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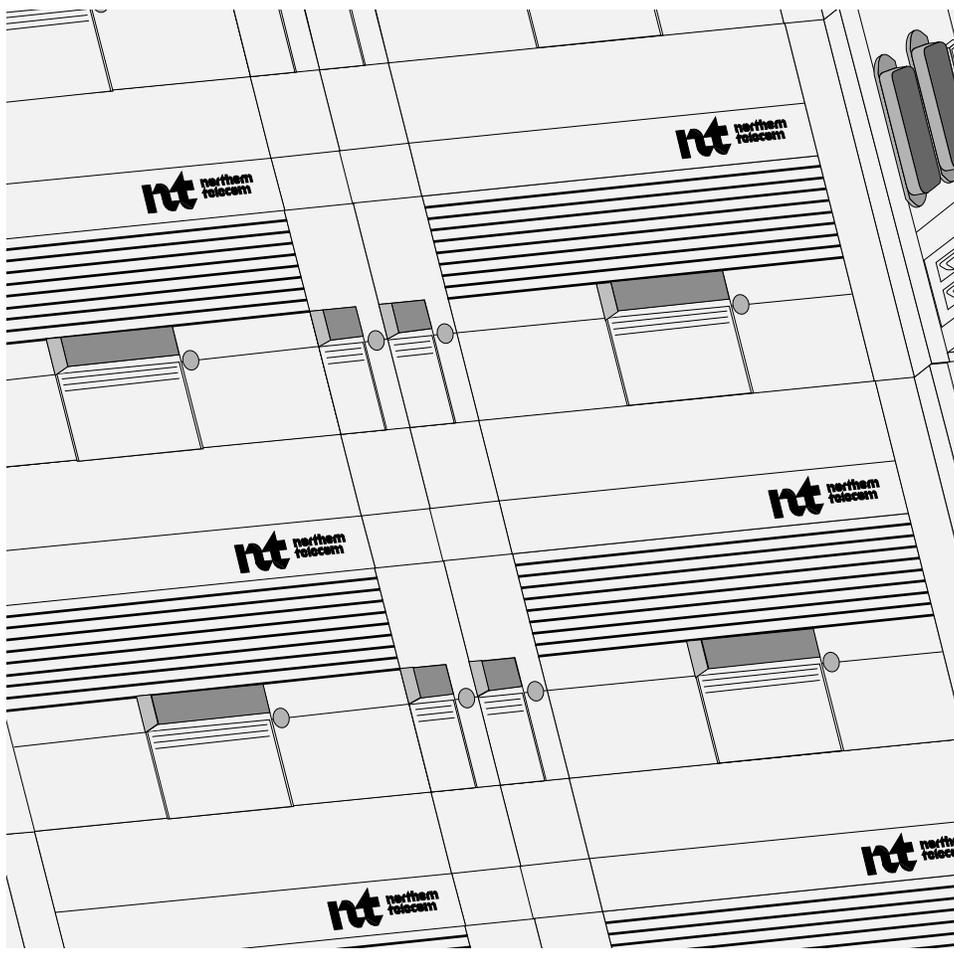
323-3001-316

SONET Products

# AccessNode

## Line Card Testing Procedures

Issue 3.0 October 1999



**NORTEL**  
NETWORKS™



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SONET Products

# **AccessNode**

## Line Card Testing Procedures

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# Publication history

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**October 1999**

AN17.20 Standard release of the document, Issue 3.0. Changes were made to chapter 2 procedures to include changing the state of a line card to out-of-service (OOS) before physically removing the card, then changing the state back to in-service (IS) after installing the replacement card.

**June 1999**

AN17 Standard release of the document, Issue 2.0. Changes were made to chapters 2 and 6 to reflect the Universal Edge 9000 product (UE9000).

**February 1999**

AN16 Standard release of the document, Issue 1.0. Changes include the following:

- changed maximum number of VMs throughout book from 14 to 28
- changed maximum slot number from 96 to 48 throughout book
- changed max VLCM # from 8 to 2 in Chapter 2
- deleted unnecessary screens in Chapter 2 to prepare for Web-readiness
- DMS access changes throughout book
- line card equipment screen change in Chapter 2

**June 1998**

AN15 Standard 01.01 release of this document. Changes were made to chapter 2 for DMS Access feature.

**September 1997**

AN14 Standard 01.01 release of this document.

**July 1996**

AN12 Standard 01.01 release of this document.

**November 1995**

Standard AN11 release of this document.

### **April 1995**

Standard AN10 release of this document. New information includes:

- more generic figures in DS1 tandem procedures in Chapter 5, to make them apply to point-to-point, single-ended, and DS1-fed configurations
- a new procedure in Chapter 2 describes how to disable/enable line card alarms
- improved TR08 slot-DS0 channel association table and multislot line card treatment in Chapter 2
- the circuit lineup worksheet has been moved to Chapter 4

### **March 1995**

Addendum release to the standard AN08 version of this document. Changes include:

- Chapter 2: improved description of multislot line cards (in descriptive text and in Procedure 2-2); details about conditions which illuminate the line card red LED (Procedure 2-3); other minor improvements
- Chapter 4: a note about slope equalization in Procedure 4-1

### **February 1995**

Addendum release to the standard AN08 version of this document. Table 2-2 has been expanded to include the DS0 channel correlation between the switch and the FCOT for TR08 DS1s.

### **December 1994**

Standard AN08 release of this document. New information includes TR08 functionality, in Chapters 2 and 6. Changes also include the removal of descriptive information about the OPC tool, Specials Lineup Manager, in Chapter 3. The information is now contained in *User Interfaces Description*, 323-3001-301.

### **November 1994**

Standard AN07 release reissued with improvements.

### **April 1994**

Standard AN07 release of this document.

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# About this document

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This document describes the setup and testing of line cards and services on AccessNode equipment. Procedures in this document include the following:

- Chapter 2 procedures are about installing and verifying line cards.
- Procedures in Chapters 3 describe how to use the operations controller (OPC) Specials Lineup Manager tool and how to line up special service circuits, respectively.
- Chapter 4 procedures describe end-to-end testing of new universal digital loop carrier (UDLC) and DS1 Tandem circuits.
- Chapter 5 procedures describe how to enable testing of AccessNode IDLC lines from the DMS-100 MAP position using the Integrated Remote Test Unit (IRTU) located at the AccessNode.
- Chapter 6 has the descriptive and procedural information about the network element user interface (NEUI) jack access tool on the local craft access panel (LCAP).
- Chapter 7 has the descriptive and procedural information about the Specials Lineup Manager Tool.

## Audience

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

## How to use this document

A process flowchart follows illustrating the recommended approach for initial lineup and testing of line cards.

Task lists follow the flowchart. Each main task in bold relates to a block in the flowchart. Each subtask refers to a procedure that must be performed.

Within some chapters, there are procedures that are only performed occasionally. These procedures are listed at the front of their respective chapter, and are not included as part of the flowchart, or its related task lists.

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

## Warnings and safety precautions

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

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

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

Samples of danger and caution warnings follow.



### **DANGER**

#### **Risk of personal injury**

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



### **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.



### **CAUTION**

#### **Risk of service interruption or equipment damage**

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

## OPC and NEUI command conventions

Information about how user interface commands are represented in documentation is provided in *Network Element User Interface Description*, 323-3001-300, in *Operations, Administration, and Provisioning*, Volume 4A. The same information is available for the operations controller (OPC) in *OPC User Interface Description*, 323-3001-301, in *Operations, Administration, and Provisioning*, Volume 4A.

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## References in this document

This document refers to the following documents.

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

- *Line Card Applications and Special Services Engineering*, 323-3001-155

### **Description, Volume 2B**

- *Line and Loop Testing Overview*, 323-3001-115

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

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

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

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

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

#### **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 5B**

- *Log Report Manual*, 323-3001-840

#### **Maintenance, Volume 5C**

- *Module Replacement Procedures*, 323-3001-547
- *Circuit Testing from the OPC User Interface*, 323-3001-548

#### **AccessNode Express Volume**

- *AccessNode Express Commissioning and OAM&P*, 323-3051-220

#### **Separately-bound documents**

- *AccessNode Express Installation Guide*, 323-3051-210
- *AccessNode Express Maintenance Guide*, 323-3051-211

- *UE9000 Installation Quick Reference Guide*
- *UE9000 Voice OAM&P User Guide*
- *UE9000 LED Quick Reference Guide*

**DMS-100 Family library**

- *Subscriber Carrier Module—100 Access Translations Guide*, 297-2741-350 (BCS36) or *XPM Translations Reference Manual*, 297-8321-815 (NA002 or later)
- *Subscriber Carrier Module—100 Access Maintenance Guide*, 297-2741-520 (BCS36) or *Subscriber Carrier Module—100 Access Maintenance Manual*, 297-8251-550 (NA002 or later)
- *North American DMS-100 Translation Guide*, 297-8001-350, Volume 19
- *Extended Peripheral Module Translations Reference*, 297-8321-8152, Volume 2

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# Overview of line card testing

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This chapter has the general information required before line card testing.

It lists equipment cautions and warnings, equipment required for testing, main task list for system expansion, and a description of what to do when you encounter alarms.

## Chapter contents

The following table lists the topics covered in this chapter.

Topic	See
Equipment cautions and warnings	page 1-1
Equipment warning label	page 1-4
Document task list	page 1-4
Flowchart of line card testing	page 1-5
Line provisioning and testing: a brief description of the process	page 1-10

## 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 AccessNode equipment:

“This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instructions manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.”

### Static electricity

It is usual for static electrical charges to build up on your body if you walk 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.

### Handling circuit packs

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



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 shipping package.  
*Note:* Proper packaging is especially important for heavier dual-card units, like the IRTU. This avoids physical damage and accumulation of dirt or dust on gold-plated contacts. Be careful not to damage any parts when inserting the circuit pack into its packaging.
- Avoid storage in areas where the relative humidity can exceed 95% and where the temperature can exceed 70 degrees C, because boards may warp or corrode.

## Laser radiation

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

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



### **DANGER**

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

At all times when handling optical fibers, follow the safety procedures recommended by your company.

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

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

The caution label at right is on the optical interface card, near the optical connector, and should be 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 might have 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 they remain off (whether located at the central office, subscriber premises, or remote location).
- Prior to starting, disconnect any optical test sets from the fibers (whether locally or remotely connected).
- Use only the optical instruments approved by your company.

### **Repairing optical fibers**

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

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

### **Equipment warning label**

The warning label shown below is located in the top left corner of the back cover of the equipment.

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

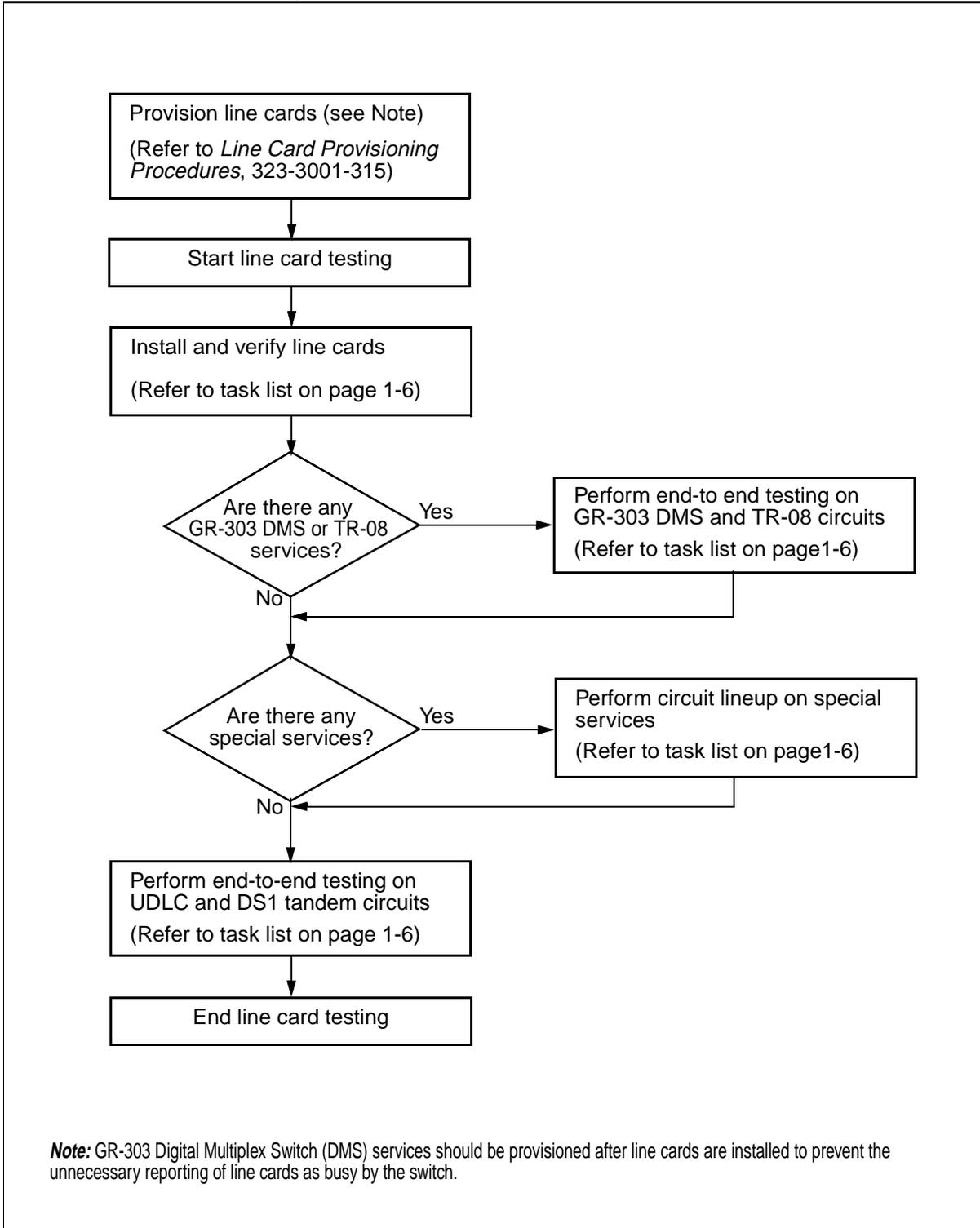
### **Document task list**

This section shows the flowchart and main tasks for line card testing an AccessNode system.

The tasks for line card testing are listed and are followed by the sequence of Procedures required to complete the task. If you cannot successfully complete these procedures, contact your next level of support.

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

**Figure 1-1**  
**Flowchart of line card testing**



**Table 1-1**  
**Document task list**

<b>If you want to perform this task</b>	<b>And you have this service</b>	<b>Then perform these procedures</b>	<b>Found on</b>
Install and verify line cards	Any	Procedure 2-1 Installing line cards  Procedure 2-2 Performing an inventory of line cards  Procedure 2-3 Running line card diagnostics (if necessary)	page 2-26  page 2-29  page 2-36
Perform circuit lineup for two-wire special services	For UDLC: <ul style="list-style-type: none"> <li>• analog special services</li> </ul> For DS1 tandem: <ul style="list-style-type: none"> <li>• FX</li> <li>• TO/ETO</li> <li>• DPO/DPT</li> <li>• PLAR/MRD</li> </ul>	Procedure 3-1 Lining up a two-wire special service circuit	page 3-5
Perform circuit lineup for 4-wire and 6/8-wire special services	For UDLC or DS1 tandem: <ul style="list-style-type: none"> <li>• FX</li> <li>• TO/ETO</li> <li>• DX</li> <li>• E&amp;M/PLR</li> <li>• TDM</li> </ul>	Procedure 3-2 Lining up a 4-wire or 6/8-wire special service circuit	page 3-13
Perform end-to-end testing on GR-303 DMS or TR-08 services	For GR-303 DMS: <ul style="list-style-type: none"> <li>• LSR</li> <li>• LGB</li> <li>• COIN</li> <li>• EBS</li> <li>• ISDN</li> </ul> For TR-08: <ul style="list-style-type: none"> <li>• POTSRT</li> <li>• COINRT</li> <li>• UVGRT</li> <li>• DPT</li> </ul>	GR-303 DMS and TR-08 circuit tests are generally performed from the user interface of the digital switch or from a line testing system.  Test the circuit end-to-end at the MAP or equivalent interface.	Refer to DMS family documents such as:  297-2741-520, 297-8251-550, or 297-2451-010 (for ISDN only)
—continued—			

**Table 1-1 (continued)**  
**Document task list**

If you want to perform this task	And you have this service	Then perform these procedures	Found on
Perform end-to-end testing on UDLC services	POTS, COIN, UVG, PLAR, and MRD	Procedure 4-1 Performing an end-to-end level test  Procedure 4-2 Performing an idle-channel noise test  Procedure 4-3 Performing a telephone call-through test  <b>Note:</b> For a COIN service with floating positive battery and loop supervision at the FCOT, and terminating on a 5ESS switch, make sure the ground reference bit is set on the 5ESS switch.	page 4-5  page 4-12  page 4-17
	2-wire DPO/DPT	Procedure 4-1 Performing an end-to-end level test  Procedure 4-5 Performing a 2-wire DPO/DPT signaling test  Procedure 4-6 Performing a 2-wire DPO/DPT reverse battery wink test  Procedure 4-2 Performing an idle-channel noise test	page 4-5  page 4-25  page 4-28  page 4-12
	2-wire or 4-wire TO or ETO	Procedure 4-1 Performing an end-to-end level test  Procedure 4-2 Performing an idle-channel noise test	page 4-5  page 4-12
	2-wire FX	Procedure 4-1 Performing an end-to-end level test  Procedure 4-4 Performing a two-wire FX signaling test  Procedure 4-2 Performing an idle-channel noise test	page 4-5  page 4-21  page 4-12
—continued—			

1-8 Overview of line card testing

**Table 1-1 (continued)**  
**Document task list**

If you want to perform this task	And you have this service	Then perform these procedures	Found on
Perform end-to-end testing on UDLC services (continued)	4-wire FX	Procedure 4-1 Performing an end-to-end level test  Procedure 4-11 Four-Wire FXS/FXO signaling test  Procedure 4-2 Performing an idle-channel noise test	page 4-5   page 4-56   page 4-12
	4-wire DX signalling	Procedure 4-1 Performing an end-to-end level test  Procedure 4-12 DX signaling test  Procedure 4-2 Performing an idle-channel noise test	page 4-5   page 4-62   page 4-12
	4-wire DDS	Procedure 4-9 Testing a DDS customer loop  Procedure 4-10 Performing an end-to-end DDS test (FCOT to RFT)	page 4-44   page 4-49
	6/8-wire E&M and PLR	Procedure 4-1 Performing an end-to-end level test  Procedure 4-13 E&M and PLR signaling test  Procedure 4-2 Performing an idle-channel noise test	page 4-5   page 4-65   page 4-12
—continued—			

**Table 1-1 (continued)**  
**Document task list**

If you want to perform this task	And you have this service	Then perform these procedures	Found on
Perform end-to-end testing of analog on DS1 tandem	2-wire special services <ul style="list-style-type: none"> <li>• DPO/DPT</li> <li>• TO/ETO</li> <li>• FX</li> <li>• MRD/PLAR</li> </ul> 4-wire special services <ul style="list-style-type: none"> <li>• TO/ETO</li> <li>• FX</li> <li>• DX</li> </ul> 6/8-wire special services <ul style="list-style-type: none"> <li>• E&amp;M/PLR</li> <li>• TDM</li> </ul>	Procedure 4-7 Testing analog special services on DS1 tandem	page 4-31
	DDS (OCUDP)	Procedure 4-8 Testing DDS (OCUDP) on DS1 tandem  Procedure 4-9 Testing a DDS customer loop	page 4-36  page 4-44
—end—			

## Line provisioning and testing: a brief description of the process

Customer services can be added after the system and copper-distribution shelves (CDSs) are installed and tested. Procedures for testing a new system are in *Commissioning and Testing*, Volume 3. Procedures for testing a new CDS added to an existing system are in *System Expansion Procedures*, 323-3001-324, in *Operations, Administration, and Provisioning*, Volume 4C.

The process of provisioning and testing new customer services, of which this document is a part, is summarized below.

### Circuit design

When a customer requests a new service, a circuit design is prepared. The circuit design has the essential information for provisioning the service, including service type and equipment parameters (such as the value of gain, impedance, and equalization attributes). See *Line Card Applications and Special Services Engineering*, 323-3001-155, in the *Engineering, Configuration, and Ordering Guide*, Volume 1, for engineering rules and methods to determine line card settings for line cards and outside plant cables.

### Circuit provisioning

Line or service provisioning includes the following:

- defining the service type to the NE database
- adjusting the equipment settings for the new service to the values specified in the circuit design

Special service circuit provisioning is fine-tuned during circuit lineup. Provisioning can also be adjusted during end-to-end testing. Bulk plain old telephone service (POTS) and TR08 provisioning and individual provisioning for TR08, universal, and DS1 tandem services are described in *Line Card Provisioning Procedures*, 323-3001-315, in *Operations, Administration, and Provisioning*, in this volume.

**Note:** AccessNode system controls in the OPC for the operations, administration, and maintenance of non-GR-303 DS0 circuits are limited to 885 provisioned DS0s circuits in a single OPC span of control. AccessNode OPC system controls are not operational beyond this limit.

### Line card installation

Procedures for installing and diagnosing line cards are provided in Chapter 3 of this document. In most applications, line cards can be installed before or after lines are provisioned; the exception being GR-303 DMS services provisioned at the DMS SuperNode MAP. For these services, provisioning should be completed before installing line cards.

### **Circuit testing**

For some special services, such as transmission only (TO) services, the loop portions of the circuit are lined up when provisioning is completed. That is, the circuit is tested and adjustments are made (reprovisioned) to meet service requirements, for such transmission parameters as gain and equalization. Loop lineup procedures are in Chapter 3, “Special services lineup procedures” on page 3-1.

End-to-end performance testing verifies the complete circuit. Tests include measuring end-to-end level, idle channel noise, and signalling. The circuit is then ready for service.

End-to-end performance testing is described in Chapter 4, “End-to-end performance tests for lines.” To test integrated services (loop-start residential, loop-ground business, coin, electronic business sets, or ISDN), refer to the appropriate testing documentation from the digital switch manufacturer.

Routine testing of lines is generally performed remotely, using the OPC Test Manager tool or using an external testing system such as CALRS or SARTS. Procedures for using the OPC Test Manager tool for routine line testing are in *Circuit Testing from the OPC User Interface*, 323-3001-548, in *Maintenance*, Volume 5C. For detailed procedures on provisioning or testing services with external testing systems, refer to the manufacturer’s product documentation. *Line and Loop Testing Overview*, 323-3001-115, in *Description*, Volume 2B, provides general information about these and other external testing systems.



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## Installing line cards

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This chapter has the procedures associated with installing, diagnosing, or removing line cards.

For circuits in a universal or DS1 tandem application, it is not necessary to install the line cards before provisioning the slot and line card parameters. If you want to provision such circuits first, refer to the document *Line Card Provisioning Procedures*, 323-3001-315, in this volume. For circuits in an integrated application, the line cards must be installed before provisioning the line terminations.

If line cards are installed first, provisioning is not inhibited by the line card type installed in any slot. This provides the convenience of being able to provision any service in a slot, even if this results in a mismatch (when the existing line card cannot support the service provisioned).

**Note:** For information on installing line cards on Universal Edge 9000 (UE9000) systems, refer to the *UE9000 Installation Quick Reference Guide*.

### How to use this chapter

Perform the procedures starting on page 2-26, according to the process flow chart and the document task list in Chapter 1. Refer to the information in the beginning of this chapter as necessary to complete your task.

## Chapter contents

The following table lists the topics covered in this chapter. If you cannot successfully complete these procedures, contact your next level of support.

Procedure	Topic	See
	Layout of copper distribution shelves and line cards	page 2-3
	Multislot line card treatment in NEUI	page 2-16
	Layout of shelves and line cards in TR-08 systems	page 2-19
2-1	Installing line cards	page 2-26
2-2	Performing an inventory of line cards	page 2-29
2-3	Running line card diagnostics	page 2-36
2-4	Resetting, replacing, or recommissioning a line card	page 2-40
2-5	Removing a line termination or a line card	page 2-45
2-6	Diagnosing failed circuit packs	page 2-50

**Note 1:** When adding a DS1 tandem circuit (a special service that is carried on a DS1 tandem facility at the central office), you need to verify that a spare channel exists on an existing DS1 tandem facility, or you have to add and provision a new DS1 facility. Adding and provisioning the DS1 facility is described in the document *Provisioning and Operations Procedures*, 323-3001-310, in this volume.

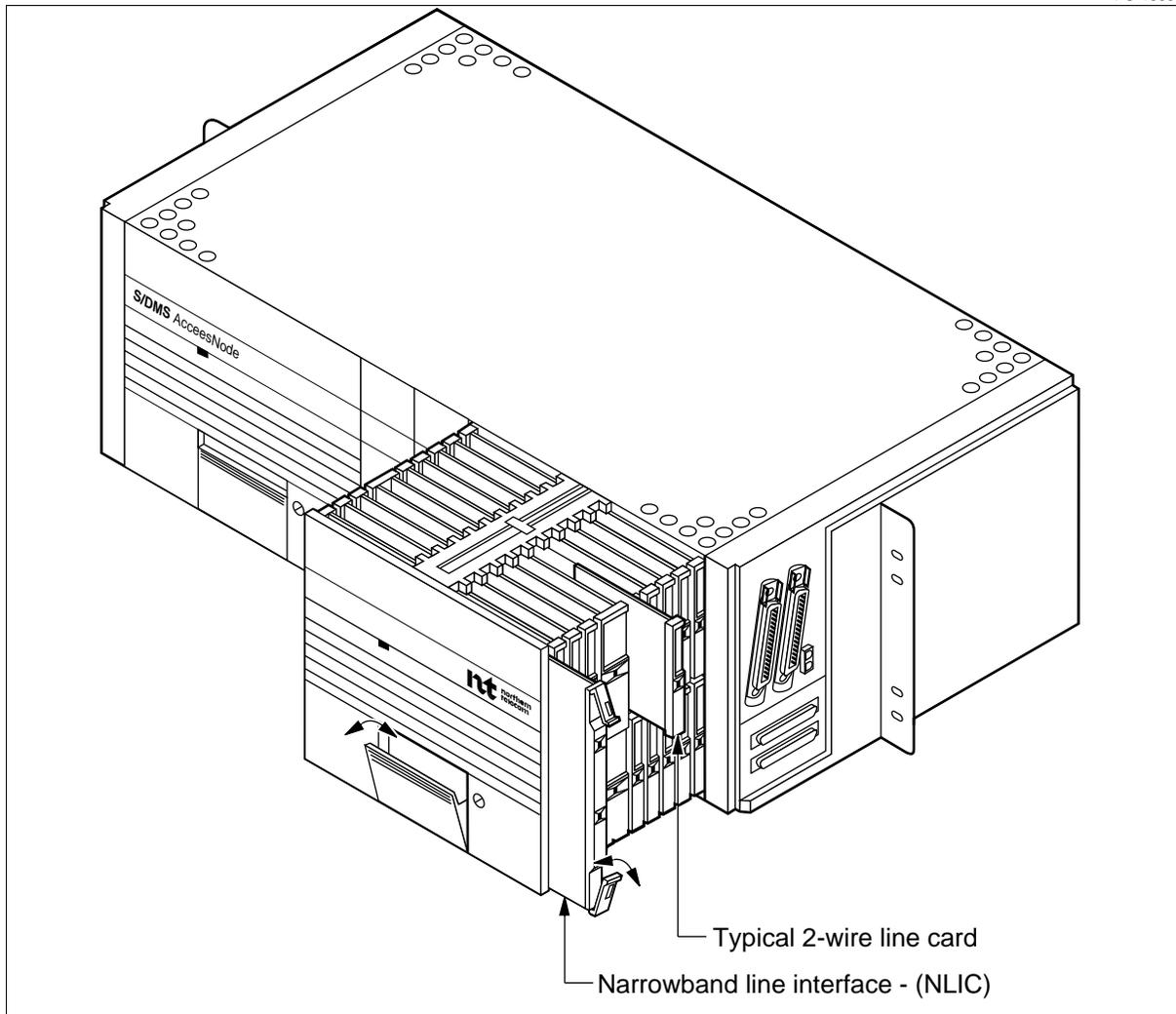
**Note 2:** Before maintenance personnel take a line card out-of-service (OOS) at the RFT in an integrated application involving a DMS switch, Nortel Networks recommends that the line first be placed in a manual busy (MB) state at the MAP of the DMS switch. This prevents unwanted termination attempts to the line card and preserves the integrity of the operational measurements of the switch. After the RFT line card is placed in service (IS), follow the appropriate product procedures for returning the line to service at the DMS MAP.

## Layout of copper distribution shelves and line cards

Figure 2-1 shows a typical copper distribution shelf (CDS) on an AccessNode bay. The right drawer is pulled out to show a two-wire line card partially inserted in an even-numbered slot.

**Figure 2-1**  
Line cards in the right drawer of a copper distribution shelf

PC-15394



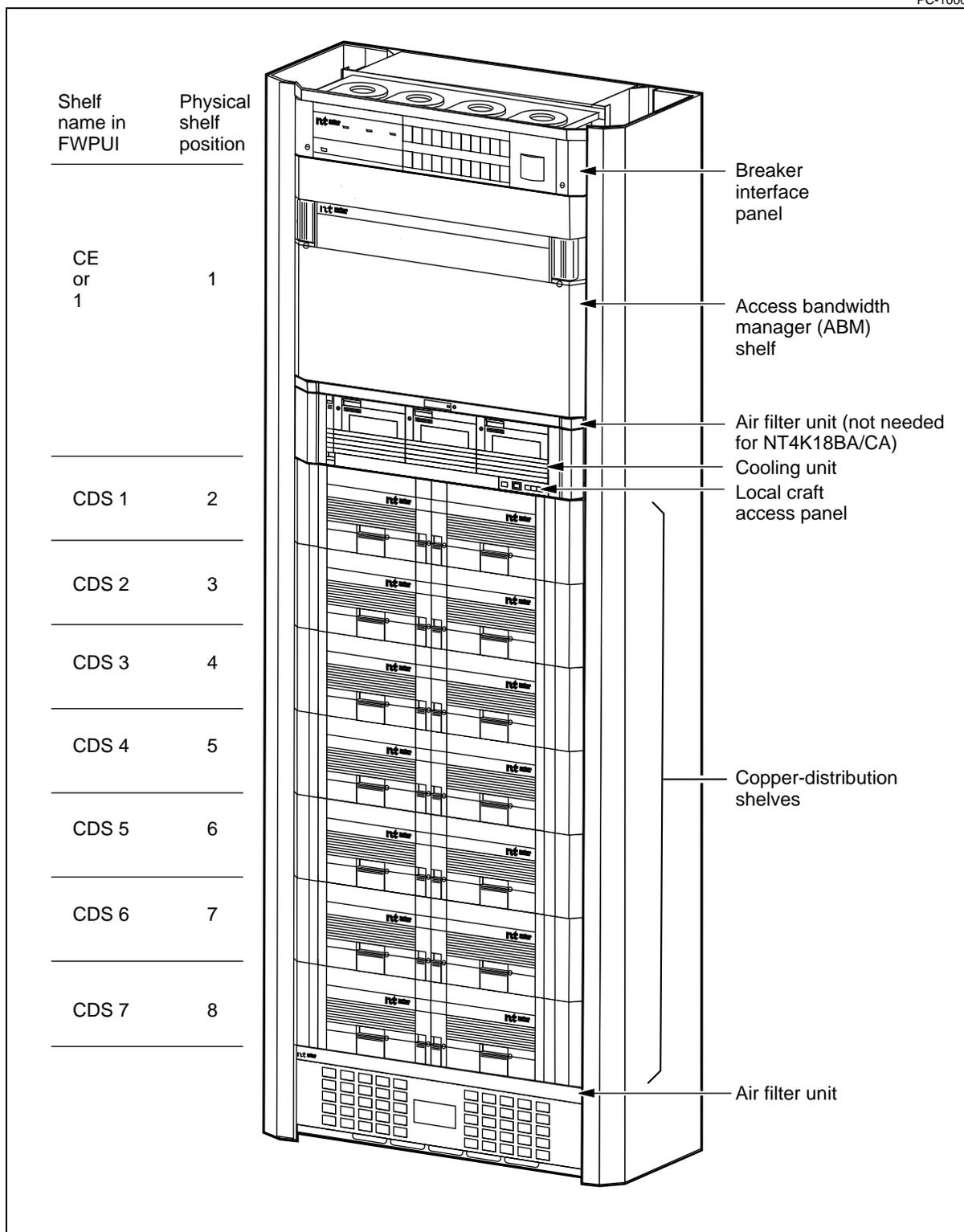
In Figure 2-2 through Figure 2-5, the CDSs are numbered CDS1 to CDS7. Within each CDS, there are two line drawers: the left line drawer has line cards 1 to 48, and the right line drawer has cards 49 to 96.

**Note:** For the line card layout in AccessNode Express, see the *AccessNode Express Maintenance Guide*, 323-3051-211.

2-4 Installing line cards

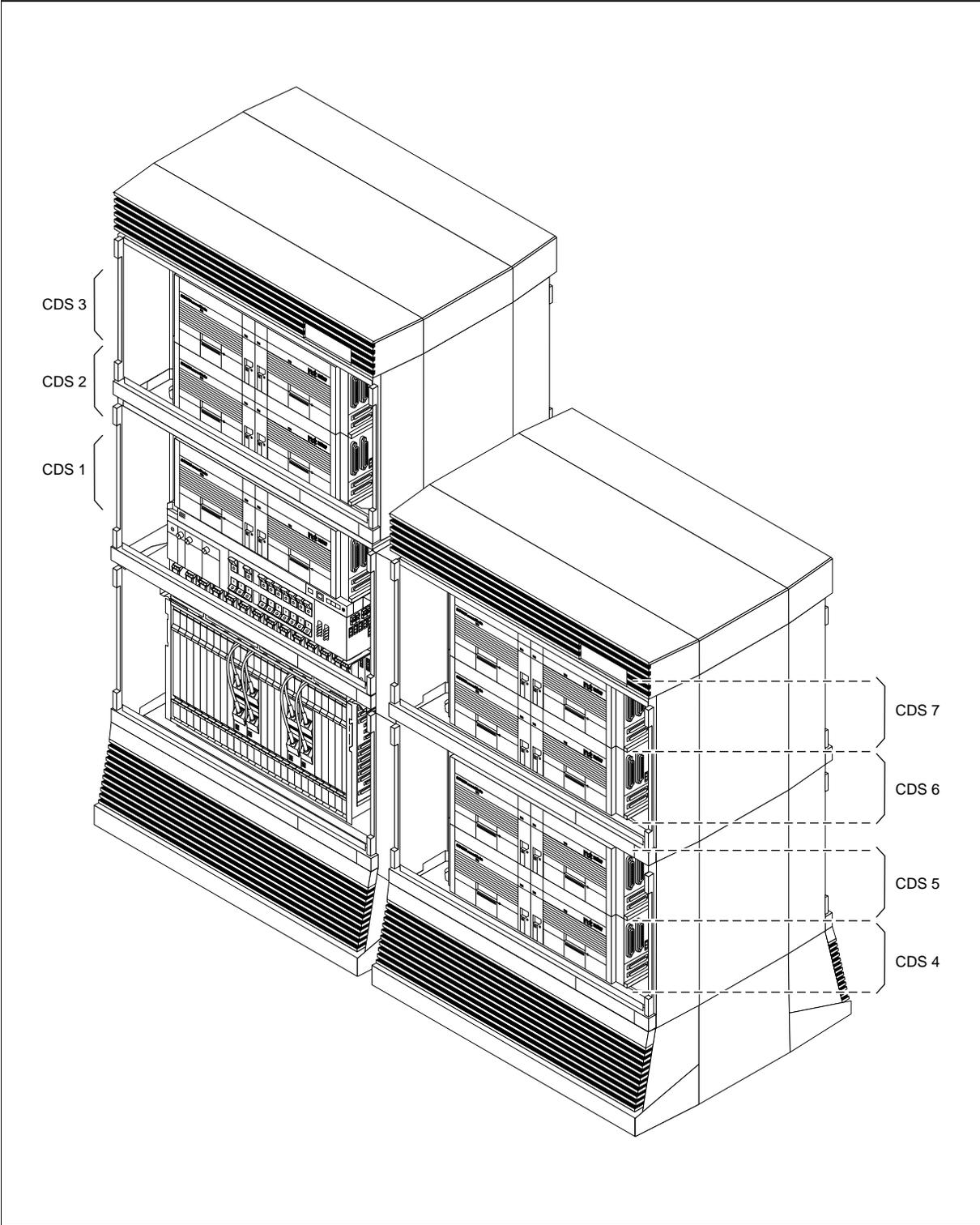
**Figure 2-2**  
**Numbering of copper distribution shelves (ABM bay)**

PC-10000



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

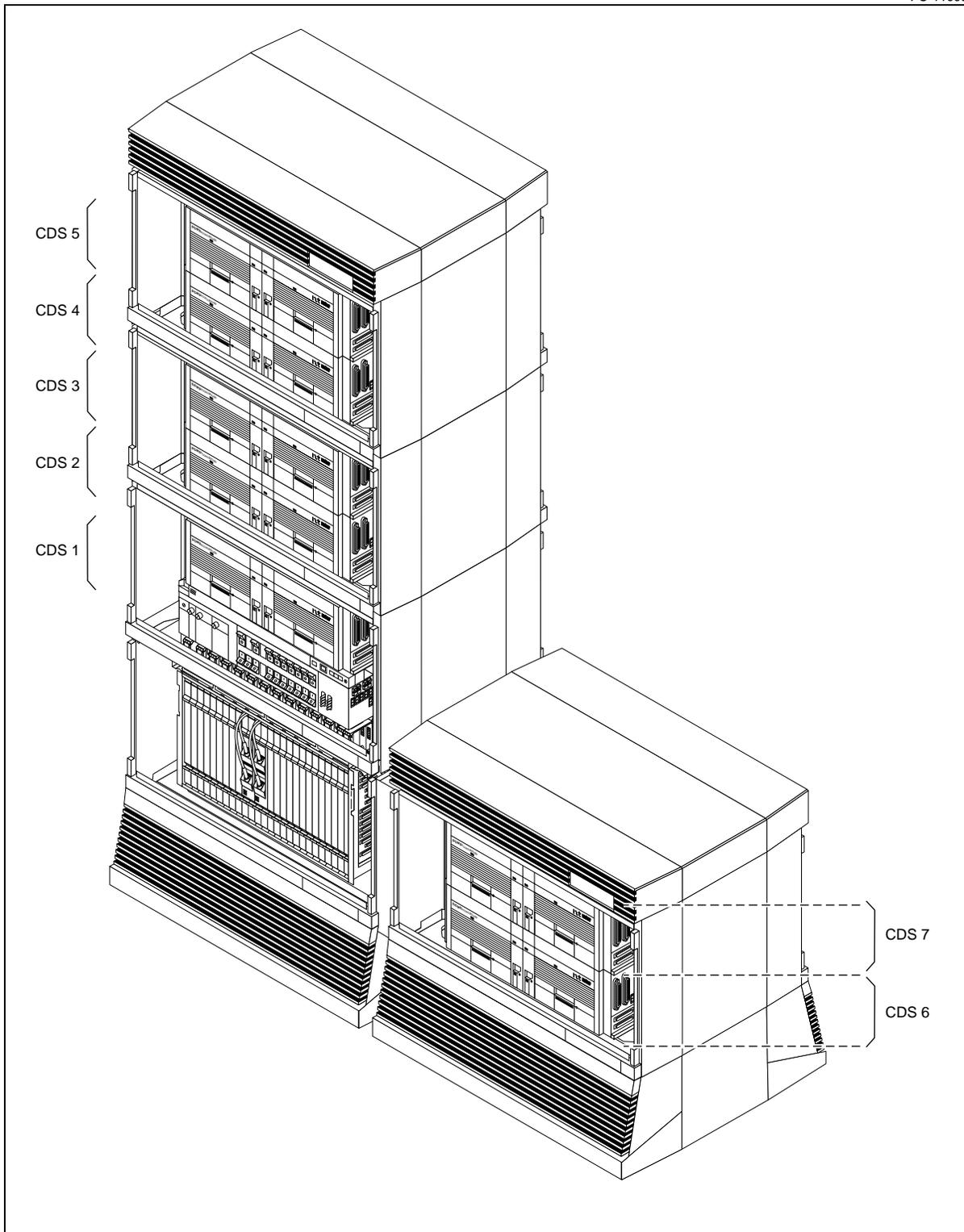
PC-15326



2-6 Installing line cards

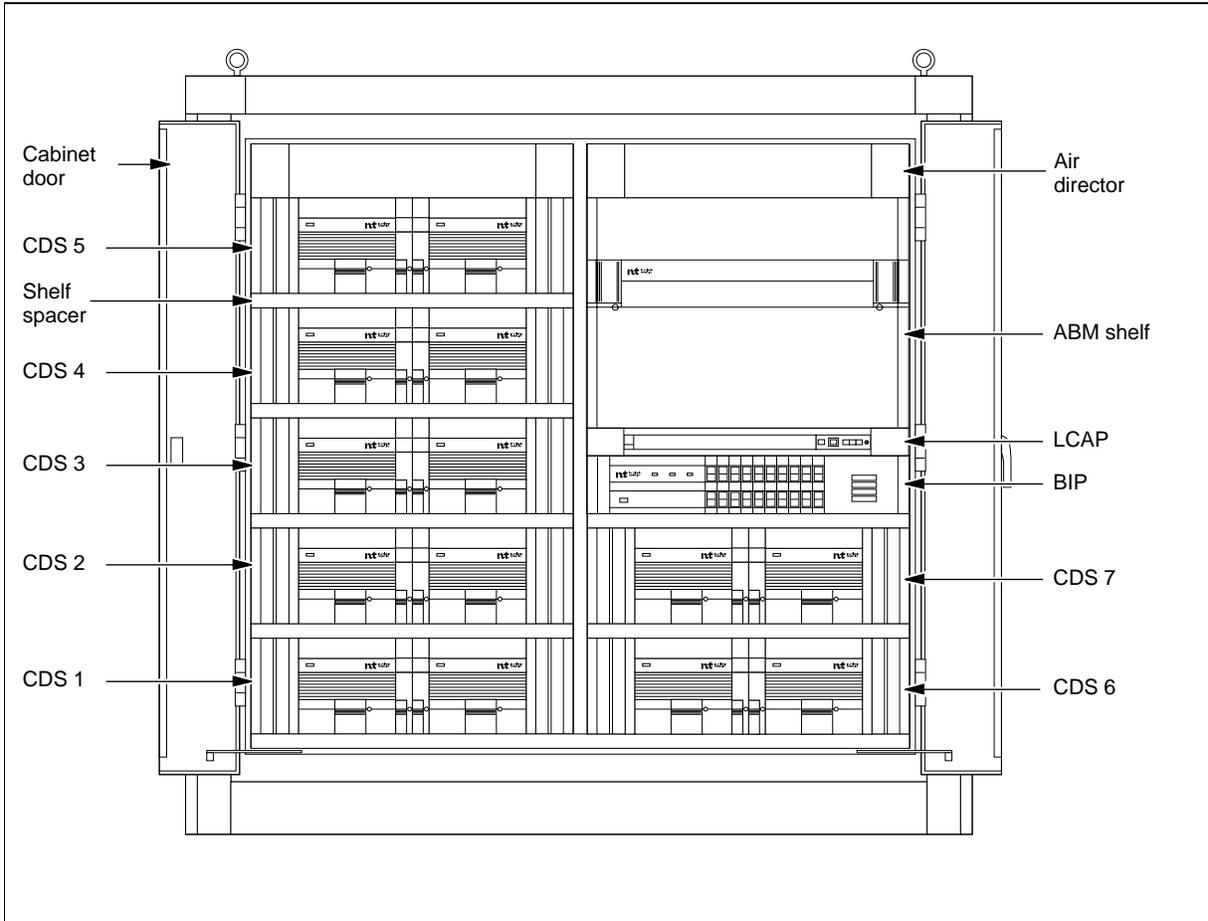
**Figure 2-4**  
**Numbering of copper-distribution shelves in a 4/1 MBP cabinet arrangement**

PC-11008



**Figure 2-5**  
**Numbering of copper-distribution shelves in a Series 800A outside plant cabinet**

PC-10990



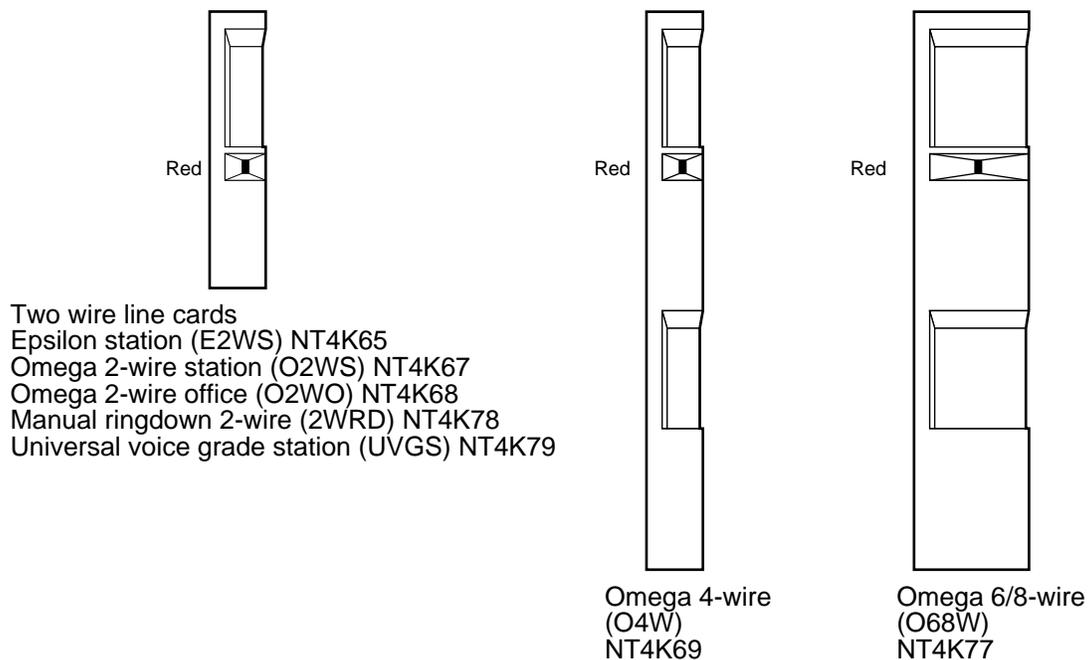
**Note:** For detailed information on the configuration options in the AccessNode Express, see the *AccessNode Express Installation Guide*, 323-3051-210.

### Line cards

The Omega service-adaptive line cards and Epsilon line card are shown in Figure 2-6 below.

**Figure 2-6**  
**Epsilon and Omega line cards**

PC-10787



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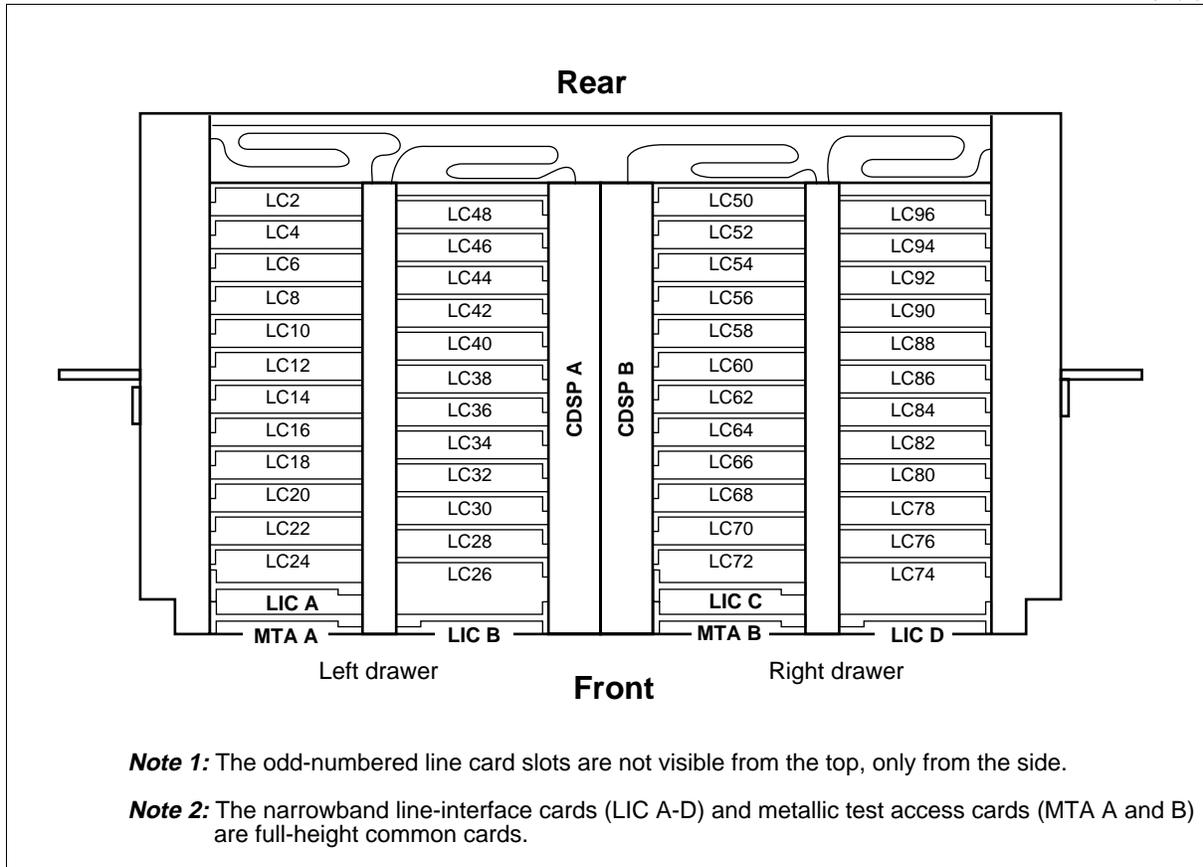
**Note:** For information on line cards used in the AccessNode Express, see the *AccessNode Express Maintenance Guide*, 323-3051-211.

## Line card slots

Within each line card drawer, line cards are arranged in two layers: odd-numbered slots are in the bottom layer, and even-numbered slots are in the top layer. Even-numbered slots are visible from the top, as shown in Figure 2-7 below, or from the side. To view odd-numbered slots, open one drawer at a time and look at the drawer from the side.

**Figure 2-7**  
Top view of the line drawers of a copper distribution shelf

PC-10750



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

Each line card slot is uniquely identified using the CDS number and slot number.

**Slot arrangements for multislot line cards**

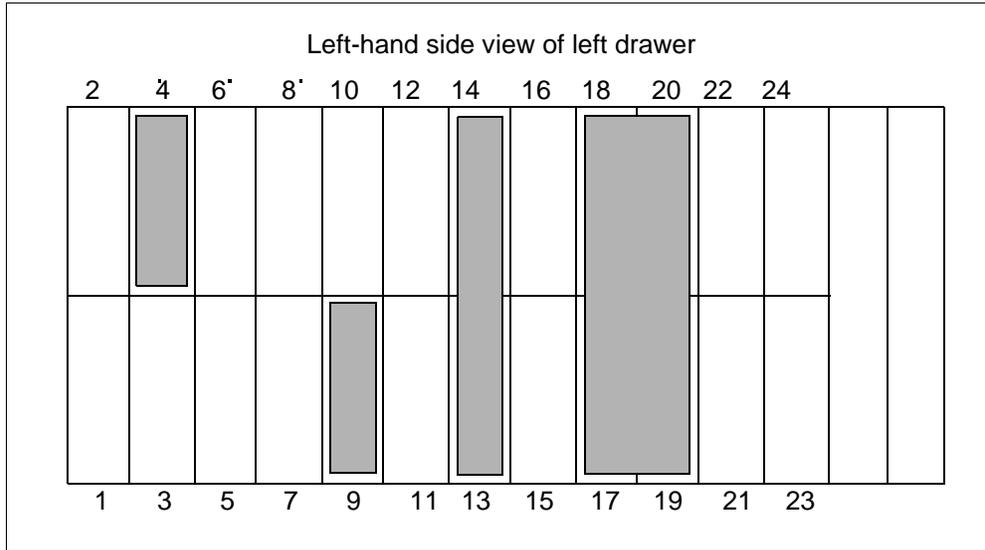
As shown in Figure 2-8 below, 4-wire line cards and 6/8-wire line cards occupy more than one slot. A 4-wire line card is shown occupying two slots (13 and 14), and a 6/8-wire line card is shown occupying four slots (17 to 20). Two 2-wire line cards are shown, one in slot 4 and one in slot 9.

For a 4-wire line card that occupies one upper slot and the adjacent lower slot, the upper (even-numbered) slot is called the *master* slot, and the lower (odd-numbered) slot is called the *slave* slot. This hierarchy is enforced in user interface screens, where actions on line cards must be directed from the line card screen for the master slot, not the slave slot. However, it is possible to view the line card equipment screens for the slave slots. This is useful, for example, to view whether a mismatch (MEA) condition exists on a slave slot when an incorrect line card is installed in it.

For a 6/8-wire line card, that occupies two upper slots and the two lower slots directly below, the master slot is the left-most upper slot (that is the lower-numbered even slot). The three remaining slots are slave slots. For example, for the 6/8-wire line card in slots 17 to 20 in Figure 2-8 below, slot 18 is the master slot and slots 17, 19, and 20 are slave slots.

OPC provisioning tools prevent the provisioning of a service using a multislot line card on any slot that is already provisioned.

**Figure 2-8**  
**Slot designation of multislot line cards**



**Note:** For the line card layout in AccessNode Express, see the *AccessNode Express Maintenance Guide*, 323-3051-211, in the AccessNode Express volume.

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**Cable pair designations for line cards**

Table 2-2 on page 2-12 lists the pin wiring designations for CDS slots, cable pairs, and CDS shelf connectors. This information is useful in preparation for a description of the wiring designations for 2-wire, 4-wire, 6-wire, and 8-wire services. Table 2-1 shows the color code abbreviations used in Table 2-2.

**Table 2-1**  
**Color code abbreviations**

<b>Code</b>	<b>Color</b>
BL	blue
O	orange
G	green
BR	brown
S	slate
W	white
R	red
BK	black
Y	yellow
V	violet

**Table 2-2**  
**Pinout for copper distribution shelf slots, cable pairs, and connector pins**

Cable pair same as slot no. (See note)	Tip color	Pin number	Ring color	Pin number
1 (also 26, 51, 76)	W BL	26	BL W	1
2 (also 27, 52, 77)	W O	27	O W	2
3 (also 28, 53, 78)	W G	28	G W	3
4 (also 29, 54, 79)	W BR	29	BR W	4
5 (also 30, 55, 80)	W S	30	S W	5
6 (also 31, 56, 81)	R BL	31	BL R	6
7 (also 32, 57, 82)	R O	32	O R	7
8 (also 33, 58, 83)	R G	33	G R	8
9 (also 34, 59, 84)	R BR	34	BR R	9
10 (also 35, 60, 85)	R S	35	S R	10
11 (also 36, 61, 86)	BK BL	36	BL BK	11
12 (also 37, 62, 87)	BK O	37	O BK	12
13 (also 38, 63, 88)	BK G	38	G BK	13
14 (also 39, 64, 89)	BK BR	39	BR BK	14
15 (also 40, 65, 90)	BK S	40	S BK	15
16 (also 41, 66, 91)	Y BL	41	BL Y	16
17 (also 42, 67, 92)	Y O	42	O Y	17
18 (also 43, 68, 93)	Y G	43	G Y	18
19 (also 44, 69, 94)	Y BR	44	BR Y	19
20 (also 45, 70, 95)	Y S	45	S Y	20
21 (also 46, 71, 96)	V BL	46	BL V	21
22 (also 47, 72)	V O	47	O V	22
23 (also 48, 73)	V G	48	G V	23
24 (also 49, 74)	V BR	49	BR V	24
25 (also 50, 75)	V S	50	S V	25
<b>Note:</b> Four 25-pair cables are wired for slots 1 to 96, one pair per slot. The color code is repeated four times. Pairs 97 to 100 are not used.				

### Pair designations for 2-wire and 4-wire services

Table 2-3 lists the designation of leads for 2-wire and 4-wire services. 2-wire services use a tip/ring or T/R designation and occupy one slot. 4-wire services use a T/R/T1/R1 designation and occupy two slots: an odd-numbered slot below and the corresponding even-numbered slot above.

For example, a 4-wire service is planned for slots 5 and 6, so slot 6 is the master slot for the service. However, if either slot is already provisioned, you cannot provision the desired 4-wire service.

**Table 2-3**  
**2-wire/4-wire lead designations**

CDS slot	Cable/connector			Line card signal designation	
	Pair	Pin	Lead	2-wire LCs	4-wire LC
1	1	26	tip	T	T
		1	ring	R	R
2	2	27	tip	T	T1
		2	ring	R	R1
and so on					

Figure 2-9 shows the pair distribution of signals for four 2-wire services in slots 1 to 4, and two 4-wire services, one in master slot 6 and one in master slot 8.

**Figure 2-9**  
**2-wire/4-wire pair distribution**

Slot 2 T, R	Slot 4 T, R	Slot 6 T1, R1	Slot 8 T1, R1
Slot 1 T, R	Slot 3 T, R	Slot 5 T, R	Slot 7 T, R

**Pair designations for 6-wire services**

Table 2-4 lists the designation of leads for 6-wire services. 6-wire services occupy four slots, starting with any odd-numbered slot, such as 1, 3, 5, 7,..., including the next three consecutively-numbered slots. The designated slot in the user interface is the lower-numbered even-numbered slot.

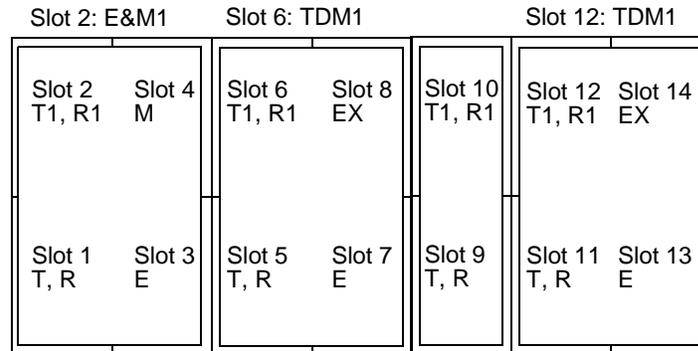
For example, a 6-wire service is planned for slots 1 to 4, so slot 2 is the master slot for the service. However, if any of the four slots are already provisioned, you cannot provision the desired 6-wire service.

**Table 2-4**  
**6-wire lead designations**

CDS slot	Cable/connector			O68W line card signal designation		
	Pair	Pin	Lead	6-wire: E&M1, PLR1	6-wire: TDM1, TDM1O, TDM1S	
					either	or
1	1	26 1	tip ring	T R	T R	T R
2	2	27 2	tip ring	T1 R1	T1 R1	T1 R1
3	3	28 3	tip ring	E not used	E not used	E1 not used
4	4	29 4	tip ring	M not used	EX not used	M1 not used
and so on						

Figure 2-10 shows the pair distribution of signals for sample 6-wire services in master slots 2, 6, and 12, with a 4-wire service in master slot 10:

**Figure 2-10**  
**6-wire pair distribution**



### Pair designations for 8-wire services

Table 2-5 lists the designation of leads for 8-wire services. 8-wire services occupy four slots, starting with any odd-numbered slot, such as 1, 3, 5, 7,..., including the next three consecutively-numbered slots. The master slot is the lower-numbered even-numbered slot.

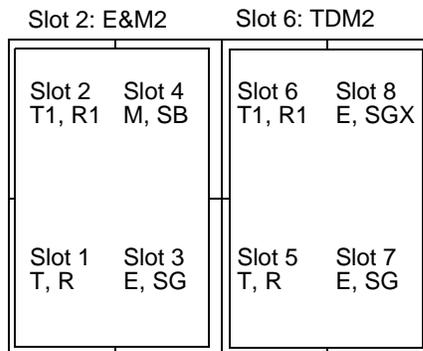
For example, an 8-wire service is planned for slots 3 to 6, so slot 2 is the master slot for the service. However, if any of the four slots are already provisioned, you cannot provision the 8-wire service.

**Table 2-5**  
**8-wire lead designations**

CDS slot	Cable/connector			O68W line card signal designations			
	Pair	Pin	Lead	8-wire: E&M2, E&M3, PLR2		8-wire: TDM2, TDM2O, TDM2S	
				either	or	either	or
1	1	26	tip	T	T	T	T
		1	ring	R	R	R	R
2	2	27	tip	T1	T1	T1	T1
		2	ring	R1	R1	R1	R1
3	3	28	tip	E	EA	E	E1
		3	ring	SG	EB	SG	E2
4	4	29	tip	M	MA	EX	M1
		4	ring	SB	MB	SGX	M2
and so on							

Figure 2-11 shows the pair distribution of signals for sample 8-wire services in master slots 2 and 6.

**Figure 2-11**  
**8-wire pair distribution**



## Multislot line card treatment in NEUI

This section explains how multislot line cards are treated in certain screens of the network element user interface (NEUI). Differences exist between the master slot and slave slots in terms of:

- operations that can be performed on line cards from the LC Equipment screen
- information displayed in LC Equipment and CDS Inventory screens

### Operations on multislot line cards

The following rules apply to multislot line cards:

#### Master slot

All administrative operations (such as resetting diagnosing, or changing the state of a line card (ResetLC, Diagnose, or ChgState commands) are possible from its LC Equipment screen.

#### Slave slot

NO administrative operations are possible from its LC Equipment screen. The following dialog is seen if any administrative operations are attempted:

*"The < command name > command is not supported for Part Of Line Card. Please post the master slot and re-enter the command."*

### Information displayed for multislot line cards

This section explains key fields in the Line Card Equipment screen and the CDS Inventory screen. The master slot of multislot line cards displays the same field values as single-slot line cards. The slave slots have different values in some fields, and these differences are explained in this section. The term "line termination" is used to refer to the service provisioning of the slot.

#### LC Equipment screen - Line State field

This field indicates the current state of the line termination and line card combination. If the current slot has no line termination, the field shows "Service Not Provisioned." Otherwise, this field can show more than one of the strings listed in Table 2-6.

**Table 2-6**  
**Line termination states**

Primary line states	Explanation
'Service Not Provisioned'	service is not provisioned
'IS'	in service
'IS Trbl'	in service with trouble
'OOS'	out of service
'OOS Mtce'	out of service for maintenance

One or more of the strings in Table 2-7 could be appended to the strings listed in Table 2-6 on page 2-16.

**Table 2-7**  
**Additional line states**

<b>Additional line states</b>	<b>Explanation</b>
'Eqpt Mismatch'	equipment mismatch
'Total Fail'	total line card fail
'Facility Fail'	facility fail
'DS0 Failure'	NT1 not responding (for ISDN lines)
'Parent Eqpt Unavail'	parent equipment (NLIC, AIC, or TIC) has failed or is out of service
'Loopback'	a loopback is active
'Traffic Busy'	the line card is carrying traffic
'Load Fail'	software loading failed
'Over Current Protection'	over-current protection is active
'Loading'	software is loading
'Metallic Access'	a metallic jack access is active
'Digital Access'	a digital jack access is active
'Parent Facility Failure'	the parent facility (DS1, VT1.5) has failed
'No Xconn'	no cross-connection is provisioned for this slot

For a slave slot, the text appearing in the “Line State:” field is the same as is displayed for the master slot of the line card, with an additional string, “-Part Of Line Card,” appended to it.

### **LC Equipment screen - Service Provided field**

This field indicates information about the line termination (service provisioning) of the slot that is currently posted. This information is displayed whether the line card is present or not, such as when provisioning occurs prior to line card installation, or when a line card is removed after provisioning.

For a slave slot, the text appearing in the “Service Provided:” field is the same as is displayed for the master slot of the line termination, with an additional string, “-POLT” (this stands for Part Of Line Termination), appended to it.

**LC Equipment screen - Secondary State field**

This field is not labeled on the line card equipment screen. It is located immediately to the right of the “Slot” field. It can have a string up to four characters in length. It is used to indicate the line card secondary states.

Table 2-8 displays possible strings.

**Table 2-8**  
**Secondary states**

<b>Secondary state</b>	<b>Explanation</b>
blank (no text)	normal or OK
'POLC'	Part of line card
'Ueq'	unequipped
'Mism'	mismatched line card and service
'Test'	test in progress
'Load'	loading software
'Trbl'	trouble
'Diag'	diagnosis is in progress

For a slave slot, the string ‘POLC’ is displayed unless a line card-slot mismatch exists; in this case, the stringiness' takes precedence.

**LC Equipment screen - A34/A37 Current Load fields**

These two fields show the name of the current software loads present on the line card. Blanks in these fields indicate that there are no loads present on the line card. This field is always blank for slave slots.

**CDS Shelf Inventory screen - CpkState field**

The CDS Shelf Inventory screen lists several fields of information about each equipped line card. Most fields are self-explanatory, but the CpkState field bears further explanation.

This field shows the circuit pack secondary states. This field is similar to the Secondary State field of the LC Equipment Screen, except:

- unequipped slots ('Ueq' secondary state) are not displayed
- if the inventory is done when a transient state like 'Test', 'Load', or 'Diag' is present, the string remains displayed even after the condition clears; the screen can be updated manually by performing the inventory again

The following rules for this field apply to multislot line cards: One line is shown for each slot of the card: two inventory lines for 4-wire cards and four inventory lines for 6/8-wire cards. All inventory lines for a multislot line card are identical except for the “Slot” field and the “CpkState” field. If there is a line card-slot mismatch, the stringiness' is displayed in the “CpkState” field for the affected slots.

## Layout of shelves and line cards in TR-08 systems

An AccessNode system can provide up to seven mode 1 TR-08 digital line carrier systems. TR-08 is an abbreviation of TR-TSY-000008, the Bellcore specification for the digital interface between AT&T's SLC-96 Digital Loop Carrier System and a Local Digital Switch. A TR-08 system consists of up to four DS1 facilities, denoted as links A, B, C, and D, connecting up to 96 lines in the remote to the local digital switch.

In AccessNode, a TR-08 system can be structured in one of two ways. It can be provisioned with the standard TR-08 mapping, or with a random mapping, between DS0 channels and line cards. You can preprovision a TR-08 system using the standard mapping, and then evolve in a flexible manner by reprovisioning individual TR-08 services.

### Standard TR-08 system

In a standard TR-08 system, the DS0 channels of the four DS1 links have a known mapping to 96 contiguous line card slots. This standard mapping between switch DS0 channels, FCOT DSO channels, and CDS line card slots is listed in Table 2-9 on page 2-20. The range of line card slots mapped to each link is as follows:

- link A: slots 1 to 24
- link B: slots 25 to 48
- link C: slots 49 to 72
- link D: slots 73 to 96

The contiguous line card slots occupy four TR-08 “shelves”, shown as A, B, C, and D. In AccessNode, each TR-08 shelf is equivalent to half of a line drawer, so one TR-08 system occupies one copper distribution shelf (CDS). The TR-08 shelves are combined into shelf groups AB and CD. A CDS has shelf group AB in the left line drawer, and shelf group CD in the right line drawer. Another way of listing the default mapping in a standard TR-08 system is given in Figure 2-12 on page 2-22 and Figure 2-13 on page 2-23.

To implement the standard mapping in a bulk manner, use the TR-08 Default Provisioning Manager tool, described in *Line Card Provisioning Procedures*, 323-3001-315, in this volume. Additions, changes, and deletions of single TR-08 lines are implemented using the Provisioning Manager tool described in the same document.

### Random-mapped TR-08 system

In a random-mapped TR-08 system, any line card slot on any CDS can be mapped to any DS0 on any TR-08 DS1 link, subject to certain constraints listed on page 2-24. Using this method, the AccessNode CDS does not conform to the standard “TR-08 system on a shelf.” To implement the random mapping, use the Provisioning Manager tool described in *Line Card Provisioning Procedures*, 323-3001-315, in this volume.

**Table 2-9**  
TR-08 default mapping of DS0 channels and RFT slots

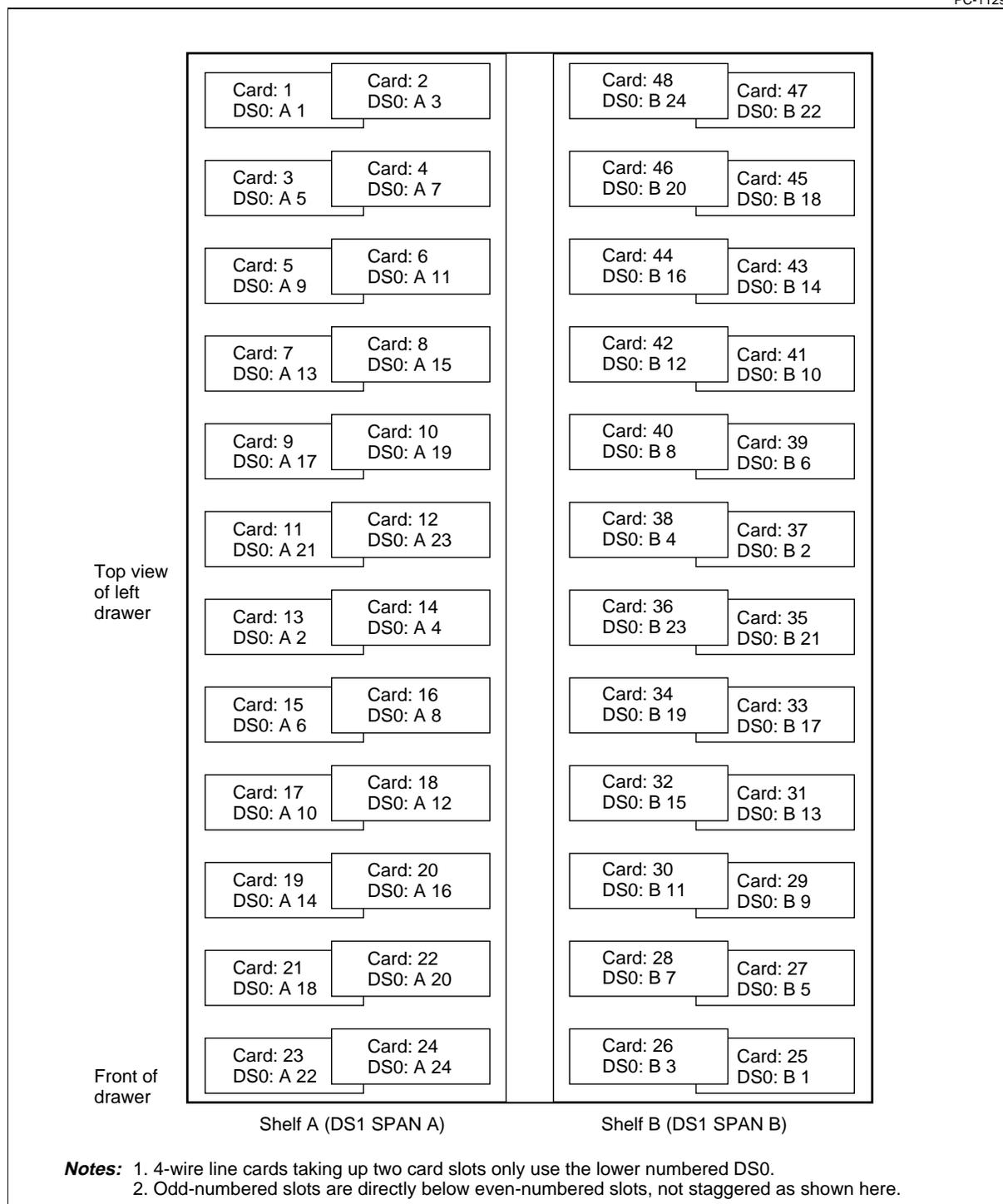
Switch DS0 channel (note 1)		FCOT DS0 channel (note 2)	CDS slot number for TR-08 shelf:			
0 to 23 scheme	1 to 24 scheme		A	B	C	D
0	1	1	1	25	49	73
1	2	3	2	26	50	74
2	3	5	3	27	51	75
3	4	7	4	28	52	76
4	5	9	5	29	53	77
5	6	11	6	30	54	78
6	7	13	7	31	55	79
7	8	15	8	32	56	80
8	9	17	9	33	57	81
9	10	19	10	34	58	82
10	11	21	11	35	59	83
11	12	23	12	36	60	84
12	13	2	13	37	61	85
13	14	4	14	38	62	86
14	15	6	15	39	63	87
15	16	8	16	40	64	88
16	17	10	17	41	65	89
17	18	12	18	42	66	90
18	19	14	19	43	67	91
19	20	16	20	44	68	92
—continued—						

**Table 2-9 (continued)**  
**TR-08 default mapping of DS0 channels and RFT slots**

Switch DS0 channel (note 1)		FCOT DS0 channel (note 2)	CDS slot number for TR-08 shelf:			
0 to 23 scheme	1 to 24 scheme		A	B	C	D
20	21	18	21	45	69	93
21	22	20	22	46	70	94
22	23	22	23	47	71	95
23	24	24	24	48	72	96
<p><b>Note 1:</b> Use the column that lists the DS0 numbering scheme for your switch.</p> <p><b>Note 2:</b> The TR-08 Default Provisioning Manager tool enforces the indicated assignments between the FCOT DS0s and the CDS slots. The Provisioning Manager tool allows flexible assignment.</p>						
—end—						

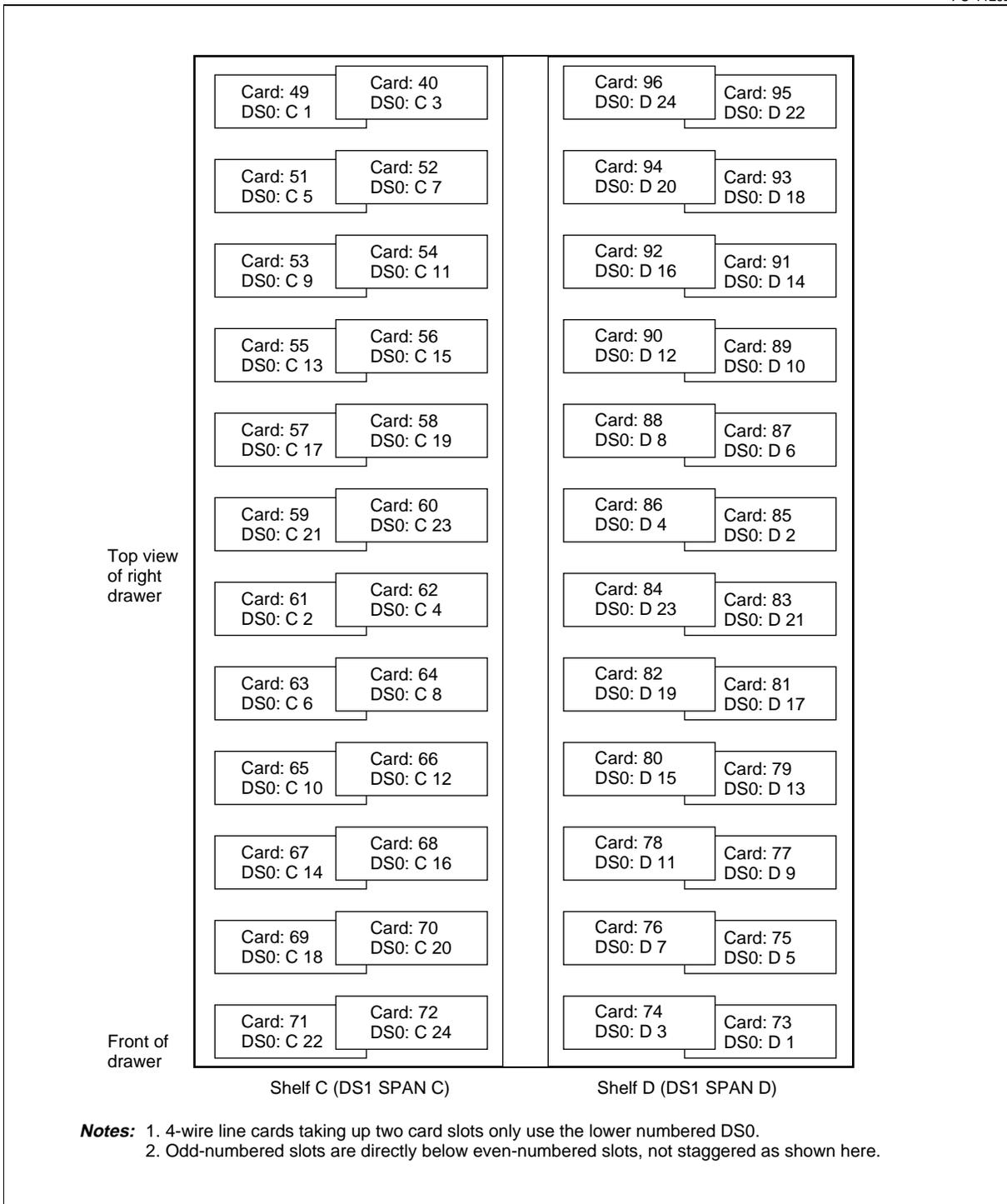
**Figure 2-12**  
**Left drawer: shelf group AB in a mode 1 TR-08 system**

PC-11291



**Figure 2-13**  
**Right drawer: shelf group CD in a mode 1 TR-08 system**

PC-11292



**Line card requirements for TR-08 services**

Table 2-10 shows the TR-08 services provided on SLC-96 line cards that are also supported on AccessNode line cards.

**Table 2-10**  
**Correlation between SLC-96 and AccessNode line cards**

TR-08 service	SLC-96 line card	AccessNode	
		Line card	Service code
POTS (single-party residential or plain ordinary telephone service)	dual unit	NT4K65CA epsilon line card NT4K67AB omega station line card NT4K79AA UVG line card	POTSRT
Coin	single unit	NT4K67AB omega station line card	COINRT
universal voice grade, CLASS, business lines, and PBX trunks	dual unit	NT4K67AB omega station line card NT4K79AA UVG line card	UVGRT
direct-in-dial PBX trunks, dial pulse terminating	single/dual unit	NT4K68AA omega office line card	DPT

**Line card slot and DS0 channel constraints for TR-08 services**

If you are implementing a random-mapped TR-08 system, there remain some constraints on the use of DS0 channels, due to the fixed mappings between DS0s and line card services expected by the TR-08 digital switch.

**Coin unit** On SLC-96, a coin single unit takes up two slots but only one DS0, and provides one coin line. This has the following effect in AccessNode:

- A coin service must be assigned to a DS0 channel corresponding to an odd-numbered line card slot, as given in Figure 2-12 and Figure 2-13.
- The DS0 channel corresponding to the adjacent even-numbered line card slot, as given in Figure 2-12 on page 2-22 and Figure 2-13 on page 2-23, remains unused; the OPC Provisioning Manager tool enforces this restriction.
- A coin service can be assigned to any odd-numbered or even-numbered slot—there is no physical line card slot constraint.

For example, referring to Figure 2-12 on page 2-22, if DS0 A1 is assigned for coin service, then DS0 A3 must be unused. However, line card slots 1 and 2 can be provisioned for any service.

**Dual unit** A SLC-96 dual unit, such as the POTS or UVG unit, takes up two physical slots, and two DS0 channels, but provides two UVG lines. This results in no constraints on the assignment of line card slots. However, the DS0 channels associated with adjacent odd/even slot pairs, as listed in Figure 2-12 on page 2-22 and Figure 2-13 on page 2-23, must be provisioned with the same TR-08 service type. The digital switch issues a warning if you attempt otherwise.

For example, referring to Figure 2-12 on page 2-22, if DS0 A5 is assigned for POTS service, then DS0 A7 must also be assigned for POTS service. However, line card slots 3 and 4 can be provisioned for any service.

### **DS1 assignment restrictions**

Special restrictions apply such as what TR-08 DS1 links must be assigned first and what DS1 ports on the mapper can be used for the first link. These restrictions are enforced in the Facility Assignment Manager tool, described in *Provisioning and Operations Procedures*, 323-3001-310, in this volume.

## Procedure 2-1 Installing line cards

---

Use this procedure to install a line card in a CDS.

**Note 1:** For instructions on installing line cards in the AccessNode Express, refer to *AccessNode Express Commissioning and OAM&P*, 323-3051-220, in the AccessNode Express volume.

**Note 2:** For instructions on installing line cards in a Universal Edge 9000 shelf, refer to the *UE9000 Installation Quick Reference Guide*.

This procedure applies to the following line cards:

- NTN502AA ExpressLine card (AccessNode Express only)
- NT4K65 Epsilon 2-wire station line card (E2WS)
- NT4K67 Omega 2-wire station line card (O2WS)
- NT4K68 Omega 2-wire office line card (O2WO)
- NT4K69 Omega 4-wire line card (O4W)
- NT4K77 Omega 6/8-wire line card (O68W)
- NT4K78 2-wire manual ringdown line card (MRD)

**Note:** Release 20 of the MRD line card requires AN16 to perform line card diagnostics. Contact your next level of support for further assistance.

- NT4K79 Omega universal voice grade line card (UVG)

### Requirements

Predetermine the CDS and line card slots where you plan to install line cards. As shown in shelf layout figures (Figure 2-2 to Figure 2-5, beginning on page 2-4), CDS shelves are numbered CDS1 to CDS7. Refer to the shelf layout figure applicable to your equipment application.



**DANGER**

**Risk of injury or damage**

Read “Equipment cautions and warnings” on page 1-1 to minimize any risk to personnel and equipment.

—continued—

Procedure 2-1 (continued)  
**Installing line cards**

**CAUTION****Risk of damage to equipment**

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

If this is a new CDS with no lines installed yet, then the following preparation is required before starting this procedure:

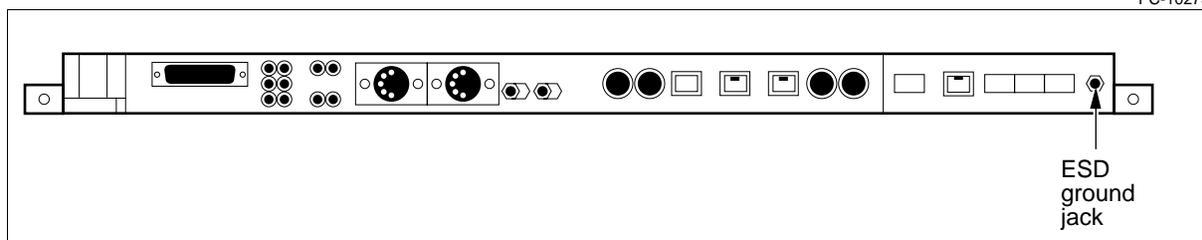
- the BIP circuit breakers applicable to this CDS are closed, so that the shelf is powered
- the CDS common cards (CDSPs, LICs, and MTACs) are installed, tested, and in service

*Note:* If the line provisioning is already completed and you are installing a line card for DX service facing a DX-provisioned line card at the other NE then at least one side of the DX circuit must be terminated prior to placing the circuit in service (that is, prior to plugging in the line card).

**Action**

Step	Action
1	Put on antistatic protection. Connect the antistatic wrist strap to the ESD jack on the LCAP, as shown below.

PC-10273



—continued—

Procedure 2-1 (continued)  
**Installing line cards**

---

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

---

**Installing line cards**

- 2** To unlock the appropriate line card drawer, turn the locking screw on the drawer faceplate, next to the handle. Use a standard screwdriver to turn the screw about one quarter turn in a counterclockwise direction, or until the slot in the screw is vertical. Grasp the handle and slide the drawer out.
- 3** Grasping the finger-hold on the faceplate, insert each line card into its correct slot. Figure 2-1 on page 2-3 shows how the line card slides into the drawer.
- 4** Make sure the line card has good contact with its shelf connector.  
*The card obtains a diagnostic software load and undergoes self-tests.*  
*If the red LED on the line card faceplate is lit, full diagnostics are run on the line card in Procedure 2-3.*

**Running a lamp test**

- 5** Run a lamp test to make sure the red LED on each line card is functioning properly. Push the ACO/Lamptest button on the local craft access panel (LCAP).  
*All lamps and LEDs on the bay light for 30 seconds.*  
Replace any line cards where the red LED failed to light.
- 6** When you are finished handling line cards, carefully close the line card drawer, and use a slotted screwdriver to lock the locking screw on the faceplate of the line drawer.
- 7** Repeat steps 2 to 6 for each line card drawer where you are installing line cards.
- 8** Remove the antistatic wrist strap put on in step 1.

**Updating the CDS utility card**

- 9** Update the CDS utility card, located in the CDS drawer faceplate. It is suggested that you record the pair assignments for each line card in the drawer. Alternatively, record information necessary for your organization's methods and operations.
- 10** If this is the initial setup of a new AccessNode, then the MDF protection modules might not be fully engaged. Engage them now.

—end—

---

## Procedure 2-2

# Performing an inventory of line cards

---

Use this procedure to obtain an inventory of circuit pack equipment installed in a copper-distribution shelf (CDS), Universal Edge 9000 (UE9000) shelf, or AccessNode Express voice module. Two inventory methods are described.

The first inventory method displays the physical state of line cards in the shelf. This inventory verifies that the AccessNode knows what kind of line card is in each slot.

The second inventory method displays the provisioned state of line cards in the shelf. This listing verifies what lines are provisioned and whether they are in-service or out-of-service.

For each line card, you can also display its LC Equipment screen. This screen displays information about the physical line card and also information about its service-provisioning.

**Note 1:** For a translation table that shows how AccessNode lines translate to lines on the DMS-10NA switch, see *Line Card Provisioning Procedures*, 323-3001-315, in this volume.

**Note 2:** See the *UE9000 Voice OAM&P User Guide* for instructions on displaying line status for UE9000 equipment.

## Requirements

You need the following information and equipment:

- a userID and password that permits entry to FWPI
- FWPI command conventions, described in *Network Element User Interface Description*, 323-3001-300, in *Operations, Administration, and Provisioning*, Volume 4A
- a VT100-compatible terminal connected and logged in to the network element (NE), or equivalent connection. See *Network Element User Interface Description*, 323-3001-300, in *Operations, Administration, and Provisioning*, Volume 4A for detailed information.

—continued—

**Performing an inventory of line cards**

**Action**

---

Step	Action
------	--------

---

1 Proceed according to the desired task:

If you want to	Then go to
perform a physical line card inventory	step 2
view a list of provisioned line card slots	step 7
view a particular line card	step 9

**Inventory of physical line cards**

2 From the Network Element Status screen, display the Shelf Equipment screen:

**eq sh** ↓

*The Shelf Equipment Screen is displayed.*

3 Proceed according to the desired task:

If you want to inventory a	Then go to
CDS shelf	step 4
UE9000 shelf	step 5

4 Display a CDS inventory:

**inventory cds <cds #>** ↓

where

<cds #> is the number of the CDS shelf to display: **1 to 7**

*The CDS inventory screen is displayed. Unequipped slots are omitted from the list. For a multislot line card, the Equip ID and Serial No fields list the same values for all of its slots.*

*The CpkState field lists the physical state of each line card; some of the field values include: (see page 2-18 for an explanation of possible values)*

- A blank indicates that the line card is OK.
- **Trbl** (trouble) indicates a trouble condition.
- **Mism** (mismatch) indicates that a line card is installed that does not support the service provisioned for the slot (when an Mism condition exists, the Fail LED of the line card is also illuminated).
- **POLC** (part of line card) indicates that the slot is a slave slot of a 4-wire, 6-wire, or 8-wire line card.

—continued—

Procedure 2-2 (continued)

**Performing an inventory of line cards**

- | Step | Action   |
|------|--|
|      | If there is more than one screen of inventory, type <b>F</b> to scroll forward, or <b>B</b> to scroll backwards.   |
| 5    | Display a UE9000 inventory:<br><b>inventory ue &lt;shelf #&gt; ↵</b><br>where<br><shelf #> is the number of the UE9000 shelf to display: <b>1 to 7</b>   |
|      | <i>The UE9000 shelf inventory is displayed.</i>  |
| 6    | To display the inventory for another CDS or UE9000 shelf, enter:<br><b>select &lt;type&gt; &lt;shelf #&gt; ↵</b><br>where<br>< type> <b>cds or ue</b><br>< shelf # >    is the shelf number: <b>1 to 7</b> |

*The inventory for the selected shelf is displayed.*

**Inventory of provisioned services**

- 7 To determine what line cards are provisioned and whether they are in service, list the line cards by entering the appropriate commands:

If you are working with a line card	Then go to
for AccessNode (AN) that does not use a virtual line concentrating module (VLCM)	step 7a
for AccessNode Express (ANX) that does not use a virtual line concentrating module (VLCM)	step 7b
for AN or ANX that does use a VLCM	step 7c

- a. Enter these commands:

**eq lc < cds # > < slot # > ↵**

**query <cds #> ↵**

where

< cds # >    is the copper distribution shelf number: **1 to 7**

< slot # >    is any line card slot number: **1 to 96**

*All slots in this CDS are listed in the conversation area, showing the service state of each provisioned line: in-service (IS), or out-of-service (OOS). Any slot that is not provisioned is shown as blank.*

—continued—

Procedure 2-2 (continued)

**Performing an inventory of line cards**

---

**Step    Action**

---

b. Enter these commands:

**eq anxlc < vm # > < lc slot # > ↵**

**query <vm #> ↵**

where

< vm # >    is the ANX shelf number: **1 to 28**

< slot # >    is any line card slot number: **1 to 48**

*All slots in this ANX are listed in the conversation area, showing the service state of each provisioned line: in-service (IS), or out-of-service (OOS). Any slot that is not provisioned is shown as blank.*

c. Enter these commands:

**eq lclmc <VLCM #> <LSG #> <LC #> ↵**

**query <VLCM #> <LSG #> ↵**

where

<VLCM #>    virtual line concentrating module (VLCM) number:  
**1 to 2**

<LSG #>    line subgroup number on DMS-10NA switch: **0 to 19**

<LC #>    line card slot number on DMS-10NA switch within  
line subgroup: **0 to 31**

*All slots are listed in the conversation area, showing the service state of each provisioned line: in-service (IS), or out-of-service (OOS). Any slot that is not provisioned is shown as blank.*

**Note:** See the *UE9000 Voice OAM&P User Guide* for instructions on displaying line status for UE9000 equipment.

**8** Scan the list and note what lines are provisioned and the service state of each. You can scroll forward through the list by pressing the Return key.

—continued—

---

 Procedure 2-2 (continued)

**Performing an inventory of line cards**


---

**Step    Action**


---

**Reviewing the state of individual line cards**

- 9        To display the LC Equipment screen for any line card, enter the appropriate command:

<b>If you are working with a line card</b>	<b>Then go to</b>
for AccessNode (AN) that does not use a virtual line concentrating module (VLCM)	step 9a
for AccessNode Express (ANX) that does not use a virtual line concentrating module (VLCM)	step 9b
for AN or ANX that does use a VLCM	step 9c

- a. Enter the following command from the NE status screen:

**eq lc < cds # > < slot # > ↵**

where

< cds # >    **1 to 7**; the copper distribution shelf number

< slot >     **1 to 96**; the line card slot number

**Note:** For Omega 4-wire and Omega 6/8-wire line cards, use the lowest even slot number occupied by the card.

*The LC Equipment screen is displayed. (See the screens on the following pages.)*

- b. Enter the following command from the NE status screen:

**eq anxic < vm # > < lc slot # > ↵**

where

< vm # >     is the ANX shelf number: **1 to 28**

< lc slot # > is the line card slot number: **1 to 48**

**Note:** For Omega 4-wire line cards, use the upper slot number occupied by the card (multiple of 3).

*The LC Equipment screen is displayed. (See the screens on the following pages.)*

—continued—

Procedure 2-2 (continued)

**Performing an inventory of line cards**

**Step Action**

c. Enter the following command from the NE status screen:

```
eq lcmlc <VLCM #> <LSG #> <LC #>.
```

where

<VLCM #> virtual line concentrating module (VLCM) number:  
1 to 2

<LSG #> line subgroup number on DMS-10NA switch: 0 to 19

<LC #> line card slot number on DMS-10NA switch within line subgroup: 0 to 31

*The LC Equipment screen is displayed. (See the following screens.)*

The following screen shows a line card that is installed, but not yet provisioned. Note the line state of an unprovisioned line card.

```

Critical Major minor warning FailProt Lockout ActProt PrfAlrt
Network View 2 4 5 2 * . . *
1 St. John's 2 3 1 1 * . . .

LC Equip
0 Quit
2 Select
3 Query
4
5 ListAlms
6 AlmRpt
7
8 ChgState
9
10
11
12 Diagnose
13
14
15
16 ResetLC
17 AlmProv
18 Help

LC Equipment
Shelf: CDS 1
Unit: LC 1
Location: RolBay4 ShPos 2
Host CLLI: SWITCH1
Line State: Service not provisioned

Service Provided:
Circuit Pack: Line Card NT4K68AA Slot 1
A34 Current Load:
A37 Current Load:

NE 1
Time 17:35 >
```

*If the line card is recognized by the AccessNode, then the product engineering code (PEC) of the line card is displayed in the Circuit Pack: field, along with the slot number, and the secondary state of the line card.*

**Note:** Possible values in the Line State field and the Secondary State field are explained on page 2-16 and page 2-18, respectively. The Secondary State field is not labeled, but is displayed to the right of the slot number on the Circuit Pack: line.

If the line card PEC is not displayed, or if the slot is shown as unequipped (ueq), remove and reinsert the line card to make sure a good physical connection is achieved.

—continued—

Procedure 2-2 (continued)  
**Performing an inventory of line cards**

**Step Action**

The following LC Equipment screen shows the slave slot of a 4-wire line card installed in slots 1 and 2. In the **Service Provided** field, POLT means part of line termination.

```

Critical Major minor warning FailProt Lockout ActProt PrfAlrt
Network View 2 4 5 2 * . . *
1 St. John's 2 3 1 1 * . . .

LC Equip
0 Quit LC Equipment Shelf: CDS 1
2 Select Unit: LC 1
3 Query Location: RolBay4 ShPos 2
4 Host CLLI: SWITCH1
5 ListAlms Line State: OOS Mtce
6 AlmRpt
7 Service Provided: FX-POLT
8 ChgState Circuit Pack: Line Card NT4K69AA Slot 1 POLC
9 A34 Current Load:
10 A37 Current Load:
11
12 Diagnose
13
14
15
16 ResetLC
17 AlmProv
18 Help

NE 1
Time 17:35 >

```

The following LC Equipment screen shows a 2-wire line card that is incorrectly installed in the slave slot of a 4-wire provisioned service, causing a mismatch (MISM) state. The red Fail LED of the line card would also be illuminated.

```

Critical Major minor warning FailProt Lockout ActProt PrfAlrt
Network View 2 4 5 2 * . . *
1 St. John's 2 3 1 1 * . . .

LC Equip
0 Quit LC Equipment Shelf: CDS 1
2 Select Unit: LC 1
3 Query Location: RolBay4 ShPos 2
4 Host CLLI: SWITCH1
5 ListAlms Line State: OOS Mtce-Eqpt Mismatch
6 AlmRpt
7 Service Provided: FX-POLT
8 ChgState Circuit Pack: Line Card NT4K68AA Slot 1 MISM
9 A34 Current Load:
10 A37 Current Load:
11
12 Diagnose
13
14
15
16 ResetLC
17 AlmProv
18 Help

NE 1
Time 17:35 >

```

—end—

## Procedure 2-3

# Running line card diagnostics

---

Use this procedure when the red LED is lit on a line card or to verify the condition of the line card. This procedure runs the “full diagnostic” software load that first checks the digital portion of the line card and then the analog portion by using the resources of the test access card (TAC), line interface card (LIC), metallic test access card (MTAC), and test buses. This diagnosis complements the self-diagnostic tests performed by the line card upon power-up and verifies a failed condition.

**Note 1:** AccessNode Express supports digital and partial analog diagnostics. The analog diagnostics use the integrated test unit (ITU) in place of the test cards described above.

**Note 2:** For information on diagnosing Universal Edge 9000 (UE9000) line cards, refer to the *UE9000 Voice OAM&P User Guide*.

**Note 3:** For information on UE9000 LEDs, refer to the *UE9000 LED Quick Reference Guide*.

The red LED is lit when the line card is not faulty. This means there could be a loss of talk battery, or a line card-slot mismatch. Reset the line card first (Procedure 2-4). If the red LED remains lit, run line card diagnostics, then review line card logs or alarm messages and refer to the *Log Report Manual*, 323-3001-840, in *Maintenance*, Volume 5B, or the *Alarm and Trouble Clearing Procedures*, 323-3001-543, in *Maintenance*, Volume 5A, as appropriate.

If there is a loss of talk battery, then three things happen:

- Red LED is on,
- Log LC602 is issued with the reason Line card protection on detected,
- Log LC300 is issued with the reason Line card failed.

Check the presence of talk battery filter voltage at the voice module I/O panel.

If a slot is provisioned for a service not supported by the line card installed in the slot, then the red LED on the line card is on and Log LC602 is issued with Line card mismatch. To find out if a mismatch exists, check the log message, or do Procedure 2-2, “Performing an inventory of line cards”, and look for the mismatch code in the CpkState field for that slot. If a mismatch exists, remove the line card and insert a line card of the type matching the service provisioned for the slot.

—continued—

---

 Procedure 2-3 (continued)  
**Running line card diagnostics**


---

## Requirements

A VT100-compatible terminal must be connected to the system.

**Note 1:** In an integrated application involving a DMS switch, if you plan to take an RFT line card out-of-service, Nortel Networks recommends that the line first be placed in a manual busy (MB) state at the MAP of the DMS switch. Refer to Note 2 on page 2-2 for complete details.

**Note 2:** For a translation table that shows how AccessNode lines translate to lines on the DMS-10NA switch, see *Line Card Provisioning Procedures*, 323-3001-315, in this volume.

## Action

---

Step	Action
------	--------

---

- |   |  |
|---|--|
| 1 | Log in to FWPU. Display the line card equipment screen for the line card that needs diagnosis by entering the appropriate command. |
|---|--|

If you are working with a line card	Then go to
for AccessNode (AN) that does not use a virtual line concentrating module (VLCM)	step 1a
for AccessNode Express (ANX) that does not use a virtual line concentrating module (VLCM)	step 1b
for AN or ANX that does use a VLCM	step 1c

- a. Enter the following command from the NE status screen:

```
eq lc < CDS # > < slot # > ↵
```

where

< CDS # > 1 to 7; the copper distribution shelf number

< slot # > 1 to 96; the line card slot number

**Note:** For Omega 4-wire and Omega 6/8-wire line cards, use the lowest even slot number occupied by the card.

*The line card equipment screen for the selected line card is displayed.*

—continued—

Procedure 2-3 (continued)

**Running line card diagnostics**

---

**Step    Action**

---

b. Enter the following command from the NE status screen:

**eq anxic < VM # > < slot # > ↵**

where

< VM # >    **1 to 28**; the ANX shelf number

< slot # >    **1 to 48**; the line card slot number

**Note:** For Omega 4-wire line cards, use the upper slot number occupied by the card (multiple of 3).

*The line card equipment screen for the selected line card is displayed.*

c. Enter the following command from the NE status screen:

**eq lcmlc <VLCM #> <LSG #> <LC #> ↵**

where

<VLCM #>    virtual line concentrating module (VLCM) number:  
**1 to 2**

<LSG #>      line subgroup number on DMS-10NA switch: **0 to 19**

<LC #>       line card slot number on DMS-10NA switch within line  
subgroup: **0 to 31**

*The line card equipment screen for the selected line card is displayed.*

**2** If the line state is OOS or not provisioned, go to step 3. If the line state is IS, enter:

**chgstate oos ↵**

*Confirmation is requested.*

**y ↵**

*The following message is displayed:*

The ChgState command has been received. It will be processed.

**3** Begin diagnosis by entering:

**diagnose ↵**

*Confirmation is requested.*

**y ↵**

—continued—

---

 Procedure 2-3 (continued)  
**Running line card diagnostics**


---

Step	Action
------	--------

---

*The system responds with:*

The Diagnose command has been received. It will be processed. Please refer to LC logs for results.

*“OOS Mtce” is temporarily displayed in the line state field. The line card type and slot number are then shown on the circuit pack line of the line card equipment screen. If the service type is not provisioned, the line state is shown as “service not provisioned”.*

- 4** 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.*

- 5** Display the diagnostic results by entering the following commands:

Command	to display
<b>open lc</b>	complete diagnostic results
<b>open lc 307</b>	log #307, which displays the failed line card diagnostics
<b>open lc 602</b>	log #602, which displays the passed line card diagnostics

You can move through the results list using the forward, back, first, and last commands. For more information on using the log utility, see *System Administration Procedures, 323-3001-302, in Operations, Administration, and Provisioning, Volume 4A.*

- 6** Inspect the line card diagnostics results and if a card fails diagnostics, replace the line card.

- 7** If the line card passes diagnostics and the line state is Service Not Provisioned, go to step 8.

If the line card passes diagnostics and If the line state is OOS, enter:

**chgstate is** ↵

*The Line State: field is highlighted, temporarily shows IS-Trbl-Loading, and then shows IS.*

- 8** When you finish the diagnosis of all selected line cards, quit the log utility and logout of the user terminal by entering:

**quit** ↵

*EQ: is displayed in the conversation area, indicating that you have quit LOGUTIL.*

**logout** ↵

—end—

## Procedure 2-4

# Resetting, replacing, or recommissioning a line card

---

Use this procedure to perform one of the following actions:

- reset an existing line card (reload the software on it)
- replace a line card with one of the same type
- recommission an existing line card with a new service
- recommission a new line card with a new service

A line card needs to be recommissioned only if it is being reassigned for a different service. Recommissioning includes reprovisioning the line and downloading software for the new service to the line card.

If you are replacing a line card with the same kind of line card, you do not need to reprovision the line. Inserting the line card on a provisioned line initiates the download of diagnostic and service software. If you want to reload the software on an existing line card without removing it, then you just need to reset the line card using the 'resetc' command as described in this procedure.

### Requirement

Equipment required includes a VT100-compatible terminal connected to the system. See *Network Element User Interface Description*, 323-3001-300, in *Operations, Administration, and Provisioning*, Volume 4A, for detailed information.

**Note 1:** In an integrated application involving a DMS switch, if you plan to take an RFT line card out-of-service, Nortel Networks recommends that the line first be placed in a manual busy (MB) state at the MAP of the DMS switch. Refer to Note 2 on page 2-2 for additional details.

**Note 2:** For a translation table that shows how AccessNode lines translate to lines on the DMS-10NA switch, see *Line Card Provisioning Procedures*, 323-3001-315, in this volume.

—continued—

Procedure 2-4 (continued)

## Resetting, replacing, or recommissioning a line card

### Action

Step	Action
1	Log in to FWPUI.
2	To display the LC Equipment screen for any line card, enter the appropriate command:

If you are working with a line card	Then go to
for AccessNode (AN) that does not use a virtual line concentrating module (VLCM)	step 2a
for AccessNode Express (ANX) that does not use a virtual line concentrating module (VLCM)	step 2b
for AN or ANX that does use a VLCM	step 2c
for UE9000	step 2d

- a. Enter the following command from the NE status screen:

```
eq lc < CDS # > < slot # > ↵
```

where

< CDS # >      1 to 7; the copper distribution shelf number

< slot # >      1 to 96; the line card slot number

**Note:** For Omega 4-wire and Omega 6/8-wire line cards, use the lowest even slot number occupied by the card.

*The line card equipment screen for the selected line card is displayed.*

- b. Enter the following command from the NE status screen:

```
eq anxic < VM # > < slot # > ↵
```

where

< VM # >      1 to 28; the ANX shelf number

< slot # >      1 to 48; the line card slot number

**Note:** For Omega 4-wire line cards, use the upper slot number occupied by the card (multiple of 3).

*The line card equipment screen for the selected line card is displayed.*

—continued—

Procedure 2-4 (continued)

**Resetting, replacing, or recommissioning a line card**

**Step Action**

c. Enter the following command from the NE status screen:

**eq lclmc <VLCM #> <LSG #> <LC #>**↵

where

<VLCM #> virtual line concentrating module (VLCM) number: **1 to 2**

<LSG #> line subgroup number on DMS-10NA switch: **0 to 19**

<LC #> line card slot number on DMS-10NA switch within line subgroup: **0 to 31**

*The line card equipment screen for the selected line card is displayed.*

d. Enter the following command from the NE status screen:

**eq mlc < shelf # > < mlc # >** ↵

where

< shelf # > **1 to 7**; the UE9000 shelf number

< mlc # > **1 to 16**; the line card number

*The line card equipment screen for the selected line card is displayed.*

**3** Choose your task from the following list:

<b>If you are</b>	<b>Then go to</b>
Replacing a line card with another of the same type	step 4
Commissioning a new line card with a new service	step 5
Recommissioning the existing line card with a new service	step 6
Resetting an existing line card (reloading service software)	step 7

**Replacing a line card**

**4** Remove the existing line card and replace with a new line card as explained in Procedure 2-5.

**Note 1:** If the new line card fails to initialize, go to step 7 to reset the line card. Replace the new line card if the reset fails to initialize the new line card.

**Note 2:** For instructions on replacing UE9000 circuit packs, refer to the *UE9000 Voice OAM&P User Guide*.

—continued—

---

 Procedure 2-4 (continued)

**Resetting, replacing, or recommissioning a line card**


---

Step	Action
------	--------

---

**Commissioning a new line card**

- 5** Insert the new line card as explained in Procedure 2-1.  
Continue at step 6 to reprovision the line.

**Recommissioning an existing line card**

- 6** Modify the line provisioning according to *Line Card Provisioning Procedures*, 323-3001-315, in this volume.

*At the completion of provisioning, the line card requests a diagnostic load. If the line card passes diagnostics, the line card requests a service load.*

**Note 1:** For information on provisioning UE9000 line cards, refer to the *UE9000 Voice OAM&P User Guide*.

**Note 2:** Only the Omega and universal voice grade (UVG) line cards accept loads. The ExpressLine card (used in the AccessNode Express) does not receive a load.

You have finished this procedure.

**Resetting a line card**

- 7** Is the line on a UE9000 shelf?

If	Then
Yes	Go to step 8.
No	Go to step 9.

- 8** Enter this command:

```
fa uelc < shelf # > < mlc # > < circuit # > .J
```

where

< shelf # >   **1 to 7**; the UE9000 shelf number

< mlc # >     **1 to 16**; the line card number

< circuit #> **1 to 24**; the line circuit number

*The facilities screen for the selected line(s) is displayed.*

Go to step 9.

—continued—

## 2-44 Installing line cards

---

Procedure 2-4 (continued)

### Resetting, replacing, or recommissioning a line card

---

Step	Action
9	<p>Perform an out-of-band cold reset of the line card by entering:</p> <pre>resetlc ↵</pre> <p><i>Confirmation is requested.</i></p> <pre>y ↵</pre> <p><i>The line interface card (LIC) resets the line card (that is, the LIC clears the line card software); this causes the line card to request a diagnostic load. After resetting, the state of the line card remains as it was before resetting: IS or OOS. If the line card passes diagnostics, the line card requests a service load. If the line card fails diagnostics, the line state becomes IS-TRBL (trouble) or OOS-TRBL.</i></p> <p><b>Note:</b> Only the Omega and universal voice grade (UVG) line cards accept loads. The ExpressLine card (used in the AccessNode Express) does not receive a load.</p>

—end—

---

## Procedure 2-5

# Removing a line termination or a line card

---

Use this procedure to remove a line termination and/or a line card. A line termination consists of the line provisioning information associated with a line card.

If you are removing a line card in order to replace it with the same kind of line card or a compatible line card, do not remove the line termination.

If the line card is being removed and the slot left empty, then the line termination should be deleted. See step 5 for more information.

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

Read “Equipment cautions and warnings” on page 1-1 to minimize any risk to personnel and equipment.

## Requirements

Verify the slots where the line terminations or line cards need to be removed.

**Note 1:** In an integrated application involving a DMS switch, if you plan to take an RFT line card out-of-service, Nortel Networks recommends that the line first be placed in a manual busy (MB) state at the MAP of the DMS switch. Refer to Note 2 on page 2-2 for additional details.

**Note 2:** For a translation table that shows how AccessNode lines translate to lines on the DMS-10NA switch, see *Line Card Provisioning Procedures*, 323-3001-315, in this volume.

—continued—

Procedure 2-5 (continued)

**Removing a line termination or a line card**

**Action**

Step	Action
------	--------

**Taking a line card out-of-service**

1 Make sure the line card does not have any calls in progress.

**Note:** For the NTN502AA line card, skip to step 5.

2 At the FWPI, enter the appropriate command from the NE status screen:

If you are working with a line card	Then go to
for AccessNode (AN) that does not use a virtual line concentrating module (VLCM)	step 2a
for AccessNode Express (ANX) that does not use a virtual line concentrating module (VLCM)	step 2b
for AN or ANX that does use a VLCM	step 2c
for UE9000	step 2d

a. Enter the following command from the NE status screen:

**eq lc < cds # > < slot # > ↵**

where

< cds # >    **1 to 7**; the copper distribution shelf number

< slot # >    **1 to 96**; the line card slot number

**Note:** For Omega 4-wire and Omega 6/8-wire line cards, use the lowest even slot number occupied by the card.

*The line card equipment screen for the selected line card is displayed. Go to step 3.*

b. Enter the following command from the NE status screen:

**eq anxic < vm # > < slot # > ↵**

where

< vm # >    **1 to 28**; the ANX shelf number

< slot # >    **1 to 48**; the line card slot number

**Note:** For Omega 4-wire line cards, use the upper slot number occupied by the card (multiple of 3).

*The line card equipment screen for the selected line card is displayed. Go to step 3.*

—continued—

---

 Procedure 2-5 (continued)  
**Removing a line termination or a line card**


---

Step	Action
------	--------

---

- c. Enter the following command from the NE status screen:

**eq lcmlc <VLCM #> <LSG #> <LC #> ↵**

where

<VLCM #> virtual line concentrating module (VLCM) number:  
**1 to 2**

<LSG #> line subgroup number on DMS-10NA switch: **0 to 19**

<LC #> line card slot number on DMS-10NA switch within  
line subgroup: **0 to 31**

*The line card equipment screen for the selected line card is displayed. Go to step 3.*

- d. For individual UE9000 line circuits, at the FWPU enter the following from the NE status screen:

**fa uelc < shelf # > < mlc # > < circuit # > ↵**

where

< shelf # > **1 to 7**; the UE9000 shelf number

< mlc # > **1 to 16**; the line card number

< circuit # > **1 to 24**; the line circuit number

*The facilities screen for the selected line(s) is displayed. Go to step 3.*

**Note:** For all facilities on UE9000 line cards, at the FWPU enter the following from the NE status screen:

**fa mlc < shelf # > < mlc # > ↵**

where

< shelf # > **1 to 7**; the UE9000 shelf number

< mlc # > **1 to 16**; the line card number

*The facilities screen for the selected line(s) is displayed. Go to step 4.*

—continued—

Procedure 2-5 (continued)

**Removing a line termination or a line card**

- | Step            | Action  |         |  |                 |   |  |  |                |  |
|-----------------|---|---------|--|-----------------|---|--|--|----------------|--|
| 3               | <p>Take the line card out-of-service by entering:</p> <p><b>chgstate oos</b> ↵</p> <p><i>Confirmation is requested.</i></p> <p><b>y</b> ↵</p> <p><i>The line card is placed out-of-service.</i></p> <p>Go to step 5.</p>  |         |  |                 |   |  |  |                |  |
| 4               | <p>Take the range of line cards out-of-service by entering:</p> <p><b>chgstate &lt;state&gt; &lt;first circuit&gt; &lt;last circuit&gt;</b>↵</p> <p>where</p> <table style="margin-left: 40px;"> <tr> <td style="padding-right: 20px;">&lt;state&gt;</td> <td>the operating state: <b>is</b> or <b>oos</b></td> </tr> <tr> <td style="padding-right: 20px;">&lt;first circuit&gt;</td> <td>the first line number in the desired range from <b>1</b> to <b>24</b></td> </tr> <tr> <td></td> <td><b>Note:</b> The &lt;first circuit&gt; parameter must be less than the &lt;last circuit&gt; parameter.</td> </tr> <tr> <td style="padding-right: 20px;">&lt;last circuit&gt;</td> <td>the last line number in the desired range from <b>1</b> to <b>24</b></td> </tr> </table> <p><i>Confirmation is requested.</i></p> <p><b>y</b> ↵</p> <p><i>The selected range of line cards are placed out-of-service.</i></p> <p>Go to step 5.</p> | <state> | the operating state: <b>is</b> or <b>oos</b> | <first circuit> | the first line number in the desired range from <b>1</b> to <b>24</b> |  | <b>Note:</b> The <first circuit> parameter must be less than the <last circuit> parameter. | <last circuit> | the last line number in the desired range from <b>1</b> to <b>24</b> |
| <state>         | the operating state: <b>is</b> or <b>oos</b>  |         |  |                 |   |  |  |                |  |
| <first circuit> | the first line number in the desired range from <b>1</b> to <b>24</b>   |         |  |                 |   |  |  |                |  |
|                 | <b>Note:</b> The <first circuit> parameter must be less than the <last circuit> parameter.  |         |  |                 |   |  |  |                |  |
| <last circuit>  | the last line number in the desired range from <b>1</b> to <b>24</b>  |         |  |                 |   |  |  |                |  |

**Removing a line termination**

- 5 If you are retaining the line termination, but removing the line card to replace it with the same type of line card, go to step 6. If you are removing the line termination, do the following:

If	Then
the line is on a UE9000 shelf	Delete the line termination at the switch. See the <i>UE9000 Voice OAM&amp;P User Guide</i> for additional deprovisioning information.
the line is on a CDS shelf or VM	Delete the line termination according to the procedure "Deleting a circuit," in <i>Line Card Provisioning Procedures</i> , 323-3001-315, in this volume.

—continued—

Procedure 2-5 (continued)

**Removing a line termination or a line card****Step Action****Removing a line card**

- 6** Put on an antistatic wrist strap.
- 7** To unlock the line card drawer, use a slotted screwdriver to turn the locking screw on the faceplate of the appropriate line card drawer (on the appropriate shelf). Grasp the faceplate handle and pull open the drawer.

**CAUTION****Removing a line card is service affecting.**

Be sure you remove the correct one.

**Note:** To access line cards in the AccessNode Express, lift up on the voice module latch and pull the voice module drawer open.

- 8** Remove the line card by grasping the finger hold on the faceplate of the line card and pulling it out of its slot. Be careful not to disturb the line card adjacent, above, or below it.
- 9** If required, install a new line card.

If the line is for a	Then
CDS shelf	See Procedure 2-1.
AccessNode Express voice module	See <i>AccessNode Express Commissioning and OAM&amp;P</i> , 323-3051-220, in the AccessNode Express volume.
UE9000 shelf	See the <i>UE9000 Installation Quick Reference Guide</i> .

- 10** When you are finished, close the CDS drawer by pushing it in. Use a slotted screwdriver to turn the locking screw on the drawer faceplate.

**Note:** To close the AccessNode Express voice module drawer, push it in completely. Then lift the latch up and press it down to lock the drawer.

- 11** Update the utility card located in the faceplate of the line card drawer, if your organization requires such an update.

- 12** From the line card equipment screen, bring the line card back in-service by entering:

**chgstate is**↵

*Confirmation is requested.*

**y** ↵

*The line card is placed in-service.*

- 13** Return to the NE status screen by entering:

**quit**↵

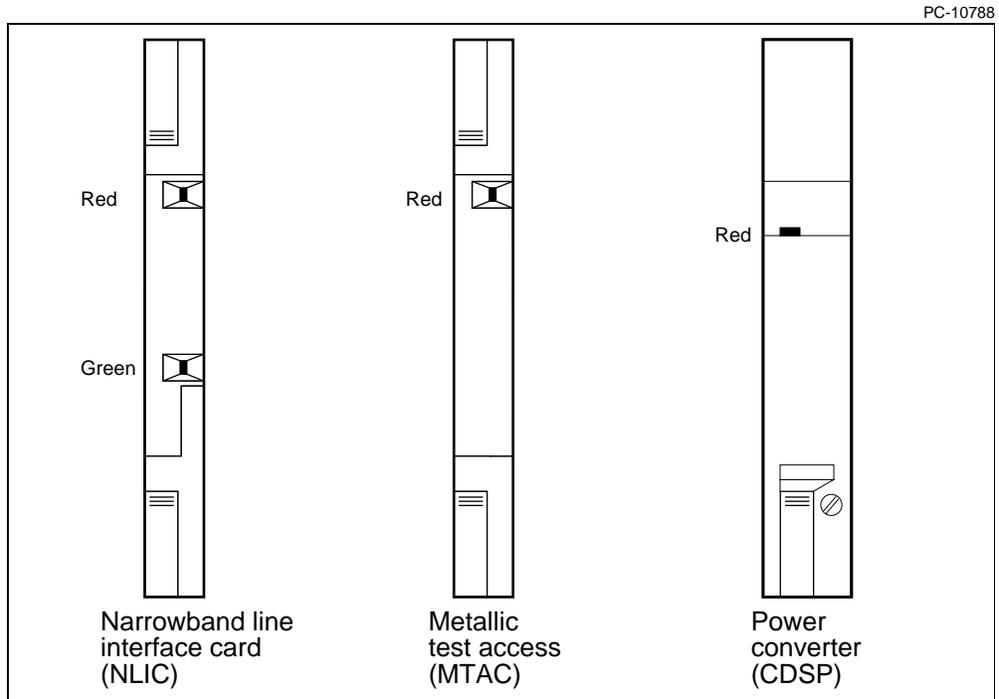
—end—

## Procedure 2-6 Diagnosing failed circuit packs

Use this procedure to diagnose common equipment circuit packs in a copper distribution shelf (CDS) or to verify failure of a circuit pack when a red LED is lit. This procedure describes how to diagnose the following circuit packs:

- line interface cards (LICs), of type narrow-band line interface card (NLIC)
- copper distribution shelf power (CDSP) converter
- metallic test access card (MTAC)

These cards are shown in the following figure.



**Note:** For information on diagnosing Universal Edge 9000 (UE9000) line cards, refer to the *UE9000 Voice OAM&P User Guide*.

### Requirements

- To perform diagnostics on MTACs, a working test access card (TAC) must be installed in slot 20 of the ABM shelf.
- A VT100-compatible terminal must be connected to the NE.

—continued—

Procedure 2-6 (continued)  
**Diagnosing failed circuit packs**

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

Read the warnings and precautions in “About this document” and Chapter 1 to minimize any risk to personnel and equipment.

**Action**

Step	Action
------	--------

- |   |  |
|---|--|
| 1 | Log in to FWPUI.   |
| 2 | If a common circuit pack in a CDS indicates trouble or failure because its red LED is on, perform out-of-service (OOS) diagnostics on the failed circuit pack. |

If you wish to diagnose	Then go to
an NLIC	step 3
a CDSP	step 9
an MTAC	step 13

**Diagnosing the NLIC**

- 3 Display the detailed equipment screen for the NLIC. Enter:

**eq lic** ↵

**dtlic < CDS # > < ID >** ↵

where

CDS # copper-distribution shelf number; enter one of 1 to 7

ID equipment instance; enter one of a, b, c, or d for NLICs. (NLICs A and B are located in the left line drawer, and NLICs C and D are in the right line drawer.)

*The detailed LIC Equipment screen is displayed for the selected unit.*

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

- 4 To place an NLIC in an out-of-service state, it must first be inactive.

If the NLIC to be diagnosed is	Then go to
the primary (active) unit	step 5
the secondary (inactive) unit	step 6

—continued—

Procedure 2-6 (continued)

**Diagnosing failed circuit packs**

---

<b>Step</b>	<b>Action</b>
5	Switch activity to change the unit to be diagnosed to a secondary (inactive) status. Enter: <b>switch</b> ↵ <i>Confirmation is requested.</i> <b>y</b> ↵ <i>The two NLICs exchange primary and secondary status.</i>
6	The module to be diagnosed must be out of service. To place the module out of service enter: <b>chgstate oos</b> ↵ <i>Confirmation is requested.</i> <b>y</b> ↵ <i>The State field value changes to OOS.</i>
7	Initiate diagnostics on the NLIC, by entering: <b>chgstate is</b> ↵ <i>The system performs out-of-service diagnostics on the NLIC as part of the transition from an OOS state to an in-service (IS) state.</i> <i>Diagnosis can take a while; it proceeds as a background task. The progress and final diagnosis are reported as updates to the state of the circuit pack.</i> <i>For a circuit pack that passes diagnostics, states similar to the following are displayed:</i> <b>OOS-DIAGNOSE</b> <b>OOS</b> <b>IS</b> <i>For a circuit pack that fails diagnostics, an example failure is:</i> <b>IS-Trbl-TOTAL-FAIL</b> <i>Different responses can be provided, depending on what part has failed.</i>
8	If failure is indicated, replace the defective NLIC with a spare one. Proceed to step 18.

—continued—

---

 Procedure 2-6 (continued)  
**Diagnosing failed circuit packs**


---

Step	Action
------	--------

---

**Diagnosing a CDSP**

**9** If the circuit pack is a CDS power card, enter:

**eq cdsp** ↵

**dtlcdsp < CDS # > < ID >** ↵

where

CDS #            copper distribution shelf number; enter one of 1 to 7

ID                equipment instance; enter one of a or b for CDSPs

**10** To place the module for diagnosis out of service enter:

**chgstate oos** ↵

*Confirmation is requested.*

**y** ↵

*The State field value changes to OOS.*

**11** Initiate diagnostics on the CDSP, by entering:

**chgstate is** ↵

*The system performs out-of-service diagnostics on the CDSP 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 progress and final diagnosis are reported as updates to the state of the circuit pack.*

*For a circuit pack that passes diagnostics, states similar to the following are displayed:*

**OOS-DIAGNOSE**

**OOS**

**IS**

*For a circuit pack that fails diagnostics, an example failure is:*

**IS-Trbl-TOTAL-FAIL**

*Different responses can be provided, depending on what part has failed.*

**12** If failure is indicated, replace the defective unit with a spare one.

Proceed to step 18.

—continued—

Procedure 2-6 (continued)  
**Diagnosing failed circuit packs**

---

**Step    Action**

---

**Diagnosing an MTAC**

**13**    If the circuit pack is a metallic test access card (MTAC), enter:

**eq mtac** ↵  
**dtlmtac < CDS # > < ID >** ↵

where

CDS #            copper distribution shelf number; enter one of 1 to 7

ID                equipment instance; enter one of a or b for MTACs;  
MTAC A is in the left line drawer and MTAC B is in the  
right line drawer

**14**    If the MTAC to be diagnosed is not already out of service, enter:

**chgstate oos** ↵

*Confirmation is requested.*

**y** ↵

*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, that uses test resources on the test access card (TAC).

**15**    Initiate diagnostics on the MTAC, by entering:

**diagnose** ↵

*Confirmation is requested.*

**y** ↵

*The system performs out-of-service diagnostics on the MTAC.*

**Note:** When diagnostics are requested on an MTAC and the resources are busy, the diagnostic request is rejected. If diagnostics are requested on an MTAC that is not out-of-service, the diagnostic request is rejected.

*Diagnosis can take a while; it proceeds as a background task. The progress and final diagnosis are reported as updates to the state of the circuit pack. For a circuit pack that passes diagnostics, states similar to the following are displayed:*

**OOS-DIAGNOSE**

**OOS**

*For a circuit pack that fails diagnostics, an example failure is:*

**OOS-Trbi-TOTAL-FAIL**

*Responses differ depending on which part fails.*

—continued—

---

Procedure 2-6 (continued)  
**Diagnosing failed circuit packs**

---

<b>Step</b>	<b>Action</b>
<b>16</b>	<p>If failure is indicated, replace the defective MTAC with a spare one. <i>The new MTAC undergoes self-tests. If it passes, it goes in service.</i></p> <p>If the new MTAC fails, or if more than one MTAC fails diagnostics, there can be a higher order problem, such as loose cables, bent pins, TAC fault, or other condition. Refer to <i>Alarm and Trouble Clearing Procedures</i>, 323-3001-543, in <i>Maintenance</i>, Volume 5A.</p>
<b>17</b>	<p>If the MTAC passed diagnostics, place it back in service, by entering: <b>chgstate is</b> ↵</p> <p><i>The MTAC goes in service.</i></p>
<b>18</b>	<p>Repeat the applicable steps of this procedure for any other circuit packs that you need to diagnose.</p>

—end—



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## Special services lineup procedures

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This chapter has the procedures for lining up new special services on an AccessNode system.

Loop lineup is performed after the circuits are provisioned and after the line cards are installed, diagnosed, and loaded with software. Line card installation and diagnosis are described in Chapter 2, “Installing line cards.” Provisioning line terminations is described in *Line Card Provisioning Procedures*, 323-3001-315, in this volume.

**Note:** When the remote fiber terminal (RFT) is in a modular business package (MBP) on the customer premises, the loops are generally shorter than when the RFT is in a bay arrangement at a telephone company location. Therefore the customer loops off the MBP would generally have lower gain requirements and simpler equalization requirements.

### How to use this chapter

Do the procedures starting on page 3-5 according to the process flowchart and the document task list in Chapter 1.

### Chapter contents

The following table lists the topics covered in this chapter. If you cannot successfully complete these procedures, contact your next level of support.

Procedure	Topic	See
	Test equipment for special service lineup	page 3-2
	Summary of special service circuit lineup	page 3-2
3-1	Lining up a two-wire special service circuit	page 3-5
3-2	Lining up a 4-wire or 6/8-wire special service circuit	page 3-13
	Circuit lineup worksheet	page 3-21

## Test equipment for special service lineup

Table 3-1 lists the test equipment for lining up a special service circuit on AccessNode.

**Table 3-1**  
**Test equipment**

Qty	Equipment	Details	Use for
1	network element user terminal, Digital Equipment Corporation VT100 or equivalent	includes RS-232C cable with a 25-pin D-subminiature male connector at the LCAP end	jack access and circuit provisioning during lineup
2	voice frequency transmission test sets, Hewlett-Packard HP3551A or equivalent	includes frequency generator and receiver, and connecting cables (one set to the bantam jacks on LCAP and another set to the customer jack access panel)	level (dB) measurements
1	Circuit Lineup Worksheet	Prepare a copy of the form, one copy for each circuit	circuit lineup results

*Note:* Jack access can be provided to analog special service circuits using either of two jack access tools: the FWPUJ jack access tool, described in “Accessing circuits at LCAP jacks” on page 6-1, or the Specials Lineup Manager on the OPC. The latter tool is preferred for special service lineup.

## Summary of special service circuit lineup

Many analog special service circuits require that a circuit lineup procedure be performed in order to make sure they work properly. The procedure results in line card adjustments that compensate for the unique transmission characteristics of the adjacent loop. The customer loop is the metallic pair connecting the RFT line card to the customer equipment. Some circuits also require FCOT line card adjustment for the central office metallic loop.

### Overview of circuit lineup

An overview of circuit lineup for the customer loop follows:

- One technician at the customer equipment connects test equipment to the customer’s jack access point.
- A second technician at the FCOT or the RFT connects test equipment to the 0TLP jacks on the LCAP.
- Set up 0TLP jack access connections to the desired line card.
- Measure the signal level, and compare this with the requirement.
- Adjust the RFT line card gain setting using the OPC Provisioning Manager.
- Measure the signal level again to verify the provisioned setting.

- Measure and adjust equalization parameters as outlined under the following heading “Equalization adjustment” (some services do not need this adjustment).

An overview of circuit lineup for the central office loop of a universal circuit follows:

- Connect test equipment to the 0TLP jacks at the FCOT LCAP.
- Connect test equipment to the jack access point at the connecting equipment in the central office (or if the loop is less than 100 ohms, connect the test equipment to the metallic jacks at the FCOT LCAP).
- Log in to the OPC and set up 0TLP jack access to the desired line card (and metallic jack access, if also connected to the metallic jacks).
- Measure the signal level, and compare this with the requirement.
- Adjust the FCOT line card setting for gain, using the OPC Provisioning Manager tool (equalization of the CO loop is not required).
- Measure the signal level again to verify the provisioned setting.

### Equalization adjustment

In each direction of a circuit, you can equalize at the transmit end (pre-equalization) or at the receive end (post-equalization). Post-equalization is preferred because it avoids transmitting high-level signals that can cause crosstalk.

On a four-wire line card it is necessary to adjust three equalization parameters: the receive height, receive slope, and receive bandwidth. Equalizing a two-wire circuit involves a similar, but simpler procedure, since only one equalization parameter, slope, is adjusted. The following steps outline how to post-equalize the signal received at the RFT from the customer equipment for a four-wire circuit:

- Set the bandwidth parameter (BW) to 16.
- Measure incoming levels and adjust two parameters: height (HT) and slope (SL).
- Measure the incoming levels again, and if they are not within tolerance, reduce the BW setting and readjust HT and SL as prescribed in *Line Card Applications and Special Services Engineering*, 323-3001-155, in *Engineering, Configuration, and Ordering Guide*, Volume 1.
- Repeat this measurement-adjustment-measurement cycle if necessary.
- If results are still not within tolerance, then the circuit probably cannot be equalized. You can try pre-equalization at the customer end of the loop.

### 3-4 Special services lineup procedures

---

If the customer equipment can adjust equalization on the receive path, then follow a similar method at the customer equipment to post-equalize the received signal. If you cannot adequately post-equalize the loop at the customer equipment, you can pre-equalize the loop, that is, set transmit height, transmit slope, and transmit bandwidth parameters on the RFT line card.

---

## Procedure 3-1

# Lining up a two-wire special service circuit

---

Use this procedure to measure loop signal levels on a two-wire special service circuit, and to adjust the line card parameters so the circuit meets the circuit design requirements. In particular, use this procedure to:

- adjust gain and equalization on the RFT line card of FX, PLAR, and ETO universal or DS1 tandem circuits
- adjust gain only, on the RFT line card of TO, MRD, and DPO/DPT universal or DS1 tandem circuits
- adjust gain only, on the FCOT line card of FX, ETO, TO, PLAR, MRD, and DPO/DPT universal circuits

### Requirements

When adjusting the RFT line card, two technicians are needed. When adjusting the FCOT line card on a universal circuit, one technician might be sufficient.

You need the following information, equipment, and materials:

- userID and password for using the Specials Lineup Manager on the OPC. Procedures in Chapter 2 describe how to use this tool to set up jack access to the line card.
- userID and password for using the OPC Provisioning Manager tool. Procedures in *Line Card Provisioning Procedures*, 323-3001-315, in this volume, describe how to use this tool to make further adjustments to the line card.
- 2 VF transmission test sets, type HP3551A or equivalent (also test cords: one set with 310-to-bantam plugs for connecting to the LCAP, and a second set for connecting to the customer equipment jack access point)
- VT100-compatible user terminal, connected to the LCAP (see the procedure for connecting a local terminal to a network element in *Network Element User Interface Description*, 323-3001-300, in *Operations, Administration, and Provisioning*, Volume 4A)
- the customer order, including the circuit design, showing the impedance, transmit and receive signal levels, and equalization slope requirements

—continued—

Procedure 3-1 (continued)

**Lining up a two-wire special service circuit**

---

- Circuit Lineup Worksheet prepared with provisioned values for gain and equalization, if applicable



**DANGER**

**Risk of injury or damage**

Read “Equipment cautions and warnings” on page 1-1 to minimize any risk to personnel and equipment.

Figure 3-1 on page 3-8 illustrates the typical layout with one technician at the RFT, and a second at the customer equipment. This layout is applicable to RFT line card adjustment for either universal or DS1 tandem circuits. Figure 3-2 illustrates an alternative layout you can use for universal circuits only. In this arrangement, the second technician is at the FCOT instead of at the RFT.

Figures 3-3 and 3-4 on page 3-9 show two possible arrangements for adjusting the FCOT line card on a universal circuit. Use the layout in Figure 3-3 when jack access is possible at the connecting equipment. Use the layout in Figure 3-4 if jack access is not possible at the connecting equipment, or if the central office loop is less than 100 ohms.

**Action**

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<b>Step</b>	<b>Action</b>
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**Adjusting the RFT line card for the customer loop**

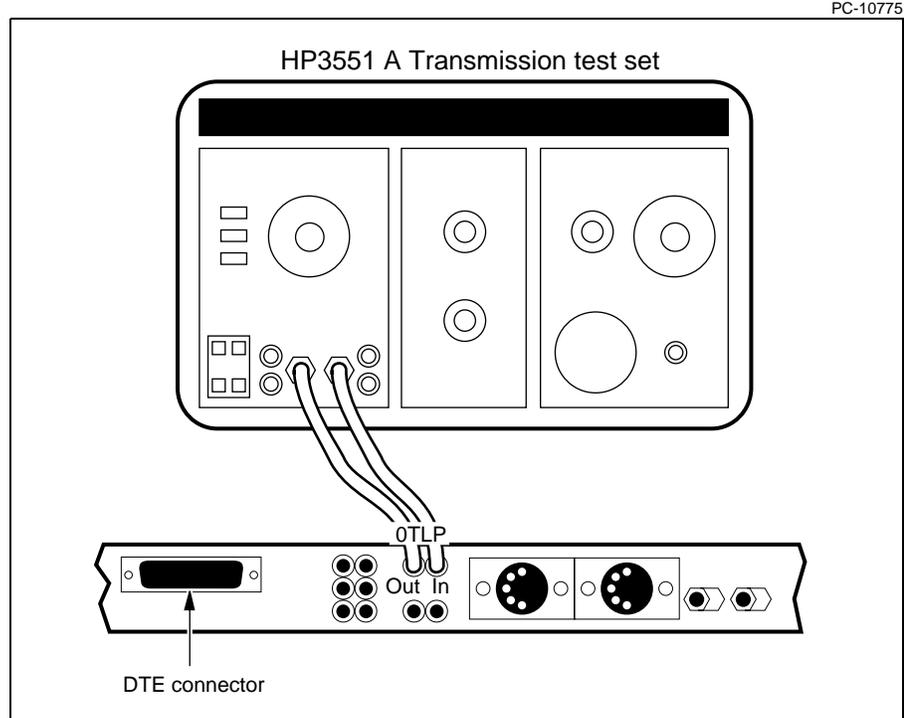
- 1** At the customer equipment, connect a VF transmission test set to the customer’s jack access point, so you are able to send to and receive signals from the RFT.
- 2** At the remote NE, connect the second transmission test set to the 0TLP Out and In jacks of the LCAP, as shown below.

—continued—

Procedure 3-1 (continued)

**Lining up a two-wire special service circuit**

**Step Action**



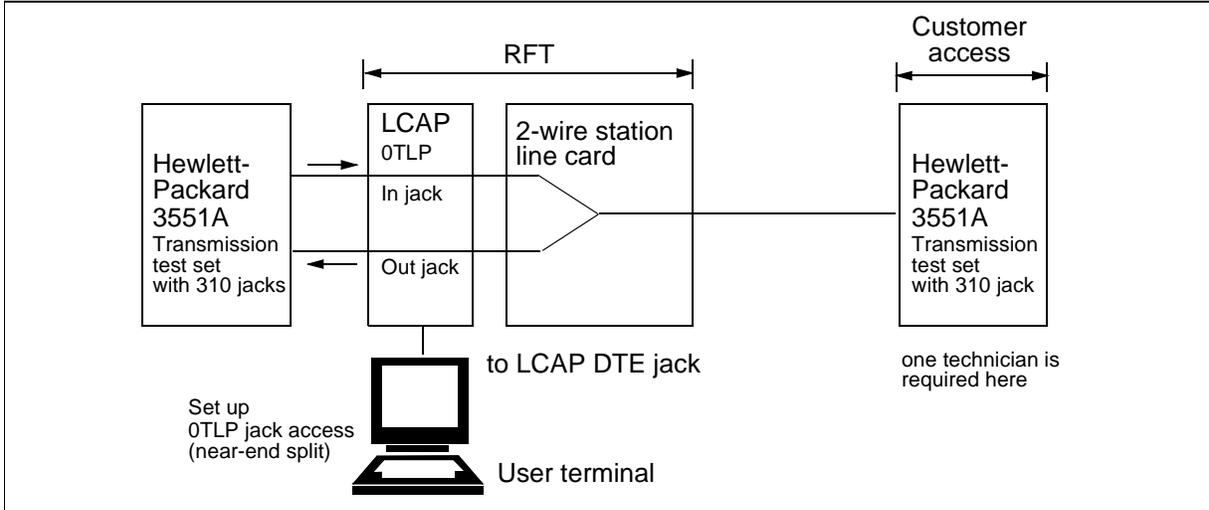
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3-8 Special services lineup procedures

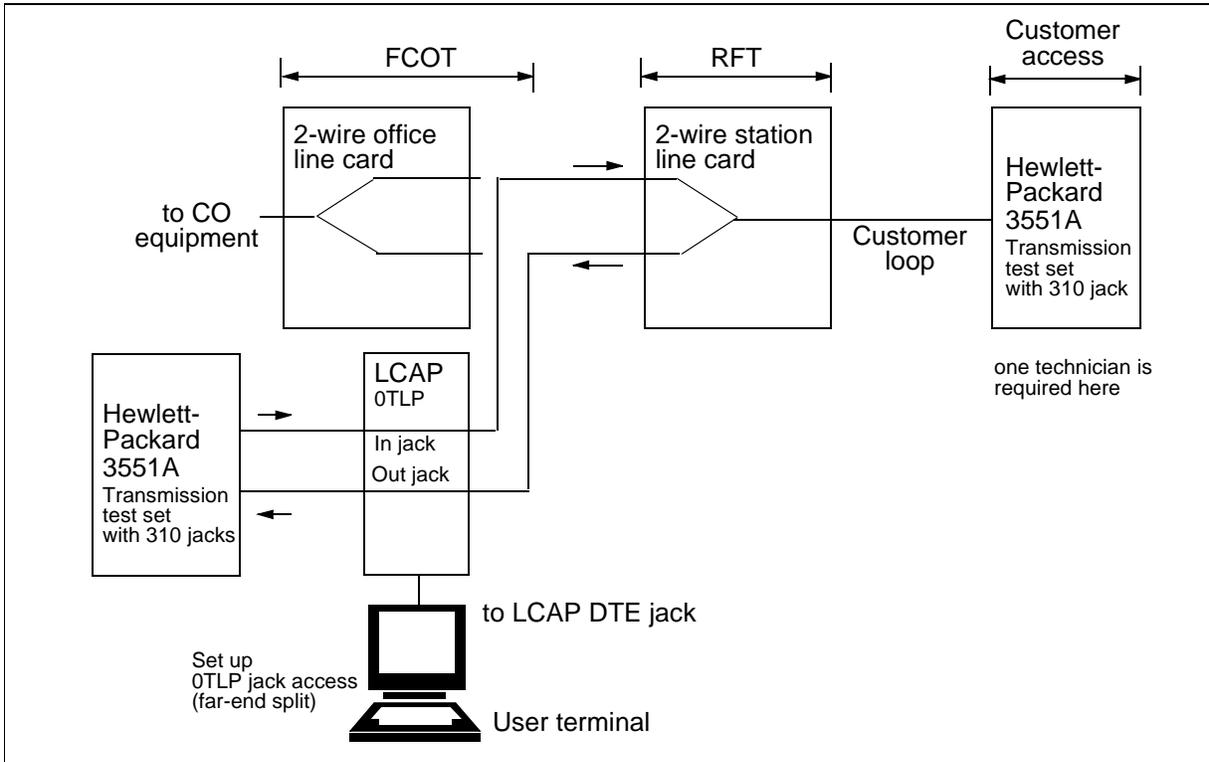
Procedure 3-1 (continued)

Lining up a two-wire special service circuit

**Figure 3-1**  
Layout for RFT 2-wire line card adjustment, second technician at RFT



**Figure 3-2**  
Layout for RFT 2-wire line card adjustment, second technician at FCOT

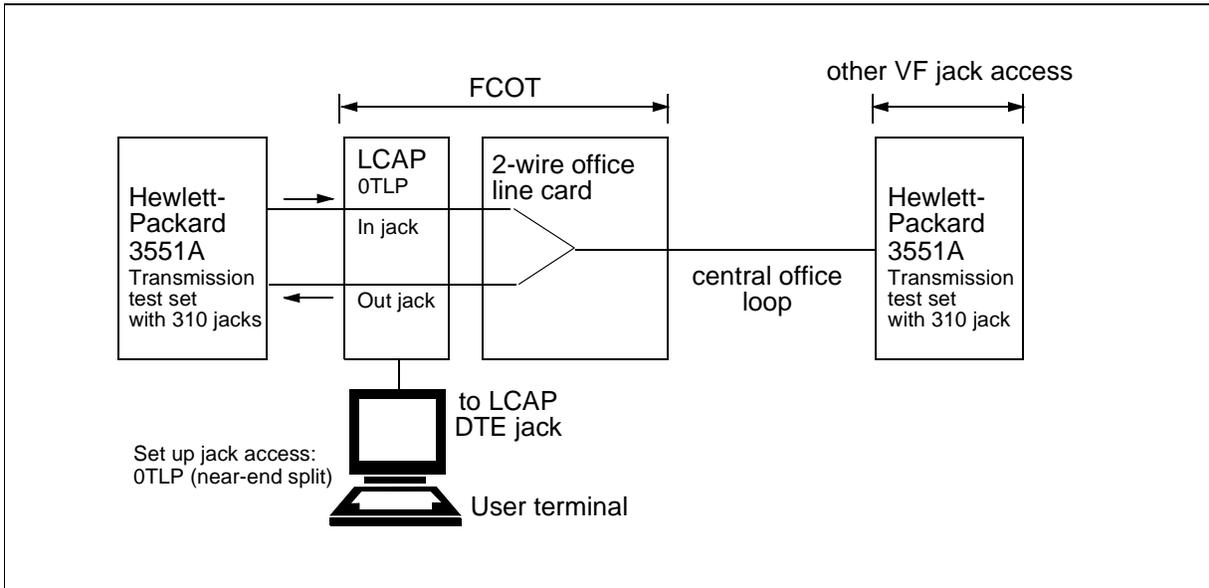


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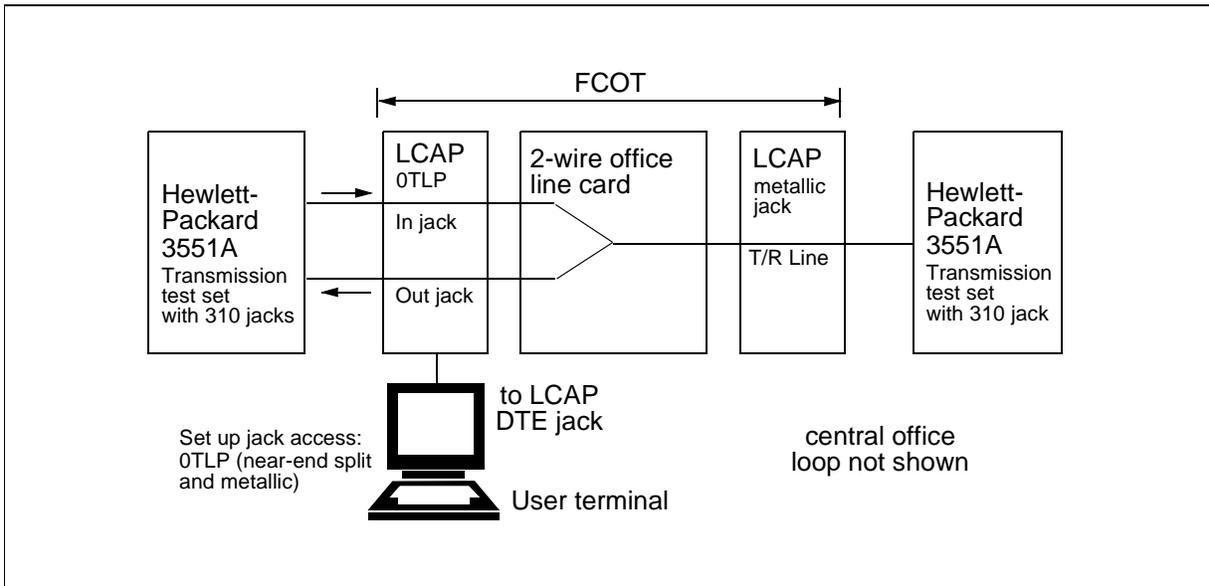
Procedure 3-1 (continued)  
**Lining up a two-wire special service circuit**

Step	Action
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**Figure 3-3**  
**Layout for FCOT 2-wire line card adjustment, including the central office loop**



**Figure 3-4**  
**Layout for FCOT 2-wire line card adjustment, line card only**



—continued—

3-10 Special services lineup procedures

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Procedure 3-1 (continued)

**Lining up a two-wire special service circuit**

---

- | Step | Action   |
|------|--|
| 3    | Log into the OPC, open the Specials Lineup Manager tool, and set up 0TLP jack access (split-near) to the selected line card. Use split-far jack access if the second technician is at the FCOT instead of the RFT.<br><br>If you do not know how to do this, see the procedure “Setting up a test access connection for special services lineup” on page 7-4 in Chapter 7. |
| 4    | Open the OPC Provisioning Manager tool and select the circuit under test.<br><br>If you do not know how to do this, see the procedure for modifying universal or DS1 tandem circuit details in <i>Line Card Provisioning Procedures</i> , 323-3001-315, in this volume.  |
| 5    | If this line card requires only gain adjustment, then skip to step 13. If it requires equalization and gain adjustment, continue at step 6.  |

**Adjusting equalization**

- |    |   |
|----|---|
| 6  | From the customer equipment, send a 1004 Hz tone at the customer’s TLP (transmission level point), as designated in the circuit design.   |
| 7  | Measure the receive level at the remote fiber terminal. Record the value on the Circuit Lineup Worksheet.   |
| 8  | Repeat steps 6 to 7 using first a 404 Hz tone, and then repeat again using a 2804 Hz tone.<br><br><b>Note:</b> The objective of equalization is to provide a flatter frequency-gain response across the voiceband. Equalization of a two-wire circuit is based on high frequency roll-off. This is usually more severe than low frequency roll-off. Equalization is provisioned by assigning a value in the range 0 to 6. Each value is associated with a different frequency-gain relation. Increasing the equalization value provides greater gain correction. The default equalization value is 0; this adds no gain across the voiceband. |
| 9  | If the signal level at 2804 Hz is lower than the level at 1004 Hz, choose a higher value (in the range 1 to 6) to increase the slope adjustment. If the signal level at 2804 Hz is higher than the level at 1004 Hz, choose a lower number (in the range 0 to 5) to decrease the slope adjustment.  |
| 10 | At the OPC user interface, use the OPC Provisioning Manager tool to enter this value for equalization.  |
| 11 | Repeat steps 6 to 10 to verify or fine tune the setting.<br><br><b>Note:</b> If the loop is still not equalized within the limits specified in the customer order, obtain a different cable pair, and repeat this procedure.  |
| 12 | Record the final equalization setting on the Circuit Lineup Worksheet.  |

—continued—

---

 Procedure 3-1 (continued)

**Lining up a two-wire special service circuit**


---

Step	Action
------	--------

**Adjusting transmit gain**

- |    |   |
|----|---|
| 13 | At the customer equipment, send 1004 Hz tone towards the RFT, at the customer transmit level specified in the circuit design.                         |
| 14 | At the remote network element, measure the level received.<br><i>Requirement: 0 TLP (The actual level in dBm is specified in the circuit design.)</i> |
| 15 | Use the OPC Provisioning Manager tool to adjust the RFT Tx gain parameter.  |
| 16 | Repeat steps 13 to 15 until the level measured at the RFT meets the requirement.  |
| 17 | Record the Tx gain setting on the RFT Circuit Lineup Worksheet.   |

**Adjusting receive gain**

- |    |  |
|----|--|
| 18 | At the remote network element, send 1004 Hz tone towards the customer equipment, at a level of 0 dBm.  |
| 19 | At the customer equipment, measure the level received.<br><i>Requirement: The customer's received TLP is specified in the circuit design.</i>                        |
| 20 | Use the OPC Provisioning Manager tool to adjust the RFT Rx gain parameter.   |
| 21 | Repeat steps 18 to 20 until the level measured at the customer equipment meets the requirement.  |
| 22 | Record the Rx gain setting on the RFT Circuit Lineup Worksheet.  |
| 23 | Disconnect the jack access connections and log out of the OPC user interface.  |
| 24 | Remove the test equipment.<br>If this is a DS1 tandem circuit, then you have finished this procedure.<br>If this is a universal circuit, then continue with step 25. |

—continued—

Procedure 3-1 (continued)

**Lining up a two-wire special service circuit**

---

**Step Action**

---

**Adjusting the FCOT line card for the central office loop**

- 25** At the central office, connect a VF transmission test set to the jack access point of the connecting equipment, so that you are able to send to and receive signals from the FCOT. This arrangement is shown in Figure 3-3 on page 3-9. If the loop is less than 100 ohms, you can connect a VF transmission test set to the metallic jacks on the FCOT LCAP instead. This arrangement is shown in Figure 3-4 on page 3-9.
- 26** Connect the second transmission test set to the 0TLP Out and In jacks of the LCAP, as shown in step 2.
- 27** Log into the OPC, open the Specials Lineup Manager tool, and set up 0TLP jack access (split near and metallic) to the desired line card. If you do not know how to do this, see Procedure 7-1 "Setting up a test access connection for special services lineup" in Chapter 7.
- 28** Open the OPC Provisioning Manager tool and select the circuit under test. If you do not know how to do this, see the procedure for modifying universal or DS1 tandem circuit details in *Line Card Provisioning Procedures*, 323-3001-315.

**Adjusting transmit gain**

- 29** From the metallic loop side, send 1004 Hz tone towards the line card, at the transmit level specified in the circuit design.
- 30** At the 0TLP jacks, measure the level received.  
*Requirement: 0 TLP (The actual level in dBm is specified in the circuit design.)*
- 31** Use the OPC Provisioning Manager tool to adjust the Tx gain parameter.
- 32** Repeat steps 29 to 31 until the level measured meets the requirement.
- 33** Record the Tx gain setting on the Circuit Lineup Worksheet.

**Adjusting receive gain**

- 34** At the 0TLP jacks, send 1004 Hz tone towards the FCOT line card, at the 0TLP level specified in the circuit design.
- 35** On the metallic loop side, measure the level received.  
*Requirement: The received TLP is specified in the circuit design.*
- 36** Use the OPC Provisioning Manager tool to adjust the Rx gain parameter.
- 37** Repeat steps 34 to 36 until the level measured meets the requirement.
- 38** Record the Rx gain setting on the Circuit Lineup Worksheet.
- 39** Disconnect the jack access connections and log out of the OPC.
- 40** Remove the test equipment.

—end—

---

## Procedure 3-2

# Lining up a 4-wire or 6/8-wire special service circuit

---

Use this procedure to measure loop signal levels on a 4-wire special service circuit, and to adjust the line card parameters to meet the circuit design requirements. This procedure also applies to the T/R and T1/R1 pairs of a 6/8-wire special service circuit. In particular, use this procedure to:

- adjust gain and equalization on the RFT line card of FX, DX, and ETO four-wire circuits (universal or DS1 tandem)
- adjust gain only, on the RFT line card of TO 4-wire circuits and E&M, PLR, and TDM 6/8-wire circuits (universal or DS1 tandem)
- adjust gain only, on the FCOT line card of FX, DX, TO, and ETO 4-wire circuits, and on the four-wire portion of E&M, PLR, and ETO 6/8-wire circuits (universal only).

Use this procedure to post-equalize the signal received from the customer equipment, that is, to set the receive height, receive slope, and receive bandwidth parameters on the RFT line card.

If the customer equipment can adjust equalization on the receive path, then follow a similar method at the customer equipment to post-equalize the received signal there.

If you cannot adequately post-equalize the loop at the customer equipment, you can pre-equalize the customer's received signal, that is, adjust the transmit height, transmit slope, and transmit bandwidth parameters on the RFT line card. If you decide to do this, you must perform a modified version of this procedure, as follows:

- Transmit a signal from the RFT.
- Measure the levels received at the *customer equipment*.
- Adjust the three *transmit* equalization parameters.
- Update the Circuit Lineup Worksheet, reflecting these variations to the given procedure.

## Requirements

When adjusting the RFT line card, two technicians are required. When adjusting the FCOT line card on a universal circuit, one technician might be sufficient.

—continued—

Procedure 3-2 (continued)

**Lining up a 4-wire or 6/8-wire special service circuit**

---

You need the following information, equipment, and materials:

- userID and password for using the Specials Lineup Manager on the OPC. Procedures in Chapter 7 describe how to use this tool to set up jack access to the line card.
- userID and password for using the OPC Provisioning Manager tool. Procedures in *Line Card Provisioning Procedures*, 323-3001-315, describe how to use this tool to make further adjustments to the line card.
- 2 VF transmission test sets, type HP3551A or equivalent (also test cords: one set with 310-to-bantam plugs for connecting to the LCAP, and a second set with 310 plugs at one end and the other ends suitable for connecting to the customer equipment access point)
- VT100-compatible user terminal, connected to the LCAP (Refer to the procedure for connecting a local terminal to a network element in *Network Element User Interface Description*, 323-3001-300, in *Operations, Administration, and Provisioning*, Volume 4A.)
- the customer order, including the circuit design, showing the impedance, transmit and receive signal levels, and equalization requirements
- Circuit Lineup Worksheet prepared with provisioned values for gain and equalization, if applicable



**DANGER**

**Risk of injury or damage**

Read “Equipment cautions and warnings” on page 1-1 to minimize any risk to personnel and equipment.

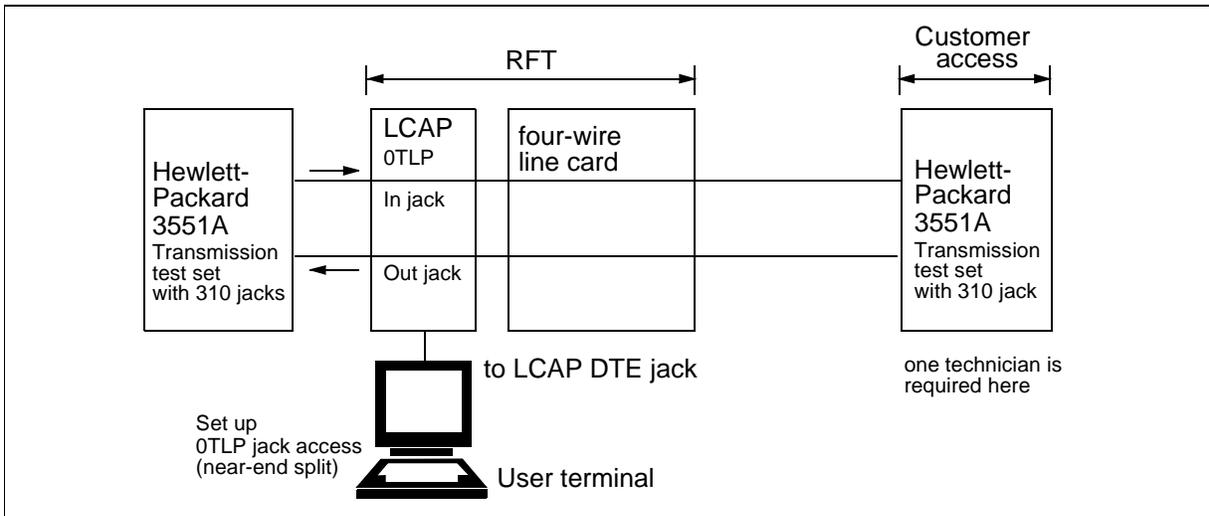
Figure 3-5 on page 3-15 illustrates the typical layout with one technician at the RFT, and a second at the customer equipment. This layout is applicable to RFT line card adjustment for either universal or DS1 tandem circuits. Figure 3-6 illustrates an alternative layout you can use for universal circuits only. In this arrangement, the second technician is at the FCOT, not at the RFT.

To adjust the FCOT line card on a universal circuit when jack access is possible at the connecting equipment, use the layout in Figure 3-7 on page 3-16. Use the layout in Figure 3-8 if jack access is not possible at the connecting equipment, or if the central office loop is less than 100 ohms.

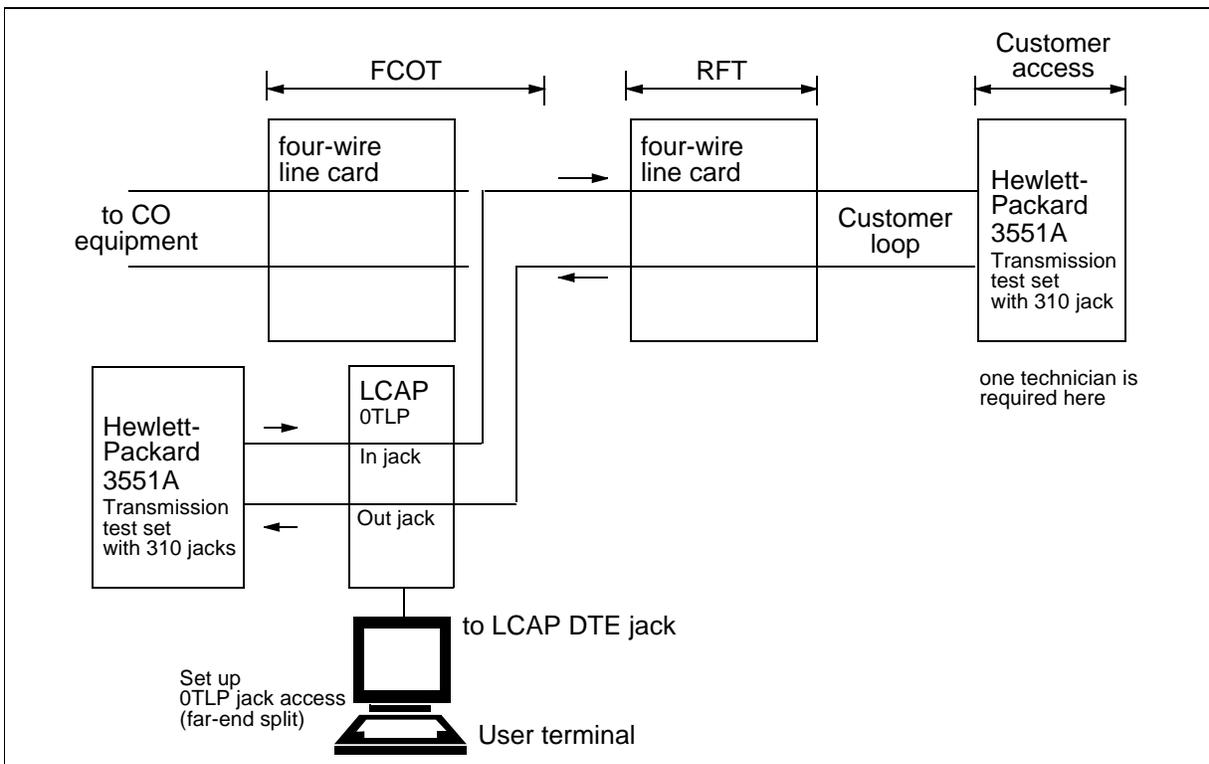
—continued—

Procedure 3-2 (continued)  
**Lining up a 4-wire or 6/8-wire special service circuit**

**Figure 3-5**  
**Layout for RFT 4-wire line card adjustment, second technician at RFT**



**Figure 3-6**  
**Layout for RFT 4-wire line card adjustment, second technician at FCOT**



—continued—

3-16 Special services lineup procedures

Procedure 3-2 (continued)

Lining up a 4-wire or 6/8-wire special service circuit

Figure 3-7

Layout for FCOT 4-wire line card adjustment, including the central office loop

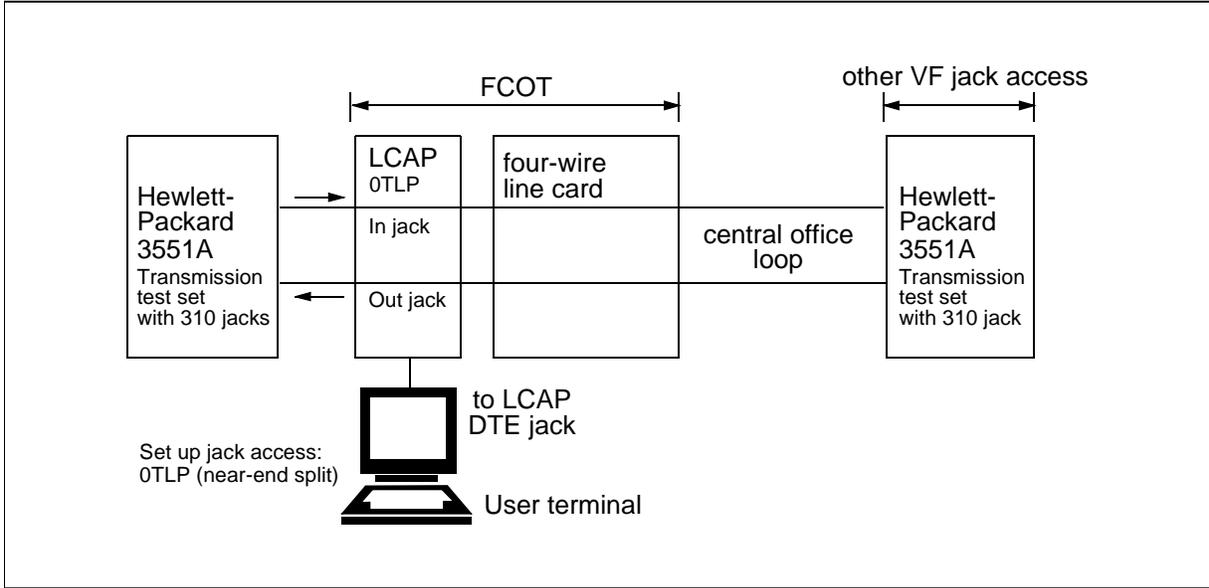
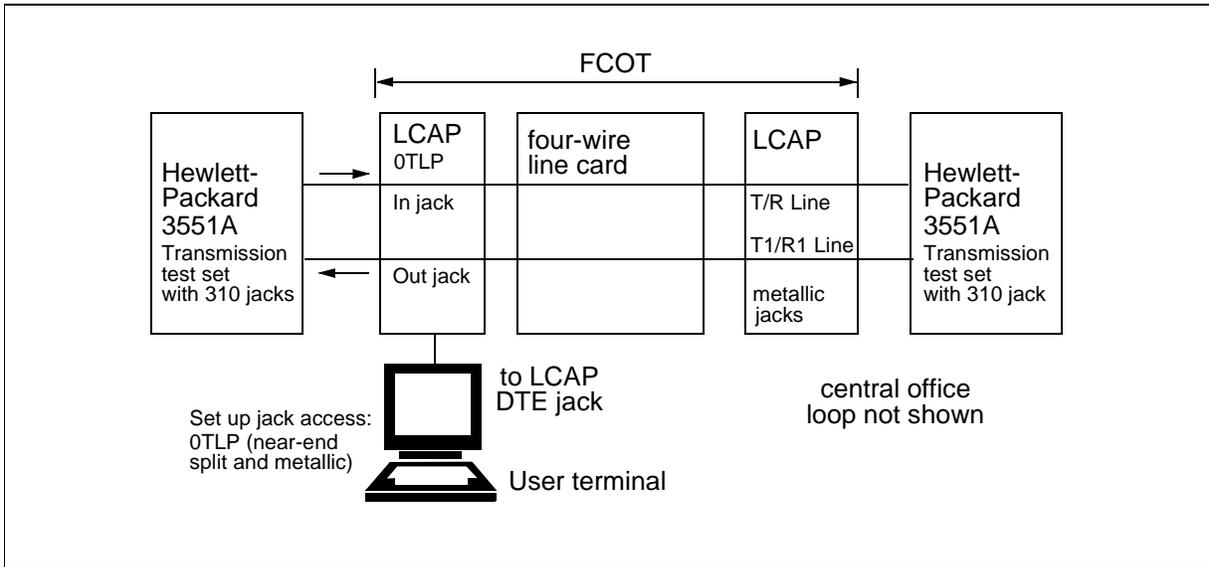


Figure 3-8

Layout for FCOT 4-wire line card adjustment, line card only



—continued—

Procedure 3-2 (continued)

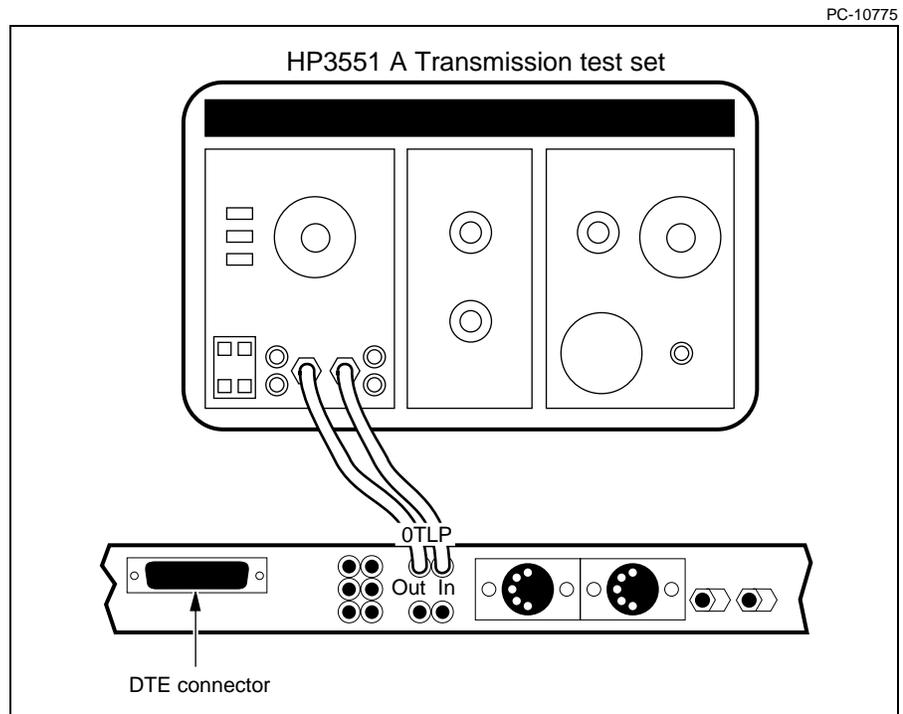
### Lining up a 4-wire or 6/8-wire special service circuit

## Action

Step	Action
------	--------

#### Adjusting the RFT line card for the customer loop

- 1 At the customer equipment, connect a VF transmission test set to the customer's jack access point, so that you can send to and receive signals from the RFT or FCOT.
- 2 At the remote network element, connect the second transmission test set to the 0TLP Out and In jacks of the LCAP, as shown below.



—continued—

3-18 Special services lineup procedures

---

Procedure 3-2 (continued)

**Lining up a 4-wire or 6/8-wire special service circuit**

---

- | Step | Action  |
|------|---|
| 3    | Log into the OPC, open the Specials Lineup Manager tool, and set up 0TLP jack access (split-near) to the desired line card. (Use split-far jack access if the second technician is at the FCOT instead of at the RFT.)<br>If you do not know how to do this, see Procedure 7-1 on page 7-4. |
| 4    | Open the OPC Provisioning Manager tool and select the circuit under test.<br>If you do not know how to do this, see the procedure “Modifying universal or DS1 tandem circuit details” in <i>Line Card Provisioning Procedures</i> , 323-3001-315, in this volume.                           |
| 5    | If this line card requires only gain adjustment, then skip to step 16. If it requires equalization and gain adjustment, continue with step 6.   |

**Adjusting equalization**

- |    |   |
|----|---|
| 6  | Verify that the bandwidth (BW) parameter is set to 16.  |
| 7  | From the customer equipment, send a 1004 Hz tone at the customer’s TLP (transmission level point), as designated in the circuit design.   |
| 8  | Measure the receive level at the remote fiber terminal. Record the value on the Circuit Lineup Worksheet.   |
| 9  | Repeat steps 7 to 8 using first a 404 Hz tone. Then repeat steps 7 to 8 again using a 2004 Hz tone. Then repeat steps 7 to 8 again using a 2804 Hz tone.  |
| 10 | On the Circuit Lineup Worksheet, subtract the value at 404 Hz from the value at 1004 Hz. Also, subtract the value at 2004 Hz from the value at 1004 Hz. Also, subtract the value at 2804 Hz from the value at 1004 Hz.<br><i>Refer to the customer order for the required levels at 404 Hz, 2004 Hz, and 2804 Hz.</i>   |
| 11 | If parameter adjustment is necessary, follow the guidelines below: <ul style="list-style-type: none"><li>• If the 404 Hz level is out of limits, decrease the slope (SL) setting for more gain or increase the slope setting for more loss. (This can affect the 2804 Hz level, requiring minor adjustment to the HT setting.)</li><li>• If the 2804 Hz level is out of limits, increase the height (HT) setting for more gain, or decrease the height setting for more loss. (This can affect the 404 Hz level, requiring minor adjustment to the SL setting.)</li><li>• If the 2004 Hz level is out of limits, decrease the bandwidth (BW) setting for more midband loss.</li></ul> |
| 12 | Use the OPC Provisioning Manager tool to enter these values for HT, SL, and BW.   |
| 13 | Repeat steps 7 to 12 to verify or finetune the setting.   |

—continued—

Procedure 3-2 (continued)

**Lining up a 4-wire or 6/8-wire special service circuit**

<b>Step</b>	<b>Action</b>
<b>14</b>	Record the equalization settings on the Circuit Lineup Worksheet.
<b>15</b>	If the loop is still not equalized within the limits specified in the customer order, obtain different cable pairs and repeat steps 7 to 14. If the loop is equalized within limits, continue at step 16.
<b>Adjusting transmit gain</b>	
<b>16</b>	At the customer equipment, send 1004 Hz tone towards the RFT, at the customer transmit level specified in the circuit design.
<b>17</b>	At the remote network element, measure the level received. <i>Requirement: 0 TLP (The actual level in dBm is specified in the circuit design.)</i>
<b>18</b>	Use the OPC Provisioning Manager tool to adjust the RFT Tx gain parameter.
<b>19</b>	Repeat steps 16 to 18 until the level measured at the RFT meets the requirement.
<b>20</b>	Record the Tx gain setting on the Circuit Lineup Worksheet.
<b>Adjusting receive gain</b>	
<b>21</b>	At the remote network element, send 1004 Hz tone towards the customer equipment, at a level of 0 dBm.
<b>22</b>	At the customer equipment, measure the level received. <i>Requirement: The customer's received TLP is specified in the circuit design.</i>
<b>23</b>	Use the OPC Provisioning Manager tool to adjust the RFT RX gain parameter.
<b>24</b>	Repeat steps 21 to 23 until the level measured at the customer equipment meets the requirement.
<b>25</b>	Record the Rx gain setting on the Circuit Lineup Worksheet.
<b>26</b>	Disconnect the jack access connections and log out of the OPC user interface.
<b>27</b>	Remove the test equipment. If this is a DS1 tandem circuit, then you are finished this procedure. If this is a universal circuit, continue at step 28.
<b>Adjusting the FCOT line card for the central office loop</b>	
<b>28</b>	At the central office, connect a VF transmission test set to the jack access point of the connecting equipment, so that you can send to and receive signals from the FCOT. See Figure 3-7 on page 3-16.  If the loop is less than 100 ohms, you can connect a VF transmission test set to the metallic jacks on the FCOT LCAP instead. This arrangement is shown in Figure 3-8 on page 3-16.

—continued—

3-20 Special services lineup procedures

---

Procedure 3-2 (continued)

**Lining up a 4-wire or 6/8-wire special service circuit**

---

<b>Step</b>	<b>Action</b>
<b>29</b>	Connect the second transmission test set to the 0TLP Out and In jacks of the LCAP, as shown in step 2.
<b>30</b>	Log into the OPC, open the Specials Lineup Manager tool, and set up 0TLP jack access (split-near and metallic) to the desired line card. If you do not know how to do this, see the procedure, "Setting up a test access connection for special services lineup" on page 7-4.
<b>31</b>	Open the OPC Provisioning Manager tool and select the circuit under test. If you do not know how to do this, see the procedure for modifying universal or DS1 tandem circuit details in <i>Line Card Provisioning Procedures</i> , 323-3001-315, in this volume.

**Adjusting transmit gain**

- 32** From the metallic loop side, send 1004 Hz tone towards the line card, at the transmit level specified in the circuit design.
- 33** At the 0TLP jacks, measure the level received.  
*Requirement: 0 TLP (The actual level in dBm is specified in the circuit design.)*
- 34** Use the OPC Provisioning Manager tool to adjust the Tx gain parameter.
- 35** Repeat steps 32 to 34 until the level measured meets the requirement.
- 36** Record the Tx gain setting on the Circuit Lineup Worksheet.

**Adjusting receive gain**

- 37** From the 0TLP jacks, send 1004 Hz tone towards the FCOT line card, at the 0TLP specified in the circuit design.
- 38** On the metallic loop side, measure the level received.  
*Requirement: The received TLP is specified in the circuit design.*
- 39** Use the OPC Provisioning Manager tool to adjust the Rx gain parameter.
- 40** Repeat steps 37 to 39 until the level measured meets the requirement.
- 41** Record the Rx gain setting on the Circuit Lineup Worksheet.
- 42** Disconnect the jack access connections and log out of the OPC.
- 43** Remove the test equipment.

—end—

## **Circuit lineup worksheet**

Use the following worksheet when performing the special services lineup procedures in this chapter.

Make one copy of this form for each circuit to be lined up.



SONET Products  
**AccessNode**

**Circuit Lineup Worksheet**

Page 1 of 3

---

AccessNode system: \_\_\_\_\_

Location names (A-Z): \_\_\_\_\_

Location type:  
(CO or remote) \_\_\_\_\_

CDS shelf number/  
slot number \_\_\_\_\_

---

Circuit number: \_\_\_\_\_

Circuit type (service): \_\_\_\_\_

Customer name: \_\_\_\_\_

Project: \_\_\_\_\_

COEO/Customer #: \_\_\_\_\_

---

Tested by: \_\_\_\_\_

Date: \_\_\_\_\_



<b>Circuit Lineup Worksheet (continued)</b>		page 2 of 3	
Circuit #: _____	Customer: _____	Tested by: _____	
Circuit type: _____	Date: _____		
AccessNode system: _____			
<b>Two-wire circuits</b>	<u>CO</u>	<u>RFT</u>	Customer <u>Access</u>
	_____	_____	_____
Location name: _____			
Equalization			
1004 Hz level: (dBm)	_____	Rx _____	Tx _____
404 Hz level: (dBm)	_____	Rx _____	Tx _____
2804 Hz level: (dBm)	_____	Rx _____	Tx _____
Equalization final setting: _____			
Gain			
Transmit gain (Tx gain): (dB)	_____	_____	_____
Receive gain (Rx gain): (dB)	_____	_____	_____
(A negative entry indicates attenuation.)			
End-to-end level			
Transmit gain (Tx gain): (dB)	_____	_____	_____
Receive gain (Rx gain): (dB)	_____	_____	_____
On-hook transmit gain (OHT Tx gain): (dB)	_____	_____	_____
On-hook receive gain (OHT Rx gain): (dB)	_____	_____	_____
Idle channel noise			
Noise level received     dBnc	_____	_____	_____



<b>Circuit Lineup Worksheet (continued)</b>	page 3 of 3		
Circuit #: _____ Circuit type: _____ AccessNode system: _____	Customer: _____ Date: _____	Tested by: _____	
<b>Four-wire circuits</b>	<u>CO</u>	<u>RFT</u>	<u>Customer Access</u>
Location name:	_____	_____	_____
Equalization			
1004 Hz level: (dBm)	_____	Rx_____	Tx_____
404 Hz level: (dBm)	_____	Rx_____	Tx_____
2004 Hz level: (dBm)	_____	Rx_____	Tx_____
2804 Hz level: (dBm)	_____	Rx_____	Tx_____
Difference comparison (dB)			
404 Hz level - 1004 Hz level =	_____	_____	_____
2004 Hz level - 1004 Hz level =	_____	_____	_____
2804 Hz level - 1004 Hz level =	_____	_____	_____
Equalization final settings: BW _____			
		SL _____	
		HT _____	
Gain			
Transmit gain (Tx gain): (dB)	_____	_____	_____
Receive gain (Rx gain): (dB)	_____	_____	_____
(A negative entry indicates attenuation.)			
End-to-end level			
Transmit gain (Tx gain): (dB)	_____	_____	_____
Receive gain (Rx gain): (dB)	_____	_____	_____
On-hook transmit gain (OHT Tx gain): (dB)	_____	_____	_____
On-hook receive gain (OHT Rx gain): (dB)	_____	_____	_____
Idle channel noise			
Noise level received dBnc	_____	_____	_____



---

## End-to-end performance tests for lines

---

This chapter has the procedures for end-to-end performance testing of new customer lines on an AccessNode universal system. Performance testing verifies that the new circuit operates from the central office to the remote fiber terminal (RFT) or customer premises. End-to-end tests are performed after line terminations are provisioned and the metallic loops are lined up.

If you are testing a special service circuit, be sure to perform the lineup procedures in Chapter 7, “Specials Lineup Manager tool,” before doing end-to-end performance tests.

Performance testing of universal (UDLC) circuits generally requires one technician at the fiber central office terminal (FCOT), and a second technician at the RFT or at the customer premises. DS1 tandem circuit tests are performed between the customer premises or RFT and the DS1 digital cross-connect panel.

### How to use this chapter

Perform the procedures starting on page 4-5, according to the process flow chart and the document task list in Chapter 1.

## Chapter contents

The following table lists the topics covered in this chapter. If you cannot successfully complete these procedures, contact your next level of support.

<b>Procedure</b>	<b>Topic</b>	<b>See</b>
4-1	Performing an end-to-end level test	page 4-5
4-2	Performing an idle-channel noise test	page 4-12
4-3	Performing a telephone call-through test	page 4-17
4-4	Performing a two-wire FX signaling test	page 4-21
4-5	Performing a 2-wire DPO/DPT signaling test	page 4-25
4-6	Performing a 2-wire DPO/DPT reverse battery wink test	page 4-28
4-7	Testing analog special services on DS1 tandem	page 4-31
4-8	Testing DDS (OCUDP) on DS1 tandem	page 4-36
4-9	Testing a DDS customer loop	page 4-44
4-10	Performing an end-to-end DDS test (FCOT to RFT)	page 4-49
4-11	Four-Wire FXS/FXO signaling test	page 4-56
4-12	DX signaling test	page 4-62
4-13	E&M and PLR signaling test	page 4-65
4-14	Troubleshooting problems encountered while testing	page 4-69

## Test equipment for end-to-end performance tests

Table 4-1 lists the test equipment for end-to-end tests.

**Table 4-1**  
**Test equipment**

Qty	Equipment	Details	Use for
1	network element user terminal, Digital Equipment Corporation VT100 or equivalent	includes RS-232C cable with a 25-pin D-subminiature male connector at the LCAP end	jack access and circuit provisioning during testing
2	voice frequency transmission test sets, Hewlett-Packard HP3551A or equivalent	includes frequency generator and receiver, and connecting cables (to bantam jacks on LCAP and to customer jack access panel)	level (dB) and idle-channel noise measurements
2	9361B Wiltron signaling test sets or equivalent		signaling tests
1	digital volt-ohm meter (DVM)	voltmeter + ohmmeter combination, plus bantam plug	reverse battery wink test (DPO/DPT)
1	Tekelec Chameleon 8000, or MC Fireberd 6000, or equivalent	test cords, for connecting test set to digital cross-connect	testing analog special services on DS1 tandem
1	Digital data test set, Hewlett-Packard 3787B, or equivalent	test cords, for connecting test set to digital cross-connect	testing DDS services on DS1 tandem
2	Data test unit, TPI 108/109RT, or equivalent	4 bantam test cords, for connecting to signal jacks, and 1 clock cord for connecting to the clock jack on the LCAP	testing DDS circuits at DS0 level (DS0DP)
1	DDS test set, TPI 95, or equivalent		testing DDS circuits (OCUDP)
1	Circuit Lineup Worksheet	Use a copy of the form in Chapter 3 of this document	circuit lineup results
1	electronic business set (EBS)		testing EBS on integrated application
2	500-type telephone set	bantam plugs, ground-start capability	connection to jack panel to test UVG, POTS, ground start or loop start
—continued—			

#### 4-4 End-to-end performance tests for lines

---

**Table 4-1 (continued)**  
**Test equipment**

<b>Qty</b>	<b>Equipment</b>	<b>Details</b>	<b>Use for</b>
4	310-to-bantam cable		to test FX, DPO, DX, E&M, PLR signaling
1	310-to-split cable		to test 4-wire FX signaling
1	bantam to split bantam cable		to test 4-wire FX signaling
—end—			

---

## Procedure 4-1

# Performing an end-to-end level test

---

Use this procedure to perform an end-to-end level test on an analog circuit in a universal AccessNode application. Perform this procedure on the following services:

- 2-wire: POTS, coin, UVG, FX, DPO/DPT, PLAR, MRD, TO, and ETO
- 4-wire: FX, DX, TO, and ETO
- 6/8-wire: E&M, PLR, TDM

For special services, the transmit and receive gain at the FCOT can be adjusted, if necessary, to meet the overall circuit requirements. No gain adjustment is possible for POTS, coin, and UVG services.

Use this procedure during initial installation of the circuit, or during maintenance. It is conducted between the fiber central office terminal (FCOT) and the customer premises with one technician at each site. An overall layout diagram is shown in Figure 4-1 on page 4-7.

If the second technician is located at the RFT instead of at the customer premises, then connect the test set to the line side metallic jacks on the RFT LCAP, and set up split metallic jack access. This approach is not detailed in this procedure.

**Note:** The measured level in POTS and UVG services may not represent the actual level due to interaction between the transmission test set hold circuit and the line card gain switching. The measured loss may be 2 to 3 dB higher than actual.

## Requirements

The following are preconditions to this test:

- loop lineup is completed according to the procedures in Chapter 3
- all system alarms are cleared



### **DANGER**

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

Read “Equipment cautions and warnings” on page 1-1 to minimize any risk to personnel and equipment.

—continued—

**4-6** End-to-end performance tests for lines

---

Procedure 4-1 (continued)

**Performing an end-to-end level test**

---

If you are testing a COIN service with floating positive battery and loop supervision at the FCOT, and terminating on a 5ESS switch, ensure that the ground reference bit is set on the 5ESS switch.

Obtain the impedance of the line cards under test from the service order. If necessary, see the table of service codes and their attributes (provisionable parameters) in *Line Card Provisioning Procedures*, 323-3001-315, in this volume, for service codes with provisionable impedance, or refer to the following list for service codes with fixed impedance:

POTSCT, POTSRT, COINCT, COINRT, MRD, UVGCT:	900 ohms
UVGRT, E&M, PLR, TDM:	600 ohms

The following equipment and material are required at the FCOT:

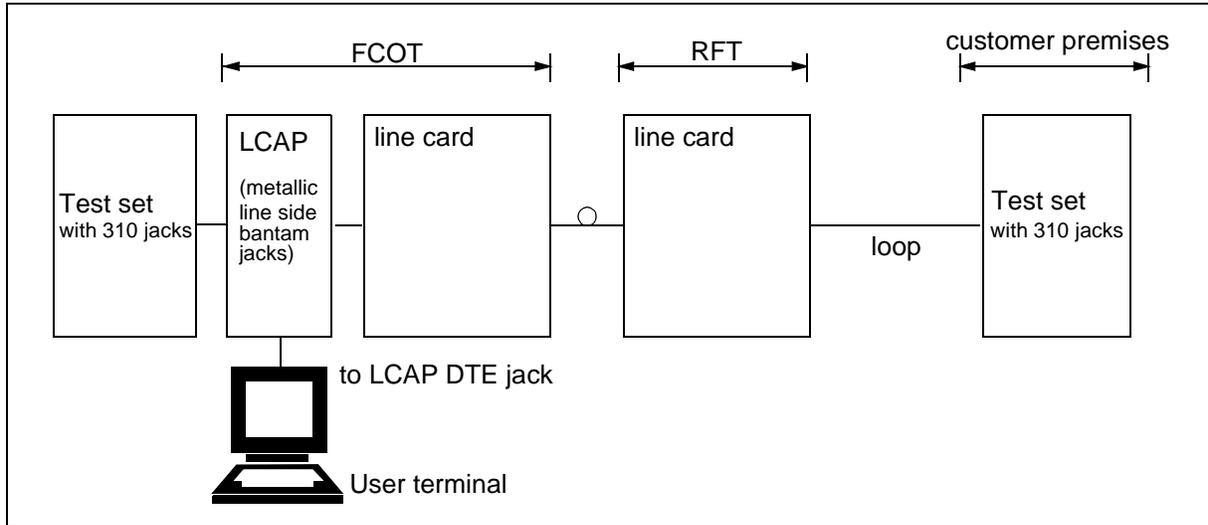
- 1 VT100-compatible user terminal, connected to the DTE port of the local craft access panel (LCAP)
- 1 VF transmission test set (HP3551A, or equivalent), and test cords (310 to bantam)
- Circuit Lineup Worksheet, as used in Chapter 3
- Customer Service Order

A VF transmission test set (HP3551A, or equivalent) and test cords (310 plug at one end) are required at the customer premises.

—continued—

Procedure 4-1 (continued)  
**Performing an end-to-end level test**

**Figure 4-1**  
**Setup for testing end-to-end level**



—continued—

4-8 End-to-end performance tests for lines

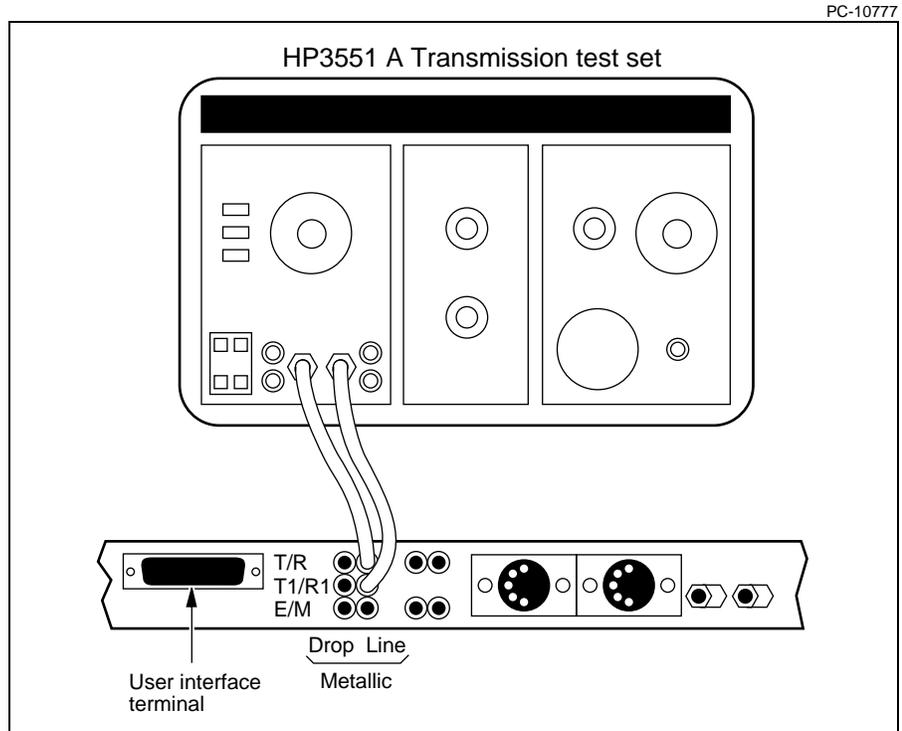
Procedure 4-1 (continued)

Performing an end-to-end level test

Action

Step Action

- 1 At the FCOT, connect the transmission test set to the LCAP jacks.  
A two-wire circuit requires a single test cord, from the output (Tx) jack of the test set to the metallic line T/R jack.  
For a four-wire circuit, connect a test cord from the output (Tx) jack of the test set to the T/R jack, and connect a second test cord from the T1/R1 jack to the input (Rx) jack of the test set. Refer to the following illustration.



**Note:** When plugging a test cord into the metallic jack on the LCAP at the FCOT, you might encounter up to a five-second delay before the transmission path between the FCOT and RFT is enabled again. This delay will not occur if the test equipment you are using is compatible with the battery-detection debounce feature. This feature restores the transmission path between the FCOT and the RFT almost immediately upon detection of loss of battery feed to the FCOT line card. Loss of office battery occurs, for example, when a split metallic jack access is set up at the FCOT. Compatible test equipment supplies office battery to the line card.

—continued—

## Procedure 4-1 (continued)

**Performing an end-to-end level test**

<b>Step</b>	<b>Action</b>
<b>2</b>	<p>At the customer premises, connect the transmission test set to the line. A two-wire circuit requires a single test cord, from the tip/ring pair to the input (Rx) jack of the test set.</p> <p>For a four-wire circuit, connect a test cord from the output (Tx) jack of the test set to the tip/ring (T/R) pair, and connect a second test cord from the T1/R1 pair to the input (Rx) jack of the test set.</p>
<b>3</b>	<p>At the sending end (FCOT, initially), set the controls of the test set as follows:</p> <p>output level: line card Tx TLP (from the service order)</p> <p>frequency: 1004 Hz</p> <p>hold coils: on</p> <p>receive mode: normal tone</p> <p>termination impedance: match the impedance of the FCOT line card (from the service order). For service codes with fixed impedance, see page 4-6.</p>
<b>4</b>	<p>At the receiving end (customer premises, initially), set the controls of the test set as follows:</p> <p>frequency: 1004 Hz</p> <p>hold coils: on</p> <p>receive mode: normal tone</p> <p>termination impedance: match the impedance of the RFT line card (from the service order). For service codes with fixed impedance, see page 4-6.</p>
<b>5</b>	<p>Log into the user interface of the FCOT. Use the procedure for logging in to the network element, and logging out, in <i>Network Element User Interface Description</i>, 323-3001-300, in <i>Operations, Administration, and Provisioning</i>, Volume 4A.</p>

—continued—

## 4-10 End-to-end performance tests for lines

---

Procedure 4-1 (continued)

### Performing an end-to-end level test

---

**Step Action**

---



#### **CAUTION**

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

Be sure that you are connecting the jack access to the correct line card. Otherwise you might interrupt service to another customer.

- 6** Set up split metallic jack access to the desired line card. Use Procedure 6-1, "Setting up metallic jack access" for initial setup, or use Procedure 6-6, "Connecting jack access to a different line card" if you are testing another line card.
- 7** On the test set at the customer premises, read the level received.  
*Requirement: customer Rx TLP from the service order.*
- 8** Save this jack access connection:  
**savequit** ↵
- 9** If level adjustment is not necessary, such as for POTS, COIN, and UVG services, skip to step 15.  
If level adjustment is necessary, then continue at step 10.

#### **Adjusting Tx level**

- 10** Quit to the command interpreter (CI):  
**quit all** ↵  
*The command interpreter prompt is displayed.*
- 11** Log in to the OPC by entering:  
**rlogin opc** ↵  
*The User Session Manager is displayed.*
- 12** Open the OPC Provisioning Manager tool.  
If necessary, refer to the procedure for opening an OPC tool in *OPC User Interface Description*, 323-3001-301, in *Operations, Administration, and Provisioning*, Volume 4A.
- 13** Select the circuit under test. Adjust the transmit gain at the FCOT to meet the level requirement.  
Use the procedure "Modifying universal or DS1 tandem circuit details," in *Line Card Provisioning Procedures*, 323-3001-315, in this volume.  
If the requirement cannot be met, perform Procedure 4-14, "Troubleshooting problems encountered while testing" on page 4-69.
- 14** Record the value for Tx gain on the Circuit Lineup Worksheet for the FCOT.

—continued—

---

 Procedure 4-1 (continued)

**Performing an end-to-end level test**


---

Step	Action
------	--------

**Measuring level in the opposite direction**

- |           |  |
|-----------|--|
| <b>15</b> | To measure the level in the opposite direction, make the customer premises the sending end, and the FCOT the receiving end, as follows: <ol style="list-style-type: none"> <li>a. At the FCOT, switch the transmission test set to receive mode, if required on your test set. Set the controls of the test set as in step 4, so that the FCOT becomes the receiving end.</li> <li>b. If this is a two-wire circuit, connect a single test cord from the LCAP metallic line-side T/R jack to the input (Rx) jack of the test set. If this is a four-wire circuit, then the test cords are already connected properly at the FCOT.</li> <li>c. At the customer premises, switch the transmission test set to transmit mode, if required on your test set. Set the controls of the test set as in step 3, so that it becomes the sending end.</li> <li>d. If this is a two-wire circuit, connect a single test cord from the output (Tx) jack of the test set to the tip/ring pair. If this is a four-wire circuit, then the test cords are already connected properly.</li> </ol> |
| <b>16</b> | On the test set at the FCOT, read the level received.<br><i>Requirement: FCOT Rx TLP from the service order.</i>   |
| <b>17</b> | If level adjustment is not necessary, such as for POTS, COIN, and UVG services, skip to step 21. If level adjustment is necessary, then continue at step 18.   |

**Adjusting Rx level**

- |           |  |
|-----------|--|
| <b>18</b> | Use the OPC Provisioning Manager tool to adjust the receive gain at the FCOT to meet the level requirement. Use the procedure "Modifying universal or DS1 tandem circuit details" in <i>Line Card Provisioning Procedures</i> , 323-3001-315.<br><br>If the requirement cannot be met, perform Procedure 4-14, "Troubleshooting problems encountered while testing," on page 4-69. |
| <b>19</b> | Record the value for Rx gain on the Circuit Lineup Worksheet for the FCOT.   |
| <b>20</b> | Close the OPC Provisioning Manager tool and log out of the OPC user interface.   |
| <b>21</b> | Resume the jack access session. If necessary, see Procedure 6-7, "Saving or terminating a jack access session," on page 6-41.  |
| <b>22</b> | Repeat this procedure from step 2, for each new line to the same customer premises.  |
| <b>23</b> | Remove the test equipment, and terminate the jack access session. If necessary, refer to Procedure 6-7, "Saving or terminating a jack access session" on page 6-41.  |

*The user interface session terminates.*

—end—

## Procedure 4-2

# Performing an idle-channel noise test

---

Use this procedure to perform an idle-channel noise test on an analog circuit in a universal AccessNode application. Perform this procedure on the following services:

- 2-wire: POTS, coin, UVG, FX, DPO/DPT, PLAR, MRD, TO, and ETO
- 4-wire: FX, DX, TO, and ETO
- 6/8-wire: E&M, PLR, TDM

Use this procedure during initial installation of the line, or during maintenance. It is conducted between the fiber central office terminal (FCOT) and the customer premises, with one technician at each site.

### Requirements

The following are preconditions to this test:

- The line card is installed and the circuit is fully provisioned.
- All system alarms are cleared.

The following equipment is required at the FCOT:

- 1 VT100-compatible user terminal, connected to the DTE port of the local craft access panel (LCAP)
- 1 VF transmission test set (HP3551A, or equivalent), and test cords (310 to bantam)
- Circuit Lineup Worksheet, as used in Chapter 3

A VF transmission test set (HP3551A, or equivalent) and test cord (310 plug at one end) are required at the customer premises.



#### **DANGER**

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

Read “Equipment cautions and warnings” on page 1-1 to minimize any risk to personnel and equipment.

—continued—

---

Procedure 4-2 (continued)

**Performing an idle-channel noise test**

---

**Action**

---

<b>Step</b>	<b>Action</b>
1	<p>At the FCOT, connect the transmission test set to the LCAP jacks, as shown in Figure 4-2.</p> <p>For a four-wire circuit, connect a test cord from the input (Rx) of the test set to the metallic line T1/R1 jack.</p> <p>For a two-wire circuit, connect a test cord from the input (Rx) of the test set to the metallic line T/R jack.</p> <p><b>Note:</b> When plugging a test cord into the metallic jack on the LCAP at the FCOT, you might encounter up to a five-second delay before the transmission path between the FCOT and RFT is enabled again. This delay will not occur if the test equipment you are using is compatible with the battery-detection debounce feature. This feature restores the transmission path between the FCOT and the RFT almost immediately upon detection of loss of battery feed to the FCOT line card. Loss of office battery occurs, for example, when a split metallic jack access is set up at the FCOT. Compatible test equipment supplies office battery to the line card.</p>

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—continued—

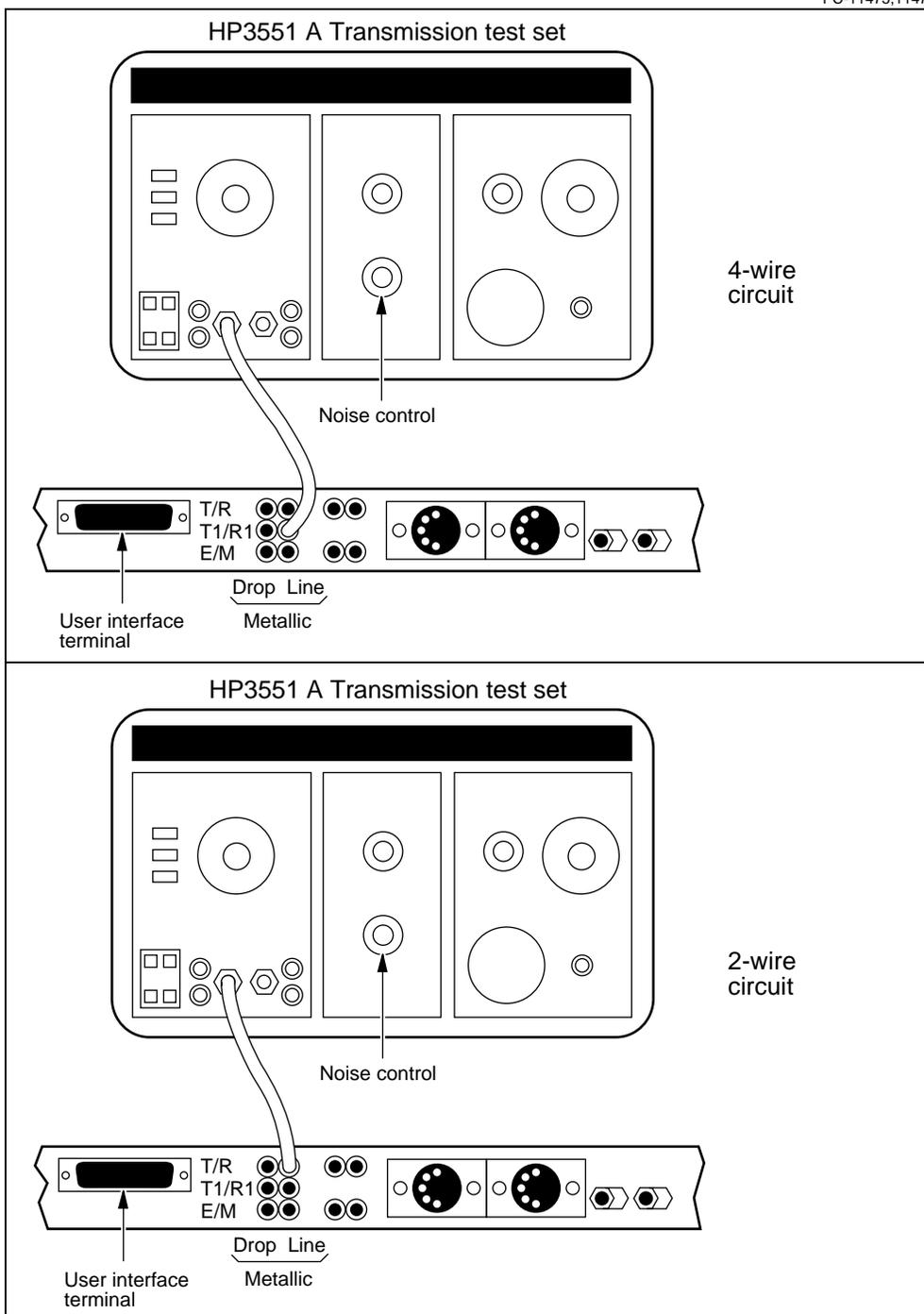
4-14 End-to-end performance tests for lines

Procedure 4-2 (continued)

Performing an idle-channel noise test

Figure 4-2  
Connecting a test set to the LCAP

PC-11475,11474

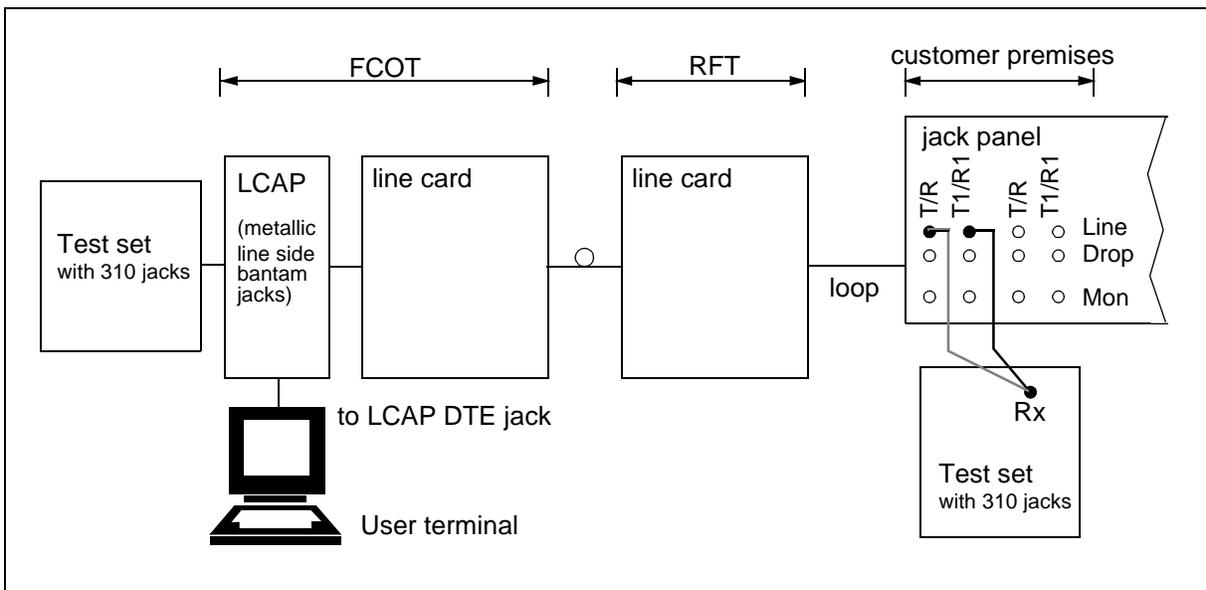


—continued—

Procedure 4-2 (continued)  
**Performing an idle-channel noise test**

Step	Action
2	<p>At the customer premises, connect the transmission test set to the line.</p> <p>If this is a four-wire circuit, connect a cord from the T1/R1 Line jack to the input (Rx) jack on the test set, as shown with a solid line in Figure 4-3.</p> <p>If this is a two-wire circuit, connect a cord from the T/R Line jack to the input (Rx) jack on the test set, as shown with a dashed line in Figure 4-3.</p>

**Figure 4-3**  
**Layout for idle-channel noise test (four-wire circuit)**



- 3 Log into the user interface of the FCOT. Use the procedure “Logging in to the network element, and logging out,” in *Line Card Provisioning Procedures*, 323-3001-315, in this volume.
- 4 Set up split metallic jack access to the desired line card. Use Procedure 6-1, “Setting up metallic jack access” for initial setup, or use Procedure 6-6, “Connecting jack access to a different line card” if you are testing another line card.



**CAUTION**  
**Risk of service interruption**  
 Be sure that you are connecting the jack access to the correct line card. Otherwise you might interrupt service to another customer.

—continued—

4-16 End-to-end performance tests for lines

---

Procedure 4-2 (continued)

**Performing an idle-channel noise test**

---

<b>Step</b>	<b>Action</b>
<b>5</b>	At the FCOT, set the controls of the test set as follows:  mode: receive mode  noise control: message circuit noise  termination impedance match the impedance of the FCOT line card (from the service order). For service codes with fixed impedance, see page 4-6.
<b>6</b>	At the customer premises, set the controls of the test set as follows:  mode: receive mode  noise control: message circuit noise  hold coils on  termination impedance match the impedance of the RFT line card (from the service order). For service codes with fixed impedance, see page 4-6.
<b>7</b>	On the test set at the FCOT, read the noise level. <i>Requirement: less than 20 dBrc</i> If the requirement cannot be met, perform Procedure 4-14, "Troubleshooting problems encountered while testing" on page 4-69, and repeat this step.
<b>8</b>	Record the final idle-channel noise level on the Circuit Lineup Worksheet.
<b>9</b>	Repeat steps 7 to 8 at the customer premises.
<b>10</b>	Repeat steps 4 to 9 for each new line at the same customer premises.
<b>11</b>	Disconnect the jack access connections at the FCOT, by entering: <b>logout ↵</b> <i>If you entered this command from within a jack access screen, then the jack access is disconnected from the line under test. The user interface session terminates.</i>
<b>12</b>	Remove the test equipment at each location.

—end—

---

## Procedure 4-3

# Performing a telephone call-through test

---

Use this procedure to perform a call-through test on a new UDLC line in an AccessNode system. Use this procedure during initial installation of a new line or during maintenance.

For locally switched services (POTS, COIN, or UVG), tests are performed between a phone terminated on a switch at the central office and a phone at the remote fiber terminal (RFT), with one technician at each site. (Alternatively, one technician can perform this test at the RFT if there is another existing line termination, or if the orderwire has a dialable connection to the public switched telephone network.)

**Note:** If this is a coin line, test it using local procedures. In lieu of local procedures, use the procedure suggested here.

With minor variation, this test can be used for certain nonswitched services (MRD and PLAR). Tests are performed between a phone terminated on the FCOT and a phone at the remote fiber terminal (RFT), with one technician at each site. In the case of PLAR, the far end rings as soon as the near end goes off-hook, with no dialing necessary. In the case of MRD, a telephone set with a ground-start button is required at the calling end (at each end, if the service is two-way originating) so that the calling end can manually apply ringing to the called end.

## Requirements

The following are preconditions to this test:

- The AccessNode line cards are installed at the FCOT and the RFT, and the circuits are fully provisioned.
- The two lines used in the test are terminated on a switch that is ready for service or in-service, and a directory number has been assigned to each line (not applicable to MRD and PLAR).
- All system alarms are cleared.

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

Read "Equipment cautions and warnings" on page 1-1 to minimize any risk to personnel and equipment.

—continued—

Procedure 4-3 (continued)

**Performing a telephone call-through test**

The following equipment is required:

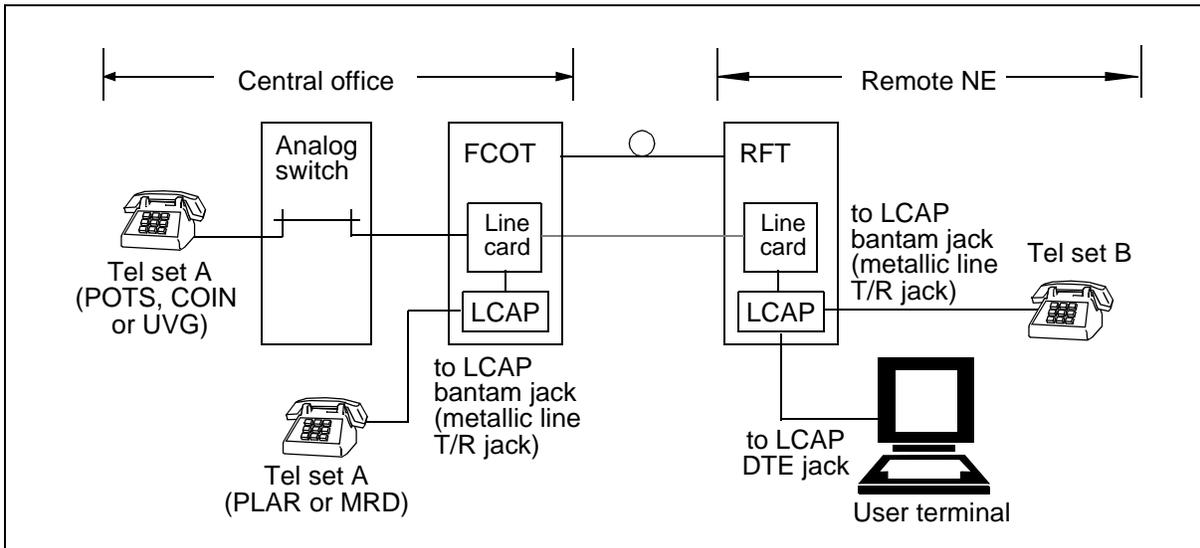
- 1 VT100-compatible user terminal, connected to the DTE port on the local craft access panel (LCAP) at the RFT
- to test POTS or UVG: two telephone sets (one must be a 500-type set equipped with bantam plugs, for connection to the LCAP at the RFT)
- to test an MRD line: two telephone sets with ground-start capability
- to test COIN: one coin telephone set, and coins at the RFT

**Action**

Step	Action
1	At the RFT, connect a telephone set equipped with bantam jacks by plugging into the drop metallic T/R jack on the LCAP, as indicated in Figure 4-4.
2	At the central office, connect a second telephone to another line terminated on the switch, such as a test line. If this is a PLAR or MRD service, connect the telephone set to the FCOT LCAP.

**Note:** For testing purposes, designate the telephone set at the central office as set A. Designate the telephone set at the remote network element as set B, as shown in Figure 4-4.

**Figure 4-4**  
Call-through test on a universal circuit



—continued—

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 Procedure 4-3 (continued)

**Performing a telephone call-through test**


---

Step	Action
3	At the remote network element, log in to the user interface. (Use the procedure for logging in to the network element in <i>Network Element User Interface Description</i> , 323-3001-300, in <i>Operations, Administration, and Provisioning</i> , Volume 4A.)
4	Set up bridged metallic access to the desired line card.  As appropriate, refer to Procedure 6-1, "Setting up metallic jack access" on page 6-9, or Procedure 6-6, "Connecting jack access to a different line card" on page 6-39.
5	If this is a PLAR or MRD service, use the RLOGIN command to log into the FCOT. (If necessary, refer to the procedure for logging in to the far-end network element, in <i>Network Element User Interface Description</i> , 323-3001-300, in <i>Operations, Administration, and Provisioning</i> , Volume 4A.)  Set up bridged metallic access to the desired line card at the FCOT, as explained in step 4 for the RFT.
6	Check for proper operation of dial tone, dialing, ringback tone, ringing, and answer supervision, as well as proper talk path quality, in one direction of the circuit, as described in the substeps below:  <b>Note:</b> If this is a coin line, insert a coin at the appropriate step: Dialtone-first type: insert the coin before substep b. Semi-postpay type: insert the coin before substep d. Coin-first type: insert the coin after substep a. (in order to receive the dialtone response)  a. Place set A off-hook. <i>Dial tone is heard at set A.</i>  b. Set A dials set B. <i>Set A hears ringback tone. Set B rings.</i>  c. Answer set B (set B goes off-hook). <i>At set A, ringback tone stops and the voice path is connected. At set B, ringing stops and the voice path is connected.</i>  d. Verify voice path continuity, and subjective voice quality, in both directions.  e. Place set B on-hook, then place set A on-hook.
7	Repeat step 6 in the other direction, originating a call from set B.  If the requirement cannot be met, perform Procedure 4-14, "Troubleshooting problems encountered while testing" on page 4-69, and repeat the test.

—continued—

4-20 End-to-end performance tests for lines

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Procedure 4-3 (continued)

**Performing a telephone call-through test**

---

<b>Step</b>	<b>Action</b>
<b>8</b>	Repeat steps 4 to 7 for all other services of this type on the AccessNode.
<b>9</b>	If this is a PLAR or MRD service, disconnect the jack access session and terminate the user interface session at the FCOT. (If necessary, refer to Procedure 6-7, "Saving or terminating a jack access session" on page 6-41 in this document, and the procedure for logging out of the far-end network element, in <i>Network Element User Interface Description</i> , 323-3001-300, in <i>Operations, Administration, and Provisioning</i> , Volume 4A.) <i>The jack access is disconnected from the line under test. The user interface session terminates.</i>
<b>10</b>	At the RFT, disconnect the jack access connections and terminate the user interface session. (If necessary, refer to Procedure 6-7, "Saving or terminating a jack access session" on page 6-41, in this document, and the procedure for logging out of the far-end network element, in <i>Network Element User Interface Description</i> , 323-3001-300, in <i>Operations, Administration, and Provisioning</i> , Volume 4A.) <i>The jack access is disconnected from the line under test. The user interface session terminates.</i>
<b>11</b>	At the RFT (and FCOT, if this is a PLAR or MRD service), remove the telephone set plugged in to the jack panel.

—end—

---

## Procedure 4-4

# Performing a two-wire FX signaling test

---

Use this procedure to test signaling on an FX line in an AccessNode system. It applies to universal circuits.

Use this procedure during initial installation of a new line, or during maintenance. Two tests are performed, with one technician at the central office, and a second technician at the customer premises. The first test uses signaling test sets to test FXS origination and takedown. The second test uses telephone sets to test FXO origination and takedown.

### Requirements

The AccessNode is connected to a switch. All AccessNode alarms are cleared.

Equipment required at the customer premises (FXS end) includes:

- 1 500-type or equivalent telephone set
- 1 310-to-bantam cable
- 1 9361B Wiltron signaling test set or equivalent, with test cord

Equipment required at the fiber central office terminal (FXO end) includes:

- 1 500-type or equivalent telephone line from the CO with a directory number
- 1 310-to-bantam cable
- 1 9361B Wiltron signaling test set or equivalent
- 1 VT100-compatible terminal, connected to the LCAP

—continued—

Procedure 4-4 (continued)

**Performing a two-wire FX signaling test**

**Action**

Step	Action
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**Signaling test with FXS origination and takedown**

1 At the customer premises (FXS end), set up the signaling test set as follows:

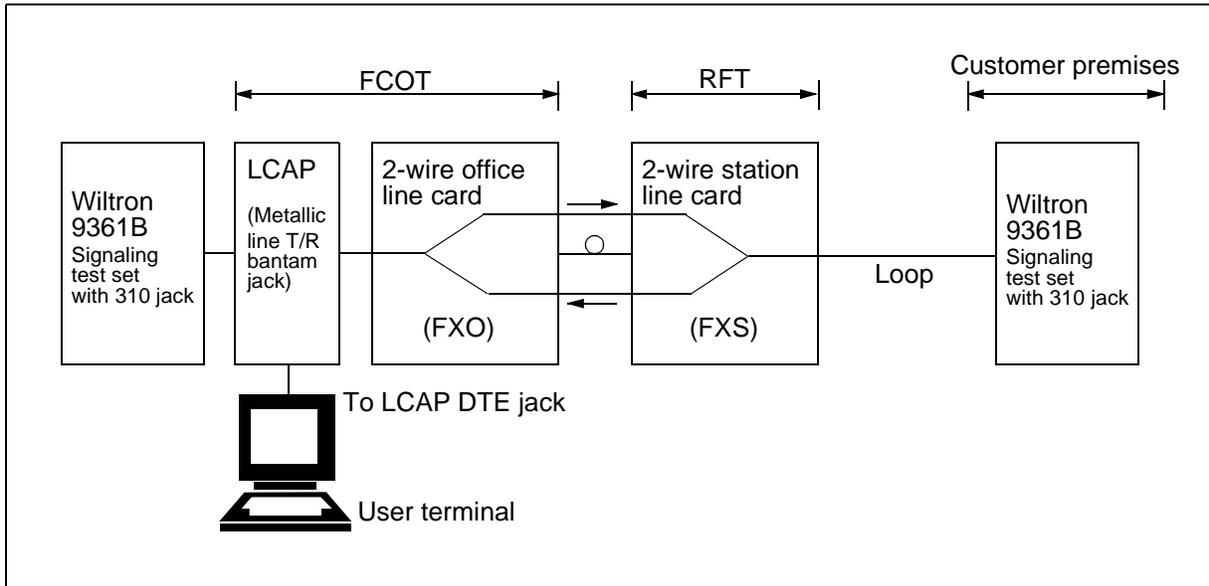
Send	loop
PPS	10 pps
% Break	64%
On-Hook	

2 At the FXO end, set up the signaling test set as follows:

Receive	Loop B&G
RCV Input	Term or S-R

3 At the FCOT, use the 310-to-bantam cable to connect the signaling test set to the metallic line T/R jack, as shown in Figure 4-5.

**Figure 4-5  
FXS/FXO signaling test (FXS origination and takedown)**



—continued—

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 Procedure 4-4 (continued)

**Performing a two-wire FX signaling test**


---

Step	Action
4	At the customer premises, connect the signaling test set to the line.
5	At the FCOT, log in to the network element user interface. (Use the procedure for logging in to the network element in <i>Network Element User Interface Description</i> , 323-3001-300, in <i>Operations, Administration, and Provisioning</i> , Volume 4A.)
6	Set up metallic jack access, in split mode, to the desired line card. (Use Procedure 6-1, "Setting up metallic jack access.")
7	At the FXS end, press the <b>GND START</b> button on the signaling test set.
8	At the FXS end, push the <b>Off-hook</b> button before releasing the GND START button.
9	Press the <b>Dial digit</b> button to dial the FXO end.
10	On the signaling test set at the FXO end, check the pulses per second (PPS), the % Break, and the pulses counted.  <i>Requirement: Received PPS = 10, % Break = 64% ± 4%, pulses counted = digits dialed.</i>  If the requirement cannot be met, perform Procedure 4-14, "Troubleshooting problems encountered while testing," and repeat the tests.
11	At the FXS end, set the signaling test set on-hook.
12	At the FXO end, remove the bantam plug.
13	At the FCOT, disconnect the metallic jack access set up in step 6. From within the jack access screen, enter:  <b>logout ↵</b>  <i>If you entered this command from within a jack access screen, then the jack access is disconnected from the line under test. The user interface session terminates.</i>
14	Remove the signaling test sets.

—continued—

4-24 End-to-end performance tests for lines

Procedure 4-4 (continued)

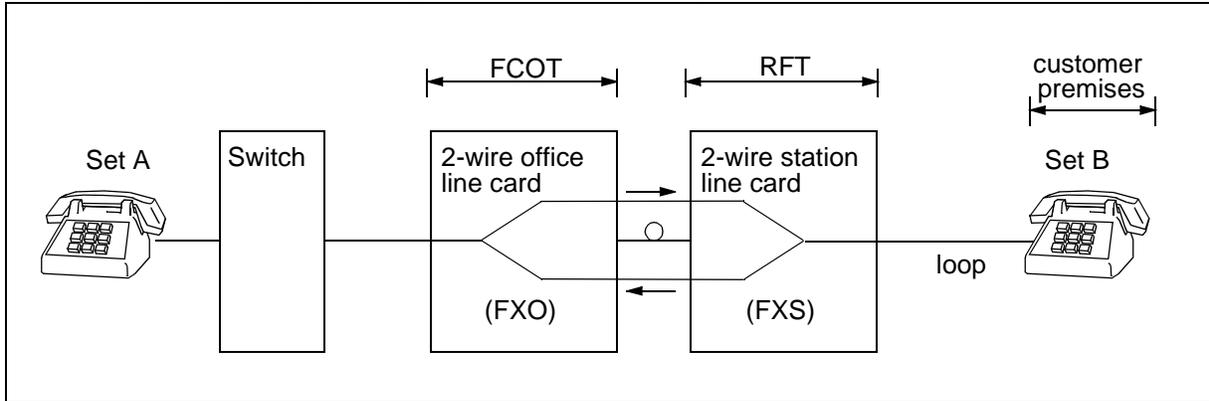
**Performing a two-wire FX signaling test**

**Step Action**

**Signaling test with FXO origination and takedown**

- 15 At the customer premises, connect the telephone set to the line, as indicated in Figure 4-6.
- 16 At the central office, obtain a 500-type telephone set connected to the switch. For purposes of this test, telephone set A is at the central office, and telephone set B is at the customer premises.
- 17 From set A at the CO, call set B at the customer premises.  
*Requirement: Telephone set A hears ringback tone. Telephone set B rings.*
- 18 Go off-hook at telephone set B.  
*Requirement: Ring tripped at telephone set B. Ringback tone is no longer heard at telephone set A.*
- 19 Go on-hook at telephone set A.  
If the requirement cannot be met, perform Procedure 4-14, "Troubleshooting problems encountered while testing" on page 4-69, and repeat the tests.
- 20 At the FCOT and the customer premises, remove the test equipment.

**Figure 4-6  
FXS/FXO signaling test (FXO origination and takedown)**



—end—

## Procedure 4-5

# Performing a 2-wire DPO/DPT signaling test

Use this procedure to test signaling on a dial pulse originating (DPO) / dial pulse terminating (DPT) circuit in an AccessNode system. It applies to universal circuits only.

Use this procedure during initial installation of a new line, or during maintenance.

### Requirements

All system alarms are cleared.

This test requires one technician at the central office, and a second technician at the customer premises.

Equipment required at the customer premises (DPT end) includes:

- test cord
- 1 9361B Wiltron signaling test set or equivalent

Equipment required at the FCOT (DPO end) includes:

- 1 310-to-bantam cable
- 1 9361B Wiltron signaling test set or equivalent

### Action

Step	Action								
1	At the DPO end (FCOT), set up the signaling test set as follows: <table border="0" style="margin-left: 20px;"> <tr> <td>Send</td> <td>loop</td> </tr> <tr> <td>PPS</td> <td>10 pps</td> </tr> <tr> <td>% Break</td> <td>64%</td> </tr> <tr> <td>On-Hook</td> <td></td> </tr> </table>	Send	loop	PPS	10 pps	% Break	64%	On-Hook	
Send	loop								
PPS	10 pps								
% Break	64%								
On-Hook									
2	At the DPT end (customer premises), set up the signaling test set as follows: <table border="0" style="margin-left: 20px;"> <tr> <td>Receive</td> <td>Loop B&amp;G</td> </tr> <tr> <td>RCV Input</td> <td>Term or S-R</td> </tr> </table>	Receive	Loop B&G	RCV Input	Term or S-R				
Receive	Loop B&G								
RCV Input	Term or S-R								

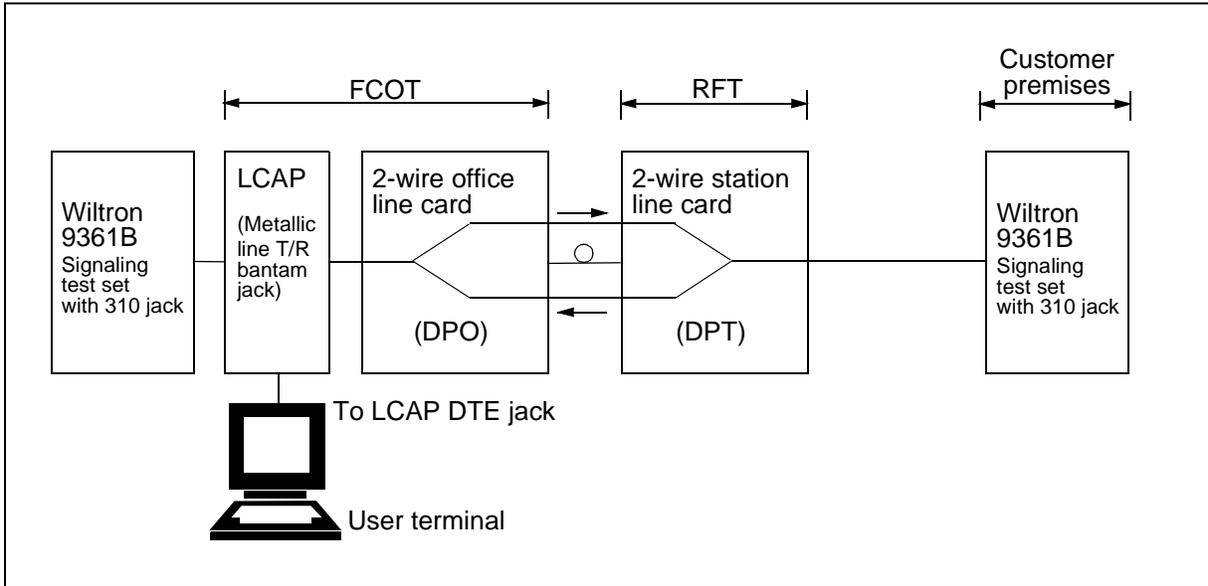
—continued—

Procedure 4-5 (continued)

**Performing a 2-wire DPO/DPT signaling test**

Step	Action
3	At the FCOT, use the 310-to-bantam cable to connect the signaling test set to the metallic line T/R jack, as shown in Figure 4-7.
4	At the customer premises, connect the signaling test set to the line.
5	At the FCOT, log in to the network element user interface. (Use the procedure for logging in to the network element in <i>Network Element User Interface Description</i> , 323-3001-300, in <i>Operations, Administration, and Provisioning</i> , Volume 4A.)
6	Set up metallic jack access, in split mode, to the desired line card. (Use Procedure 6-1, "Setting up metallic jack access" on page 6-9.)

**Figure 4-7**  
**DPO/DPT signaling test (DPO origination and takedown)**



- 7 At the DPO end, push the **Off-hook** button.
- 8 At the DPO end, press the **Dial digit** button to dial the DPT end.

—continued—

---

Procedure 4-5 (continued)

**Performing a 2-wire DPO/DPT signaling test**

---

<b>Step</b>	<b>Action</b>
<b>9</b>	<p>On the signaling test set at the DPT end, check the pulses per second (PPS), the % Break, and the pulses counted.</p> <p><i>Requirement: Received PPS = 10, % Break = 64% ± 4%, pulses counted = digits dialed.</i></p> <p>If the requirement cannot be met, perform Procedure 4-14, "Troubleshooting problems encountered while testing" on page 4-69, and repeat the tests.</p>
<b>10</b>	<p>At the DPO end, set the signaling test set on-hook.</p>
<b>11</b>	<p>At the DPT end, remove the bantam plug.</p>
<b>12</b>	<p>Repeat steps 7 through 11 to make sure that call takedown originated by the DPO works correctly.</p>
<b>13</b>	<p>Remove the signaling test set at the DPT end.</p>
<b>14</b>	<p>If you are going to perform the reverse battery wink test now, go to the next procedure. If not, continue at step 15.</p>
<b>15</b>	<p>Remove the signaling test set at the customer premises.</p>
<b>16</b>	<p>At the FCOT, disconnect the jack access set up in step 6. From within the jack access screen, enter:</p> <p><b>logout ↵</b></p> <p><i>If you entered this command from within a jack access screen, then the jack access is disconnected from the line under test. The user interface session terminates.</i></p>

—end—

## Procedure 4-6

# Performing a 2-wire DPO/DPT reverse battery wink test

---

Use this procedure to perform the reverse battery wink test signaling a dial pulse originating (DPO) or dial pulse terminating (DPT) circuit in an AccessNode system. It applies to universal circuits only.

Use this procedure during initial installation of a new line, or during maintenance.

### Requirements

All system alarms are cleared.

This test requires one technician at the central office, and a second technician at the customer premises.

Equipment required at the customer premises (DPT end) includes:

- 9361B Wiltron signaling test set or equivalent
- 1 test cord

Equipment required at the FCOT (DPO end) includes:

- 1 Digital voltmeter (DVM) and 600-ohm resistor, 2 Watt or greater
- 1 cable with bantam plug on one end and connection to the DVM on the other end

### Action

---

Step	Action
1	At the FCOT, log in to the network element user interface. (Use the procedure for logging in to the network element in <i>Network Element User Interface Description</i> , 323-3001-300, in <i>Operations, Administration, and Provisioning</i> , Volume 4A.)
2	At the FCOT, locate the test card with the bantam jack and connect the 600 $\Omega$ resistor and DVM across the tip and ring conductors at the other end of it. Set the DVM to read DC Volts at 100 Volts or greater. This test card with 600 $\Omega$ termination will be used later to simulate a CO off-hook into the DPO located in the FCOT.

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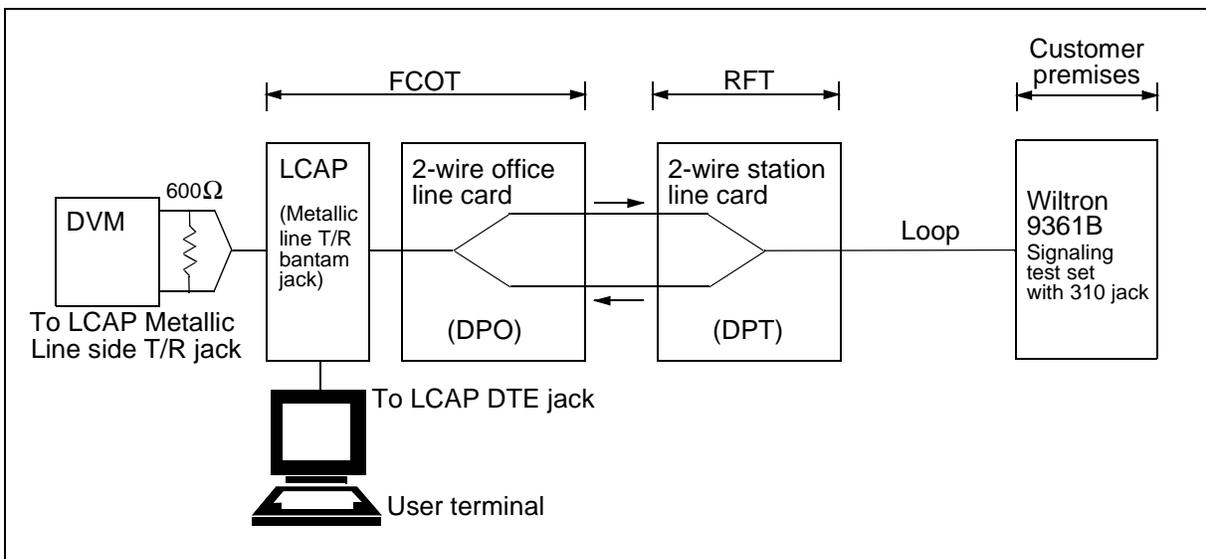
—continued—

Procedure 4-6 (continued)

**Performing a 2-wire DPO/DPT reverse battery wink test**

Step	Action
3	At the FCOT, set up metallic jack access in split mode for the line card under test. (See Figure 4-8.) If necessary, refer to the procedure, "Setting up metallic jack access" on page 6-9.
4	At the customer premises, connect the tip and ring of the DPT line card under test to the RECEIVE input on the 9861B Wiltron test set. Set up the test set as follows: <ul style="list-style-type: none"> <li>• press Receive Loop/B&amp;G</li> <li>• release T/R Rev (Receive Input)</li> <li>• press A-Relay (Receive Input)</li> <li>• press Power</li> </ul> <p><b>Note:</b> The 9361B test set Send functions are not used for this test.</p>

**Figure 4-8**  
DPO/DPT reverse battery wink test



—continued—

## 4-30 End-to-end performance tests for lines

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Procedure 4-6 (continued)

### Performing a 2-wire DPO/DPT reverse battery wink test

---

Step	Action
5	At the customer premises, verify that the RECEIVE ON HK LED is not lit. This indicates that the FCOT DPO is detecting CO on-hook and sending the on-hook status to the RFT DPT.
6	At the FCOT, plug the test card which is connected to the 600 $\Omega$ resistor and DVM into the metallic line side T/R jack on the LCAP. This will simulate a CO off-hook into the FCOT DPO. Record the DC voltage and polarity. It should be less than -48V DC if the DPO line is detecting off-hook.
7	At the customer premises, verify that the RECEIVE ON HK LED is lit. This will indicate that the FCOT DPO is sending off-hook to the RFT DPT.
8	At the customer premises, press T/R REV on the test set. This will send reverse battery to the RFT DPT to simulate a customer off-hook or start of wink at the FCOT DPO.
9	At the FCOT, verify that the polarity of the voltage indicated by the DVM has reversed. This indicates that the FCOT DPO is receiving the reverse battery (off-hook or start of wink) from the RFT DPT.
10	At the customer premises, release T/R REV. This sends normal battery to the RFT DPT to simulate a customer on-hook or end of wink at the FCOT DPO.
11	At the FCOT, verify that the polarity of the voltage indicated by the DVM has reversed back to normal battery. This indicates that the FCOT DPO is receiving the normal battery (on-hook or end of wink) from the RFT DPT.
12	If the requirement cannot be met, perform Procedure 4-14, "Troubleshooting problems encountered while testing" on page 4-69.
13	Remove the test equipment at each end.
14	At the FCOT, disconnect the jack access set up in step 3. From within the jack access screen, enter: <b>logout</b> ↵ <i>If you entered this command from within a jack access screen, then the jack access is disconnected from the line under test. The user interface session terminates.</i>

—end—

---

## Procedure 4-7

# Testing analog special services on DS1 tandem

---

Use this procedure to test an analog special service circuit on DS1 Tandem, in an AccessNode system. This test verifies line card provisioning and circuit integrity. The test is conducted between the digital cross-connect panel and the customer premises.

In a point-to-point or single-ended system, the digital cross-connect panel is at the central office. In a DS1-fed AccessNode (DFA) system, test access to the digital signal can be at the central office or at the remote fiber terminal.

Perform this procedure on the following services:

- 2-wire: FX, DPO/DPT, TO, ETO, MRD, PLAR
- 4-wire: FX, DX, TO, and ETO
- 6/8-wire: E&M, PLR, and TDM

Use this procedure during initial installation of a new line, or during maintenance.

## Requirements

All system alarms are cleared.

The line card is installed and the circuit is fully provisioned, including the DS0 channel.

This test requires one technician at the central office, equipped with a DS1 test set (TTC Fireberd 6000 or Tekelec Chameleon 8000 or equivalent) and test cords. Also required is a user terminal connected to the OPC. A second technician is required at the customer premises, equipped with a VF transmission test set (HP3551A, or equivalent) and test cords (310 plug at one end).

—continued—

Procedure 4-7 (continued)

**Testing analog special services on DS1 tandem**

**Action**

<b>Step</b>	<b>Action</b>
1	Log in to the OPC and use the Provisioning Manager tool to determine which DS1 and which channel carries the circuit under test.
2	Set up the DS1 test set to match the provisioning of the DS1/VT mapper card and the line card termination. Verify if the provisioning is as follows:  frame format            superframe  line coding            AMI or B8ZS  yellow alarm           bit two, for superframe  signaling bits        yes, for type FX, DPO/DPT, DX, E&M, PLR, TDM, MRD, or PLAR  signaling bits        no, if circuit is TO or ETO

**Send from digital cross-connect**

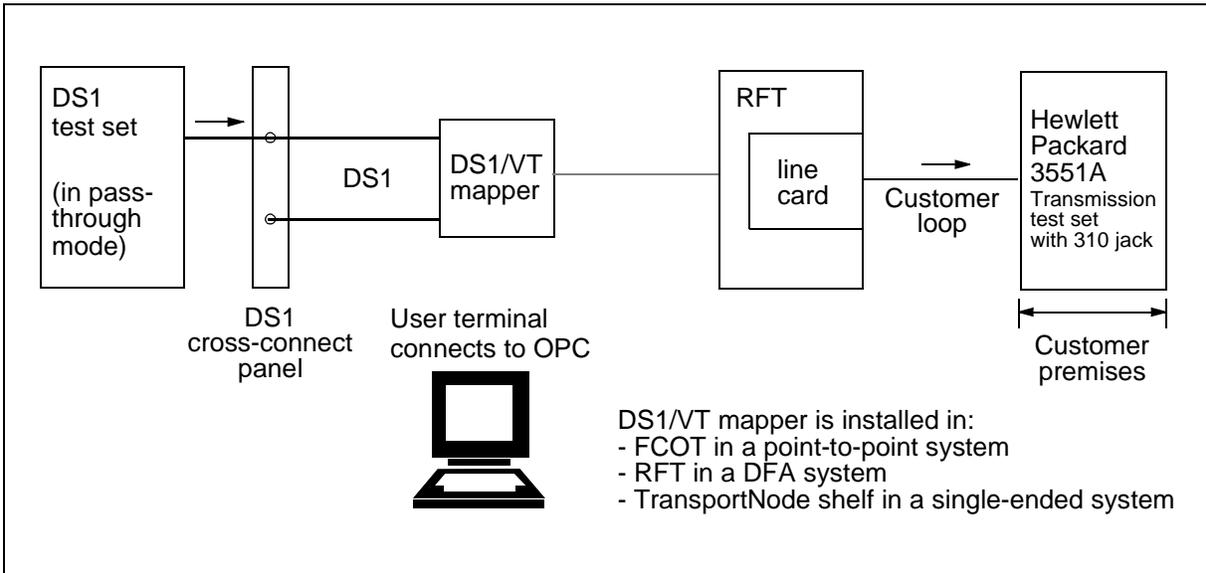
3	To send data, set up the DS1 test set as follows:  mode                    pass-through (23 channels pass through, one channel will be manipulated)  channel                select the channel # for the circuit under test  frequency            1004 Hz  level                    0 dBm  signaling bits        select the call-setup AB signal code from on page 6-29, that applies to the provisioned service (not applicable to TO and ETO)
4	At the digital cross-connect panel, connect the test cord between the transmit jack of the DS1 test set and the send jack (towards the customer premises) of the DS1 carrying the circuit under test. The test setup is shown in Figure 4-9.
5	At the customer premises, set up the transmission test set as follows:  frequency            1004 Hz  input impedance    600 ohms, balanced, terminating  receive mode        normal tone  hold coils            on

—continued—

Procedure 4-7 (continued)

**Testing analog special services on DS1 tandem**

Step	Action
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**Figure 4-9****Testing analog circuits on DS1 tandem, sending from the DS1 cross-connect panel**

- 6 Connect the transmission test set to the line.
- 7 Verify that the signal is received at the customer premises.  
If the requirement cannot be met, perform Procedure 4-14, "Troubleshooting problems encountered while testing," and repeat this step.
- 8 If this circuit is TO or ETO service, skip to step 12. If this circuit is not TO or ETO, continue at step 9.

**Signaling from the digital end**

- 9 To check signaling from the digital end, toggle the A and B bits on the DS1 test set to send a signal. (Use Table 6-4 on page 6-28 for a listing of the signaling codes that apply to each service.)
- 10 Log in to the network element user interface at the RFT. (Use the procedure for logging in to the network element in *Network Element User Interface Description*, 323-3001-300, in *Operations, Administration, and Provisioning*, Volume 4A.)
- 11 Verify the signaling bits received by the RFT line card. (Use Procedure 6-4, "Using signaling control in 0TLP jack access" on page 6-24.)  
If the requirement cannot be met, perform Procedure 4-14, "Troubleshooting problems encountered while testing" on page 4-69, and repeat this step.

—continued—

**4-34** End-to-end performance tests for lines

Procedure 4-7 (continued)

**Testing analog special services on DS1 tandem**

**Step Action**

**Send from customer premises**

**12** At the customer premises, set up the transmission test set as follows:

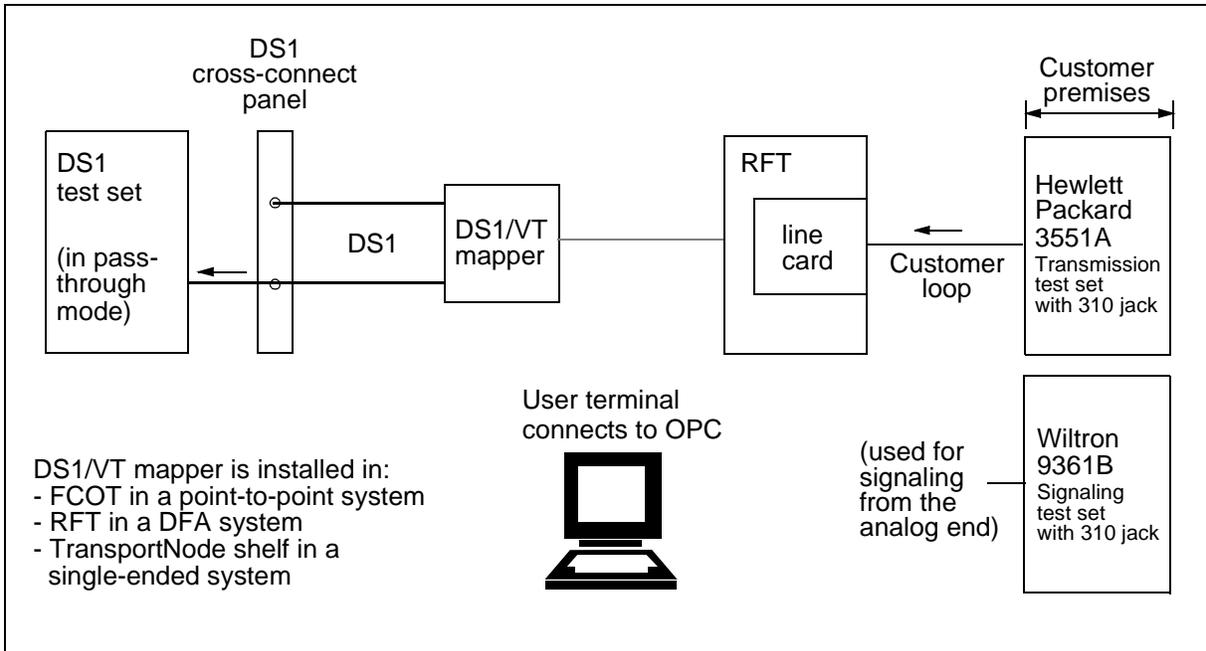
- output level            customer Tx TLP (from the service order)
- frequency             1004 Hz
- impedance             600 ohms, balanced
- transmit mode        normal tone
- hold coils             ON

**13** At the digital cross-connect panel, set the DS1 test set as follows, for the channel already selected:

- mode                    mon-thru (for a high-impedance connection)

**14** Set up the test equipment as shown in Figure 4-10.

**Figure 4-10**  
**Testing analog circuits on DS1 tandem, sending from the customer premises**



—continued—

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 Procedure 4-7 (continued)

**Testing analog special services on DS1 tandem**


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Step	Action								
15	<p>Verify that the signal from the customer premises is received. Read the level and frequency on the DS1 test set.</p> <p>If the requirement cannot be met, perform Procedure 4-14, "Troubleshooting problems encountered while testing" on page 4-69, and repeat this step.</p>								
16	<p>If this circuit is TO or ETO service, skip to step 24. If this circuit is not TO or ETO, continue at step 17.</p>								
<b>Signaling from the analog end</b>									
17	<p>To check signaling from the customer premises, disconnect the transmission test set and connect a Wiltron signaling test set to the line.</p>								
18	<p>Set up the signaling test set for the service being tested. Refer to the test set user manual for setup details. If the service type is FXS, use the following settings:</p> <table border="0" style="margin-left: 40px;"> <tr> <td style="padding-right: 20px;">Send</td> <td>loop</td> </tr> <tr> <td>PPS</td> <td>10 pps</td> </tr> <tr> <td>% Break</td> <td>64%</td> </tr> <tr> <td>On-Hook</td> <td></td> </tr> </table>	Send	loop	PPS	10 pps	% Break	64%	On-Hook	
Send	loop								
PPS	10 pps								
% Break	64%								
On-Hook									
19	<p>At the digital cross-connect panel, set the DS1 test set as follows, for the channel already selected:</p> <table border="0" style="margin-left: 40px;"> <tr> <td style="padding-right: 20px;">mode</td> <td>terminate: monitor signaling</td> </tr> </table>	mode	terminate: monitor signaling						
mode	terminate: monitor signaling								
20	<p>Verify the on-hook condition at the DS1 test set. (Use on page 6-29 for a listing of the signaling codes that apply to each service.)</p>								
21	<p>Change the signal sent by the signaling test set to off-hook.</p>								
22	<p>Verify the off-hook condition at the DS1 test set. (Use on page 6-29 for a listing of the signaling codes that apply to each service.)</p>								
23	<p>Verify any other signaling conditions appropriate to this service.</p> <p>If the requirement cannot be met, perform Procedure 4-14, "Troubleshooting problems encountered while testing" on page 4-69, and repeat this step.</p>								
24	<p>Remove the test equipment at the customer premises and at the DS1 cross-connect panel.</p>								
25	<p>Log out of the user interface session at the RFT.</p>								

—end—

## Procedure 4-8

# Testing DDS (OCUDP) on DS1 tandem

---

Use this procedure to test a Digital Data Service (DDS) Office Channel Unit (OCUDP) service on a DS1 Tandem circuit. This test verifies line card provisioning and operation. It is conducted between the digital cross-connect panel and the customer premises.

In a point-to-point or single-ended system, the digital cross-connect panel is at the central office. In a DS1-fed AccessNode (DFA) system, test access to the digital signal can be at the central office or at the remote fiber terminal.

This procedure has two parts. The first part is service-affecting—it interrupts the DS1 path by terminating the DS1 facility on a digital data test set. *It can only be used when adding DDS service on a new DS1 facility that is not yet providing customer service.*

The second part of this procedure provides a monitor-only function at the DS1 cross-connect panel, and can be used during initial installation of a new line, or during maintenance.

### Requirements

All system alarms are cleared. The line card is installed at the RFT and the circuit is fully provisioned, including the DS0 channel.

This test requires one technician at the digital cross-connect panel, equipped with a digital data test set, HP3787B or equivalent, and test cords. A second technician is required at the customer premises, equipped with a TPI95 DDS test set or equivalent, and test cords suited to the method of connection.

—continued—

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Procedure 4-8 (continued))  
**Testing DDS (OCUDP) on DS1 tandem**

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## Action

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Step	Action
1	<p>Log in to the OPC and use the Provisioning Manager tool to determine which DS1 and which channel carries the circuit under test.</p> <p>Refer to the procedure for logging in to the OPC in <i>OPC User Interface Description</i>, 323-3001-301, in <i>Operations, Administration, and Provisioning</i>, Volume 4A. Refer to the procedures for using the Provisioning Manager tool in <i>Line Card Provisioning Procedures</i>, 323-3001-315, in this volume.</p>
2	<p>If you want to monitor a DDS service on a DS1 facility that is serving working customers, then skip to step 14.</p> <p>If you want to test a new DDS service on a new DS1 facility that is not yet providing service, then continue at step 3.</p>

**CAUTION**

**This test interrupts data transmission on all 24 channels of a DS1 facility.**

Do not use the procedure beginning at step 3 if there are customer services in use on this DS1 facility, because customer service would be interrupted.

—continued—

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Procedure 4-8 (continued))

**Testing DDS (OCUDP) on DS1 tandem**

**Step Action**

**Terminating the DS1 facility on the digital data test set**

**3** Set up the HP3787B test set as follows:

Interface level	Tx & Rx Transmitting DS1
Code	as provisioned for the DS1/VT mapper: B8ZS or AMI
Frame	as provisioned for the DS1/VT mapper: superframe or extended superframe
DS1 clock	looped
Timeslot	select the channel # for the circuit under test
Rate	as provisioned for the DS1/VT mapper: 2.4, 4.8, 9.6, 19.2, 56, or 64 kbps
Loopback	Off
Channel	Primary channel
Pattern	2047 PRBS (pseudo-random bit stream)
Errors	Logic Error Add Single
Insertion	Insertion On

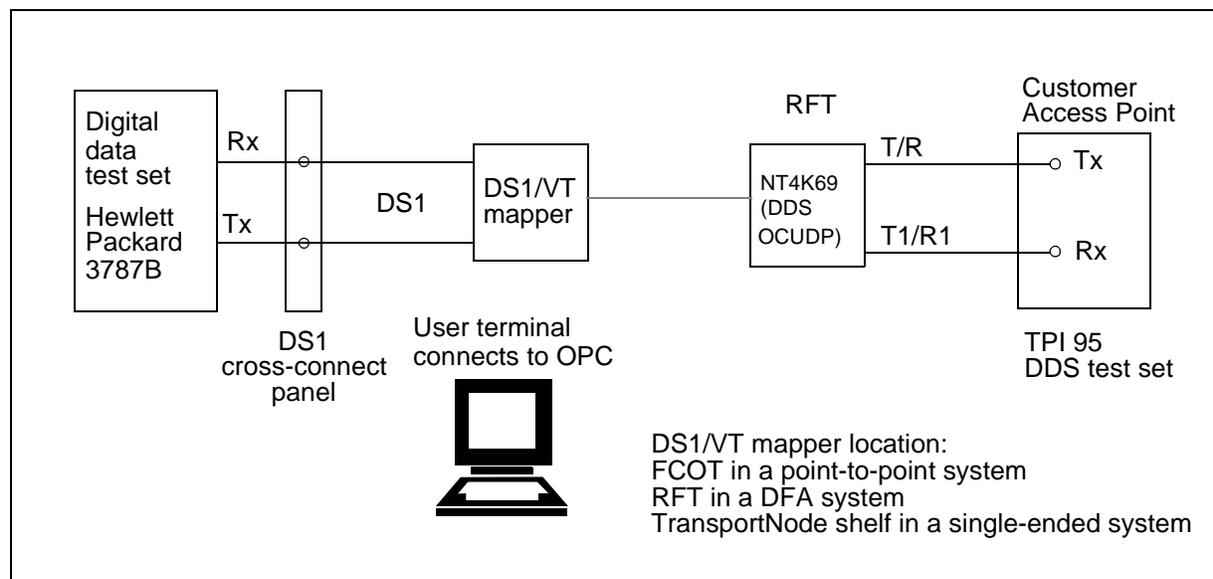
Interface level	Tx & Rx Receiving DS1 DSX
Code	as provisioned for the DS1/VT mapper: B8ZS or AMI
Frame	as provisioned for the DS1/VT mapper: superframe or extended superframe
Timeslot	select the channel # for the circuit under test
Rate	as provisioned for the DS1/VT mapper: 2.4, 4.8, 9.6, 19.2, 56, or 64 kbps
Channel	Primary channel
Pattern	2047 PRBS (pseudo-random bit stream) Continuous
Results	DS0A Logic Error Count

—continued—

Procedure 4-8 (continued)

**Testing DDS (OCUDP) on DS1 tandem**

Step	Action
4	At the digital cross-connect panel, connect a test cord between the DS1 Tx jack of the HP3787B test set and the Send or In jack of the DS1 carrying the circuit under test. The test setup is shown in Figure 4-11.
5	At the digital cross-connect panel, connect a test cord between the DS1 Rx jack of the HP3787B test set and the Rcv or Out jack of the DS1 carrying the circuit under test.

**Figure 4-11****Testing a DDS OCUDP circuit on DS1 tandem, with the DS1 facility terminated on a test set**

—continued—

4-40 End-to-end performance tests for lines

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Procedure 4-8 (continued)

**Testing DDS (OCUDP) on DS1 tandem**

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<b>Step</b>	<b>Action</b>
<b>6</b>	<p>At the customer premises, set up the TPI95 data test unit, TEST section, as follows:</p> <ul style="list-style-type: none"><li>a. set Normal/Loopback switch to Normal</li><li>b. set metallic controls to OFF (3 switches)</li><li>c. set data rate to the rate provisioned for the DDS line card (2.4, 4.8, 9.6, 19.2, 56, or 64 kbps)</li><li>d. set primary channel to 2047; set secondary channel to OFF.</li><li>e. set the Extend range/Normal switch to Normal</li><li>f. set the -dB/Normal switch to Normal</li><li>g. set the Self-test/Normal/Local clock switch to Normal</li><li>h. set the Bit Errors/Error-seconds/Reset switch to Bit Errors</li><li>i. set the Timer section Run/OFF/Set to Run</li></ul>
<b>7</b>	<p>Connect the TPI95 DDS test set (using the Digital testing port) to the line at the customer premises.</p>
<b>8</b>	<p>If error counts are stable at both ends, reset the counts to zero:</p> <ul style="list-style-type: none"><li>a. On the HP3787B test set, reset the error count to zero, by pressing the Start/Stop key.</li><li>b. On the TPI95 DDS test set, reset the counter to zero by switching the Bit Errors switch to RESET and then back to the Bit Errors position.</li></ul> <p>If error counts are not stable at both ends, verify that the line cards are in service, and the test cord connections.</p>
<b>9</b>	<p>At the customer premises, press the "Insert six errors" key on the TPI95 test set.</p> <p><i>Requirement: Six errors are added to the Receiving display on the HP3787B test set. This verifies continuity in one direction.</i></p>
<b>10</b>	<p>On the HP3787B test set, press the Single error key three times to insert three errors.</p> <p><i>Requirements: Three errors are added to the TPI95 display at the customer premises. This verifies continuity in the other direction.</i></p>

—continued—

Procedure 4-8 (continued)

**Testing DDS (OCUDP) on DS1 tandem**

- | Step | Action  |
|------|---|
| 11   | <p>On the TPI95 DDS test set, reset the counter to zero by switching the Bit Errors switch to RESET and then back to the Bit Errors position. Then observe the test set counter.</p> <p><i>Requirements: The counter should remain at zero for at least 30 seconds after it has been reset.</i></p> <p>If the requirement cannot be met, perform Procedure 4-14, "Troubleshooting problems encountered while testing" on page 4-69, and repeat this step.</p> |
| 12   | <p>On the HP3787B test set, reset the error count to zero. Then observe the bit error count.</p> <p><i>Requirements: The bit error count in the Receiving display should remain at zero for at least 30 seconds after it has been reset.</i></p> <p>If the requirement cannot be met, perform Procedure 4-14, "Troubleshooting problems encountered while testing" on page 4-69, and repeat this step.</p>  |
| 13   | <p>Remove the test equipment at the customer premises, and at the DS1 cross-connect panel. Log out of the user interface.</p> <p><b>Stop. You have finished this procedure.</b></p>   |

**CAUTION****Risk of service interruption**

Check for data transmission before performing the procedure beginning at step 14.

**Monitor-mode only, at the DSX-1 panel**

- 14 Verify that you are connecting to the correct circuit.
- 15 Set up the HP3787B test set as follows:

Interface level	Tx & Rx Receiving DS1
Mode	DSX-MON (monitor only is very important)
Line coding	as provisioned for the DS1/VT mapper: B8ZS or AMI
Framing	as provisioned for the DS1/VT mapper: superframe or extended superframe
Timeslot	select the channel # for the circuit under test
Pattern	2047 BIT PRBS (pseudo-random bit stream) Normal
Results	Logic Error Count

—continued—

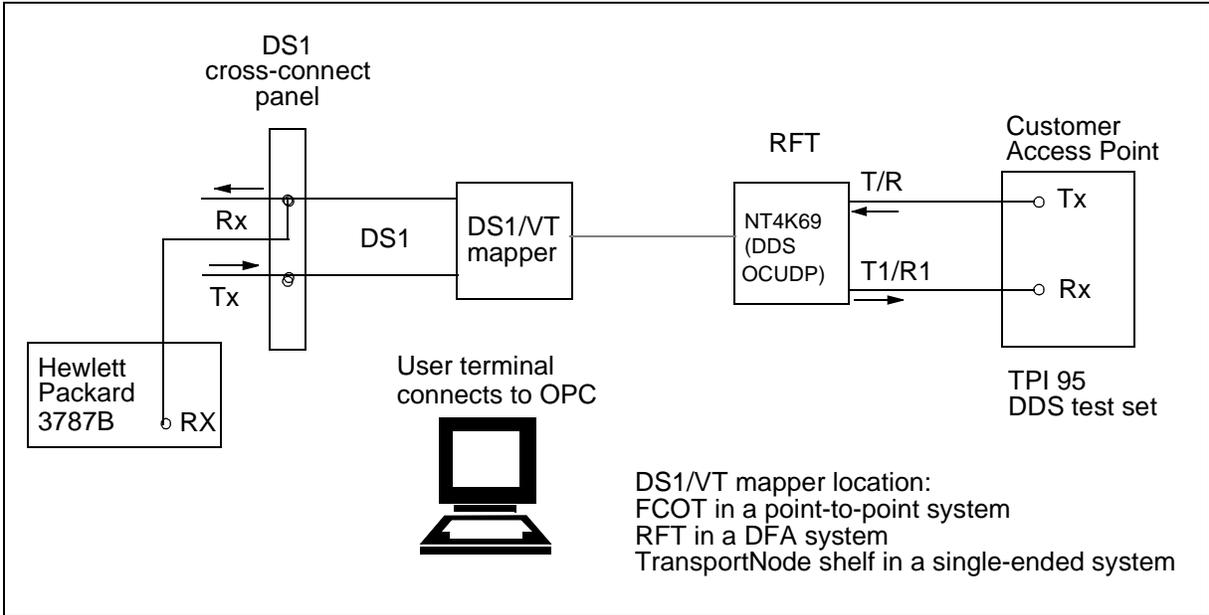
4-42 End-to-end performance tests for lines

Procedure 4-8 (continued)

Testing DDS (OCUDP) on DS1 tandem

Step	Action
16	At the digital cross-connect panel, connect a test cord between the DS1 Rx jack of the HP3787B test set and the Monitor jack (at the DSX-1 panel) for the DS1 carrying the circuit under test. The test layout is shown in Figure 4-12.

**Figure 4-12**  
Testing a DDS OCUDP circuit on DS1 tandem, sending from the RFT, monitoring at the DSX-1



—continued—

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 Procedure 4-8 (continued)

**Testing DDS (OCUDP) on DS1 tandem**


---

Step	Action
17	At the customer premises, set up the TPI95 data test unit, TEST section, as follows: <ol style="list-style-type: none"> <li>a. set Normal/Loopback switch to Normal</li> <li>b. set metallic controls to OFF (3 switches)</li> <li>c. set data rate to the rate provisioned for the DDS line card (2.4, 4.8, 9.6, 19.2, 56, or 64 kbps)</li> <li>d. set primary channel to 2047; set secondary channel to OFF.</li> <li>e. set the Extend range/Normal switch to Normal</li> <li>f. set the -dB/Normal switch to Normal</li> <li>g. set the Self-test/Normal/Local clock switch to Normal</li> <li>h. set the Bit Errors/Error-seconds/Reset switch to Bit Errors</li> <li>i. set the Timer section Run/OFF/Set to Run</li> </ol>
18	Connect the TPI95 DDS test set to the line at the customer premises.
19	On the HP3787B test set, reset the error count to zero by pressing the <b>Start/Stop</b> button.
20	At the customer premises, insert six errors. <i>Requirement: Six errors are added to the display at the HP3787B test set. This verifies continuity in one direction.</i>
21	On the HP3787B test set, reset the bit error count to zero. Then observe the test set counter. <i>Requirements: The counter should remain at zero for at least 30 seconds after it has been reset.</i> If the requirement cannot be met, perform Procedure 4-14, "Troubleshooting problems encountered while testing" on page 4-69.
22	Remove the test equipment at the customer premises, and at the DS1 cross-connect panel. Log out of the OPC.

—end—

## Procedure 4-9 Testing a DDS customer loop

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Use this test during initial installation and maintenance to verify the operation of a local data loop on a Digital Data Service (DDS) circuit. The test may also be used to isolate trouble on the local loop. The test is performed on one terminal at a time.

### Requirements

All system alarms are cleared.

Equipment required at the RFT includes:

- 1 TPI108/109RT data test unit, or equivalent
- test cords
- VT100-compatible terminal and RS232 cable, connected to the DTE connector on the LCAP



#### **CAUTION**

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

Check for data transmission before starting your testing of a data line. Testing will interrupt data transmission.

### Action

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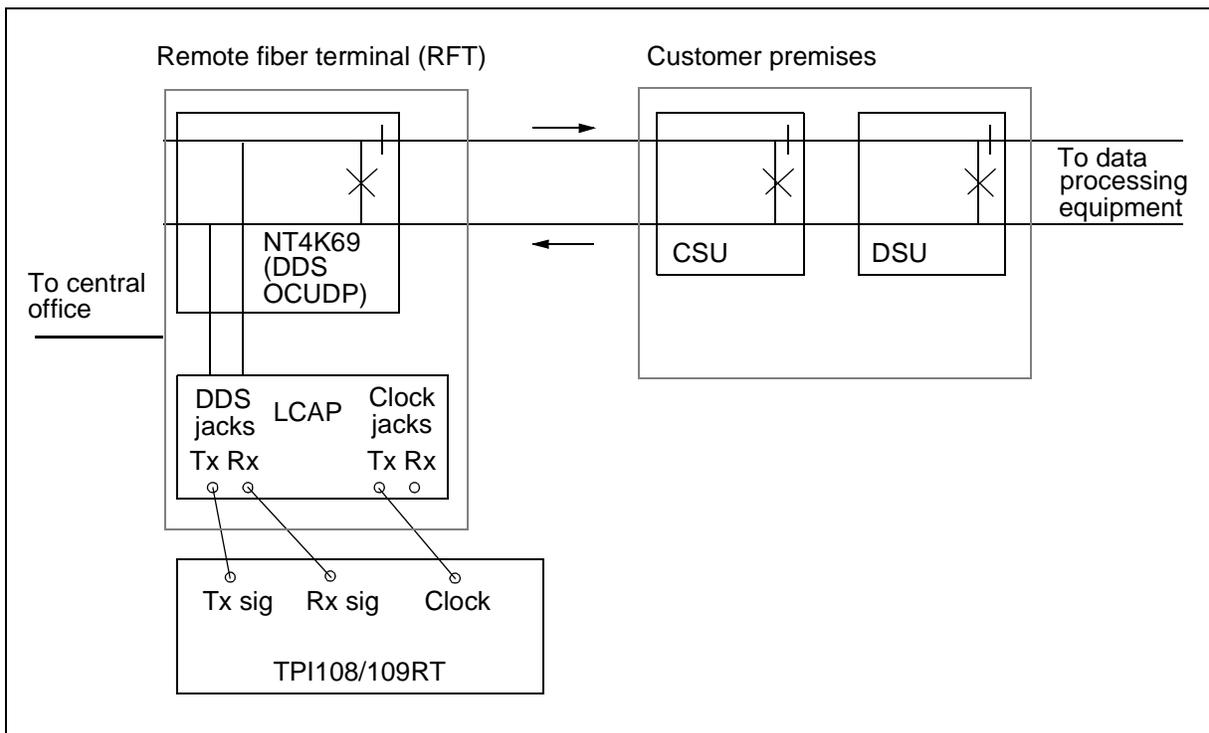
<b>Step</b>	<b>Action</b>
1	Plug the data test sets into 115 V ac outlets, and switch the power switches on the sets to POWER ON.
2	On the TPI108/109RT transmit unit: <ol style="list-style-type: none"><li>a. Connect the clock cord from the transmitter to the Tx clock jack on the LCAP.</li><li>b. Press the RESET switch, and then set the MODE switch to REPEAT and the FUNCTION switch to LOOPBACK TEST.</li><li>c. Set the OUTPUT switch to LOGIC FAR.</li><li>d. Set the DATA RATE switch to the data rate of the circuit being tested.</li></ol>

—continued—

Procedure 4-9 (continued)  
**Testing a DDS customer loop**

Step	Action
3	Connect the signal cord from the TPI108/109RT data test unit to the DDS Rx jack on the LCAP. The layout is shown in Figure 4-13.
4	On the TPI108/109RT receive unit: <ol style="list-style-type: none"> <li>Set the COUNTER MODE switch to COUNT.</li> <li>Set the COUNTER switch to ERRORS-BIT.</li> <li>Set the TESTWORD switch to LOOPED.</li> <li>Set the INPUT switch to LOGIC FAR.</li> <li>Set the DATA RATE switch to the data rate of the circuit being tested.</li> </ol>

**Figure 4-13**  
**Customer Data Loop test**



—continued—

Procedure 4-9 (continued)

**Testing a DDS customer loop**

---

<b>Step</b>	<b>Action</b>
<b>5</b>	Connect the test cord from the TPI108/109RT data test unit received signal jack to the DDS Tx jack on the LCAP.
<b>6</b>	Press the <b>Reset</b> button on the TPI108/109RT data test unit.
<b>7</b>	Set up split DDS jack access to the line under test. (Use Procedure 6-2, "Setting up DDS jack access," on page 6-14.)
<b>Office channel unit (OCU) loopback test</b>	
<b>8</b>	Press the <b>Reset</b> button on the TPI108/109RT data test unit.
<b>9</b>	On the TPI108/109RT data test unit, press and hold the OCU (office channel unit loopback) switch for a few seconds.  <i>The Latch LED turns on to indicate that the loopback has latched.</i>  <b>Note:</b> The OCU loopback test switch must be depressed long enough for the loopback point to be activated. When the switch is released, the loopback is latched on, and the loopback code is interleaved with the 2047-bit pseudorandom code for return to the TPI108/109RT data test unit.
<b>10</b>	On the TPI108/109RT data test unit, reset the counter to zero by switching the COUNTER MODE switch to RESET, and then back to the COUNT position.  <i>Requirements: The counter reads zero for at least 30 seconds after it has been reset.</i>  If the requirement cannot be met, perform Procedure 4-14, "Troubleshooting problems encountered while testing" on page 4-69, and repeat the tests.
<b>11</b>	Press the <b>Reset</b> button on the TPI108/109RT data test unit to release the loopback.
<b>12</b>	If the equipment at the customer premises is a data service unit (DSU), skip to step 17.  If the equipment at the customer premises is a channel service unit (CSU), continue at step 13.

—continued—

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Procedure 4-9 (continued)  
**Testing a DDS customer loop**

---

<b>Step</b>	<b>Action</b>
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**Channel service unit (CSU) loopback test**

- 13** Press the **Reset** button on the TPI108/109RT data test unit.
- 14** On the TPI108/109RT data test unit, press the CHAN switch and keep it depressed for a few seconds.  
*The Latch LED turns on to indicate that the loopback has latched.*  
**Note:** The CHAN loopback test switch must be depressed long enough for the loopback point to be activated. When the switch is released, the loopback is latched on, and the loopback code is interleaved with the 2047-bit pseudorandom code for return to the TPI108/109RT data test unit.
- 15** On the TPI108/109RT data test unit, reset the counter to zero.  
*Requirement: The counter reads zero for at least 30 seconds after it has been reset.*  
If the requirement cannot be met, perform Procedure 4-14, "Troubleshooting problems encountered while testing" on page 4-69, and repeat the tests.
- 16** Press the **Reset** button on the TPI108/109RT data test unit to release the loopback.  
Skip to step 21.

—continued—

Procedure 4-9 (continued)

**Testing a DDS customer loop**

---

<b>Step</b>	<b>Action</b>
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**Data service unit (DSU) loopback test**

- |           |   |
|-----------|---|
| <b>17</b> | Press the <b>Reset</b> button on the TPI108/109RT data test unit.   |
| <b>18</b> | On the TPI108/109RT data test unit, press the DSU switch and keep it depressed for a few seconds.<br><br><b>Note:</b> The DSU loopback test switch must be depressed long enough for the loopback point to be activated. When the switch is released, the loopback is latched on, and the loopback code is interleaved with the 2047-bit pseudorandom code for return to the TPI108/109RT data test unit. |
| <b>19</b> | On the TPI108/109RT data test unit, reset the counter to zero.<br><br><i>Requirements: The counter reads zero for at least 30 seconds after it has been reset.</i><br><br>If the requirement cannot be met, perform Procedure 4-14, "Troubleshooting problems encountered while testing," and repeat the tests.   |
| <b>20</b> | Press the <b>Reset</b> button on the TPI108/109RT data test unit to release the loopback.   |
| <b>21</b> | Repeat steps 6 through 20 for each DDS OCUDP line to be tested.   |
| <b>22</b> | Take down the jack access session. (Use Procedure 6-7, "Saving or terminating a jack access session" on page 6-41.)   |
| <b>23</b> | Remove the test connections.  |

—end—

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## Procedure 4-10

### Performing an end-to-end DDS test (FCOT to RFT)

---

Use this procedure to test a Digital Data Service (DDS) circuit, FCOT to RFT. This test verifies line card provisioning and operation, and is conducted between the FCOT and the RFT in a point-to-point configuration.

Use this procedure during initial installation of a new line, or during maintenance.

#### Requirements

All system alarms are cleared. The line cards are installed at the FCOT and RFT, and the circuit is fully provisioned.

Equipment requirements include:

- 2 TPI108/109RT data test units, or equivalent
- test cords
- VT100 compatible terminal and RS232 cable, connected to the DTE connector on the LCAP

**CAUTION****Risk of service interruption**

Check for data transmission before starting your testing of a data line. Testing will interrupt data transmission.

—continued—

Procedure 4-10 (continued)

**Performing an end-to-end DDS test (FCOT to RFT)**

---

**Action**

---

<b>Step</b>	<b>Action</b>														
1	Plug the data test sets into 115 V ac outlets, and switch the power switches on the sets to POWER ON.														
2	If the FCOT line card is provisioned for DDS OCUDP, follow steps 3 to 14. If the FCOT line card is provisioned for DDS DS0DP, skip to step 15.														
<b>Office channel unit (OCU) loopback test</b>															
3	On the TPI108/109RT at the FCOT: <ul style="list-style-type: none"><li>a. Connect the clock cord from the TP108/109RT to the Tx clock jack on the LCAP.</li><li>b. Set the front panel switches on the data test unit to the following settings:<table><tbody><tr><td>Mode</td><td>Repeat</td></tr><tr><td>Function</td><td>Loopback Test</td></tr><tr><td>Data rate</td><td>to the data rate of the circuit being tested</td></tr><tr><td>Output/Input</td><td>Logic Far</td></tr><tr><td>Subrate channel</td><td>Single</td></tr><tr><td>Counter</td><td>Bit Err.</td></tr><tr><td>CSDC</td><td>LED indicator extinguished</td></tr></tbody></table></li><li>c. Connect the transmit bantam test cord from the TPI108/109RT data test unit to the DDS Tx jack on the LCAP, as shown in Figure 4-14 on page 4-51.</li><li>d. Connect the receive bantam test cord from the TPI108/109RT data test unit to the DDS Rx jack on the LCAP.</li></ul>	Mode	Repeat	Function	Loopback Test	Data rate	to the data rate of the circuit being tested	Output/Input	Logic Far	Subrate channel	Single	Counter	Bit Err.	CSDC	LED indicator extinguished
Mode	Repeat														
Function	Loopback Test														
Data rate	to the data rate of the circuit being tested														
Output/Input	Logic Far														
Subrate channel	Single														
Counter	Bit Err.														
CSDC	LED indicator extinguished														
4	Be sure that the line card at the RFT for the circuit being tested is in service. This test will cause the RFT line card transmit signal to be looped back to its receive side.														
5	Set up split DDS jack access to the line under test at the FCOT. (Use Procedure 6-2, "Setting up DDS jack access" on page 6-14.)														

—continued—

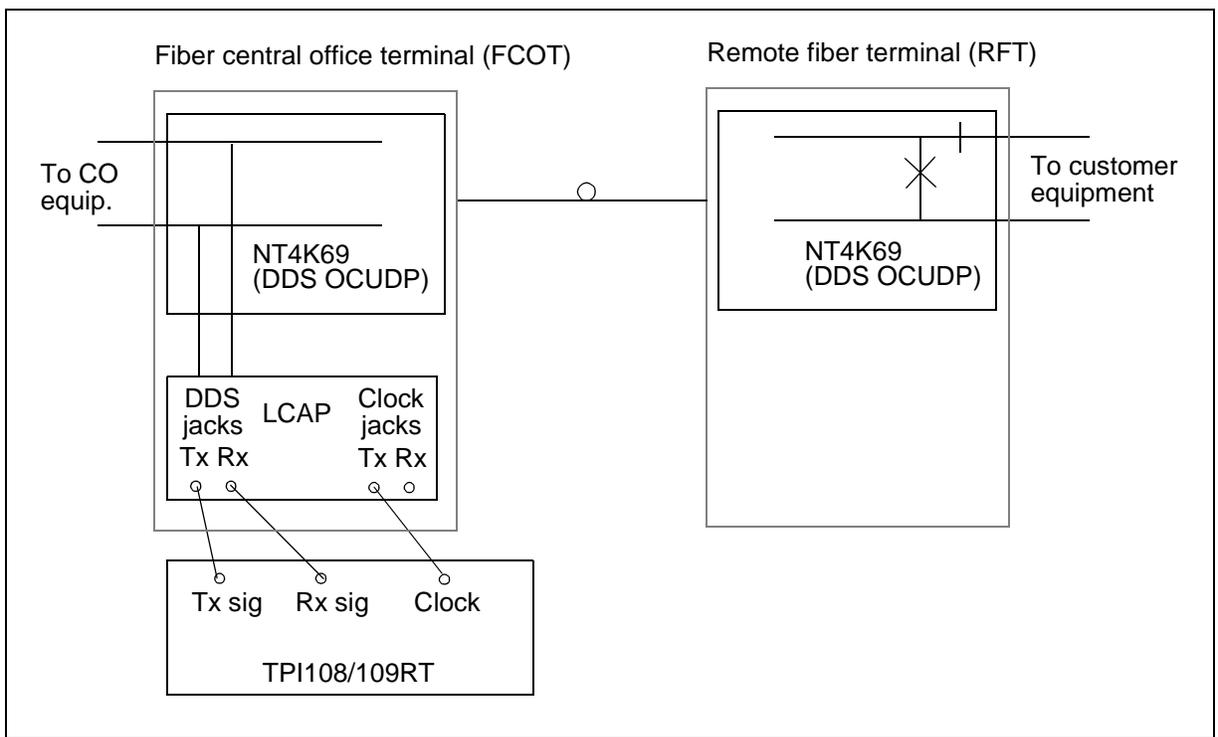
Procedure 4-10 (continued)

**Performing an end-to-end DDS test (FCOT to RFT)**

Step	Action
6	Press the <b>Reset</b> button on the TPI108/109RT data test unit.
7	On the TPI108/109RT data test unit, press and hold the OCU (office channel unit loopback) switch for a few seconds. <i>The Latch LED turns on to indicate that the loopback has latched.</i>

**Note:** The OCU loopback test switch must be depressed long enough for the loopback point to be activated. When the switch is released, the loopback is latched on, and the loopback code is interleaved with the 2047-bit pseudo-random code for return to the TPI108/109RT data test unit.

**Figure 4-14**  
**DDS OCUDP loopback at the RFT, testing from the FCOT**



—continued—

Procedure 4-10 (continued)

**Performing an end-to-end DDS test (FCOT to RFT)**

---

<b>Step</b>	<b>Action</b>
<b>8</b>	On the TPI108/109RT data test unit, reset the counter to zero by switching the Counter Mode switch to Reset, and then back to the Count position. <i>Requirements: The counter reads zero for at least 30 seconds after it has been reset.</i>
<b>9</b>	After the 30-second interval, press the <b>Insert 6 Errors</b> button to verify that errors you insert can be detected. <i>Requirement: 6 errors are added to the display.</i>
<b>10</b>	Press the <b>Reset</b> button on the TPI108/109RT data test unit to release the loopback.
<b>11</b>	Disconnect the jack access session in the user interface. (Use Procedure 6-7, "Saving or terminating a jack access session" on page 6-41.)
<b>12</b>	Log out of the user terminal session at the FCOT.
<b>13</b>	Remove the test equipment at the FCOT.
<b>14</b>	Repeat steps 3 to 13, testing from the RFT. The layout is shown in Figure 4-15 on page 4-53.

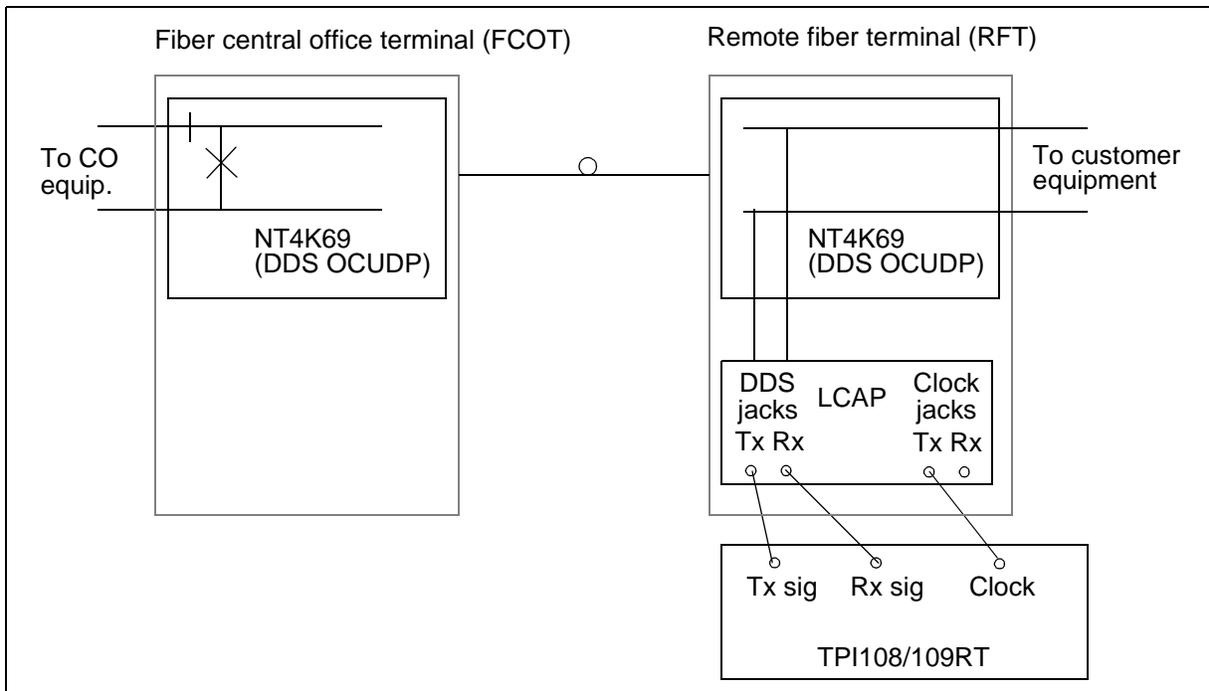
—continued—

Procedure 4-10 (continued)

**Performing an end-to-end DDS test (FCOT to RFT)**

Step	Action														
15	On the TPI108/109RT data test units at the FCOT and RFT: <ol style="list-style-type: none"> <li>a. Connect the clock cord from the TPI108/109RT data test unit to the Tx clock jack on the LCAP.</li> <li>b. Set the front panel switches on the data test unit to the following settings:                             <table border="0" style="margin-left: 20px;"> <tr> <td>Mode</td> <td>Repeat</td> </tr> <tr> <td>Function</td> <td>Test Word 2047</td> </tr> <tr> <td>Data rate</td> <td>to the data rate of the circuit under test (must be the same at the FCOT and RFT)</td> </tr> <tr> <td>Output/Input</td> <td>Logic Far</td> </tr> <tr> <td>Subrate Channel</td> <td>Single</td> </tr> <tr> <td>Counter</td> <td>Bit Err</td> </tr> <tr> <td>CSDC</td> <td>LED indicator extinguished</td> </tr> </table> </li> </ol>	Mode	Repeat	Function	Test Word 2047	Data rate	to the data rate of the circuit under test (must be the same at the FCOT and RFT)	Output/Input	Logic Far	Subrate Channel	Single	Counter	Bit Err	CSDC	LED indicator extinguished
Mode	Repeat														
Function	Test Word 2047														
Data rate	to the data rate of the circuit under test (must be the same at the FCOT and RFT)														
Output/Input	Logic Far														
Subrate Channel	Single														
Counter	Bit Err														
CSDC	LED indicator extinguished														

**Figure 4-15**  
**DDS OCUDP loopback at the FCOT, testing from the RFT**



—continued—

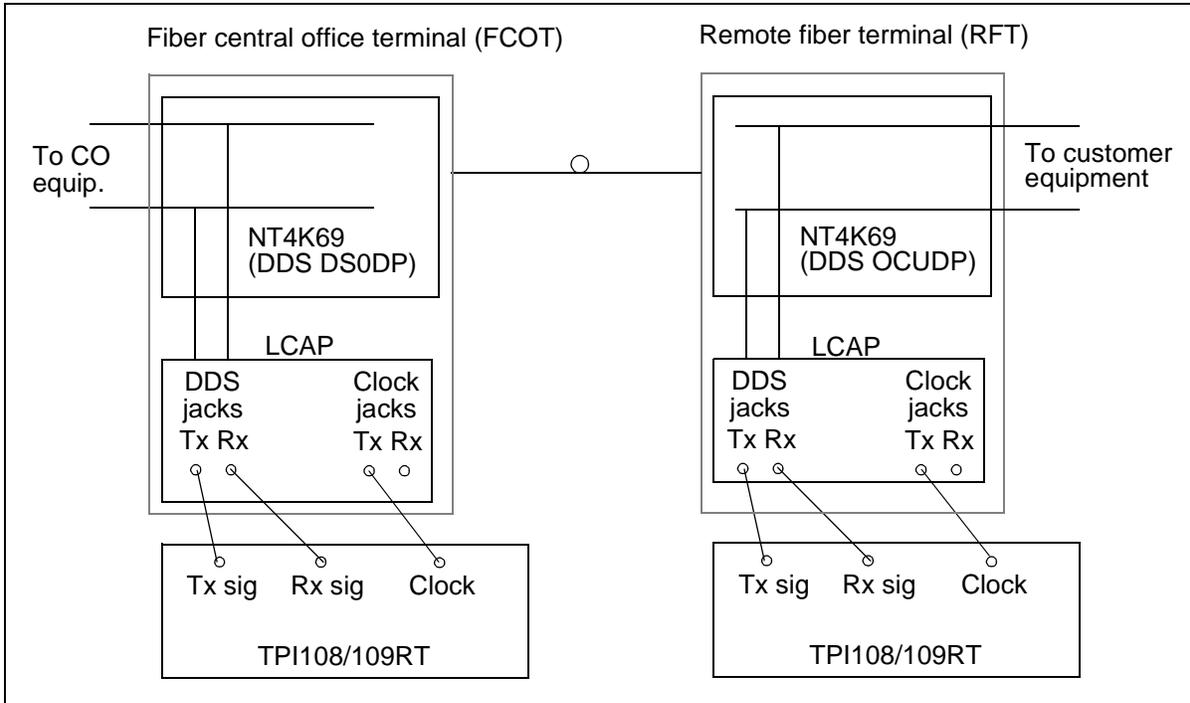
4-54 End-to-end performance tests for lines

Procedure 4-10 (continued)

**Performing an end-to-end DDS test (FCOT to RFT)**

Step	Action
16	<p>Set up split DDS jack access to the line under test at the FCOT. (Use Procedure 6-2, "Setting up DDS jack access" on page 6-14.)</p> <ol style="list-style-type: none"> <li>Connect the transmit bantam plug from the TPI108/109RT data test unit to the DDS Tx jack on the LCAP, according to Figure 4-16.</li> <li>Connect the receive bantam plug from the TPI108/109RT data test unit to the DDS Rx jack on the LCAP.</li> </ol>
17	<p>Set up split DDS jack access to the line under test at the RFT. (Use Procedure 6-2, "Setting up DDS jack access" on page 6-14.)</p> <ol style="list-style-type: none"> <li>Connect the transmit bantam plug from the TPI108/109RT data test unit to the DDS Tx jack on the LCAP, according to Figure 4-16.</li> <li>Connect the receive bantam plug from the TPI108/109RT data test unit to the DDS Rx jack on the LCAP.</li> </ol>

**Figure 4-16**  
**DDS DS0DP to OCUDP end-to-end test**



—continued—

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Procedure 4-10 (continued)

**Performing an end-to-end DDS test (FCOT to RFT)**

---

<b>Step</b>	<b>Action</b>
<b>18</b>	Press the <b>Reset</b> button on the TPI108/109RT data test units at FCOT and RFT.
<b>19</b>	On the TPI108/109RT data test unit at the RFT, reset the Bit Error count to zero by moving the Counter Mode switch to Reset, and then back to the Count position. <i>Requirements: The counter reads zero for at least 30 seconds after it has been reset.</i>
<b>20</b>	After the 30-second interval, press the <b>Insert 6 Errors</b> button at the FCOT (to verify that errors you insert can be detected at the RFT). <i>Requirement: 6 errors are added to the display at the RFT.</i>
<b>21</b>	Repeat steps 18 to 20, but this time, test the path in the opposite direction. (In step 19, reset the Bit Error count at the FCOT. In step 20, insert errors at the RFT, and detect them at the FCOT.)
<b>22</b>	If the requirements cannot be met, perform Procedure 4-14, "Troubleshooting problems encountered while testing" on page 4-69, and repeat these tests.
<b>23</b>	Disconnect the jack access sessions in the user interfaces. Use Procedure 6-7, "Saving or terminating a jack access session" on page 6-41.)
<b>24</b>	Log out of the user terminal sessions at the FCOT and RFT.
<b>25</b>	Remove the test equipment at the FCOT and RFT.

—end—

## Procedure 4-11

# Four-Wire FXS/FXO signaling test

---

Use this procedure to test signaling on a four-wire FX line in an AccessNode system. It applies to universal circuits.

Use this procedure during initial installation of a new line, or during maintenance. Two tests are performed, with one technician at the central office, and a second technician at the customer premises. The first test uses signaling test sets to test FXS origination and takedown. The second test uses telephone sets and CO lines to test FXO origination.

### Requirements

All system alarms are cleared. A test person is present at each terminal.

Equipment required for the FXS origination test:

- two 310-to-split bantam cables, customer-fabricated.  
This cable consists of a 310 plug at one end and two bantam plugs (T) and (R) at the other end as shown in Figure 4-17 on page 4-57. The tip lead of the 310 plug connects to the tip lead of the bantam plug (T), and the ring lead of the 310 is connected to the tip lead of the bantam plug (R). This cable is used to provide dc continuity, but it does not provide a voice path.
- two 9361B Wiltron signaling test sets or equivalent

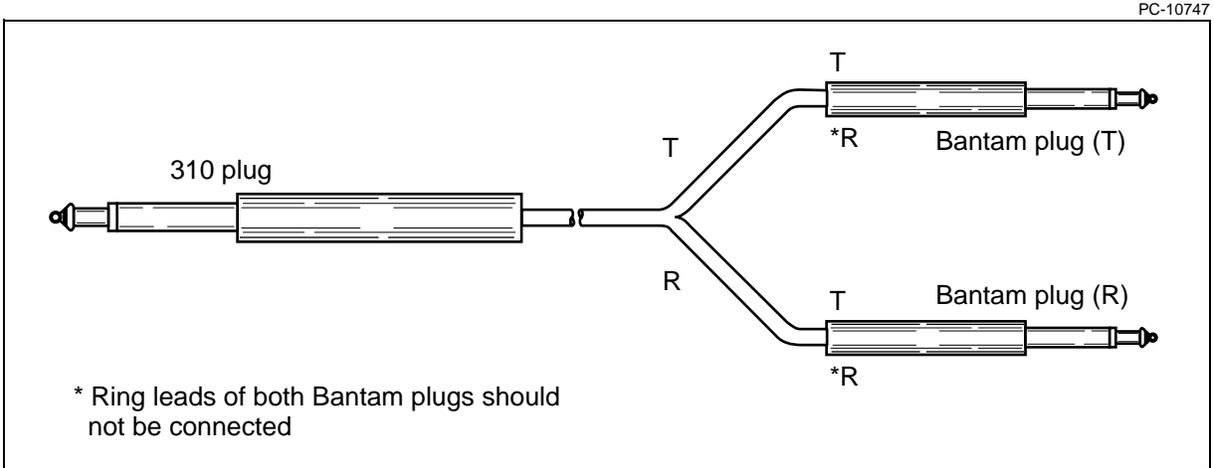
Equipment required for the FXO origination test:

- two 500-type or equivalent telephone sets
- two 500-type or equivalent telephone lines from a CO or PBX, each with a directory number
- two split bantam cables, customer-fabricated.  
This cable might consist of a 310 plug at one end and two bantam plugs (T) and (R) at the other end as shown in Figure 4-17 on page 4-57. The tip lead of the 310 plug connects to the tip lead of the bantam plug (T), and the ring lead of the 310 is connected to the tip lead of the bantam plug (R).  
However, if the telephone set at the FXS end or the CO line at the FXO end do not have 310 jacks for termination of the cable, then the 310 plug is not needed on the cable, such as shown in Figure 4-18 on page 4-57, and other means for terminating the cable are needed.

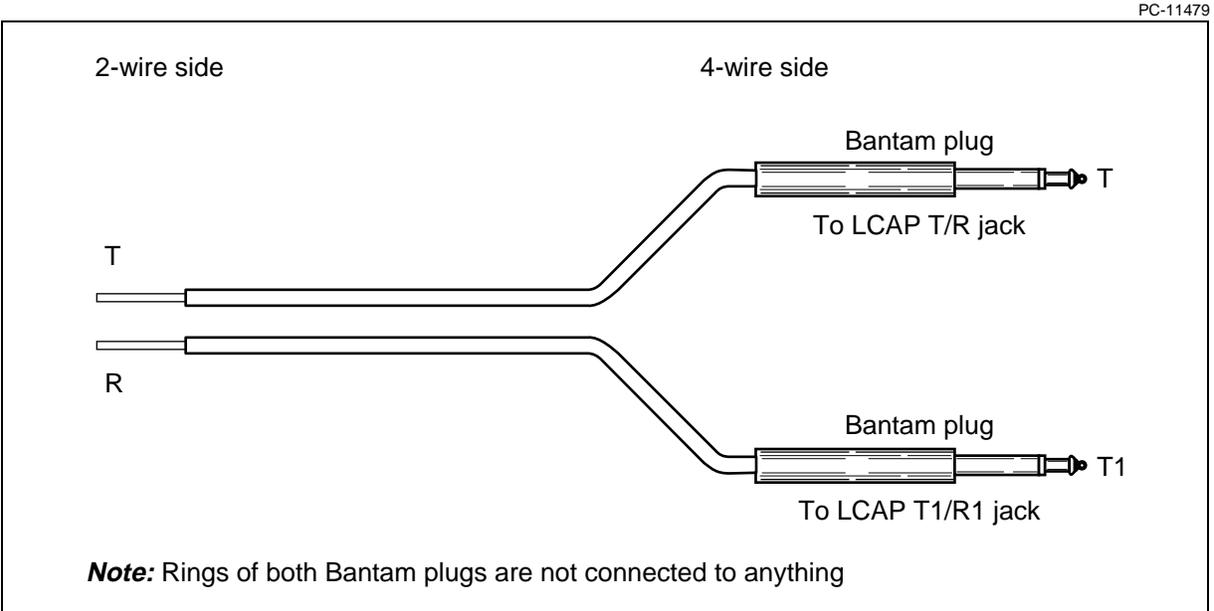
—continued—

Procedure 4-11 (continued)  
**Four-Wire FXS/FXO signaling test**

**Figure 4-17**  
**310-to-split bantam cable for FXS origination test**



**Figure 4-18**  
**Split bantam cable for FXO origination test**



—continued—

Procedure 4-11 (continued)

**Four-Wire FXS/FXO signaling test**

---

**Action**

---

<b>Step</b>	<b>Action</b>
1	For testing, reprovision the FXO and FXS line cards with normal polarity. (Note the provisioned values so that they can be restored after testing.)
2	At both ends, set up a split metallic jack access to the line to be tested. (Use Procedure 6-1, "Setting up metallic jack access" on page 6-9.)
3	If you want to test FX signaling when a call is originated at the FXO end, skip to step 14. If you want to test FX signaling when the call is originated at the FXS end, continue at step 4.

**Signaling test with FXS origination**

4	At the FXS end, set up the signaling test set as follows:  Send                      loop PPS                        10 pps % Break                  64% On-Hook
5	At the FXO end, set up the signaling test set as follows:  Receive                  Loop B&G RCV Input                A-Relay
6	At the FXS end, insert the T bantam of the 310-to-split bantam plug into the Line T/R jack and the R bantam plug of the same cable into the Line T1/R1 jack at the LCAP. The test setup is shown in Figure 4-19 on page 4-59. Connect the 310 plug end to the SEND jack on the test set.
7	At the FXO end, insert the R bantam plug of the 310-to-split bantam cable into the Line T1/R1 jack, but do not connect the bantam T plug. Connect the 310 plug end to the RCV jack on the test set.

—continued—

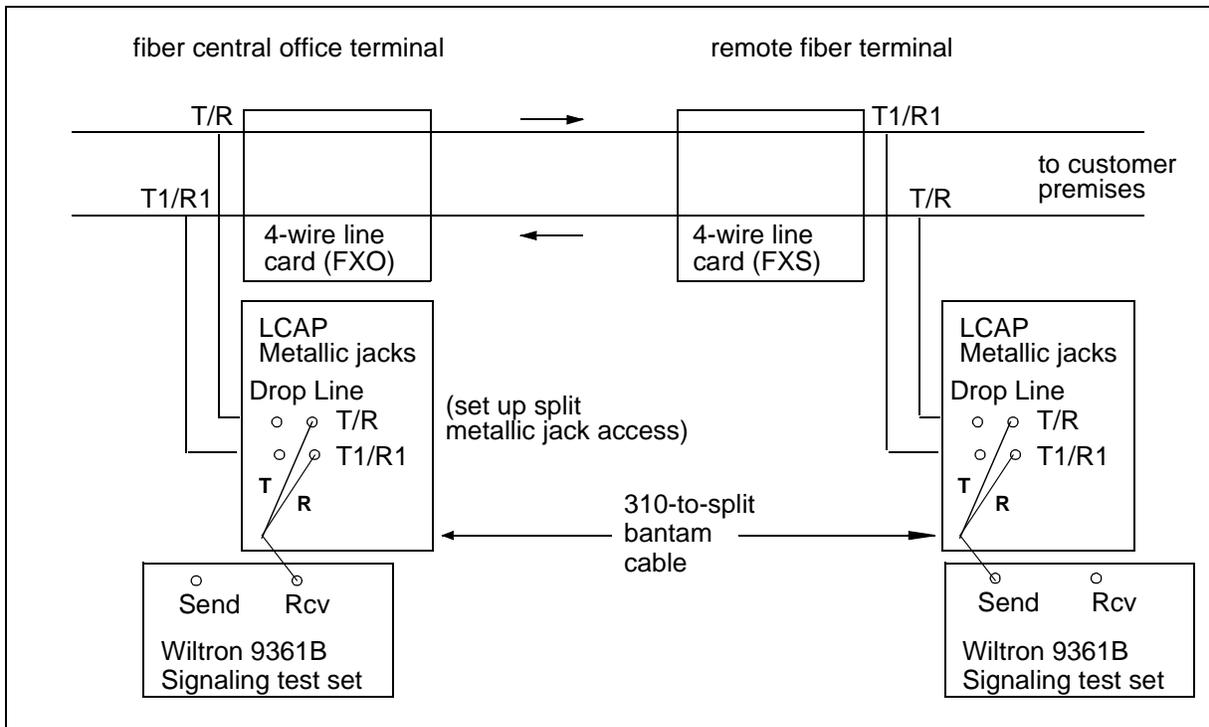
Procedure 4-11 (continued)  
**Four-wire FXS/FXO signaling test**

Step	Action
8	At the FXS end, press the <b>GND START</b> button on the signaling test set and keep it depressed until the bantam T plug is inserted into the Line T/R jack at the FXO end.
9	At the FXS end, push <b>Off-hook</b> button before releasing the <b>GND START</b> button.
10	Press the <b>Pulse</b> button to dial.
11	Check pulses per second, % break, and pulses counted at the FXO end signaling test set.

*Requirements: Received PPS = 10, % Break = 64% ± 4%, pulses counted = digits dialed.*

If the requirement cannot be met, perform Procedure 4-14, "Troubleshooting problems encountered while testing" on page 4-69, and repeat the tests.

**Figure 4-19**  
**FX signaling test (FXS origination and takedown)**



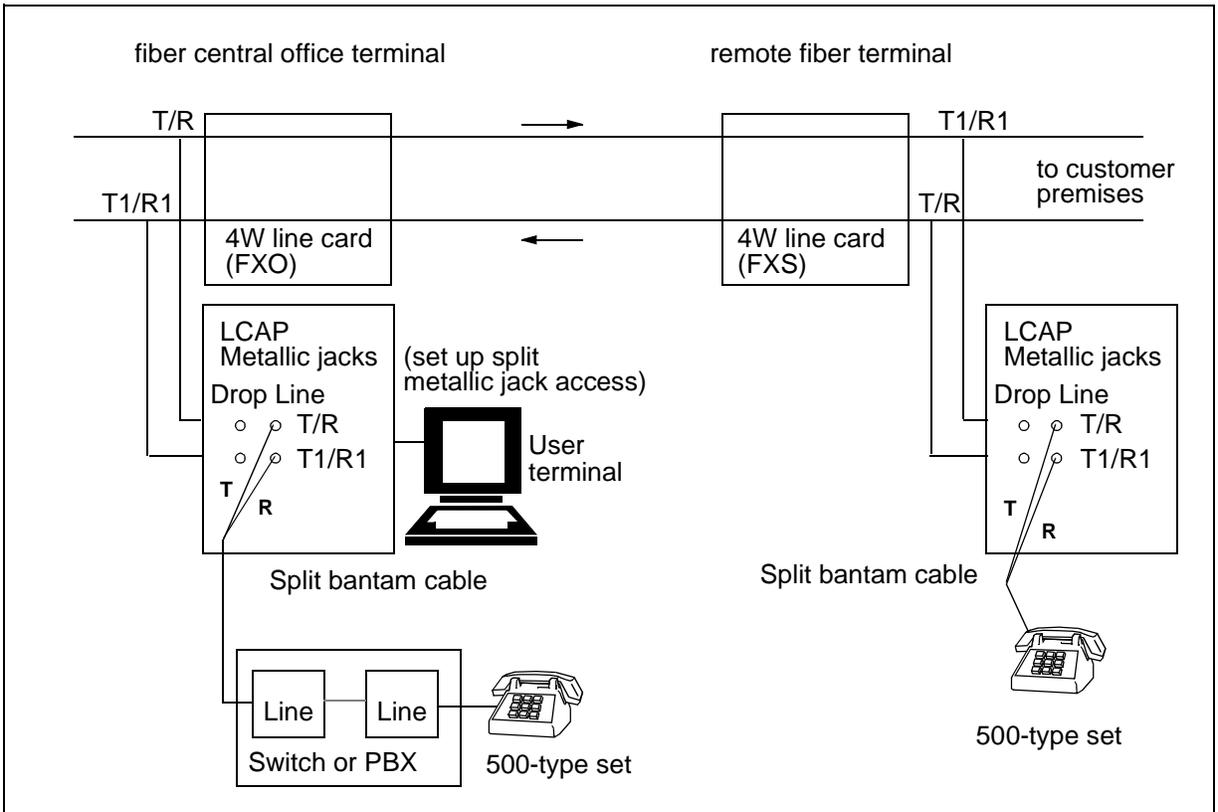
—continued—

Procedure 4-11 (continued)

**Four-Wire FXS/FXO signaling test**

Step	Action
12	Remove the signaling test sets.
13	If you need to test signaling with FXO origination, continue at step 14. If you are finished testing this FX circuit, skip to step 22.
<b>Signaling test with FXO origination</b>	
14	Perform steps 1 and 2, if not already done.
15	At both terminals, insert the bantam T plug of the split bantam test cable into the Line T/R jack, and insert the bantam R plug into the Line T1/R1 jack. Connect the circuit as shown in Figure 4-20.

**Figure 4-20**  
**FX signaling test (FXO origination)**



—continued—

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 Procedure 4-11 (continued)

**Four-Wire FXS/FXO signaling test**


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Step	Action
<b>16</b>	At the FXS end, connect the single-plug end of the split bantam test cable to one of the 500-type telephone sets.
<b>17</b>	At the FXO end, connect the single-plug end of the split bantam test cable to a PBX or CO line. This line terminates the FX service on the switch.
<b>18</b>	Connect a 500-type set to the second CO line (the non-FX service line).
<b>19</b>	<p>Originate a call from the telephone set on the non-FX service line to the telephone set connected to the FX line.</p> <p><i>Requirement: The originating CO line hears ringback tone. The receiving CO line rings into the FXO card, which sends ring status to the FXS line cards, which then rings the telephone set at the FXS end.</i></p> <p>If the requirement cannot be met, perform Procedure 4-14, "Troubleshooting problems encountered while testing" on page 4-69, and repeat the tests.</p>
<b>20</b>	<p>Go off-hook at the telephone set at the FXS end.</p> <p><i>Requirement: Ringing stopped at the telephone set. The ringback tone is not heard at the calling end.</i></p> <p>If the requirement cannot be met, perform Procedure 4-14, "Troubleshooting problems encountered while testing," and repeat the tests.</p>
<b>21</b>	Go on-hook at both telephone sets.
<b>22</b>	If applicable, restore the provisioning values modified in step 1.
<b>23</b>	Take down the jack access session. Use Procedure 6-7, "Saving or terminating a jack access session" on page 6-41.

—end—

## Procedure 4-12 DX signaling test

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Use this procedure to set up test equipment and to verify signaling functions on a line card provisioned as DX service.

If the line card at the other network element is provisioned as E&M or PLR, then refer to Procedure 4-13 for the test setup. For purposes of this procedure, the other network element is assumed to be provisioned for DX signaling.

### Requirements

All system alarms are cleared. Test personnel are present at both terminals.

*Note:* If a DX circuit in the FCOT is connected to a DX circuit in the RFT, at least one side of the DX circuit must be terminated prior to placing the circuit in service, and must remain terminated.

Equipment required includes:

- 4 bantam-to-310 test cords
- two 9361B Wiltron signaling test sets, with the DX option installed

### Action

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Step	Action
1	Use the default DX service load settings provided by the OPC Provisioning Manager.
2	Connect the circuit as shown in Figure 4-21 on page 4-64.

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—continued—

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 Procedure 4-12 (continued)  
**DX signaling test**


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Step	Action																
<b>3</b>	Set the controls on the signaling test set as follows:  In the DX section:  <table style="width: 100%; border: none;"> <tr> <td style="width: 50%;">CKT SPLIT</td> <td style="width: 50%;">TWD FAR DX</td> </tr> <tr> <td>SEND</td> <td>OFF HK &amp; DIAL</td> </tr> <tr> <td>4-WIRE</td> <td>ON</td> </tr> <tr> <td>SEND</td> <td>ON</td> </tr> <tr> <td>RCV</td> <td>ON</td> </tr> <tr> <td>LINE RES &amp; RELAY BALANCE</td> <td>ALL RESISTANCE OFF, 4<math>\mu</math>F ON</td> </tr> </table> In the RECEIVE section:  SET RECEIVE MONITOR TO SF/DX  In the SEND section:  SET SEND MONITOR TO SF/DX  <table style="width: 100%; border: none;"> <tr> <td style="width: 50%;">SEND PPS</td> <td style="width: 50%;">10</td> </tr> <tr> <td>SEND%BREAK</td> <td>64</td> </tr> </table>	CKT SPLIT	TWD FAR DX	SEND	OFF HK & DIAL	4-WIRE	ON	SEND	ON	RCV	ON	LINE RES & RELAY BALANCE	ALL RESISTANCE OFF, 4 $\mu$ F ON	SEND PPS	10	SEND%BREAK	64
CKT SPLIT	TWD FAR DX																
SEND	OFF HK & DIAL																
4-WIRE	ON																
SEND	ON																
RCV	ON																
LINE RES & RELAY BALANCE	ALL RESISTANCE OFF, 4 $\mu$ F ON																
SEND PPS	10																
SEND%BREAK	64																
<b>4</b>	Set up a split metallic jack access to the line to be tested, at both ends. (Use Procedure 6-1, "Setting up metallic jack access" on page 6-9.)																
<b>5</b>	Press dial digit to dial from either terminal. The results of the outpulsing will be on the far-end test set display.  <i>Requirement: Received PPS = 10, % Break = 64% <math>\pm</math> 4%; Pulses counted = digit dialed.</i>  If the requirement cannot be met, perform Procedure 4-14, "Troubleshooting problems encountered while testing," and repeat steps 1 through 5.																
<b>6</b>	Repeat steps 1 through 5 on each DX line installed.																
<b>7</b>	Take down the jack access session. (Use Procedure 6-7, "Saving or terminating a jack access session" on page 6-41.)																

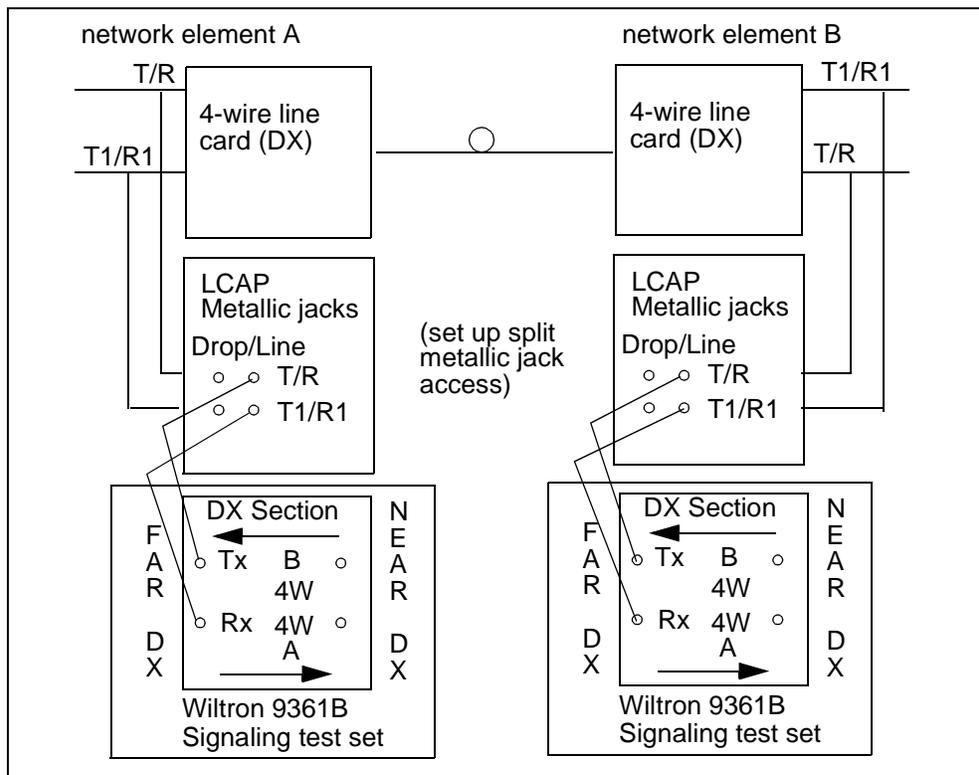
—continued—

Procedure 4-12 (continued)

**DX signaling test**

**Step Action**

**Figure 4-21  
DX signaling test**



—end—

## Procedure 4-13

### E&M and PLR signaling test

Use this procedure to set up test equipment and to verify signaling functions on a line card provisioned as E&M signaling or pulse link repeater (PLR).

For purposes of this procedure, both network elements are assumed to be provisioned for the same service type. If the line card at the other network element is provisioned as DX, E&M, or PLR, then refer to the appropriate procedure for the test setup:

Duplex	DX	Procedure 4-12
E&M	E&M	Procedure 4-13
Pulse link repeater	PLR	Procedure 4-13

### Requirements

All system alarms are cleared. Test personnel are present at both terminals.

Equipment required:

- 2 bantam-to-310 test cords
- two 9361B Wiltron signaling test sets, or equivalent
- 1 VT100-compatible user terminal, with RS232 cable connected to the DTE connector on the LCAP

### Action

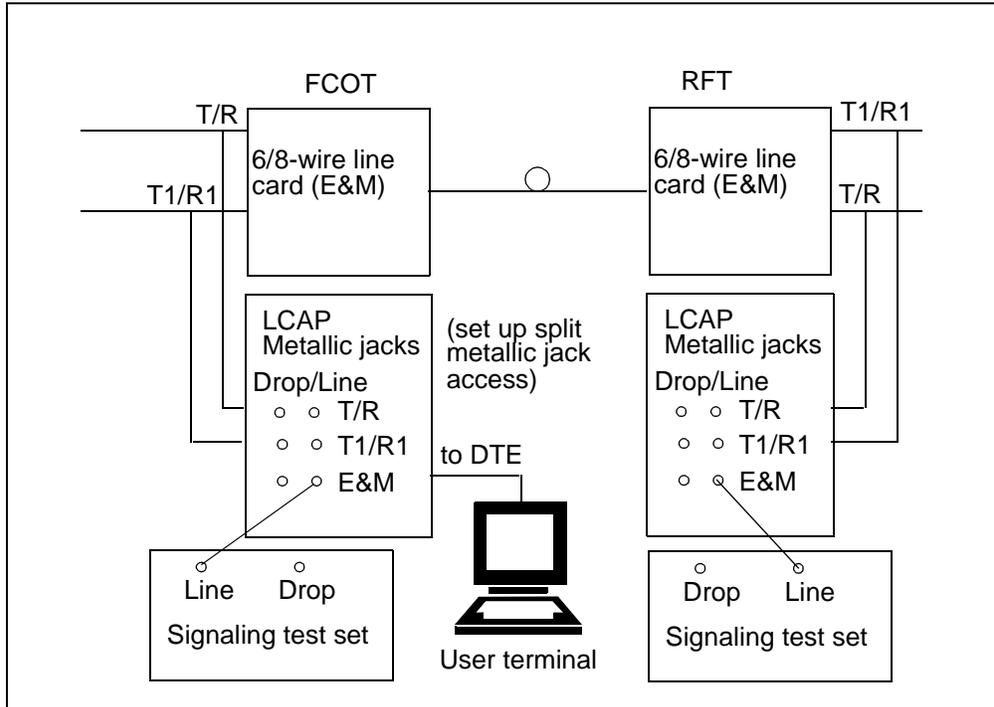
Step	Action																								
1	At the FCOT and RFT, set the controls on the signaling test sets for E&M or PLR as follows:																								
	<table> <thead> <tr> <th></th> <th>E&amp;M TEST</th> <th>PLR TEST</th> </tr> </thead> <tbody> <tr> <td>SEND PPS</td> <td>10</td> <td>10</td> </tr> <tr> <td>SEND %BREAK</td> <td>64</td> <td>64</td> </tr> <tr> <td>E&amp;M CKT SPLIT</td> <td>TWD LINE</td> <td>TWD DROP</td> </tr> <tr> <td>E&amp;M RCV FROM</td> <td>LINE</td> <td>DROP</td> </tr> <tr> <td>INTERFACE TYPE</td> <td>I</td> <td>1</td> </tr> <tr> <td>RECEIVE</td> <td>E&amp;M</td> <td>E&amp;M</td> </tr> <tr> <td>E&amp;M SEND</td> <td>OFF HK &amp; DIAL</td> <td>OFF HK &amp; DIAL</td> </tr> </tbody> </table>		E&M TEST	PLR TEST	SEND PPS	10	10	SEND %BREAK	64	64	E&M CKT SPLIT	TWD LINE	TWD DROP	E&M RCV FROM	LINE	DROP	INTERFACE TYPE	I	1	RECEIVE	E&M	E&M	E&M SEND	OFF HK & DIAL	OFF HK & DIAL
	E&M TEST	PLR TEST																							
SEND PPS	10	10																							
SEND %BREAK	64	64																							
E&M CKT SPLIT	TWD LINE	TWD DROP																							
E&M RCV FROM	LINE	DROP																							
INTERFACE TYPE	I	1																							
RECEIVE	E&M	E&M																							
E&M SEND	OFF HK & DIAL	OFF HK & DIAL																							

—continued—

Procedure 4-13 (continued)  
**E&M and PLR signaling test**

- | Step                          | Action  |
|-------------------------------|---|
| 2                             | If this line card is provisioned as E&M, perform steps 3 to 11.<br>If this line card is provisioned as PLR, perform steps 12 to 20.   |
| <b>E&amp;M signaling test</b> |   |
| 3                             | Connect the circuit as shown in Figure 4-22.<br><br>At the FCOT, insert the 310 plug of a 310-to-bantam test cord into the line jack of the signaling test set and the bantam plug into the E/M line jack of the LCAP.<br><br>At the RFT, insert the 310 plug of a 310-to-bantam test cord into the line jack of the signaling test set and the bantam plug into the E/M line jack of the LCAP. |
| 4                             | For the line cards at both ends, use the default E&M 1 service settings as provided by the Provisioning Manager.  |
| 5                             | Set up metallic split jack access to the line cards at both ends.<br>Use Procedure 6-1, "Setting up metallic jack access" on page 6-9.  |

**Figure 4-22**  
**E&M type 1 signaling test setup**



—continued—

---

 Procedure 4-13 (continued)  
**E&M and PLR signaling test**


---

Step	Action
6	<p>Push the <b>Pulse</b> button to dial from the test set at the FCOT end. The results of the dialed digit outpulsing will be displayed at the test set at the RFT end.</p> <p><i>Requirement: Received PPS = 10, % Break = 64 ± 4%, Pulses counted = digit dialed</i></p> <p>If the requirement cannot be met, perform Procedure 4-14, “Troubleshooting problems encountered while testing” on page 4-69, and repeat this step.</p>
7	Release the <b>Pulse</b> button at the FCOT end.
8	<p>Push the <b>Pulse</b> button to dial from the test set at the RFT end. The results of the dialed digit outpulsing will be displayed at the test set at the FCOT end.</p> <p><i>Requirement: Received PPS = 10, % Break = 64 ± 4%, Pulses counted = digit dialed</i></p> <p>If the requirement cannot be met, perform Procedure 4-14, “Troubleshooting problems encountered while testing,” and repeat this step.</p>
9	Reset the line cards at both ends to their originally provisioned values. Refer to <i>Line Card Provisioning Procedures</i> , 323-3001-315, in this volume.
10	Take down the jack access session at both ends. Use Procedure 6-7, “Saving or terminating a jack access session” on page 6-41.
11	Repeat steps 3 through 10 on each E&M line installed.
	<b>Stop. You have finished this procedure.</b>

**PLR signaling test**

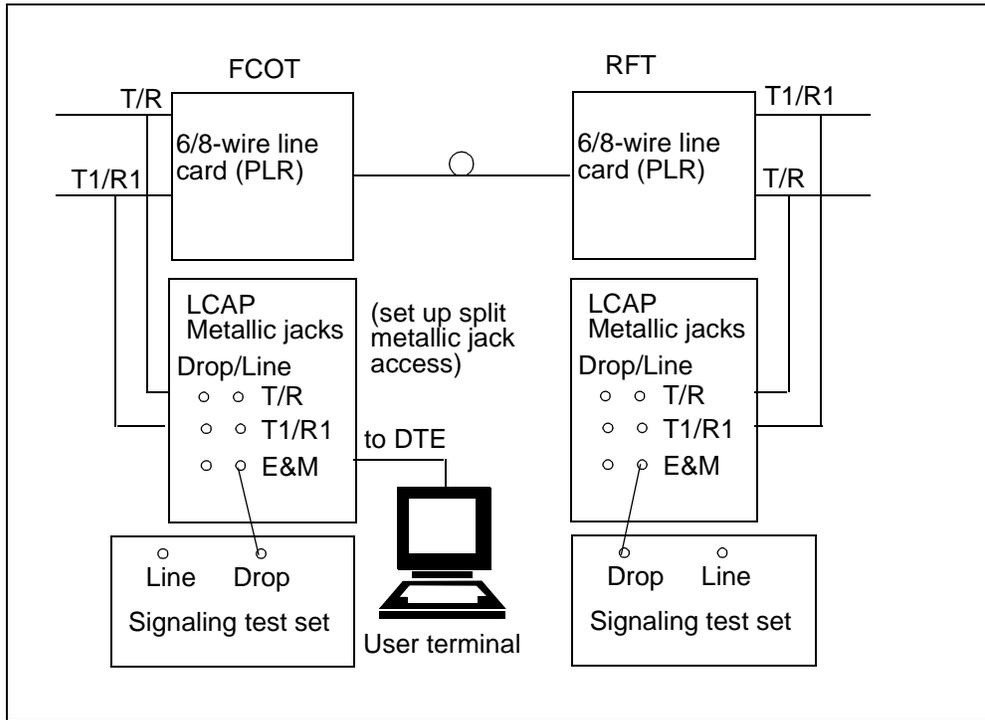
- 12 To test a PLR line card, go to step 1 and set up both test sets for PLR. Connect the circuit as shown in Figure 4-23 on page 4-68. At the FCOT, insert the 310 plug of a 310-to-bantam test cord into the Drop jack of the signaling test set, and the bantam plug into the E&M Line jack of the LCAP. At the RFT, insert the 310 plug of a 310-to-bantam test cord into the Drop jack of the signaling test set, and the bantam plug into the E&M Line jack of the LCAP.
- 13 Using the default service settings as provided by the Provisioning Manager, set up PLR service at both ends.
- 14 Set up metallic split jack access to the line cards at both ends. Use Procedure 6-1, “Setting up metallic jack access” on page 6-9.
- 15 Push the **Pulse** button to dial from the test set connected to the FCOT end. The results of the dialed digit outpulsing will be displayed on the test set connected to the RFT.
- Requirement: Received PPS = 10, % Break = 64 ± 4%, Pulses counted = digit dialed*
- If the requirement cannot be met, perform Procedure 4-14, “Troubleshooting problems encountered while testing” on page 4-69, and repeat this step.

—continued—

Procedure 4-13 (continued)  
**E&M and PLR signaling test**

Step	Action
16	Release the <b>Pulse</b> button at the FCOT end.
17	Push the <b>Pulse</b> button to dial from the test set at the RFT end. The results of the dialed digit outpulsing will be displayed at the test set at the FCOT end. <i>Requirement: Received PPS = 10, % Break = 64 ± 4%, Pulses counted = digit dialed</i> If the requirement cannot be met, perform Procedure 4-14, "Troubleshooting problems encountered while testing" on page 4-69, and repeat this step.
18	Reset the line cards at both ends to their originally provisioned values. Refer to <i>Line Card Provisioning Procedures</i> , 323-3001-315, in this volume.
19	Take down the jack access session at both ends. Use Procedure 6-7, "Saving or terminating a jack access session" on page 6-41.
20	Repeat steps 12 through 19 on each PLR line installed.

**Figure 4-23**  
**PLR signaling test setup**



—end—

---

## Procedure 4-14

# Troubleshooting problems encountered while testing

---

Use this procedure to methodically determine a solution to problems encountered during testing. Use this procedure when referred here from one of the testing procedures.

### Action

---

Step	Action
1	<p>If a test fails to provide the proper results, try one or more of the following, preferably in the order given:</p> <ul style="list-style-type: none"><li>• Reset the line card, so that it reloads software. (Use Procedure 2-4, “Resetting, replacing, or recommissioning a line card” on page 2-40 for resetting a line card.)</li><li>• Run line card diagnostics. (Use Procedure 2-3 for performing line card diagnostics.)</li><li>• Replace the line card. (Use the line card replacement procedure in the <i>Module Replacement Procedures</i>, 323-3001-547, in <i>Maintenance</i>, Volume 5C.)</li><li>• Ensure that the problem is just associated with the circuit under test, and does not have a wider scope.</li><li>• Call your supervisor for assistance.</li><li>• Call Nortel Networks ETAS for assistance.</li></ul>
2	Rerun the test that failed.
3	If the test fails again, try another of the suggestions in step 1.

—end—



---

# SMA/AccessNode IRTU Integration

---

This chapter describes the steps required to enable testing of AccessNode IDLC lines from the DMS-100 MAP position using the Integrated Remote Test Unit (IRTU) located at the AccessNode.

## Chapter contents

The following table lists the topics covered in this chapter. If you cannot successfully complete these procedures, contact your next level of support.

Procedure	Topic	See
	Description	page 5-1
	Testing	page 5-2
	Control and talk/monitor paths	page 5-3
	Table RDTINV	page 5-3
	Table LNINV	page 5-4
5-1	Datafilling the RDTINV table	page 5-5
5-2	Datafilling the LNINV table	page 5-7
5-3	Verifying the status of MAP IRTU testing components	page 5-10
5-4	Performing a line test from the DMS-100 MAP position	page 5-11

## Description

The IRTU is an integrated test head for Line/Loop testing of all AccessNode narrow and wide band services.

Map IRTU provides access from the switch to the remote metallic test equipment residing in the AccessNode. Map IRTU replaces the multi-line test unit (MTU) and test bypass pair (TBP) in the DMS-100, or an external remote test unit (ERTU) at the AccessNode.

The IRTU can emulate the MTU and digital remote test unit (DRTU). The DRTU is one type of ERTU. By eliminating the TBP and MTU, the IRTU removes distance limitations and electrical deviations created by the TBP and the need for a metallic path and its associated hardware.

### **Testing**

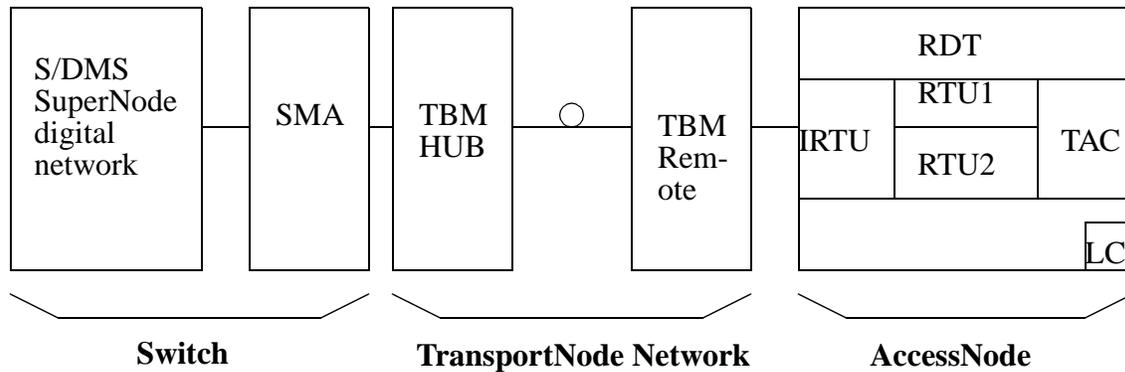
The IRTU has two analog test heads, remote test unit 1 (RTU 1) and remote test unit 2 (RTU 2). Before you can begin testing, you must gain access to the line under test through the metallic test access unit (MTAU) and the metallic test access path termination (MTAPT).

A permanent correlation exists between the RTU and the test access point (TAP). RTU 1 is connected to TAP 1 and RTU 2 is connected to TAP 2.

The IRTU provides an interface to internal and external testing systems. This chapter describes only the internal test system (for example, the DMS-100 MAP terminal). The IRTU provides MTU emulation to perform line maintenance tests initiated from the MAP terminal.

Figure 5-1 shows an example of an internal test system.

**Figure 5-1**  
**Internal IRTU Interface**



For a more complete description of the various internal and external testing configurations, refer to NTP 297-8521-550, *SCM-100 Access Maintenance Manual* section on “Trouble isolation and correction” under Integrated Remote Test Unit. If you are using SMA2, refer to NTP 297-8321-550, *Expanded Subscriber Carrier Module-100 Access Maintenance Manual*.

## Control and talk/monitor paths

An ERTU device requires control and talk or monitor paths which are provided using line cards. The control path is used to send commands to the test head. The talk or monitor path is used to monitor or talk to the line under test. For the IRTU, this functionality is provided by the IRTU line cards (ILC) residing in the AccessNode. The ILC talk path is required for MAP display-based MONLTA and TALKLTA connections.

## Table RDTINV

ILC Provisioning and RDTINV Table Control for IRTU provide table changes for the addition of the IRTU line card and virtual IRTU line card for the AccessNode. The fields affected by this feature are in field MTSTACPT. Completion of field MTSTACPT and installation of the IRTU card activates IRTU access.

**Table LNINV**

To provision the Integrated Line Card (ILC), use **RDILC** as the value for field **CARDCODE**. The following is a list of new card types for field **CARDINFO**:

- **ILC1C** - ILC control path for test head 1
- **ILC1T** - ILC talk path for test head 1
- **ILC2C** - ILC control path for test head 2
- **ILC2T** - ILC talk path for test head 2

ILCs provide origination and termination points for maintenance functions. Because ILCs represent a maintenance function and no service capability, **SERVORD** will only allow a directory number and one flat rate (IFR) service for all IRTU line card creations.

Because the ILC is a virtual concept, no line card is associated with the IRTU line at the AccessNode. However, an empty copper distribution shelf slot must be reserved for each ILC. Provisioning an ILC on an occupied slot at the AccessNode will result in a mismatch condition at the AccessNode.

## Procedure 5-1 Datafilling the RDTINV table

Use this procedure to datafill the RDTINV table.

### Requirements

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

- DMS-100 is running BCS37 or later.
- RDTINV options are provisioned.
- A valid equipment configuration must be datafilled on the switch side.
- AccessNode System is running AN08 software or later.
- TAC card and IRTU card are present and In-Service at the AccessNode RFT.
- Provisioned Integrated Line Card (ILC) on AccessNode for Monitor commands.

### Action

Step	Action
1	Assign test heads 1 and 2 (to be used with the IRTU) from the MAP position by datafilling the test head fields shown in Table 5-1 below.

**Table 5-1**  
RDTINV Fields for MAP IRTU Testing

Field	Test Head 1	Test Head 2
TSTUTTYP	IRTU	IRTU
RTUNUM	RTU1	RTU2
TSTHDUSER	MAPIF	MAPIF
ALTUSE	N	N
TSTACCPA	TAP1	TAP2
SCSDUSED	N	N

**Note:** The IRTU-related fields are the same for both SMA and SMA2.  
Figure 5-2 on page 5-6 shows table RDTINV datafilled for use with the IRTU.

—continued—

## 5-6 SMA/AccessNode IRTU Integration

Procedure 5-1 (continued)

### Datafilling the RDTINV table

---

Step	Action
------	--------

---

**Figure 5-2**

**Table RDTINV datafilled for the IRTU**

```
>table rdtinv
MACHINES NOT IN SYNC - DMOS NOT ALLOWED
JOURNAL FILE UNAVAILABLE - DMOS NOT ALLOWED
TABLE: RDTINV
>pos n115 1 0
N115 01 0 29 SMA 6 115 $
      $                $
RFT 1 7 1 96          Y
      (IRTU RTU1 MAPIF N TAP1 N ) (IRTU RTU2 MAPIF N TAP2 N )$
      ( 1 13) ( 2 15)$
N      STDLN          S
                        $
(NETWORK_ID 1) (SYSTEM_ID 1) (NETWORKELEMENT_ID 115)
(EQUIPMENT_ID 1) $
```

**Note:** For a more detailed description of the fields in table RDTINV, refer to the following NTP sections for SMA and SMA2 respectively:

- 297-8001-350, *North American DMS-100 Translation Guide*, Volume 19
- 297-8321-8152, *Extended Peripheral Module Translations Reference*, Volume 2

—end—

---

## Procedure 5-2

### Datafilling the LNINV table

---

Use this procedure to datafill the LNINV table. Table LNINV must be datafilled for the Integrated Line Card (ILC), which is the *virtual* line card that emulates control, talk, and monitor path functionality.

For a more detailed description of the datafill for Table LNINV, refer to NTP 297-8321-8152, *Extended Peripheral Module Translations Reference*, Volume 2.

### Requirements

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

- DMS-100 is running BCS37 or later.
- RDTINV options are provisioned.
- A valid equipment configuration must be datafilled on the switch side.
- AccessNode System is running AN08 software or later.
- TAC card and IRTU card are present and In-Service at the AccessNode RFT.
- Provisioned Integrated Line Card (ILC) on AccessNode for Monitor commands.

### Action

---

Step	Action
1	Provision the control and talk paths for test heads 1 and 2 by entering: <b>table lnlv</b>

---

—continued—

## 5-8 SMA/AccessNode IRTU Integration

### Procedure 5-2 (continued) Datafilling the LNINV table

- | Step     | Action  |         |                    |        |                                |          |  |        |                              |
|----------|---|---------|--------------------|--------|--------------------------------|----------|--|--------|------------------------------|
| 2        | <p>Enter the following information:</p> <pre>add n115 1 0 &lt;shelf&gt; &lt;slot&gt; &lt;rdtilc&gt; stdln working n nl n &lt;card&gt; y y</pre> <p>where</p> <table><tr><td>&lt;shelf&gt;</td><td>AccessNode shelf #</td></tr><tr><td>&lt;slot&gt;</td><td>AccessNode (line card?) slot #</td></tr><tr><td>&lt;rdtilc&gt;</td><td>value to be entered for CARDCODE field</td></tr><tr><td>&lt;card&gt;</td><td>card type for field CARDINFO</td></tr></table> <ul style="list-style-type: none"><li>• <b>ilc1c</b> = ILC control path for test head 1</li><li>• <b>ilc1t</b> = ILC talk path for test head 1</li><li>• <b>ilc2c</b> = ILC control path for test head 2</li><li>• <b>ilc2t</b> = ILC test path for test head 2</li></ul> | <shelf> | AccessNode shelf # | <slot> | AccessNode (line card?) slot # | <rdtilc> | value to be entered for CARDCODE field | <card> | card type for field CARDINFO |
| <shelf>  | AccessNode shelf #  |         |                    |        |                                |          |  |        |                              |
| <slot>   | AccessNode (line card?) slot #  |         |                    |        |                                |          |  |        |                              |
| <rdtilc> | value to be entered for CARDCODE field  |         |                    |        |                                |          |  |        |                              |
| <card>   | card type for field CARDINFO  |         |                    |        |                                |          |  |        |                              |
| 3        | <p>Repeat step 2 until each control path, talk path, and card type for test heads 1 and 2 have been entered, as shown in Figure 5-3 below.</p>  |         |                    |        |                                |          |  |        |                              |

**Figure 5-3**  
**Table LNINV datafilled for the ILC**

```
>table lninv
MACHINES NOT IN SYNC - DMOS NOT ALLOWED
JOURNAL FILE UNAVAILABLE - DMOS NOT ALLOWED
TABLE: LNINV
>pos n115 1 0 1 93
N115 01 0 01 93 RDILC STDLN HASU N NL N ILC1C
>list 4
      LEN  CARDCODE PADGRP  STATUS GND BNV MNO      CARDINFO
-----
N115 01 0 01 93 RDILC  STDLN  HASU  N  NL  N  ILC1C
N115 01 0 01 94 RDILC  STDLN  HASU  N  NL  N  ILC1T
N115 01 0 01 95 RDILC  STDLN  HASU  N  NL  N  ILC2C
N115 01 0 01 96 RDILC  STDLN  HASU  N  NL  N  ILC2T
```

—continued—

---

Procedure 5-2 (continued)  
Datafilling the LNINV table

---

Step	Action
------	--------

---

- 4 Use SERVORD to assign a DN to the ILCs.

**servord**

**new \$ 5201593 1fr n115 1 0 1 93 dgt \$ yy**

**new \$ 5201594 1fr n115 1 0 1 94 dgt \$ yy**

**new \$ 5201595 1fr n115 1 0 1 95 dgt \$ yy**

**new \$ 5201596 1fr n115 1 0 1 96 dgt \$ yy**

*The STATUS field in Table LNINV will change from HASU to WORKING.*

—end—

## Procedure 5-3

# Verifying the status of MAP IRTU testing components

---

Use this procedure to verify the status of the components involved in MAP integrated remote test unit (IRTU) testing.

*Note:* To facilitate IRTU testing from the DMS-100 MAP position, no specific provisioning is necessary on the AccessNode side.

### Requirements

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

- The AccessNode has been commissioned and provisioned and is communicating with the switch.
- The test access card (TAC) is present in slot 20.
- The IRTU card is present in slot 21.

### Action

---

Step	Action
1	Verify the IDT state is <b>InSv</b> by entering the following command from the DMS-100 MAP: <b>mapci;mtc;pm;post idt &lt;idt#&gt;</b> <i>The IDT state appears.</i>
2	From the AccessNode MAPCI, verify the TAC state is In-service ( <b>IS</b> ) by entering: <b>eq tac</b> <i>The TAC state appears.</i>
3	Verify the IRTU state is <b>IS</b> and test head 1 and 2 states are <b>IS-Idle</b> by entering: <b>eq irtu</b> <i>The IRTU state appears.</i>
4	Verify the ILC states are all <b>IS</b> and the service provided is <b>ILCLSR</b> by entering: <b>eq lc &lt;shelf #&gt; &lt;slot #&gt;</b> <i>The ILC states and service provided appear.</i>

—end—

---

## Procedure 5-4

# Performing a line test from the DMS-100 MAP position

---

Use this procedure to perform a line test from the DMS-100 MAP position after the DMS-100 datafill has been completed.

*Note:* To perform a line/loop test on AccessNode Express systems using a remote ITBP, the DS1-6 switch on the I/O module (NTN555AB) must always be set to “ITBP”.

### Action

---

Step	Action
1	Enter the LTPLTA level on the DMS-100 MAP position.
2	Execute a line test by entering: <b>mapci;mtc;lns;ltplta;post I &lt;len&gt;;ltplta;Intst</b> <i>The DMS-100 MAP screen appears.</i>
3	Verify proper functioning of the AccessNode components with a <b>Test OK</b> response.
4	Verify the state of the line card under test is <b>IS-Traffic Busy-Metallic Access</b> .
5	Verify the state of the ITRU test heads is <b>IS-Busy</b> .

—end—



---

## Accessing circuits at LCAP jacks

---

This chapter has the procedures for using the FiberWorld product user interface (FWPUI) to set up test access to customer lines from jacks on the local craft access panel (LCAP). You use test access to do lineup, performance, or maintenance testing of customer circuits.

### How to use this chapter

Refer to the document task list of the process flow chart in Chapter 1 to determine which procedures you need to perform.

### Chapter contents

The following table lists the topics covered in this chapter. If you cannot successfully complete these procedures, contact your next level of support.

Procedure	Topic	See
	Description of jack access arrangements	page 6-1
	Jack access command functions	page 6-4
	System responses	page 6-5
6-1	Setting up metallic jack access	page 6-9
6-2	Setting up DDS jack access	page 6-14
6-3	Setting up 0TLP jack access	page 6-19
6-4	Using signaling control in 0TLP jack access	page 6-24
6-5	Setting up metallic and digital jack access	page 6-34
6-6	Connecting jack access to a different line card	page 6-39
6-7	Saving or terminating a jack access session	page 6-41

### Description of jack access arrangements

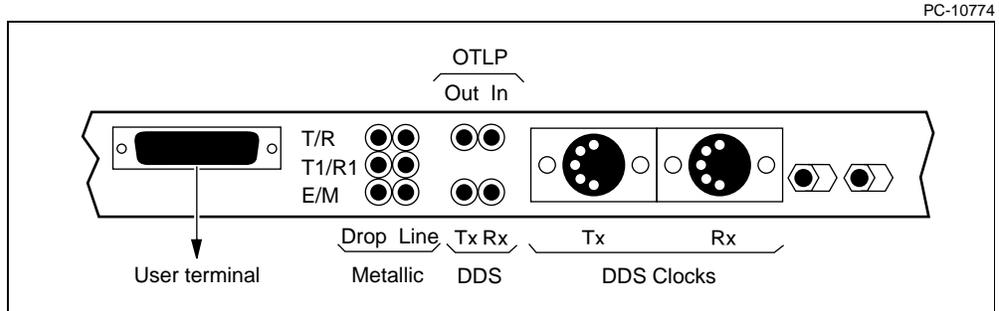
Jack access capability is provided to support special services lineup, end-to-end performance testing, and troubleshooting. The following jack access arrangements are possible:

- Metallic jack access (bridged or split)
- 0TLP jack access (monitor or split)
- DDS jack access (monitor or split)

Details of each type of jack access follow.

**Metallic jack access**

Six bantam jacks on the LCAP are designated for metallic jack access. As shown in the following figure, they are arranged in two columns of three jacks each. The jacks are labelled T/R, T1/R1, and E/M. When connecting the jacks to a 2-wire circuit, only the T/R jacks are used. Similarly, T/R and T1/R1 jacks connect to 4-wire circuits, and all three jacks connect to 6-wire circuits, such as E&M trunks.



The metallic jacks connect to the metallic side of the desired line card. Two metallic access arrangements exist, bridged access and split access. Bridged access (the default metallic jack access arrangement) provides access without interrupting the path between the line card and the loop. Split access splits the path on the metallic side of the line card into two paths, terminating the loop at the Drop jacks and terminating the line card at the Line jacks. Split access is service-affecting. After the split command is entered, the jacks remain configured in a bridged mode until a plug is actually inserted into the jack.



**CAUTION**  
**Bridged access can be service-affecting on DDS**  
 Make sure access is absolutely necessary *before* establishing metallic bridged jack access to a DDS-provisioned line card.



**CAUTION**  
**Plugging in jacks can cause hits on a DDS circuit**  
 To avoid hits on a DDS circuit, you should connect the test equipment to the LCAP jacks *before* setting up jack access to the DDS-provisioned line card.

*Note:* When plugging a test cord into the metallic jack on the LCAP at the FCOT, you might encounter a five-second delay before the transmission path between the FCOT and RFT is enabled again. This delay does not occur if the test equipment you are using is compatible with the battery-detection debounce feature. This feature restores the transmission

path between the FCOT and the RFT almost immediately upon detection of loss of battery feed to the FCOT line card. Loss of office battery occurs, for example, when a split metallic jack access is set up at the FCOT.

### **OTLP jack access**

OTLP jacks provide access to the zero transmission level point of an analog circuit. They provide voice frequency access to the digital side (DS0 portion) of the line card, one jack for each direction of transmission.

Two bantam jacks on the LCAP are designated for OTLP jack access. As shown in the previous figure, the jacks are labelled Out and In.

Several arrangements exist, as follows:

- monitor access (near-end or far-end)
- split access (near-end or far-end)

Monitor access provides a monitor capability without interrupting the digital path from and to the line card. Near-end monitor access (the default OTLP jack access arrangement) connects the Out jack to the transmit path, while far-end monitor access connects the Out jack to the receive path.

Split access splits both paths on the digital side of the line card. Split access is service-affecting.

In the near-end split arrangement, the transmit path from the line card terminates at the Out jack, and the receive path to the line card terminates at the In jack. Path conditioning is automatically transmitted to the far end. Signaling control can be transmitted to and received from the near end.

In the far-end split arrangement, the transmit path to the far end terminates at the In jack, and the receive path from the far end terminates at the Out jack. Path conditioning is automatically transmitted to the near end (to the line card). Signaling control can be transmitted to and received from the far end.

### **DDS jack access**

Internal circuitry provides jack access to the digital side of the desired line card. Intended for digital data circuits, this is called DDS jack access.

Two bantam jacks on the LCAP are designated for DDS jack access. As shown in the preceding illustration, the jacks are labelled Tx and Rx.

Two arrangements exist, as follows:

- full monitor access
- full splitting access

Full monitor access (the default DDS jack access arrangement) provides a monitor capability without interrupting the digital path from and to the line card. It connects the Rx jack tip lead to the transmit path from the line card, and connects the Rx jack ring lead to the receive path from the far end.

Split access splits both paths on the digital side of the line card. Split access is service-affecting.

## Jack access command functions

Table 6-1 lists FWUI commands:

**Table 6-1**  
**FWUI commands**

Command	Description
<b>jackacc acc met</b>	set up metallic access (bridged is default)
<b>jackacc ueacc met</b>	set up metallic access (bridged is default) for UE9000
<b>metsplit, metbrdge</b>	change existing metallic access to split or bridged metallic access
<b>jackacc acc dig</b>	set up digital access (monitor full is default)
<b>jackacc anxacc dig</b>	set up digital access on AccessNode Express (monitor full is default)
<b>ddsmon, ddssplit</b>	change existing digital access to monitor or split digital access
<b>jackacc acc tlp</b>	set up 0TLP access (monitor near-end is default)
<b>jackacc anxacc tlp</b>	set up 0TLP access on AccessNode Express (monitor near-end is default)
<b>tlpmon, tlpssplit</b>	change existing 0TLP access to monitor or split 0TLP access
<b>chkdir</b>	toggle the direction of a 0TLP access arrangement between far-end and near-end
<b>chgtxsig</b>	insert signaling control (AB or ABCD signaling conditions as appropriate) in a split 0TLP access
<b>jackacc acc all</b>	arrange both metallic and digital jack access when starting a session
<b>cnctboth</b>	arrange both metallic and digital jack access during a session
<b>select</b>	apply an existing jack access arrangement to a different line card
<b>savequit</b>	save a jack access arrangement to do work in a different user interface screen
<b>jackacc r</b>	resume the same (or an expanded) jack access session
<b>logout</b>	quit disconnect jack access
<b>help</b>	obtain help for jack access commands or screens

## System responses

During a jack access session, you can see one of the following system responses displayed on the screen. They are separated into warnings, errors, and hints. Most of the error messages are provided for information only. If a user response is required, this is explained below the message.

### Warnings

A warning is displayed if the next action you take can risk personal injury or equipment damage. You must respond to a warning in order to proceed.



#### **DANGER**

##### **Risk of injury or damage due to hazardous voltage**

If you establish the jack access connection, you can encounter hazardous voltage, which could result in personal injury, or damage to equipment.

### **Hazardous voltage check**

If an overvoltage condition is detected on the line when attempting to establish metallic jack access to a line card:

*WARNING: Hazardous Voltage Detected. Continue?*

Answering “yes” or “y” results in a forced connection to the line.

If you are changing from TLP access to metallic/TLP access:

*WARNING: Unable to check for Hazardous Voltage — Resources unavailable. Continue?*

Answering “yes” or “y” results in a forced connection to the line.

### **Red-lined circuit**

If the user selects a line which has been provisioned as a red-lined circuit:

*WARNING: This is a red-lined circuit. Continue?*

Respond “yes” to establish jack access or “no” to abandon jack access to the line.



#### **CAUTION**

##### **Risk of service interruption on a priority service**

If you establish split jack access, you affect service on a red-lined circuit. Ensure that jack access to this circuit is absolutely necessary before proceeding.

## Errors

Errors usually provide information about why the requested action cannot be performed.

### **Jack access is denied**

If you attempt to start a jack access session while another user is already using jack access, access is denied, and the following response is displayed:

*ERROR: Test session already in progress.*

### **Jack access abandoned**

If you enter a jack access command after the test session has been abandoned, one of the following messages is displayed:

*ERROR: Metallic Test Session has been aborted.*

*ERROR: Digital Test Session has been aborted.*

*ERROR: Test Session has been aborted.*

### **Jack access session saved**

If you attempt to start a new jack access session when one is saved:

*ERROR: Test session in progress. Use resume.*

*ERROR: Jack Access currently active on Shelf: Slot:*

### **Jack access session not saved**

If you attempt to resume a jack access session when none is saved:

*ERROR: Invalid Choice. No Test Session has been saved.*

### **Service not provisioned**

If you select a line which has no service provisioned:

*ERROR: Service not provisioned. Access denied.*

### **Invalid service**

If you select a line which has been provisioned for a service not recognized by the Jack Access feature:

*ERROR: Provisioned service not valid for Jack Access.*

If you select a line which has been provisioned for a service not valid for the type of jack access already set up:

*ERROR: Provisioned service not valid for TLP Access.*

*ERROR: Dig access only valid with Digital Terminations*

### **TLP access in one direction only**

One of the following messages are displayed, for example, if the change direction command did not work:

*ERROR: Access only granted in far direction.*

*ERROR: Access only granted in near direction.*

### **Signaling bits in TLP Mon mode**

If you attempt to change the signaling bits while in TLP monitor access:

*ERROR: Cannot change signaling bits while in Monitor mode.*

**Software error**

This is an internal error beyond the user's control.

*Software error. Request denied.*

**Discontinuing jack access**

The following errors are possible upon discontinuing jack access:

*ERROR: Line termination deregistration unsuccessful*

*ERROR: Line card deregistration unsuccessful*

*ERROR: Metallic test access deregistration unsuccessful*

*ERROR: Digital test access deregistration unsuccessful*

*ERROR: 0TLP signaling deregistration unsuccessful*

*ERROR: Could not disconnect metallic test access*

*ERROR: Could not disconnect digital test access*

**Other common equipment errors**

Metallic test access depends on the TAC, MTAC, and line card being in the in-service-Normal (IS-NR) state. Digital test access depends on the TAC and line card being in the same state. If a card is not IS-NR, one of the following error messages are issued, followed by an appropriate hint.

*ERROR: Could not connect metallic loop-around*

*ERROR: Could not connect metallic monitor access*

*ERROR: Could not change to bridged configuration*

*ERROR: Could not connect metallic jack*

*ERROR: Could not connect digital loop-around*

*ERROR: Could not change digital test configuration*

*ERROR: Could not start 0TLP transmit signaling*

*ERROR: Could not change 0TLP transmit signaling bits*

*ERROR: Could not change to metallic split configuration*

*ERROR: Could not change to metallic bridged configuration*

*ERROR: Could not retrieve line termination information*

*ERROR: Line termination data not available*

*ERROR: Line card CPG data not available*

*ERROR: Metallic test access data not available*

*ERROR: Digital test access data not available*

*ERROR: 0TLP signaling data not available*

## Hints

A hint that provides an indication of how to resolve the error is usually given following an error message.

*HINT: The TAC state needs to be IS-Normal.*

*HINT: The MTAC state needs to be IS-Normal.*

*HINT: Line card state is not IS-Normal.*

*HINT: Line termination state is not IS-Normal.*

*HINT: Resources unavailable for jack access.*

*HINT: Line card is in protection state.*

*HINT: Line card is in load fail state.*

*HINT: Line card common equipment is not IS-Normal.*

*HINT: Line card is in test fail state.*

*HINT: Line card is in mismatch state.*

*HINT: Line card is unequipped.*

*HINT: Check LIC state on AIC plane being monitored.*

*HINT: Path or hardware problem in facility direction.*

---

## Procedure 6-1

### Setting up metallic jack access

---

Use this procedure to set up metallic jack access to a customer line at the local craft access panel (LCAP). Two metallic jack access modes are possible: bridged access and full splitting access.

**DANGER****Risk of injury or damage if hazardous voltage is detected**

If hazardous voltage is detected on a line, you are offered the choice of continuing or abandoning your attempt to establish jack access. See this and other possible system responses on page 6-5.

**CAUTION****Split access is service-affecting**

Before setting up split access, be sure that the jacks are connected to the intended line card. Otherwise, you can accidentally put a customer's line out of service.

**CAUTION****Risk of data hits on the DDS circuit under test**

Setting up the metallic jack access connection before connecting test equipment to the LCAP jacks can cause data hits on the DDS circuit. Be sure to connect the test equipment to the LCAP jacks *before* setting up metallic jack access to a DDS circuit.

This procedure shows how to set up metallic jack access when:

- no jack access is connected
- metallic jack access is already connected and you want to modify it

To set up metallic jack access when digital jack access is already connected, refer to Procedure 6-5, “Setting up metallic and digital jack access” on page 6-34.

To save, resume, or quit a jack access session, refer to Procedure 6-7, “Saving or terminating a jack access session” on page 6-41.

### Requirements

The line termination to be accessed must be provisioned.

—continued—

6-10 Accessing circuits at LCAP jacks

---

Procedure 6-1 (continued)

**Setting up metallic jack access**

---

You need the following information and equipment:

- a userID and password that permits you to use the jack access level of the FiberWorld product user interface (FWPUI)
- a VT100-compatible user terminal, connected to the LCAP DTE port

**Action**

---

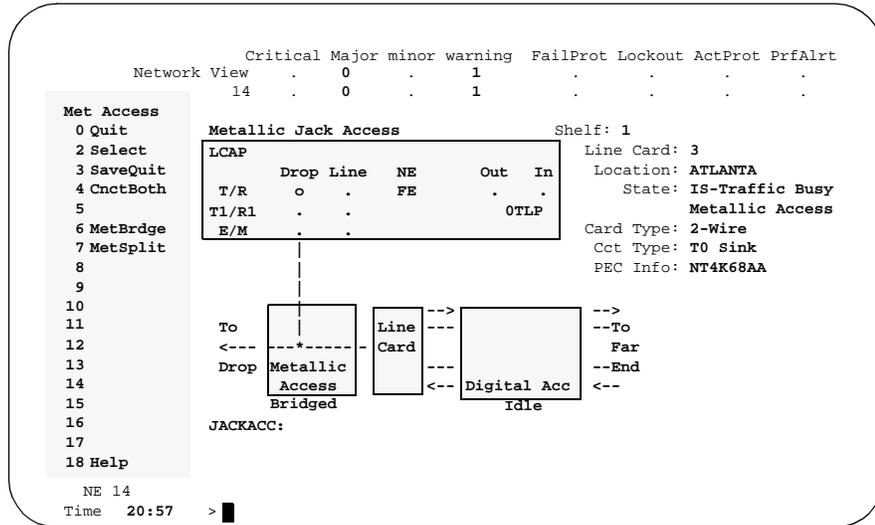
<b>Step</b>	<b>Action</b>								
1	Determine the type of system you have.  <table><thead><tr><th><b>If you are connecting to</b></th><th><b>Then</b></th></tr></thead><tbody><tr><td>Copper distribution shelves</td><td>Go to step 2.</td></tr><tr><td>AccessNode Express</td><td>Go to step 3.</td></tr><tr><td>Universal Edge 9000 shelves</td><td>Go to step 4.</td></tr></tbody></table>	<b>If you are connecting to</b>	<b>Then</b>	Copper distribution shelves	Go to step 2.	AccessNode Express	Go to step 3.	Universal Edge 9000 shelves	Go to step 4.
<b>If you are connecting to</b>	<b>Then</b>								
Copper distribution shelves	Go to step 2.								
AccessNode Express	Go to step 3.								
Universal Edge 9000 shelves	Go to step 4.								
2	If no jack access is already connected, log in to FWPUI and set up metallic jack access to the desired line card by entering: <b>jackacc acc met &lt; CDS# &gt; &lt; slot &gt; ↵</b> where  met connects the metallic jacks to the metallic side of the line card in a bridged configuration  CDS# an integer in the range <b>1</b> to <b>7</b> ; this is the copper distribution shelf containing the desired line card  slot an integer in the range <b>1</b> to <b>96</b> ; this is the slot containing the desired line card								

*The Metallic Jack Access screen appears, confirming jack access to the desired line card. The default access type is bridged. A typical view is shown in the following figure. The metallic Drop jacks are connected to the line.*

—continued—

Procedure 6-1 (continued)  
**Setting up metallic jack access**

**Step Action**



Go to step 5.

- 3** If no jack access is already connected, log in to FWUI and set up metallic jack access to the desired line card by entering:

**jackacc anxacc met < VM# > < slot > ↵**

where

met connects the metallic jacks to the metallic side of the line card in a bridged configuration

VM# an integer in the range **1** to **28**; this is the voice module containing the desired line card

slot an integer in the range **1** to **48**; this is the slot containing the desired line card

*The Metallic Jack Access screen appears, confirming jack access to the desired line card. The default access type is bridged.*

Go to step 5.

—continued—

## 6-12 Accessing circuits at LCAP jacks

---

Procedure 6-1 (continued)

### Setting up metallic jack access

---

Step	Action								
4	<p>If no jack access is already connected, log in to FWPUI and set up metallic jack access to the desired line card by entering:</p> <pre>jackacc ueacc met &lt; shelf# &gt; &lt; mlc &gt; &lt; circuit &gt; ↵</pre> <p>where</p> <table><tr><td>met</td><td>connects the metallic jacks to the metallic side of the line card in a bridged configuration</td></tr><tr><td>shelf#</td><td>an integer in the range <b>1</b> to <b>7</b>; this is the voice module containing the desired line card</td></tr><tr><td>mlc</td><td>an integer in the range <b>1</b> to <b>16</b>; this is the multi-circuit line card containing the desired line circuit</td></tr><tr><td>circuit</td><td>an integer in the range of <b>1</b> to <b>24</b>; this is the line circuit</td></tr></table>	met	connects the metallic jacks to the metallic side of the line card in a bridged configuration	shelf#	an integer in the range <b>1</b> to <b>7</b> ; this is the voice module containing the desired line card	mlc	an integer in the range <b>1</b> to <b>16</b> ; this is the multi-circuit line card containing the desired line circuit	circuit	an integer in the range of <b>1</b> to <b>24</b> ; this is the line circuit
met	connects the metallic jacks to the metallic side of the line card in a bridged configuration								
shelf#	an integer in the range <b>1</b> to <b>7</b> ; this is the voice module containing the desired line card								
mlc	an integer in the range <b>1</b> to <b>16</b> ; this is the multi-circuit line card containing the desired line circuit								
circuit	an integer in the range of <b>1</b> to <b>24</b> ; this is the line circuit								

*The Metallic Jack Access screen appears, confirming jack access to the desired line card. The default access type is bridged.*

Go to step 5.

**5** If you want to change bridged metallic access to split metallic access, perform step 6. If you want to change split metallic access to bridged metallic access, perform step 7.

**6** To set up split access, enter:

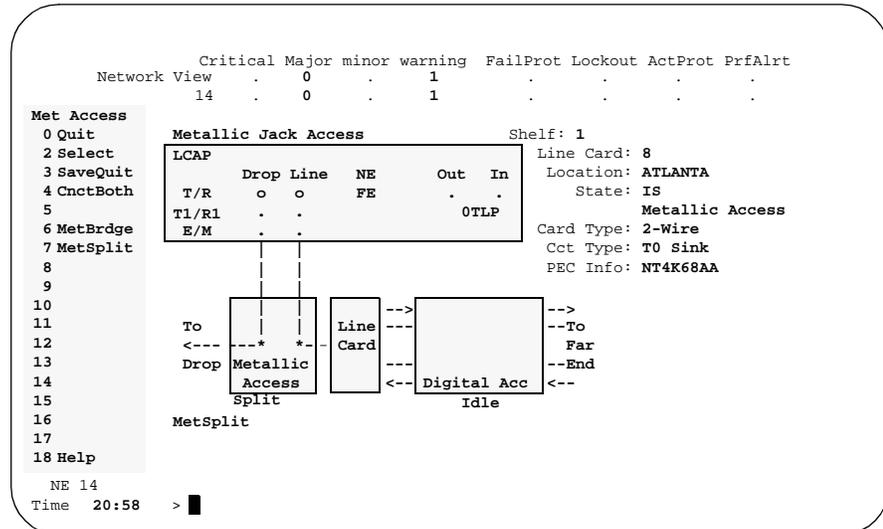
```
metsplit.↵
```

*The Metallic Jack Access screen is displayed, showing split access to the same line card. A typical CDS view is shown in the following figure.*

—continued—

Procedure 6-1 (continued)  
**Setting up metallic jack access**

**Step Action**



**Note:** Although the screen shows that the jack access is in split mode, the circuit remains bridged until you insert a bantam plug into one of the metallic jacks.

*When a bantam plug is inserted into the LCAP jacks, the loop becomes disconnected from the line card. The metallic Line jacks connect to the line card, and the metallic Drop jacks connect to the loop.*

**7** To set up bridged access, enter:

**metbrdge.**

*The Metallic Jack Access screen appears, in bridged mode. The metallic Drop jacks are connected to the line.*

—end—

## Procedure 6-2

### Setting up DDS jack access

---

Use this procedure to set up DDS jack access to a customer line at the local craft access panel (LCAP). This procedure describes how to connect the DDS jacks on the LCAP to a line card in one of the following arrangements:

- full monitor (access to near and far ends)
- full splitting (access to near and far ends)

See page 6-3 for a description of these arrangements.



#### **DANGER**

##### **Risk of injury or damage if hazardous voltage is detected**

If hazardous voltage is detected on a line, you are offered the choice of continuing or abandoning your attempt to establish jack access. See this and other possible system responses on page 6-5.



#### **CAUTION**

##### **Split access is service-affecting**

Before setting up split access, be sure that the jacks are connected to the intended line card. Otherwise, you can accidentally put a customer's line out of service.

This procedure shows how to set up DDS jack access when:

- no jack access is connected
- DDS jack access is already connected and you want to modify it

To set up DDS jack access when metallic jack access is already connected, refer to Procedure 6-5, "Setting up metallic and digital jack access" on page 6-34.

To save, resume, or quit a jack access session, refer to Procedure 6-7, "Saving or terminating a jack access session" on page 6-41.

## Requirements

You need a userID and password that permits you to use the jack access level of the FiberWorld product user interface (FWPUI).

You need a VT100-compatible terminal, connected to the LCAP DTE port.

The line termination to be accessed must be provisioned.

—continued—

Procedure 6-2 (continued)  
**Setting up DDS jack access**

**Action**

Step	Action						
1	<p>Determine the type of system you have.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">If you are connecting to</th> <th style="text-align: left;">Then</th> </tr> </thead> <tbody> <tr> <td>Copper distribution shelves</td> <td>Go to step 2.</td> </tr> <tr> <td>AccessNode Express</td> <td>Go to step 3.</td> </tr> </tbody> </table>	If you are connecting to	Then	Copper distribution shelves	Go to step 2.	AccessNode Express	Go to step 3.
If you are connecting to	Then						
Copper distribution shelves	Go to step 2.						
AccessNode Express	Go to step 3.						
2	<p>If no jack access is already connected, log in to FWPUl and set up DDS jack access to the desired line card by entering:</p> <pre>jackacc acc dig &lt; CDS# &gt; &lt; slot &gt; ↵</pre> <p>where</p> <table border="0" style="width: 100%;"> <tr> <td style="padding-right: 20px;">dig</td> <td>connects the DDS jacks to the digital side of the line card</td> </tr> <tr> <td>CDS#</td> <td>an integer in the range <b>1</b> to <b>7</b>; this is the copper distribution shelf containing the desired line card</td> </tr> <tr> <td>slot</td> <td>an integer in the range <b>1</b> to <b>96</b>; this is the slot containing the desired line card</td> </tr> </table>	dig	connects the DDS jacks to the digital side of the line card	CDS#	an integer in the range <b>1</b> to <b>7</b> ; this is the copper distribution shelf containing the desired line card	slot	an integer in the range <b>1</b> to <b>96</b> ; this is the slot containing the desired line card
dig	connects the DDS jacks to the digital side of the line card						
CDS#	an integer in the range <b>1</b> to <b>7</b> ; this is the copper distribution shelf containing the desired line card						
slot	an integer in the range <b>1</b> to <b>96</b> ; this is the slot containing the desired line card						

*The following warning appears:*

Warning: This is a red-lined circuit.  
 Continue? Please confirm.

**y** ↵

*The DDS Jack Access screen appears, confirming jack access to the desired line card. The default access type is monitor full. A typical view is shown in the following figure. The DDS Rx jack is connected to the line as follows:*

- the Rx jack tip lead is connected to the line card's transmit stream
- the Rx jack ring lead is connected to the far end's transmit stream

—continued—



Procedure 6-2 (continued)  
**Setting up DDS jack access**

**Step Action**

The DDS Jack Access screen appears, confirming jack access to the desired line card. The default access type is monitor full. The DDS Rx jack is connected to the line as follows:

- the Rx jack tip lead is connected to the line card's transmit stream
- the Rx jack ring lead is connected to the far end's transmit stream

Go to step 4.

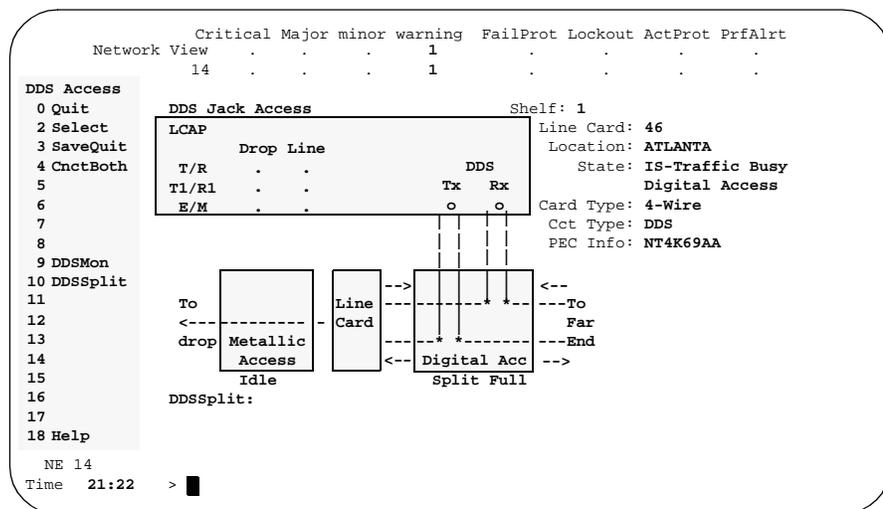
**4** Within an existing DDS jack access session, change access to the desired mode as follows:

**a.** To set up split access, enter:

**ddssplit.**

The DDS Jack Access screen is displayed, showing split access to the same line card. A typical view is shown in the following figure. The DDS Tx and Rx jacks are connected to the line as follows:

- the Rx jack tip lead is connected to the line card's transmit stream
- the Rx jack ring lead is connected to the far end's transmit stream
- the Tx jack tip lead is connected to the line card's receive stream
- the Tx jack ring lead is connected to the far end's receive stream



—continued—

## 6-18 Accessing circuits at LCAP jacks

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Procedure 6-2 (continued)

### Setting up DDS jack access

---

Step	Action
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---

b. To set up monitor access, enter:

**ddsmon.**␣

*The DDS Jack Access screen appears, in full monitor mode, as shown in the screen. The DDS Rx jack is connected to the line as follows:*

- the Rx jack tip lead is connected to the line card's transmit stream
- the Rx jack ring lead is connected to the far end's transmit stream

—end—

## Procedure 6-3

### Setting up OTLP jack access

Use this procedure to set up OTLP jack access to a customer line at the local craft access panel (LCAP). This procedure describes how to connect the OTLP jacks on the LCAP to the desired line card in one of the following arrangements:

- monitor access to near end
- monitor access to far end
- split access to near end (path conditioning to far end)
- split access to far end (path conditioning to near end)



#### **DANGER**

##### **Risk of injury or damage if hazardous voltage is detected**

If hazardous voltage is detected on a line, you are offered the choice of continuing or abandoning your attempt to establish jack access. See this and other possible system responses on page 6-5.



#### **CAUTION**

##### **Split access is service-affecting**

Before setting up split access, be sure that the jacks are connected to the intended line card. Otherwise, you can accidentally put a customer's line out of service.

This procedure shows how to set up OTLP jack access when:

- no jack access is connected
- OTLP jack access is already connected and you want to modify it

To control signaling in the split jack access mode, refer to Procedure 6-4, "Using signaling control in OTLP jack access" on page 6-24.

To set up OTLP jack access when metallic jack access is already connected, refer to Procedure 6-5 "Setting up metallic and digital jack access" on page 6-34.

To save, resume, or quit a jack access session, refer to Procedure 6-7, "Saving or terminating a jack access session" on page 6-41.

—continued—

Procedure 6-3 (continued)

**Setting up 0TLP jack access**

---

**Requirements**

The line termination to be accessed must be provisioned.

You need a VT100-compatible user terminal, connected to the LCAP DTE port.

You need a userID and password that permits you to use the jack access level of the FiberWorld product user interface (FWPUI).

**Action**

---

<b>Step</b>	<b>Action</b>						
1	Determine the type of system you have.  <table><thead><tr><th><b>If you are connecting to</b></th><th><b>Then</b></th></tr></thead><tbody><tr><td>Copper distribution shelves</td><td>Go to step 2.</td></tr><tr><td>AccessNode Express</td><td>Go to step 3.</td></tr></tbody></table>	<b>If you are connecting to</b>	<b>Then</b>	Copper distribution shelves	Go to step 2.	AccessNode Express	Go to step 3.
<b>If you are connecting to</b>	<b>Then</b>						
Copper distribution shelves	Go to step 2.						
AccessNode Express	Go to step 3.						
2	If no jack access is already connected, log in to FWPUI and set up 0TLP jack access to the desired line card by entering: <b>jackacc acc tlp &lt; CDS# &gt; &lt; slot &gt; ↵</b> where <table><tbody><tr><td>tlp</td><td>connects the 0TLP jacks to the digital side of the line card</td></tr><tr><td>CDS#</td><td>an integer in the range <b>1</b> to <b>7</b>; this is the copper distribution shelf containing the desired line card</td></tr><tr><td>slot</td><td>an integer in the range <b>1</b> to <b>96</b>; this is the slot containing the desired line card</td></tr></tbody></table>	tlp	connects the 0TLP jacks to the digital side of the line card	CDS#	an integer in the range <b>1</b> to <b>7</b> ; this is the copper distribution shelf containing the desired line card	slot	an integer in the range <b>1</b> to <b>96</b> ; this is the slot containing the desired line card
tlp	connects the 0TLP jacks to the digital side of the line card						
CDS#	an integer in the range <b>1</b> to <b>7</b> ; this is the copper distribution shelf containing the desired line card						
slot	an integer in the range <b>1</b> to <b>96</b> ; this is the slot containing the desired line card						

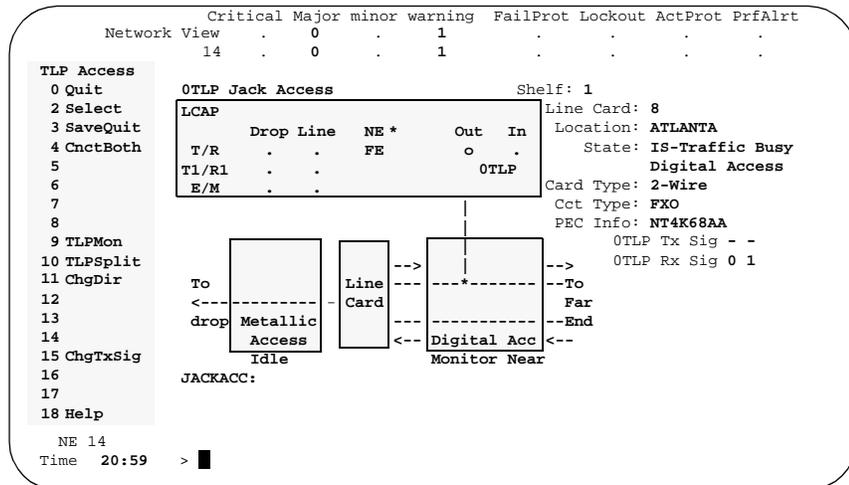
---

*The 0TLP Jack Access screen appears, confirming jack access to the desired line card. A typical CDS view is shown below. The default access type is monitor near-end. The 0TLP Out jack is connected to the line card's transmit stream.*

—continued—

Procedure 6-3 (continued)  
**Setting up 0TLP jack access**

**Step Action**



Go to step 4.

- 3 If no jack access is already connected, log in to FWUI and set up 0TLP jack access to the desired line card by entering:

**jackacc anxacc tlp < VM# > < slot > ↵**

where

tlp connects the 0TLP jacks to the digital side of the line card

VM# an integer in the range 1 to 28; this is the ANX shelf containing the desired line card

slot an integer in the range 1 to 48; this is the slot containing the desired line card

*The 0TLP Jack Access screen appears, confirming jack access to the desired line card. The default access type is monitor near-end. The 0TLP Out jack is connected to the line card's transmit stream.*

Go to step 4.

—continued—



---

Procedure 6-3 (continued)

**Setting up OTLP jack access**

---

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

---

- |          |  |
|----------|--|
| <b>5</b> | To toggle OTLP access between the near-end and far-end directions, enter:<br><b>chgdir</b> ↵<br><i>Near-end monitor or split access changes to far-end access. Far-end monitor or split access changes to near-end access.</i> |
|----------|--|

—end—

## Procedure 6-4 Using signaling control in 0TLP jack access

Use this procedure to control signaling (AB signaling on superframes or ABCD signaling on extended superframes) transmitted in a 0TLP split access arrangement. Also use it to read the AB(CD) signaling received at the 0TLP test access point.

The tables of signaling codes sent and received by the line card are listed following this procedure, starting on page 6-28.

Table 6-2 and Table 6-3 list, for each 0TLP jack access arrangement, the destination of the signaling transmitted by the 0TLP jack, and the source of the signaling received at the 0TLP jack. Transmitted signaling is displayed on the jack access screen in the 0TLP Tx Sig field. Received signaling is displayed in the 0TLP Rx Sig field.

**Table 6-2**  
**0TLP near-end jack access**

0TLP arrangement	Jack connections	Tx Sig field	Rx Sig field
near-end monitor	OUT jack receives the line card Tx stream	blank; AB(CD) not transmitted	AB(CD) rec'd from line card's Tx stream
near-end split	IN jack sends to the line card Rx stream; OUT jack receives the line card Tx stream	AB(CD) sent to line card's Rx stream	AB(CD) rec'd from line card's Tx stream

**Table 6-3**  
**0TLP far-end jack access**

0TLP arrangement	Jack connections	Tx Sig field	Rx Sig field
far-end monitor	OUT jack receives the far end's Tx stream	blank; AB(CD) not transmitted	AB(CD) received from far end's Tx stream
far-end split	IN jack sends to the far-end's Rx stream; OUT jack receives the far-end's Tx stream	AB(CD) sent to far end's Rx stream	AB(CD) received from far end's Tx stream

—continued—

---

Procedure 6-4 (continued)

**Using signaling control in 0TLP jack access**

---

Signaling generated by the 0TLP jack can be set in one of three modes: automatic, idle, or manual.

The automatic mode allows voice frequency transmission on circuits not provisioned with on-hook transmission by transmitting an off-hook signal pattern. Automatic mode is the default signal transmitted when split access is initiated.

The idle mode transmits an on-hook signal pattern, which puts the line termination in an idle call processing state. The on-hook and off-hook signal patterns are service dependent, and are further explained in Table 6-5 on page 6-30.

Several types of signaling control can be defined manually:

- ABCD signaling is used in extended superframes for locally switched universal (UDLC) services, such as POTS, universal voice grade (UVG), and coin. It provides four distinct signaling bits per extended superframe.
- AB signaling is used in superframes for most nonlocally switched special services and for TR08 services. It provides two distinct signaling bits per superframe. (In the AccessNode, AB signaling is duplicated and sent as four bits in each frame, formatted as ABAB.)

While performing this procedure, you could encounter some of the system responses listed on page 6-5 and following pages.

## Requirements

A 0TLP jack access session has been set up to a provisioned line card.

—continued—



Procedure 6-4 (continued)  
**Using signaling control in OTLP jack access**

**Step Action**

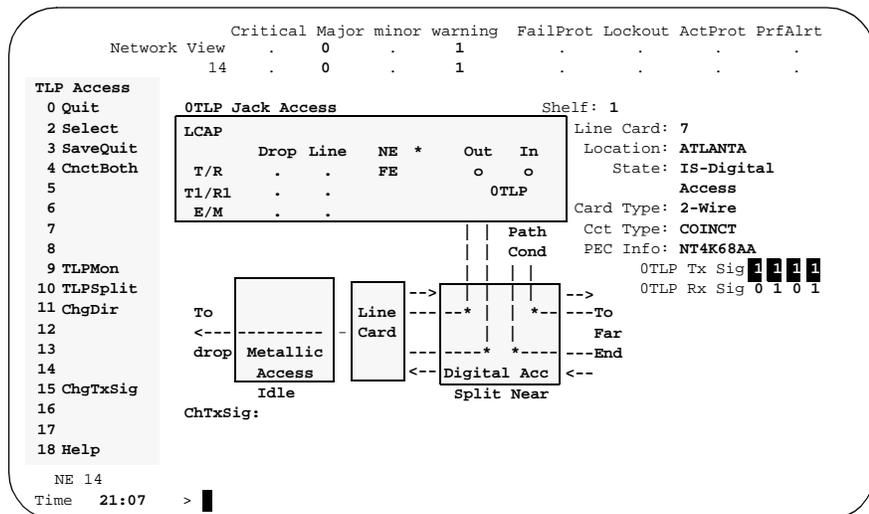
**3** To manually set the desired signaling control to the direction selected (near end or far end) for POTS, coin, and other switched services, enter:

**chgtxsig m < sig bits >.**

where

sig bits is a four-bit combination of 0's and 1's, with a space between each bit value, such as 0 0 0 0  
 The values are further explained in Table 6-5, page 6-30.

*The OTLP split access screen shows the bit codes transmitted to the far end.*



**4** To change signaling to automatic or idle condition, enter:

**chgtxsig < mode >.**

where

mode is i or a, with i = idle mode and a = automatic mode

*The automatic mode allows voice frequency transmission on circuits not provisioned with on-hook transmission by transmitting an off-hook signal pattern. The idle mode transmits an on-hook signal pattern, which puts the line termination in an idle call processing state. The on-hook and off-hook signal patterns are service dependent, and are further explained in Table 6-5 on page 6-30.*

—continued—

Procedure 6-4 (continued)

**Using signaling control in 0TLP jack access****Table 6-4**  
**Line card signaling for nonlocally switched special services**

Service (note 1)	Analog in → to line card (note 2)	ABCD out (note 3)	ABCD → in to LC (note 3)	Analog out from line card (note 4)	Tx mode (note 5)
TO/ETO	not applicable	–	–	–	–
FXS	ring grounded	0000	0000	negative superimposed ringing on the ring lead; tip is grounded	–
	loop open; ring not grounded	0101	0101	no ring; tip grounded	idle/ auto
	loop closed	1111	1x1x	no ring; tip not grounded	–
FXO	no ring; tip not grounded	1111	1111	loop closed	auto
	no ring; tip grounded	0101	0101	loop open; ring not grounded	idle
	ring; tip grounded	0000	0000	ring grounded	
DPO	loop open	0000	0x0x	normal battery	idle
	loop closed	1111	1x1x	reverse battery	auto
DPT	normal battery	0000	0x0x	loop open	idle
	reversed battery	1111	1x1x	loop closed	auto
E&M	M-lead grounded or open	0000	0x0x	E-lead open	idle
	battery on M-lead	1111	1x1x	E-lead grounded or looped	auto
PLR	E-lead open	0000	0x0x	M-lead grounded or open	idle
	E-lead grounded or looped	1111	1x1x	M-lead battery or looped	auto
DX or Tandem 2-state	on-hook	0000	0x0x	on-hook	idle
	off-hook	1111	1x1x	off-hook	auto
—continued—					

—continued—

Procedure 6-4 (continued)  
**Using signaling control in 0TLP jack access**

**Table 6-4 (continued)**  
**Line card signaling for nonlocally switched special services**

Service (note 1)	Analog in → to line card (note 2)	ABCD out (note 3)	ABCD → in to LC (note 3)	Analog out from line card (note 4)	Tx mode (note 5)
Tandem 3-state station	ring grounded	0000	0000	ring	–
	loop open	0101	0101	loop current feed (battery)	auto
	loop closed	1111	1x1x	loop current feed open (no battery)	idle
Tandem 3-state office	loop current feed open (no battery)	1111	1111	loop closed	auto
	loop current feed (battery)	0101	0101	loop open	idle
	ring	0000	0000	ring grounded	–
MRD	ring	0000	0x0x	ring	–
	no ring	1111	1x1x	no ring	idle/auto
PLAR-I	loop open	0000	0x0x	no ring	idle/auto
	loop open	1111	1x1x	ring (if loop is open)	–
PLAR-II	loop open	0000	0x0x	ring (if loop is open)	–
	loop open	1111	1x1x	no ring	idle/auto

**Note 1:** Subclasses of a main service are not listed, because they have signaling identical to the main service.

**Note 2:** “ABCD out” in column 3 represents the signaling generated by the line card when it receives the “Analog in →” signal in column 2.

**Note 3:** For services where only AB signaling is valid, signaling is shown ABAB. That is, bit C = A, and bit D = B. An x in the signal code means that the value of x can be 0 or 1; for example, in the code 1x1x, only the 1 is relevant.

**Note 4:** “Analog out” in column 5 is the analog signal presented by the line card to the loop when it receives the “ABCD →” signal in column 4.

**Note 5:** Tx mode in column 6 indicates that, under idle or automatic signaling control, the 0TLP jack in split mode transmits the “ABCD →” signal in column 4.

—end—

—continued—

6-30 Accessing circuits at LCAP jacks

Procedure 6-4 (continued)

Using signaling control in 0TLP jack access

**Table 6-5**  
Line card signaling for locally switched universal and TR08 services

Service (note 1)	Analog in → to line card (note 2)	ABCD out (note 3)	ABCD → in to LC (note 3)	Analog out from line card (note 4)	Tx mode (note 5)
COINCT	loop current feed open (no battery)	1111	0000	ring grounded	–
	loop current feed (battery)	0101	0101	loop open	idle
	reverse loop current feed	0100	1111	loop closed	auto
	ring	0000	1110	coin ground	–
	+ coin check	1010			
	– coin check	1011			
	+ coin control	1100			
	– coin control	1110			
COINRT	ring grounded	0000	1111	loop current feed open (no battery)	–
	loop open	0101	0101	loop current feed (battery)	idle/ auto
	loop closed	1111	0000	ring	–
	coin ground	1110	0100	reverse loop current feed	–
			1010	+ coin check	–
			1011	– coin check	–
			1100	+ coin control	–
			1110	– coin control	–
—continued—					

—continued—

Procedure 6-4 (continued)  
**Using signaling control in 0TLP jack access**

**Table 6-5 (continued)**  
**Line card signaling for locally switched universal and TR08 services**

Service (note 1)	Analog in → to line card (note 2)	ABCD out (note 3)	ABCD → in to LC (note 3)	Analog out from line card (note 4)	Tx mode (note 5)
COINRT (TR08)	on-hook	0000	0000	Negative loop	
			0001	+ coin check	
			0010	+ coin control	
			0011	- coin check	
			0100	+ coin check	
	coin ground	0101	0101	Channel test	
			0110	- coin check	
			0111	- coin control	
			1000	+ coin control	
			1001	- coin check	
	off-hook	1010	1010	Positive loop	-
			1011	- R ringing	-
			1100	- coin check	-
			1101	- coin control	
			1110	- R ringing	
	unequipped	1111	1111	ground start	-
UVGCT and POTSCT	no ring; tip not grounded	1111	1111	loop closed	auto
	no ring; tip grounded	0101	0101	loop open; ring not grounded	idle
	ring; tip grounded	0000	0000	ring grounded	-
	reverse loop current feed	0100	-	-	-
—continued—					

—continued—

Procedure 6-4 (continued)

**Using signaling control in 0TLP jack access****Table 6-5 (continued)****Line card signaling for locally switched universal and TR08 services**

<b>Service (note 1)</b>	<b>Analog in → to line card (note 2)</b>	<b>ABCD out (note 3)</b>	<b>ABCD → in to LC (note 3)</b>	<b>Analog out from line card (note 4)</b>	<b>Tx mode (note 5)</b>
UVGRT and POTSRT	ring grounded	0000	0000	ring; tip grounded	–
	loop open; ring not grounded	0101	0101	no ring; tip grounded	idle/ auto
	loop closed	1111	1111	no ring; tip not grounded	–
	–	–	0100	reverse loop current feed	–
POTSRT (TR08)	on-hook	0000			
			0101	channel test	
	off-hook	1010	1010	forward disconnect	
			1011	- R ringing	
			1110	- R ringing	
	unequipped	1111	1111	idle	
UVGRT/ CLASS (ground start) (TR08)	on-hook	0000	0000	ground start/ forward disconnect	
			0001	idle	
			0100	idle	
	ring grounded	0101	0101	channel test	
	off-hook	1010			
			1011	- R ringing	
			1110	- R ringing	
	unequipped	1111			
—continued—					

—continued—

Procedure 6-4 (continued)  
**Using signaling control in 0TLP jack access**

**Table 6-5 (continued)**  
**Line card signaling for locally switched universal and TR08 services**

Service (note 1)	Analog in → to line card (note 2)	ABCD out (note 3)	ABCD → in to LC (note 3)	Analog out from line card (note 4)	Tx mode (note 5)
<p><b>Note 1:</b> Subclasses of a main service are not listed, because they have signaling identical to the main service.</p> <p><b>Note 2:</b> “ABCD out” in column 3 represents the signaling generated by the line card when it receives the “Analog in →” signal in column 2.</p> <p><b>Note 3:</b> For services where only AB signaling is valid, signaling is shown ABAB. That is, bit C = A, and bit D = B. An x in the signal code means that the value of x can be 0 or 1; for example, in the code 1x1x, only the 1 is relevant.</p> <p><b>Note 4:</b> “Analog out” in column 5 is the analog signal presented by the line card to the loop when it receives the “ABCD →” signal in column 4.</p> <p><b>Note 5:</b> Tx mode in column 6 indicates that, under idle or automatic signaling control, the 0TLP jack in split mode transmits the “ABCD →” signal in column 4.</p>					
<p>—end—</p>					

—end—

## Procedure 6-5

# Setting up metallic and digital jack access

---

Use this procedure to set up both metallic jack access and digital jack access to a customer line at the local craft access panel (LCAP).

If no jack access is established, using this procedure connects the metallic jacks to the metallic side of the line card in a bridged arrangement, and provides one of the following connections to the digital side of the line card:

- When the line card is provisioned for an analog service, OTLP jacks are connected in near-end monitor access.
- When the line card is provisioned for a digital data service, DDS jacks are connected in full monitor access.

In an existing metallic jack access session, you can use this procedure to add DDS or OTLP jack access. Or, you can add metallic access to an existing digital jack access session.



### **DANGER**

#### **Risk of injury or damage if hazardous voltage is detected**

If hazardous voltage is detected on a line, you are offered the choice of continuing or abandoning your attempt to establish jack access. See this and other possible system responses on page 6-5.



### **CAUTION**

#### **Risk of data hits on the DDS circuit under test**

Setting up the metallic jack access connection before connecting test equipment to the LCAP jacks can cause data hits on the DDS circuit. Be sure to connect the test equipment to the LCAP jacks *before* setting up metallic jack access to a DDS circuit.

To save, resume, or quit a jack access session, refer to Procedure 6-7, “Saving or terminating a jack access session” on page 6-41.

## Requirements

You need a userID and password that permits you to use the jack access level of the FiberWorld product user interface (FWPUI).

You need a VT100-compatible terminal, connected to the LCAP DTE port.

The line termination to be accessed must be provisioned.

—continued—

Procedure 6-5 (continued)  
**Setting up metallic and digital jack access**

**Action**

Step	Action						
1	<p>Determine the type of system you have.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">If you are connecting to</th> <th style="text-align: left;">Then</th> </tr> </thead> <tbody> <tr> <td>Copper distribution shelves</td> <td>Go to step 2.</td> </tr> <tr> <td>AccessNode Express</td> <td>Go to step 3.</td> </tr> </tbody> </table>	If you are connecting to	Then	Copper distribution shelves	Go to step 2.	AccessNode Express	Go to step 3.
If you are connecting to	Then						
Copper distribution shelves	Go to step 2.						
AccessNode Express	Go to step 3.						
2	<p>If jack access is not already connected, log in to FWPUJ and set up metallic and digital jack access to the desired line card by entering:</p> <pre>jackacc acc all &lt; CDS# &gt; &lt; slot &gt; ↵</pre> <p>where</p> <table border="0" style="width: 100%;"> <tr> <td style="padding-right: 20px;">all</td> <td>connects the metallic jacks in bridged mode AND EITHER connects the 0TLP jacks in near-end monitor mode OR connects the DDS jacks in full monitor mode</td> </tr> <tr> <td>CDS#</td> <td>an integer in the range 1 to 7; this is the copper distribution shelf containing the desired line card</td> </tr> <tr> <td>slot</td> <td>an integer in the range 1 to 96; this is the slot containing the desired line card</td> </tr> </table>	all	connects the metallic jacks in bridged mode AND EITHER connects the 0TLP jacks in near-end monitor mode OR connects the DDS jacks in full monitor mode	CDS#	an integer in the range 1 to 7; this is the copper distribution shelf containing the desired line card	slot	an integer in the range 1 to 96; this is the slot containing the desired line card
all	connects the metallic jacks in bridged mode AND EITHER connects the 0TLP jacks in near-end monitor mode OR connects the DDS jacks in full monitor mode						
CDS#	an integer in the range 1 to 7; this is the copper distribution shelf containing the desired line card						
slot	an integer in the range 1 to 96; this is the slot containing the desired line card						

*A Metallic and Digital Jack Access screen appears, confirming jack access to the desired line card. A typical view is shown in the following figure.*

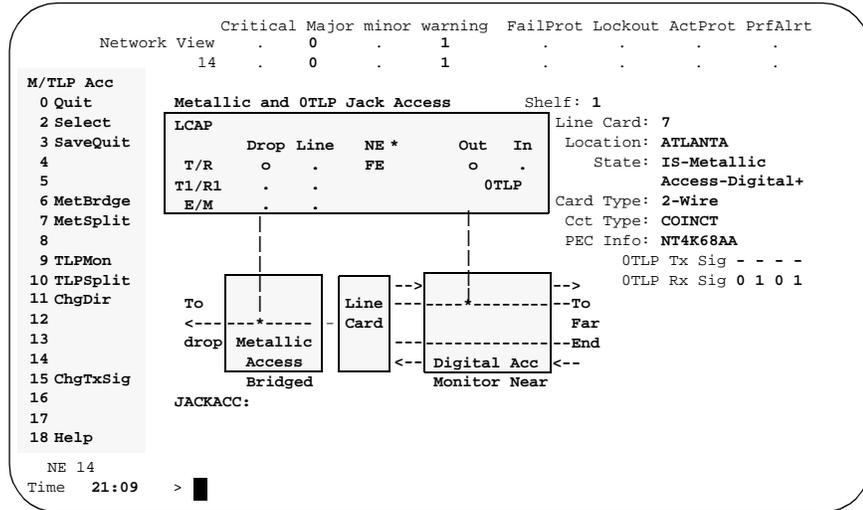
—continued—

6-36 Accessing circuits at LCAP jacks

Procedure 6-5 (continued)

Setting up metallic and digital jack access

Step Action



The metallic Drop jacks are connected to the metallic side of the line. If the service is digital data, then the DDS Rx jack is connected to the digital side of the line. If the service is analog, then the OTLP Out jack is connected to the digital side of the line in the transmit direction (near-end).

**Note:** On the jack access screens, if the complete state information cannot be displayed, the last character is a plus sign (+). Complete state information is displayed on the equipment line card screen.

Go to step 4.

—continued—

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 Procedure 6-5 (continued)

**Setting up metallic and digital jack access**


---

Step	Action						
3	<p>If no jack access is already connected, log in to FWPUI and set up metallic and digital jack access to the desired line card by entering:</p> <pre><b>jackacc anxacc all &lt; VM# &gt; &lt; slot &gt;.</b></pre> <p>where</p> <table border="0"> <tr> <td style="padding-right: 20px;">all</td> <td>connects the metallic jacks in bridged mode AND EITHER connects the 0TLP jacks in near-end monitor mode OR connects the DDS jacks in full monitor mode</td> </tr> <tr> <td>VM#</td> <td>an integer in the range 1 to 28; this is the ANX shelf containing the desired line card</td> </tr> <tr> <td>slot</td> <td>an integer in the range 1 to 48; this is the slot containing the desired line card</td> </tr> </table>	all	connects the metallic jacks in bridged mode AND EITHER connects the 0TLP jacks in near-end monitor mode OR connects the DDS jacks in full monitor mode	VM#	an integer in the range 1 to 28; this is the ANX shelf containing the desired line card	slot	an integer in the range 1 to 48; this is the slot containing the desired line card
all	connects the metallic jacks in bridged mode AND EITHER connects the 0TLP jacks in near-end monitor mode OR connects the DDS jacks in full monitor mode						
VM#	an integer in the range 1 to 28; this is the ANX shelf containing the desired line card						
slot	an integer in the range 1 to 48; this is the slot containing the desired line card						

*A Metallic and Digital Jack Access screen appears, confirming jack access to the desired line card.*

*The metallic Drop jacks are connected to the metallic side of the line. If the service is digital data, then the DDS Rx jack is connected to the digital side of the line. If the service is analog, then the 0TLP Out jack is connected to the digital side of the line in the transmit direction (near-end).*

Go to step 4.

4	<p>If jack access is already connected to one side of the line card, you can set up jack access to both sides of the line card by entering:</p> <pre><b>cnctboth.</b></pre> <p><i>The Metallic and Digital Jack Access screen appears, confirming jack access to both sides of the desired line card.</i></p> <p><b>Note:</b> The preexisting access remains unchanged, while the added access is in monitor or bridged mode:</p> <ul style="list-style-type: none"> <li>• With an existing digital access, bridged metallic access is added, as shown in the preceding illustration. The metallic Drop jacks are connected to the metallic side of the line.</li> <li>• With an existing metallic access, the default 0TLP access type is monitor near-end, as shown in the preceding illustration. The 0TLP Out jack is connected to the digital side of the line in the transmit direction.</li> <li>• With an existing metallic access, the default DDS access type is full monitor, as shown in the following figure. The DDS Rx jack is connected to the digital side of the line.</li> </ul>
---	---

—continued—



## Procedure 6-6 Connecting jack access to a different line card

In an existing jack access session, you can use this procedure to connect to a different line card, either with the same jack access arrangement, or with a different one.



### **DANGER**

#### **Risk of injury or damage if hazardous voltage is detected**

If hazardous voltage is detected on a line, you are offered the choice of continuing or abandoning your attempt to establish jack access. See this and other possible system responses on page 6-5.



### **CAUTION**

#### **Split access is service-affecting**

Before setting up split access, be sure that the jacks are connected to the intended line card. Otherwise, you can accidentally put a customer's line out of service.

## Requirements

You need a userID and password that permits you to use the jack access level of the FiberWorld product user interface (FWPUI).

You need a VT100-compatible terminal, connected to the LCAP DTE port.

The line termination to be accessed must be provisioned.

## Action

Step	Action								
1	Determine the type of system you have.								
	<table border="0"> <thead> <tr> <th style="text-align: left;">If you are connecting to</th> <th style="text-align: left;">Then</th> </tr> </thead> <tbody> <tr> <td>Copper distribution shelves</td> <td>Go to step 2.</td> </tr> <tr> <td>AccessNode Express</td> <td>Go to step 3.</td> </tr> <tr> <td>Universal Edge 9000 shelves</td> <td>Go to step 4.</td> </tr> </tbody> </table>	If you are connecting to	Then	Copper distribution shelves	Go to step 2.	AccessNode Express	Go to step 3.	Universal Edge 9000 shelves	Go to step 4.
If you are connecting to	Then								
Copper distribution shelves	Go to step 2.								
AccessNode Express	Go to step 3.								
Universal Edge 9000 shelves	Go to step 4.								

—continued—

6-40 Accessing circuits at LCAP jacks

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Procedure 6-6 (continued)

**Connecting jack access to a different line card**

---

<b>Step</b>	<b>Action</b>						
<b>2</b>	<p>To connect to a different line card with the same jack access arrangement (without explicitly quitting and restarting jack access), enter:</p> <p><b>select &lt; CDS# &gt; &lt; slot &gt; ↵</b></p> <p>where</p> <table><tr><td>CDS#</td><td>an integer in the range <b>1</b> to <b>7</b>; this is the copper distribution shelf containing the desired line card</td></tr><tr><td>slot</td><td>an integer in the range <b>1</b> to <b>96</b>; this is the slot containing the desired line card</td></tr></table> <p><i>The same-type Jack Access screen appears for the specified line card.</i></p>	CDS#	an integer in the range <b>1</b> to <b>7</b> ; this is the copper distribution shelf containing the desired line card	slot	an integer in the range <b>1</b> to <b>96</b> ; this is the slot containing the desired line card		
CDS#	an integer in the range <b>1</b> to <b>7</b> ; this is the copper distribution shelf containing the desired line card						
slot	an integer in the range <b>1</b> to <b>96</b> ; this is the slot containing the desired line card						
<b>3</b>	<p>To connect to a different line card with the same jack access arrangement (without explicitly quitting and restarting jack access), enter:</p> <p><b>select &lt; VM# &gt; &lt; slot &gt; ↵</b></p> <p>where</p> <table><tr><td>VM#</td><td>an integer in the range <b>1</b> to <b>28</b>; this is the copper distribution shelf containing the desired line card</td></tr><tr><td>slot</td><td>an integer in the range <b>1</b> to <b>48</b>; this is the slot containing the desired line card</td></tr></table> <p><i>The same-type Jack Access screen appears for the specified line card.</i></p>	VM#	an integer in the range <b>1</b> to <b>28</b> ; this is the copper distribution shelf containing the desired line card	slot	an integer in the range <b>1</b> to <b>48</b> ; this is the slot containing the desired line card		
VM#	an integer in the range <b>1</b> to <b>28</b> ; this is the copper distribution shelf containing the desired line card						
slot	an integer in the range <b>1</b> to <b>48</b> ; this is the slot containing the desired line card						
<b>4</b>	<p>To connect to a different line card with the same jack access arrangement (without explicitly quitting and restarting jack access), enter:</p> <p><b>select &lt; ue# &gt; &lt; mlc &gt; &lt; circuit&gt; ↵</b></p> <p>where</p> <table><tr><td>ue#</td><td>an integer in the range <b>1</b> to <b>7</b>; this is the UE9000 shelf containing the desired line card</td></tr><tr><td>mlc</td><td>an integer in the range <b>1</b> to <b>16</b>; this is the multi-circuit line card containing the desired circuit</td></tr><tr><td>circuit</td><td>an integer in the range <b>1</b> to <b>24</b>; this is the line circuit</td></tr></table>	ue#	an integer in the range <b>1</b> to <b>7</b> ; this is the UE9000 shelf containing the desired line card	mlc	an integer in the range <b>1</b> to <b>16</b> ; this is the multi-circuit line card containing the desired circuit	circuit	an integer in the range <b>1</b> to <b>24</b> ; this is the line circuit
ue#	an integer in the range <b>1</b> to <b>7</b> ; this is the UE9000 shelf containing the desired line card						
mlc	an integer in the range <b>1</b> to <b>16</b> ; this is the multi-circuit line card containing the desired circuit						
circuit	an integer in the range <b>1</b> to <b>24</b> ; this is the line circuit						

*The same-type Jack Access screen appears for the specified line card.*

—end—

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## Procedure 6-7

# Saving or terminating a jack access session

---

Use this procedure to perform one of the following functions:

- save an existing jack access arrangement for later resumption
- resume a saved jack access session
- terminate a jack access session

While performing this procedure, you could encounter some of the system responses listed on page 6-5 and following pages.

### **Jack access connections if login session terminates**

If your OPC NElogin session terminates unexpectedly, then your jack access session is automatically disconnected. You would have to set up a new jack access session in order to resume testing.

If your LCAP login session terminates unexpectedly, or if you log out of your LCAP login session after saving a jack access connection, then your jack access remains connected.



#### **CAUTION**

##### **Split access is service-affecting**

A split access that remains connected is service-affecting, so be sure to properly disconnect the access when you are finished using it, as described in step 4 in this procedure.

## Requirements

You need a userID and password that permits you to use the jack access level of the FiberWorld product user interface (FWPUI).

The line termination to be accessed must be provisioned.

You need a VT100-compatible user terminal, connected to the LCAP DTE port.

—continued—

Procedure 6-7 (continued)

**Saving or terminating a jack access session**

---

**Action**

---

<b>Step</b>	<b>Action</b>
1	<p>If you want to save a jack access session to resume it later, perform step 2. If you want to resume the saved session, perform step 3. If you want to terminate a jack access session, perform step 4.</p>
2	<p>To save a jack access arrangement (so that you can perform a function in a different user interface screen and then resume the jack access session later), enter:</p> <p><b>savequit.</b></p> <p><i>The jack access connections are saved, and the Network Element Status main menu appears.</i></p>
3	<p>There are two ways to resume a jack access session.</p> <ul style="list-style-type: none"><li>• To resume a saved jack access session, enter: <b>jackacc r.</b></li><li>• To resume a saved jack access session, and at the same time, add access to the other side of the line card, enter: <b>jackacc r all.</b></li></ul> <p><i>The Jack Access screen appears as it was before quitting, and the jack access connections to the line card are maintained.</i></p> <p><i>The Jack Access screen appears, showing the access type saved before quitting, and an additional access added. For example, if metallic access to an analog service had been saved, then the new session provides the same metallic access mode, and adds OTLP access in near-end monitor mode.</i></p>

—continued—

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 Procedure 6-7 (continued)

**Saving or terminating a jack access session**


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Step	Action
	<p><b>Note:</b> If you have saved and quit a jack access session, but now you want to disconnect the jack access, then you must first resume the session (perform step 3), and then quit according to step 4.</p>
4	<p>At the end of a jack access session, when you are still displaying a jack access screen, you can disconnect the jack access in one of several ways:</p> <ul style="list-style-type: none"> <li>• Disconnect jack access and log out by entering:  <b>logout</b>↵  <i>The jack access connections are disconnected, the user interface session is terminated, and the login prompt appears.</i></li> <li>• Disconnect jack access and display the desired user interface screen or command level by entering:  <b>quit &lt; level &gt;</b>↵            where            level        is one of 1, 2, 3, or all                             1: displays the initial FWUI screen, the Network Element Status screen (1 is optional since it is the default value)                             2: displays the MAPCI screen                             3: displays the command interpreter (CI) prompt                             all: displays the command interpreter (CI) prompt</li> </ul> <p><i>The jack access connections are disconnected and the session is terminated. The desired user interface screen or command prompt appears.</i></p>

—end—



---

## Specials Lineup Manager tool

---

This chapter describes a procedure to establish jack access connections required to perform a two-person special service lineup on nonlocally switched (NLS) and nonswitched (NS) special service circuits passing through the AccessNode. A procedure for running diagnostics on special service line cards is also provided.

Special service circuits often have specific tariffed transmission specifications. This usually requires line card parameter adjustments, such as equalization and gain modifications, to compensate for the characteristics of the copper loop. This is referred to as special service lineup. The special services lineup procedures can be found in Chapter 3 of this document.

The Specials Lineup Manager can be used in lining up the following line cards and their supported services:

- Omega 2-wire source (NT4K67) supporting FXS, DPO, PLAR, TOS, and ETOS
- Omega 2-wire sink (NT4K68) supporting FXO, DPT, TOO, and ETOO
- Omega 4-wire special services (NT4K69) supporting FXO, FXS, DX, TO, and ETO
- Omega 6/8-wire special services (NT4K77) supporting EM1, EM2, EM3, PLR1, PLR2, TDM1, TDM2, TDM1O, TDM1S, TDM2O, and TDM2S
- Omega 2-wire manual ringdown line card (NT4K78) supporting MRD

DS0 access to Digital Data Service (DDS) circuits is not supported on the Specials Lineup Manager.

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

## How to use this chapter

Refer to the task list or process flowchart in Chapter 1 to determine which procedures you should perform.

## Chapter contents

The following table lists the topics covered in this chapter. If you cannot successfully complete these procedures, contact your next level of support.

Procedure	Topic	See
	Introduction to special service lineup procedures	page 7-2
	Restrictions and limitations	page 7-3
7-1	Setting up a test access connection for special services lineup	page 7-4
7-2	Running diagnostics on a special service line card	page 7-7

## Introduction to special service lineup procedures

For the AccessNode, the Fiber Central Office Terminal (FCOT) line card is aligned against the central office copper wiring, and the Remote Fiber Terminal (RFT) line card is aligned against the customer loop. Special service lineup is likely to be performed as part of:

- customer service start up
- customer service troubleshooting to adjust for copper loop deterioration

Access to the circuit is accomplished through jack ports on the Local Craft Access Panel (LCAP) of the AccessNode. The LCAP jack capabilities used during special service lineup are the following:

- OTLP voiceband access to the line card's digital side
- Metallic access to the line card and loop

In this document, the following terms are used:

- near-end: the line card location that the craftsperson has specified in the test point specification fields of the Specials Lineup Manager
- far-end: the line card location at the opposite end of the line card specified in the Specials Lineup Manager

To perform a two-person special service lineup, the installer accesses the digital and/or metallic side of the AccessNode line card in a split configuration.

External test equipment is connected to the digital side of the line card via the OTLP jack. Access to the digital side of the line card is achieved at the near-end NE and also at the far-end NE (if the circuit is universal). A second installer connects external test equipment to the metallic side of the line card at one of the following metallic locations:

- customer premises end of loop
- copper wire off the FCOT (intra-office wiring or a customer loop)
- metallic interface of the line card via the LCAP metallic jack

A series of stimuli and measurements are exchanged between the digital side of the line card and the metallic test access point. Based on the results of these measurements, the installer adjusts the line card parameters. Measurements are repeated until the line card parameters are aligned with the metallic portion of the circuit. Although the Specials Lineup Manager supports a user interface to perform these tasks, a second tool (the OPC Provisioning Manager) must be used to input adjustments to parameters.

## Restrictions and limitations

The following restrictions apply to the use of the Specials Lineup Manager to set up jack access or to obtain line card diagnostics:

- Jack access connection and line card diagnostics may be initiated from the Specials Lineup Manager only for nonlocally switched or nonswitched services over universal circuits and DS1 tandem circuits.
- The test point must be equipped with a line card.
- Line card diagnostics and jack access cannot be performed at the same time.
- Jack access must be disconnected before the tool can be closed.
- Diagnostics must be completed before the tool can be closed.
- Far-end OTLP jack access is available only if the test point is an endpoint of a universal DS0 AccessNode circuit.
- Access to locally switched services (for example, COIN, UVG, POTS) and to DDS is not supported by this tool. Locally switched, integrated services (2-wire LRB, 2-wire LGB, 2-wire LSR, EBS, COIN, and ISDN-U) are also prohibited.
- The Specials Lineup Manager cannot be used to line up services of type ILC (IRTU line cards), which provide communication between the IRTU and an external testing system.

## Procedure 7-1

# Setting up a test access connection for special services lineup

---

Use the following procedure to select a special service line card and to establish a connection to that test point, in preparation for circuit lineup.

### Requirements

Before beginning this procedure, you must do the following:

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

### Action

---

Step	Action
1	<p>Log in to the OPC and open the Specials Lineup Manager.</p> <p>If you do not know how to do this, see the procedures in <i>OPC User Interface Description</i>, 323-3001-301, in <i>Operations, Administration, and Provisioning</i>, Volume 4A.</p> <p><i>The Specials Lineup Manager is displayed.</i></p>
2	<p>Display the chooser menu associated with the Network element field, by pressing <b>Ctrl_L /</b> (or Keypad <b>3</b>).</p> <p>The chooser menu lists all of the commissioned network elements.</p>
3	<p>Select the network element on which the desired line card is located by entering its menu number or by moving the cursor to the name of the network element, and pressing the space bar.</p> <p><i>The network element name is displayed in the Network element field.</i></p> <p>Tab to the next field.</p>
4	<p>Display the chooser menu associated with the CD shelf field, by pressing <b>Ctrl_L /</b> (or Keypad <b>3</b>).</p> <p><i>The chooser menu lists all of the available copper distribution shelves on the selected network element.</i></p>

—continued—

Procedure 7-1 (continued)

**Setting up a test access connection for special services lineup**

Step	Action
5	<p>Select the identifier of the shelf in which the line card is located by entering its menu number or by moving the cursor to the shelf identifier, and pressing the space bar.</p> <p><i>The shelf identifier is displayed in the CD shelf field.</i></p> <p>Tab to the next field.</p>
6	<p>Enter the physical slot location within the shelf, where the desired line card is located. A number between 1 and 96 must be entered.</p> <p><i>The contents of the Line card field are validated.</i></p>
7	<p>Tab to the <b>Connect</b> button and select it by pressing <b>Ctrl_A</b> (or Keypad <b>0</b>).</p> <p><i>Test point data is retrieved from the network element, and the loop type and service code fields are loaded with the values of the selected line card. During this time, the Test Point Specification fields, Connect button, and Diagnose button are disabled.</i></p> <p><i>Depending on the current provisioning state of the line card, an error or confirmation dialog may be presented. These dialogs describe why the action cannot be completed, what connection limitations apply, or what affects the action will have on the circuit. You must acknowledge these dialogs, by selecting the OK button. Selecting the Cancel button on a confirmation button abandons the connection attempt.</i></p> <p><i>If no information dialogs are presented, or if you elect to proceed with the connection attempt, the Connect Parameters dialog is displayed.</i></p> <p><i>If the test point is part of an AccessNode universal circuit, you are offered a choice of near- and far-end jack access configurations (as shown). Otherwise, only near-end configurations are offered for DS1 tandem circuits.</i></p>
8	<p>Tab to the desired jack access configuration, and select it by pressing <b>Ctrl_A</b> (or Keypad <b>0</b>).</p> <p><i>The selection bullet is moved to the configuration you selected.</i></p>
9	<p>Tab to the <b>OK</b> button and select it by pressing <b>Ctrl_A</b> (or Keypad <b>0</b>).</p> <p><i>The connection is attempted. The Connect and Diagnose buttons are disabled until the connection is established. When complete, the appropriate Jacks image is displayed and the Connect button becomes the Disconnect button. A record of the successful connection is placed in the Session History field. The Diagnose button remains disabled.</i></p> <p>Selecting the Cancel button aborts the connect sequence.</p>

—continued—

7-6 Specials Lineup Manager tool

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Procedure 7-1 (continued)

**Setting up a test access connection for special services lineup**

---

<b>Step</b>	<b>Action</b>
<b>10</b>	<p>The line card parameters of the test point or of the far-end line card may now be adjusted, using the OPC Provisioning Manager tool.</p> <p>Type <b>Ctrl_T 0</b> to return to the User Session Manager. Refer to Chapter 3 for procedures to perform special service lineup, using the OPC Provisioning Manager tool. When finished, return to the Specials Lineup Manager, by selecting it from the Open Tools list. When you return to this tool, its window content is displayed as you left it.</p>
<b>11</b>	<p>Tab to the <b>Disconnect</b> button, and select it by pressing <b>Ctrl_A</b> (or Keypad <b>0</b>). <i>The disconnect confirmation dialog is displayed.</i></p>
<b>12</b>	<p>Select the <b>OK</b> button by pressing <b>Ctrl_A</b> (or Keypad <b>0</b>). <i>The Disconnect button is disabled until the disconnection is completed. At that time, the Disconnect button becomes the Connect button. All buttons and Test Point Specification fields are then enabled. A record of the disconnection is placed in the Session History dialog. The Jacks image area is removed.</i></p> <p>Selecting the Cancel button aborts the disconnect action, leaving the connection in place.</p>
<b>13</b>	<p>To exit the tool:</p> <ol style="list-style-type: none"><li><b>a.</b> Display the window menu by pressing <b>Ctrl_L W</b> (or Keypad <b>6</b>). <i>The window menu is displayed.</i></li><li><b>b.</b> Select the <b>Exit</b> command by pressing <b>Space</b> (or Keypad <b>0</b>). <i>The tool is displayed.</i></li></ol>

—end—

## Procedure 7-2

# Running diagnostics on a special service line card

Use this procedure to select a special service line card and to run diagnostics on it. This task can also be performed from the network element user interface. (See Procedure 2-3, “Running line card diagnostics” on page 2-36).

### Requirements

Before beginning this procedure, you must do the following:

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

### Action

Step	Action
1	<p>Log in to the OPC and open the Specials Lineup Manager.</p> <p>If you do not know how to do this, see the procedures in <i>OPC User Interface Description, 323-3001-301, in Operations, Administration, and Provisioning, Volume 4A</i></p> <p><i>The Specials Lineup Manager is displayed.</i></p>
2	<p>Display the chooser menu associated with the Network element field, by pressing <b>Ctrl_L</b> / (or Keypad <b>3</b>).</p> <p><i>The chooser menu lists all of the commissioned network elements.</i></p>
3	<p>Move to the name of the network element on which the desired line card is located, and select it by pressing <b>Ctrl_A</b> (or Keypad <b>0</b>).</p> <p><i>The network element name is displayed in the Network element field.</i></p> <p>Tab to the next field.</p>
4	<p>Display the chooser menu associated with the CD Shelf field, by pressing <b>Ctrl_L</b> / (or Keypad <b>3</b>).</p> <p><i>The chooser menu lists all of the available copper distribution shelves on the selected network element.</i></p>
5	<p>Move to the shelf identifier, in which the desired line card is located, and select it by pressing <b>Ctrl_A</b> (or Keypad <b>0</b>).</p> <p><i>The shelf identifier is displayed in the CD Shelf field.</i></p> <p>Tab to the next field.</p>

—continued—

Procedure 7-2 (continued)

**Running diagnostics on a special service line card**

---

<b>Step</b>	<b>Action</b>
<b>6</b>	<p>Enter the physical slot location within the shelf, where the desired line card is located. A number between 1 and 96 must be entered.</p> <p><i>The contents of the Line card field are validated.</i></p>
<b>7</b>	<p>Tab to the <b>Diagnose</b> button and select it by pressing <b>Ctrl_A</b> (or Keypad <b>0</b>).</p> <p><i>Test point data is retrieved from the network element, and the loop type and service code fields are loaded with the values of the selected line card. During this time, the Test Point Specification fields, Connect button, and Diagnose button are disabled.</i></p> <p><i>Depending on the current provisioning state of the line card, an error or confirmation dialog may be presented. These dialogs describe why the action cannot be completed, what connection limitations apply, or what affects the action will have on the circuit. You must acknowledge these dialogs, by selecting the OK button. Selecting the Cancel button on a confirmation button abandons the diagnostic.</i></p> <p><i>If no information dialogs are presented, or if you elect to proceed with the diagnose sequence, diagnostics are initiated on the line card. Progress and results of the diagnostics are displayed in the Results field. All buttons are disabled until the diagnostics are complete.</i></p> <p><i>At completion, buttons and test point specification fields are enabled. A record of the diagnostic activity is placed in the Session History field.</i></p>
<b>8</b>	<p>To exit the tool:</p> <ol style="list-style-type: none"><li>Display the window menu by pressing <b>Ctrl_L W</b> (or Keypad <b>6</b>). <i>The window menu is displayed.</i></li><li>Select the <b>Exit</b> command by pressing <b>Space</b> (or Keypad <b>0</b>). <i>The tool disappears.</i></li></ol>

—end—

---

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## **AccessNode**

### Line Card Testing Procedures

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