about the results.

—**continued**—

Procedure 2-3 (continued)
Testing lamps and LEDs

Figure 2-1
Lamps and LEDs on an ABM shelf configuration

Note: Open each copper-distribution shelf drawer to inspect LEDs on cards.
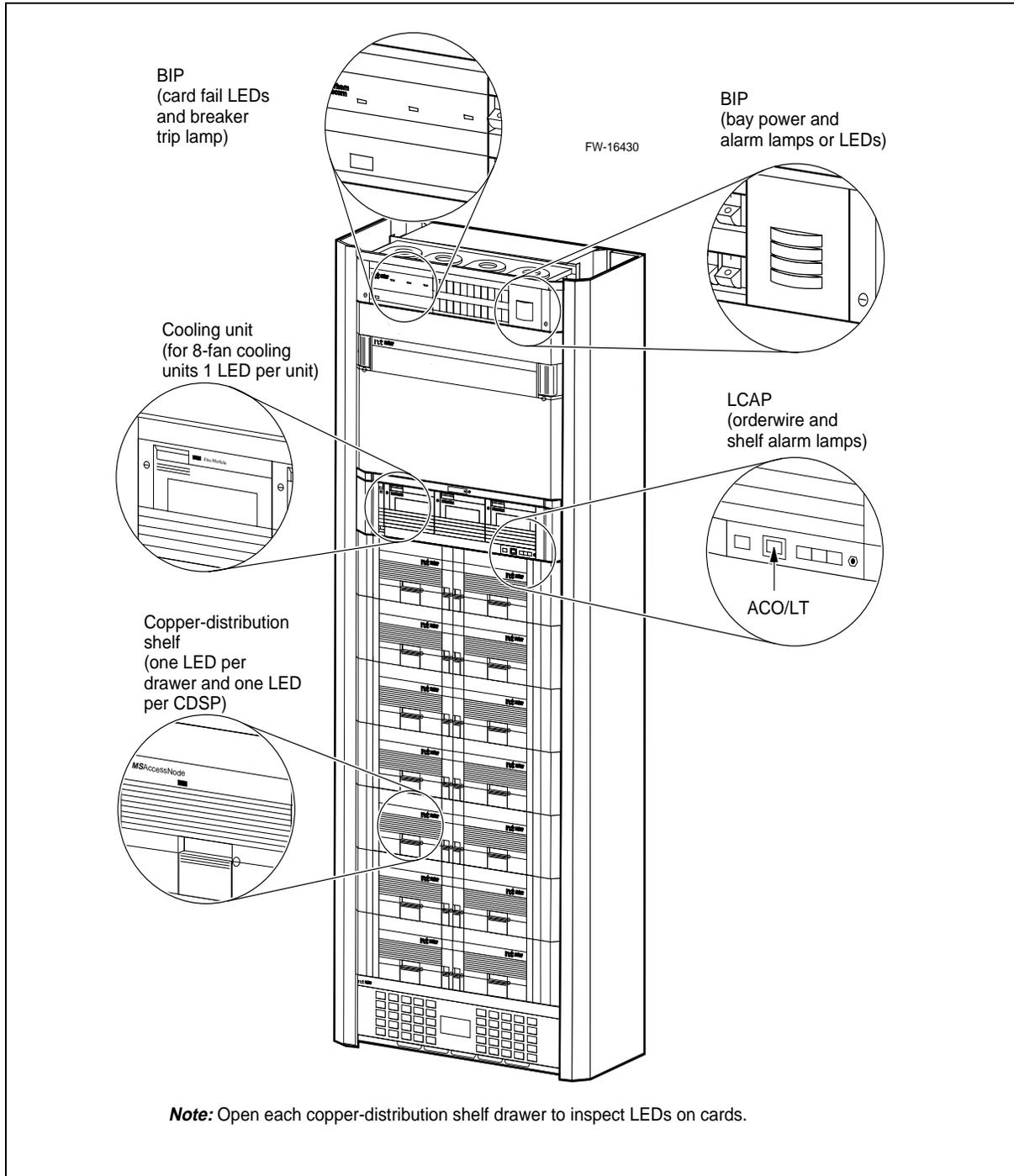
Procedure 2-3 (continued)
Testing lamps and LEDs

Figure 2-2
Processor card, maintenance interface card, and operations controller (OPC) showing LEDs

PC-15752

Processor
(Proc)

Maintenance
interface card
(MIC)

Operation
controller card
(OPC)
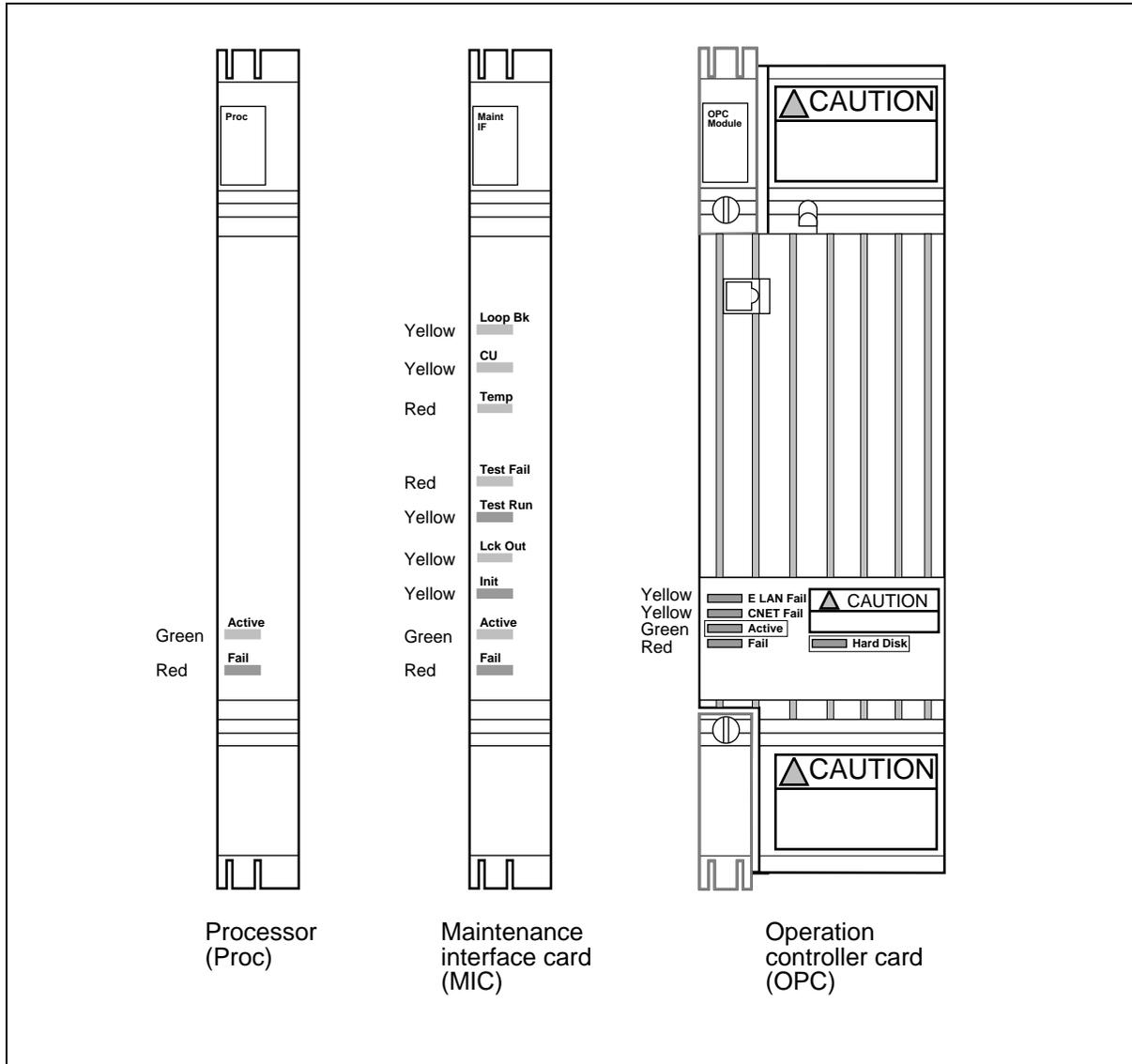
—continued—

Procedure 2-3 (continued)
Testing lamps and LEDs

Figure 2-3
DS1/VT mapper, transport interface card (TIC), access interface card (AIC), test access card (TAC) showing LEDs
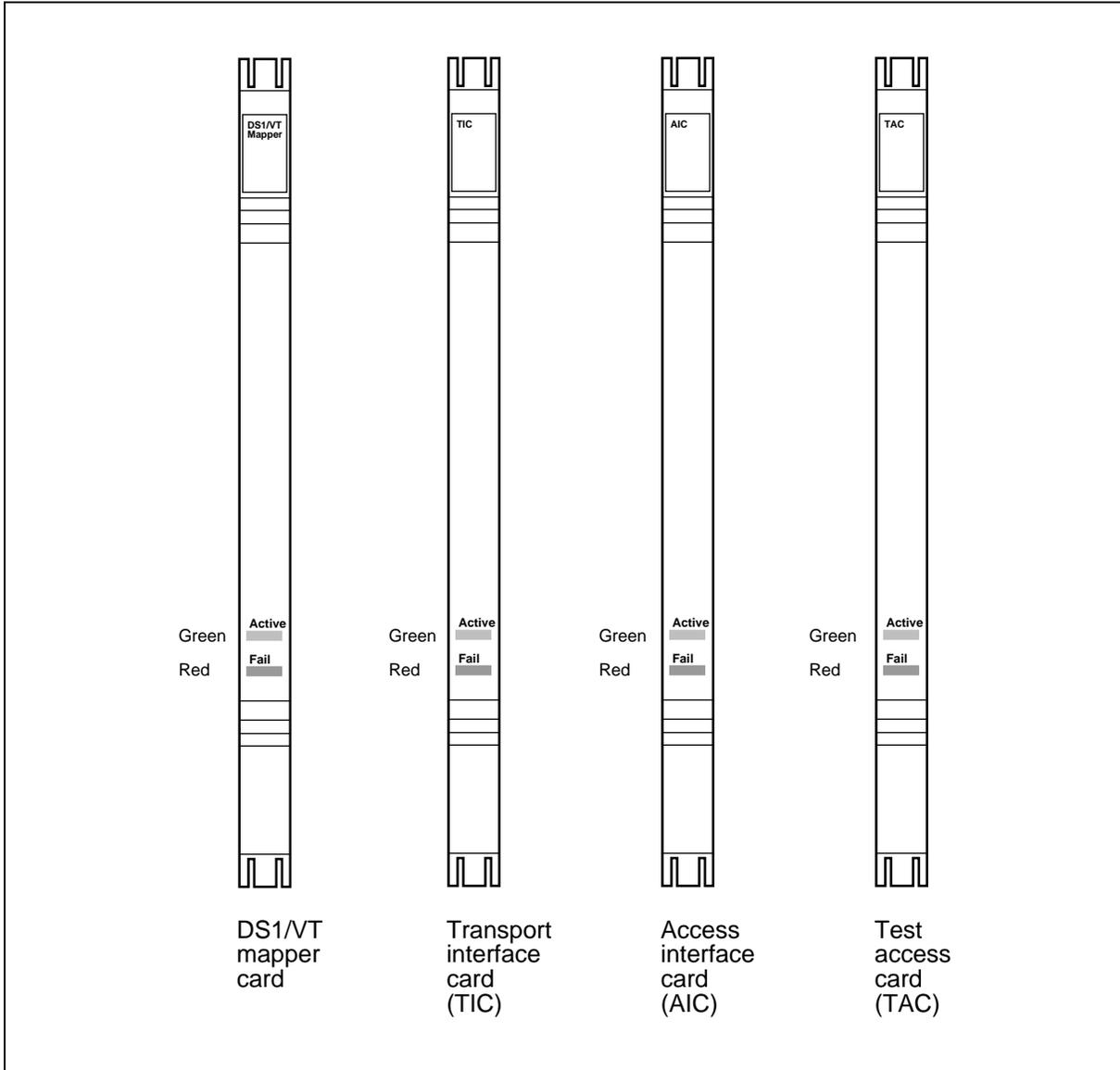
—**continued**—

Procedure 2-3 (continued)
Testing lamps and LEDs

Figure 2-4
Narrowband line interface card (NLIC), metallic test access card (MTAC), CDSP card showing LEDs

PC-10788

Narrowband line
interface card
(NLIC)

Metallic
test access
(MTAC)

Power
converter
(CDSP)
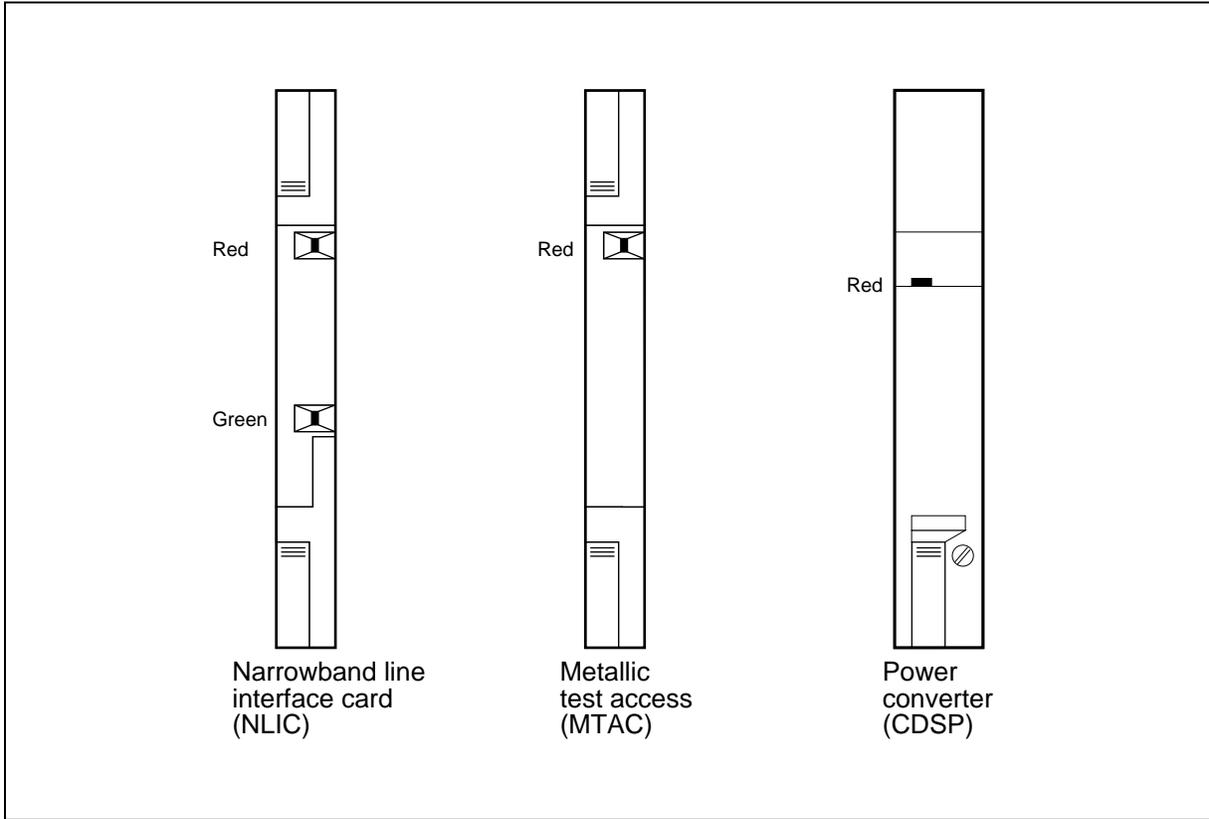
—**continued**—

Procedure 2-3 (continued)
Testing lamps and LEDs

Figure 2-5
Timing and cross-connect circuit pack (TXC) and integrated remote test unit (IRTU) showing LEDs

PC-11494

Timing and
cross-connect
circuit pack
(TXC)

Integrated
remote
test unit
(IRTU)
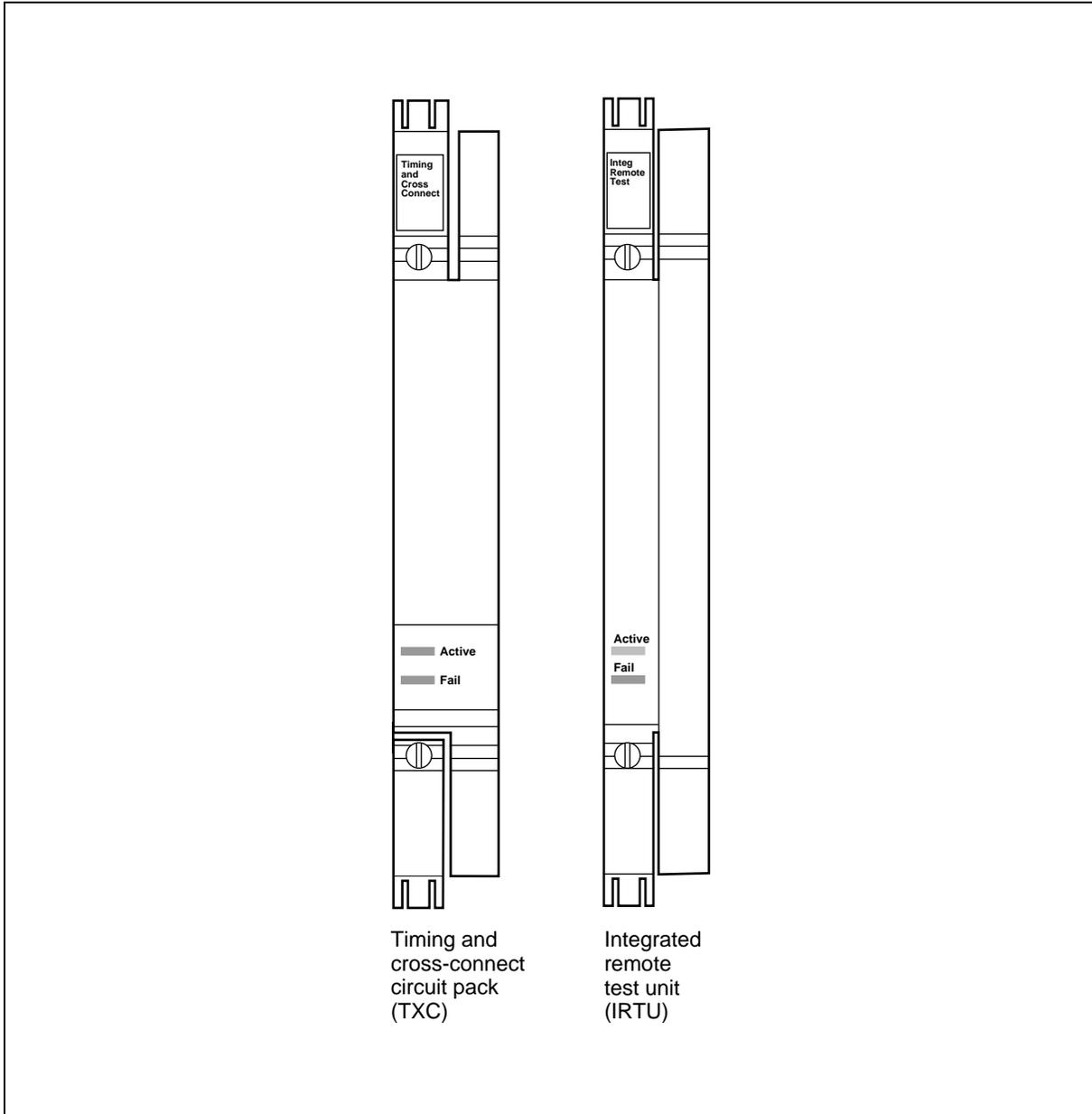
—**end**—

Procedure 2-4
Performing a circuit pack inventory

Use this procedure to help you inventory circuit packs on a
common-equipment shelf and describe how to verify the common cards
(narrowband line interface cards (LICs) and metallic test access cards
(MTACs)) in the copper-distribution shelves (CDSs) associated with an ABM
shelf.

An inventory is a list of all circuit packs in a shelf (excluding the side
interconnect left and side interconnect right). This procedure helps you verify
that the processor knows what circuit pack is inserted in each slot and the state
of each circuit pack.

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

Before starting this procedure, you must:

- connect a VT100-compatible terminal to the network element (NE). Refer
  to mapper *Network Element User Interface Description*, 323-3001-300 in
  Operations, Administration, and Provisioning, Volume 4A.

- have a copy of the DS1 Feeder Test Results Form, located in "Appendix A:
  DS1 Feeder Test Results Form" on page 6-1.

> **DANGER**
> **Risk of injury or damage**
> Read the warnings and precautions in Chapter 1 to
> minimize any risk to personnel and equipment.

—continued—

Procedure 2-4 (continued)
Performing a circuit pack inventory

Action

Step	Action

1   Log in to FWPUI. From the Network Element Status screen, display the shelf equipment screen:

eq sh ↵

The Shelf Equipment screen is displayed.

2   Display the shelf inventory for the common-equipment shelf:

inventry ce ↵

Inventory for the shelf is displayed.

3   If a circuit pack is displayed in the list, review the entry in the circuit-pack-state

If	Then
there is more than one screen of inventory	enter an f to scroll forward or a b to scroll backwards.
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.

(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 it and put it in its correct slot.
trbl (trouble)	perform diagnostics.

4   Quit the inventory and shelf screens by entering the following:

quit 2 ↵

The Network Element Status screen is displayed.

If this configuration has	Then
no CDSs	you have finished this procedure; go to step 11.
CDSs	go to step 5.

—continued—

Procedure 2-4 (continued)
Performing a circuit pack inventory

Step	Action
5	To verify the existence of the common cards installed in the CDSs, look at the equipment screen for each equipment type. To verify the LICs, enter: **eq lic** ↵ *The LIC Equipment screen is displayed.*
6	Using the summary screen list, verify that the cards appear for all CDSs equipped. Note the cards that are not in service (IS). ***Note:*** If TIC A or AIC A is missing or failed, then LIC A and LIC C state becomes "IS-TRBL - Parent Equipment failed". 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 TAC.
7	If any circuit pack in the list is out of service (OOS), place it in service by entering: **dtlLic <CDS #> <ID>** ↵ **where** <CDS #> is copper-distribution shelf (CDS) number: one of **1** to **7**. <ID> is equipment instance: one of **a**, **b**, **c**, or **d**. *The appropriate detailed LIC Equipment screen is displayed.*
8	Enter the following. **chgstate is** ↵ *The card performs self-diagnostics and enters the in-service state.*

—**continued**—

Procedure 2-4 (continued)
Performing a circuit pack inventory

Step	Action

The following table shows the card name for each common card in a CDS, and the corresponding card type and instance displayed in the user interface screen.

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

9   Repeat steps 5 through 7 for metallic test access cards (MTACs), but at step 5 enter the following:

eq mtac ↵

and at step 7 enter:

dtlMtac <CDS #> <ID> ↵

where

<CDS #>   is copper-distribution shelf (CDS) number: one of **1** to **7**.

<ID>   is equipment instance: one of **a** or **b**.

The MTAC Equipment screen is displayed.

10 Repeat steps 5 through 7 for CDS power cards, but at step 5, enter the following:

eq cdsp ↵

and at step 7 enter:

dtlCdsp <CDS #> <ID> ↵

where

<CDS #>   is copper-distribution shelf (CDS) number: **1** to **7**.

<ID>   is equipment instance: **a** or **b**.

—continued—

Procedure 2-4 (continued)
Performing a circuit pack inventory

Step	Action

The CDSP Equipment screen is displayed.

11 Note the completion of this procedure on the DS1 Feeder Test Results Form.

—end—

Procedure 2-5
Diagnosing failed circuit packs

Use this procedure to identify failed circuit packs or to verify failure of circuit packs.

Note: To help in diagnosing failed circuit packs, you may want to display the logs and log reports for a network element (NE). For the procedures on how to display the logs and log reports for an NE, 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

Before starting this procedure, you must:

- connect a VT100-compatible terminal to the NE. Refer to *Network Element User Interface Description*, 323-3001-300 in the *Operations, Administration, and Provisioning,* Volume 4A.

- make sure all facilities are tested.

- have a copy of the DS1 Feeder Test Results Form, located in "Appendix A: DS1 Feeder Test Results Form" on page 6-1.

> **DANGER**
> **Risk of injury or damage**
> Read the warnings and precautions in Chapter 1 to minimize any risk to personnel and equipment.

If the circuit pack to be diagnosed is in the	Then go to
common-equipment shelf	step 1
copper-distribution shelf (CDS)	step 5

—continued—

Procedure 2-5 (continued)
Diagnosing failed circuit packs

Action

Step	Action

Diagnosing the circuit pack in the common-equipment shelf

1   If any circuit pack in the common-equipment shelf indicates trouble or failure by its red LED being lit, or when failure is suspected, you can perform out-of-service (OOS) diagnostics on the failed circuit pack. Display the appropriate equipment screen as follows:

equipmnt <equipment ID> ↵

  where

    <equipment ID>   for the circuit pack is obtained from the following table. It is not necessary to test circuit packs in the order given in the table.

Equipment type	Equipment ID
processor	proc a, proc b
maintenance interface card	mic
operations controller	opc
DS1/VT mapper	(see note)
timing and cross connect card	txc
access interface card	aic a, aic b
transport interface card	tic a, tic b
test access card	tac
integrated remote test unit	irtu

Note: The Equipment IDs for DS1 mappers consist of the traffic type (DS1) and the group number associated with that mapper. See Table 2-3 on page 2-28 for the group numbers for DS1/VT mappers. As an example, the DS1 mapper in slot 2 has an equipment ID of DS1 g2.

2   If the module to be diagnosed is not already out of service, enter the following:

chgstate oos ↵

The following message appears on the screen:

```
WARNING: This action may disrupt TAC and IRTU operations.
Please confirm ("Yes" or "No"):
```

Confirmation is requested. If you confirm the action, the State field value changes to OOS.

                            —continued—

Procedure 2-5 (continued)
Diagnosing failed circuit packs

Step	Action

3   Initiate diagnostics by entering:

chgstate is ↵

The system performs out-of-service diagnostics (OOS) on the module as part of the transition from an OOS state to an in-service (IS) state.

Diagnosis can take a while; it proceeds 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
OOS-TSTF	diagnostics failed
IS	diagnostics passed

If	Then
failure is indicated	remove the defective module and insert a spare module.
the test access card (TAC) is indicating failure	verify that all ground cables are correctly connected as described in one of the acceptable office grounding schemes described in "Power and ground distribution," in *Site Installation Planning and Engineering*, 323-3001-200, in *Engineering, Configuration, and Ordering Guide*, Volume 1.

4   Diagnose any other failed modules. Note the completion of diagnostics on the common-equipment shelf circuit packs on the DS1 Feeder Test Results Form.

If this configuration has CDSs, go to step 5. Otherwise, the procedure is complete.

—**continued**—

Procedure 2-5 (continued)
Diagnosing failed circuit packs

Step   Action

Diagnosing the circuit pack in the copper-distribution (CDS) shelf

5   If a LIC or CDSP circuit pack in a CDS indicates trouble or failure by its red
        LED being lit, you can 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	Then enter the following
line interface card (LIC)	eq lic ↵
	dtllic <CDS #> <ID> ↵
CDSP	eq cdsp ↵
	dtlcdsp <CDS #> <ID> ↵

        where

        <CDS #>   is copper-distribution shelf (CDS) 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.

6   If the primary LIC fails, it must be put in an inactive state before placing it out
        of service for diagnostics. Enter the following (for LICs only):

        switch ↵

        Confirmation is requested.

        y ↵

        The two LICs exchange primary and secondary states.

7   Perform steps 2 to 4 until each failed LIC or CDSP circuit pack is diagnosed.
        Then continue with step 8.

If	Then enter the following
a metallic test access card (MTAC) indicates trouble or failure	eq mtac ↵
	dtlmtac <CDS #> <ID> ↵

        where

        <CDS #>   is copper-distribution shelf (CDS) number: one of **1** to **7**.

        <ID>   is equipment instance: one of **a** or **b** for MTACs.

                    —continued—

Procedure 2-5 (continued)
Diagnosing failed circuit packs

Step	Action
8	If the MTAC 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.

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.

9   Initiate 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 in-service, the diagnostic request is also rejected.

Diagnosis can take a while; it proceeds 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
OOS-TSTF	diagnostics failed
IS	diagnostics passed

10   If failure is indicated, remove the defective MTAC and insert a spare one.

The new MTAC undergoes self-tests. If it passes, it goes in service.

If the MTAC	Then
passed diagnostics	place it back in service by entering: chgstate is ↵ . *The MTAC goes in service.*
new MTAC fails, or if more than one MTAC fails diagnostics	there may 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.

11   Note the completion of diagnostics on the copper-distribution shelf (CDS) circuit packs on the DS1 Feeder Test Results Form.

—**end**—

Procedure 2-6
Verifying redundant common-equipment cards

Use this procedure to test the redundancy feature of the common-equipment cards equipped in your configuration.

The following cards are checked for redundancy operation:

- processor card (Proc), NT4K52

- access interface card (AIC), NT4K55 (ABM shelf only)

- transport interface card (TIC), NT4K56 (ABM shelf only)

- narrowband line interface card (NLIC), NT4K70 (in copper-distribution shelves)

The AICs are both active at all times, carrying the same traffic (this is true in each direction). Since no circuit pack switching occurs, a redundancy test of the AICs is not required.

DS1 redundancy is verified in protection switching procedures later in this document.

DS1 mapper, group and slot associations

Table 2-3 lists the DS1 circuit pack groups for the ABM shelf functions. It also shows the association between mappers in the lower level of the shelf and input cards and output cards in the upper level.

For example, Table 2-3 shows that the mapper for DS1 group g4 is located in slot 4 which corresponds to DS1 input card 35 and DS1 output card 37.

Table 2-3
ABM DS1 mapper, group, and I/O numbers

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

Note 1: * DS1 equipment allowed in a DS1-fed ABM shelf.

Note 2: The symbol "p" in the DS1 input and output slots denotes a protection bridge card.

Note 3: The feeder occupies slots 9 and 10. If an OPC is installed, it occupies slots 5 through 8.

—continued—

Procedure 2-6 (continued))
Verifying redundant common-equipment cards

Requirements

For each type of card being tested, two cards are installed in the shelf and are in service normal (IS-NR). The processor cards (Proc) must have valid data and software must be initialized. In order to test redundancy of the narrowband line interface cards (NLICs), or the transport interface cards (TICs), the access interface cards (AICs) must be installed and in service.

Before starting this procedure, you must:

- connect a VT100-compatible terminal to the network element (NE). Refer to *Network Element User Interface Description*, 323-3001-300 in the *Operations, Administration, and Provisioning,* Volume 4A.

- make sure the system is not in service.

- have a copy of the DS1 Feeder Test Results Form, located in "Appendix A: DS1 Feeder Test Results Form" on page 6-1.

Action

Step	Action

Verifying processor card redundancy

1   Log in to FWPUI. Display the Processor Equipment screen, by entering:

eq proc <equipment ID> ↵

   where

   <equipment ID>   is **a** or **b**, whatever is on standby.

The Processor Equipment screen is displayed.

2   If the data on the two Procs is not synchronized, enter:

datasync on ↵

The Processor Equipment screen indicates when the data was synchronized.

3   Verify the routine exercising of the Procs 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.

—**continued**—

Procedure 2-6 (continued)
Verifying redundant common-equipment cards

Step	Action

4   Verify that the Procs can switch activity by entering:

switch ↵

y ↵

When you enter the Switch command, the following message is displayed on the bottom of the processor equipment screen.

If card A was on standby, it becomes active and its green (Active) LED turns on. Card B goes on standby and its 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 in again, as in step 1.

Repeat this step to verify that switching works in both directions.

If	Then go to
no failure occurred in routine exercising or in switching activity	step 6
failure 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>　　　is **a** or **b**, whichever is 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 to 5.

6   To turn off the routine exerciser, enter:

rexena off ↵

Routine exercising is disabled.

                    —continued—

Procedure 2-6 (continued)
Verifying redundant common-equipment cards

Step	Action

Verifying transport interface cards (TICs) redundancy

7   Display the TIC Equipment screen for one TIC.

eq tic <equipment ID> ↵

   where

   <equipment ID>   is **a** or **b**, whichever is on standby.

The TIC Equipment screen is displayed.

8   Verify that the TIC cards can actually switch activity by entering:

switch ↵

y ↵

If card A was in secondary state, it goes into IS-primary state and card B goes into IS-secondary state.

Repeat this step to verify that switching works in both directions.

If	Then go to
no failure occurred in switching activity	step 10
failure occurred in switching activity	step 9

9   To perform full diagnostics on the secondary unit, enter:

eq tic <equipment ID> ↵

   where

   <equipment ID>   is **a** or **b**, whichever is 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 TIC Equipment screen shows that the TIC card goes back into service.

If a fault is detected, replace the card and repeat steps 7 to 9.

   —continued—

Procedure 2-6 (continued)
Verifying redundant common-equipment cards

Step	Action

Verifying narrowband line interface cards (NLICs) redundancy

10 To display the detailed LICs screen for an NLIC, enter:

eq lic; dtllic <CDS #> <equipment ID> ↵

> **where**

> <CDS #>   is **1** to **7**.

> <equipment ID>   is **a**, **b**, **c**, or **d**.

Redundant pairs of NLICs 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 NLIC cards can actually switch activity by entering:

switch ↵

You are prompted for confirmation. Enter the following:

y ↵

If card A was IS-SECONDARY it becomes IS-PRIMARY and card B goes into IS-SECONDARY.

12 Repeat step 11 to verify that switching works in both directions.

If failure	Then go to
occurred in any switching activity	step 13 to perform diagnostics on the LICs
did NOT occur in any switching activity	step 15

—continued—

Procedure 2-6 (continued)
Verifying redundant common-equipment cards

Step	Action

Performing full diagnostics on NLICs

13   Perform full diagnostics on the NLIC that is 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 ↵

You are prompted for confirmation. Enter the following.

y ↵

The LIC card goes out of service.

chgstate is ↵

The LIC Equipment screen indicates that diagnostics are in progress. When diagnostics are complete, it shows that the LIC card goes back in-service.

If a fault is detected, replace the card.

14   Perform full diagnostics on the second LIC card by repeating step 13.

If no fault is detected, continue at step 15.

15   Repeat steps 10 to 12 until you have tested every pair of redundant NLICs in the CDSs. There are up to 14 pairs if all CDSs are equipped.

16   Note the completion of this procedure on the DS1 Feeder Test Results Form.

—**end**—

Procedure 2-7
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)
  - There are two drawers per shelf and each drawer is equipped with two narrowband line interface cards (NLICs) and one metallic test access card (MTAC).
- continuity of the longest path in each drawer (to 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).

Insert a line card for the resulting system activities that effectively test the communications paths and continuity from the common equipment to the line card. These activities include line card self-diagnosis and downloading the line card software. Performing the analog self-tests also tests the path to and functionality of the test access card (TAC). All that remains for the technician to verify is that the system recognizes the line card.

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 common-equipment cards are installed and in service in the ABM shelf: TAC, TIC, AIC. The following cards are installed and in service in each drawer of the copper-distribution shelves: 2 LICs and 1 MTAC.

Before beginning this procedure, you must:

- make sure the system is not in service.
- verify that one power filter card, NT4K63, is already installed in each line card drawer. It is located at the rear of the drawer, on the inner side, when viewed from the front.
- have a copy of the DS1 Feeder Test Results Form, located in "Appendix A: DS1 Feeder Test Results Form" on page 6-1.

You need the following additional equipment:

- one (1) Omega 4-wire line card, NT4K69, for testing
- VT100-compatible terminal, connected to the network element (NE)

Layout of copper-distribution shelves and line cards

The copper-distribution shelves are numbered CDS 1 to CDS 7. The numbering and location of CDS shelves is shown in Figure 2-7 (bay view) on page 2-37, The first CDS is below the local craft access panel (LCAP) in the bay arrangement, directly above the breaker interface panel (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 contains line cards 1 to 48, and the right line drawer contains cards 49 to 96. 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 illustrated in Figure 2-6 on page 2-36 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 at a time, you can view the slots as follows:

- slots 1 to 24 are visible on the left side of the left line drawer
- slots 25 to 48 are visible on the right side of the left line drawer
- slots 49 to 72 are visible on the left side of the right line drawer
- slots 73 to 96 are visible on the right side of the right line drawer

—continued—

Procedure 2-7 (continued)
Testing the copper-distribution shelves

Figure 2-6
Numbering of line card slots in a copper-distribution shelf (CDS)

PC-10750

Rear — Top view of copper-distribution shelf

| Left drawer | | | | Right drawer |

LC2, LC4, LC6, LC8, LC10, LC12, LC14, LC16, LC18, LC20, LC22, LC24, LIC A, MTA A

LC48, LC46, LC44, LC42, LC40, LC38, LC36, LC34, LC32, LC30, LC28, LC26, LIC B

CDSP A, CDSP B

LC50, LC52, LC54, LC56, LC58, LC60, LC62, LC64, LC66, LC68, LC70, LC72, LIC C, MTA B

LC96, LC94, LC92, LC90, LC88, LC86, LC84, LC82, LC80, LC78, LC76, LC74, LIC D

Front

Note 1: Odd-numbered line card slots are not visible from the top, only from the side.

Note 2: The LICs and MTACs are full-height common cards.

—**continued**—

Procedure 2-7 (continued)
Testing the copper-distribution shelves

Figure 2-7
Numbering of copper-distribution shelves in a bay arrangement

PC-10000
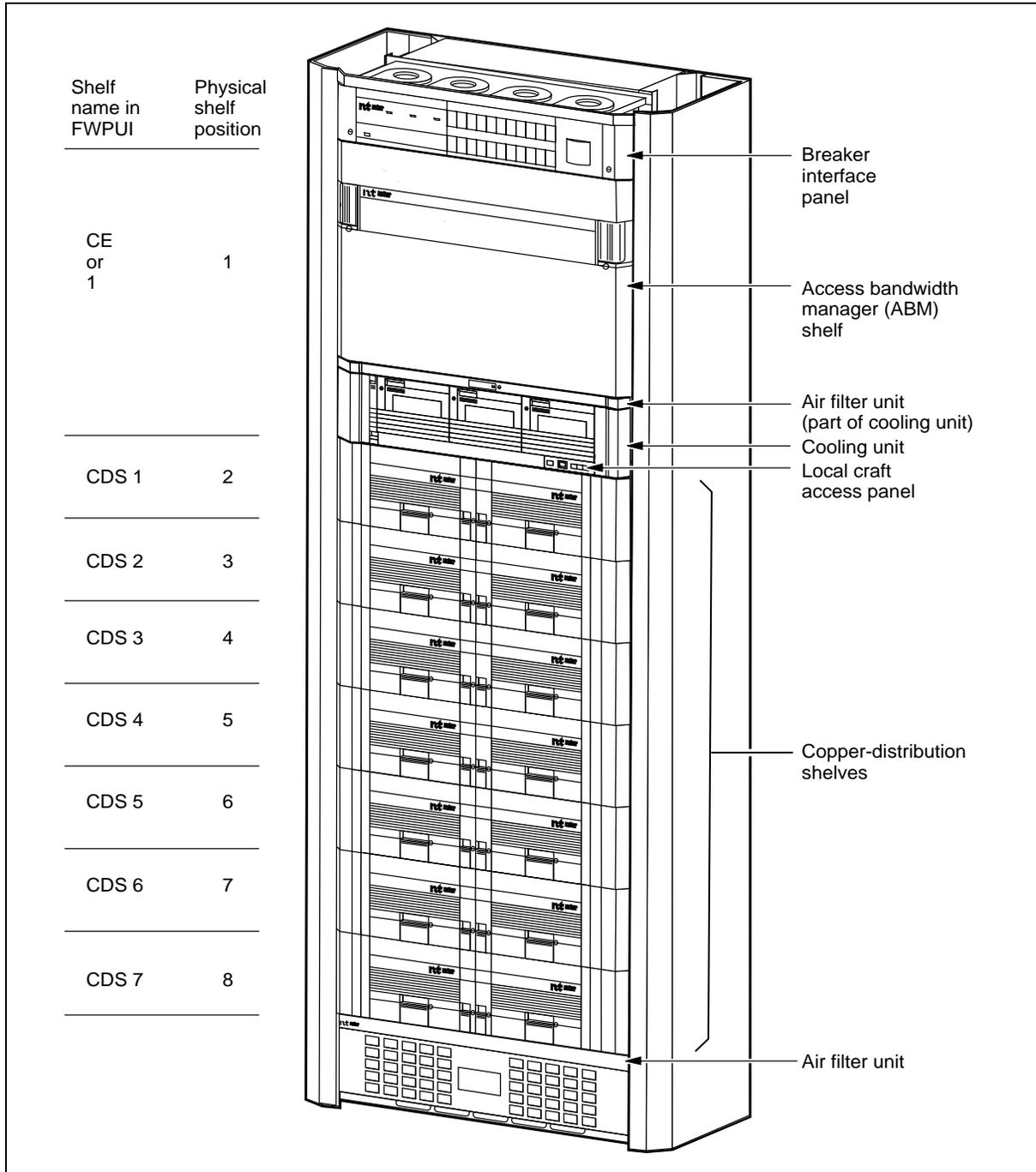
Shelf name in FWPUI	Physical shelf position
CE or 1	1
CDS 1	2
CDS 2	3
CDS 3	4
CDS 4	5
CDS 5	6
CDS 6	7
CDS 7	8

Breaker interface panel

Access bandwidth manager (ABM) shelf

Air filter unit (part of cooling unit)

Cooling unit

Local craft access panel

Copper-distribution shelves

Air filter unit

—**continued**—

Procedure 2-7 (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	Insert a 4-wire line card into slots 47/48 of the first copper-distribution shelf (CDS 1). CDS shelf numbering is shown in Figure 2-7 on page 2-37. Slots 47/48 are on the right side of the left drawer, as shown in the following figure.

The processor identifies the line card type, downloads diagnostic software, and performs basic diagnostic tests only if the line card was provisioned first. If the line card passes testing, the processor downloads an operational software load to the line card. This is a service-independent load.

PC-10752

Right-hand side view of left drawer

—continued—

Procedure 2-7 (continued)
Testing the copper-distribution shelves

Step	Action
3	Check that the Processor recognizes the line card in its slot. Four-wire line cards are addressed by their even slot number.

equipmnt lc 1 48 ↵

> **where**

> lc   is line card.

> 1   is copper-distribution shelf (CDS) 1.

> 48   is slot 48, in the left drawer.

The LC (line card) Equipment screen is displayed.

The red LED on the line card can be lit if:

- the line card failed diagnostic tests.

- the slot was provisioned for a service that this line card is incompatible with. In this case, the LC Equipment screen indicates the mismatch as an MISM secondary state.

4	If UEQ (unequipped) is displayed instead of DIAG, remove and reinsert the line card.
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.
```

6	Check the network element logs for results of the 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 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 4-wire line card. If the line card failed the diagnostic tests, replace the line card.

—continued—

Procedure 2-7 (continued)
Testing the copper-distribution shelves

Step	Action
8	Repeat steps 2 to 7 with a line card in slots 23/24, in the left drawer of the shelf. The top view of the shelf is shown on page 2-38.
9	Repeat steps 2 to 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.
10	Repeat steps 2 to 9 on the remaining CDSs.
11	Note the completion of this procedure on the DS1 Feeder Test Results Form.

—**end**—

Procedure 2-8
Verifying DS1 signal continuity

Use this procedure to check signal continuity from the digital cross connect-1 (DSX-1) cross connect panel at the remote site to the remote fiber terminal (RFT).

The procedure is performed using a CI tool that initiates a DS1 loopback at the access interface card (AIC) in the RFT.

Requirements

Before starting this procedure, you must:

• make sure the system is not in service.

You need the following materials and equipment:

• a VT100-compatible terminal, connected to the network element (NE)

• a DS1 transmission test set, Tau-Tron S5104

• two (2) electrical test cords, P3Q3B

• a copy of the DS1 Feeder Test Results Form, located in "Appendix A: DS1 Feeder Test Results Form" on page 6-1

> **CAUTION**
> **Loss of traffic**
> If you are testing DS1s using loopbacks and your system is provisioned for superframe frame format, AMI line coding, and bytesynchronous synchronization mode, do not use the 3 in 24 or 1 in 8 test patterns.
>
> If you use the 3 in 24 or 1 in 8 test patterns, traffic is not restored when you remove the loopback and re-insert it. To restore traffic, place the facility out of service and then back in service.

Action

Step	Action
1	Connect the output of the DS1 test set to the input of the DS1 under test at the DSX-1 panel, and the input to the output of the DS1 under test.

—continued—

Procedure 2-8 (continued)
Verifying DS1 signal continuity

Step	Action
2	To prevent unintended protection switching, lockout 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> is the circuit pack group under test: **g1**, **g2**, or **g4**.
	y ↵
	An asterisk (*) is displayed in the Lockout field for the DS1 group under test.
3	Invoke the CI tool for setting up a loopback for the DS1 under test by entering at the network element user interface (NEUI) prompt:
	facttxcci ↵
	The CI screen is displayed.
4	Set up the DS1 loopback by entering:
	facttxc conn-lpbk <circuit pack group> <port #> ↵
	where
	<circuit pack group> is the circuit pack group under test: **g1**, **g2**, or **g4**.
	<port #> is the port number of the DS1 under test: **1** to **14**.
	A loopback is connected for the DS1 under test.
5	On the DS1 receiver 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 error.
6	Press the Single Bit Error Inject button three times on the DS1 test set.
	The DS1 receiver test set displays 3 bit errors received.
7	Release the DS1 loopback by entering:
	facttxc disc-lpbk ↵
8	Record the results of this procedure on the DS1 Feeder Test Results Form.
9	Repeat steps 1 through 8 for each additional working DS1/VT mapper equipped.

—**end**—

DS1 in-bay tests

In this chapter you test digital signal, level 1 (DS1) equipment in a DS1 feeder system network element (NE).

These procedures cover local in-bay tests on equipment located at a single NE. Unless otherwise noted, one technician can do these tests.

How to use this chapter

Refer to the task lists in Chapter 1 when using this chapter. The task lists in Chapter 1 identify the procedures that must be performed in this chapter.

Chapter task list

The following table list the topics in this chapter. These topics are the procedures that help you with DS1 in-bay testing.

Topic	See
Verifying the DS1 transmission test set performance	page 3-3
Performing initial DS1 provisioning	page 3-5
Testing DS1 cables and input/output cards	page 3-9
Testing DS1 protection switching	page 3-14
Testing DS1 signal continuity	page 3-22
Testing TXC protection switching	page 3-26

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

DS1 group and slot associations

Table 3-1 lists the DS1 circuit pack groups for the ABM shelf functions. It also shows the association between mappers in the lower level of the shelf, and input cards and output cards in the upper level.

For example, Table 3-1 shows that the mapper for DS1 group g4 is located in slot 4 and that the DS1/VT mapper in slot 4 corresponds to DS1 input card 35 and DS1 output card 37.

Table 3-1
ABM DS1 mapper, group, and I/O numbers

Shelf function	Group or I/O slot	Mapper slot																		
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	-
RFT	Group	g1*	g2*	P*	g4*	g5*	g6*	g7	g8											
RFT_BLSR	Input slot	30*	31*	34p*	35*	38	39	42	43											
FCOT	Output slot	32*	33*	36p*	37*	40	41	44	45											
FCOT_BLSR																				
Note 1: * DS1 equipment allowed in a DS1-fed ABM shelf.																				
Note 2: The symbol "p" in the DS1 input and output slots denotes a protection bridge card.																				
Note 3: The feeder occupies slots 9 and 10. If an OPC is installed, it occupies slots 5 through 8.																				

Procedure 3-1
Verifying the DS1 transmission test set performance

This procedure describes how to test the performance of the DS1 digital transmission test set. This is necessary so that reliable results can be obtained when testing.

Requirements

To perform this procedure, you need the following materials and equipment:

- a DS1 transmitter-receiver test set, Tau-Tron S5104 (Tx-Rx) or equivalent
- an electrical patch cord, Bantam-to-Bantam or Bantam to 310, 1 m (3 ft) or equivalent
- a copy of the DS1 Feeder Test Results Form, located in "Appendix A: DS1 Feeder Test Results Form" on page 6-1

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

Action

Step	Action
1	Set the Power Switch to ON.
2	Set the Transmitter Out controls as follows:

	Frame	Frame
	Pattern	PRBS (or QRSS)
	DS:	DSX-1

Step	Action
3	Set the Error Inject controls as follows:

	Type	Bit
	Mode	Err free

Step	Action
4	Connect the Bantam-to-Bantam patch cord between input and output.

Procedure 3-1 (continued)
Verifying the DS1 transmission test set performance

Step	Action
5	Set the Measurement Time controls as follows:
	Mode Untimed (or continuous)
	Start/Stop: In Proc
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 test set indicates "in process" and displays 0 error.
10	Press the Single Bit Error Inject button three times.
	The DS1 test set displays 3 bit errors.
11	If you do not obtain the required results, check the settings and repeat the test. If necessary, replace the test set.
12	Disconnect the patch cord and you are ready to perform tests.
13	Note the completion of this procedure on the DS1 Feeder Test Results Form.

—**end**—

Procedure 3-2
Performing initial DS1 provisioning

Use this procedure to perform initial provisioning of DS1 facilities (also called ports) for the purpose of testing S/DMS functionality. 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 each facility for proper operation should be provisioned after testing is completed, to make the system 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.

Requirements

Before starting this procedure, you must:

- connect a VT100-compatible terminal to the network element (NE). Refer to *Network Elements User Interface Description*, 323-3001-300 in *Operations, Administration, and Provisioning,* Volume 4A.

- have the facility record or equivalent document showing the distance between the system bay and the DS1 cross-connect frame

- make sure the system is not in service

- have a copy of the DS1 Feeder Test Results Form, located in "Appendix A: DS1 Feeder Test Results Form" on page 6-1

   Note: You can obtain better test results if you provision the DS1 ports with the actual value shown on your facility record.

—continued—

Procedure 3-2 (continued)
Performing initial DS1 provisioning

Action

Step	Action
1	Log in to the Network Element Status screen and verify that the system recognizes the mapper card(s) by entering:

eq ds1 <circuit pack group> ↵

> **where**

> <circuit pack group>   is one of **g1**, **g2**, or **g4**. These entries correspond to shelf slots 1, 2, and 4.

The DS1 Equipment screen for the specified circuit pack group is displayed.

2   If the circuit pack group equipment is not provisioned, add it as follows:

add ↵

The circuit pack group is now provisioned.

3   Repeat steps 1 and 2 for each installed DS1/VT mapper circuit pack.

4   Display the All DS1 Facilities screen for all DS1 facilities, by entering:

fa ds1 all ↵

The All DS1 Facilities screen is displayed, with all DS1 facilities in context already added.

Note: The All DS1 Facilities screen can list up to nine working mappers. Ignore any listings for mappers that are not present in your system.

5   Take all the facilities out of service, by entering:

chgstate oos ↵

You are prompted to confirm the command.

y ↵

All facilities are placed out of service.

6   Display the DS1 Edit menu, by entering:

edit ↵

The All DS1 Facilities screen for all DS1 facilities is shown. For each parameter, the default value or a blank is displayed, as appropriate.

—continued—

Procedure 3-2 (continued)
Performing initial DS1 provisioning

Step	Action

7   Enter the appropriate command or commands to set the parameters to the following values for testing purposes:

line build-out	(lbo)	short, medium, or long
line coding	(lcoding)	B8ZS
frame format	(framefmt)	superframe
alarm encoding	(alarmenc)	ones
synchronization	(synchr)	bytesynchronous
performance monitoring	(pmprov)	enabled

lbo <build-out> ↵
where

<build-out>   is **short**, **medium**, or **long** depending on the distance between the AccessNode bay and cross-connect frame

If the distance is	Then
less than 46 m (150 ft)	use short
46 to 137 m (150 to 450 ft)	use medium
137 to 200 m (450 to 655 ft)	use long

a. To set the type of line coding to B8ZS enter the following:
    lcoding b8zs ↵

b. To set the type of framing format to superframe enter the following:
    framefmt superframe ↵

c. To set the type of alarm encoding enter the following:
    alarmenc ones ↵

d. To set the synchronization mode to bytesynchronous, enter:
    synchr bytesynchronous ↵

    The provisioned values are displayed in reverse video.

e. To set the performance monitoring to enabled enter the following:
    pmprov enable ↵

8   Quit out of the edit screen by entering:

quit ↵

The DS1 Facilities screen is displayed again.

—continued—

Procedure 3-2 (continued)
Performing initial DS1 provisioning

Step	Action
9	Display the DS1 facility menu. Verify the settings by viewing the facility summary, entering the following: **query all** ↵ *The DS1 Facilities screen is displayed, showing the facility summary in the conversation area, as shown below.*
10	Quit to the Network Element Status screen by entering: **quit** ↵
11	Note the completion of this procedure on the DS1 Feeder Test Results Form.

—**end**—

Procedure 3-3
Testing DS1 cables and input/output cards

In this procedure, the DS1 cables between the Digital System Cross-Connect (DSX-1) panel and DS1-fed access node remote fiber terminal (DFA RFT) are tested, as well as the DS1 input/output (I/O) cards of each DS1/VT mapper. All the DS1s of a mapper circuit pack are daisy-chained so they can be tested in one operation.

The signal path tested is as follows:

- from the input of the first DS1 at the DSX-1 panel through the office cabling and the DS1 input card
- through the DS1/VT mapper circuit pack to the DS1 output card and office cabling to the output side of the first DS1 at the DSX-1 panel
- through a DS1 test cord to the input of the next DS1, and so on

Requirements

Before starting this procedure, you must:

- make sure the system is not in service
- connect a VT100-compatible terminal to the network element (NE). Refer to *Network Element User Interface Description*, 323-3001-300, in *Operations, Administration, and Provisioning,* Volume 4A.

You need the following equipment to perform this procedure:

- a DS1 transmission test set, Tau-Tron S5104
- two (2) electrical patch cords, P3Q3B Bantam-to-Bantam, or Bantam-to-310
- thirteen (13) electrical patch cords, Bantam-to-Bantam, 1 m (3 ft) used as DSX-1 jumpers
- a copy of the DS1 Feeder Test Results Form, located in "Appendix A: DS1 Feeder Test Results Form" on page 6-1

> **DANGER**
> **Risk of injury or damage**
> Read the warnings and precautions in Chapter 1 to minimize any risk to personnel and equipment.

—continued—

Procedure 3-3 (continued)
Testing DS1 cables and input/output cards

Action

Step	Action

Testing the first working DS1/VT mapper

⚠️ **CAUTION**
Loss of traffic
If you are testing DS1s using loopbacks and your system is provisioned for superframe frame format, AMI line coding, and bytesynchronous synchronization mode, do not use the 3-in-24 or 1-in-8 test patterns.

If you use the 3-in-24 or 1-in-8 test patterns, traffic is not restored when you remove the loopback and re-insert it. To restore traffic, place the facility out of service and then back in service.

1 To prevent unintended protection switching, lockout the DS1/VT mapper under test by entering:

pr;dtlprot ds1 ↵

The DS1 Protection screen is displayed.

lockout op <circuit pack group> ↵

> **where**
>
> <circuit pack group>   is the circuit pack group under test: **g1**, **g2**, or **g4**

y ↵

An asterisk is displayed in the Lockout field for the DS1 group under test.

2 Display the DS1 facility screen by entering:

fa ds1 <circuit pack group> all ↵

> **where**
>
> <circuit pack group>   is the circuit pack group under test: **g1**, **g2**, or **g4**

3 Put all DS1 facilities on DS1 mapper out-of service by entering:

chgstate oos ↵

You are prompted to confirm the command.

yes ↵

—continued—

Procedure 3-3 (continued)
Testing DS1 cables and input/output cards

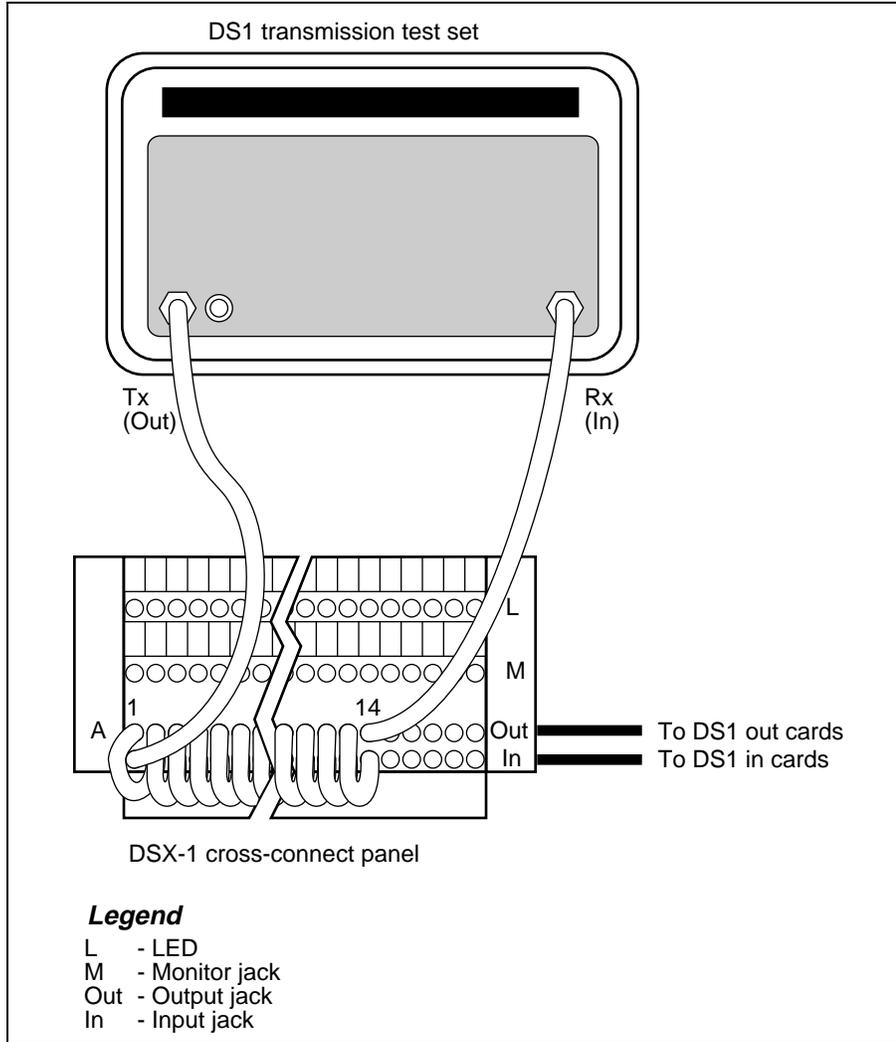| Step	Action
4	Set up a facility loopback for the DS1s under test by entering: **loopback op fa** ↵ *This performs a facility loopback for all DS1s for the selected mapper.* ***Note:*** A facility loopback redirects a DS1 received at the local digital input port to the local digital output port.
5	Daisy-chain all DS1 circuits of the DS1/VT mapper circuit pack under test as shown below. • At the DSX-1 panel, use a test cord to loop the output of the first DS1 to the input of the next DS1. • Daisy-chain in this manner until all DS1s on the circuit pack are included. • Connect the transmit side of the transmission test set to the input of the first DS1. Connect the receiver side of the test set to the output of the last DS1.

—**continued**—

Procedure 3-3 (continued)
Testing DS1 cables and input/output cards

Step   Action

PC-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

6   On the DS1 receiver 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 error.

7   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 3-3 (continued)
Testing DS1 cables and input/output cards

Step	Action

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 6 and 7
- connect the DS1 test set to the second short chain and repeat steps 6 and 7
- continue in this manner until you have located all faults. Fix the faults.
- rebuild the daisy chain and repeat this step

8   Record the results of this procedure on the DS1 Feeder Test Results Form.

9   Release the remaining loopbacks by entering:

fa ds1 <circuit pack group> all ↵

   where

   <circuit pack group>   is the group number of the mapper under test: **g1**, **g2**, or **g4**

   loopback re ↵

10   Release the remaining DS1 lockouts by entering:

dtlprot ds1 ↵

lockout re <circuit pack group> ↵

   where

   <circuit pack group>   is the group number of the mapper under test: **g1**, **g2**, or **g4**

You are prompted to confirm the command.

yes ↵

11   Repeat steps 1 through 7 for each additional working DS1/VT mapper equipped.

<div align="center">—end—</div>

Procedure 3-4
Testing DS1 protection switching

In this procedure, you can test protection switching of DS1 facilities on a circuit pack basis at one site. The test sequence demonstrates that:

• you can manually switch to the protection unit

• you can lockout a circuit pack and prevent it switching to protection

• you can simulate an equipment failure and cause automatic switching to occur

• you can force a protection switch and override automatic switching

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: DS1 priority switching is not tested in this procedure because it involves a different test setup.

CAUTION
Loss of traffic
If you are testing DS1s using loopbacks and your system is provisioned for superframe frame format, AMI line coding, and bytesynchronous synchronization mode, do not use the 3-in-24 or 1-in-8 test patterns.

If you use the 3-in-24 or 1-in-8 test patterns, traffic is not restored when you remove the loopback and re-insert it. To restore traffic, place the facility out of service and then back in service.

Requirements

Before performing this procedure, you must:

• make sure the system is not in service

Note: In this procedure, manual switching, automatic switching, and lockout from switching require that one working and one protection DS1/VT mapper circuit pack be provisioned. Forced switching requires that two working and one protection DS1/VT mapper circuit packs be provisioned.

—continued—

Procedure 3-4 (continued)
Testing DS1 protection switching

You need the following materials and equipment:

- a DS1 transmission test set, Tau-Tron S5104
- two (2) electrical patch cords, P3Q3B, Bantam-to-Bantam, or Bantam-to-310.
- a VT100-compatible terminal connected to the network element
- a copy of the DS1 Feeder Test Results Form, located in "Appendix A: DS1 Feeder Test Results Form" on page 6-1

> ⚠ **DANGER**
> **Risk of injury or damage**
> Read the warnings and precautions in Chapter 1 to minimize any risk to personnel and equipment.

Action

Step	Action
1	Log in to the Network Element Status screen.
2	Set a facility loopback on port 1of DS1 g1 and g2 mapper by entering:

fa ds1 <circuit pack group> 1 ↵

    where

    <circuit pack group>   is the group number of the working mapper under test: **g1** or **g2**

loopback op fa ↵

A facility loopback is set.

Note: If this is the only equipped mapper, set a loopback on port 1 of DS1 g1.

| **3** | Put port 2 of the DS1/VT mapper in service by entering: |

fa ds1 <circuit pack group> 2 ↵

    where

    <circuit pack group>   is the group number of the working mapper under test: **g1** or **g2**

—continued—

Procedure 3-4 (continued)
Testing DS1 protection switching
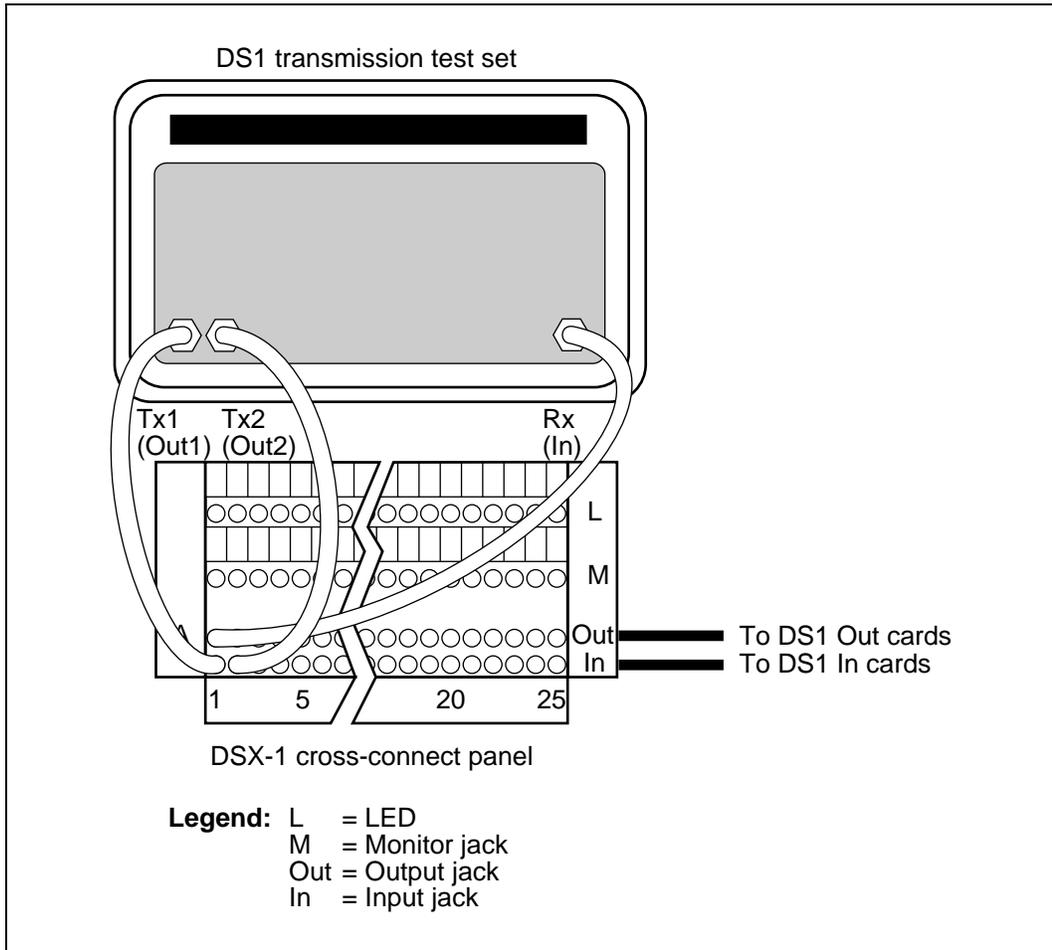
Step	Action

chgstate is ↵

The facility is put in service.

Note: If this is the only equipped mapper, put port 1 of DS1 g1 in service.

4   As shown following, connect the output of the DS1 test set to the in jack of port 1 and 2 of the working DS1 mapper. Connect the input of the DS1 test set to the out jack of port 1 of the same working DS1/VT mapper.

PC-11502

DS1 transmission test set

Tx1 (Out1)   Tx2 (Out2)   Rx (In)

L

M

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

5   Press the Start/Stop button twice to reset the error count to zero.

The DS1 receiver test set indicates in process and displays 0 error.

6   To verify digital continuity, press the Single Bit Error Inject button three times.

The DS1 receiver test set indicates 3 bit errors received.

—continued—

Procedure 3-4 (continued)
Testing DS1 protection switching

Step	Action
7	Display the protection status of the DS1/VT mapper circuit packs, by entering:

pr;dtlprot ds1 ↵

The DS1 Protection screen is displayed.

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. After causing a switch to protection, look at the display to verify that the switch has occurred as expected. A dash (-) indicates not applicable.

Testing manual switching

8   Manually switch the DS1s on the working DS1/VT mapper to protection.

Note: For simplicity in this procedure, the working mapper is assumed to be mapper G1 in slot 1. If you are not performing this test with the mapper in slot 1, use the appropriate group number for the mapper you are using. The other possible working mappers are in slots 2 and 4 that correspond to group numbers G2 and G4.

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.

9   Press the Start/Stop button twice to reset the error count to zero.

The DS1 receiver test set indicates in process and displays 0 error.

10   To verify that DS1 continuity is maintained, press the Single Bit Error Inject button three times.

The DS1 receiver test set indicates 3 bit errors received.

11   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.

12   Press the Start/Stop button twice to reset the error count to zero.

The DS1 receiver test set indicates in process and displays 0 error.

13   To verify that DS1 continuity is maintained, press the Single Bit Error Inject button three times.

The DS1 receiver test set indicates 3 bit errors received.

—**continued**—

Procedure 3-4 (continued)
Testing DS1 protection switching

Step	Action

Testing lockout from switching (and automatic switching override)

14   Operate a lockout on the working DS1/VT mapper by entering:

      lockout op g1 ↵

      You are prompted to confirm the command.

      y ↵

15   Wearing antistatic protection, 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.

16   Press the Start/Stop button twice on the DS1 receiver test set to verify that the DS1s are lost and to reset the error count.

      The DS1 receiver test set shows a high error count.

17   Release the lockout setup in step 14 on the working mapper, 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 AutoSw field. Alarms created at step 15 clear.

18   Press the Start/Stop button twice to reset the error count to zero.

      The DS1 receiver test set indicates in process and displays 0 error.

19   To verify that DS1 continuity exists and that the DS1s are rerouted to the protection mapper, press the Single Bit Error Inject button three times.

      The DS1 receiver test set indicates 3 bit errors received.

20   Reengage the working DS1/VT mapper.

      After five minutes, the DS1s revert to the first working DS1/VT mapper, and the DS1 Protection screen displays a dot (.) in the AutoSw field.

21   Press the Start/Stop button twice to reset the error count to zero.

      The DS1 receiver test set indicates i n process and displays 0 error.

22   Press the Single Bit Error Inject button three times to verify that DS1 continuity exists and that the DS1s have reverted to the first working mapper.

      The DS1 receiver test set indicates in process and indicates 3 bit errors received.

                                   —continued—

Procedure 3-4 (continued)
Testing DS1 protection switching

Step	Action

Testing automatic switching due to card failure

> *Note:* Wear antistatic protection for the next step.

23   Simulate card failure by removing the working DS1/VT mapper circuit pack from its backplane connector.

The DS1 Protection screen displays an asterisk (*) in the AutoSw field of the G1 circuit pack group. The asterisk 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 the DS1 input card and DS1 output card associated with that mapper. The traffic is rerouted to the protection mapper by way of the DS1 protection bus, located in the backplane of the shelf.

24   Press the Start/Stop button twice to reset the error count to zero.

The DS1 receiver test set indicates in process and displays 0 error.

25   To verify that DS1 continuity is maintained, press the Single Bit Error Inject button three times.

The DS1 receiver test set indicates 3 bit errors received.

26   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 41
two or more working DS1/VT mappers	step 27

Testing forced switching (and automatic switching override)

> *Note:* Two working DS1/VT mappers are required to test forced switching as described below. For simplicity in this procedure, the second working mapper is G2 in slot 2.

27   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.

28   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.

—continued—

Procedure 3-4 (continued)
Testing DS1 protection switching

Step	Action
29	At the cross-connect panel, connect the input of the test set to the output of the G2 mapper, and the output of the test set to the input of port 1 of the G2 mapper.
30	Press the Start/Stop button twice to reset the error count to zero. *The DS1 receiver test set indicates in process and displays 0 error.*
31	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 3 bit errors received.* ***Note:*** The DS1s that are normally handled by the G2 mapper are forced onto the protection mapper. Those DS1s continue to enter and exit the common-equipment shelf by way of the DS1 input card and DS1 output card associated with that mapper. The traffic is rerouted to the protection mapper by way of the DS1 protection bus, located in the backplane of the shelf.
32	Release the forced switch on the second working mapper, by entering: **forced re g2** ↵ *You are prompted to confirm the command.* **y** ↵ *The screen displays a dot (.) in the Forced field. Alarms generated at step 27 are cleared. The DS1s that were forced to the protection mapper revert to the G2 mapper. The protection mapper automatically resumes handling the DS1s from the disconnected G1 unit.*
33	Press the Start/Stop button twice to reset the error count to zero. *The DS1 receiver test set indicates in process and displays 0 error.*
34	To verify that DS1 continuity for DS1s on the G2 mapper is maintained and the DS1s that are forced onto the protection unit have reverted to the G2 circuit pack, press the Single Bit Error Inject button three times. *The DS1 receiver test set indicates 3 bit errors received.*
35	At the cross-connect panel, connect the input of the test set to the output of the first working (G1) mapper, and the output of the test set to the input of port 1 of the G1 mapper.
36	Press the Start/Stop button twice to reset the error count to zero. *The DS1 receiver test set indicates in process and displays 0 error.*
37	To verify that DS1 continuity for DS1s from the G1 mapper is restored, and 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 3 bit errors received.*

—continued—

Procedure 3-4 (continued)
Testing DS1 protection switching

Step	Action
38	Reinsert the first working DS1/VT mapper.
	The DS1 Protection screen displays a W (wait-to-restore) in the AutoSw field.
	After five minutes, the DS1s revert to the G1 working DS1/VT mapper, and the DS1 Protection screen displays a dot (.) in the AutoSw field.
39	Press the Start/Stop button twice to reset the error count to zero.
	The DS1 receiver test set indicates in process and displays 0 error.
40	To verify that DS1 continuity exists and the DS1s are reverted to the G1 mapper from the protection mapper, press the Single Bit Error Inject button three times.
	The DS1 receiver test set indicates 3 bit errors received.
41	Record the results of this procedure on the DS1 Feeder Test Results Form.
42	If protection switching did not function as expected, refer to *Alarm and Trouble Clearing Procedures*, 323-3001-543 in *Maintenance*, Volume 5A.
43	If forced switching is not tested, re-engage the working DS1/VT mapper removed at step 23.
44	Release remaining loopbacks, by entering:

fa ds1 <circuit pack group> <port #> ↵

    where

    <circuit pack group>   is the circuit pack group under test: **g1** or **g2**

    <port #>   is the port number of the DS1 under test: **1** to **14**

    loopback re ↵

45	Return to the Network Element Status screen:

fwp ↵

46	Remove all test equipment and test cords.

—end—

Procedure 3-5
Testing DS1 signal continuity

Use this procedure to check signal continuity from the Digital System Cross-Connect (DSX-1) panel at the remote site to a line card in the DS1-fed AccessNode remote fiber terminal (DFA RFT). This procedure cannot be performed at the network element (NE) having the DFA operations controller (OPC) shelf, since it does not have copper-distribution shelves (CDSs).

During this test, a signal is sent from a line card through the access interface card (AIC), transport interface card (TIC), timing and cross connect (TXC) card, and DS1/VT mapper to the cross-connect panel. A loopback, set up at the DSX-1 panel then causes the signal to be looped back to the line card through the same path.

Note: It is also possible to perform this procedure using HP3787 or HP 37702 DS1 test sets at the DSX-1 panel and a physical loopback between T/R & T1/R1 of the DDS OCUDP line card.

Requirements

Before starting this procedure, you must:

• make sure the system is not in service

You need the following materials and equipment to perform this procedure:

• an OPC connected to the NE, and a VT100-compatible terminal connected to the OPC

• one (1) 4-wire line card, NT4K69

• TPI95 test set

• two (2) electrical patch cords, P3Q3B, Bantam-to-Bantam or Bantam-to-310

• one (1) jumper cable (to loop back the DS1 tandem circuit at the DSX-1)

• a copy of the DS1 Feeder Test Results Form, located in "Appendix A: DS1 Feeder Test Results Form" on page 6-1

—continued—

Procedure 3-5 (continued)
Testing DS1 signal continuity

CAUTION
Loss of traffic
If you are testing DS1s using loopbacks and your system is provisioned for superframe frame format, AMI line coding, and bytesynchronous synchronization mode, do not use the 3-in-24 or 1-in-8 test patterns.

If you use the 3-in-24 or 1-in-8 test patterns, traffic is not restored when you remove the loopback and re-insert it. To restore traffic, place the facility out of service and then back in service.

Action

Step	Action
1	Assign a DS1 tandem service to a DS1 at the DFA RFT.
2	Provision a DS1 tandem to DDS OCUDP circuit (56 kbits/s with no error corrections) at the DFA RFT. Refer to *Line Card Provisioning Procedures*, 323-3001-315 in *Operations, Administration, and Provisioning*, Volume 4B.
3	Log in to the NE. For information on the OPC, refer to *OPC User Interface Description*, 323-3001-301 in *Operations, Administration, and Provisioning*, Volume 4A.
4	Put the DS1 Tandem facility in service by entering:

fa ds1 <circuit pack group> <port #> ↵

> **where**

<circuit pack group>	is the circuit pack group under test: **g1** or **g2**
<port #>	is the port number of the DS1 under test: **1** to **14**

chgstate is ↵

The DS1 facility goes in service.

—continued—

Procedure 3-5 (continued)
Testing DS1 signal continuity

Step	Action
5	Make sure the associated TIC VT1.5 is also in service by entering:
	fa TIC 1 ↵
	VTselect <VT#> ↵
	where
	<VT #> is number of the VT under test
	chgstate is ↵
6	Install a 4-wire line card in the slot provisioned in step 2 of the DFA RFT. For more information on this, refer to *Line Card Testing Procedures*, 323-3001-316 in *Operations, Administration, and Provisioning,* Volume 4B.
7	At the DSX-1 panel, set up a physical loopback for the provisioned DS1 tandem circuit.
8	Set up metallic jack access in split mode to the line that was just provisioned. For information on this, refer to the procedure "Setting up metallic jack access" in *Line Card Testing Procedures*, 323-3001-316, of *Operations, Administration, and Provisioning,* Volume 4B. Additional information on jack access connections is also provided in the *Line Card Testing Procedures*, 323-3001-316 in *Operations, Administration, and Provisioning,* Volume 4B.
9	At the DFA RFT, set up the TPI95 test set TEST section, as follows:
	• set the Normal/Loopback switch to Normal
	• set the metallic controls to OFF (3 switches)
	• set the data rate to the rate provisioned for the DDS line card (2.4, 4.8, 9.6, 19.2, 56, or 64 kbits/s)
	• set the primary channel to 2047; set the secondary channel to OFF
	• set the Extend range/Normal switch to Normal
	• set the –dB/Normal switch to Normal
	• set the Self-test/Normal/Local clock switch to Normal
	• set the Bit Errors/Error-seconds/Reset switch to Bit Errors
	• set the Timer section Run/OFF/Set to Run
10	Connect the TPI95 test set to the line at the DFA RFT.
11	On the TPI95 test set, reset the counter to zero by switching the Bit Errors switch to RESET and then back to the Bit Errors position.
	If the error count is not stable, verify that the line card is in service and the test cords are connected.

—**continued**—

Procedure 3-5 (continued)
Testing DS1 signal continuity

Step	Action

12   Press the Insert Six Errors key on the TPI95 test set.

Six errors are injected in to the line and should be received again by the test set.

If six errors are	Then
received by the test set	DS1 continuity is verified
NOT received by the test set	perform the procedure "Troubleshooting problems encountered while testing", in *Line Card Testing Procedures*, 323-3001-316, in *Operations, Administration, and Provisioning,* Volume 4B, and repeat this step

13   Keep the jack access setup and the test set connected to the line (it is required in the next procedure).

14   Record the completion of this test on the DS1 Feeder Test Results Form.

—**end**—

Procedure 3-6
Testing TXC protection switching

Use this procedure to test timing and cross-connect (TXC) circuit pack protection switching at a DS1-fed AccessNode remote fiber terminal (DFA RFT). This procedure cannot be performed at the DFA operations controller (OPC) shelf since it does not have copper-distribution shelves (CDSs).

Requirements

Before starting this procedure, you must:

*   make sure the system is not in service

*   have completed the test setup from Procedure 3-5 on page 3-22

*   have a copy of the DS1 Feeder Test Results Form, located in "Appendix A: DS1 Feeder Test Results Form" on page 6-1, is required

Action

Step	Action
1	To keep the metallic jack access setup from the previous procedure, enter the following in the Metallic Jack Access Screen:
	savequit ↵
2	Display the Protection screen for the TXC circuit pack by entering:
	pr;dtlprot txc ↵
	The TXC Detailed Protection screen is displayed.

Testing manual switching

> *Note:* In step 3, the active TXC circuit pack is assumed to be G1. If G2 is active, use g2 instead.

3	Manually switch to the protection TXC circuit pack by entering:
	manual op g1 ↵
	You are prompted for confirmation.
	y ↵
	Traffic switches to the protection TXC circuit pack, g2.
4	On the TPI95 test set, reset the counter to zero by switching the Bit Errors Switch to RESET, then back to the Bit Errors position.
	If the error count is not stable, verify that the line card is in service and the test cords are connected.
5	To verify that signal continuity is maintained, press the Insert Six Errors key on the TPI95 test set.
	Six errors are injected into the line and should be received again by the test set.

—continued—

Procedure 3-6 (continued)
Testing TXC protection switching

Step	**Action**

If six errors are	Then
received by the test set	DS1 continuity is verified
NOT received by the test set	perform the procedure "Troubleshooting problems encountered while testing", in *Line Card Testing Procedures*, 323-3001-316 in *Operations, Administration, and Provisioning*, Volume 4B, and repeat this step

Testing automatic switching

> *Note:* Wear antistatic protection for the next step.

6   Simulate card failure by removing the G2 TXC circuit pack from its backplane connector.

Traffic switches to the G1 TXC circuit pack.

7   On the TPI95 test set, reset the counter to zero by switching the Bit Errors switch to RESET, then back to the Bit Errors position.

If the error count is not stable, verify that the line card is in service and the test cords are connected.

8   To verify that signal continuity is maintained, press the Insert Six Errors key on the TPI95 test set.

Six errors are injected into the line and should be received again by the test set.

If six errors are	Then
received by the test set	DS1 continuity is verified
NOT received by the test set	perform the procedure "Troubleshooting problems encountered while testing", in *Line Card Testing Procedures*, 323-3001-316 in *Operations, Administration, and Provisioning*, Volume 4B, and repeat this step

9   Replace the G2 TXC circuit pack in to its backplane connector.

Traffic remains on the G1 TXC circuit pack.

> *Note:* Allow at least 30 seconds to elapse between removal and reinsertion of the TXC circuit pack.

10   Disconnect the TPI95 test set from the line but leave it nearby (it is required in the next procedure).

11   Record the completion of this test on the DS1 Feeder Test Results Form.

—**continued**—

Procedure 3-6 (continued)
Testing TXC protection switching

Step	Action
12	Disconnect the metallic jack access, by entering:
	jackacc resume ↵
	quit ↵
13	Deprovision the DS1 Tandem to DDS OCUDP circuit.

<div align="center">**—end—**</div>

Testing system telemetry and alarms

Use the procedures in this chapter to test system telemetry and alarms at a network element (NE).

How to use this chapter

Refer to the document task list in Chapter 1 because it identifies the procedures that must be performed in this chapter.

Chapter task list

The following table lists the topics in this chapter. These topics are the procedures you follow to help you test system telemetry and alarms at a network element (NE).

Topic	See
Verifying the serial telemetry interface	page 4-3
Verifying the parallel telemetry input port (ABM shelf)	page 4-13
Verifying the parallel telemetry output port (ABM shelf)	page 4-17
Testing MBP/MPP power and environmental alarms	page 4-25
Testing alarms on the Series 800A outside plant cabinet	page 4-34
Testing office alarms for the ABM shelf	page 4-43

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

Electrical characteristics of parallel telemetry ports

The electrical characteristics of parallel telemetry input and output ports, listed in the following tables are required for connecting parallel telemetry ports to external equipment.

Electrical characteristics of input ports	Acceptable condition
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 condition
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 4-1
Verifying the serial telemetry interface

Use this procedure to verify the operation of the provisionable serial TBOS ports (ports 3 and 4). TBOS is a byte-oriented serial telemetry protocol.

Requirements

Before starting this procedure, you must make sure:

- the system is not in service

- there are no active alarms displayed on the breaker interface panel (BIP)

- the serial telemetry port is accessible in the software load purchased

- you have a copy of the DS1 Feeder Test Results Form, located in "Appendix A: DS1 Feeder Test Results Form" on page 6-1

You need the following equipment for this procedure:

- a VT100-compatible terminal, connected to the network element (NE)

- a TBOS test set, model Tempo KS 22828, list 1; or a Toshiba laptop computer with the following:

  — TBOS emulation program

  — an RS422 converter box

  — refer to Table 4-2 on page 4-10 for the serial telemetry alarm points in the system monitor display 3 (equipment)

  — 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

- NT4K86CA serial telemetry cable, 30 m (100 ft), with a 25-pin D-subminiature connector with the pinout given in Table 4-1 on page 4-4

> **DANGER**
> **Risk of injury or damage**
> Read the warnings and precautions in Chapter 1 to minimize any risk to personnel and equipment.

—continued—

Procedure 4-1 (continued)
Verifying the serial telemetry interface

Table 4-1
Pin out details of the serial telemetry connector and cable (NT4K86CA)

Signal	Pin	Pair	Wire	Signal	Pin	Pair	Wire
	1		N/C	future	13	6	future
	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	
N/C No connection							

Note: For system ABM 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 4-1 on page 4-5) as follows:

Parameter	Value
Output	RS422A
Data speed	2400
Parity bit	Included

—continued—

Procedure 4-1 (continued)
Verifying the serial telemetry interface

Step	Action

Figure 4-1
Faceplate of the TBOS test set
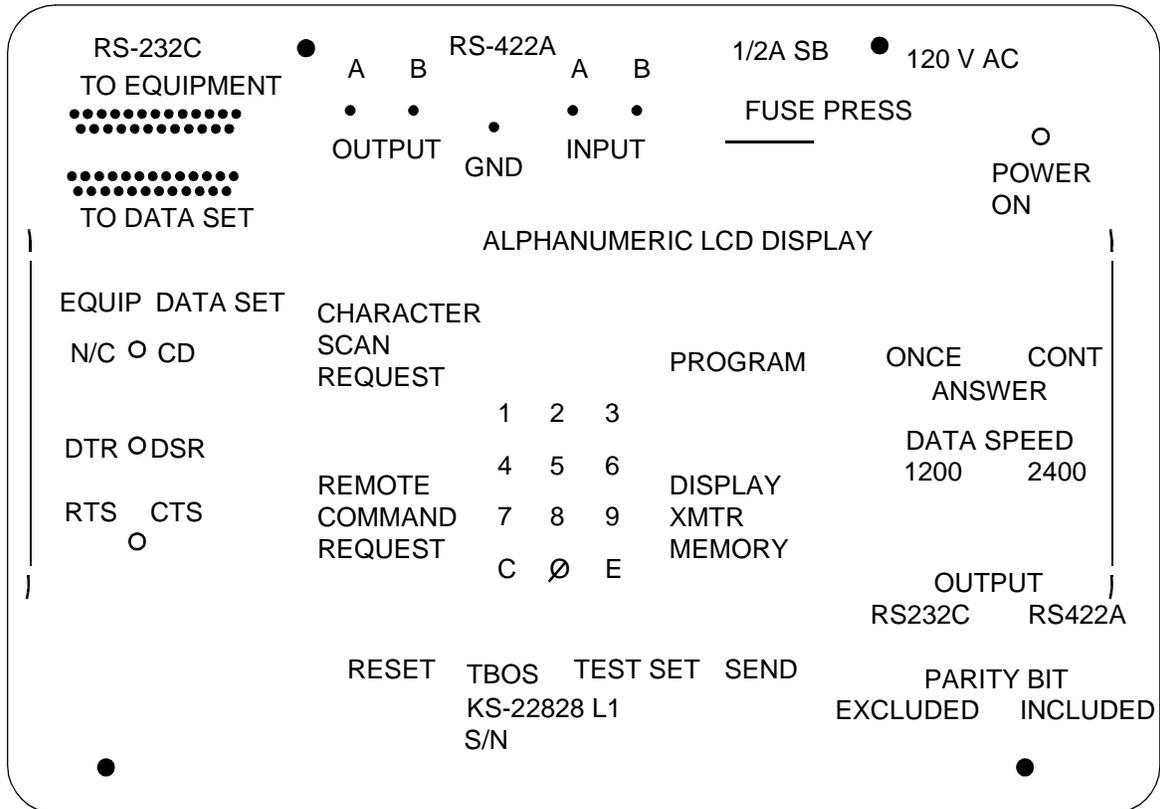
2	Turn on the power of the TBOS test set.

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.

Procedure 4-1 (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\> is **3** or **4** *The TBOS Port screen is displayed for port 3 if you entered a 3.*
5	If the port state is OOS (out of service), place it in service by entering: **chgstate is** ↵ **y** ↵
6	Assign the telemetry display 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 access bandwidth manager (ABM) shelf use connector J06, as shown in Figure 4-2 on page 4-7.

—**continued**—

Procedure 4-1 (continued)
Verifying the serial telemetry interface

Step	**Action**

Figure 4-2
Connection of the serial telemetry cable to the ABM shelf

PC-10697

Connect to
Serial
Telemetry
J06
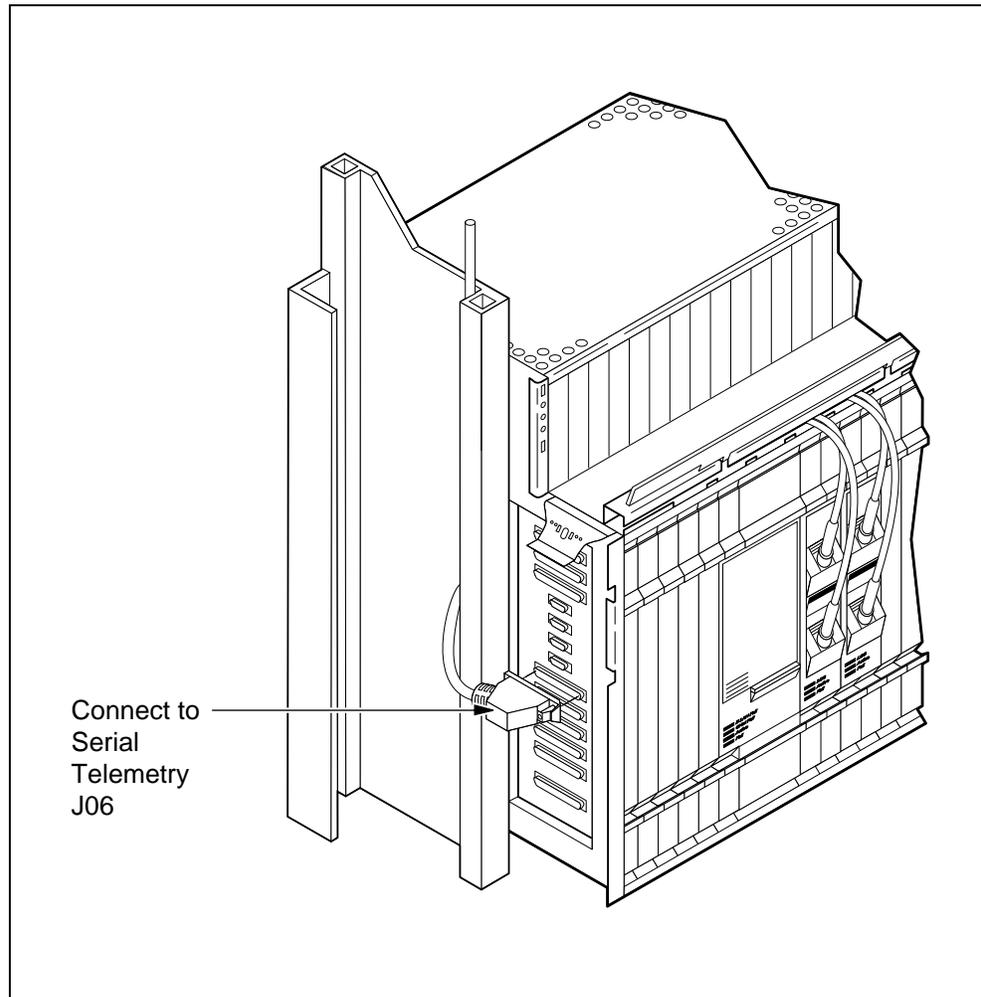
8   To simulate the alarm, use the TBOSTEST CI tool or cause fan 1 to fail
manually.

To use the TBOSTEST CI tool, enter the following on the command line:

tbostest↵

y↵

set 3 1

—**continued**—

Procedure 4-1 (continued)
Verifying the serial telemetry interface

Step	Action

To cause the fan to fail manually, refer to the following table.

If this is a	Then
bay arrangement, on the middle cooling module (under the common-equip ment 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 • pull the module out of its backplane connector, but not out of the shelf
modular business package (MBP)	fan 1 is the blower unit in the main cabinet. • Remove the front pedestal cover of the main cabinet. Refer to the procedure for removing MBP covers in *Modular Business Package Cabinet Installation Guide,* 323-3001-206. • Switch OFF the CB1 circuit breakers, 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 stop the fan from rotating, 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 has failed.

Note: In byte 8, the value of bit 2 is one and the values of bit 1 and bits 3 to 8 is zero. This indicates an alarm condition is reported on bit 2. As can be seen in Table 4-2 on page 4-10, bit 2 indicates that fan 2 is failed. For information on port 4 refer to Appendix A in *Alarms and Surveillance Description*, 323-3001-104 in *Description*, Volume 2A.

—continued—

Procedure 4-1 (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)	switch on circuit breaker CB1, located on the faceplate of the blower unit. Re-install the pedestal cover after you have tested TBOS port 4. Refer to the procedure for re-installing MBP covers in the *Modular Business Package Cabinet Installation Guide*, 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 To test TBOS port 4, repeat steps 4 through 10.

12 Note the completion of this procedure on the DS1 Feeder Test Results Form.

—**end**—

Table 4-2
Serial telemetry alarm points in monitor display 3 for the ABM shelf: 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
			—continued—

Table 4-2 (continued)
Serial telemetry alarm points in monitor display 3 for the ABM shelf: equipment

Point	Byte	Bit	Description
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
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
48	6	8	Not used

—**continued**—

Table 4-2 (continued)
Serial telemetry alarm points in monitor display 3 for the ABM shelf: equipment

Point	Byte	Bit	Description
49	7	1	Breaker-trip indicator 1 (48V supply CE, CU, or TB CF fail)
50	7	2	Not used
51	7	3	Breaker-trip indicator 3 (failure of 48V supply to copper-distribution shelf)
52	7	4	Not used
53	7	5	Breaker-trip indicator 5 (failure of fuse for 48V talk battery filter power)
54	7	6	Shelf over-temperature: common-equipment shelf
55	7	7	Shelf over-temperature: copper-distribution shelf
56	7	8	Not used
57	8	1	Failure of fan 1
58	8	2	Failure of fan 2
59	8	3	Failure of fan 3
60	8	4	Not used
61	8	5	Not used
62	8	6	Not used
63	8	7	Communication failure (LAPD or control-network loss of signal detected)
64	8	8	Not used
			—end—

Procedure 4-2
Verifying the parallel telemetry input port (ABM shelf)

Use this procedure to verify the operation of the parallel telemetry input port of an access bandwidth manager (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 4-24 about accessing parallel telemetry points at the ABM breaker interface panel (BIP) wirewrap block.

Requirements

Before starting this procedure, you must:

- make sure the system is not in service

To perform this procedure, you need the following materials and equipment:

- a VT100-compatible terminal, connected to the network element (NE)
- the parallel telemetry cable, NT4K85GX, installed and terminated
- a jumper wire, to connect two pins together
- a copy of the DS1 Feeder Test Results Form, located in "Appendix A: DS1 Feeder Test Results Form" on page 6-1

Note: Electrical characteristics of parallel telemetry ports for connecting parallel telemetry ports of external equipment are listed in Table 4-3 below.

Table 4-3
Electrical characteristics of parallel telemetry ports

Electrical characteristics of input ports	Acceptable condition
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 condition**
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

—**continued**—

Procedure 4-2 (continued)
Verifying the parallel telemetry input port (ABM shelf)

Action

Step	Action
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. |
| **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 4-3 on page 4-15. |

If you are testing with	Then
input point 1	tie IN 01 (pin 21, BL 1BK) to IN Return (pin 43, O 1V)
a different input point	determine the pins to tie together from Table 4-4 on page 4-16

| **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 DS1 Feeder Test Results Form. |

—continued—

Procedure 4-2 (continued)
Verifying the parallel telemetry input port (ABM shelf)

Figure 4-3
Connection of the parallel telemetry cable to the ABM shelf

PC-10058
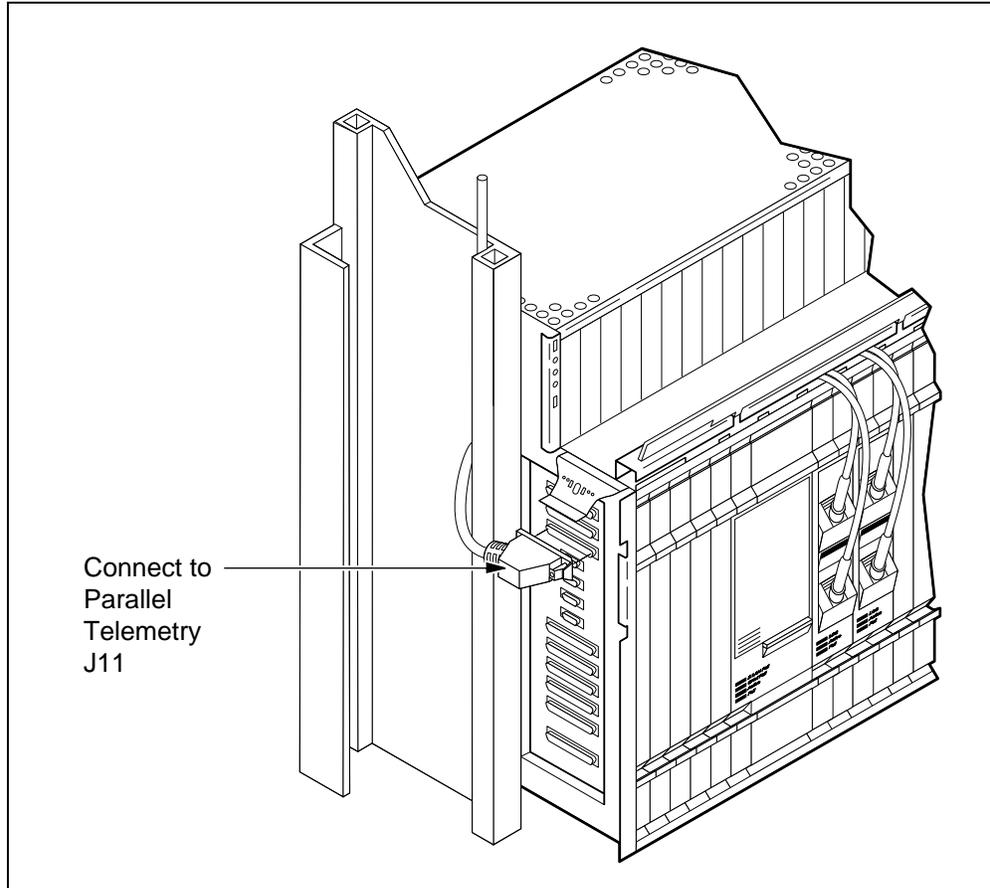
Connect to
Parallel
Telemetry
J11

—continued—

Procedure 4-2 (continued)
Verifying the parallel telemetry input port (ABM shelf)

Table 4-4
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 4-3
Verifying the parallel telemetry output port (ABM shelf)

Use this procedure to verify that the parallel telemetry output port on the access bandwidth manager (ABM) shelf is operating properly. You can do this by assigning one equipment display bit to one output point. This causes the equipment to fail and verifies 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 4-24 about accessing parallel telemetry points at the ABM breaker interface panel (BIP) wirewrap block. Refer to Figure 4-4 on page 4-22 and Table 4-5 on page 4-23 for wirewrap block pin-out details on the ABM BIP.

Serial telemetry (TBOS) display map 3, used to map system equipment to output points, is listed in Table 4-2 on page 4-10. It consists of 64 display points, listed in 8 bytes of 8 bits each. You are failing the left cooling module that reports fan failure on byte 8, bits 1 and 2.

An output point can be reporting one of two conditions, active or inactive. The output point is active when it is receiving an alarm, and 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, and in the disabled state, it does not.

Requirements

Before starting this procedure, you must:

- make sure the system is not in service
- connect a VT100 user terminal to the network element (NE)
- have a digital multimeter, Fluke 85 or equivalent
- have a copy of the DS1 Feeder Test Results Form, located in "Appendix A: DS1 Feeder Test Results Form" on page 6-1

> ⚠️ **DANGER**
> **Risk of injury or damage**
> Read the warnings and precautions in Chapter 1 to minimize any risk to personnel and equipment.

—continued—

Procedure 4-3 (continued)
Verifying the parallel telemetry output port (ABM shelf)

> *Note:* Electrical characteristics of parallel telemetry ports, for connecting parallel telemetry ports of external equipment, are listed in Table 4-3 on page 4-13.

Action

Step	Action
1	Select output point 18 of the parallel output port, by entering: **admin ip** ↵ **dtlport 6 18** ↵ *The Telemetry Output Point screen appears.*
2	In this step, you establish a relation between the selected output point and the serial-telemetry alarm point whose function is to report a failure of fan unit 1. Enter the following: **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 text in the Description field contains the words "Manual Mode."

    c. Relate the output point in context (output point 18) to the required 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).

Step	Action
3	If the status of the output point is off, enter: **status on** ↵ **y** ↵ *The status changes to ON.*

<div align="center">**—continued—**</div>

Procedure 4-3 (continued)
Verifying the parallel telemetry output port (ABM shelf)

Step	Action

4   Make sure the output point is inactive.

If	Then
the output point is active	an alarm condition already exists.Try the following, as required, to obtain the inactive condition: • Verify that you have correctly associated output point 18 to fan 1. If necessary, refer to Table 4-2 on page 4-10.
this is a bay arrangement	Check that the fan power plug is properly connected and that all cooling modules are fully inserted.
this is a modular business package (MBP) arrangement	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 *Modular Business Package Cabinet Installation Guide,* 323-3001-206. • Replace the fan unit.

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 obtain the correct result, there may 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)	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 *Modular Business Package Cabinet Installation Guide,* 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 4-3 (continued)
Verifying the parallel telemetry output port (ABM shelf)

Step	Action

The Telemetry Output Point screen shows that the selected output point has become active.

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 you obtain the correct result, go to step 9. If you do not obtain the correct result, try failing fan unit 3 (reported on byte 8, bit 3) and repeat steps 6 to 7.

After failing fan unit 3, if you obtain the correct result, go to step 9. If you do not obtain the correct result, that indicates that there may be a faulty relay on the alarm relay card in the BIP. In this case, go to step 8.

8   Replace the alarm card on the BIP. Proceed as follows:

    a. use a small flat-head (slotted) screwdriver to turn the latching screw counterclockwise. Then pull the card out of its slot.

    b. 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.

    c. repeat steps 5 to 7. If this does not solve the problem, call your Nortel representative, otherwise continue at step 9.

9   Record the test result for the telemetry output port on the DS1 Feeder Test Results Form.

—continued—

Procedure 4-3 (continued)
Verifying the parallel telemetry output port (ABM shelf)

Step	Action

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 after you have tested TBOS port 4. Refer to the procedure for re-installing MBP covers in *Modular Business Package Cabinet Installation Guide,* 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 appears.

13   Note the completion of this procedure on the DS1 Feeder Test Results Form.

—**continued**—

Procedure 4-3 (continued)
Verifying the parallel telemetry output port (ABM shelf)

Figure 4-4
Wirewrap pins on the ABM breaker interface panel (BIP)

PC-16497
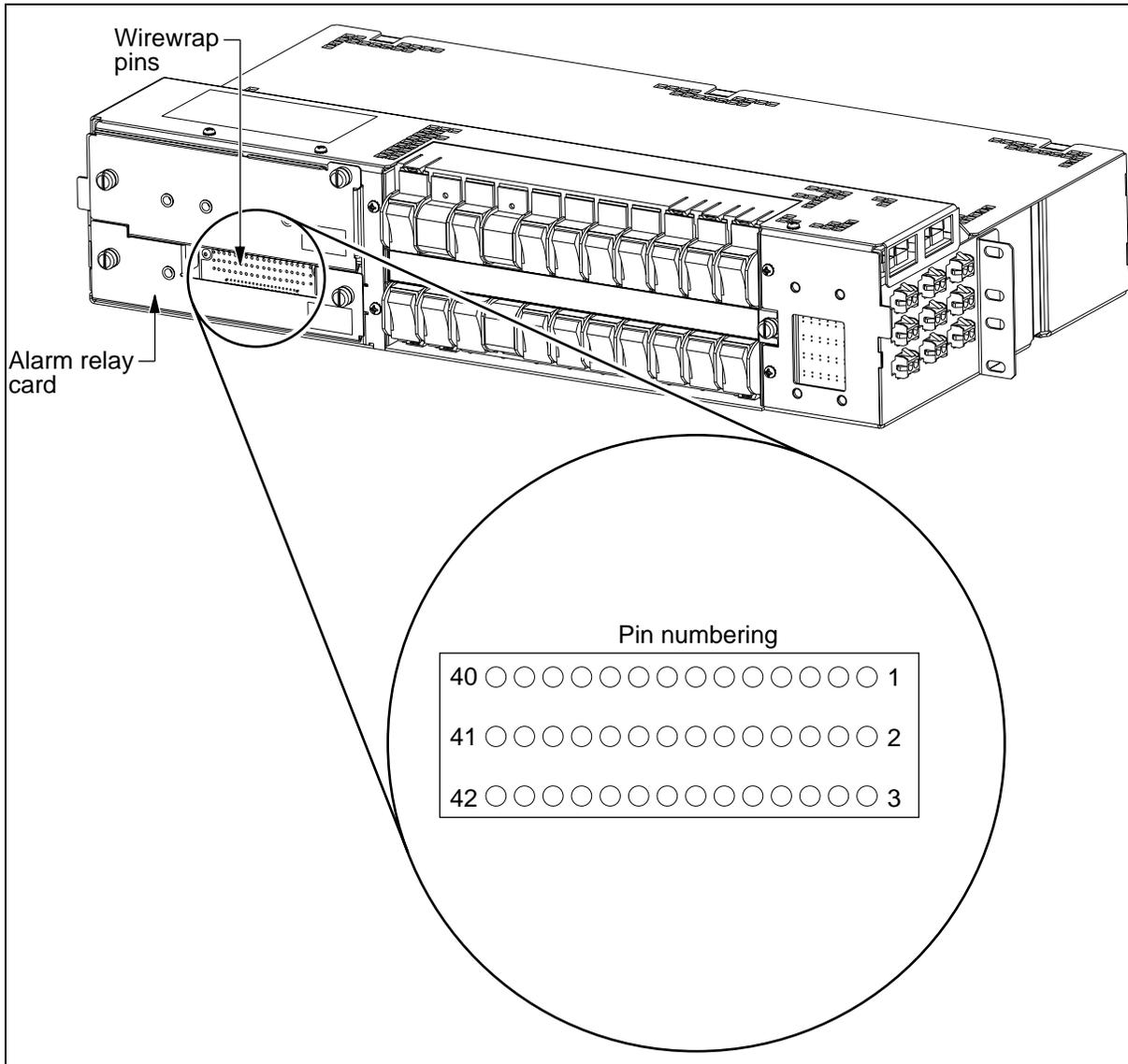
—**continued**—

Procedure 4-3 (continued)
Verifying the parallel telemetry output port (ABM shelf)

Table 4-5
Wirewrap 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.

—**continued**—

Procedure 4-3 (continued)
Verifying the parallel telemetry output port (ABM shelf)

Note 1: When testing parallel telemetry points in Procedure 4-2 on page 4-13 or Procedure 4-3 on page 4-17, you can also access the input points 1 to 11 and output points 15 to 18 at the ABM BIP wirewrap block, shown in Figure 4-4 on page 4-22. Note that testing at the ABM BIP does not test continuity of the parallel telemetry cable to the office termination point. You may need a ladder to work at the wirewrap block.

Note 2: You can turn off the audible alarms at the RFT from an external control point which is connected to pins 27 and 30.

—end—

Procedure 4-4
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 network element user interface (NEUI).

Requirements

Before starting this procedure, you must:

- make sure the system is not in service

To perform this procedure, you need the following materials and equipment:

- a VT100-compatible terminal and connecting cable

- a hot-air blower, such as a hair dryer, for cabinet temperature test

- a small flat-head (slotted) screwdriver, for adjusting a potentiometer when testing the MPP low voltage alarm

- a multimeter, for testing ac fail and repeater alarms if either of these is connected by the customer. This can also be used to test the MPP low voltage alarm, but is not essential.

- a copy of the DS1 Feeder Test Results Form, located in "Appendix A: DS1 Feeder Test Results Form" on page 6-1

Note: On a new system, some alarm descriptions reported in FWPUI are quite generic until they are data filled. Also, some alarms may not be 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 4-6 on page 4-32. 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	Connect the VT100-compatible terminal to the LCAP and log in to FWPUI.
2	Select the Alarms branch 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 4-4 (continued)
Testing MBP/MPP power and environmental alarms

Step	Action

Testing the fan fail alarm

3 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 when the PDU cover removed.

FWPUI reports a fan failed alarm.

4 Close the CB1 circuit breaker.

FWPUI indicates that the fan fail alarm is no longer active.

5 Repeat steps 1 and 2 for each installed cabinet.

When	and	Result
all cabinet doors are closed	each maintain a pressure switch in the closed position	no alarm is reported
any cabinet door is not closed	its pressure switch is in the half-open position	an alarm is reported
the doors are removed		alarms are suppressed by pulling each pressure switch into the fully open position

Testing cabinet door alarms

If the cabinet doors are	Then go to
closed	step 6
open	step 9

Closed cabinet doors

6 Open one MBP cabinet door (remove a front panel).

FWPUI reports a door open alarm.

7 Close the cabinet door (reinstall the front panel).

FWPUI indicates that the door open alarm is no longer active.

8 Repeat steps 6 and 7 for other cabinet doors.

Open cabinet doors

9 Make sure all door switches are in the fully-open position by pulling each switch out to this position.

10 Press in the open door switch for one cabinet door to its middle position to cause an alarm.

FWPUI reports a door open alarm.

—continued—

Procedure 4-4 (continued)
Testing MBP/MPP power and environmental alarms

Step	Action
11	Press the switch in the closed position and hold it there for about 15 seconds. Check that the door open alarm is longer active. If you are working alone, it is easier to install the cabinet door while holding the switch in the closed position and checking FWPUI.
12	Pull the switch out to the fully-open position.
13	Repeat steps 9 to 12 for other cabinet doors.

Testing fan speed controller alarms

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 in the enclosure. When the middle temperature sensor at the top of the cabinet exceeds a pre-set threshold, the fans begin to operate at a higher speed. As soon as the temperature goes back below the pre-set threshold value, low speed operation is automatically restored.

If power to the blower unit is interrupted (such as CB1 breaker trip/restored) for less than three seconds, it disables the fan speed controller operation, causing the fans to operate at 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 FWPUI use the following information to determine what cabinet has the failed equipment:

- the top cap LED on the MPP cabinet illuminates only when the MPP cabinet has the fan speed controller failure

- the top cap LED on the adjacent cabinet illuminates only when the adjacent cabinet has the fan speed controller failure

- the top cap LED on the main equipment cabinet illuminates when ANY system alarm is generated. But if the top cap LED on the main cabinet is the only top cap LED illuminated, then the main cabinet has the fan speed controller failure.

Test alarm reporting of a fan speed controller failure:

14	On the blower unit of the main cabinet, open the CB1 circuit breaker and close it again within a second. It is located in the pedestal and is accessible from the front with the PDU cover removed.

The cooling fans speed up. FWPUI reports a fan speed controller failed alarm.

—continued—

Procedure 4-4 (continued)
Testing MBP/MPP power and environmental alarms

Step	Action
15	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.

Test fan speed controller operation

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.

16	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, the fans in the blower unit speed up.
17	Remove the hot air blower and allow the temperature to drop.
	When the cabinet temperature drops below 42°C, the fans in the blower unit slow down.
18	Repeat steps 16 and 17 for each installed cabinet.

Testing high temperature alarm

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 steps.

19	Hold a hot air blower such as a hair dryer near the temperature sensor on the top left side of the main cabinet. Be careful to not overheat the equipment.
	FWPUI reports a high temperature alarm.
20	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.
21	Repeat steps 19 and 20 but test the temperature sensor on the right side at the top of the main cabinet.
22	Repeat steps 19 through 21 for each installed cabinet.

—**continued**—

Procedure 4-4 (continued)
Testing MBP/MPP power and environmental alarms

Step   Action

Testing the MPP alarms

If the system is	Then go to
not equipped with an MPP cabinet	step 34
equipped with an MPP cabinet	step 23

Testing the LVA alarm generated by the MPP

23   On the NT6C14JA dc distribution shelf, move the Normal/Bypass switch to the Bypass position.

24   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 step. The dc distribution panel meter still reads the correct operating voltage.

25   Use a small screwdriver to adjust the Test Adjust potentiometer in a counterclockwise direction.

The LV Alarm LED is illuminated and the MPP low dc voltage alarm is reported in FWPUI (after a few seconds).

26   Remove the alarm condition by adjusting the Test Adjust potentiometer in a clockwise direction.

The LV alarm LED is extinguished and FWPUI indicates that the low voltage alarm is no longer active.

27   Move the Normal/Bypass switch on the dc distribution shelf to the Normal position.

Testing the MPP fuse alarm

28   Open CB7 (repeater equipment power) on the dc distribution shelf.

FWPUI reports an MPP fuse alarm.

29   Close the circuit breaker.

FWPUI indicates that the MPP fuse alarm is no longer active.

Testing the MPP minor alarm

Note: Battery backup must be present to perform this test, as well as the MPP major alarm test (in step), and the ac fail alarm test (in step 34).

30   Turn OFF the dc output breaker on one rectifier in the MPP.

FWPUI reports an MPP minor alarm.

31   Turn ON the dc output breaker on the rectifier.

FWPUI indicates that the MPP minor alarm is no longer active.

—**continued**—

Procedure 4-4 (continued)
Testing MBP/MPP power and environmental alarms

Step	Action

Testing the MPP major alarm

32 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.

33 Turn ON the dc output breaker on the two rectifiers.

FWPUI indicates that the MPP major and minor alarms are no longer active.

Testing AC fail alarms

The ac fail sensing device is wired by the customer to the BIP wirewrap block pins 1 and 2. Refer to the following note for details about the wiring of the ac fail alarm.

Note: (Refer to Table 4-5 on page 4-23). When testing parallel telemetry points in this procedure or Procedure 4-3 on page 4-17, you can also access the input points 1 to 11 and the output points 15 to 18 at the ABM BIP wirewrap block, illustrated in Figure 4-4 on page 4-22. Shows the pinout of the parallel telemetry input and output points on the BIP. Note that testing at the ABM BIP does not test continuity of the parallel telemetry cable to the office termination point. You may need a ladder to work at the wirewrap block.

If the ac fail alarm is	Then go to
not wired out and battery backup does not exist	step 36
wired out and battery backup does exist	step 34

Testing the ac fail alarm

34 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.

35 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.

36 Repeat steps 34 and 35 for each remaining ac power feed.

If DS1 repeaters are	Then go to
not installed	step 43
installed	step 37

—**continued**—

Procedure 4-4 (continued)
Testing MBP/MPP power and environmental alarms

Step	Action

Testing the RPTR fuse alarm

37   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.

38   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.

Testing the RPTR loss-of-signal alarm

39   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.

40   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.

Testing the RPTR error alarm

41   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.

42   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

43   Log out of FWPUI:

logout ↵

44   Note the completion of this procedure on the DS1 Feeder Test Results Form.

—end—

Table 4-6
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 4-6 (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.						
—end—						

Procedure 4-5
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 network element user interface (NEUI) .

Requirements

Before starting this procedure, you must:

• make sure the system is not in service

You need the following materials and equipment for this procedure:

• a VT100-compatible terminal and connecting cable

• a hot-air blower, such as a hair dryer, for cabinet high temperature test

• a can of spray coolant (do not use ozone-depleting materials) 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). The multimeter can also be used when testing the low voltage alarm, but is not essential

• a copy of the DS1 Feeder Test Results Form, located in "Appendix A: DS1 Feeder Test Results Form" on page 6-1

Note: On a new system, some alarm descriptions reported in FWPUI are quite generic until they are data filled. To obtain the alarm responses in this procedure, you must provision the alarm text and severity level shown in Table 4-7 on page 4-41. 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	Connect the VT100-compatible terminal to the local craft access panel (LCAP), and log in to Fiber World Product User Interface (FWPUI). For more information, refer to *Network Element User Interface Description*, 323-3001-300 in *Operations, Administration, and Provisioning,* Volume 4A.

—**continued**—

Procedure 4-5 (continued)
Testing alarms on the Series 800A outside plant cabinet

Step	Action

2   Select the Alarms branch 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 breaker interface panel (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 (65°F). The ceiling fans 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 ceiling fans are	Then perform
OFF	substep 3 a and then substep 3 b
ON	substep 3 b first and substep 3 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 which is located on the side of the cabinet. The temperature to turn on and off the ceiling fans, differs by 2°C between banks. Once 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.

Procedure 4-5 (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 properly 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, an alarm is reported. 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 operate properly, open all doors on the cabinet and proceed as follows:

a. Make sure 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 in to the closed position and hold it there for about 15 seconds and check that the door open alarm is no 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 5 b to 5 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.

To test the bay high temperature alarm, perform the following substeps:

—**continued**—

Procedure 4-5 (continued)
Testing alarms on the Series 800A outside plant cabinet

Step	Action

    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 Vdc 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 4-5 (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 LVA 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 LVA LED is extinguished (takes a few seconds), and FWPUI indicates that the LVA is no longer active. To see 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 To test the fuse alarm, perform 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 To test the PWR minor alarm, perform 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 To test the PWR major alarm, perform the following substeps:

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 4-5 (continued)
Testing alarms on the Series 800A outside plant cabinet

Step	Action

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
not installed	go to step 15
installed	continue at step 12

12   To test the RPTR fuse alarm, perform the following substeps:

a. Open the dc power circuit breaker on the repeater equipment. At the prompt enter:

update ↵

FWPUI reports a RPTR fuse failure alarm. BIP wirewrap pins 13 and 14 indicate a closed circuit condition.

b. 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.

14   Make sure the repeater equipment is error free and functioning. To test the RPTR error alarm, perform 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.

—**continued**—

Procedure 4-5 (continued)
Testing alarms on the Series 800A outside plant cabinet

Step	Action
	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 ↵
16	Note the completion of this procedure on the DS1 Feeder Test Results Form.

—**end**—

Table 4-7
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 4-7 (continued)
Series 800A outside plant cabinet scan points (E2A inputs and some internal scan points)

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 4-6
Testing office alarms for the ABM shelf

Use this procedure to test the generation of office alarms for the access bandwidth manager (ABM) shelf. Testing verifies that minor, major, and critical alarm signals to the office alarm system are correct. It also verifies the alarm cutoff feature, which turns off the audible office alarms.

Requirements

Before starting this procedure, you must:

- make sure the system is not in service

You need the following materials and equipment for this procedure:

- a VT100-compatible terminal, connected to the network element (NE)
- a digital multimeter, Fluke 85 or equivalent
- a copy of the DS1 Feeder Test Results Form, located in "Appendix A: DS1 Feeder Test Results Form" on page 6-1
- a ladder, to reach the wirewrap block

> **DANGER**
> **Risk of injury or damage**
> Read the warnings and precautions in Chapter 1 to minimize any risk to personnel and equipment.

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 breaker interface panel (BIP) are not lit.*
2	Remove the cover from the breaker interface panel (BIP).
3	Insert the alarm relay card, if not already done so. ***Note:*** The alarm relay card fits in the slot just to the right of the wirewrap pins (in the BIP).

—continued—

Procedure 4-6 (continued)
Testing office alarms for the ABM shelf

Step	Action
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 indicating a non-active state, as shown in the table below and in Figure 4-4 on page 4-22.

critical alarm	visible	pins 37 and 40	open
	audible	pins 31 and 34	open
major alarm	visible	pins 38 and 41	open
	audible	pins 32 and 35	open
minor alarm	visible	pins 39 and 42	open
	audible	pins 33 and 36	open

If the correct results are not obtained, replace the alarm relay card.

Step	Action
5	From the command interpreter (CI) level of the user interface, or from any FiberWorld product user interface (FWPUI) screen, access the FiberWorld Alarm Test CI (fwaltsci) tool by entering:

fwaltsci ↵

The "fwaltsci" prompt appears.

Step	Action
6	Raise a minor alarm by entering:

raise minor ↵

At the BIP, the alarm lamps light. If office alarm connections are wirewrapped already, office alarm lamps light and office alarm bells ring.

Step	Action
7	Check the state of the office alarm relay contacts again.

critical alarm	visible	pins 37 and 40	open
	audible	pins 31 and 34	open
major alarm	visible	pins 38 and 41	open
	audible	pins 32 and 35	open
minor alarm	visible	pins 39 and 42	closed
	audible	pins 33 and 36	closed

—continued—

Procedure 4-6 (continued)
Testing office alarms for the ABM shelf

Step	Action

8   Test audible alarm cutoff by pressing the ACO/LT button on the local craft access panel (LCAP). Then check the state of the office alarm relay contacts again.

critical alarm	visible	pins 37 and 40	open
	audible	pins 31 and 34	open
major alarm	visible	pins 38 and 41	open
	audible	pins 32 and 35	open
minor alarm	visible	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 were 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 out, 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 4-6 (continued)
Testing office alarms for the ABM shelf

Step	Action

11 Repeat steps 7 to 8.

The state of the office alarm relay contacts, after the alarm is created, should be as follows:

critical alarm	visible	pins 37 and 40	open
	audible	pins 31 and 34	open
major alarm	visible	pins 38 and 41	closed
	audible	pins 32 and 35	closed
minor alarm	visible	pins 39 and 42	open
	audible	pins 33 and 36	open

The state of the office alarm relay contacts, after the audible alarm cutoff button is pressed, should be as follows:

critical alarm	visible	pins 37 and 40	open
	audible	pins 31 and 34	open
major alarm	visible	pins 38 and 41	closed
	audible	pins 32 and 35	open
minor alarm	visible	pins 39 and 42	open
	audible	pins 33 and 36	open

If the correct results are not obtained, try the following:

- check for unexpected alarms that can be generated while testing
- check the connections to the office alarm system, if connected
- replace the alarm relay card

12 Remove the major alarm by entering:

clear major ↵

The BIP alarm lamps go out, if there are no other alarms on the bay.

13 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 4-6 (continued)
Testing office alarms for the ABM shelf

Step	Action

14 Repeat steps 7 and 8.

The state of the office alarms relay contacts after the alarm is created should be as follows:

critical alarm	visible	pins 37 and 40	closed
	audible	pins 31 and 34	closed
major alarm	visible	pins 38 and 41	open
	audible	pins 32 and 35	open
minor alarm	visible	pins 39 and 42	open
	audible	pins 33 and 36	open

The state of the office alarm relay contacts after the audible alarm cutoff button is pressed should be as follows:

critical alarm	visible	pins 37 and 40	closed
	audible	pins 31 and 34	open
major alarm	visible	pins 38 and 41	open
	audible	pins 32 and 35	open
minor alarm	visible	pins 39 and 42	open
	audible	pins 33 and 36	open

If the correct results are not obtained, try the following:

- check for unexpected alarms that can be generated while testing
- check the connections to the office alarm system, if connected
- replace the alarm relay card

15 Remove the critical alarm by entering:

clear critical ↵

The BIP alarm lamps go off if there are no other alarms on the bay.

16 Quit from the "fwaltsci" tool by entering:

quit ↵

17 Reinstall the BIP cover.

18 Record the results on the DS1 Feeder Test Results Form.

—**end**—

Testing system integrity

Use this chapter to test the following:

- the DS1-fed AccessNode (DFA) systems and the system equipment at a system level

  — These procedures cover basic system tests on equipment located at more than one network element (NE). Unless otherwise noted, the tests can be performed by one technician.

- end-to-end testing on a new DFA system

  — End-to-end tests are performed after site tests have been completed at both NEs in the system.

Before starting these tests, make sure that a physical path between the operations controller (OPC) shelf at the central office (CO) and the remote fiber terminal (RFT) exists.

How to use this chapter

Since the DFA RFT receives its traffic directly from the switch, minimal system testing is possible. Tests that can be performed on the system are listed in the following task list. If you cannot successfully complete the procedures in this chapter, contact your next level of support.

Note: Other end-to-end tests performed from the switch exist, however, they are not described in this document.

Chapter task list

The following table lists the topics in this chapter. These topics are the procedures that you follow to help you test system integrity.

Topic	See
Connecting the network element to the system	page 5-3
Testing TXC synchronization	page 5-5
Setting the TXC timing reference parameters	page 5-8
Backing up and restoring the NE database to the OPC	page 5-13
Verifying OPC data backup and restoration	page 5-17
Verifying communication between primary and backup OPCs	page 5-20
Testing remote network telemetry	page 5-22

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

Procedure 5-1
Connecting the network element to the system

This procedure defines several activities performed at the network element (NE) prior to beginning system tests.

Requirements

Before starting this procedure, you must make sure:

- all NE commissioning and site testing has been successfully completed

- the system is not in service

- a VT100-compatible terminal is connected to the NE

- you have a copy of the DS1 Feeder Test Results Form, located in "Appendix A: DS1 Feeder Test Results Form" on page 6-1

> **DANGER**
> **Risk of injury or damage**
> Read the warnings and precautions, in Chapter 1, to minimize any risk to personnel and equipment.

Action

Step	Action
1	Terminate the DS1s for your system according to the following: • GR-303 DS1s should be connected to the appropriate equipment on the host switch • TR-08 DS1s should be connected to the appropriate ports on the TR-08 switch • Tandem DS1s should be connected to a channel bank (or equivalent) • OMC DS1s should be connected to the OPC shelf and DFA RFT
2	Make sure there are no active alarm conditions being generated by the network element. Alternatively, record the existence of any alarms on the DS1 Feeder Test Results Form.

—continued—

Procedure 5-1 (continued)
Connecting the network element to the system

Step	Action
3	If the OMC links and DS1 facility parameters are provisioned at both the OPC shelf and the DFA RFT, continue with this step. Otherwise skip to step 5.
	When the OMC links and DS1 facility parameters are set at both network elements (NEs), communication between the two should be possible after about 3 minutes. To test that communication is established, log in to the network element user interface (NEUI) and display the alarm screen for the shelf by entering:
	al ↵
	All alarms on the shelf are displayed. If the OMC Link Fail alarm is not present, OMC provisioning is successful and communication is established.
	You can try logging in to the far-end NE or you can log in to the NE from the OPC. Refer to the *OPCUser Interface Description*, 323-3001-300 in the *Operations, Administration, and Provisioning,* Volume 4A.
	If you are successful in logging in to the far-end NE, communication is established. If you are not successful, OMC or DS1 provisioning can be incorrect. In this case, you must go to each site and check the provisioning.
4	Log out of the NEUI by entering:
	logout ↵
	The CI pre-login screen is displayed.
5	Remove or store all test equipment, tapes, and test forms used in the commissioning and site tests.
6	Note the completion of this procedure on the DS1 Feeder Test Results Form.

<div align="center">—**end**—</div>

Procedure 5-2
Testing TXC synchronization

Use this procedure to test the timing and cross-connect circuit pack (TXC) synchronization at the operations controller (OPC) shelf and DS1-fed AccessNode remote fiber terminal (DFA RFT).

Requirements

Before starting this procedure, you must:

- make sure the system is not in service

- make sure a VT100-compatible terminal is connected to the network element (NE)

- have a copy of the DS1 Feeder Test Results Form, located in "Appendix A: DS1 Feeder Test Results Form" on page 6-1

> **DANGER**
> **Risk of injury or damage**
> Read the warnings and precautions in Chapter 1 to minimize any risk to personnel and equipment.

Action

Step	Action
1	Log into 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: **eq sh; edit; clocksrc triblinetimed** ↵ **y** ↵ *The Clock Source field displays the following:* `TribLineTimed`
3	Provision the timing and cross connect parameters. To do this, go to Procedure 5-3 on page 5-8. *With the presence of valid DS1 signals on Ref A and Ref B, the current filter mode should now indicate normal.*

—**continued**—

Procedure 5-2 (continued)
Testing TXC synchronization

Step	Action

4 Display the TXC Equipment screen by entering:

eq txc <circuit pack group> ↵

    where

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

    The TXC Equipment screen is displayed.

5 Enter the following to edit the Target Filter Mode field:

edittarg holdover ↵

Verify that the Current Filter Mode field changes to `"Holdover"`.

Note: In holdover mode, the network element (NE) holds the phase and the frequency of the timing source to the last known reference. Holdover mode is valid for a period of up to 24 hours.

6 Change the target filter mode back to `"Normal"` and verify that the current filter mode goes through `"Fast"`, then `"Normal"` filter modes.

edittarg normal ↵

7 Disconnect both incoming timing references to force the TXC to automatically go to `"Freerun"` mode. Verify that the screen is updated accordingly.

8 Restore the timing references and make sure the current filter mode goes through `"Acquire"`, `"Fast"`, then `"Normal"` filter modes.

Testing timing reference protection switching

9 Display the TXC Reference Protection screen, by entering:

pr;TRefProt ↵

The TXC Reference Protection screen is displayed.

10 Manually switch the timing reference to the secondary source by entering:

manual op pri ↵

A confirmation prompt is displayed. Enter the following:

y ↵

The secondary timing source becomes active.

11 Force a lockout on the secondary timing reference by entering:

lockout op sec ↵

A confirmation prompt is displayed. Enter the following:

y ↵

The TXC Reference Protection screen displays an asterisk (*) in the Lockout field for the SEC (secondary) timing source.

Note: You must wear antistatic protection before starting the next step.

               —continued—

Procedure 5-2 (continued)
Testing TXC synchronization

Step	Action
12	Simulate a loss of signal at the DSX-1 cross-connect panel by opening the DS1 signal associated with the secondary timing source.
	Because you have locked out the secondary timing source, the system cannot switch to the primary source. Alarms are generated.
13	Force a switch to the primary timing source by entering:
	forced op sec ↵
	A confirmation prompt is displayed. Enter the following:
	y ↵
	The TXC Reference Protection screen displays an 'R' in the Force field indicating a request. Because you have locked out the secondary timing source, no switch takes place. Alarms are still present.
14	Release the lockout on the secondary timing reference source by entering:
	lockout re sec ↵
	A confirmation prompt is displayed. Enter the following:
	y ↵
	The TXC Reference Protection screen displays a dot (.) in the Lockout field for the SEC (secondary) timing source. Since you have forced a switch to the primary timing source, it becomes active. Alarms clear.
15	Close the DS1 signal at the DSX-1 cross-connect panel that you opened in step 14.
	Alarms associated with the simulated loss of signal clear.
16	Release the forced switch on the secondary timing reference source by entering:
	forced re sec ↵
	A confirmation prompt is displayed. Enter the following:
	y ↵
17	Note the completion of this procedure on the DS1 Feeder Test Results Form.

—**end**—

Procedure 5-3
Setting the TXC timing reference parameters

Use this procedure to set the timing and cross connect parameters for the timing and cross connect (TXC) card. This procedure sets parameters for up to two TXC cards (G1 and G2).

The parameters for the TXC card are listed in the tables below:

- **EditTarg**: edit the target filter mode

Target filter mode parameter	Setting and explanation	Default
freerun	The TXC is not locked to an external timing reference. The voltage controlled oscillator on the TXC is set at the midpoint and is providing a Stratum 3 clock. This mode is used during installation of the TXC.	
holdover	The TXC maintains a Stratum 3 holdover based on the last good reference signal.	
normal	The TXC is locked to an external timing reference.	normal

- **PriTSrc**: primary timing source

Primary timing source parameters	Setting and explanation	Default
REFA	Sets the primary timing source to reference bus A for both TXC cards	REFA
REFB	Sets the primary timing source to reference bus B for both TXC cards	
NULL	Sets no timing source (provision NULL if the primary BITS input source is not used)	

—continued—

Procedure 5-3 (continued)
Setting the TXC timing reference parameters

- **SecTSrc**: secondary timing source

Secondary timing source parameter	Setting and explanation	Default
REFA	Sets the secondary timing source to reference bus A for both TXC cards	
REFB	Sets the secondary timing source to reference bus B for both TXC cards	REFB
NULL	Sets no timing source (provision NULL if the secondary BITS input source is not used)	

- **REFASrc**: reference bus A timing source

Reference bus A parameter	Setting and explanation	Default
DS1 <group> <port>	Sets the timing source for reference bus A (REFA) to a DS1 facility. This DS1 facility is defined by two variables, where <group> is g1, g2, or g4, and <port> is 1 to 14	g1 1 (port 1 on mapper g1)
NULL	Set the timing source for reference bus A (REFA) to NULL indicating there is no timing reference.	

- **REFBSrc**: reference bus B timing source

Reference bus B timing parameter	Setting and explanation	Default
DS1 <group> <port>	Sets the timing source for reference bus B (REFB) to a DS1 facility. This DS1 facility is defined by two variables, where <group> is g1, g2, or g4, and <port> is 1 to 14	g2 1 (port 1 on mapper g2)
NULL	Set the timing source for reference bus B (REFB) to NULL indicating there is no timing reference.	

—continued—

Procedure 5-3 (continued)
Setting the TXC timing reference parameters

Requirements

Before starting this procedure, you must:

- obtain from your system administrator the requirements for the timing reference

- have a copy of the DS1 Feeder Test Results Form, located in "Appendix A: DS1 Feeder Test Results Form" on page 6-1

Action

Step	Action
1	From the Network Element Status screen, display the TXC Equipment screen by entering: **eq txc <circuit pack group>** ↵ **where** <circuit pack group> is the TXC group number: **g1** or **g2** *The TXC Equipment screen is displayed.*
2	Provision the target filter mode for the TXC: **edittarg <mode>** ↵ **where** <mode> target filter mode: **freerun, normal**, or **holdover** *The target filter mode is displayed in reverse video.*
3	Display the TXC Reference Protection screen by entering: **pr; TRefProt** ↵ *The TXC Reference Protection screen is displayed.*
4	Set the primary (active) timing reference: **PriTSrc <source>** ↵ **where** <source> is the primary (active) timing reference: **REFA**, **REFB**, or **Null** **y** ↵

—continued—

Procedure 5-3 (continued)
Setting the TXC timing reference parameters

Step	Action
5	Set the secondary (standby) timing reference:

SecTSrc <source> ↵

 where

 <source>   is the secondary (standby) timing
 reference: **REFA**, **REFB**, or **Null**

y ↵

| **6** | Display the TXC Timing Reference source screen by entering: |

TRefsrc ↵

The Timing Reference Source screen is displayed.

| **7** | Set the timing source for the primary timing reference by entering: |

REFASrc <facility> <circuit pack group> <port #> ↵

 where

<facility>	is the facility type: **DS1** or **NULL**
<circuit pack group>	is the group number of the DS1/VT mapper used for timing: **g1**, **g2**, or **g4**
<port #>	is the port number: **1** to **14**

y ↵

| **8** | Set the timing source for the secondary timing reference by entering |

REFBSrc <facility> <circuit pack group> <port #> ↵

 where

<facility>	is the facility type: **DS1** or **NULL**
<circuit pack group>	is the group number of the DS1/VT mapper used for timing: **g1**, **g2**, or **g4**
<port #>	is the port number: **1** to **14**

 —continued—

Procedure 5-3 (continued)
Setting the TXC timing reference parameters

Step	Action
	Note 1: The REFA and REFB sources must be provisioned on different working DS1/VT mappers. The protection mapper cannot be used.
	Note 2: Even though there are no BITS inputs to the TXC card, BITS clocks can still be used to synchronize the DFA RFT. Instead of direct BITS input to the TXC, BITS DS1 can be connected to the DS1/VT mapper and provisioned to source the REFA or REFB timing source.
9	Log out of the Network Element User Interface (NEUI).
10	Record the completion of this test on the DS1 Feeder Test Results Form.

—**end**—

Procedure 5-4
Backing up and restoring the NE database to the OPC

Use this procedure to back up the network-element (NE) database to the operations controller (OPC). This procedure makes a new (current) copy of the NE database and copies the existing database as backup 1.

The test is conducted at the OPC user interface at the OPC shelf in the central office (CO).

Requirements

Before starting this procedure, you must:

- make sure a VT100-compatible terminal is connected to the OPC

  — If necessary, obtain the userID and password for the "admin" security level from your system administrator.

- read the command conventions for the type of interface you are using (CMT or graphical) in *Network Element User Interface Description*, 323-3001-300, in *Operations, Administration, and Provisioning,* Volume 4A

- have a copy of the DS1 Feeder Test Results Form, located in "Appendix A: DS1 Feeder Test Results Form" on page 6-1

- make sure the OPC and NE are initialized and tested

Action

Step	Action

Performing the NE database backup

1 Log in to the OPC.

   Note: For instructions on how to log in to and open an OPC, see *Network Element User Interface Description*, 323-3001-300 in *Operations, Administration, and Provisioning*, Volume 4A.

2 Log in to a remote network element (NE). If necessary, refer to the procedure "Logging in to a network element from the OPC, and logging out", in *Network Element User Interface Description*, 323-3001-300 in *Operations, Administration, and Provisioning*, Volume 4A.

3 Display the equipment shelf screen by entering:

   eq sh ↵

   The shelf equipment screen is displayed.

<div align="center">—continued—</div>

Procedure 5-4 (continued)
Backing up and restoring the NE database to the OPC

Step	Action
4	Backup the shelf database to OPC disk storage by entering:

4   Backup the shelf database to OPC disk storage by entering:

backupdb ↵

The following confirmation message is displayed:

```
BackupDB
Please confirm ("Yes" or "No")
```

5   After you enter "yes", the NE generates a backup request to the OPC and backup begins.

The following message is displayed:

```
yes
The Backup DB has been initiated.Please refer to FWDB
logs for results.
```

Results of the database backup are listed as a log message.

6   To obtain the result of the database backup enter the following at the prompt:

logutil ↵

The following appears on the screen.

```
LOGUTIL:
```

7   Now enter the following at the prompt:

open fwdb ↵

The following fwdb logutil message appears on the screen provided there is a successful backup of the NE database.

8   Change some provisioned data. Make sure it is data that can be restored later from the database that is backed up in step 9. For example, take a DS1 facility out of service (OOS):

quit ↵
fa ds1 g2 ↵
chgstate oos ↵

A confirmation message appears on the screen.

```
Warning: Traffic on DS1 G2 port 1
WILL BE LOST if this command is confirmed
Please confirm ("Yes" or "No"):
```

Enter the following:

y ↵

The DS1 G2 facility is out-of-service.

<div align="center">**—continued—**</div>

Procedure 5-4 (continued)
Backing up and restoring the NE database to the OPC

Step	Action

Review the backup list at the OPC

9   To view the database backup list at the OPC, exit out of the NEUI by selecting quit until you are at the CI prompt, then enter logout. You are returned to the NEUI screen. Select logout from the NEUI screen until you are back at the User Session Manager screen.

10   From the User Session Manager screen, move to the Software Admin toolset and select the Backup/Restore tool.

The Backup/Restore window is displayed.

11   Select the remote NE by moving the arrow keys and pressing **Ctrl_A** (or Keypad **0**).

The remote NE is highlighted in reverse video.

12   From the selected remote NE, display the List item menu by pressing **Ctrl_L** (or Keypad **Enter**).

The List item menu is displayed.

13   Select Manage backups from the List item menu by pressing the **space bar** (or Keypad **0**).

The Manage Backups dialog is displayed as shown below. The Manage Backups dialog shows all backups currently stored on the OPC for the NE. The new database copy and its creation time appear in the list.

14   Verify that the latest backup is in the list. The new database copy can be verified by its creation time.

15   To close the dialog, tab to the Done button, and press **Ctrl_A** (or Keypad **0**).

16   Exit the Backup/Restore Manager tool by pressing **Ctrl_L T** (or Keypad **6**) to get the Window menu. Then select Exit from the Window menu.

The User Session Manager screen appears.

Restoring the NE database

17   Select the NE Login Manager tool from the Utilities toolset and login to the NE.

18   Display the equipment shelf screen by entering:

eq sh ↵

The shelf equipment screen is displayed.

—**continued**—

Procedure 5-4 (continued)
Backing up and restoring the NE database to the OPC

Step	Action
19	To restore the database enter the following at the prompt:
	Restore <version>↵
	where
	<version> you can select current or backup 1. If you do not select the version, the system will prompt you for the version.
	The following confirmation message is displayed:
| | ```
This command will start a restart reload of the shelf
processor.
Do you want to continue?
Please confirm ("Yes" or "No"):
``` |
| **20** | Enter the following to restore the database: |
| | **y** ↵ |
| | ```
The Restore has been initiated Please refer to FWDB logs
for results
``` |
| **21** | After the restore is completed, the system comes back with the following message: |
| | ```
Press return to exit.
``` |
| **22** | Press **return** to exit and you are returned to the NE Login Manager screen. |

—end—

Procedure 5-5
Verifying OPC data backup and restoration

Use this procedure to verify that operations controller (OPC) data can be backed up to tape and then restored from tape. Perform verification by changing some data after saving a copy of the OPC data to tape. When the tape data is restored to the OPC the modified data should also be restored.

Note: This procedure is service affecting because you perform a cold restart.

CAUTION
Risk of OPC system corruption
Follow the procedure exactly as documented. Deviation from the procedure can result in corruption of the OPC system.

Requirements

Before starting this procedure, you must:

- make sure the system is not in service
- ensure the appropriate software is available on the OPC disk
- connect a VT100-compatible terminal to the OPC at the central office (CO). If necessary, obtain the userID and password for the "admin" security level from your system administrator for both the OPC and the remote network element (NE).
- make sure equipment has been set up at the site of the primary OPC
- be logged in to the OPC user interface with the security level of admin
- insert the tape in the tape drive
- read the command conventions for the interface you are using (CMT or graphic). Refer to *OPC User Interface Description*, 323-3001-301 in *Operations, Administration, and Provisioning,* Volume 4A
- have a copy of the DS1 Feeder Test Results Form, located in "Appendix A: DS1 Feeder Test Results Form" on page 6-1

—continued—

Procedure 5-5 (continued)
Verifying OPC data backup and restoration

Action

Step	Action
1	Follow the procedure "Saving OPC data to tape" in *Data Administration Procedures,* 323-3001-304, in *Operations, Administration, and Provisioning,* Volume 4A.
2	Now we will change one piece of data, your OPC password. To do this, go to the Utilities toolset on the User Session Manager window and select the Password Update tool from the list of available tools.
3	Enter your old password and press the **Return** key.
	If the password is correct the field label changes to "Enter new password".
4	Enter a new password in the field and press the **Return** key.
	If the password is acceptable, the text above the field changes to "Retype new password".
5	Retype your new password in the field and press the **Return** key.
	If the password matches your previous entry, the field label changes to "Passwords match" and the field is removed.
6	Select the Update button.
	The new password is put into effect, the field is removed, and the text above the field changes to "Password Updated".
7	Close the Password Update tool by selecting Exit from the Window menu (Keypad 6).
8	Restore the OPC data from the tape backup. To do this, select the OPC Save and Restore tool from the OPC Admin toolset list.
	The OPC Save and Restore main window is displayed.
9	Tab to the Save to tape button at the top of the main window. Do not select it.
10	Use the down arrow key and move to the Restore OPC data from tape button. Select the Restore from tape button by pressing **Ctrl_A** (or Keypad **0**).
	The buttons for restoring OPC data from tape are displayed in the main window. An arrow is displayed to the left of the first button.
11	To confirm that the correct tape is inserted in the tape drive, select the Display tape details button by pressing **Ctrl_A** (or Keypad **0**).
	The Tape Details dialog is displayed with information about the tape.
12	Check the fields in the Tape Details dialog to confirm that you have inserted the correct tape into the tape drive.

—**continued**—

Procedure 5-5 (continued)
Verifying OPC data backup and restoration

Step	Action
13	To remove the Tape Details dialog, select the Done button by pressing **Ctrl_A** (or Keypad **0**).
	The Tape Details dialog disappears. In the main window, the arrow moves down to the Restore OPC data from tape button.
14	In the main window, select the Restore OPC data from tape button by pressing **Ctrl_A** (or Keypad **0**).
	A confirmation dialog is displayed prompting you to confirm your request.
15	Tab to the Yes button. Select the Yes button by pressing **Ctrl_A** (or Keypad **0**).
	The confirmation dialog disappears. The local OPC becomes inactive. Dialogs are displayed, indicating the progress of the restore operations. The restore operation can take up to 10 minutes to complete. When the OPC becomes active again, the following information dialog is displayed for each user session.
16	To remove the information dialog, select the Done button by pressing **Ctrl_A** (or Keypad **0**).
	A completion dialog is displayed indicating that the restore operation is complete.
17	To remove the completion dialog, select the Done button by pressing **Ctrl_A** (or Keypad **0**).
	In the main window the arrow moves down to the Transfer data to Backup OPC button.
18	Logoff the OPC.

If the tape backup is	Then you will
working	be able to log back on using the original password
not working	have to use the new password

Step	Action
19	Record the completion of this procedure in the DS1 Feeder Test Results Form.

—**end**—

Procedure 5-6
Verifying communication between primary and backup OPCs

Use this procedure to verify the following:

- the primary operations controller (OPC) can be shut down and rebooted
- the primary and backup OPCs can communicate

    Note: If the system has no backup OPC, then skip this procedure.

Requirements

Before starting this procedure, you must:

- make sure the system is not in service
- make sure the equipment has been set up at the site of the primary OPC
- be logged in to the OPC at the admin security level
- read the command conventions for the interface you are using (CMT or graphic) in *OPC User Interface Description*, 323-3001-301 in *Operations, Administration, and Provisioning,* Volume 4A
- have a copy of the DS1 Feeder Test Results Form, located in "Appendix A: DS1 Feeder Test Results Form" on page 6-1

Action

Step	Action
1	Log in to the primary OPC and shut it down. Follow the procedure "Shutting down an OPC" in *Data Administration Procedures*, 323-3001-304 in *Operations, Administration, and Provisioning*, Volume 4A. You are rebooting the OPC, not removing the OPC.
2	Log back in to the OPC at the admin security level.
	The User Session Manager is displayed.
3	Select the Event Browser tool from the Software Admin toolset list.
	The Event Browser main window is displayed.
4	Select the List item menu (Keypad Enter).
	The Event Browser main window is displayed with the List item menu.
5	Check the log list for the following message. This records the restoration of communications between the primary and backup OPCs:

```
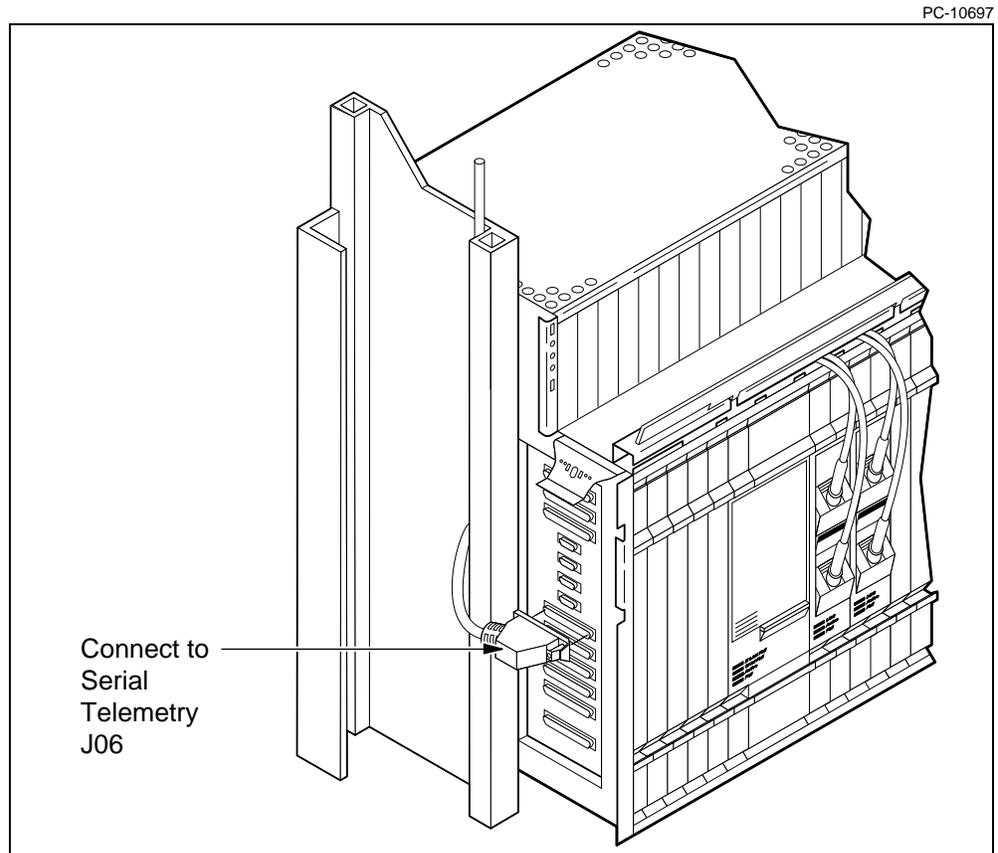STBY507 OPC to OPC link established.
```

—continued—

Procedure 5-6 (continued)
Verifying communication between primary and backup OPCs

Step	Action
6	Close the Event Browser and log out of the OPC.
7	Record the completion of this procedure in the DS1 Feeder Test Results Form.

—**end**—

Procedure 5-7
Testing remote network telemetry

Use this procedure to test the remote network telemetry feature.

Requirements

Before starting this procedure, you must:

- make sure the system is not in service

- connect a VT100-compatible terminal to the operations controller (OPC)

- have available a telemetry byte-oriented serial (TBOS) (E2A) test set KS-22828 L1 and connecting cable

- have a copy of the DS1 Feeder Test Results Form, located in "Appendix A: DS1 Feeder Test Results Form" on page 6-1

Action

Step	Action
1	Use the TBOS test cable to connect the TBOS test set to the serial telemetry connector on the side interconnect left circuit pack of the common-equipment shelf. Use jack J06 on the ABM shelf as shown in Figure 5-1 on page 5-23.
2	Log in to the OPC under the 'admin' userID. *The User Session Manager screen is displayed.*
3	Select the Network Admin toolset and choose the Network Telemetry - TBOS tool. *The Telemetry - TBOS screen appears.*
4	Choose the local network element (NE) as the one that is to receive the remote network telemetry display. Enter display number 7 on serial port 1.
5	Log in to the user interface of the local network element (NE). *The Network Element Status screen is displayed.*

—**continued**—

Procedure 5-7 (continued)
Testing remote network telemetry

Step	Action

Figure 5-1
Connection of the serial telemetry cable to the ABM shelf

PC-10697

Connect to
Serial
Telemetry
J06

6   Verify that the serial telemetry display field is updated:

admin ip ↵

dtlport 3 ↵

The TBOS Port screen is displayed. Display 7 shows remote display 1.

—continued—

Procedure 5-7 (continued)
Testing remote network telemetry

Step	Action
7	At the fiber central office terminal (FCOT), remove a DS1/VT mapper circuit pack.
8	At the local network element (NE) review the TBOS port screen.
	The following alarm is raised on display 7 of the E2A TBOS port 1:
	`Network Element     Remote Display     Byte 1, Bit 3`
9	Replace the circuit pack and wait for the wait-to-restore (200 or 300 seconds) period to complete.
	The minor alarm clears on the TBOS test set.
10	Remove a DS1 input or output card at the FCOT.
11	At the local NE, review the TBOS port screen.
	The following alarm is raised on display 7 of the E2A TBOS port 1:
	`Network Major      Remote Display     Byte 1, Bit 2`
	(For the datacomm loss of signal alarm at the local network element.)
12	Reinsert the removed card.
	The alarm clears on the TBOS test set.
13	At the FCOT, remove the processor (Proc) card.
14	At the local NE, review the TBOS port screen.
	The following alarm is raised on the remote display 1 of the E2A TBOS port 1.
	`Network Minor      Remote Display     Byte 1, Bit 3`
	For the datacomm loss of signal alarm at the local network element.
	`Counts Inaccurate  Remote Display     Byte 1, Bit 5`
	The alarm information cannot be retrieved from the FCOT.
15	Reinsert the Proc card.
	The Proc card reboots.
16	Make sure downloading is successfully completed by logging in to the FCOT from the OPC.
	The Network Element Status screen of the FCOT is displayed.
17	Log out of the NE.
	logout ↵

—continued—

Procedure 5-7 (continued)
Testing remote network telemetry

Step	Action
18	Log out of the OPC session: display the User Session Manager screen by pressing **Ctrl_T +** several times. Then tab to the Logout button and select it by pressing **Ctrl_A** (or Keypad **0**). Confirm the logout.
	The OPC login screen is displayed.
19	Record the completion of this procedure in the DS1 Feeder Test Results Form.
20	Install the common-equipment shelf cover as described in *Routine Maintenance Procedures*, 323-3001-546, in *Maintenance*, Volume 5C.

<div align="center">**—end—**</div>

Appendix A:
DS1 Feeder Test Results Form

This appendix has the master copy of the DS1 Feeder Test Results Form. Use it to record the completion of each test as it is performed.

> *Note:* Not all tests on this form are performed, and those that are, may not be performed in this exact order. To determine the procedures that must be performed for your system and the order the procedures should be performed, refer to Chapter 1 of this document.

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 cannot be successfully completed, please list pertinent details on a separate sheet of paper.

SONET Products

DS1 Feeder Test Results Form   Page 1 of 4

System: _____

Location name: _____

Location type: _____
(CO or remote)

Shelf type   _____

Customer: _____

Project: _____

COEO/Customer #:   _____

FiberWorld Product Release   _____

Tested by: _____

Date: _____

DS1 Feeder Test Results form		Page 2 of 4
Procedure	**Procedure and items tested**	**Results**
2-1	Enabling and disabling TIC/STS-1 and VT1.5 alarms	pass _____
2-2	Powering up the line equipment	pass _____
2-3	Testing lamps and LEDs	pass _____
2-4	Performing a circuit pack inventory	pass _____

2-5	Diagnosing failed circuit packs
	    common-equipment shelf
	    copper-distribution shelf
		
		pass _____
		pass _____

2-6	Verifying redundant common-equipment cards • verifying processor redundancy • verifying TIC redundancy • verifying LIC redundancy	 pass _____ pass _____ CDS1 pass _____ CDS2 pass _____ CDS3 pass _____ CDS4 pass _____ CDS5 pass _____ CDS6 pass _____ CDS7 pass _____
2-7	Testing the copper-distribution shelves	CDS1 pass _____ CDS2 pass _____ CDS3 pass _____ CDS4 pass _____ CDS5 pass _____ CDS6 pass _____ CDS7 pass _____
2-8	Verifying DS1 signal continuity	pass _____

DS1 Feeder Test Results Form	Page 3 of 4
Procedure	**Procedure and items tested**	**Results**

Procedure	Procedure and items tested	Results
3-1	Verifying DS1 transmission test set performance	pass _____
3-2	Performing initial DS1 provisioning (if applicable)	pass _____
	Line build-out (short, medium, or long):	_____
3-3	Testing DS1 cables and input/output cards	
	DS1/VT mapper in slot # _____	pass _____
	DS1/VT mapper in slot # _____	pass _____
	DS1/VT mapper in slot # _____	pass _____
	DS1/VT mapper in slot # _____	pass _____
3-4	Testing DS1 protection switching	
	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 _____
	Priority switching	pass _____
3-5	Testing DS1 signal continuity	pass _____
3-6	Test TXC protection switching	pass _____
4-1	Verifying the serial telemetry interface	pass _____
4-2	Verifying the parallel telemetry input port	pass _____
4-3	Verifying parallel telemetry output port	pass _____
4-4	Testing MBP/MPP power and environmental alarms (if applicable)	pass _____
4-5	Testing alarms on the Series 800A outside plant cabinet (if applicable)	pass _____

DS1 Feeder Test Results Form		Page 4 of 4
Procedure	**Procedure and items tested**	**Results**
4-6	Testing office alarms	
	minor office alarms, audible and visible	pass _____
	major office alarms, audible and visible	pass _____
	critical office alarms, audible and visible	pass _____
5-3	Connecting the network element to the system	pass _____
5-2	Testing the TXC synchronization	pass _____
5-3	Setting the TXC timing reference parameters	pass _____
5-4	Backing up and restoring the NE database to the OPC	pass _____
5-5	Verifying OPC data backup and restoration	pass _____
5-6	Verifying communication between primary and backup OPCs	pass _____
5-7	Testing remote network telemetry	pass _____

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A

Alarm
  clear critical   4-47
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