297-1001-595

DMS-100 Family

Trunks

Maintenance Guide

TL10 Standard 05.03 November 1999

northern telecom

DMS-100 Family

Trunks

Maintenance Guide

Publication number: 297-1001-595
Product release: TL10
Document release: Standard 05.03
Date: November 1999

© 1993, 1995, 1996, 1997, 1998 1999 Northern Telecom
All rights reserved

Printed in the United States of America

NORTHERN TELECOM CONFIDENTIAL: The information contained in this document is the property of Northern Telecom. Except as specifically authorized in writing by Northern Telecom, the holder of this document shall keep the information contained herein confidential and shall protect same in whole or in part from disclosure and dissemination to third parties and use same for evaluation, operation, and maintenance purposes only.

Information is subject to change without notice. Northern Telecom reserves the right to make changes in design or components as progress in engineering and manufacturing may warrant.
This equipment has been tested and found to comply with the limits for a Class A digital device pursuant to Part 15 of the FCC Rules, and the radio interference regulations of the Canadian Department of Communications. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at the user's own expense
Allowing this equipment to be operated in such a manner as to not provide for proper answer supervision is a violation of Part 68 of FCC Rules, Docket No. 89-114, 55FR46066
The SL-100 system is certified by the Canadian Standards Association (CSA) with the Nationally Recognized Testing Laboratory (NRTL).
This equipment is capable of providing users with access to interstate providers of operator services through the use of equal access codes. Modifications by aggregators to alter these capabilities is a violation of the Telephone Operator Consumer Service Improvement Act of 1990 and Part 68 of the FCC Rules

DMS, DMS SuperNode, LOGIC, MAP, and NT are trademarks of Northern Telecom.

Publication history

November 1999

TL10 Standard 05.03

- added the noise command to table 6–10 menu item 8 (CSR CN90070).

August 1998

TL10 Standard 05.01

- added a description of the GROUPCMD command (C7TTP level) to Table 6-13 (feature AU2962)
- name of TRK342 log changed to TRK343 (Chapter 3)
- added information to the Cktloc command description in Table 6-5

February 1998

TL09 Standard 04.01

Revisions for TL09 features.

December 1997

TL07 Standard 03.01

DMS-100G trunk information added to “Trouble isolation and correction” (Chapter 8).

August 1997

TL06 Standard 02.03

Editing changes

November 1996

TL06 Standard 02.02

revised affected chapters to incorporate changes associated Software Design review of AIM content

August 1996

TL06 Standard 02.01

- revised affected chapters to incorporate AIM as a new analog trunk peripheral for CSP06 (features AG4453, AG5037, AG5038)

- various editing changes made

September 1995

TL04 Standard 01.03

revised MANUAL level commands table in ‘‘Trunks related user interface commands” chapter to incorporate PRS solution

May 1995

TL04 Standard 01.02

- revised affected chapters to incorporate PRS solutions
- revised affected chapters to incorporate CSP04 features
- revised outreferences for consistency with current NTP numbering and titles

March 1993

BCS35 Standard 01.01 Initial release of this document

Contents

About this document

This document is a maintenance guide for maintenance personnel. Maintenance personnel must have a basic knowledge of the Digital Multiplex System (DMS) and the trunks subsystem. Operating company personnel who need step-by-step procedures to perform maintenance tasks cannot use this procedure. This document describes the operation and functions of the trunks subsystem. This document includes commands and displays for the manual and automatic trunks maintenance menu levels.

How to check the version and issue of this document

The version and issue of the document are indicated by numbers, for example, 01.01.

The first two digits indicate the version. The version number increases each time the document is updated to support a new software release. For example, the first release of a document is 01.01. In the *next* software release cycle, the first release of the same document is 02.01.

The second two digits indicate the issue. The issue number increases each time the document is revised but rereleased in the *same* software release cycle. For example, the second release of a document in the same software release cycle is 01.02.

This document is written for all DMS-100 Family offices. More than one version of this document may exist. To determine whether you have the latest version of this document and how documentation for your product is organized, check the release information in *Product Documentation Directory,* 297-8991-001.

Where to find information

The table below lists the documents that you require to understand the content of this document, or to perform the tasks it describes. These documents are also referred to in the appropriate places in the text.

More than one version of these documents may exist. To determine which version of a document applies to the BCS in your office, check the release information in *Product Documentation Directory,* 297-8991-001.

In the table, the letters xxxx indicate the document layer number, for example, 8311 (Extended Peripheral Module). The document layer number denotes the product computing module load (PCL) associated with the NTP. For more information on document numbering, refer to *North American DMS-100 Cancellation Cross-Reference Directory,* 297-8991-002.

Number	Title
297-1001-121	*Automatic Trunk Testing Description*
297-1001-103	*Peripheral Modules*
297-1001-300	*Basic Administration Procedures*
297-1001-318	*Service Problem Analysis Administration Guide*
297-8xxx-350	*Translations Guide*
297-1001-520	*Maintenance System Man–Machine Interface Description*
297-1001-533	*Bit Error Rate Performance Testing*
297-8xxx-543	*Alarm and Performance Monitoring Procedures*
297-8xxx-544	*Trrouble Locating and Clearing Procedure*
297-8xxx-546	*Routine Maintenance Procedures*
297-8xxx-547	*Card Replacement Procedures*
297-1001-594	*Lines Maintenance Guide*
297-8xxx-814	*Operational Measurements Reference Manual*
297-1001-822	*DMS-100 Family Commands Reference Manual*
297-8xxx-840	*Log Report Reference Manual*
297-2121-224	*Datapath Modem Pools—Installation and Maintenance*
297-2121-225	*Datapath 3270 Network Switched Access—Installation and Maintenance*
297-2121-226	*Data Unit—Installation and Maintenance*
297-2121-227	*Datapath DIALAN Service—Installation and Maintenance*
297-2401-516	*Integrated Services Digital Network (ISDN) Line Maintenence Reference Manual*
TAM-1001-011	*Data Layout Manual*
TR-TSY-00008	*Bell Communications Research Incorporated Technical Reference*

What precautionary messages mean

The types of precautionary messages used in NT documents include attention boxes and danger, warning, and caution messages.

An attention box identifies information that is necessary for the proper performance of a procedure or task or the correct interpretation of information or data. Danger, warning, and caution messages indicate possible risks.

Examples of the precautionary messages follow.

ATTENTION Information needed to perform a task

ATTENTION

If the unused DS-3 ports are not deprovisioned before a DS-1/VT Mapper is installed, the DS-1 traffic will not be carried through the DS-1/VT Mapper, even though the DS-1/VT Mapper is properly provisioned.

DANGER Possibility of personal injury

DANGER

Risk of electrocution

Do not open the front panel of the inverter unless fuses F1, F2, and F3 have been removed. The inverter contains high-voltage lines. Until the fuses are removed, the high-voltage lines are active, and you risk being electrocuted.

WARNING Possibility of equipment damage

WARNING
Damage to the backplane connector pins
Align the card before seating it, to avoid bending the backplane connector pins. Use light thumb pressure to align the card with the connectors. Next, use the levers on the card to seat the card into the connectors.

CAUTION Possibility of service interruption or degradation

CAUTION
Possible loss of service
Before continuing, confirm that you are removing the card from the inactive unit of the peripheral module. Subscriber service will be lost if you remove a card from the active unit.

How commands, parameters, and responses are represented

Commands, parameters, and responses in this document conform to the following conventions.

Input prompt (>)

An input prompt (>) indicates that the information that follows is a command:

```
>BSY
```

Commands and fixed parameters

Commands and fixed parameters that are entered at a MAP terminal are shown in uppercase letters:

```
>BSY CTRL
```

Variables

Variables are shown in lowercase letters:

```
>BSY  CTRL  ctrl_no
```

The letters or numbers that the variable represents must be entered. Each variable is explained in a list that follows the command string.

Responses

Responses correspond to the MAP display and are shown in a different type:

```
FP 3 Busy CTRL 0: Command request has been submitted.
FP 3 Busy CTRL 0: Command passed.
```

The following excerpt from a procedure shows the command syntax used in this document:

1 Manually busy the CTRL on the inactive plane by typing

>BSY CTRL ctrl_no
and pressing the Enter key.

where

ctrl_no is the number of the CTRL (0 or 1)

Example of a MAP response:

```
FP 3 Busy CTRL 0: Command request has been submitted.
FP 3 Busy CTRL 0: Command passed.
```

Underscore connecting

means two words are to be treated as one element, for example, pm_type or #_set.

Trunk maintenance overview

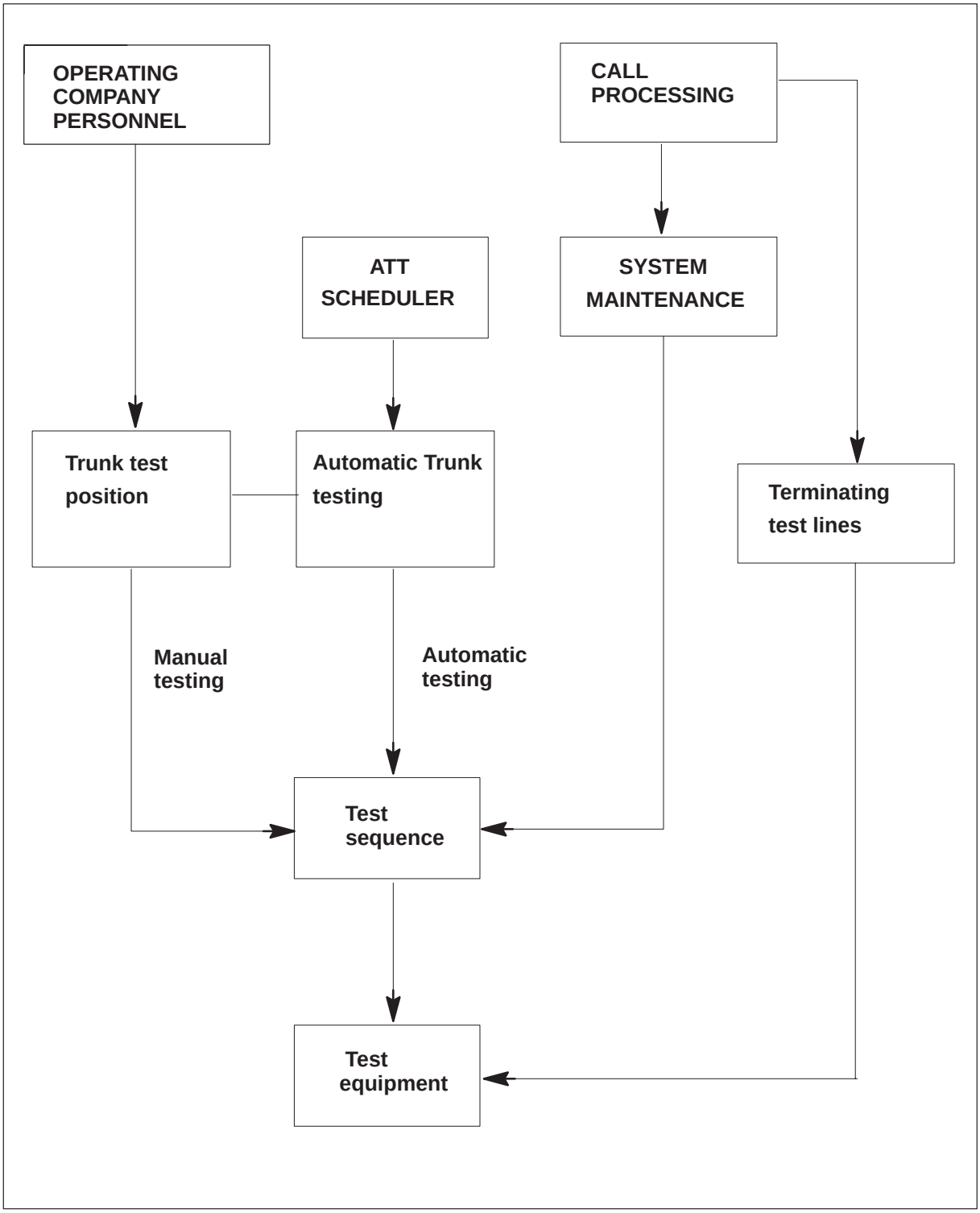
Functional description

This document describes the DMS-100 Family trunk maintenance subsystem. The trunk maintenance subsystem shows how to test and monitor trunk operation. The subsystem also shows how to detect, identify, and locate trunk problems. In addition, the trunk maintenance subsystem performs tests and maintenance functions for several non-trunk circuits. The circuits include the circuits associated with receivers and test equipment. Figure 1-1 shows a block diagram of the trunk maintenance subsystem.

Instructions for how to perform different types of trunk maintenance appear in the following NTPs:

- *Alarm and Performance Monitoring Procedures.*
- *Card Replacement Procedures.*
- *Routine Maintenance Procedures.*
- *Trouble Locating and Clearing Procedures.*

Figure 1-1
Block diagram of the trunk maintenance subsystem



The trunk subsystem can transmit analog voice or digital voice signals. Trunk peripheral modules (PM) transmit signals. You cannot process analog and digital signals on the same trunk PM. Each type of signal requires separate PMs. You can also use trunk PMs for maintenance and service activities.

Three categories of trunks are:

- analog voice trunks
- digital voice trunks
- analog test equipment and service trunks

Analog voice trunks

Analog voice trunks transmit voice signal trunk modules (TM).

Trunk module

The trunk module (TM) is a subsystem that occupies a single shelf. The TM provides an interface to analog trunks from the outside plant through a distributing frame. Trunk modules can contain special service circuits and internal test equipment. Use the test equipment to test both inside and outside plant facilities.

The trunk module consists of four common circuit packs (excluding power) with many trunk interfaces that you can change.

The primary functions and features of the TM are the following:

- converts analog trunk speech and signaling information to or from a 2.56-Mbyte/sec digital stream
- connects a maximum of 30 analog voice trunks to the network ports through a DS30 link to the network
- TM features include
  - — a maximum of 15 trunk circuit cards
  - — modular shelf design
  - — no concentration
  - — digital and analog loopback circuits for maintenance
  - — firmware control of supervision and signaling functions
  - — storage and control of incoming and outgoing digits (up to 15 digits)
  - — message error checking
  - — automatic switch over between network planes when integrity message discontinuity occurs

— digitally derived tones supply to precise tone plan

All trunk modules share the basic functions and features described above. Several types of trunk modules (TM) are present for different types of trunk facilities. A TM2 is a TM cabled for 2-wire trunks. In the same way, TM4s and TM8s are 4-wire and 8-wire trunk modules in the sequence given. A TM8A is also an 8-wire trunk.

The Analog Interface Module (AIM) provides emulation of analog trunks. This series 1 TM peripheral replaces the older version TM and MTM analog trunk cards and the RMM controller. For call processing, trunk and TM maintenance you manage all AIM trunks the same as previous generation analog trunks .

In central offices, AIM consists of the AIM controller card (NTFX46AA) with an internal ISM controller to interface DS30 trunks. The AIM also consists of the DSP processor that controls the operation of six analog trunks and generates signaling tones. The AIM card B (NTFX48AA) is an extension of the controller card. When you use the AIM card B with the controller card, analog trunk emulation increases to 18. You can use the controller card alone. The card requires the AIM signal routing card (NTFX15AA) to replace AIM card B.

Remote AIM consists of the AIM-based RMM controller (NTFX14AA). This card contains an internal RMM controller to interface DS30A links. This card also contains a DSP processor that operates a maximum of four NT2X90AD analog trunks.

Digital voice trunks

Digital voice trunks enter the DMS switch through a digital trunk controller (DTC). One 24-channel DS-1 Carrier (also called T span or T1) transmits 24 digital voice trunks.

Each DTC can accommodate up to 20 DS-1 carriers, to a maximum of 480 (24x20 = 480) digital trunk circuits. The capacity of the DTC is higher than the capacity of a TM.

Analog test equipment and service trunks

Maintenance trunk modules (MTM) control the analog test equipment and service trunks. The structure of an MTM is the same as a modified TM. MTMs use the same control cards as TMs. MTMs have all the basic functions of a TM. MTMs interface with all of the TM interface cards and special test and service circuits.

The maintenance trunk module is a peripheral module located in a TM equipment frame. The primary functions and features of the MTM are the following:

- converts analog trunk speech and signaling information to or from a 2.56-Mbyte/sec digital stream
- connects as many as 28 analog test trunks to network ports through a DS30 link to network
- acts as switching center for control messages sent between the central control complex (CCC) and separate test or service circuit cards
- MTM features include
  - — a maximum of 12 or 14 service circuit cards, depending on the shelf design.
  - — modular shelf design, with odd and even slot card connections
  - — no concentration
  - — digital and analog loopback circuits for maintenance
  - — firmware control of supervision and signaling functions
  - — storage and control of a maximum of 15 incoming and outgoing digits
  - — message error checking
  - — automatic switch over between network planes when integrity message discontinuity occurs
  - — digitally derived tones supply to precise tone plan
  - — possible configuration as an OAU or DRAM

The service trunk module (STM) is a peripheral module that consists of two compact MTMs. The primary functions and features of the STM are the following:

- converts analog trunk speech and signaling information to or from a 2.56-Mbyte/sec digital stream
- connects different numbers of analog trunks to network ports through a DS30 link to network. The number of trunks depends on the type of STM configuration, NT1X58 or NT7X30.
- STM features include:
  - — a maximum of 5, 6, or 7 service circuit cards, according to shelf design
  - — modular shelf design that can contain two STMs
  - — no concentration

- — digital and analog loopback circuits for maintenance
- — firmware control of supervision and signaling functions
- — storage and control of a maximum of 15 incoming and outgoing digits
- — message error checking
- — automatic switch over between network planes when a integrity message discontinuity occurs
- — digitally derived tones supply to precise tone plan

The office alarm unit (OAU) is a peripheral mode in a TM equipment frame. The OAU is like the MTM. The primary functions and features of the OAU are the following:

- converts analog trunk speech and signaling information to or from a 2.56-Mbyte/sec digital stream
- connects a maximum of 28 analog trunks to network ports through a DS30 link to network
- OAU features include:
  - — a maximum of 11 OAU cards, including scan/SD/OAU alarm group/OAU dead system cards
  - — modular shelf design
  - — no concentration
  - — digital and analog loopback circuits for maintenance
  - — firmware control of supervision and signaling functions
  - — storage and control of a maximum of 15 incoming and outgoing digits
  - — message error checking
  - — automatic switch over between network planes when integrity message discontinuity occurs
  - — digitally derived tones supply to precise tone plan

The primary functions and features of the digital recorded announcement machine (DRAM) are the following:

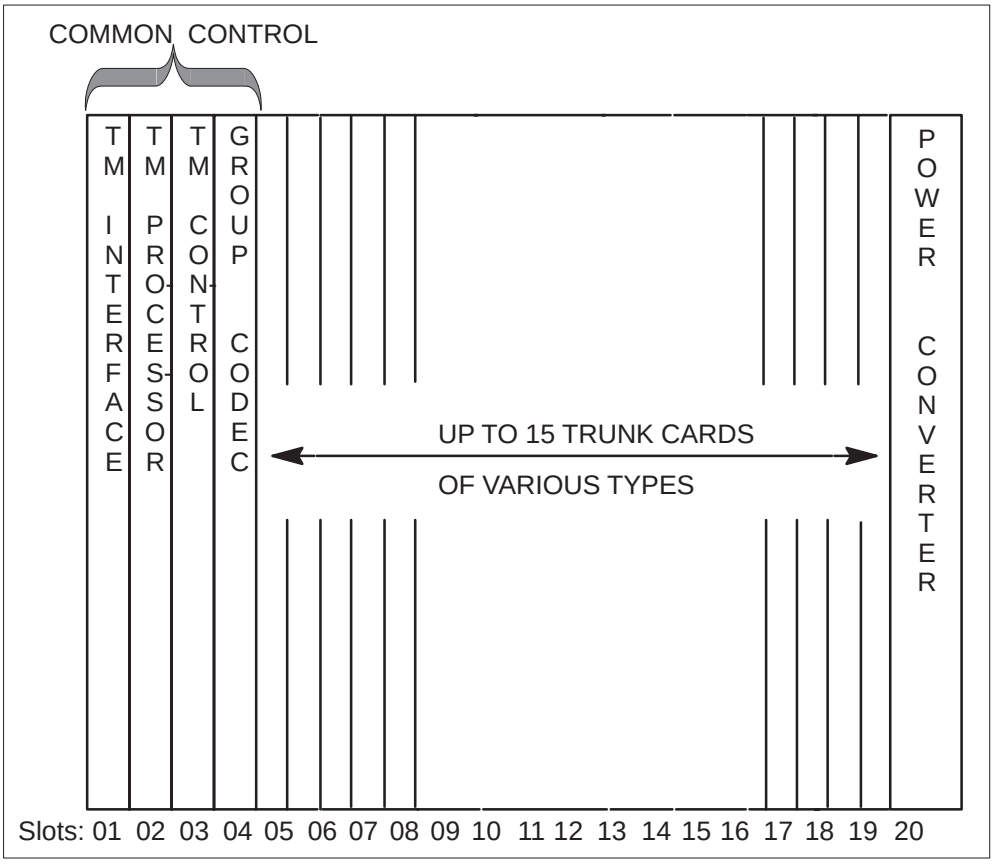
- converts analog trunk speech and signaling information to or from a 2.56-Mbyte/sec digital stream
- connects a maximum of 28 analog trunks to network ports through a DS30 link to network
- provides digital recorded announcements

- DRAM features include
  - — a maximum of eight memory cards
  - — modular shelf design, with card bus linking the first ten card slots
  - — no concentration
  - — digital and analog loopback circuits for maintenance
  - — firmware control of supervision and signaling functions
  - — storage and control of a maximum of 15 incoming and outgoing digits
  - — message error checking
  - — automatic switch over between network planes when integrity message discontinuity occurs
  - — digitally derived tones supply to precise tone plan

TM/MTM/STM configuration

The TM, MTM, and STM modules have a common configuration. The modules provide an interface between network C-side and P-side links. Other common characteristics include a shelf with a common control section that performs four functions. The four functions are network interface, processor, control, and group CODEC (PCM/PAM coder/decoder). The TM Interface card, the TM processor card, the TM control card, and the group CODEC card provide these functions. Figure 1-2 shows an example of a shelf from this group of modules (the trunk module shelf).

Figure 1-2
Trunk module shelf



Shelves with AIM conform to present ISM and RMM shelf designs. Mount the AIM controller card (NTFX46AA) in any even-numbered slot (6 through 16) in MTM shelves. If you use card B (NTFX48AA), the card occupies the odd-numbered slot to the left side.

Unless you have an ISM shelf in a cabinetized integrated services module (CISM), you can install AIM card A. You must install AIM card (NTFX46AA) in even-numbered slots from 6 through 16. If you have an ISM shelf in a CISM cabinet, you can install the NTFX46AA. You must install NTFX46AA in even-numbered slots from 10 through 16. You must install AIM card B (NTFX48AA) to the left side of card A, in an odd-numbered slot. If you do not require card B, you must replace the card with an AIM signal routing card (NTFX15AA).

In RMM shelves, you must mount the remote AIM card (NTFX14AA) in slot 3 with slot 4 left empty. You do not need NTFX15AA and NTFX48AA.

Figures 1-3 and 1-4 show shelf locations for AIM cards in ISM and TME frames.

Figure 1-3
AIM shelf for ISM

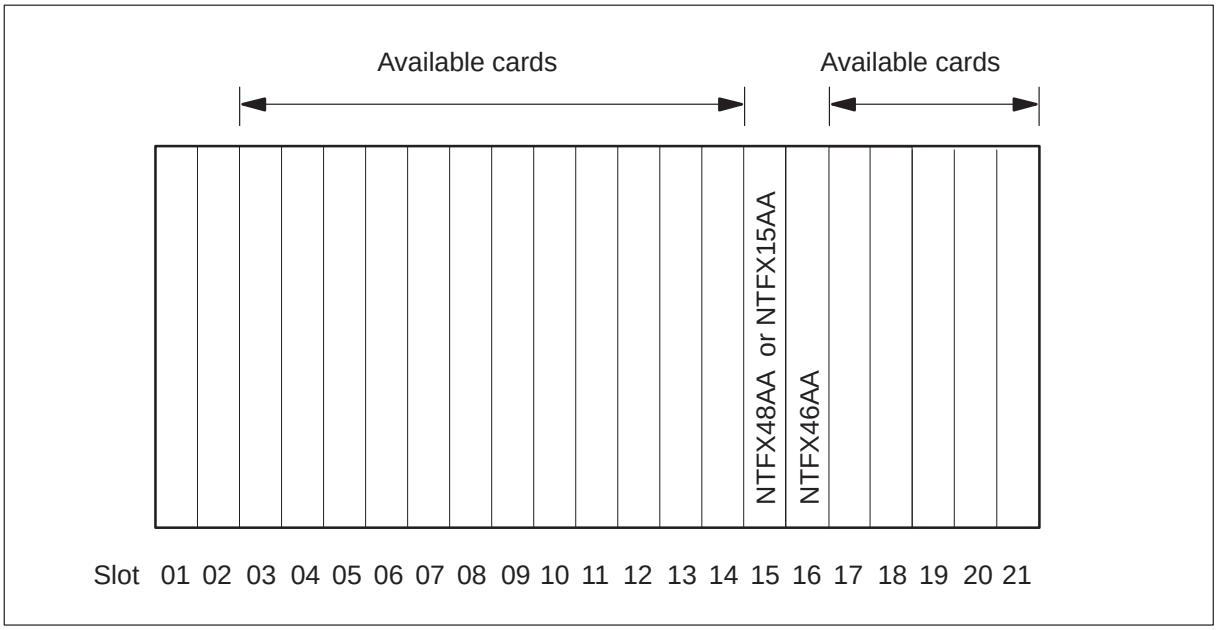
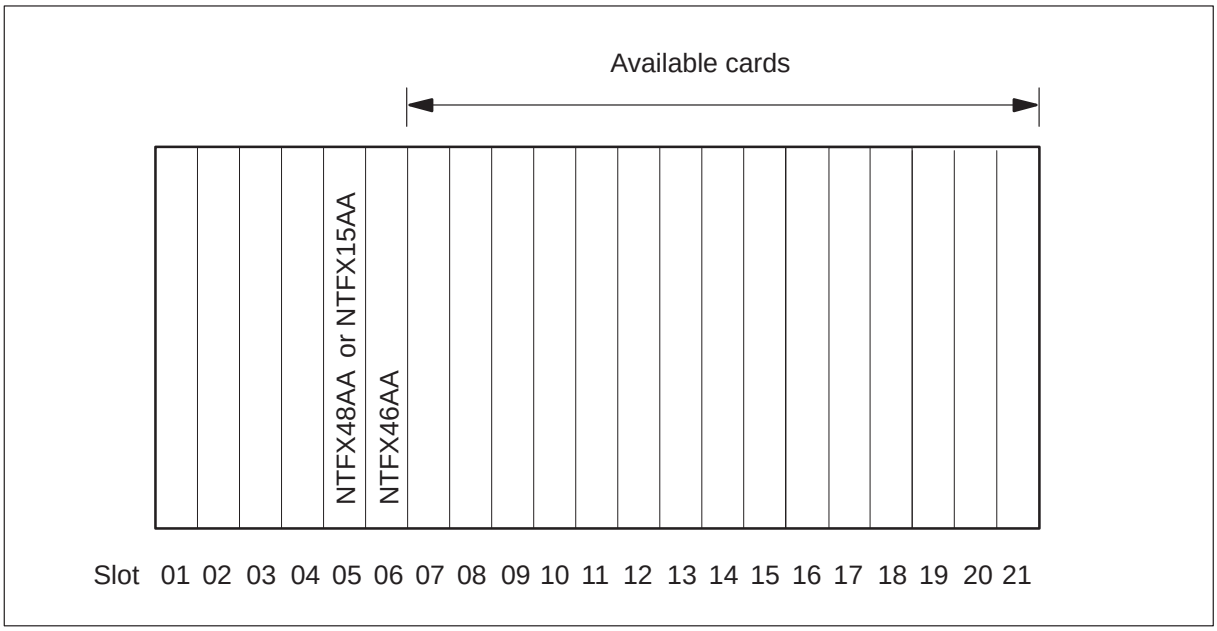


Figure 1-4
AIM shelf for TME frame



TM/MTM/STM messages and data flow

The best method to describe the operation of these modules is to divide data flow into receive paths and transmit paths.

When the network or central control sends data, a network interface card in the trunk PM shelf receives the data. The data passes through the receive path of the shelf to one of two points. These points are a trunk interface, service circuit, or other personality card, or the peripheral processor.

When a personality card or peripheral processor sends data, the data passes through the transmit path of the trunk PM shelf. The card or processor sends the data to the network or to central control.

> ***Note:*** Personality cards, which normally associate with XPMs, give a trunk PM a different identity. Trunk circuit cards are like personality cards. Trunk circuit cards give a TM a personality or different identity. Different trunk PMs have different personality cards.

The receive path in the TM, MTM, and STM shelves operates as follows:

- Data on the receive channels of the speech links from network module Plane-0 or Plane-1 enters the shelf through the network interface card.
- The network interface card aligns and formats the data again. The network interface card separates PCM (pulse code modulated) speech samples from control messages. PCM speech samples go through automatic level adjustment.
- PCM speech samples travel through the speech bus to the CODEC (code/decode) card. The CODEC decodes PCM into PAM (pulse amplitude modulated) speech samples. The CODEC places the PAM speech samples on the RPAM (receive PAM) bus.
- A trunk interface, service circuit, or other personality card receives the PAM speech samples and constructs the original analog signal again.
- The trunk transmission facilities receive the original analog signal.
- The network or central control puts control messages in one of two places. The two places are the digital data bus (RDAT/receive data bus) and the data bus to the PP (peripheral processor). The placement occurs at the same time that the CODEC places the PAM speech samples on the RPAM bus.
- Some control messages pass through the RDAT bus to a trunk interface, service circuit, or other personality card. The trunk interface, service circuit, or other personality card translates the data into signals. These signals are compatible with the signaling method of the associated trunk facility. Other control messages pass through the data bus to the PP.

The Transmit Path in the TM, MTM, and STM shelves operates as follows:

- Analog speech samples from trunk transmission facilities enter the analog side of a trunk interface, service circuit, or other personality card.
- The trunk interface, service circuit, or other personality card converts the speech samples to PAM samples. The personality card multiplexes the PAM samples on the XPAM (transmit PAM) bus.
- PAM samples pass from the XPAM bus to the CODEC card. The CODEC card encodes the PAM samples into PCM samples.
- PCM samples pass through the speech bus to the network interface card. The network interface card passes the PCM samples to the network or to central control.
- At the same time, data from a trunk transmission facility convert to digital data.
- The digital data reads out on the XDAT (transmit data) bus and travels to the network interface card.
- The network interface card combines and formats the PCM samples and their associated digital data again into a data stream.
- The network interface card places the data stream on the speech link Transmit Path.
- A control circuit handles the PP responses to messages from the central control. The control circuit controls the transmission of the CSM (channel supervisory message). The responses pass through the data bus to the network interface card for insertion on the speech link transmit message channel.

Problem conditions

Focused Trunks Maintenance in feature package NTX272AA monitors trunk faults through the Trunks Trouble (TRKSTRBL) level of the MAP display. When you access the TRKSTRBL through the TTP level, the TRKSTRBL identifies trunks and trunk groups that have faults and cause alarms. TRKSTRBL alarms do not generate the same audible alarms as out-of-service alarms. The MTC and TRKSTRBL MAP levels indicate that TRKSTRBL alarms are present. The TRKSTRBL level identifies trunks that have faults so that you can take maintenance action. Do not perform maintenance action from the TRKSTRBL level.

Incrementing buffer and display of alarms

The failure rate of a trunk group generates alarms when the failure rate exceeds acceptable limits. Trunk faults cause the alarms. A buffer records the rate of failure. When a customer cannot complete a call because of a trunk fault, the failure count in the buffer increases by one. The failure count decreases by one for a given quantity of successful attempts on the

same trunk group. For the failure count to decrease, the trunk group must accumulate the quantity of successful attempts defined by the operating company. The quantity of failures generates an alarm when the quantity reaches the defined limits.

The different degrees of alarm codes displayed for the DMS trunks are:

- minor alarm (MN)
- major alarm (MJ)
- critical alarm (CR)

Note: If the failure rate on a trunk or trunk group rises quickly, the alarm degree increases from minor to critical. The increase indicates the degree of the fault.

When the increase in failure rate generates a TRKSTRBL alarm, the trunk fault flags the alarm. The alarm can be a maintenance (M) or a call-processing (CP) alarm. When you access the TRKSTRBL MAP level, the level displays the alarm. The LISTALM command displays and identifies the trunk group that causes the alarm. The display helps you take the correct alarm clearing action.

If the command LISTALM does not display a trunk group, increase the threshold levels. You can increase the threshold levels in field ATMPCNT of data table TRKMTCE.

The alarm display at the MTC MAP level updates to show the most important alarm generated by TRKSTRBL. The alarm switches every 30 seconds with the current alarm to represent the percentage of out-of-service trunks. The out-of-service alarm is more important than the TRKSTRBL alarm. The alarm display shows the out-of-service alarm when no TRKSTRBL alarm is present. When a TRKSTRBL alarm is present and there is no out-of-service alarm, the alarms switch every 30 seconds. The difference between the two displays is that the alarm display does not show an out-of-service alarm. If the alarm display shows the TRKSTRBL alarm, the alarm display will change if the out-of-service alarm changes. The alarm display will change to show the out-of-service alarm. After 30 seconds, the alarm display shows the TRKSTRBL alarm again. The alarm codes MN, MJ, and CR show the degree of the TRKSTRBL. The codes M or CP next to the alarm code indication show either it is a maintenance or call processing alarm.

A delay in the buffering of trunk troubles reduces CPU use during and immediately after a restart. This delay occurs until two minutes after the restart is complete.

Call processing error threshold on trunks

Call processing (CP) errors appear at a slower continuous rate. Other types of error messages, like false seizures on trunks, occur quickly.

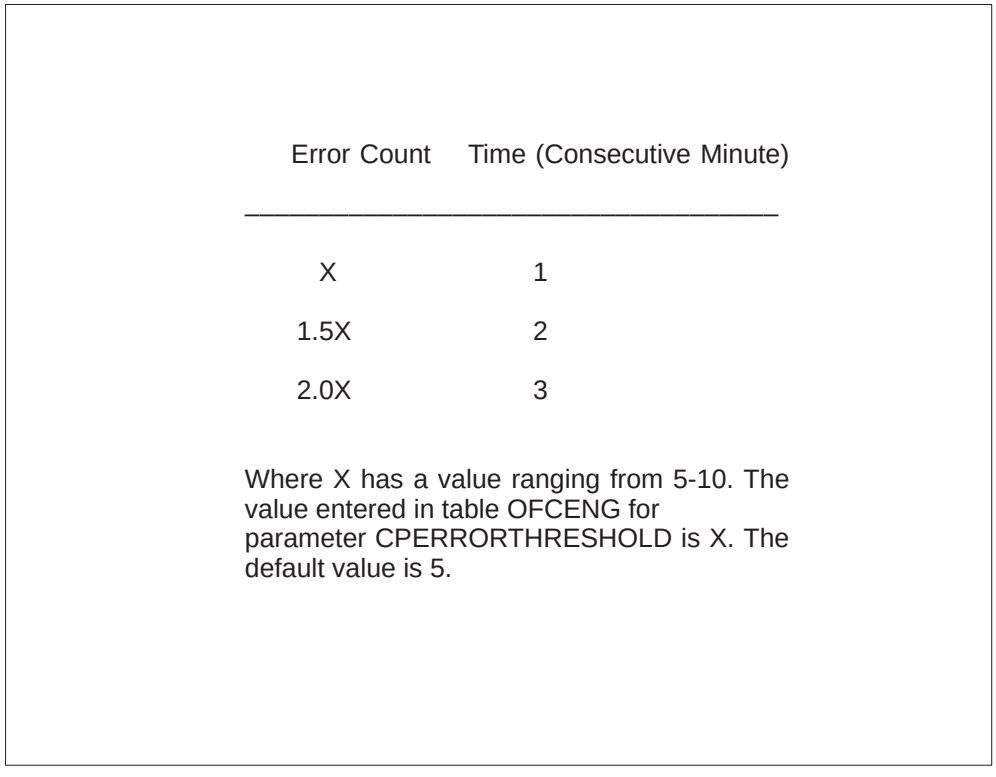
When messages from a trunk result in many call processing errors, a SWER log entry and additional log entries are output. Additional log entries display the call condense block (CCB), call data block (CDB), and other extension blocks the call involves. The call process terminates and diagnoses the trunk fault. These actions cause loss of call processing time. Switch performance degradation may result if a large number of call processing errors occur.

CP error thresholds and trunk handling procedures decrease large numbers of CP errors.

The operating company sets the CP error rate threshold for a trunk. The operating company places the entry for the office parameter CPERRORTHRESHOLD in the table OFCENG.

A trunk exceeds the threshold if any of the following occurs:

Figure 1-5
Threshold limitations



The administration of trunks with many CP errors causes the system to proceed as follows:

- The first time a trunk exceeds the error threshold, the system outputs a log message. The system removes the trunk from service for a system diagnostic.
- If the trunk passes the system diagnostic, the trunk returns to service.
- A record of the time of events and activities appears in the CPTERMERR queue.
- If the trunk fails the system diagnostic, or if the trunk exceeds the error threshold for a second time within 15 min:
  - — If the trunk is an outgoing trunk, the system removes the trunk from service for additional testing.
  - — If the trunk is an incoming or two-way trunk, the trunk state sets to remote make busy (RMB). The trunk must support RMB.
  - — If the trunk does not support RMB, and if the trunk is an incoming or two-way trunk, the trunk returns to service.

Trunk test position

The trunk test position (TTP) is a MAP level associated with hardware components used for trunk testing. You may use any MAP display (including remote) for trunk testing. The types of tests available depends on the hardware configuration of the trunks in the office.

Detached users can use all of the TTP abilities, except for the abilities that require dedicated hardware.

A TTP normally includes:

- a visual display unit (VDU) with a keyboard
- a voice communication facility
- a printer
- two jack fields
- associated furniture

The VDU is the main MMI device used to perform trunk tests. You enter commands to test and monitor at the keyboard. The screen displays and updates trunk status information and test results. Chapter 6, Trunks user interface commands, provides a description of the displays and the commands.e

For voice communication, use:

- key telephone set (KTS), normally of the LOGIC 10 or 20 series

- NT5X64 communication module

The lines of the telephone set connect to the NE-1A2 KTS, which provides:

- access to 101 test trunks (101 test lines that terminate)
- communication trunks (test lines that originate)
- a headset trunk, used to talk and listen over a circuit

You can obtain a hardcopy of the status and test information from a printer accessed from a VDU.

A TTP contains two identical jack fields connected in parallel, one on each side of the VDU. Each jack field has four configurations. Each configuration has two jacks. One jack transmits and one jack receives. Three of the jack configurations connect to jack-ended trunks through the Main Distribution Frame (MDF). Jack-ended trunks connect circuits under test to portable test equipment. Use the portable test equipment when you require tests different from those provided by the internal equipment. Functions determined by the operating company use the fourth jack configuration. The fourth jack also connects to the MDF. An example of a function defined by the operating company is connection to a voice frequency patch bay. Circuit numbers of the jack-ended trunks are assigned in sequence according to the TTP number. For example, circuits 0, 1, 2 are assigned to TTP 0, and circuits 3, 4, 5 to TTP 1.

Related to TTP switch hardware

The main test hardware for maintenance requests is in the DMS switch in a maintenance trunk module (MTM). For a detailed description of the MTM, see *Peripheral Modules*, 297-1001-103.

The TTP switch hardware uses the following equipment:

- A transmission test trunk (TTT), which includes:
  - — PCM level meter (PLM) card (NT2X96). The PLM card measures the incoming signal levels and frequencies in transmission, loss, and noise tests. The PLM card also identifies supervisory signal tones.
  - — test signal generator (TSG) card (NT1X90), which contains signal generator circuits and filter circuits.

    Note: The cards described operate together. The GS2X96 and GS1X90 describe the PLM and TSG.

- A transmission test unit (TTU), which includes:
  - — control processor (CP) (NT2X47), which communicates with the Central Control (CC) and generates outgoing test tones

— digital filter (DF) (NT2X56), which receives incoming tones and determines their level at selected filters.

Note: The GS2X47 and GS2X56 describe CP and DF.

- A milliwatt supply (from a standard 1004-Hz source) used for the 102 test line test.

All the connections between test equipment and a circuit under test are through the network module (NM). The system selects an idle TTT, TTU, or milliwatt supply to use this test equipment. The selection depends upon the test. The system provides a connection with the circuit under test. When the test is complete, the equipment becomes available to other users.

Trouble tests

To locate faults, perform trouble tests manually. The following reports identify faults:

- subscriber reports
- call processing test reports
- ALT reports

You can perform most of the problem tests from the TTP level and from the following TTP sublevels:

- ATT
- TRKSTRBL
- CARRIER

The menus at each level include commands for most of the tests. The menus also include commands for maintenance actions for the tests. Chapter 6, Trunks user interface commands, lists the commands for these tests.

Maintenance tests

Maintenance tests:

- check the accuracy of trunks as a routine to make sure that all circuits work correctly
- determine the cause of a fault that is present and isolate the correct circuit

You can perform all trunk tests manually. You can schedule the system to run some tests automatically.

Manual testing

To perform a manual test, use commands at the MAP level. The MAP level is the level that associates with the hardware and software that you test. Command entry establishes, holds, and releases test connections. Connected test equipment continuously transmits information until you stop the equipment.

For test functions not provided by the DMS switch, you can connect external testing equipment to the switch by the TTP jacks. Tests run from external equipment include:

- singing point
- frequency attenuation distortion
- harmonic distortion
- longitudinal balance
- envelope delay distortion
- absolute delay distortion
- level tracking distortion
- foldover distortion
- phase jitter
- echo return loss

Note: The term ‘‘manual testing” does not refer to the MANUAL level of the MAP display.

Automatic maintenance

Automatic trunk testing (ATT) allows you to schedule the system to run trunk maintenance tests to be run by the system automatically. The ATT is in feature package in NTX051AA. You can schedule at the ATT level of the MAP, or in data table ATTSCHED. Automatic tests do not occur as a result of a hardware or software failure.

You can schedule, initiate, monitor, or stop the tests at the ATT level. You can run a maximum of 15 tests at the same time. For the description of the ATT feature, see *Automatic Trunk Testing Description*, 297-1001-121.

The ATT does not support all the test scheduled at the ATT MAP level. When a test the system does not support begins, the system generates an ATT log. The system bypasses the test and the ATT log indicates the system cannot complete the test.

Escalation to manual maintenance

When automatic (system) maintenance fails to correct a fault in the subsystem of the trunks, the switch provides problem (fault) indicators. The indicators identify the fault condition is present. Alarms are examples of these fault indicators. OMs and logs also indicate a failure of automatic maintenance. When automatic maintenance fails to clear a fault, you must clear the fault manually.

Preventive maintenance strategies

Description of routine maintenance procedures

You can perform routine maintenance procedures according to a known schedule. Refer to *Routine Maintenance Procedures* for a detailed description of trunk routine maintenance procedures. Examples of trunk maintenance procedures are:

- manual trunk tests. Use manual trunk tests for trunk problems that occur when there is no automatic trunk testing scheduled. Associate manual trunk tests with:
  - — receive level problems
  - — transmission level problems
  - — not continuous noise problems
  - — supervision problems
  - — large numbers of trunk test failures
- automatic trunk tests. Entries control automatic tests in two automated trunk testing (ATT) associated tables: ATTOPTNS and ATTSCHED. The following functions occur during automatic trunk testing:
  - — noise measurement
  - — loss measurement
  - — tone detection
  - — tone sending
- return of cards or assemblies for replacement or repair.

Routine maintenance schedules

Operating company personnel must perform these routine maintenance procedures at repeated intervals. Table 2-1 contains a list of routine maintenance tasks and their performance intervals.

Table 2-1
Routine maintenance tasks and intervals

Performance interval	Maintenance task
As required	Perform manual trunk test
As required	Perform automatic trunk test
As required	Return cards or assemblies for replacement or repair

Fault isolation

When the TRKSTRBL detects a problem condition in the trunks subsystem you must take maintenance action. Operating company personnel use fault isolation procedures to determine the component that causes the fault. Operating company personnel also use fault isolation procedures to remove or report the problem condition to the next level of support.

Chapter 8, “Problem isolation and correction”, provides problem isolation procedures for the trunks subsystem.

Maintenance tools

Maintenance tools for the trunks subsystem include commands at the MAP and maintenance tools. Chapter 6, ‘‘Trunks user interface commands”, provides a description of the commands. Chapter 8, ”Problem isolation and correction”, provides a description of maintenance tools.

Trunks related logs

Log reports

The output report system generates many log reports. The system mixes the log reports on the log device. The system mixes the reports because it is not possible to have a printer device for each log type. The system generates the reports in real time.

It is difficult to monitor the printer for background information that occurred hours before an event. You need to use the individual subsystem buffers to view log reports of the same log type.

An example of an event is the occurrence of a fault in the trunks subsystem. The maintenance personnel can dump the contents of the trunks subsystem logs and scan the logs for any information relating to trunk faults. This action provides the necessary background information to assist in the isolation of the fault.

Table 3-1 lists log reports used in trunk subsystem maintenance. The table lists each log report along with the possible causes. The table also lists the correct response from the operating company personnel. The text that follows the table discusses key log reports in detail.

Table 3-1
Trunks logs

Log name	Causes	Response
TRK101	Percentage of busy trunks in a trunk group exceeded the threshold value for a minor alarm.	Save all TRK101 log reports for network planning personnel.
Note: More information on all logs in this table appears in the *Log Report Reference Manual*.		
—continued—		

Table 3-1
Trunks logs (continued)

Log name	Causes	Response
TRK102	Major alarm threshold reached or exceeded by trunks in suspect trunk group.	Save all TRK102 log reports for network planning personnel.
TRK103	Number of busy trunks in a trunk group exceeded threshold value for critical alarm.	Save all TRK103 log reports for network planning personnel.
TRK104	Percentage of busy trunks dropped below the threshold for a trunk group. The same trunk group that reached or exceeded the threshold value for a minor, major, or critical alarm level.	Save all TRK104 log reports for network planning personnel.
TRK105	Command RONIXFR entered in the CI MAP display level.	There is no response. Information only.
TRK106	Diagnostic test on trunk equipment failed.	Use ACTION field in the table Diagnostic Result in *Log Report Manual*, 297-1001-840.
TRK107	Diagnostic test on trunk equipment passed.	There is no response. Information only.
TRK108	Diagnostic test on a DS-1 facility passed.	There is no response. Information only.
TRK109	Diagnostic test on a DS-1 facility failed.	Contact next level of maintenance Contact the next level of maintenance if the action stated in the description column for ERROR does not work, or if error is not found.
TRK110	System changes the trunk state to system busy (SysB) Lockout (LO) from call processing busy (CPB).	Check the TRK log report buffer for trunk problem reports for the same trunk equipment. If you find a trunk problem report, follow the ‘‘Action to be Taken” for that report. If you do not find a trunk trouble report, see *Alarm and Performance Monitoring Procedures*. This document gives diagnostic procedures to follow before you run the suspect trunk equipment to service.
Note: More information on all logs in this table appears in the *Log Report Reference Manual*.		

—continued—

Table 3-1
Trunks logs (continued)

Log name	Causes	Response
TRK111	The system encounters problems or assigns a treatment during routing of an incoming trunk to trunk call.	Do not take action if the system generates the following two logs: - a TRK111 with the same message a maximum of five times in one hour or - a CLLI or TRK111 with different messages or CLLI, or both. Contact next level of maintenance if the system generates TRK111 with the same message and CLLI a minimum of six times in one hour.
TRK112	Two requests take the trunk off the lockout (LO) list and cause the trunk to return-to-service (RTS). These requests are: a manual request from the LTP MAP display level or a system request	There is no response. Information only.
TRK113	The system encounters problems during call processing of a trunk-to-trunk call.	If the system generates one of the following two logs, do not take action: –a TRK113 with the same CLLI a maximum of five times in one hour, or –a TRK113 with different CLLI a minimum of 20 times in one hour. Contact next level of management if the system generates a TRK113 with different CLLI a minimum of 20 times in one hour.
Note: More information on all logs in this table appears in the *Log Report Reference Manual*.		
—continued—		

Table 3-1
Trunks logs (continued)

Log name	Causes	Response
TRK114	The system encounters problems during dial pulse (DP) reception for an incoming call over a trunk. The system did not determine the call destination.	If the system generates one of the following two logs, do not take action: –a TRK114 with the same CLLI a maximum of five times in one hour, or –a TRK114 with different CLLI a minimum of 20 times in one hour. Contact next level of maintenance If the system generates TRK114 with a different CLLI a minimum of 20 times in one hour.
TRK115	The system encounters problems during dial pulse (DP) reception for an incoming call over a trunk.	If the system generates one of the following logs, do not take action: – a TRK115 with the same CLLI a maximum of five times in one hour, or – a TRK115 with different CLLI a minimum of 20 times in one hour. Contact next level of maintenance if the system generates TRK115 with a different CLLI a minimum of 20 times in one hour
Note: More information on all logs in this table appears in the *Log Report Reference Manual*.		

—continued—

Table 3-1
Trunks logs (continued)

Log name	Causes	Response
TRK116	The system encounters problems during multifrequency (MF) reception for an incoming call over a trunk. The system also did not determine the call destination.	Investigate the far-end office if the system generates TRK116 with the same CLLI with TRBCODE=PRE_ROUTE_ABANDON a minimum of 20 times in one hour. If the system generates one of the following logs, do not take action: – a TRK116 with the same CLLI a maximum of 5 times in one hour, or – a TRK116 with different CLLI a minimum of 20 times in one hour. Contact next level of maintenance if the system generates TRK116 with a different CLLI a minimum of 20 times in one hour.
TRK117	The system encounters problems during multifrequency (MF) reception for an incoming call over a trunk. The system did not determine the call destination.	If the system generates one of the following logs, do not take action: – a TRK117 with the same CLLI a maximum of five times in one hour with the same CLLI, or – a TRK117 with different CLLI a minimum of 20 times in one hour. Contact next level of maintenance if the system generates TRK117 with a different CLLI a minimum of 20 times in one hour
Note: More information on all logs in this table appears in the *Log Report Reference Manual*.		

—continued—

Table 3-1
Trunks logs (continued)

Log name	Causes	Response
TRK118	The system encounters problems during automatic number identification (ANI) spill for an incoming call over a trunk. The system did not determine the call origination address.	If the system generates TRK118 and the trouble is ANI_OFFICE_FAILURE, contact the office at the far-end of the trunk group. Inform the office that the system does not send ANI when required. If the system generates one of the following logs, and the problem is not ANI_OFFICE_FAILURE, do not take action: – a TRK118 a maximum of five times in one hour with the same CLLI, or – a TRK118 a maximum of 20 times in one hour with different CLLI Contact next level of maintenance if the system generates TRK118 with a different CLLI a minimum of 20 times in one hour.
TRK119	Operator enters the originating station number identification and releases the call.	There is no response. Information only.
TRK120	The system encounters problems during operator number identification (ONI) spill for an incoming call over a central automatic message accounting (CAMA) trunk. The system encounters problems by the DMS switch or the intervening operator. The system did not determine the call origination address.	If the problem is CAMA_POSITION_TROUBLE, contact the office at the far-end of the trunk group. Inform the office that the system does not send ONI when required. If the problem occurs a maximum of 10 times in one hour and the trouble is not ONI_OFFICE_FAILURE, do not take action.
Note: More information on all logs in this table appears in the *Log Report Reference Manual*.		

—continued—

Table 3-1
Trunks logs (continued)

Log name	Causes	Response
TRK121	The system encounters problems during transmission on a given outgoing trunk. The DMS switch does not receive acknowledgement from the far-end equipment. Acknowledgement indicates that the far-end equipment is ready to receive digits.	Post suspect trunk equipment from the test trunk position (TTP) MAP display level, and attempt transmission. If the system generates TRK121 again for suspect trunk equipment, diagnose the trunk equipment.
TRK122	Central Control (CC) detects both planes of the trunk equipment lose accuracy.	Perform trunk diagnostic test procedures. Contact the next level of maintenance if the action stated in the description column for REASON fails to correct the problem.
TRK123	Peripheral Processor (PP) sends the wrong message to the central control (CC).	Check the TRK log buffer for results of diagnostics initiated by the system for the suspect equipment. Follow ‘‘Action to be Taken” in the *Log Report Reference Manual* for diagnostic log reports. Contact the next level of maintenance for the following reasons: –no diagnostic reports are present –the system continues to generate TRK123 for the suspect equipment –the system continues to generate TRK123 for trunks connected to the same PP.
TRK124	Group trunk test aborts.	Perform trunk diagnostic test procedures. Contact the next level of maintenance if the action stated in the description column for REASON fails to correct the problem.
TRK125	T102 trunk test completes correctly.	There is no response. Information only.
Note: More information on all logs in this table appears in the *Log Report Reference Manual*.		

—continued—

Table 3-1
Trunks logs (continued)

Log name	Causes	Response
TRK126	T102 trunk test fails.	See *Alarm and Performance Monitoring Procedures* for correction maintenance procedures.
TRK127	T100 trunk test completes correctly.	There is no response. Information only.
TRK128	T100 trunk test fails.	See *Alarm and Performance Monitoring Procedures* for correction maintenance procedures.
TRK129	T100 trunk test fails.	Contact the next level of maintenance if the action stated in T100 Results table fails to correct the problem. See *Alarm and Performance Monitoring Procedures* for correction maintenance procedures.
TRK130	T100 trunk test completes correctly.	There is no response. Information only.
TRK131	T100 trunk test fails.	See *Alarm and Performance Monitoring Procedures* for correction maintenance procedures.
TRK132	T103 trunk test completes correctly.	There is no response. Information only.
TRK133	T103 trunk test fails.	Contact the next level of maintenance if the action stated in T103 Results table fails to correct the problem. See *Alarm and Performance Monitoring Procedures* for correction maintenance procedures.
TRK134	T104 trunk test completes correctly.	There is no response. Information only.
TRK135	T104 trunk test fails.	Contact the next level of maintenance if the action stated in T104 Results table fails to correct the problem. See *Alarm and Performance Monitoring Procedures* for correction maintenance procedures.
Note: More information on all logs in this table appears in the *Log Report Reference Manual*.		

—continued—

Table 3-1
Trunks logs (continued)

Log name	Causes	Response
TRK136	T104 trunk test fails.	Contact the next level of maintenance if the action stated in T104 Results table fails to correct problem. See *Alarm and Performance Monitoring Procedures* for correction maintenance procedures.
TRK138	The system routes a call to a treatment after the system was call processing busy (CPB).	Check TRK log report buffer for trunk trouble report(s) with the same originating trunk circuit or trunk group. Follow the ‘‘Action to be Taken” in the *Log Report Reference Manual* for the trouble report(s) the system generates.
TRK139	Non-synchronous testline test (TNSS) completes correctly.	There is no response. Information only.
TRK140	Non-synchronous testline test (TNSS) fails.	Contact the next level of maintenance if the action stated in the description column of the diagnostics results table fails to correct the problem. The diagnostics results table is in the *Log Report Reference Manual*. See *Alarm and Performance Monitoring Procedures* for correction maintenance procedures.
TRK141	Synchronous testline test (TSYN) completes correctly.	There is no response. Information only.
TRK142	Synchronous testline test (TSYN) fails.	Contact the next level of maintenance if the action stated in the description column of the diagnostics results table fails to correct problem, The diagnostics results table is in the *Log Report Reference Manual*. See *Alarm and Performance Monitoring Procedures* for correction maintenance procedures.
TRK143	Ear and Mouth lead signaling test (TE_M) completes correctly.	There is no response. Information only.
Note: More information on all logs in this table appears in the *Log Report Reference Manual*.		

—continued—

Table 3-1
Trunks logs (continued)

Log name	Causes	Response
TRK144	Ear and Mouth lead signaling test (TE_M) fails.	Contact the next level of maintenance if the action stated in the description column of the diagnostics results table fails to correct problem. The diagnostics results table is in the *Log Report Reference Manual*. See *Alarm and Performance Monitoring Procedures* for correction maintenance procedures.
TRK145	A long or short delay Repeat Two test (TR2L or TR2S) completes correctly.	There is no response. Information only.
TRK146	Either a long or short delay Repeat Two test (TR2L or TR2S) fails.	Contact the next level of maintenance if the action stated in the description column of the diagnostics results table fails to correct the problem. The diagnostics results table is in the *Log Report Reference Manual*. See *Alarm and Performance Monitoring Procedures* for correction maintenance procedures.
TRK147	Remote Office Testline (ROTL) returns the trunk to service (RTS) and places the trunk in an idle state.	There is no response. Information only.
TRK148	Remote Office Testline (ROTL) makes the trunk manually busy (ManB).	Contract the remote office before you resume testing, if test is in progress. If test is not in progress, do not take action.
TRK151	Blue box Fraud (BBF) Detection feature activates at CI MAP display level.	There is no response. Information only.
TRK152	Blue box Fraud Detection feature deactivates at the CI MAP display level.	There is no response. Information only.
TRK153	Blue box Fraud Detection feature is active and the system detects a Blue box call.	Save report for security personnel.
Note: More information on all logs in this table appears in the *Log Report Reference Manual*.		

—continued—

Table 3-1
Trunks logs (continued)

Log name	Causes	Response
TRK154	Blue box Fraud Detection feature is active. The system disconnects a fraudulent Bluebox call to identify the calling and called parties.	Save report for security personnel.
TRK155	Emergency Service Bureau (ESB), originating a call, is off-hook longer than the time designated in customer data Table TRKGRP.	Place the telephone located at the ESB back on the hook, and return the trunk to service
TRK156	TLPA trunk test completes correctly.	There is no response. Information only.
TRK157	The system aborts the TLPA trunk test and cannot execute the requested test.	Contact the next level of maintenance if you cannot find reason text generated.
TRK158	TLPA trunk test fails or does not complete on a reference or test trunk.	Contact the next level of maintenance if you cannot find reason text generated.
TRK162	The system encounters problems during transmission of a trunk-to-trunk or line-to-trunk call that uses digital multifrequency (DTMF) signaling.	If the system generates the following logs, do not take action: – a TRK162 with the same CLLI a maximum of five times in one hour, or – a TRK162 with different CLLI a maximum of 20 times in one hour. For different CLLI, contact the next level of maintenance. Contact next level of maintenance if the system generates TRK162 with different CLLI a minimum of 20 times in one hour.
TRK163	The system routes a call that originates from a local line over a trunk to a line in another office. The trunk in the other office must request calling line identification (CLI).	Save TRK163 for the department that requested CLI.

Note: More information on all logs in this table appears in the *Log Report Reference Manual*.

—continued—

Table 3-1
Trunks logs (continued)

Log name	Causes	Response
TRK164	The system routes a call that originates from an external line through the office to a line in a distant office. The line in the distant office must request calling line identification (CLI).	Save TRK164 for the department that requested CLI.
TRK165	The system encounters problems during an attempt to route traffic through a wide area telephone service (WATS) trunk group that exceeds the threshold.	If the system generates the following logs, do not take action: –a TRK165 with the same CLLI a maximum of five times in one hour with the same CLLI, or –a TRK165 with different CLLI a maximum of 20 times in one hour. If the system generates the following logs, save the reports for the Network Planning Department: –a TRK165 with the same CLLI a minimum of six times in one hour, or –a TRK165 with different CLLI a minimum of 20 times in one hour.
TRK166	When a general (not operating company) MAP user changes the state of a trunk in the trunk test position (TTP).	The operating company can keep the report as a record of when the user altered the trunk state. The log is an INFO log.
TRK170	Trunk test on a 105-type test line completes correctly.	There is no response. Information only.
TRK171	Trunk test on a 105-type test line completes correctly.	There is no response. Information only.
TRK172	Trunk test on a 105-type test line completes correctly.	There is no response. Information only.
TRK173	Trunk test on a 105-type test line completes correctly.	There is no response. Information only.

Note: More information on all logs in this table appears in the *Log Report Reference Manual*.

—continued—

Table 3-1
Trunks logs (continued)

Log name	Causes	Response
TRK174	Trunk test on a 105-type test line does not complete correctly.	If you cannot find the reason text generated, contact the next level of maintenance.
TRK175	Trunk test on a 105-type test line does not complete correctly.	If you cannot find the reason text generated, contact the next level of maintenance.
TRK176	Trunk test on a 105-type test line does not complete correctly.	If you cannot find the reason text generated, contact the next level of maintenance.
TRK177	Trunk test on a 105-type test line does not complete correctly.	If you cannot find the reason text generated, contact the next level of maintenance.
TRK178	Trunk test on a 105-type test line does not complete correctly.	If you cannot find the reason text generated, contact the next level of maintenance.
TRK179	The system performs a shelf check (SC) of a trunk.	There is no response. Information only.
TRK180	The system performs a shelf check (SC) of a trunk.	There is no response. Information only.
Note: More information on all logs in this table appears in the *Log Report Reference Manual*.		

—continued—

Table 3-1
Trunks logs (continued)

Log name	Causes	Response
TRK181	A waiting 2X90n trunk goes into the timeout state.	If reason is RECEIVER check the receiver. See *Alarm and Performance Monitoring Procedures* for instructions. If reason is END_OF_DIAL_SIGNAL and the omission was not voluntary, check the test desk equipment. See *Alarm and Performance Monitoring Procedures*. If the omission was voluntary, do not take action. If reason is DISCONNECT_SIGNAL and the omission was not voluntary, check the test desk equipment and return the test trunk to idle. See *Alarm and Performance Monitoring Procedures* for instructions. If the omission was voluntary, do not take action.
Note: More information on all logs in this table appears in the *Log Report Reference Manual*.		

—continued—

Table 3-1
Trunks logs (continued)

Log name	Causes	Response
TRK182	The system encounters problems during digitone (DGT) reception for an incoming call over a trunk. The system did not determine the call destination.	If the system generates TRK182 with the problem PRE_ROUTE_ABANDONED, Do not take action. If the system generates TRK182 with any problem other than PRE_ROUTE_ABANDONED, check for other TRK182 reports: If the system generates the following logs, do not take action: –a TRK182 with the same CLLI a maximum of five times in one hour, or –a TRK182 with different CLLI maximum of 20 times in one hour with different CLLI. Contact next level of support if the system generates TRK182 with different CLLI a minimum of 20 times in one hour.
Note: More information on all logs in this table appears in the *Log Report Reference Manual*.		
—continued—		

Table 3-1
Trunks logs (continued)

Log name	Causes	Response
TRK183	The system encounters problems during digitone (DGT) reception for an incoming call over a trunk, and a permanent signal problem occurs.	If the system generates TRK183 with the problem PRE_ROUTE_ABANDONED, do not take action. If the system generates TRK183 with any problem other than PRE_ROUTE_ABANDONED, check for other TRK183 reports. If the system generates the following logs, do not take action: –a TRK183 with the same CLLI a maximum of five times in one hour, or –a TRK183 with different CLLI a maximum of 20 times in one hour. Contact next level of maintenance if the system generates TRK183 with different CLLI a minimum of 20 times in one hour.
TRK190	Call processing receives a message that is not expected at that stage of the call.	Contact the next level of maintenance if TRK190 appears often.
TRK191	The system receives a Group Blocking message from the far end and sets the Remote Make Busy (RMB) condition.	There is no response. Information only.
TRK192	The systems receives a group unblocking message from the far end and clears the Remote make busy (RMB) condition.	There is no response. Information only.
TRK195	The terminating ARTER sequence terminates early.	There is no response. Information only.
TRK199	A 2-wire originating ARTER test fails.	There is no response. Information only.
Note: More information on all logs in this table appears in the *Log Report Reference Manual*.		

—continued—

Table 3-1
Trunks logs (continued)

Log name	Causes	Response
TRK206	A 4-wire originating ARTER test fails.	There is no response. Information only.
TRK207	Call processing detects problems with a receiver.	If TRK207 occurs often, manually diagnose the receiver. When reports occur continuously, check facilities and trunk signaling mode of receiver.
TRK208	Call processing detects a private branch exchange (PBX) code which is not in the lookup tables.	Check and compare the data between the central office (CO) and the PBX.
TRK225	TL105 self check test sequence passes.	There is no response. Information only.
TRK226	TL105 self check test sequence passes.	There is no response. Information only.
TRK227	TL105 self check test sequence passes.	There is no response. Information only.
TRK228	TL105 self check test sequence passes.	There is no response. Information only.
TRK260	The systems senses alarm conditions on dual frequency signaling unit (DFSU) status leads that associates with a given trunk.	If the reason given is DFSU MULTIPLE ALARMS ON, perform the following actions. If the reason is not DFSU MULTIPLE ALARMS ON, do not take action. Run diagnostics on the suspect trunk circuit pack (trunk card and network path). The system does not provide diagnostics for the DFSU, but the problem can be with the associated trunk card.
TRK301	The system performs a N6 trunk continuity test that passes.	There is no response. Information only.
TRK302	The system aborts a continuity test because of the reason given.	There is no response. Information only.
TRK303	The system performs a continuity test of a trunk that fails.	There is no response. Information only.

Note: More information on all logs in this table appears in the *Log Report Reference Manual*.

—continued—

Table 3-1
Trunks logs (continued)

Log name	Causes	Response
TRK320	A failure occurs when you transmit digits.	Check the entry for the protocol between the two offices. If the failure is a UTR fault, check the UTR card (NT6X92). Perform diagnostics on the affected trunk.
TRK321	Reception failed on MFC trunks during register signaling.	Check the entry for the protocol between the two offices. If the failure is a UTR fault check the UTR card (NT6X92). Perform diagnostics on the affected trunk.
TRK322	An R2 trunk encountered a signaling protocol problem.	This log appears when a breakdown of line signaling protocol occurs between two offices. Check the parameters in Table TRKSGRP to make sure they are correct for the trunk that reports error. Perform diagnostics on the trunks.
TRK333	International circuits pass the international signal supervisory (originating 103-test line) test (TLISS).	There is no response. Information only.
TRK334	International circuits fail the international signal supervisory (originating 103-test line) test (TLISS).	Test trunk card manually.
TRK340	A protocol problem occurs on a DPNSS trunk.	Contact the next level of maintenance if the same trouble code continues on the same circuit.
TRK341	A problem occurs on the DPNSS trunks during the digit reception phase.	Contact the next level of maintenance if the same trouble code continues on the same circuit.
TRK343	An IBN7 message arrives without the expected DPNSS message in the refinement of the message.	Make sure that the connection node in the network has DFT capability. Contact the next level of maintenance.

Note: More information on all logs in this table appears in the *Log Report Reference Manual*.

—continued—

Table 3-1
Trunks logs (continued)

Log name	Causes	Response
TRK351	A telephony user part (TUP) trunk encounters a maintenance problem.	If the reason text is C7TRKMEM NOT FILLED, add entries to table C7TRKMEM for a TUP trunk that needs entries. You can also change the signaling data so that the trunk does not require C7TRKMEM. If the reason text is not C7TRKMEM NOT FILLED, check the messaging system. Look for overload or failure conditions that could stop the arrival or sending of messages.
TRK352	A telephony user part (TUP) encounters a problem with a trunk.	An initial and final message (IAFM) generates this log when the trunk receives the message with values the trunk does not support. The values are for service handling protocol or call path indicator (CPI). Investigate the source of the IAFM message that generated the log.
TRK424	The Trunk exceeds the call processing error thresholds for the first time and the system scheduled the trunk for system diagnostics. The trunk fails the diagnostics initiated by the system. The trunk exceeds the call processing error thresholds again within 15 min of the system diagnostic test.	Contact the next level of maintenance if system diagnostics do not correct the problem
Note: More information on all logs in this table appears in the *Log Report Reference Manual*.		
—end—		

Trunks-related operational measurements

Operational measurements (OM) are records of events that occur during a given time period. Three basic types of measurements are present: peg counts, use, and overflow. You can use operational measurements as service-level indicators. You can also use OMs as input for maintenance, hardware and software assignment, accounting, and equipment decisions.

Table 4-1 describes the basic functions of OMs that associate with the trunks subsystem. The table describes the register group, each register in the group, and when the creation of the measurement occurred. The table also describes related registers and logs, and a method that validates the register output. For detailed explanations of other OMs, refer to *Operational Measurements Reference Manual*. For detailed information about how to activate these OMs, refer to the *Basic Administration Procedures*, 297-1001-300, and the *Service Problem Analysis Administration Guide*, 297-1001-318.

Table 4-1
Trunks operational measurements

Group	Information
TRK	**Description:** TRK provides information on trunk traffic for each trunk group. The registers in TRK count routing attempts, seizure attempts, seize failures, total trunk use, and busy state use. **Associated logs:** TRK106, TRK109, TRK111, TRK112, TRK113, TRK114, TRK115, TRK116, TRK117, TRK118, TRK119, TRK121, TRK122, TRK138, TRK162, TRK182, TRK183, TRK213.
TRKVERSDS	**Description:** Collects information about trunk verification from a designated station (TVDS) calls. **Associated logs:** There are no associated logs.

—continued—

Table 4-1
Trunks operational measurements (continued)

Group	Information
OFZ	**Description:** Summarizes the form of traffic that arrives at an office, and the first routing of outgoing traffic. Registers count calls. This count depends on the source of the call (trunk or line) and the intended destination (not the real destination). **Associated logs:** TRK111, TRK113, TRK114, TRK116, TRK121, TRK123, TRK138, TRK162.
OFZ2	**Description:** Counts calls routed to generalized no circuit treatment (GNCT). A call is routed to GNCT when a trunk group is the last route in the route list. All trunks must be busy. **Associated logs:** TRK114, TRK115, TRK116, TRK117, TRK138, TRK162, TRK182, TRK183.
OTS	**Description:** Counts calls by source (trunk) and destination. **Associated logs:** TRK106, TRK108, TRK111, TRK113, TRK114, TRK116, TRK122, TRK123, TRK138, TRK162.
DS1CARR	**Description:** Provides information about maintenance thresholds and out-of-service (OOS) thresholds for digital peripheral modules (PM). The system removes DS-1 from service when the PM exceeds OOS thresholds until you manually return-to-service (RTS) the DS-1. The setting for the trunks on the DS-1 carrier is the carrier fail state. Each DS-1 carrier has two settings when the character reaches an OOS threshold: NOT TO BE REMOVED or left alone. If the carrier is set to NOT TO BE REMOVED, the carrier generates a log. The CARRIER level of the MAP displays the information on the DS-1 carrier. **Associated logs:** TRK109, TRK182.
ISDD	**Description:** Provides information on the grade of service given to trunk calls that enter a DMS switch. The trunk calls enter the switch through three types of XMS-based peripheral modules(XPM). When the length of time required to complete a call exceeds a defined threshold, the register for each XPM increases. **Associated logs:** There are no associated logs.
	—end—

Operating company personnel can use OMs to identify problems in the trunks system. The operating company personnel can use OMs to identify the source of the problem. This identification is based on the OM group and registers that exceed their thresholds. Table 4-2 identifies OM registers that exceed their thresholds and the possible causes. You can use this table as a problem isolation chart.

Table 4-2
Trunks problem locating chart

OM group	Register	Possible cause
TRK	ANF	Not correct, no ANI signal received
	AOF	ANI failure
	BLKCTRK	Blocked calls on trunk
	GLARE	Selected trunk dropped because the PM detects an origination before it can seize the trunk
	INFAIL	Permanent signal, partial dial time outs, bad digits, origination on one-way outgoing trunks, lost integrity, failure to attach to receiver, receiver queue overflow, receiver queue wait time-out, failure to time-out, progress message not expected, force release
	OUTFAIL	Outgoing failure
	PRERTEAB	Preroute abandon
	SBU	System busy use
OFZ	INABNC	Incoming call abandoned by customer
	INABNM	Incoming call abandoned by machine
	INANN	Incoming call routed to an announcement
	INLKT	True identity of incoming trunk lost.
		Not possible to connect to tone or announcement.
		Forced release initiated manually.
		Forced release initiated because call processing requests a delay.
Note: Run diagnostics on trunks to identify faults.		

—continued—

Table 4-2
Trunks problem locating chart (continued)

OM group	Register	Possible cause
	INOUT	Number of incoming calls from trunks
	INTONE	Number of incoming calls routed to a tone
	OUTOSF	Reversed trunk, failure to recognize start-dial, stop-dial not expected, timeout before expected stop-dial received
	TRMBLK	Failed voice-path termination attempt
	TRMMFL	Terminating match failures
OFZ2	OFZNCBN	No Meridian Digital Centrex trunk available
	OFZNCID	No circuit inward dial trunks
	OFZNCIM	No circuit intermachine trunks
	OFZCIT	No circuit intertoll trunks
	OFZNCLT	No circuit local tandem trunks
	ONZCOF	No circuit offnet trunks
	OFZNCON	No circuit onnet trunks
	OFZNCOT	No circuit other trunk
	OFZNCRT	No circuit trunks
	OFZNCTC	No circuit toll completing trunks
	OFZNOSC	No service circuit trunks
	PDLM	Machine dialed partial dials
	PSGM	Machine dialed permanent signal
Note: Run diagnostics on trunks to identify faults.		

—continued—

Table 4-2
Trunks problem locating chart (continued)

OM group	Register	Possible cause
OTS	ICABNM	Incoming abandoned by the machine
	INCLKT	Call routed to lockout
	INCTRMT	Call routed to a treatment
	SYSABDN	System originations abandoned
	SYSLKT	System originations to lockout
	SYSTRMT	Call routed to a treatment
DS1CARR	DS1ECF	DS-1 echo canceller failure
	DS1LGCA	Local carrier group alarm
	DS1MBU	Manual busy use
	DS1RCGA	Remote carrier group alarm
	DS1SBU	System busy use
Note: Run diagnostics on trunks to identify faults.		
—end—		

Trunks-related data structures

A future release will provide trunks data structures.

Trunks-related user interface commands

User interface

The MAP interface provides the human machine interface to the trunks maintenance subsystem. You can access this interface at three places. These places are: the TRKS MAP level, the associated trunk maintenance sublevels, and the associated menu commands (listed or not listed).

The non-menu commands CLLIRBT and CLLIREF can identify some trunk table datafill problems. For more information on these commands, refer to the non-menu commands section at the end of this chapter.

You can perform the following maintenance activities at the different trunk maintenance MAP levels.

- equipment tests
- determination of equipment configuration
- status requests
- adjustment of equipment status
- equipment location requests

The trunk maintenance MAP levels provide

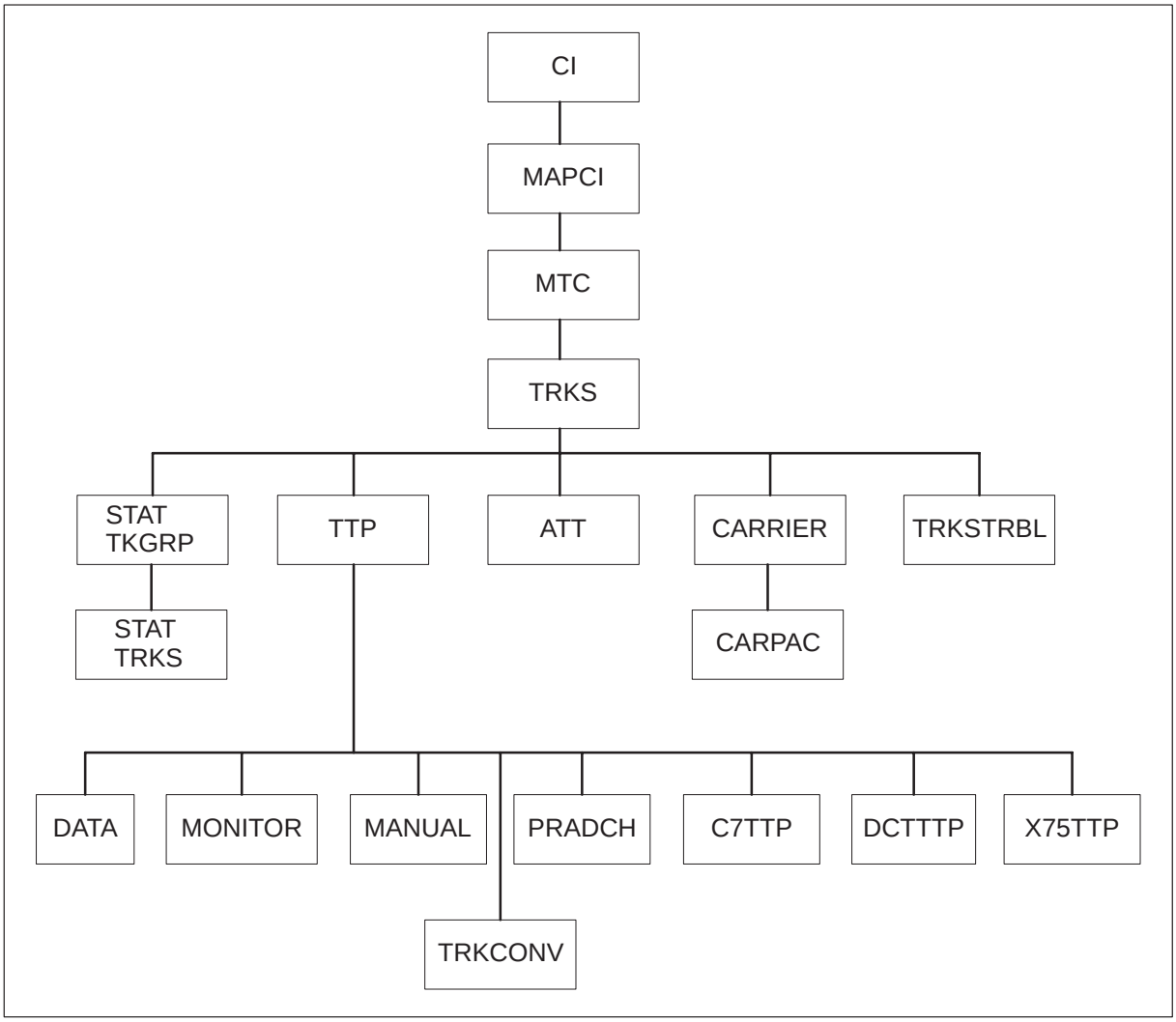
- command menus
- displays of equipment status
- displays of equipment location
- displays of system audit results
- displays of results of user requests

Display Hierarchy

The MAP display organizes information into sequenced levels, starting at the command interpreter (CI) level (refer to figure 6-1). Users automatically access the CI level when they log on at the MAP display. At the CI level, the command MAPCI accesses the display for the level of a

subsystem. Subsystems have one or more levels where you monitor and maintain hardware and software.

Figure 6–1
Trunks maintenance MAP display hierarchy



Note: The term *level* refers to "MAP level, menu, and status display(s)" unless otherwise specified. The term *display* refers to status display or response as a result of a command entry. For more information on the MAP displays and menus refer to the *Maintenance System Man-Machine Interface Description*, 297-1001-520.

You access lower levels in the hierarchy from the MAPCI level by telescoping into subtending levels. Each level has a

- menu of the commands available for that level

- display of the subsystem status
- display of associated hardware or software configuration
- display of responses to commands executed

Command Menus

Execution of the commands in the menu allows

- queries or changes to the function and operation of the part of the trunks subsystem that is associated with that level
- access to other levels in the hierarchy

The left side of the MAP display for a level contains a menu. This menu is a list of commands available for the level. Numbers can accompany these commands or parameters.

For a list of the menu commands at different trunks subsytem MAP levels, refer to Figures 6-2 and 6-3.

Figure 6-2
Menu commands in the TRKS subsystem

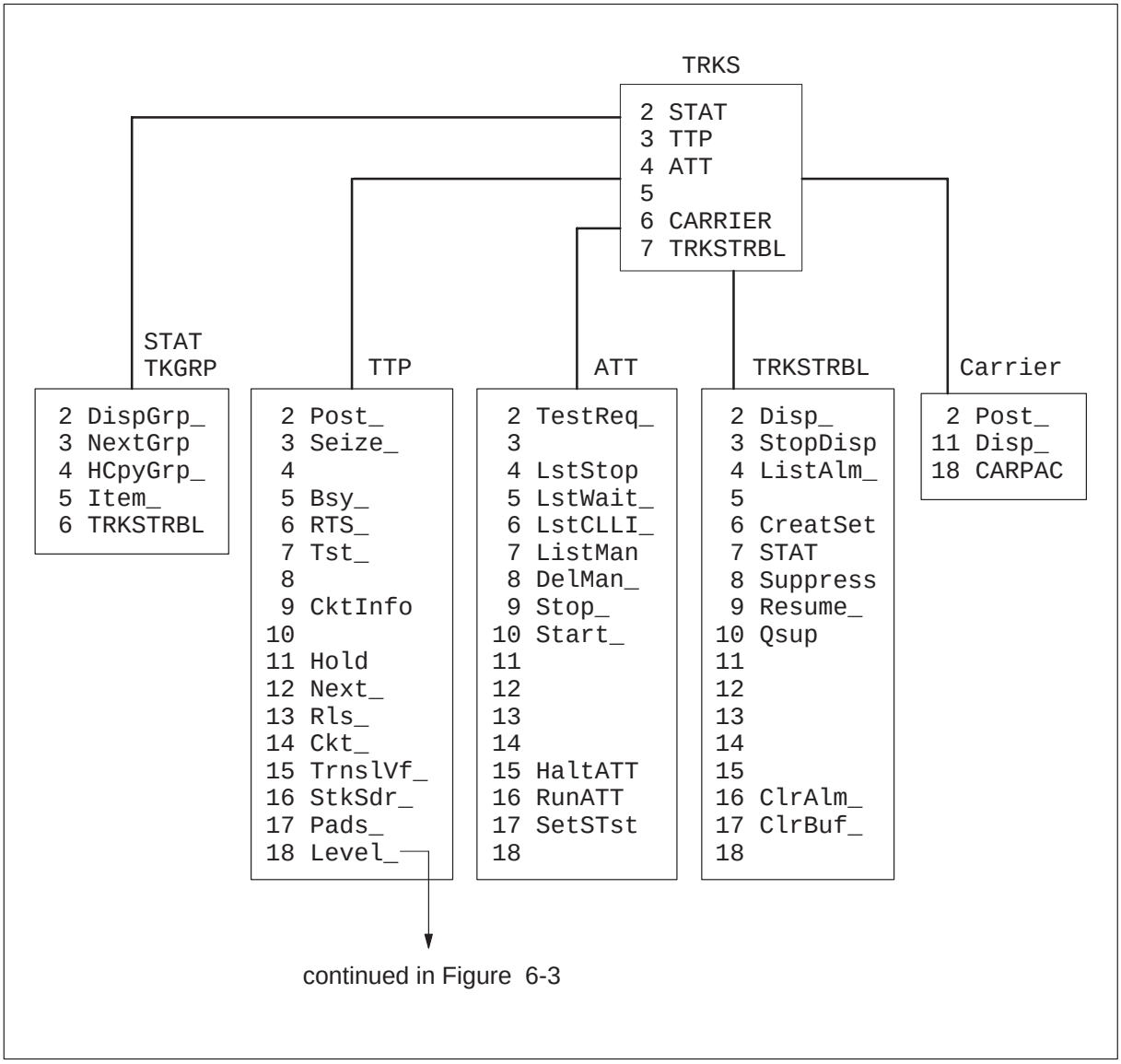
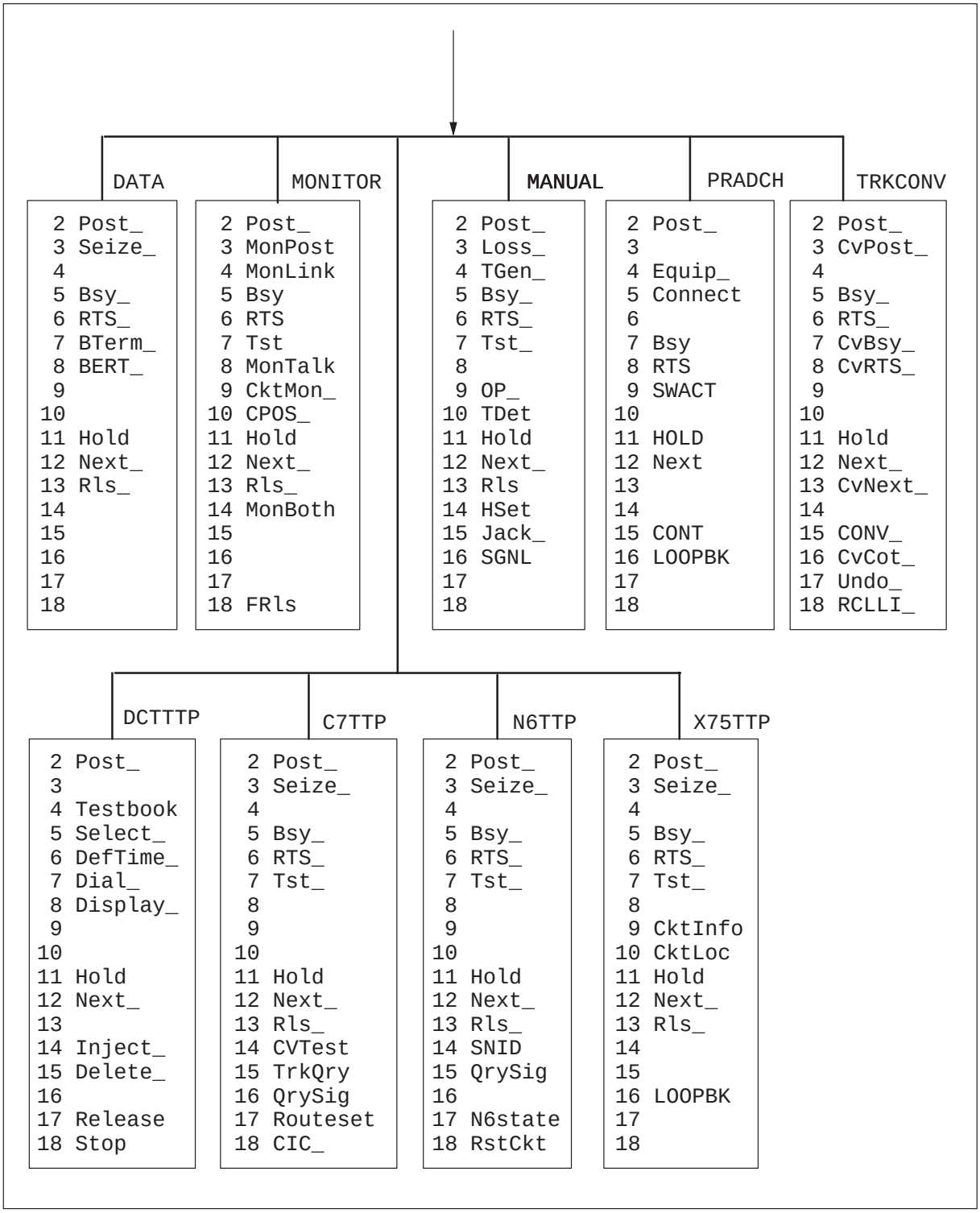


Figure 6-3
Menu commands in the TTP subsystem



Maintenance Status

The first three lines of the TRKS level MAP display form an alarm banner. This alarm banner is common to all sublevels accessed from the TRKS level (refer to figure 6-4). This part of the display continuously indicates the system status using alarm codes. The first line is a fixed set of abbreviations (headers) that represent switch subsystems. These switch subsystems include TRKS (trunks).

Figure 6-4
Maintenance (MTC) system status display

```
   CC    CMC    IOD    Net    PM    CCS    Lns    Trks    Ext
   .      .      .      .      .      .      .     2GC      .
                                                    M

    MTC
0   Quit
2   Activity
3   MTCNA
4   SRSTATUS
5   BERP
6   COSTATUS
7
8
9   CM
10  MS
11  IOD
12  Net
13  PM
14  CCS
15  Lns
16  Trks
17  Ext
18  APPL
          userid
    TIME   hh : mm>
```

On the second line of the alarm banner, each subsystem header displays data fields of up to six characters. The data is in the form of mnemonic codes. The mnemonic codes indicate the status of the associated subsystem and the number of units affected. The status code displayed is the most severe error condition present in the subsystem. Each subsystem generates alarm conditions. The alarm conditions have a priority. The priority determines the alarm condition to display when a minimum of two alarm conditions are present at the same time. The alarm condition displays at the system level. The most severe alarm condition takes priority. The next most severe alarm displays when correction of the first alarm occurs. Table 6-1 lists the TRKS subsystem alarm codes.

Each trunk group has an assigned maintenance state. The switch displays the maintenance state. Commands entered manually at the MAP display also show the maintenance state. Each trunk state has a mnemonic code that appears in the status displays. Table 6-1 contains the trunk states, their mnemonic codes, and a description of each trunk state.

The third line of the alarm banner indicates the severity of the alarm using the following codes:

- *C* (critical) The number of circuits out of service in a minimum of one group exceeds the critical alarm threshold for the group. Take immediate maintenance action.
- M (major) The number of circuits out of service in a minimum of one group exceeds the major alarm threshold for the group. The number of circuits out-of-service does not exceed the critical alarm threshold. The number of circuits out-of-service has a severe effect on service and requires quick maintenance action.
- blank (minor) The number of circuits out of service in a minimum of one group exceeds the minor alarm threshold for the group. The number of circuits out-of-service does not exceed the major alarm threshold. The number of circuits out of service could affect traffic during heavy load conditions.

A dot (.) is present on the second line of the alarm banner when there is no alarm condition. No alarm condition is present when the system is completely in service.

TRKS Subsystem Displays

All TRKS sublevels keep the display on the first three lines of the alarm banner. The alarm banner displays the trunks subsystem alarms below the TRKS header. Below the alarm banner is the trunks subsytem menu and status display for the associated trunks subsystem. The menu lists the commands available at that sublevel.

At each sublevel, a subsystem status display adds to the TRKS status display. The subsystem level descriptions that follow describe these displays.

Using Commands

The descriptions of the commands and parameters for the TRKS maintenance subsystem use the standards listed in command format standards. *Maintenance System Human-Machine Interface Description,* 297-1001-520 describes access to the maintenance system. This document also describes the basic procedures for how to enter commands. After you type a command, press the Enter key to execute the command(s). The term

MMI refers to the sequences of commands and responses required to perform trunks maintenance.

Commands are available to query and change the status of given trunks. For a comparison of all the trunks maintenance commands, refer to Figures 6-2 and 6-3. The menu area lists commands and parameters that you can enter at the MAP terminal keyboard at each maintenance level. This menu area is on the left side of the MAP display of each level. An underscore character that follows any menu item indicates that the item requires a parameter as part of the entry. For example, DispGrp_ (menu item 2) requires parameter grp_type. An underscore character before a menu item indicates an optional parameter. To obtain information about the syntax and parameters that associate with a command, enter Q (query) and the name of the command.

To execute menu commands at any level, enter

- the number before the menu item (plus parameters)
- the complete command, in lower case characters

Note 1: You enter the number in response to a command prompt. A space must go before the number you enter when the number is the same as a menu item number.

Note 2: The command QUIT (menu item 0) is common to all MAP display menus. Because the command is common, The *DMS-100 Family Commands Reference Manual*, 297-1001-822 describes the command QUIT.

The commands QUIT, LOGOUT, HX, and STOP, executed at the CI level, have the following common response, explanation, and action.

Response: *Do you want to keep the monitor or jack connection?*

Explanation: The response asks you if you want to maintain present connections.

System Action: The system will not execute the command until you give confirmation.

User Action: Enter Y to confirm the command and N to terminate. If you have problems with the entry of a command, use the ABORT command and enter the original command again. For information on the ABORT command see *DMS-100 Family Commands Reference Manual* 297-1001-822. For a command syntax that is not correct, the following message appears: *EITHER INCORRECT OPTIONAL PARAMETER(S) OR TOO MANY PARAMETERS*. The reason for the error follows this message.

Responses

A response appears after you enter a command. Response text in this NTP is in uppercase letters (except for variables), as it appears at the MAP. The MAP display lists the heading *Responses* in alphabetical order.

TRKS Level

At the top of the trunks maintenance hierarchy, the TRKS level provides access to other trunk maintenance sublevels. Figure 6-5 shows the TRKS level MAP display. Table 6-1 lists the alarm codes that appear in the TRKS MAP display in alphabetical order, and describes the alarm codes.

Figure 6-5
TRKS level menu and example display

```
   CC    CMC    IOD    Net    PM    CCS    Lns    Trks    Ext
                                                 2GC
   .      .      .      .      .      .      .      M      .

    TRKS
0  Quit
2  STAT
3  TTP
4  ATT
5
6  CARRIER
7  TRKSTRBL
8
9
10
11
12
13
14
15
16
17
18
         userid
   TIME   hh : mm>
```

Table 6-1
TRKS subsystem alarm codes

Code	Description
. (dot)	No circuits are out of service.

—continued—

Table 6-1
TRKS subsystem alarm codes (continued)

Code	Description
C	A minimum of one carrier is system busy and all circuits are in service.
CB	A minimum of one carrier is system busy and the most important out-of-service condition of circuits in the group is Manual Busy (MB).
CC	A minimum of one carrier is system busy, and a Group Critical (GC) alarm is present.
CE	A minimum of one carrier is system busy, and the most important out-of-service condition of circuits in the group is External Busy (EX).
CG0	A minimum of one carrier is system busy, and a Group Minor (G) alarm is present.
CM	A minimum of one carrier is system busy, and a Group Major (GM) alarm is present.
CS	A minimum of one carrier is system busy, and the most important out-of-service condition of circuits in the group is system busy (SB).
EX	The most important out-of-service condition of circuits in the group is External Busy (EX).
G	Group Minor alarm. The quantity of circuits in EX, MB, and SB states exceeds the set level, but not the major alarm level.
GC	Group Critical alarm. The quantity of circuits in the EX, MB, and SB states exceeds the set level.
GM	Group Major alarm. The quantity of circuits in EX, MB, and SB states exceeds the set level, but not the critical alarm level.
MB	The most important out-of-service condition of circuits in the group is Manual Busy (MB).
SB	The most important out-of-service condition of circuits in the group is System Busy (SB).

—end—

User interface for the Trunks subsystem

The following sections highlight the commands used for maintaining trunks from the MAP. Figure 6-6 shows the menu and alarm banner for MTC level of the MAP display.

Figure 6-6
System status at MTC level

```
   CC    CMC    IOD    Net    PM    CCS    Lns    Trks    Ext
   .      .      .      .     .      .      .     2GM      .
                                                   M

    MTC
0   Quit
2   Activity
3   MTCNA
4   SRSTATUS
5   BERP
6   CPSTATUS
7
8
9   CM
10  MS
11  IOD
12  Net
13  PM
14  CCS
15  Lns
16  Trks
17  Ext
18  APPL
          userid
    TIME   hh : mm>
```

TRKS level menu commands

Table 6-2 describes the commands at the TRKS level of the MAP display.

Table 6-2
Overview of commands at the TRKS level

Menu item	Command	Description
0	Quit_	The QUIT command causes the system to leave the current level and return to a higher level of the MAP display.
2	STAT	The STAT command accesses the Trunk group status level.
3	TTP	The TTP command accesses the TTP level.
4	ATT	The ATT command accesses the ATT level.

—continued—

Table 6-2
Overview of commands at the TRKS level (continued)

Menu item	Command	Description
5		Not used.
6	CARRIER	The CARRIER command accesses the CARRIER level.
7	TRKSTRBL	The TRKSTRBL command accesses the TRKSTRBL level.
8-18		Not used.
		—end—

TRKS level unlisted commands

The unlisted command REPEAT does not appear on any of the TRKS level menus, but it may be entered as if it were listed on the menu. The REPEAT command is described in table 6-3.

Table 6-3
Overview of unlisted commands at the TRKS level

Command	Description
REPEAT	The REPEAT command repeats a test or sequence of tests.

STAT TKGRP level commands

Use Commands at the STAT TKGRP level to monitor and maintain trunk groups. For a list of the commands that are available for the trunks maintenance system, refer to figure 6-2. Table 6-4 describes the commands at the STAT TKGRP level.

Table 6-4
Overview of commands at the STAT TKGRP level

Menu item	Command	Description
0	Quit_	The QUIT command causes the system to leave the current level and return to a higher level of the MAP display.
2	DispGrp_	The DispGrp command displays information on specified trunk groups.
3	NextGrp	The NextGrp command displays data on the next 12 trunk groups of a group type and alarm.
4	HCpyGrp_	The HCpyGrp command displays or prints information on trunk groups in continuous format.
5	Item_	The ITEM command displays data on circuits within a group and accesses the STAT TRKS level.
6	TRKSTRBL	The TRKSTRBL command accesses the TRKSTRBL level.
7-18		Not used.

TTP level commands

Commands at the TTP level are used to monitor and maintain trunk status and to access the sublevels of trunk maintenance. The TTP level commands are described in table 6-5.

Table 6-5
Overview of commands at the TTP level

Menu item	Command	Description
0	Quit_	The QUIT command causes the system to leave the current level and return to a higher level of the MAP display.
2	Post_	The POST command posts a minimum of one circuit for maintenance.
3	Seize_	The SEIZE command seizes a circuit for maintenance actions.
4		Not used.

—continued—

Table 6-5
Overview of commands at the TTP level (continued)

Menu item	Command	Description
5	Bsy_	The BSY command busies a circuit to the specified out-of-service state.
6	RTS_	The RTS command returns to service the circuit in the control position.
7	Tst_	The TEST command tests the circuit in the control position.
8		Not used.
9	CktInfo	The CKTINFO command displays specific information for aspecified circuit.
10	CktLoc	This command displays the physical location of the circuit in the control position. For DRAM cards, this command displays slot 5, the location of the DRAM controller card. For more information, refer to the description of table DRAMS in the data schema section of *Translations Guide*.
11	Hold	The HOLD command places the circuit in the control position in the first available HOLD position.
12	Next_	The NEXT command places another circuit in the control position.
13	Rls_	The RLS command releases the connection to the circuit in the control position.
14	Ckt_	The CKT command connects the specified circuit to the circuit in the control position.
15	TrnslVf_	The TRNSLVF command displays routing data for a call originated on a posted trunk.
16	StkSdr_	The STKSDR command offers different functions related to the stuck sender (StkSdr) feature, which identifies trunks with outpulsing problems. StkSdr only acts on trunks that belong to the user.
17	Pads_	The PADS command queries, sets, or adjusts digital pad settings for testing a posted circuit.
18		Not used.

—end—

TTP level unlisted commands

The unlisted menu commands do not appear on the TTP level menu, but may be entered as if they were listed on any of the TTP menus. The unlisted menu commands CREATE_TTP, DATATTP, DELETE_TTP, LOADFW and DELETE are described in table 6-6.

Table 6-6
Overview of unlisted commands at the TTP level

Command	Description
CREATE_TTP	The CREATE_TTP command creates another TTP.
DATATTP	The DATATTP command accesses the DATA level from the TTP level of the MAP display.
DELETE_TTP	The DELETE_TTP command deletes the TTP process from the specified position.
LOADFW	The LOADFW command loads firmware to a Multiline Test Unit (MTU). The command also loads firmware to a Digital Test Unit (DTU) that is installed on a Maintenance Trunk Module (MTM). The command also loads firmware to an Enhanced Digital Test Unit (EDTU) that is installed on an MTM or an integrated services module (ISM). The following restrictions apply to the LOADFW command for EDTU firmware downloading: ▪ only 1 EDTU loads at any given time ▪ all 4 EDTU circuits must be in the hold position before issuing the LOADFW command ▪ all EDTU circuits must be seized and busied before using the LOADFW command ▪ the QUERY command cannot be used while the EDTU loads
LEVEL	The LEVEL command accesses the TTP sublevel display.

DATA level commands

Use commands at the DATA level to run BER Tests (BERT). Table 6-7 describes commands a the DATA level.

Table 6-7
Overview of commands at the DATA leve

Menu item	Command	Description
0	Quit_	The QUIT command causes the system to leave the current level and return to a higher level of the MAP display.
2	Post_	The POST command posts a minimum of one circuit for maintenance. The command posts trunks that belong to the user.
3	Seize_	The SEIZE command seizes a circuit for maintenance action.
4		Not used.
5	Bsy_	The BSY command busies a circuit to the specified out-of-service state.
6	RTS_	The RTS command returns to service the circuit in the control position.
7	BTerm_	The BTERM command registers the type of termination that you must establish in far end office for the duration of the BERT trunk test. The BTERM command displays the termination, or cancels (resets) the registry of the termination.
8	BERT_	The BERT command runs the Bit Error Ratio Test (BERT) between offices.
9-10		Not used.
11	Hold	The HOLD command places the circuit in the control position in the first available HOLD position.
12	Next_	The NEXT command places another circuit in the control position.
13	Rls_	The RLS command releases the connection to the circuit in the control position.
14-18		Not used.

DATA level unlisted command

The unlisted menu command BERTTIME does not appear on the DATA level menu, but you can enter the command. Table 6-8 describes the BERTTIME command.

Table 6-8
Overview of unlisted commands at the DATA level

Command	Description
BERTTIME	The BERTTIME command specifies the duration of the Bit Error Ratio Test (BERT).

Monitor level commands

The MONITOR level monitors call processing busy connections like listening, talking, or both. You can establish a monitor connection with the circuit in the control position, or the circuit linked with the control position circuit. Table 6-9 describes commands at the MONITOR level.

Table 6-9
Overview of commands at the MONITOR level

Menu item	Command	Description
0	Quit_	The QUIT command causes the system to leave the current level and return to a higher level of the MAP display.
2	Post_	The POST command posts one or more circuits for maintenance.

—continued—

Table 6-9
Overview of commands at the MONITOR level (continued)

Menu item	Command	Description
3	MonPost	The MONPOST command establishes a connection between the headset of the TTP communications device and the circuit in the control position. It establishes a connection to listen to the incoming transmission of the posted circuit. The MONPOST command supports digital monitoring with digital test equipment. In analog monitoring, this command takes a parameter, CONN_DURATION (1 to 36), which determines the duration of the connection. If you do not enter this (optional) parameter, the default setting is for an untimed connection. An untimed connection remains until manual interruption removes the connection. In digital monitoring, the MONPOST command provides the connection between two paths. These paths are the receive path of the posted trunk and the transmit path of the digital jack-ended trunk. The jack-ended trunk connects to the digital test equipment. For digital monitoring, the MONPOST command takes three parameters. The first parameter, D, indicates that the request is for digital monitoring. The second parameter, a jack number from 1 to 3, supports digital monitoring. If you do not enter D, you cannot enter the jack number. The third parameter is CONN_DURATION, which has the same function as for analog monitoring. The monitor downgrades to a MONPOST connection if two conditions are present. Condition one is that the command establishes a monitor connection. Condition two is that the connection is ”next” to the next trunk in the posted set.

—continued—

Table 6-9
Overview of commands at the MONITOR level (continued)

Menu item	Command	Description
4	MonLink	The MONLINK establishes a connection between two points. These points are the headset of the TTP communications device and the circuit linked to the circuit in the control position. The command establishes a connection to listen to the incoming transmission of the posted circuit. The command enables a user to listen to the incoming transmission of the linked circuit. In analog monitoring, this command takes a parameter CONN_DURATION (1 to 36), which determines the duration of the connection. If you do not enter this (optional) parameter, the default setting is for an untimed connection. An untimed connection remains until manual interruption removes the connection. The MONLINK command supports digital monitoring with digital test equipment. In digital monitoring, the MONLINK command provides the connection between two paths. These paths are the receive path of the linked trunk and the transmit path of the digital jack-ended trunk. The jack-ended trunk connects to the digital test equipment. For digital monitoring, the MONLINK command takes three parameters. The first parameter, D, indicates that the request is for digital monitoring. The second parameter, a jack number from 1 to 3, supports digital monitoring. If you do not enter D, you cannot enter the jack number. The third parameter is CONN_DURATION, which has the same function as for analog monitoring.
5	Bsy_	The BSY command busies the circuit to the specified out-of-service state.
6	RTS_	The RTS command returns to service the circuit in the control position, that is, idles the circuit.
7	Tst _	The TST command tests the circuit in the control position.

—continued—

Table 6-9
Overview of commands at the MONITOR level (continued)

Menu item	Command	Description
8	MonTalk_	The MONTALK command establishes a 3-party conference circuit connection between three parties. These parties are the circuit in the control position, the circuit linked to that circuit, and the headset of the TTP. The MONTALK command establishes the connection through a 3-port conference circuit. The parameter CONN_DURATION,(1 to 36) determines the duration of the connection. If you do not enter this parameter, the default setting is for an untimed connection. An untimed connection remains until manual interruption removes the connection.
9	CktMon_	The CKTMON command turns the circuit monitor feature ON or OFF.
10	CPOS_	The CPOS command tests a CAMA or RONI trunk in the control position.
11	Hold	The HOLD command places the circuit in the control position in the first available HOLD position.
12	Next_	The NEXT command places another circuit in the control position.
13	Rls_	The RLS command releases the connection to the circuit in the control position.
14-17		Not used.
18	FRLS	The FRLS command forces the CPB circuit in the control position to the manual busy state. The connection releases if another circuit connects to the circuit in the control position.
		—end—

MANUAL level commands

Use the commands at the MANUAL level to monitor and maintain trunks. Table 6-10 describes commands at the MANUAL level.

Table 6-10
Overview of commands at the MANUAL level

Menu item	Command	Description
0	Quit_	The QUIT command causes the system to leave the current level and return to a higher level of the MAP display.
2	Post_	The POST command posts one or more circuits for maintenance.
3	Loss_	The LOSS command measures the received signal loss of the circuit in the control position.
4	TGen_	The TGEN command sends a tone over the circuit in the control position to a distant office.
5	Bsy_	The BSY command busies a circuit to the specified out-of-service state.
6	RTS_	The RTS command returns to service the circuit in the control position.
7	Tst_	the TST command tests the circuit in the control position.
8	NOISE	The NOISE command measures noise by connecting the circuit in the control position to the noise measuring circuit and displaying the measured noise (dBrnC0) at the MAP terminal. The measurement displays update continuously. The Maintenance Noise Limit and the Immediate Action Noise Limit of the circuit display under headers MNL and IANL in the sequence given. OOR (Out of Range) displays if the measurement is below 0 dBrnc. Adjust pad values to get a positive noise measurement.
9	OP_	The OP command transmits a given number on the circuit in the control position.
10	TDet	The TDET command identifies the tone detector and identifies the tone signal that the circuit in the control position receives.
11	Hold	The HOLD command places the circuit that is in the control position in the first idle HOLD position.
12	Next_	The NEXT command places another circuit in the control position.

—continued—

Table 6-10
Overview of commands at the MANUAL level (continued)

Menu item	Command	Description
13	Rls_	The RLS command releases the connection to the circuit in the control position.
14	HSet	The HSET command connects a headset to the circuit in the control position by a headset trunk.
15	Jack	The JACK command connects one of the TTP test jacks to the control position. The parameter CONN_DURATION,1 to 36, determines the duration of the connection. If you do not enter this parameter, the default setting is for an untimed connection. An untimed connection remains until manual interruption removes the connection.
16	SGNL	The SGNL command sends the signaling test on a North American (NA) circuit or an International circuit.
17-18		Not used.

—end—

PRADCH level commands

Use commands at the PRADCH level to run integrated Services Digital Network (ISDN) and Digital Trunk Controller (DTCI) B, and D channel tests. Table 6-11 describes the commands at the PRADCH level.

Table 6-11
Overview of commands at the PRADCH level

Menu item	Command	Description
0	Quit_	The QUIT command causes the system to leave the current level and return to a higher level of the MAP display.
2	Post_	The POST command posts a minimum of one circuit for maintenance.
3		Not used.

—continued—

Table 6-11
Overview of commands at the PRADCH level (continued)

Menu item	Command	Description
4	Equip_	The EQUIP command allows you to reserve a BRI ISDN line card or two DS-0 channels for use in DTA monitoring.
5	Connect_	The CONNECT command connects the monitoring equipment reserved with the EQUIP command to the PRI D-channel that is to be monitored.
6		Not used.
7	BSY_	The BSY command busies a circuit to the specified out-of-service state.
8	RTS_	The RTS command returns to service the circuit in the control position.
9	SWACT	The SWACT command is used to switch the D1 and D2 activity from in service (INS) to lockout (LO) and from STB to INS.
10		Not used.
11	HOLD	The HOLD command places the circuit in the control position in the first available hold position.
12	Next	The NEXT command places another circuit in the control position.
13-14		Not used.
15	CONT	The CONT command allows you to run a continuity test on the posted D-channel.
16	LOOPBK	The LOOPBK command sets or removes a loopback on the posted trunk. The LOOPBK command is also used to query if a loopback is set for the trunk. For the CP buffer, the attempt counter is also reset.
17-18		Not used
		—end—

DCTTTP level commands

Commands at the TRKS level are used to monitor and maintain DCTTTP trunks. A description of the DCTTP commands are given in table 6–12.

Table 6-12
Overview of commands at the DCTTTP level

Menu item	Command	Description
0	Quit_	The QUIT command causes the system to leave the current level and return to a higher level of the MAP display.
2	Post_	The POST command posts a minimum of one circuit for maintenance.
3		Not used.
4	Testbook_	The TESTBOOK command allows you to access an existing testbook, create a new testbook, display information on the active testbook, count the number of testbooks, list a specified number of testbooks IDs from the list of testbook IDs, and to move the list index up or down a specified number of items in the list of testbook IDs.
5	Select_	The SELECT command allows you to specify and select the trunk or trunk group that is to be tested.
6	DefTime_	The DEFTIME command allows you to set the test duration, test start, wait, delay, and duration times.
7	Dial_	The DIAL command allows you to sequentially dial a number of NSs from table DCTDIAL and perform BERT testing on each one. You may also halt, resume, or abort the currently executing dial command.
8	Display	The DISPLAY command allows you to display the current selections, settings and test results for the trunk under test.
9-10		Not used.
11	Hold	The HOLD command allows you to move the line in the control position to a spare position, and move the next line from the posted set to the control position.
12	Next_	The NEXT command places another circuit in the control position.
13		Not used.
14	Inject	The INJECT command allows you to inject up to 16 bit errors in to the current test.

—continued—

Table 6-12
Overview of commands at the DCTTTP level (continued)

Menu item	Command	Description
15	Delete_	The DELETE command allows you to delete all or a subset of the results of the active testbook. It also allows test results which contain no errors in a specified test range to be deleted.
16		Not used.
17	Release	The RELEASE command terminates the current test call of the active testbook.
18	Stop	The STOP command stops a test sequence on a specified trunk group.
		—end—

C7TTP level commands

Use the commands at the C7TTP level to test and maintain CCS7 trunks. The commands TRKQRY, QRYSIG, ROUTESET, TST, and CIC are CCS7-specific. Use these commands only on CCS7 trunks. The other C7TTP menu commands are common to both the C6TTP and C7TTP levels.

Table 6-13 describes the CCS7-specific commands and the commands that are common to both the C7TTP and C6TTP levels.

Table 6-13
Overview of commands at the C7TTP level

Menu item	Command	Description
0	Quit_	Same as C6TTP.
2	Post_	The POST command posts one or more circuits for maintenance.
3	Seize_	The SEIZE command seizes a circuit for maintenance action.
4		Not used.
5	Bsy_	The BSY command busies a circuit to the specified out-of-service state.
		—continued—

Table 6-13
Overview of commands at the C7TTP level (continued)

Menu item	Command	Description
6	RTS_	The RTS command returns the circuit in the control position to service.
7	Tst_	The TST command tests the circuit in the control position.
8-9		Not used.
10	GroupCmd	The GroupCmd command allows you to group trunks together to perform maintenance actions on the trunk group.
11	Hold	The HOLD command places the circuit in the control position in the first idle HOLD position.
12	Next_	The NEXT command places another circuit in the control position.
13	Rls_	The RLS command releases the connection to the circuit in the control position.
14	Cvtest	The CVTEST command allows you to perform a circuit validation test on a posted trunk.
15	TrkQry_	The TRKQRY command displays the local and/or remote state of the posted trunk. If the neither LOCAL or REMOTE is specified, both states are displayed. If these two states are incompatible, the maintenance action required to solve the problem is displayed and the user is prompted to proceed.
16	QrySig_	The QRYSIG command displays the signaling state of the posted CCS7 trunk.
17	Routeset	The ROUTESET command displays the route set CLLI of the posted CCS7 trunk.
18	CIC_	The CIC command displays the Circuit Identification Code of the posted trunk.
		—end—

TRKCONV level commands

With feature package NTX875, use commands at the TRKCONV level to monitor and maintain trunks. You can enter any TTP level command from the TRKCONV level. Table 6-14 describes commands at the TRKCONV level.

Table 6-14
Overview of commands at the TRKCONV level

Menu item	Command	Description
0	Quit_	The QUIT command causes the system to leave the current level and return to a higher level of the MAP display.
2	Post_	The POST command posts one or more circuits for maintenance.
3	CvPost_	The CVPOST command posts one or all of the trunks records in data table TKCVDATA at the TRKCONV level only.
4		Not used.
5	Bsy_	The BSY command busies a circuit to the specified out-of-service state.
6	RTS_	The RTS command returns the circuit in the control position to service.
7	CvBsy_	The CVBSY command changes the state of all of the trunks in the posted set to Maintenance Busy (MB) or offline (INB).
8	CvRTS_	The CVRTS command changes the state of the trunks in the records to idle, and returns the trunks to service.
9-10		Not used.
11	Hold	The HOLD command places the circuit that is in the control position in the first idle HOLD position.
12	Next_	The NEXT command places another circuit in the control position.
13	CvNext_	The CVNEXT command places the next record in the posted set in the control position.
14		Not used.
15	CONV_	The CONV command uses the data in table TKCVDATA to convert PTS trunks into ISUP trunks.
16	CvCot_	The CVCOT command runs a continuity test and verifies the CIC alignment of 2-way or outgoing ISUP trunks. Log TKCV100 records mismatches.

—continued—

Table 6-14
Overview of commands at the TRKCONV level (continued)

Menu item	Command	Description
17	Undo_	The UNDO command uses the data in table TKCVDATA to convert ISUP trunks back into PTS trunks.
18	RCLLI_	The RCLLI command uses a PTS trunk CLLI after all the trunk members of the CLLI convert to ISUP trunks. The command also converts the ISUP trunk CLLI back to the PTS trunk CLLI. The changes update the data table CLLIMTCE.
		—end—

ATT level commands

Commands at the ATT level are used to monitor and control the Automatic Trunk Testing (ATT). This level appears at the MAP display only if the feature is present. Table 6-15 describes commands at the ATT level.

Table 6-15
Overview of commands at the ATT level

Menu item	Command	Description
0	Quit_	The QUIT command causes the system to leave the current level and return to a higher level of the MAP display.
2	TestReq_	The TESTREQ command requests a manual test.
3		Not used.
4	LstStop	The LSTSTOP command lists all inactive entries in the scheduling table ATTSCHED.
5	LstWait_	The LSTWAIT command lists the active and the waiting tests.
6	LstCLLI_	The LSTCLLI command displays all the scheduled automatic circuit tests and associated data for a trunk group.
		—continued—

Table 6-15
Overview of commands at the ATT level (continued)

Menu item	Command	Description
7	ListMan	The LISTMAN command displays data about manual tests.
8	DelMan_	The DELMAN command deletes manual test entries for a specified trunk group.
9	Stop_	The STOP command stops a test sequence on a specified trunk group.
10	Start_	The START command starts a sequence of tests on a specified trunk group. You can use the START command to start tests that the STOP command stops. The START command restarts only those tests that the STOP command stops. A test always restarts from the beginning.
11-14		Not used.
15	HaltATT	The HALTATT command stops all ATT testing.
16	RunATT	The RUNATT command starts all tests the HALTATT command stops. These tests include scheduled ATT tests or automatic tests.
17	SetSTst	The SETSTST command sets the maximum quantity of tests that can run at the same time.
18		Not used.
		—end—

CARRIER level commands

Use commands at the CARRIER level to monitor and maintain the trunks associated with carriers. The CARRIER menu and display are basic. Other sublevels contain information on selected carriers. This information includes menus for correct maintenance action. Table 6-16 describes commands at the CARRIER level.

Table 6-16
Overview of commands at the CARRIER level

Menu item	Command	Description
0	Quit_	The QUIT command causes the system to leave the current level and return to a higher level of the MAP display.
2	Post_	The POST command posts a minimum of one circuit for maintenance action and displays information for up to five carriers.
3-10		Not used.
11	Disp_	The DISP command lists all carriers of a given state.
12-17		Not used.
18	CARPAC	The CARPAC command accesses the Carrier Pretest and Cutover level (CARPAC).

TRKSTRBL level commands

The TRKSTRBL level provides trunk maintenance through thresholding and alarm generation, and buffers trunk problem information. Use this level to identify problem trunks and their problems. You can not perform maintenance actions at this level. The TRKSTRBL commands are in table 6-17.

Table 6-17
Overview of commands at the TRKSTRBL level

Menu item	Command	Description
0	Quit_	The QUIT command causes the system to leave the current level and return to a higher level of the MAP display.
2	Disp_	The DISP command displays the full buffer of the specified group.
3	StopDisp	The STOPDISP command stops the screen update that the DISP command starts.
4	ListAlm_	The LISTALM command lists the CLLI of trunk groups have active alarms of the specified type in the specified buffer type.

—continued—

Table 6-17
Overview of commands at the TRKSTRBL level (continued)

Menu item	Command	Description
5		not used.
6	CreatSet	The CREATSET command creates a post set that contains the troubles recorded in the buffer. The post set appears in the TTP level.
7	STAT	The STAT command accesses the STAT TKGRP level.
8	Suppress	The SUPPRESS command causes the system to ignore the specified trouble types.
9	Resume_	The RESUME command lifts the suppression of the specified trouble type.
10	Qsup	The QSUP command lists all of the trouble types that are suppressed.
11-15		Not used.
16	ClrAlm_	The CLRALM command clears the alarm of the buffer for the specified group and resets the failure counters. For the CP buffer, the attempt counter is also reset.
17	ClrBuf_	The CLRBUF command clears all or part of the buffer.
18		Not used.
		—end—

X75TTP level commands

The X75TTP MAP display level provides trunk maintenance when you issue a Tst X75E command to perform an external continuity test. The level provides maintenance through a loopback on a X75 trunk. Table 6-18 describes commands at the X75TTP level.

Table 6-18
Overview of commands at the X75TTP level

Menu item	Command	Description
0	Quit_	The QUIT command causes the system to leave the current level and return to a higher level of the MAP display.
2	Post_	The POST command places a trunk in the control position.
3	Seize_	The SEIZE command seizes a trunk for maintenance purposes.
4		Not used.
5	Bsy_	The BSY command manually busies a trunk.
6	RTS_	The RTS command returns a trunk to service.
7	Tst_	The TST command runs a test on a trunk.
8		Not used.
9	CktInfo	The CKTINFO command provides the name and status of the PM that associates with the posted trunk.
10	CktLoc	The CKTLOC command locates the hardware for the posted trunk.
11	Hold	The HOLD command places the posted trunk in one of the three HOLD positions.
12	Next_	The NEXT command moves the next trunk in the post set to the control position.
13	Rls_	The RLS command releases a seized trunk or a test connection from the trunk.
14-15		Not used.
16	LOOPBK	The LOOPBK command sets or removes a loopback on the posted trunk. The LOOPBK command is also used to query if a loopback is set for the trunk. For the CP buffer, the attempt counter is reset.
17-18		Not used.

Non-menu commands

The following table describes the non-menu commands that associate with problem isolation.

Table 6-19
Overview of non-menu commands

Command	Directory	Description
cllirbt	PROG	The CLLIRBT command initiates a scan for entry differences between tables. These differences are between table CLLI and CLLIMTCE, or between table TRKMEM and CLLIMTCE subtable DIAGDATA. If the scan detects a difference, the system attempts to correct the problem. The scan replaces the wrong entries with default entries.
clliref	PROG	If you use the parameter MEMBERLESS, you can use the CLLIREF command to search for CLLIs. The CLLIs are in the table TRKGRP. The CLLIs do not have corresponding members in table TRKMEM. If you use the parameter SEARCH, you can use this command to search one or all tables for a CLLI.
Note: If you add a device parameter to the CLLIREF command, you can send the output of the command to an output device.		

Trunks card requirements

Description of circuit card removal and replacement procedures

There are no special procedures for circuit card removal and replacement with trunk cards. For information on trunk card replacement procedures, refer to *Card Replacement Procedures*.

Description of other equipment removal and replacement procedures

There are no special procedures for the removal and replacement of equipment other than trunk cards.

Trouble isolation and correction

This chapter provides an overview of the faults in the trunks subsystem and the problem solving methods used to clear these faults. This chapter provides different tests and test configurations. These tests provide the operating company personnel with an approach for solving line faults.

Description of troubleshooting procedures

The main problem solving procedures for trunks are

- problem isolation and clearing
- problem isolation tests
- diagnostic tests
- product test tools

The operating company personnel use the tools in the DMS-100 switch. These tools include monitoring log reports, operational measurements (OM), the status of trunks, and threshold levels for trunks alarms.

Some user commands assist in the identification of trunk entry problems. For more information on these commands, refer to chapter 6, “Trunks user interface commands” in this document.

Trunk management system

To avoid interruption of service, a management system for tests makes sure that you can test only available trunk circuits. The management system queues circuits for the tests, and assigns a status to indicate the type of queue. To ready a circuit for tests, the management system uses different queues. As each circuit becomes available, the system conducts tests, and you can return the circuit to service.

The following are different methods to queue a circuit:

- place the circuit in the control position
- post the circuit
- busy the circuit

- seize the circuit
- place a circuit in the hold position

Control position

You can only perform maintenance on a circuit when the circuit is in the control position of the MAP display. If you place a circuit in the control position, any maintenance command affects only that circuit. Only one circuit at a time can occupy the control position.

If you place the circuit in the control position that action does not remove the circuit from service or ready the circuit for maintenance. You must seize the circuit before you can perform maintenance.

While the circuit is in the control position, you can

- test or check the circuit
- assign the circuit to a given state again
- place the circuit in a hold status for later action

Posting a circuit

To select circuits for possible placement in the control position, post the circuits. If you post a circuit, the action does not alter the state of the circuit. A posted set is a group of posted circuits. You can post circuits with the command POST at the different maintenance levels of the MAP display. You can post a maximum of 2047 circuits at the same time. You cannot add circuits to a posted set, but you can post more circuits as another set.

Post circuits according to

- the Common Language Location Identifiers (CLLI) of the circuits
- the Peripheral Modules (PM) that contains the circuits
- the state of the circuits
- the position of the circuits in the queue. The queue contains circuits to use when call processing is complete.

  Single quotation marks (’) must go before and follow the CLLI when you post a circuit with

  — a full CLLI or

  — a short CLLI that starts with a number or the letter A, B, C, D, E, or F.

If you post a circuit, the circuit remains in service. The system can use the circuit for call processing any time before or after maintenance action.

Busying a circuit

If you busy a circuit, the circuit is not available for call processing.

You can busy circuits

- manually. To place the circuit in the ManB state, use the command BSY
- automatically. The system places the circuit by the system in the SysB state

If you post a circuit, the circuit becomes available for maintenance, To busy the circuit, use the BSY command. If a call processing or maintenance action is in progress on the circuit, the circuit enters a Busy Queue (BUSYQ). This circuit queue, called a BUSYQ CCT, can contain a maximum of 20 circuits. When a circuit becomes available, the system busies the circuit and removes the circuit from the queue.

If necessary, you can busy a given group of circuits, or the whole posted set. These circuits enter a Busy All Queue (BUSYQ ALL). As circuits become available, the system busies and deletes the circuits from the BUSYQ ALL. The system only accepts another request to busy a different posted set while circuits remain in the BUSYQ ALL if the system can transfer circuits that remain to BUSYQ CCT.

The system no longer attempts to busy circuits in the BUSYQ ALL if the circuits are not available. The circuits must become available within 4 min after the circuits enter the queue. The system continuously treats circuits in the BUSYQ CCT. The treatment does not have a time limit. Post circuits which remain in the BUSYQ when required.

When you busy transmission links, a failure of the whole associated trunk group can occur. Failures can occur in an office equipped with Common Channel Signaling (CCIS6, CCITT6, or CCS7).

Seizing a circuit

If you seize a circuit you are the only user with access to the circuit. The seizure removes the circuit from service. Other users cannot interrupt or affect maintenance action performed on the circuit. At any one time, a TTP can seize a maximum of four circuits. One of these four circuits is in the control position and three of the circuits are in hold positions.

If a circuit is available, you can seize the circuit on command. If the circuit is not available because another user manually seized the circuit, the system cannot execute the SEIZE command. If the system cannot execute the SEIZE command, the system returns an error message.

If the circuit is not available because the circuit is busy, the circuit enters the Deload Queue (DELQ).

The DELQ involves two counters:

- a D (for Deload) counter, which indicates the number of circuits that are not available and are queued for seizure
- an A (for Available) counter, which indicates the number of circuits available for seizure

The normal sequence to seize a circuit that is not available (for example, a CPB circuit) is as follows:

1 While call processing occurs, the circuit deloads and enters the DELQ. The D counter increments by 1. The circuit state changes from CPB to Call Processing Deload (CPD).

2 When call processing activity completes, the circuit deloads. The circuit state changes from CPD to Deloaded (DEL). The A counter increases by 1 and the D counter decreases by 1. The circuit state changes to Manual Busy from the TTP. The circuit is available for maintenance action.

3 When the circuit is in the first available position in the queue, you can seize and move the circuit to the control position. The circuit state changes to Seized (SZD), and the A counter decreases by 1.

While the circuit is in the control position, you can assign a circuit to one of the three hold positions. Refer to Hold position for a description of these positions. The circuit retains the seized state.

You can specify a maximum of 20 circuits for automatic seizure. CPB circuits are automatically put into the DELQ. Each circuit that you place into the control position automatically changes to the SZD state.

The DELQ clears and the available circuits idle if you post another set and quit the TTP level. If you do not post another set, the circuits return to the current posted set when you quit the TTP level.

Hold position

You can suspend maintenance on a circuit in the control position for a short time. To suspend maintenance, place the circuit in a hold position. While in the hold position, the circuit retains the state the circuit had when in the control position. While in the hold position, maintenance action does not affect a circuit. Three hold positions are available.

When you return a circuit from a hold position to the control position, you must:

- transfer any circuits now in the control position to a hold position
- return any circuits now in the control position to the posted set
- release any circuits now in the control position from maintenance action

When you quit the TTP level of the MAP display, circuits in the hold position retains their status and connections. The circuit retains the status and connections for a maximum of two hours. The circuit in the control position becomes idle. If other maintenance does not occur at the TTP level during the two hours, the system releases the circuits.

In the display for held circuits, the information on the circuit that occupies the control position goes before circuit identification.

Locating and clearing faults

Use the following to identify faults:

- operational measurements (OMs)
- log reports
- alarms
- customer complaints

Use the following problem solving steps to locate and clear locked out (LO) trunk circuit faults:

1 Access the MANUAL level of the MAP display.

2 Post all the locked out trunk circuits.

3 Send an on-hook and off-hook signal on the circuit.

4 Release the circuit.

5 Return the circuit to service.

Use the following problem solving steps to monitor call processing busy (CPB) trunk circuits. Monitor for conditions like noise, TX level trouble, and RX level trouble.

1 Access the MONITOR level of the MAP display.

2 Post the circuit or circuits that you want to monitor.

3 Release the circuit.

Use the following problem solving steps to identify and correct RX (receive) level trouble on T1 trunks.

1 Access the MANUAL level of the MAP display.

2 Post the trunk circuit.

3 Seize the trunk circuit.

4 Contact personnel at the far-end office.

5 Have personnel at the far-end office generate a 1004 Hz tone at 0 dBm on the trunk you posted.

6 Measure the loss on the circuit.

7 Compare the results.

8 If loss is not within 1 dB of expected measured loss, contact the next level of maintenance support

9 If loss is within 1 dB of the expected measured loss, release the circuit.

Use the following problem solving steps to identify and correct TX (transmission) level trouble on T1 trunks.

1 Access the MANUAL level of the MAP display.

2 Post the trunk circuit.

3 Seize the trunk circuit.

4 Contact personnel at the far-end office.

5 Have the far-end personnel seize the same circuit.

6 Generate a 1004 Hz tone at 0 dBm on the same trunk.

7 Have the end office measure the loss.

8 Compare the results.

9 If loss is not within 1 dB of expected measured loss, contact the next level of maintenance support.

10 If loss is within 1 dB of the expected measured loss, release the circuit.

Use the following problem solving steps to identify and correct supervision faults on intertoll T1 trunks.

1 Access the MAPCI level of the MAP display.

2 Open the log utility.

3 Start to record the trunk logs.

4 Access the TTP level of the MAP display.

5 Post the trunk circuit that have faults.

6 Seize the trunk.

7 Run a T103 test.

8 Check the log to see if supervision test passed or failed.

9 If the test passed, release the circuit.

10 If the test failed, perform

— the action indicated by the *Log Report Reference Guide* for the error message indicated, or

— contact the next level of support

Use the following problem solving steps to identify and correct TTT troubles:

1 Access the TTP level of the MAP display.

2 Post the TTT circuit that have faults.

3 Busy the TTT circuit.

4 Seize the TTT circuit.

5 Test the TTT circuit.

6 If the test passed, return the TTT to service.

7 If the test failed, replace the old NT2X90AA card and test the new card.

8 If the test passed, return the TTT to service.

9 If the test failed on the new card, contact the next level of maintenance.

OMs

OMs, which monitor and count events in the trunks subsystem, detect both real and possible system problems. The OM threshold feature monitors and reports trunks activity. Perform these reports daily or weekly. These reports are the primary method of problem detection. For more information on OMs, refer to chapter 4, ‘‘Trunks related operational measurements.”

Log reports

Use log reports for analysis. You can use log reports to provide details on call errors, diagnostic results, and system status. Logs also indicate problems when any of the following conditions are present:

- sudden increase in volume of logs
- the message *not printed* reports
- large number of similar logs

Refer to chapter 3, ‘‘Trunks related logs” for more information on trunks logs.

Fault isolation tests

Test lines

Use test lines to test local and toll trunk connections to other offices. Test Line Tests (TLT) run under the control of the calling office. You can initiate the tests manually from the TTP level or automatically from the ATT level. The TLT can test the originating and terminating ends of trunks. You can use TLT to simulate most conditions that can occur during normal conditions of operation.

Table 8-1 lists the types of TLT. Use the Test Line codes under the header TLCODE as parameters when you enter commands for testing. A table, which includes the test line configurations and test sequences, lists each of the major test line (TLINE) types.

Test names in table TSTLCONT

Each test line can have a minimum of one test name assigned to the test line. The first test name has the "T" character. You must assign one test name for each test line, except for the LPA and ATME test lines.

Table 8-1
Test line tests

TLINE	TLCODE	DESCRIPTION	TOLL	LOC	300	INT
100	N100	Quiet (Balanced) Termination (New)	X	X	X	-
100	S100	Quiet (Balanced) Termination (Old)	X	X	X	-
100	T100	Quiet (Balanced) Termination (Both)	X	X	X	-
102	T102	Milliwatt Test Line	X	X	X	X
103	T103	Supervisory and Signaling Tests	X	-	-	-
104	S104	Transmission Loss Test	X	X	X	-
104	T104	Transmission Loss and Noise Test	X	X	X	-

—continued—

Table 8-1
Test line tests (continued)

TLINE	TLCODE	DESCRIPTION	TOLL	LOC	300	INT
105	T105	Loss Measurement	X	X	-	-
105	TL0N	Loss and Noise	X	X	-	-
105	TL0S	Loss Measurement	X	X	-	-
105	TL05	Loss Measurement	X	X	-	-
105	T165	Loss and Noise	X	X	-	-
105	TL6N	Loss and Noise	X	X	-	-
105	TL6S	Loss Measurement	X	X	-	-
105	TL65	Loss Measurement	X	X	-	-
105	TS05	Equipment Check	X	X	-	-
105	TS6N	Equipment Check	X	X	-	-
105	TS65	Equipment Check	X	X	-	-
105	T5AS	Loss, noise, return loss and self-check	X	X	-	-
105	T5AT	Loss, noise, and return loss	X	X	-	-
105	T50L	Loss and return loss	X	X	-	-
105	T56N	Loss, noise and return loss	X	X	-	-
105	T5LB	Loss and return loss	X	X	-	-
105	TSBS	Loss, noise and return loss self-check	X	X	-	-
105	TSBT	Return loss	X	X	-	-
105	T5SB	Return loss self-check	X	X	-	-
105	T5BS	Return loss and return loss self-check	X	X	-	-
105	TERL	Echo return loss	X	X	-	-
105	T5LH	Return loss low and high	X	X	-	-
108	T108	Echo Suppression Test	X	X	-	-

—continued—

Table 8-1
Test line tests (continued)

TLINE	TLCODE	DESCRIPTION	TOLL	LOC	300	INT
Continuity	TCON	CCIS6 Continuity Test	X	-	-	-
Continuity	TCOT	CCITT6 Continuity Test	-	-	X	-
Continuity	ICOT	ISUP Continuity Test	X	-	-	-
Diagnostic	DIAG	Circuit Diagnostic Test	X	X	X	X
Loop-A-R	TLPA	Looparound Test Line	-	X	-	-
Loop-A-R	TL01	Looparound (DMS-300)	-	-	X	-
Loop-A-R	TART	Loss and Noise (Turkey)	-	-	-	X
Open Ckt	TOPC	Open-Circuit Test Line	-	X	-	-
Repeat 2	TR2L	Repeat 2 Test (Long delay)	X	X	-	-
Repeat 2	TR2S	Repeat 2 Test (Short delay)	X	X	-	-
Short Ckt	TCLC	Short Circuit Test Line	-	X	-	-
	TE_M	E&M Lead Test	X	X	-	-
Supervision	TNSS	Non-Synchronous Test Line	-	X	-	-
Supervision	TSYN	Synchronous Test Line	-	X	-	-
Supervision	TISS	Supervisory and Signaling	-	-	X	-
ISDN	ISDN	ISDN test call (DMS-300)	-	-	X	-
ATME	TA01	Loss Measurement	-	-	X	-
ATME	TA02	Loss and Frequency Deviation	-	-	X	-
ATME	TA03	Noise (C-msg)	-	-	X	-
ATME	TA04	Loss, Noise	-	-	X	-

—continued—

Table 8-1
Test line tests (continued)

TLINE	TLCODE	DESCRIPTION	TOLL	LOC	300	INT
ATME	TA05	Loss, Frequency Deviation, Noise (C-notch)	-	-	X	-
ATME	TA06	Supervision	-	-	X	-
ATME	TA07	Loss, Supervision	-	-	X	-
ATME	TA08	Loss, Frequency Deviation, Supervision	-	-	X	-
ATME	TA09	Noise, Supervision	-	-	X	-
ATME	TA10	Loss, Noise, Supervision	-	-	X	-
ATME	TA11	Loss, Noise, Frequency Deviation, Supervision	-	-	X	-
ATME	TA12	Supervision	-	-	X	-
ATME	TA13	Supervision	-	-	X	-
ATME	TA14	Busy Flash, Loss	-	-	X	-
ATME	TA15	Busy Flash, Loss, Frequency Deviation	-	-	X	-
ATME	TA16	Busy Flash, Noise	-	-	X	-
ATME	TA17	Busy Flash, Loss, Noise	-	-	X	-
ATME	TA18	Busy Flash, Loss, Frequency Deviation, Noise	-	-	X	-
ATME	TA19	Supervision	-	-	X	-
ATME	TA20	Supervision, Busy Flash, Loss	-	-	X	-
ATME	TA21	Supervision, Busy Flash, Loss, Frequency Deviation	-	-	X	-

—continued—

Table 8-1
Test line tests (continued)

TLINE	TLCODE	DESCRIPTION	TOLL	LOC	300	INT
ATME	TA22	Supervision, Busy Flash, Noise	-	-	X	-
ATME	TA23	Supervision, Busy Flash, Loss, Noise	-	-	X	-
ATME	TA24	Supervision, Busy Flash, Frequency Deviation, Noise	-	-	X	-
ATME	TA25	Supervision, Busy Flash	-	-	X	-
—end—						

Note 1: Most INT trunks are the P30SIG type. The DIAG test does not cover the INT trunks. The P30 diagnostics run at the CARRIER level.

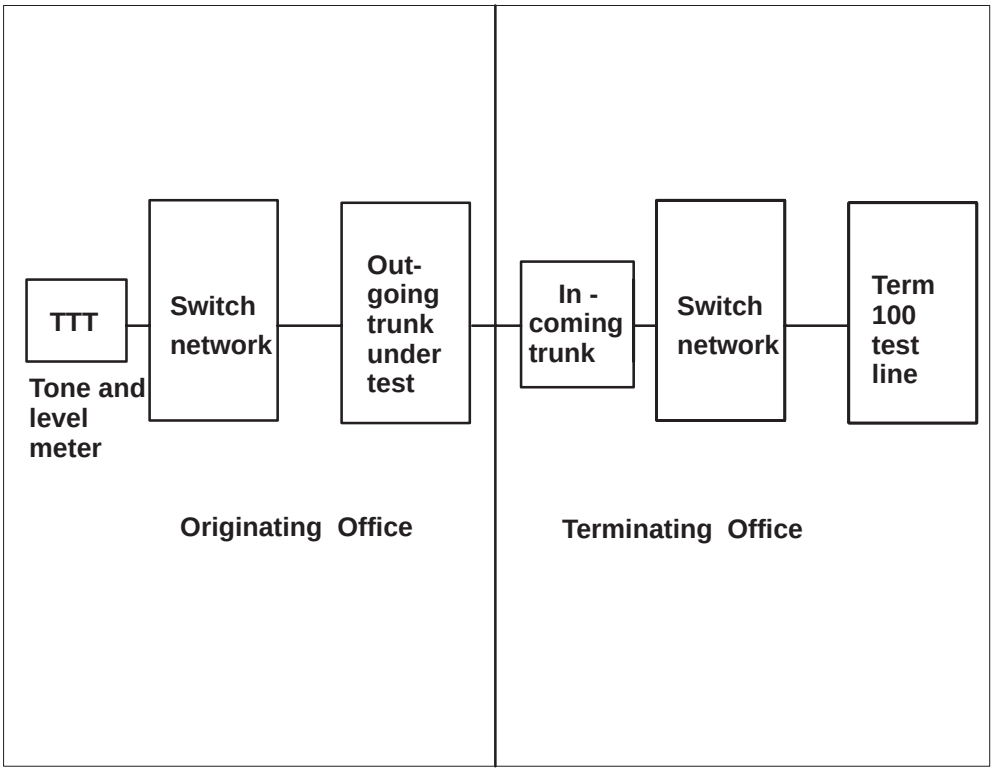
Note 2: ATME is Automatic Transmission Measuring Equipment.

100 Test Line (TL100)

The 100 Test Line, also known as a quiet or balanced termination, provides noise and loss measurements. Three versions of the TL100 are present. These version are: T100, S100, and N100. Use the T100 when the equipment at the terminating office is not known. When the T100 test line test is complete, a 2 s time-out attempts to detect a milliwatt tone. If the time-out does not detect a tone, the S100 version of the test runs. The S100 version provides a quiet termination for noise measurements only. If the time-out detects a milliwatt tone, the N100 version of the test runs. The N100 includes a milliwatt test. You can use the N100 for far-to-near loss measurements. If you know the version of the distant office test line, you can run that version of the test directly. A 2 s delay for each trunk is not required.

Manual transmission of N100 or S100 fails if the first test name in data table TSTLCONT is not T100. You can run TL100 tests from a Remote Office Test Line (ROTL) unit. Figure 8-1 shows the configuration of the TL100.

Figure 8-1
TL100 configuration (block diagram)



The test sequence occurs for TL100 as follows.

1 The originating office transmits the test code to the terminating office. The terminating office responds with an off-hook signal when the test code establishes a connection.

2 The originating office connects the Transmission Test Trunk (TTT) to the trunk under test.

3 The terminating office delays the off-hook signal and the start of the milliwatt test tone by 300 ms.

4 The originating office detects the milliwatt tone and a level meter measures the far-to-near loss. The milliwatt tone is present for a maximum of 6 s. The terminating office provides a quiet termination.

5 The terminating office maintains the quiet termination for as long as the originating office holds the incoming trunk.

6 The originating office measures noise on the trunk.

7 The originating office sends an on-hook signal to the terminating office to indicate the end of the test, and releases the incoming trunk.

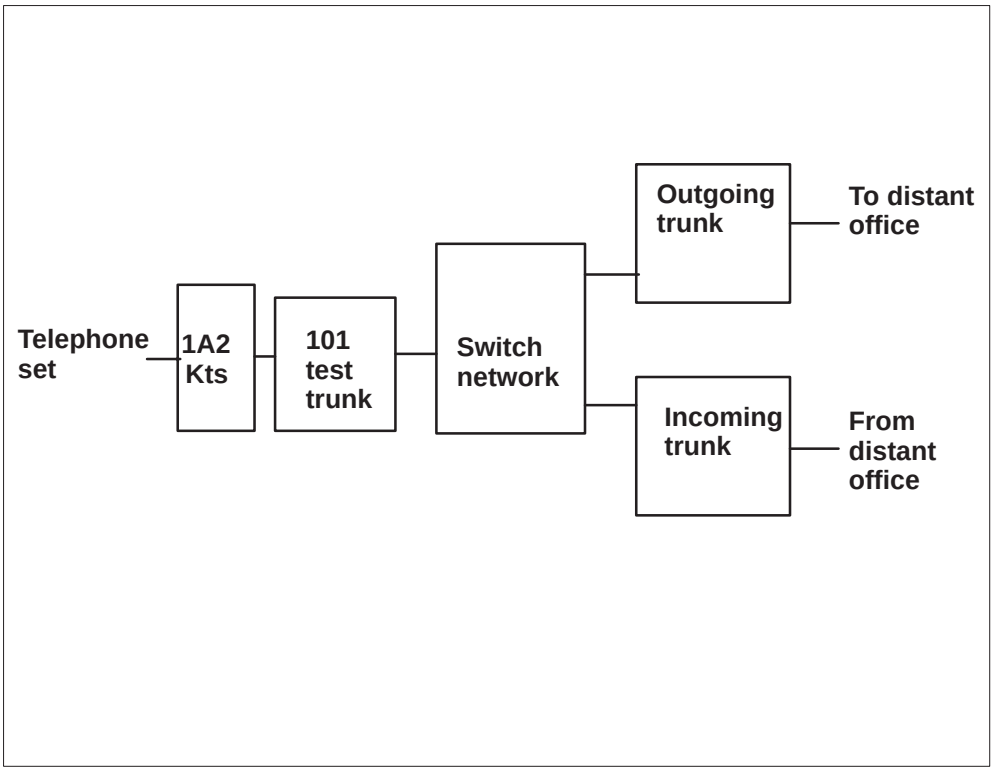
Note: When the terminating end is a DMS-100 Family office, determine the associated test equipment to connect according to data table TRKGRP.

101 Test Line (TL101)

Use the 101 Test Line to establish two-way talk between a test position and a trunk (incoming or outgoing). The trunk must associate with the DMS-100 Family switch. The number of test lines depends on the office size. The operating company assigns the 101 Test Lines in data table TRKGRP.

Originating 101 test lines, called Communication Trunks, allow the initialization of 101 maintenance calls to distant offices. The originating 101 test lines also initialize 101 maintenance calls to other phones within the same office. Terminating 101 test lines, called 101 Test Trunks, carry 101 maintenance calls from distant offices. All voice communication devices at the TTP have access to all 101 test trunks. A 101 call from a distant office makes every test position in the receiving office ring. Figure 8-2 shows the configuration of the TL101.

Figure 8-2
TL101 configuration (block diagram)



The test sequence for originating 101 test lines (TL101 communication trunks) is as follows.

1 On the telephone set, select an outgoing line and go off-hook. Dial the digits required to initiate a 101 test call.

2 The DMS receives the 101 test call and processes the call as an incoming call.

3 The DMS enters the talk phase and establishes calling/called supervision.

4 A flash-hook on the initiating telephone set transmits a ring forward to the called end.

5 If the telephone line at the called end is on hold, a ringback received from the called end applies ringing to the initiating telephone set. The initiating telephone set rings until the set receives off-hook supervision.

The test sequence for terminating 101 test lines (test trunks) is as follows:

1 The DMS receives an incoming 101 test call from a distant office, and selects a 101 test line.

2 The DMS applies ringing to all telephone sets connected to that line and returns audible ringing tone to the calling far-end.

3 When any of the connected telephone sets go off-hook, the DMS removes ringing and audible ringing tone. The DMS enters the talking phase.

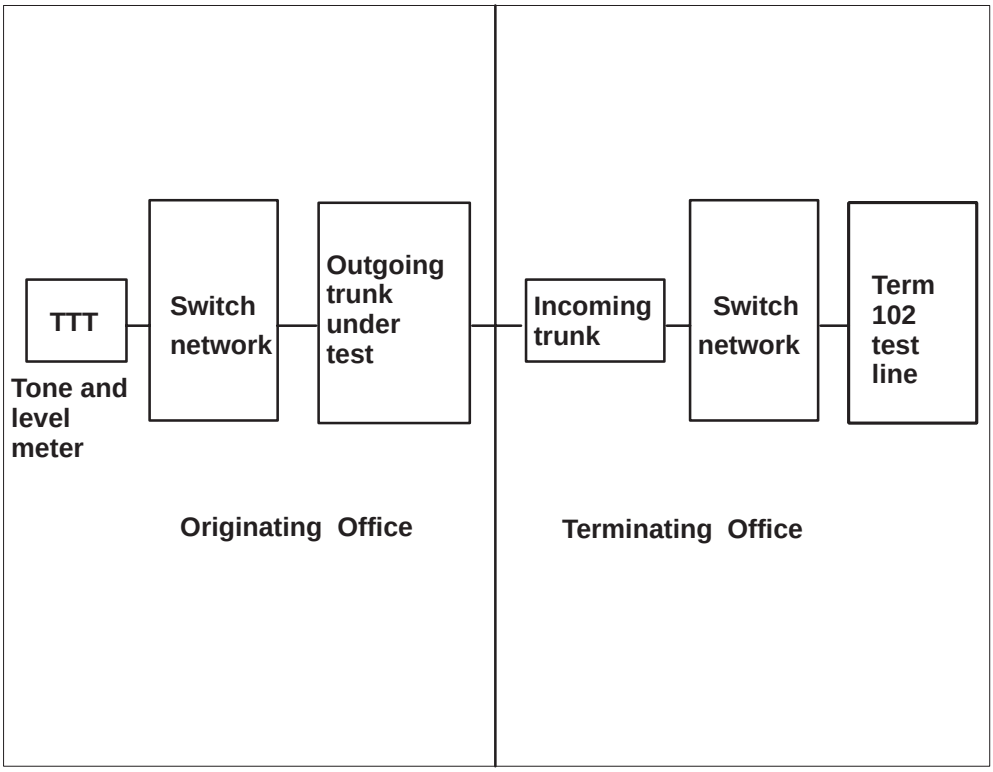
4 If the receiving telephone line is on hold, ring forward applies ringing until the telephone line answers. A flash-hook from the receiving telephone set sends ringing to the calling end.

TTP call transfer allows you to transfer an answered 101 test line call from the logic 10/20 or telephone set to the control position of the TTP. At the same time, the system connects the TTP headset to the incoming NT5X30 card so you can perform maintenance activities.

102 Test Line (TL102)

The 102 Test Line, also called a milliwatt test line, provides far-to-near transmission loss measurements. The far-end sends a 9 s off-hook signal, and applies the milliwatt test tone. An on-hook signal and quiet termination follow the tone. If the far-end is a local office, the test tone repeats in 10 s cycles: 9 s on and 1 s off. For a toll office, quiet termination continues until the near-end releases the connection or requests another test cycle. The toll office makes the test cycle request with a ring-forward signal. The milliwatt source levels in use depend on the office type and the trunk group. Figure 8-3 shows the configuration of the TL102.

Figure 8-3
TL102 configuration (block diagram)



The test sequence for TL102 is as follows.

1 The originating office transmits the test code to the terminating office.

2 When the test code establishes a connection, the terminating office returns an off-hook signal.

3 The originating office connects the TTT to the trunk under test.

4 The terminating office introduces a 300 ms delay, followed by a 1004 Hz milliwatt tone.

5 The originating office detects the tone, and a level meter measures far-to-near loss.

6 The terminating office maintains the tone for 9 s. After 9 s, the terminating office sends an on-hook signal, followed by quiet termination. For local office, this cycle repeats. For toll office, quiet termination is continuous.

7 The originating office releases the connection or requests another test sequence through a ring-forward signal.

Note 1: When the far end is a DMS-100 Family office, the system determines the associated test equipment to connect according to data in table TRKGRP.

Note 2: Use the milliwatt source levels of -15 dB and -20 dB and continuous off-hook supervision for specialized common carriers that depend on radio equipment.

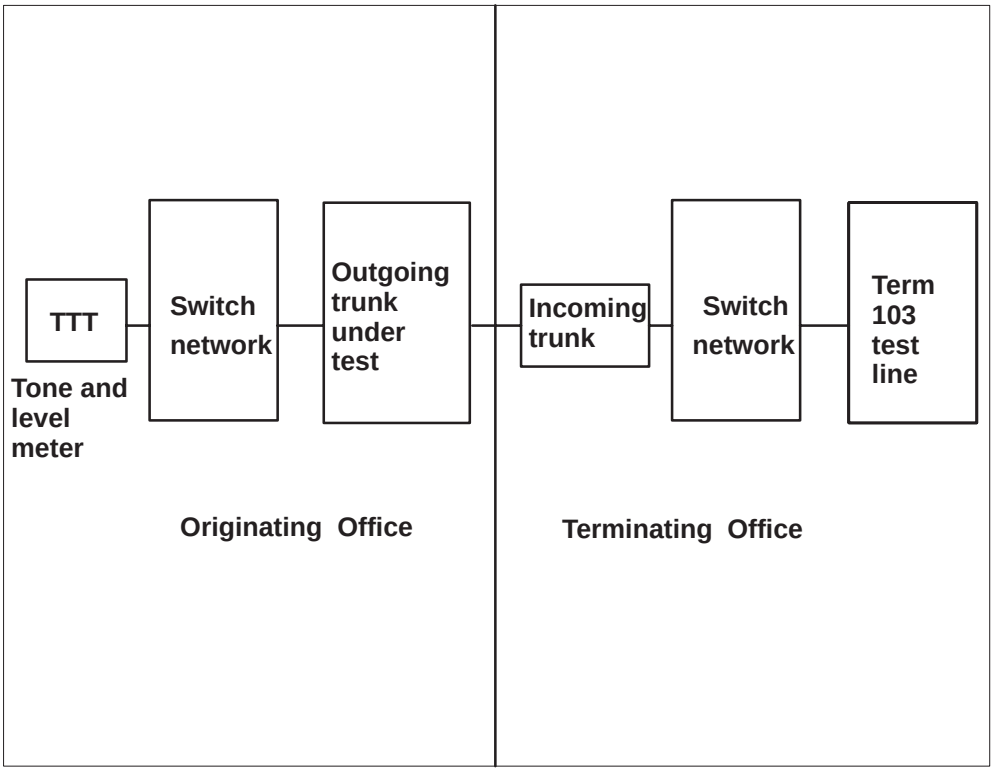
103 Test Line (TL103)

The TL103 provides a connection to a supervisory and signaling test circuit of intertoll trunks. Internal test equipment performs supervisory checks over the TTT, and detects supervisory signals. These signals include:

- busy and re-order tones
- test progress tones
- milliwatt tones
- announcement signals
- ringing signals

Figure 8-4 shows the configuration of the TL103.

Figure 8-4
TL103 configuration (block diagram)



The test sequence for TL103 is as follows:

1 The originating office transmits the test code. When the terminating circuit connects, the terminating office responds with an off-hook signal.

2 The originating office connects the TTT to the trunk under test, and sends a ring-forward (100 ms on-hook) signal.

3 The terminating end responds with an on-hook signal.

4 The originating office sends a second ring-forward signal.

5 The terminating end responds with on- and off-hook signals at 120 IPM.

6 The originating office sends a clear-forward signal when the originating office wants to terminate the test sequence.

DMS-100 Family offices can generate required signals for the 103 test line test without connection to an external test line. When software receives the T103 test code from another office, the software directs the incoming trunk module to send correct signals.

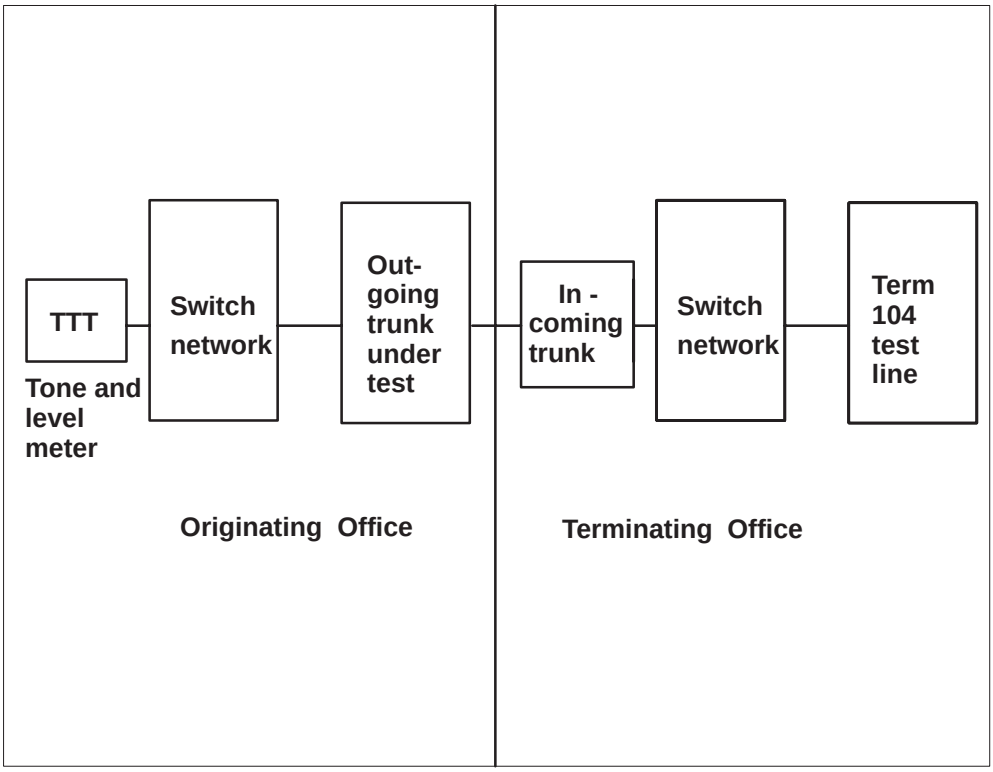
104 Test Line (TL104)

The 104 Test Line provides:

- measurement of two-way transmission loss
- measurement of far-to-near noise
- a check of near-to-far noise.

Figure 8-5 shows the configuration of the TL104.

Figure 8-5
TL104 configuration (block diagram)



The test sequence that occurs for TL104 is as follows.

1 The originating office transmits the test code and the terminating office provides off-hook supervision.

2 The originating office connects the TTT to the trunk under test.

3 The originating office sends a milliwatt tone for 3 s. The terminating office measures the near-to-far loss.

4 The terminating office sends a milliwatt tone for 3 s. The originating office measures the far-to-near loss.

5 A delay occurs. The terminating office sends a milliwatt tone for 3 s attenuated by the near-to-far loss measured in Step 3. This tone makes the originating office able to measure the near-to-far and far-to-near losses.

6 Immediately following the attenuated milliwatt tone, the originating office measures the far-to-near noise level. The terminating office measures the near-to-far noise level after 2 s.

7 If the near-to-far noise level exceeds 41 dBrnc, the terminating office sends a tone at 30 or 120 IPM.

8 The originating office sends on-hook supervision to the terminating office to stop the test.

105 Test Line (TL105)

The 105 Test Line feature (NTX136AA01) provides two-way testing from the originating office. Types of measurements include:

- loss
- noise
- echo return loss
- transmission loss
- singing point return
- high and low frequency measurements.

The TL105 tests run automatically. Each designation code causes the system to run a different group of tests. Table 8-2 lists the designation codes and associated tests. An ROTL can also run TL105 tests.

Table 8-2
TL105 Test combination description

CODE	TESTS	DESCRIPTIONS
T105	LSC, L, NSC, RN, N	Loss measurement with self-check at 0 dBm and 1004 Hz. Noise measurement with self-check (quiet termination; C-message filter).
T105	LSC, L, NSC, RN, N	Loss measurement with self-check at 0 dBm and 1004 Hz. Noise measurement with self-check (quiet termination; C-message filter).
TL0N	L, RN, N	Loss measurement at 0 dBm and 1004 Hz. Noise measurement (quiet termination, C-message filter).
TL0S	LSC, L	Loss measurement with self-check at 0 dBm and 1004 Hz.
TL05	L	Loss measurement at 0 dBm and 1004 Hz.
T165	LSC4, LSC10, LSC28, L4, L10, L28, NTSC, NT	Loss measurement at -16 dBm and 404, 1004, 2804 Hz. Noise measurement with self-check (tone at -16 dB, 1004 Hz. C-notched filter).
TL6N	L4, L10, L28, NT	Loss measurement at -16 dBm and 404, 1004, 2804 Hz. Noise measurement (tone, C-notched filter).

—continued—

Table 8-2
TL105 Test combination description (continued)

CODE	TESTS	DESCRIPTIONS
TL6S	LSC4, LSC10, LSC28, L4, L10, L28	Loss measurement with self-check at -16 dBm and 404, 1004, 2804 Hz.
TL65	L4, L10, L28	Loss measurement at -16 dBm and 404, 1004, 2804 Hz.
TS05	LSC, NSC	Far-end loss self-check at 1004 Hz and 0 dBm. Far-end noise self-check (quiet termination, C-message filter).
TS65	LSC4, LSC10, LSC28, NTSC	Far-end loss self-check at -16 dBm and 404, 1004, 2804 Hz. Far-end noise self-check (tone at -16 dBm, 1004 Hz. C-notched filter).
T5SB	ERLSC, SRLSC, SHISC	Return loss self-check.
T5BS	ERL, ERLSC, SRLLO, SRLSC, SHI, SHISC	Return loss measurement and self-check.
TERL	ERL	Echo return loss measurement.
T5LH	SRL, SHI	Singing return loss (low and high) measurements.
T5AS	LSC, L, NSC, RN, N, ERL, ERLSC, SRLLO, SRLSC, SHI, SHISC	Loss measurement and self-check at 0dB and 1004 Hz. Noise measurement and self-check (C-message filter). Return loss measurement and self-check.
T5AT	L, RN, N, ERL, SRLLO, SHI	Loss measurement at 0dB and 1004 Hz. Noise measurement (C-message filter). Return loss measurement.
T50L	L, ERL, SRLLO, SHI	Loss measurement at 0dB and 1004 Hz. Return loss measurement.
T56N	L4, L10, L28, NT, ERL, SRLLO, SHI	Loss measurement at -16 dB and 404, 1004, 2804 Hz. Noise measurement (C-notched filter). Return loss measurement.
T5LB	L4, L10, L28, ERL, SRLLO, SHI	Loss measurement at -16 dB and 404, 1004, 2804 Hz. Return loss measurement.

—continued—

Table 8-2
TL105 Test combination description

CODE	TESTS	DESCRIPTIONS
TSBS	LSC, NTSC, SRLSC, SHISC	Loss self-check at -16 dB and 404, 1004, 2804 Hz. Noise self-check (C-notched filter). Return loss self-check.
TSBT	ERL, SRLLO, SHI	Return loss measurement.
—end—		

The system groups tests in layers, named layer 2 or layer 3. Each test has an associated Multi-Frequency (MF) digit, but two tests in different layers can share the same MF digit. The MF transmits when you request a test. Another MF digit, known as a ”layer change request” digit (1100/1700 Hz) goes before a request for a test in layer 3. If this digit is not present, the system selects the associated test in layer 2 by default. Table 8-3 lists the individual tests with their associated layers and MF digits.

A Noise Measuring Set (NMS) reads noise levels. Noise passes through a C-message filter before measurement. The filter reads the noise as C-level noise. For trunks on a carrier that compresses and expands signals, a 1004 Hz tone transmits over the trunk the NMS measures. A C-notch filter filters out the tone, and reads the noise as C-notch noise. See table 8-2 and table 8-3 for tests that use these filters.

Table 8-3
Test/layer format description

TEST	LAYER	MF DIGIT	MF FREQ.	TEST DESCRIPTION
ERL	2	C	700/ 1700	Echo return loss measurement with quiet termination.
ERLSC	3	A,C	700/ 1700	Echo return loss self-check with quiet termination.
L	2	2	700/ 1100	Two-way loss measurement at 0 dBm and 1004 Hz.
L4	2	6	1100/ 1300	Two-way loss measurement at -16 dBm and 404 Hz.
—continued—				

Table 8-3
Test/layer format description (continued)

TEST	LAYER	MF DIGIT	MF FREQ.	TEST DESCRIPTION
L10	2	C	1500/ 1700	Two-way loss measurement at -16 dBm and 1004 Hz.
L28	2	E	1300/ 1700	Two-way loss measurement at -16 dBm and 2804 Hz.
LSC	2	1	700/ 900	Far-end Loss self-check at 0 dBm and 1004 Hz.
LSC4	3	6	1100/ 1300	Far-end Loss self-check at -16 dBm and 404 Hz.
LSC10	3	C	1500/ 1700	Far-end Loss self-check at -16 dBm and 1004 Hz.
LSC28	3	E	1300/ 1700	Far-end Loss self-check at -16 dBm and 2804 Hz.
N	2	3	900/ 1100	Far-end noise measurement with C-message filter.
NSC	2	4	700/ 1300	Far-end noise self-check with C-message filter.
NT	2	F	700/ 1700	Two-way noise with tone measurement with C-notched filter.
NTSC	3	F	700/ 1700	Far-end Noise/Tone self-check with C-notched filter at -16 dBm and 1004 Hz.
RN	2	A	1300/ 1500	Near-end noise measurement with C-message filter. Filter at-16 dBm and 1004 Hz tone.
SHI	3	2	700/ 1100	High frequency singing return loss measurement with quiet termination.
SHISC	3	A,1	700/ 900	High frequency singing return loss self-check with quiet termination.
SRLHI	3	A,2	2200/ 3400	High frequency singing return loss with quiet termination.

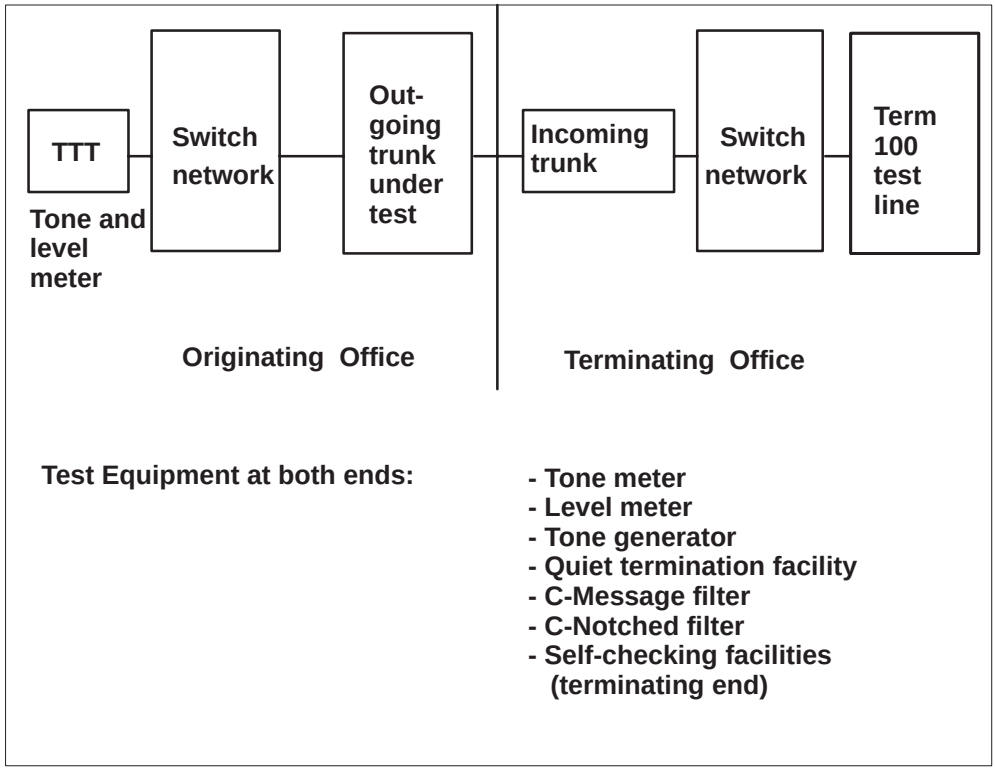
—continued—

Table 8-3
Test/layer format description (continued)

TEST	LAYER	MF DIGIT	MF FREQ.	TEST DESCRIPTION
SRLLO	2	8	900/ 1500	Low frequency singing return loss measurement with quiet termination.
SRLSC	3	A,8	900/ 1500	Low frequency singing return loss self-check with quiet termination.
—end—				

Figure 8-6 shows the configuration of the TL105.

Figure 8-6
TL105 configuration (block diagram)



The test sequences for TL105 are as follows.

1 The originating office transmits the number assigned to the 105 Test Line in the terminating office.

2 After the terminating 105 Test Line receives this assigned number, the terminating 105 Test Line connects to the incoming trunk. The terminating 105 Test Line sends a 2225-Hz Test Progress Tone (TPT) to the originating end.

3 The originating office connects the Transmission Test Unit (TTU) to the trunk under test.

4 When the terminating office is ready to start the test, the terminating office removes the TPT.

5 The originating office detects the removal of the TPT, and starts with the requested group of tests. The sequence in which the tests run is:

a. Loss self-checks

b. Loss measurements

c. Noise self-checks

d. Noise measurements

e. Echo-return losses.

The specified group of tests does not affect this sequence. A request sent to the far end starts each test. The request is one or two MF digits.

6 For each loss self-check for the far-end, the originating office sends the corresponding MF digits to the terminating office. Refer to table 8-3 for more information on MF digits. The self-checks are LSC, LSC4, LSC10, or LSC28. When the terminating office recognizes the request, the terminating office provides the correct tone. The correct tone tests the loss measurement set of the terminating office. Several consecutive far-end loss self-checks can be present.

7 For each two-way loss measurement requested (L, L4, L10, or L28), the sequence is as follows:

a. The originating office sends the loss measurement test-request (MF digit) to the terminating office. The originating office checks for the return of the correct test tone. The returned test tone depends on the level and the frequency. This tone lasts 430 ms.

b. The originating office measures the signal level, and records the far-to-near loss in dB.

c. The originating office sends back the same test tone for 640 ms. This tone transmits 70 ms after the test tone from the terminating office stops. When the terminating office detects the tone, the office measures the level of the tone. The office measures the tone to obtain the near-to-far loss in dB.

d. The terminating office sends back a guard tone at 1200 Hz for 430 ms, followed by a 2200 Hz data tone. The duration of the data tone depends on the loss measurement in dB. A second guard tone follows at 1200 Hz for 50 ms. The terminating office sends the measurement results to the originating office. The originating office records the results. This process is the Frequency Shift Keying (FSK) data transmission design.

e. Any other two-way loss self-checks requested occur now with the same format.

8 If you request a far-end noise self-check with quiet termination (NSC), the originating office sends the corresponding test request. The originating office sends this request to the terminating office (MF DIGIT 4). The terminating office introduces the quiet termination required to test the noise measuring set of the terminating office. If you request a far-end noise self-check with tone (NTSC), the terminating office introduces a tone. The equipment test for the terminating office requires this tone.

9 If you request a far-to-near noise test with quiet termination (RN), the sequence is as follows:

a. The originating office sends a far-to-near noise measurement test signal (MF DIGIT 0: 1300/1500 Hz) to the terminating office.

b. The terminating office provides a quiet termination. The originating office uses a C-message filter to measure the far-to-near noise. The originating office records the measurement.

10 If you request a near-to-far noise test with quiet termination (N), the sequence is as follows:

a. The originating office sends a near-to-far noise measurement test signal (MF DIGIT 3: 900/1100 Hz) to the terminating office. The terminating office introduces a quiet termination.

b. The terminating office receives the near-to-far noise measurement. The terminating office uses the same FSK design as the near-far loss measurements. The terminating office transmits the measurement to the originating office.

c. The originating office records near-to-far noise measurements in dBrnc.

11 The sequence for a two-way noise test that uses a test tone (NT) is the same as the two-way transmission loss test. The difference is that you use the noise measurement circuit instead of the loss measurement circuit.

12 **Echo Return Loss Tests**

Two different types of responder are available for these tests:

- a one-way far-to-near return loss measurement
- a two-way return loss measurement. If you use a Transmission Test Unit (TTU) as a responder in the far-end office, a two-way transmission test runs. Test sequences are as follows:

  — **(1) One-Way Transmission**

  At the start, the system assumes a two-way transmission test sequence for all return loss measurements. If the far-end office does not provide a near-to-far return loss measurement, the far-end office does not affect the near-end office test equipment. The distant office does not affect the near-end office. The far-end office test equipment returns a fixed 3 ms data tone. The data tone is in FSK form and indicates the end of the test.

  — **(2) Two-Way Transmission**

  The offices take far-to-near measurements first. Near-to-far measurements follow directly. One end takes measurements and the other end provides quiet termination. When the far-end office removes TPT, the near-end office sends MF digits to request a given return loss test. The far-end equipment responds with 2.56 s of quiet termination. The near-end equipment takes far-to-near return loss measurements. For near-to-far return loss measurements, the near-end applies quiet termination for 2.56 s. The far-end takes the measurements. The system uses FSK to transmit the results to the near-end. The near-end records the results.

The DMS-100 Family switch runs a test on the TTU before the TTU connects for 105 tests. The switch requests self-checks for the far-end only.

TL100, TL102, TL105 by remote office test line

A Remote Office Test Line (ROTL) can initiate tests with feature package NTX167, the TL100, TL102, and TL10 . The tests can also run on the Integrated Services Digital Network (ISDN) User Part (ISUP) trunks of the CCS7 system.

Feature package NTX052AB provides the ROTL system. Feature package NTX052AB requires the following hardware:

- for the 105 test lines:
  - — at the near-end office: a TTU card NT2X47
  - — at the far-end: a TERM105 card NT3X91AA and ROTL unit

or

a TTU card NT2X47AC or higher issue

- for the office to use ROTL:
  - — at the near-end office: Automation Products Company (APC) ROTL unit, card NT3X91AA
  - — at the far-end office: a TERM105 card NT3X91AA and ROTL unit

or

a TTU card NT2X47AC or higher issue

- for signaling between offices:
  - — all CCS7 signaling abilities (like an MSB7) and a DTC with ISUP trunks.

The system provides a line to the ROTL equipment. The system can use the line to run test line tests from another location. When the calling party makes a call to the ROTL, the calling party sends control digits to the ROTL. These control digits indicate which trunk to test and which test to run. You can use ROTL to run the following test lines on ISUP trunks:

- TL100
- TL102
- TL105.

The ROTL seizes the trunk and the test line runs as a normal ISUP test line test. The ROTL sends the results of the tests back to the party that called the ROTL.

> ***Note:*** These test lines do not use the test line code in IAM (Initial Address Message) because the ROTL originates these test lines. The ROTL is an incoming trunk Normal call processing, not test line control, formats the IAM message.

You can use the ROTL hardware or a TTU to terminate a TL105. The entries in the switch select which to use.

The tables that you must complete to allow ROTL to test ISUP trunks by TL100, TL102, or TL105 are

TSTLCONT to specify the position on the ISUP TSTNOIND of table CLLIMTCE.

TLNOS to specify the types of tests for TL100, TL102, TL105 for the ISUP trunks.

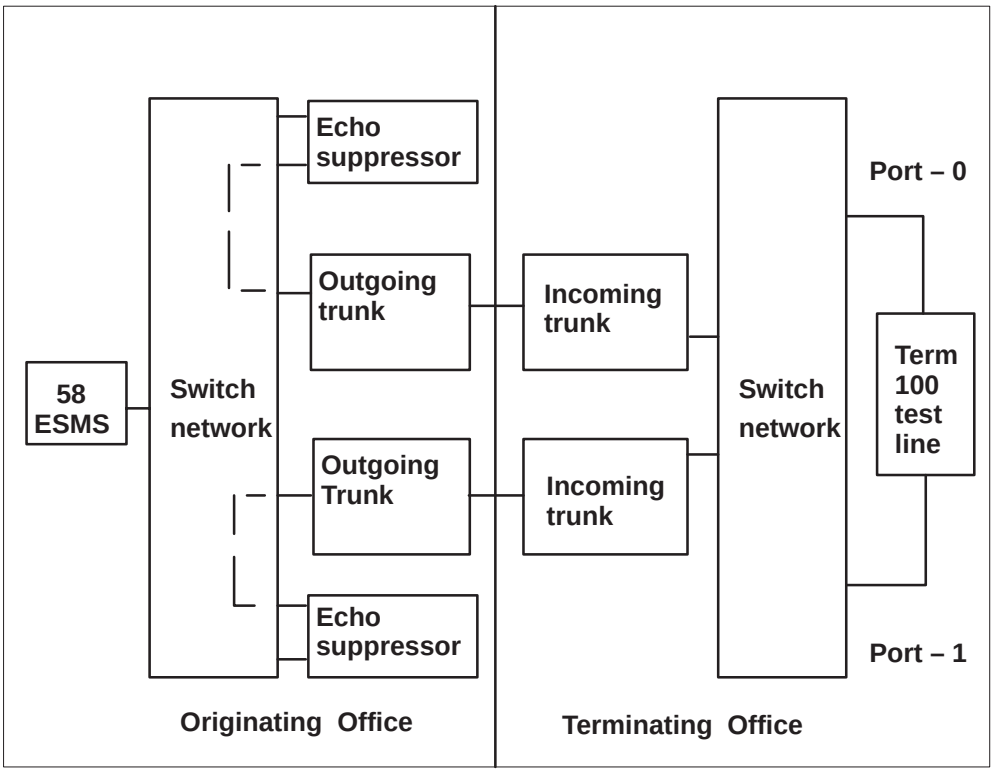
STDPRTCT to specify the terminating translation for the test line that uses the C7PT entry as pretranslator for ISUP test calls.

STDPRT to specify the pretranslator C7PT of table STDPRTCT in order for all the test lines to operate.

108 Test Line (TL108)

The 108 Test Line provides far-end, looparound terminations that connects to a near-end Echo Suppressor Measuring Set (ESMS). Figure 8-7 shows the configuration of the TL108.

Figure 8-7
TL108 configuration (block diagram)



The TL108 test sequence is as follows.

1 The originating toll office connects the ESMS (normally a 58 ESMS), and seizes an outgoing intertoll trunk.

2 After the originating office seizes the trunk, the originating office dials the 108 Test Line code. The seized trunk is the Trunk Under Test (TUT).

3 The terminating office translates the 108 code and connects the incoming trunk to test Port-0 of the 108 Test Line. The terminating office uses a 1-kHz tone to calibrate the ESMS. The terminating office sends the tone to the originating office.

4 The originating office seizes another outgoing trunk, called the Auxiliary trunk, and dials the 108 Test Line code again.

5 The terminating office translates the 108 code and connects the Auxiliary trunk to test Port-1 of the 108 Test Line. The terminating office cuts off the 1-kHz tone, and establishes a connection to Port-0.

6 When the terminating office establishes a connection, the originating end transmits a 1-kHz tone on the Auxiliary trunk. This tone passes through the 108 Test Line, back over the trunk under test. This tone completes the calibration of the ESMS. The offices use the Auxiliary trunk as a reference trunk for later tests of echo suppressors.

7 When tests on the TUT complete, the originating office releases the TUT. The originating office seizes the next trunk for tests, and dials the 108 Test Line code over this trunk. When all tests complete, the originating end goes on-hook on both the TUT and the Auxiliary trunk. The terminating office releases (idles) the 108 Test Line termination set.

Note 1: The originating end does the required tests on the ES through a test position.

Note 2: The test sequence is the same for Echo Suppressors that associate with trunks.

Diagnostic tests

Use diagnostic tests to diagnose trunk conditions. Diagnostic tests can run automatically or manually according to the switch configuration.

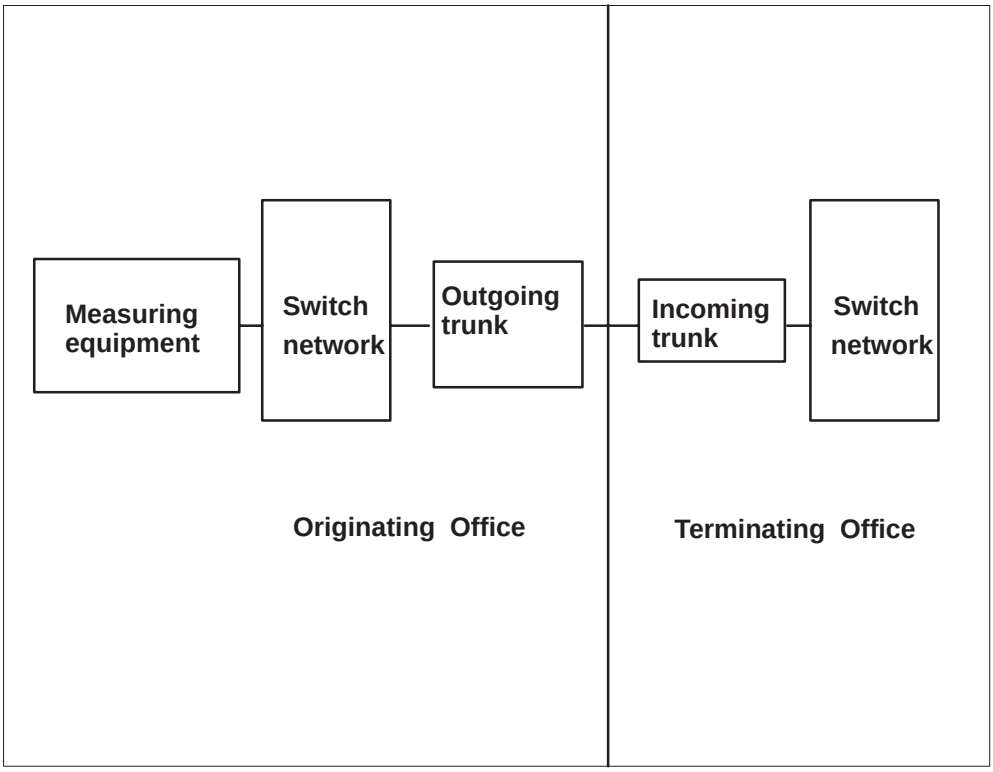
Bit error rate test

Use the bit error rate test (BERT) to test transmission paths through the network. To perform this test, execute the BERT command at the DATA level of the MAP display.

Synchronous test line (TSYN)

The Synchronous Test Line provides testing for ringing, tripping, and supervisory functions. The Synchronous Test Line also provides marginal testing of the supervisory and tripping functions of toll-completing trunks. DMS-100 Family offices apply the correct protocol on the incoming trunk to implement this termination feature. Offices supply the protocol under software control. Figure 8-8 shows the configuration of the TSYN.

Figure 8-8
TSYN configuration (block diagram)



When a DMS-100 office terminates a synchronous test line test, the sequence is as follows:

1 The originating office transmits the test code.

2 The DMS office translates the code and responds with:

   a. audible ringing for 2 s, followed by a 4 s silent interval

   b. audible ringing for another 2 s period, followed by a maximum of 3 s silent interval during which ringing trips.

   c. a series of supervisory signals, followed by a 120 IPM signal that indicates that all tests are complete.

3 The originating office sends an on-hook signal, and the terminating office disconnects.

When a DMS-100 office originates a synchronous test line test, the sequence is as follows.

1 The DMS office transmits the test code to the terminating office, and connects the TTT to the trunk under test.

2 The terminating office responds with a test signal and a series of supervisory signals.

3 The TTT detects and analyses the tones received. The Trunk Module (TM) for the trunk under test checks the supervisory signals.

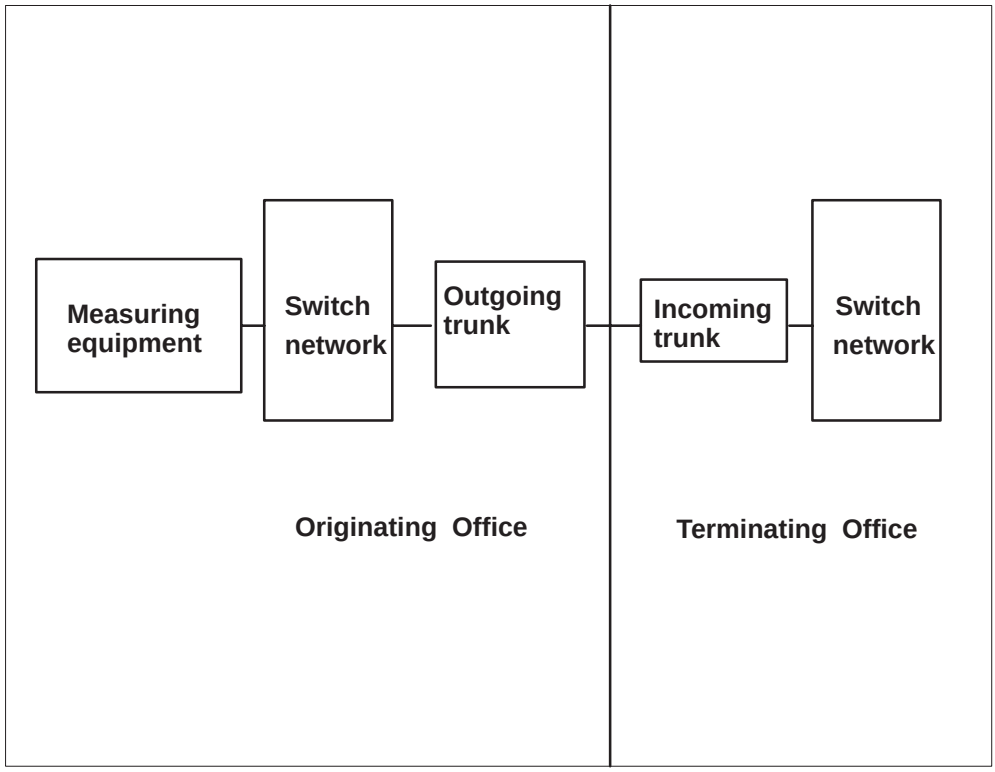
4 The office records any results that the office did not expect.

Non-synchronous test line (TNSS)

The Non-synchronous Test Line provides a test to quickly test ringing, tripping, and supervisory functions of toll-completing trunks. The test is not as complete as the synchronous test, but you can perform the test more quickly. You can also run tests that are not marginal on supervisory and tripping functions. DMS-100 Family offices apply the correct protocol, under software control, on the incoming trunk to implement this termination feature.

Figure 8-9 shows the configuration of the TNSS.

Figure 8-9
TNSS configuration (block diagram)



The TNSS test sequence is as follows.

1 The originating office transmits the test code and connects the TTT to the trunk under test.

2 The terminating office:

   a. supplies audible ringing for 0.5-1.5 s.

   b. trips the ringing

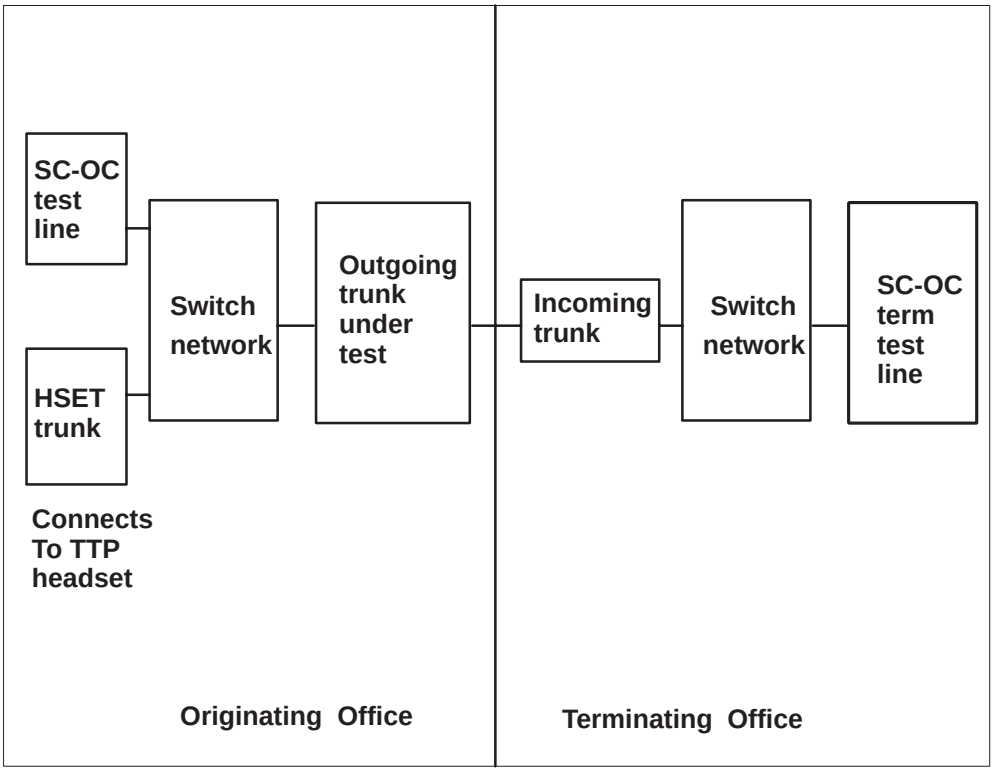
   c. transmits a series of off-hook and on-hook pulses at 60 IPM.

3 The originating office sends a clear forward signal when the originating office completes the test.

Short- and open-circuit test lines (TCLC and TOPC)

Use the TCLC and TOPC tests to test the stability of trunks that have negative-impedance repeaters. Each test line has an access code. Figure 8-10 shows the configuration of the TCLC and TOPC.

Figure 8-10
TCLC and TOPC configuration (block diagram)



The TCLC and TOPC test sequence is as follows.

1 The originating office transmits the test code to the terminating office.

2 The terminating office selects an idle test line (2X71AA) and assembles the pads that you can select in the test line.

3 The terminating office connects the incoming trunk to the test line and returns an off-hook signal to the originating office.

4 The originating office selects an idle test line and assembles the pads that you can select in the test line. The test line connects to the outgoing trunk.

5 The originating office sets up a Monitor Listen connection between the TTP headset and the trunk under test.

6 The terminating office maintains the off-hook signal until the terminating office receives an on-hook signal from the originating office.

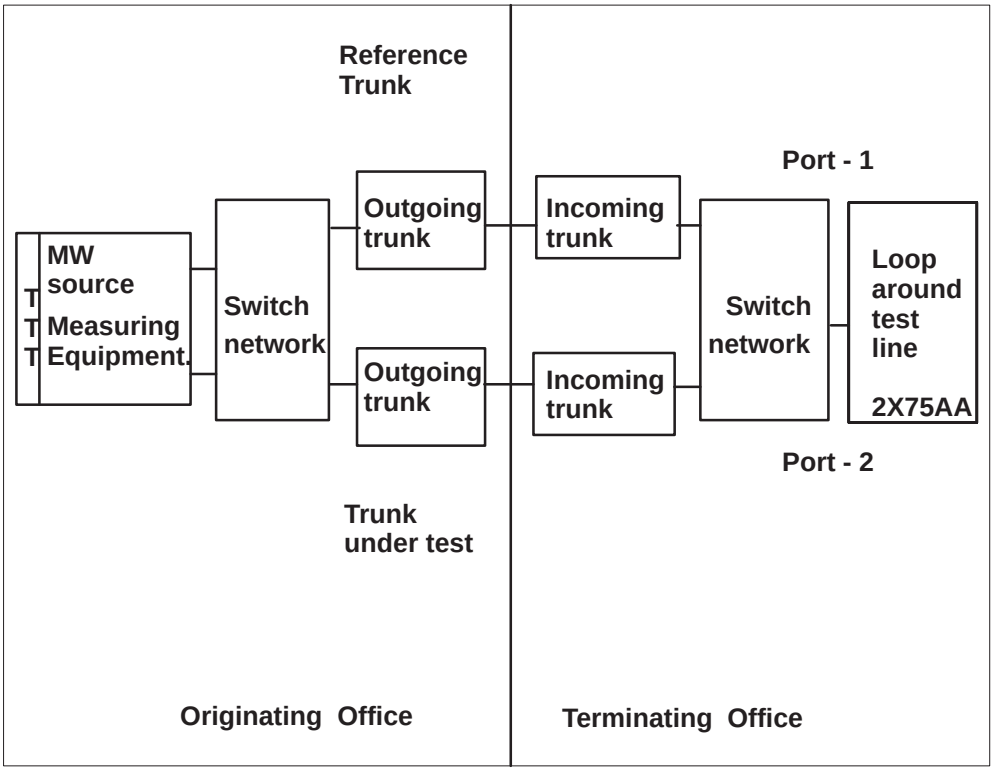
Looparound test line (TLPA)

The Looparound Test Line provides two-way transmission tests on trunks to an end office. The end office does not need to participate in these transmission tests. You can perform tests that use this test line automatically

from the TTP level, or manually from the TTP level. First, the originating office sends a milliwatt test (T102) out on two trunks. The test determines the far-to-near loss of each trunk. The two trunks connect. The terminating TLPA has two ports. A different code accesses each port. The originating office transmits a milliwatt signal. This signal passes over one trunk, through the TLPA, and back to the originating office over the second trunk. The originating office measures the signal. To determine the near-to-far loss of one trunk, the originating office performs the following procedure. The originating office subtracts the known far-to-near loss of the other trunk from the total loss. The originating office repeats TLPA test, and reverses the direction of the signal through the TLPA.

Figure 8-11 shows the configuration of the TLPA information.

Figure 8-11
TLPA configuration (block diagram)



The TLPA manual test sequence is as follows:

1 A milliwatt test (far-to-near loss) runs on a trunk from the posted set. This trunk is the reference trunk.

2 A milliwatt test (far-to-near loss) runs on the trunk you want to test. This trunk is the test trunk.

3 The TLPA test runs on the reference trunk for near-to-far loss.

4 The TLPA test runs on the test trunk for near-to-far loss.

If the trunk selected as the reference trunk does not meet specifications, the test repeats and uses another trunk.

The TLPA automatic (ATT) test sequence is as follows.

1 A milliwatt test runs on a trunk from the group under test for far-to-near loss.

2 A milliwatt test runs on a second trunk from the group under test for far-to-near loss.

3 A TLPA test runs on the first trunk for near-to-far loss.

4 A TLPA test runs on the second trunk for near-to-far loss.

5 The system selects a reference trunk, if the system can locate a trunk that meets specifications (refer to Note). If a trunk does not meet specifications, steps 1-4 repeat five times. If the system does not find an acceptable reference trunk after five attempts, the ATT bypasses the trunk group under test.

6 If necessary, the system selects a second reference trunk to test the first reference trunk again. If five consecutive trunks in a group fail the test, the ATT tests this reference trunk again.

7 TLPA Tests run on the rest of the trunks in the group under test.

Note: In each step, the ATT checks the loss deviation from the Expected Measured Loss (EML) against the acceptable set limits. If the deviation exceeds the EML or the acceptable set limits, the ATT indicates measurement and the trunk fails the test.

Digital looparound test line for DMS-300 (TL01)

CCITT #7 ISUP trunks in DMS-300 Gateway offices have a digital looparound test line - originating and terminating. The TL01 test code identifies the test line test at the originating office. When the far-end receives the outpulsed digits, the terminating sequence assembles.

Originating looparound test line

The CCITT #7 ISUP trunk at the originating DMS-300 Gateway office can be either an outgoing or two-way trunk. The test line provides facilities at the originating office. These facilities allow performance of automatic far-to-near, and near-to-far loss and noise measurements on this trunk.

The originating looparound test sequence is as follows:

1 The terminating looparound test line receives the answer message (ANM) from the far-end office. After the test line receives the ANM, the test line sends a milliwatt tone for 14 s. After the milliwatt tone, a quiet termination period occurs for 14 s.

2 The originating office uses a Transmission Test Trunk (TTT) for far-to-near loss measurements during the first 14 s interval. The TTT conducts far-to-near noise measurements during the second interval.

3 The test line responder connects the receive path of the responder to the transmit path (looparound). The originating office uses the TTT to send out a milliwatt tone for 5 s on the transmit path of the originating office. The office measures the milliwatt tone on the receive path of the originating office.

4 After 5 s of milliwatt tone, the TTT provides 5 s of quiet termination at the transmit path of the TTT. The TTT measures the noise level at the receive path of the TTT.

5 The transmission loss measurements over the ISUP trunk that loops back allow the calculation of near-to-far loss and noise.

Terminating looparound test line

The CCITT #7 ISUP trunk at the terminating DMS-300 Gateway office can be an incoming or two-way trunk. The system permits test access if the trunk is in one of the following trunk states: IDL, MB, RMB, SB.

The system uses the NT1X00AE test trunk in the Maintenance Trunk Module (MTM) as test equipment to generate the milliwatt tone. The system also uses the NT1X00AE test trunk to provide the 600-ohm balanced termination.

The terminating looparound test sequence is as follows:

1 When the ISUP trunk under test receives an Initial Address Message (IAM), the ISUP trunk replies with an address complete message (ACM). An ANM follows the ACM.

2 The trunk connects to a free test trunk. The free test trunk provides a 600 ohm balanced termination to the receive (RX) path of the four wire digital trunk. The trunk transmits a milliwatt tone of 1020 Hz at -10 dBm0 on the transmit (TX) path. The milliwatt tone lasts for 14 s.

3 When the milliwatt tone terminates, the test trunk provides a 600 ohm balanced termination to the TX path for the next 14 s.

4 At the end of the second interval, the 600 ohm terminations for the TX and RX paths disconnect.

5 The TX and RX paths connect with the switching network digital pad set to 0 dBr. The loopback point is at the DMS-300 Network Module (NM).

6 The paths maintain the looparound condition until the ISUP trunk receives a release (REL) message from the originating office. When the trunk receives this message, the paths release the looparound. The ISUP trunk idles. A release complete (RLC) message returns to the originating office.

E&M lead test (TE_M)

The E&M Lead test provides quick continuity, signaling, and pulsing tests to a distant office. The test normally applies to trunks with E&M leads that terminate in Step-by-Step offices. The test is a limited version of the T103, TSYN and TNSS Test Line tests. The test sequence begins with the connection to a far-end office test line. The test sequence ends when the office receives the off-hook signal.

Repeat 2 test (TR2L and TR2S)

The Repeat 2 test makes sure that a trunk circuit in the far-end office disconnects correctly in the allowed time. The circuit disconnects after the originating office disassembles the connection. The test stages made in sequence on the same trunk circuit are:

- a standard operational test line test (T103, TSYN, or TNSS)
- an E&M Lead test.

The versions of this test line test are:

- TR2L, which provides a 10 s delay between tests
- TR2S, which provides a 1 s delay between tests.

ATME test line

The Automatic Transmission Measuring Equipment (ATME) test line is the version of the TL105 that applies to different trunks. These different trunks are trunks that serve the DMS-100 International switch. While the signaling format is different, the maintenance functions and test sequences are the same.

ARTER test line (TART)

ARTER is the name for the equipment used for automatic transmission testing of outgoing trunks in the Turkish network. The ARTER system works with 6805 units in the far-end offices that provide 804 Hz reference frequency and quiet termination. The following are types of 6805 units:

- two-wire trunks

- four-wire trunks.

The ARTER provides looparound testing. The ARTER uses only one trunk.

The testing sequence with a two wire 6805 unit in the distant office is as follows:

1 The correct digits transmit and the DMS test equipment connects to the outgoing trunk.

2 The outgoing trunk connects to the 6805 unit in the terminating office and answer supervision returns.

3 The 6805 unit transmits 804 Hz at 0 dBmO for 5 s. The originating office measures the received frequency and level and compares the frequency to the Expected Measured Loss (EML).

4 The 6805 unit provides 5 s of quiet termination. The originating office measures the noise level. The originating office compares the level to the Maintenance Noise Limit (MNL) and the Immediate Action Noise Limit (IANL).

5 After noise measurement completes, the trunk disconnects. Test results display at the TTP level.

6 The 6805 unit in the far-end office disconnects after a period of 5 s of quiet termination. The disconnect occurs if the unit does not receive a clear forward.

The testing sequence with a four wire 6805 unit in the far-end office is as follows:

1 The correct digits transmit and the DMS test equipment connects to the outgoing trunk.

2 The outgoing trunk connects to the 6805 unit in the terminating office and answer supervision returns.

3 The 6805 unit transmits 804 Hz at of 0 dBm0 for 5 s. The originating office measures the received frequency and level and compares the level to the EML.

4 The 6805 unit provides 5 s of quiet termination. The originating office measures the noise level and compares the level to the MNL and the IANL.

5 The 6805 unit provides looparound capability for the transmit and receive paths of the four wire trunk.

6 The originating office transmits 804 Hz at 0 dBm0 on the transmit path and measures the frequency and level on the receive path. The originating office compares the thresholds.

7 When the office makes the measurements, the originating office terminates the test tone on the transmit path.

8 The originating office provides quiet termination on the transmit path, and measures the noise level on the receive path. The originating office compares thresholds.

9 After the noise measurement on the looparound completes, the trunk disconnects. Test results display at the TTP level.

10 The 6805 unit in the terminating office disables the looparound ability. The unit disconnects after 10 s of looparound connection, if the unit does not receive a clear forward.

ISDN test line (ISDN)

This test line provides ISDN test facilities for CCITT #7 trunks (BTUP and TUP+) in a DMS-300 office. The test call simulates an ISDN call to a number or device in the national or international network. The test call simulates an ISDN call over the user part of the #7 signaling system. You can use the connection path for transmission testing.

The ISDN option is available at the TTP, MON and MAN levels of the MAP display. A PSID (parameter set identification code) must come before the ISDN test option. This PSID code (a maximum of eight characters) maps to table ISDNTCP, which defines the different test parameters.

CCIS6 continuity test (TCON)

The TCON test checks for interruptions in transmission in CCIS6 trunks, from both ends. The near-end office sends a continuity tone over the voice-path of the CCIS6 trunk. The office sends the tone to the far-end office, which detects the tone and makes a continuity check. The far-end office returns the tone, and the near-end performs the same test. This test runs for all CCIS6 connections.

Automatic trunk testing (ATT) does not support the test code TCON.

CCITT6 continuity test (TCOT)

The TCOT provides continuity tests for CCITT6 trunks, and uses the looparound test method. The TCOT test sequence is as follows:

1 The originating office connects the continuity transceiver to the outgoing trunk under test.

2 The terminating office sets up a loopback connection to the corresponding incoming trunk.

3 The originating office sends the continuity tone over the transmit path of the trunk.

4 The terminating office receives the tone over its receive path, and returns it over the transmit path to the originating office.

5 The originating office receives the returned tone and takes measurements.

Automatic trunk testing (ATT) does not support the test code TCOT.

ISUP trunk continuity test (ICOT)

If you have feature package NTX167, you can test the Integrated Services Digital Network (ISDN) User Part (ISUP) trunks for continuity. The ICOT test uses the specifications of T1X1.1 to validate the speech path on a trunk that uses CCS7 signaling.

The command TST of the C7TTP level tests trunks manually. You can test trunks for each call or for every other call.

Automatic trunk testing (ATT) does not support the test code ICOT.

Voice facility testing

As a result of CCS7 signaling, the voice facility does not perform call setup signaling to the voice facility. Before you connect the voice path, you must test the voice facility for analog trunks.

To check the voice facility for analog trunks, connect a tone and a receiver to the originating end. Make the tone loop back through the terminating end. If the tone test passes, connect the voice facility to the call, and continue with the continuity testing.

Continuity checks on consecutive circuits

Some ISUP trunks do not perform continuity tests. When the test runs, the ISUP trunks not under test must wait for the previous circuit to send a COT signal. The previous circuit transmits that signal to the next office and an Initial Address Message (IAM) confirms the signal.

When two ISUP trunks run a continuity test in sequence, the previous circuit sends the COT message on the second trunk. The circuit sends the message after the previous continuity check passes.

A call can seize a trunk at both ends at the same time. This seizure is glare. When this seizure occurs, the office not in control of the test must transmit an outgoing tone on the trunk for 60 ms. This action makes sure that the control office can pass the continuity test. The tone does not require a looparound. If the office that is not in control does not run a continuity test, the tone requires an immediate looparound.

Per-call continuity failure

If the system does not detect an acceptable tone within a 2 s timeout, the continuity tests for each call on a trunk fail. Within 10 s of the failure, the system attempts the call on another trunk.

Each end of the trunk runs timers during the 10 s. The trunk that originated the continuity test waits to check again. The trunk at the other end waits to receive a Continuity Check Request (CCR) message. When the timeout for CCR expires, the waiting end sends a CCR message to request a continuity test. If the timer that waits for a loopback acknowledgement (LPA) message expires, the test fails. The test waits for another attempt. If the timer that waits for the CCR message expires, the timer sends an RSC message to the connecting office. The message informs the connecting office to stop the test. If the COT timer on the original test expires, the originating trunk does not make any additional checks. The far-end sends an RLS message. If the calling party has not hung up, the system attempts the call again..

Manual continuity success

You can perform the manual continuity test from the C7TTP level of the MAP display on one trunk at a time. You can also use the manual continuity test to test continuity after a first failure on a per-call test. If you test again because of a per-call failure, the test repeats at 3 min intervals. The test repeats until the test passes or until you manually stop the test.

The manually run continuity tests do not comply with the T1X1.1 specifications. The tests do not comply because the person that starts a manual test controls the test. The system does not perform tests again for trunks on which you manually initiate the original continuity test.

Manual continuity failure

If a manually run continuity test fails, the system does not run the test again. The response to the test shows if the test passed. Log TRK263 records the reason for failure. Also, the system sends the far-end office an RSC message to stop all the far-end timers.

If you perform the manually run continuity because of a per-call continuity failure, tests occur again at 1-3 min intervals. The test repeats until the test passes or until you manually stop the test. Test completion or interruption generates log TRK263.

Trunk states for continuity testing

The trunk states for the continuity tests are different. The different states depend on the type of test. The types of test are call by call on each trunk (per-call), or trunk by trunk (manual). During a per-call continuity test, the state of the incoming and outgoing trunks is CPB (from the TTP level).

If a per-call continuity test fails, both ends of the trunk remain in the system busy state (SB). The ends remain in this state until the system checks the trunk again within 10 s. You must not choose the ends of the trunk for call processing because the trunks continue to run continuity checks. The checks run every 1 to 3 minutes. These checks run until you use C7TTP command BSY to busy the trunk manually, or until the test passes.

During a manually run continuity test on all outgoing or two-way ISUP trunks, the outgoing trunk is seized (SZD state). Trunks that are offline (OFFL state) are an exception, and are not seized. The incoming trunk is call-processing busy (CPB state).

Participation of PMs in continuity testing

The part of the continuity test that checks the tone facility is in the PM. The test attaches a transceiver to the circuit with the correct tone. The correct tone depends on the two or four wire test. The test passes if the incoming tone monitors continuously for 30 ms. The transceiver remains on for at least 60 ms to cover from a seizure of both ends, or glare.

The continuity tone card (NT6X70) must be present for all DTC or LTC PMs that contain ISUP trunks. You must enter this information in table LTCINV.

The DTC maintains the CCITT protocol on the trunk. The DTC requests the COT tasks in the Signaling Processor of the PM to generate and scan the tone. The CC software maintains the trunk state. The software prevents call processing on any trunk that runs additional continuity tests until the trunk passes continuity.

Call processing interaction for ICOT

You can run the continuity test on all types of ISUP trunks. When a continuity test runs during a call, a time delay occurs for the ISUP call. The delay is at the near-end, and the far-end. The near-end waits for the continuity to pass. The far-end waits for the COT message. Use the continuity tests on analog trunks for some calls. Do not use continuity tests on all calls. The call setups of the test minimize the impact on real time.

For two-way trunks, do continuity tests on both ends to prevent glare.

The data tables for ICOT

Continuity tests require the entry of data into the following tables:

TRKSGRP

To specify the type of continuity test and the percentage of calls for per-call checks on the trunk subgroup

LTCINV
To add the CONTINUITY card (NT6X70) to the entry for LTCs and DTCs

TSTLCONT
To specify the test line test for the trunks

TLNOS
To specify the T105 tests that are to run on the ISUP trunks.

Types of continuity tests
The two-wire and four-wire trunks each have a separate continuity test. Two-wire and four-wire trunks combined require a different test.

The two-wire continuity test sends a tone from the originating office to the terminating office. To confirm the tone, the terminating office sends back another tone. The tone varies according to the direction of the signal on the trunk:

Outgoing
Sends a 2000 Hz tone and monitors for a 1780 Hz tone

incoming
Monitors for the 2000 Hz tone then sends the 1780 Hz tone.

The four-wire continuity test allows the trunk at the far end to loop back the tone. The four wire continuity test sends and receives the same tone. The loopback messages vary according to the direction of the signal on the trunk:

Outgoing
Sends a 2000 Hz tone and monitors for the same tone.

Incoming
Loops back an IAM message and does not monitor the incoming tone.

The groups of four wire and two wire trunks depend on the entries in table TRKSGRP. On outgoing calls, the values in table TRKSGRP correspond to:

- XMIT 2000, RCV 2000: value THRH
- XMIT 1780, RCV 2000: value TLRH

On incoming calls, the values in table TRKSGRP correspond to:

- RCV 2000, LOOP 2000: value LOOPAROUND
- RCV 2000, XMIT 1780: for the incoming version of TLRH.

Product specific test tools

DS-1 interface card maintenance

You can set up the following DS-1 interface cards in a connection loop when you test carriers:

- NT6X50AA
- NT6X50AB
- NT6X85AA
- NT6X85AB.

These DS-1 Interface cards connect to the P-side of PMs. At the Carrier level of the MAP display, the command LOOP specifies if the test of a carrier includes the card.

When the counts for the Error Second and Severe Error Second exceed the threshold, the carrier is system busy. SB appears under the header STATE. The out-of-service status field increases by one. The increase appears under the header OS. The OS field sets back to 0 when the 24 hour carrier audit occurs. The OS field decreases by one 1 when you manually return the carrier to service. The CARRIER level of the MAP display shows the status displays.

Data table changes

A change to the carrier data for PMs in table CARRMTC does not take effect until the CC updates the PM. Every time you manually or automatically test or return the PM to service, the system makes sure that the data matches. If the data does not match, the CC attempts to update the PM. If the inactive unit of the PM is in service (InSv), the system attempts the update. If the update fails, you can continue to test or return the unit to service. The status of the unit displays as In-Service Trouble (ISTb). If the system does not update the active unit, a return to service or test cannot occur. The status of the unit changes to system busy (SysB).

OM group

OM group DS1CARR increments the activities involving the DS-1 carrier interface cards.

Digital trunk unit (NT4X23) maintenance

You can perform maintenance for a Digital Test Unit (DTU) card (NT4X23AA) that connects to a Maintenance Trunk Module (MTM). Perform maintenance at any TTP level of the MAP display. A DTU is a card with two single trunk circuits. The card is like the Trunk Test Unit (TTU). The system treats the card as a TTU. The TTP subsystem monitors

and maintains the card. Maintenance action on a DTU includes the command LOADFW to load the firmware.

A single DTU card has two logical DTUs, and maintenance actions affect only one DTU at a time. If other DTUs connect to different MTMs, maintenance on the DTUs can occur at the same time. Log TRK106 records errors that occur during DTU maintenance.

DTU status display

The command POST at a TTP sublevel posts a DTU. The TTP display shows the status of the DTU under the headers COM LANG and STA S. For example, DTU-0 and DTU-1 on MTM-0 can have this status:

```
POST  127  DELQ D 4  A 16  BUSYQ  A 59  DIG
TTP  14
 CKT TYPE   PM NO.   COM LANG   STA S R DOT  TE RESULT
 OGT    MTM    0 18 DTU      0  SZD
                                P..MB
                     DTU      1  SZD
```

Data tables for DTUs

You must enter the following tables before you attempt maintenance on a DTU:

- **CLLI** for the CLLI of the DTU
- **TRKGRP** for data on the DTU trunk group
- **TRKSGRP** for data on the DTU trunk subgroup
- **TRKMEM** for data on each DTU

  Note: This type of entry is the same as for a TTU.

Carrier trunk maintenance

General

The Northern Telecom (Nortel) standard DS-1 defines the characteristics of the 24-channel, 1.544 Mb/sec multiplexed carrier system used in the DMS-100 Family system. Each DS-1 channel carries the signaling information of one trunk.

The interface between the DS-1 carrier link and the DMS-100 switch is the DS-1 line card. There are a maximum of five of these line cards in each Digital Carrier Module (DCM). For information on the DCM and DS-1 line card, refer to *Peripheral Modules*, 297-1001-103.

CARRIER level access

Use the CARRIER level to access, check, and perform maintenance on carriers. The TTP level accesses each trunk that corresponds to each channel in the same method as non-carrier trunks. The state of a carrier does not reflect the state of each of the trunks of the carrier.

When you access the CARRIER level, the system performs an automatic check. The system performs this check to make sure that the system knows the state of every carrier. If the system does not know the state, a full audit runs automatically before the level displays. This audit acts as a safety check. This check makes sure that a carrier does not remain in a state that is not known for any longer than permitted. The carrier cannot remain in that state for longer than the 16 minute audit cycle permits.

Posted carrier display

The posted carrier(s) display the following fields:

```
N   CLASS   SITE   pm   CKT   D   ALRM   SLIP   FRME   BER   ES  SES  STATE
```

Information displays for the set of posted carriers, where:

- **N** is 0 to 4 for the number of the carrier.
- **CLASS** displays the function of the carrier, which is one of:
  - — **PROTLN** indicates the carrier is a protline that connects the carrier to an SMS.
  - — **REMOTE** indicates the carrier connects a remote PM.
  - — **TIMING** indicates the carrier performs timing that synchronizes call processing and signaling in subtending PMs.
  - — **TRUNKS** indicates the carrier makes call connections.
- **SITE** is HOST or REM for the class of the carrier, where:
  - — **HOST** indicates a local carrier that connects to the host.
  - — **REM** indicates a remote carrier connected to a PM.
- **pm** is the type of PM that connects to the carrier.
- **CKT** is the circuit number on the PM that connects to the carrier.
- **D** is direction. D specifies either C-side or P-side of the posted carrier.
- **ALRM** is the trunk alarm. If no alarm applies, the field remains blank.
- **SLIP** is the number of times the carrier exceeds the 24 hour threshold for slipping errors.

- **FRME** is the number of times the carrier exceeds the 24 hour threshold for framing errors.
- **BER** is the Bit Error Rate (BER). For DS-1 carriers to XPMs, BER displays as a multiple of 10^{-7}. For example, a BER of 5 in 10,000,000 (5 x 10^{-7}) displays as 5.0.
- **ES** is the quantity of Error Seconds.
- **SES** is the quantity of Severe Error Seconds.

Operational measurements (OM)

The OM subsystem provides measurement and reporting of:

- Local Carrier Group Alarms (LCGA)
- Remote Carrier Group Alarms (RCGA)
- slips
- framing losses
- Bit Error Rate (BER)

The OM subsystem makes these reports every 15 or 30 min, according to the operating company procedures.

The operating company determines maintenance limits (ML) and out-of-service (OS) limits for slip and frame errors. For BER, these limits are fixed as: ML BER = 1.0 X 10- ¿ OS BER = 1.0 X 10- Û

Every 100 s, counters indicate the quantity of carriers that are manual busy or system busy. The system performs exception reporting when a slip, frame, or BER error-count exceeds a defined limit. This limit is a 24 hour maintenance or out-of-service limit. The system generates a log report to record the information. The system can accumulate 15 or 30 minute measurements to provide 24 hour reports. The *Operational Measurements Reference Manual* describes OMs.

When the system reaches an out-of-service limit, you can:

- remove the involved DS-1 from service, or
- let the DS-1 remain in service

For both occurrences, the system generates a log report to indicate that the system reached the OS limit. If you remove the carrier from service, the trunks of the carrier are set in the carrier-fail state.

When a BER OS limit is reached, the Central Control (CC) removes the DS-1 from service. When the condition of the limit clears, the CC returns the carrier to service.

Table 8-4
DS-1 (Carrier) State Code

Code	Heading
INS	The DS-1 is in service. A card is present. No alarms are indicated. You can perform maintenance in the enabled state. A test does not run, and no test request is present. You can use the DS-1 as a timing link.
MB	The DS-1 is manually busy. A card can be present. The DS-1 is out-of-service because of a command, or because a test is about to run from the TTP level. All trunks are busy. You cannot use the DS-1 as a timing link. You can remove the card at any time.
SB	The DS-1 is system busy for of one or more of the following reasons. A local or remote alarm is present. A DCM is busy. You removed a card and the DS-1 is not MB. The DS-1 reached an out-of-service limit and the system removed the DS-1 from service. You cannot use the DS-1 as a timing link.
UNEQ	The DS-1 is unequipped. Trunks are offline. You cannot perform maintenance on this DS-1.

CARRIER level capabilities

The CARRIER level guarantees flexibility in carrier trunk maintenance. This level accesses the four classes of carrier (displayed under the header CLASS):

- carriers that serve trunks (displayed next to the header TRUNKS)
- carriers that link remote PMs (displayed next to the header REMOTE)
- function as timing links (displayed next to the header TIMING)
- those serving as protection lines (displayed next to the header PROTL)

The CARRIER level display the Central-Side Busy (CBSY) and the Peripheral-Side Busy (PBSY) status codes. These codes indicate if either side of the carrier is in service.

The system busy (SysB) state divides into: Temporary (SysB-T) and Permanent (SysB-P). If the system places the carrier temporarily out-of-service (SysB-T), the carrier remains in this state until:

- the carrier audit does not detect a persisting alarm
- the PMs on both sides of the carrier report that all alarms cleared
- you manually return the carrier to service correctly

Note: If the system places the carrier permanently out-of-service, (SysB-P), the carrier remains SysB-P until you manually return the carrier to service.

The system places a carrier out-of-service in response to an alarm. The system returns the carrier to service when you clear the alarm condition. If the alarms occur often, the carrier changes between the two states. A counter increases each time you return the carrier to service by command RTS within an audit. The counter resets for the next audit. If the count exceeds the maintenance limit (RTSML), a warning displays at the MAP display. If the count exceeds the out-of-service limit (RTSOL), the system places the carrier SysB-P. When a carrier is SysB-P, you must manually return the carrier to service.

When you enter and post carriers with different PCM types in the same PM, the system groups carriers into post sets by PCM type. The system displays the sets in order on the MAP display. You can also post sets by PCM type.

Digital test access (DTA)

The digital test access (DTA) facility applies to offices equipped with PCM-30 digital voice/data carriers. The DTA provides testing of digital trunks on these carriers.

The system provides DTA over digital jack-ended trunks. You can locate the trunks at the MAP display. The trunks connect to the PMs through digital links that terminate on the NT6X55BA/CA interface card.

Carrier maintenance and MMI is the same as for other carriers. Carrier maintenance and MMI includes diagnostics and alarm clearing.

Common channel signaling

Common Channel Signaling is a system that uses separate circuits for voice and signaling transmission between switching offices. The Common Channel Signaling network contains the voice network, and the signaling network. The voice network is a series of trunks used in voice and data transmission. The signaling network is a series of signaling links which include:

- error check and control functions
- a transmission link, which is a trunk dedicated to transmission of signaling data.

Common Channel Signaling networks can be one of the following types:

- CCIS6 - Common Channel Interoffice Signaling 6
- CCITT6 - CCITT Signaling System 6

- CCS7 - Common Channel Signaling 7

CCIS6 trunks maintenance

Maintain CCIS6 trunks from the C6TTP level. Displays and commands are in Chapter 6, ‘‘Trunks User Interface Commands.”

Maintain signaling links from the CCS level (refer to *DMS-100 Family Commands Reference Manual*,297-1001-822). To maintain the transmission links, use the commands available at the TTP level. To identify the transmission links, use the CCS level.

CCITT6 trunks maintenance

Maintain CCITT6 trunks from the N6TTP level of the MAP display. Chapter 6, ‘‘Trunks User Interface Commands.” gives detailed descriptions of displays and commands.

Maintain signaling links at the CCS level (refer to *DMS-100 Family Commands Reference Manual*, 297-1001-821). To maintain the transmission links use commands available at the TTP level. To identify the transmission links, use the CCS level.

CCS7 trunks maintenance

Maintain CCS7 trunks from the TTP, MONITOR, MANUAL, and C7TTP levels. The following restrictions apply:

- At all MAP display levels for trunks, command TST supports the following tests:
  - T100 T108
  - T101 TCON
  - T102 TCOT
  - T104 ICOT
  - T105
- The system supports the T100, T101, T102, T104, T105, and T108 tests for ISUP trunks.
- The system supports the T100, T101, T102, ICOT, and ATME-2 tests for telephone user part (TUP) trunks.
- The DMS-300 switches support the T100, T101, and T102 tests for Australian telephone user part (ATUP) trunks.

  Automatic trunk testing (ATT) does not support the test codes ICOT, TCON, and TCOT.

- At the TTP level, the command LEVEL supports access to the MONITOR, MANUAL, and C7TTP sublevels.
- The MONITOR sublevel does not support the command CPOS.
- The MANUAL sublevel does not support the commands SGN1 and CALLTRF.

Maintain signaling links from the CCS level (refer to the *DMS-100 Family Commands Reference Manual*, 297-1001-822). To maintain the transmission links, use the commands available at the TTP level. To identify the transmission links, use the CCS levels.

DMS-100G switch trunks

DMS-100G trunks are maintained from the ATT level of the MAP display. The following limitations apply:

- At all MAP display levels for DMS-100G trunks, command TST supports the following tests:
  - T100
  - T102

Note: The T101 testline is not used with the TST command. It is used by the OP command or when operating company personnel initiate a call on the 101 headset.

A message “Invalid request” is displayed if an attempt is made to schedule an automatic test type (ATT) for an unscheduled DMS-100G trunk.

If you enter an invalid test type for a DMS-100G based trunk, the system generates a list of correct test types at the ATT level.

Converting PTS trunks into ISUP trunks

If you have feature package NTX875, the system can convert Per Trunk Signaling (PTS) trunks into ISDN User Part (ISUP) trunks. This conversion occurs after you set up data table TKCVDATA. The conversion updates the data tables TRKMEM and C7TRKMEM. If you edit table TKCVDATA you can plan how to group and rename trunks.

The trunks are out-of-service during the conversion. Signaling System 7 (SS7) uses the ISUP trunks.

Datafilling table TKCVDATA

Split the trunk group into two records when you enter data into table TKCVDATA, if the PTS (old) trunk group is large. The system can convert the old trunk group while the whole trunk group is in service. During the entry process, the Circuit Identification Code (CIC) for each trunk must be the same at the end offices. For all SS7 trunks in an office, the CIC must be different for every Destination Point Code (DPC). If the external trunk numbers are not the same at the end offices, the difference complicates the entry process.

To determine the CIC assigned to a ISUP trunk X, use the following formula:

cic(X) = (ext_num(X) + trk_cic) -n_strt mem

where

cic	is the CIC for trunk member X.
ext_num	is the external number for a trunk member X in the new trunk group.
trk_cic	are the CICs for the set of new trunks that start with this cic.
n_strt_mem	is the external trunk number to assign to the set of new trunks, to start at this value.

Note: These values correspond to entries in table TKCVDATA

To determine the CIC value, the system uses the external trunk number of the new group. This value makes sure that the external trunk numbers of the new group are the same at the end offices.

If PTS trunks that do not have entries are present in the record, they transfer to the new trunk group. The system does not use all CICs. To avoid the holes in the assigned CICs, construct the records to contain only entered trunks.

Enter the records so that the CICs are the same for the trunks at the end offices. The entry process does not have problems if the external numbers are the same for the trunks at the end offices.

Data verification before conversion

The following data checks are run during the entry of data and before the command CONV runs:

- both trunk group CLLIs are for correct trunk groups
- the two trunk group CLLIs are not the same
- the corresponding subgroup tuples are present in table TRKSGRP for the ISUP trunk group in the PTS trunk group
- the PTS trunk specified by the value in the field OSTRTMEM of table TKCVDATA is present (Perform this check if you will not attempt command CONV again.)
- the PTS trunk specified by the value in the field OLASTMEM of table TKCVDATA is present (Perform this check if you will not attempt command CONV again.)
- the PTS trunks are on an XPM (for example, DTC). Table LTCINV specifies the XPM as SS7 peripherals. The set of entered ISUP trunks is not present, but is a set of acceptable trunk members. (Perform this check if you will not attempt command CONV again.)
- the CIC for each ISUP trunk is not already used, but each is a valid CIC. (Perform this check if you will not attempt command CONV again.)

Standard table control performs the following verifications:

- PTS trunk group CLLI is present
- ISUP trunk group CLLI is present
- the value of TRKCIC is within the correct range
- the selector is CIC.

In summary, there is no verification of the overlay of ranges between records. That is, there is no cross verification between PTS and ISUP

datafill. You can perform this verification manually after you add all the entries to table TKCVDATA.

The ISUP trunks retain the subgroup information after the conversion. Each ISUP trunk remains in the same subgroup the trunk was in when the trunk was a PTS trunk. The data in each record specifies a block of PTS trunks for conversion.

Procedure for the conversion process

After you enter table TKCVDATA for the process, one person in one of the controlling offices must perform the conversion process. The person must have access to a remote MAP display to the other offices involved.

WARNING

Trunk Conversion-Static Data Mismatch

Do not perform a manual warm swact before you perform a trunk conversion. Turn REX off or perform the table control changes outside of the REX window. If you do not follow this procedure, the inactive unit will not receive static data because of the warm swact.

Print hardcopies of data tables TRKMEM and C7TRKMEM before the conversion process starts. Hardcopies make sure that you have a backup of the information in case the command UNDO cannot reverse the process.

Offices involved in the conversion process must perform the following steps.

1 Check that the office has datafill for SS7 signaling (refer to data schementera section of *Translations Guide*). If the SS7 datafill is not present, do datafill in the following tables:

   — C7NETWRK

   — C7LKSET

   — C7LINK

   — C7RTESET

   — IPMLINV

   — LTCINV (to update the opt_attr field as a SS7 PM).

2 Determine if the ISUP trunk group data is present. If the data is not present:

   — add entry to table TRKGRP

   — add entry to table TRKSGRP

— add entries to table ISUPDEST

— add TRANSLATION/ROUTING data for the new ISUP trunk group.

3 Select a block of trunks from a PTS trunk group for conversion. Check with the other office for the choices.

4 Add this block of PTS trunks to table TKCVDATA. Different data verifications occur before you can add this entry to the table. An example of a verification is to check that all the PTS trunks reside on a #7 DTC.

5 At the MAP display, the header CSTATUS has the value INITIAL in the TRKCONV status display.

6 Repeat steps 3 - 5 for additional blocks of trunks.

7 Access the TRKCONV level of the MAP display. Chapter 6, ‘‘Trunks user interface commands” describes the TRKCONV level.

8 To post the record selected by both offices, use the command CVPOST (described in chapter 6, ‘‘Trunks user interface commands”).

9 To post the record selected by both offices, use the command CVPOST (described in chapter 6, ‘‘Trunks user interface commands”). The posted record at both offices must contain the same trunks.

10 To change the state of all the PTS trunks to offline (INB), enter the command CVBSY INB. Chapter 6, ‘‘Trunks user interface commands” describes the command CVBSY INB. The system generates logs to record which trunks did not change to INB. The trunks must be INB before you can continue.

If any of the trunks are in the CPB state:

— Wait for the trunks to IDLE. To take them offline, use the command CVBSY INB.

— Go to the next record in the posted set. Post the PTS trunks again that are not offline.

— Divide the posted set so that the set contains fewer records and isolate the CPB trunks from the set.

— Make sure that the other offices have made the trunks INB for the same set of trunks.

11 When all the trunks in the posted records are in the INB state, you can start the conversion process. To start the conversion process, use the command CONV. The conversion status changes to INITIAL while data verifications occur. When the verifications pass, the status changes to RUNNING and the conversion starts.

The result of the conversion appears as COMPLETE or FAILURE. If the conversion status is FAILURE, the conversion did not convert some of the PTS trunks. The system generates logs to record these trunks.

If the conversion status is COMPLETE, the conversion converted all of the PTS trunks.

12 Make sure that the other offices convert the same set of trunks.

13 Use the information supplied by the logs to correct the data in the records before you continue. You must post the trunks again that failed the conversion. You must repeat the conversion process for these trunks.

14 For switches other than DMS switches, prepare the trunks to allow continuity tests to run.

For DMS switches, enter the command CVBSY MB to change the state of the ISUP trunks from INB to MB. You can perform continuity tests on outgoing trunks in the Manual Busy (MB) or Idle states.

Perform the following procedure at the office that contains the outgoing or two-way trunks:

1 Inform the other office that the continuity test will start soon. To start the test, use the command CVCOT.

If the system generates logs because of the continuity tests, correct the errors in all offices before you continue.

a. After you correct the errors, run the command CVCOT again. When CVCOT completes correctly, return to service the ISUP trunks. To return to service the ISUP trunks, use the command CVRTS. Inform the other offices to return to service the associated ISUP trunks.

b. To complete the conversion for the record, check the performance of the ISUP trunks.

Failure conditions for the PTS to ISUP conversion

The command CVCOT generates responses that indicate if the trunk conversion is complete. The system generates logs to record that the conversion is not complete. If the responses to the command CVCOT indicate that the conversion is not complete, choose one of the following:

- To reverse the conversion process to fix the errors, use the command UNDO. Enter the command UNDO only if:
  - — the PTS trunk group data continues to be present. An example of this data is the hardcopies of the contents of the tables TRKMEM, C7TRKMEM, and TKCVDATA.

— the conversion status is not set to LOCKED because of the command RCLLI.

Note: The command UNDO deletes the ISUP trunks from tables C7TRKMEM and TRKMEM, and adds the PTS trunks to table TRKMEM.

- If a restart occurs during the conversion process, you can lose data. If you cannot recover the data with the software, you must correct the errors manually. To correct the errors manually, use the hardcopies of the contents of the tables.

Restarts during the conversion process

A restart can occur at any time during the conversion process. The recovery from a restart depends on the stage in the process at which the restart occurs. Header CSTATUS of the TRKCONV status display shows the stages of the process as values. The following describes the values and the recovery from a restart.

RUNNING

Changes to FAILURE after the restart.

If the switch boots again with the last office image, apply the journal file. The application of the journal file restores the switch to the earlier status of the switch. If the journal file restores the conversion status to RUNNING, the software changes the status to FAILURE. After a restart while the process is in progress (RUNNING), wait until the restart stabilizes before you continue with the conversion process.

If a restart occurs before the journal file records the record, you must start the process again.

If a restart occurs while the commands CONV or UNDO are RUNNING, you must correct the differences manually. Correct the differences manually if the software cannot perform the correction.

A restart can occur between the two stages of the command UNDO. In the first stage, UNDO deletes a PTS trunk from TRKMEM. In the second stage, UNDO adds the corresponding ISUP trunk to tables C7TRKMEM or TRKMEM. If a restart occurs between the two stages, you must restore the PTS data to attempt the conversion again.

COMPLETE

Automatically changes to INITIAL after the restart if the command CVCOT is in progress. The trunk status also changes to INI, which means the trunks are available for call processing. You can change the trunk states back to MB by the command CVBSY. You can attempt the continuity tests run by the command CVCOT again.
If a restart occurs during execution of the commands CVPOST, CVBSY, or CVRTS, you can enter the command again.

If a restart occurs when you enter the command CVBSY, the trunks in the MB state change to INI. The other trunks remain in the state they were in before the restart. In this condition, you can enter the command CVBSY again.

Note: If you enter HX at a MAP display, the command can cause the status of the record to change to RUNNING. To correct the status to process the record, you must perform a restart.

Renaming the ISUP trunk CLLI to the old PTS CLLI

When the conversion completes correctly, you can give the ISUP trunks the old CLLIs of the PTS trunks. The command to rename trunk group CLLIs is RCLLI at the TRKCONV level.

Note: After the command RCLLI renames ISUP CLLI, you cannot use the command UNDO to reverse the conversion.

The RCLLI renames trunks if:

- the PTS trunk group does not have any additional members and the trunk group data continues to be present
- the system finds a temporary CLLI to replace the CLLI while the names change. All the records that contain the PTS or the ISUP CLLI change, and the status of the records becomes LOCKED. The status displays under the header CSTATUS at the TRKCONV display
- the system removes all the translations for the renamed PTS trunk group
- the system removes all the trunk group data for the renamed PTS trunk group

Connecting ISUP trunks with PBX trunks

If you have feature package NTX167, the following trunk maintenance abilities apply to ISUP trunks.

- You can connect ISUP trunks with Private Branch Exchange (PBX) trunks.

- You can connect ISUP trunks with Plain Ordinary Telephone Service (POTS) lines.
- You can test ISUP trunks.
  - — at the C7TTP level of the MAP display with these tests: ICOT, T100, T101, T102, T104, T105, T108, and ROTL.
  - — with entries in tables TRKSGRP, LTCINV, TSTLCONT, and TLNOS.

Screening of subscribers

If you have subscriber screening, the operating company allows Centrex subscribers to operate and maintain their own trunks. This operation and maintenance does not affect trunks that belong to other subscribers or to the operating company. Feature packages NTX427AA and NTX412CA have subscriber screening. The operating company designates trunks as property of a subscriber through entries in tables OWNER, CDCLOGON, and DATAOWNER.

The operating company provides the subscriber with a MAP display to perform trunk maintenance. The MAP display shows the system status headers. The MAP display does not display the status indicators that associate with the headers. The exception is for the TRKS subsystem header. The status display for the TRKS subsystem displays only the status of the trunks that the subscriber owns. The subscriber cannot see the state of the system the operating company owns.

The subscriber can view only trunks the subscriber owns. If the subscriber attempts to view any other trunks, the response TEST ACCESS DENIED displays. If you screen subscribers, you prevent access for the subscribers to MAP display levels that are not authorized.

Toll break-in for international software

If you have feature package NTX492, Toll Break In (TBI) for International software simulates a TBI condition and tests a TBI signal. The command TBI at the TTP level of the MAP display starts the test.

Setting up trunks to allow TBI

TBI applies to trunks that support the TBI signal. To determine which trunks support the signal, check data table TRKSGRP for the index LNSIGSYS. You must datafill these trunks as operator trunks at the far-end office. To datafill these trunks as operator trunks, use value OPR.

Setting up trunks to use TBI

Establish trunks for TBI at the MANUAL level of the MAP display. The assembly requires a three-port conference circuit for each TBI call. Establish the assembly as follows:

1 At the MANUAL sublevel of the TTP level, post the outgoing trunk that supports the TBI signal. To connect the headset to the posted trunk, use the command HSET.

2 The next action depends on the the entry of field ALERCTL of table TRKSGRP as TERM or ORIG.

TERM

To transmit the digits of the subscriber, use the command OP. According to the line state (idle or busy), the sounds that the caller and the subscriber hear are different.

IDLE

The subscriber receives physical ringing and the caller hears audible ringing automatically. You do not need the command TBI.

BUSY

The caller hears a busy tone through the headset. You can use the command TBI, to make the outgoing trunk send a TBI signal through the facility. The trunk sends the signal to a subscriber call. All three parties hear the Break In tone. If the subscriber disconnects, the subscriber receives physical ringing and the caller receives audible ringing.

ORIG

To transmit the digits of the subscriber, use the command OP. According to the line state (idle or busy), the sounds that the caller and the subscriber hear are different.

IDLE

The circuit makes a connection. Physical ringing to the subscriber and audible ringing to the caller does not occur. You can use the command TBI. The command TBI causes the subscriber to receive physical ringing and the caller to receive audible ringing.

BUSY

The caller hears the busy tone over the headset. You can use the command TBI. The command TBI makes the outgoing trunk send a TBI signal through the facility to a subscriber call. All three parties hear the Break In tone. If the subscriber disconnects when the subscriber hears the TBI tone, the caller must use the command TBI. The command TBI starts physical ringing to the subscriber and audible ringing to the caller.

If the subscriber ignores the TBI signal for the duration of time specified, the caller receives the tone to order again. The field TBI_OPR_TIMEOUT of table OFCVAR specifies the duration.

Interactions of TBI with other features

TBI interacts with the following features as indicated. The following list shows the features in alphabetical order by code or title.

- Abbreviated Dialing (ADL): TBI does not affect this feature.
- Automatic Number Identification (ANI): TBI does not affect this feature.
- Call Diversion Features (CDIV, CDA, CDB, CDF, CDO, CDS): TBI does not divert operator trunks. TBI gives the trunks normal busy treatment. This action allows TBI to come before all Call Diversion features.
- Cancel Call Waiting (CCW): TBI does not interact with this feature. The feature accepts a TBI attempt.
- Coin lines (Coin): this feature denies TBI for calls between offices if the subscriber is the originator of a coin call. The feature denies TBI for calls within the office, if either of the parties is the originator of a coin call.
- Call Waiting (CWT): this feature denies TBI when active. The feature denies CWT if TBI occurs.
- Do Not Disturb (DND): this feature gives operator trunks normal busy treatment so that TBI comes before DND.
- Denied Origination (DOR): TBI does not affect this feature.
- Denied Features (DTM, PLP, SUS): the feature denies TBI if the subscriber affected by TBI denies termination.
- DIGITONE (DGT) lines: this feature is compatible with TBI.
- Dial Pulse (DP) lines: this feature is compatible with TBI.
- Essential Lines (ELN): this feature is compatible with TBI.
- Feature Denied (FDN): TBI does not affect the completion of a toll call.
- Free Number Terminating (FNT): For calls between offices, the other end must answer the call for TBI to occur. This condition occurs only if the subscriber is the terminating party with FNT active. For calls within the office, the other end must answer the call for TBI to occur.
- Hot Line (HTL): TBI does not affect this feature.
- Hunt Groups (CIR, DLH, DNH, MLH, SHU): these features come before TBI. If all lines are busy, the pilot receives TBI.
- International Call Recording (ICR): TBI does not affect this feature.

- International Line Restrictions (ILR): ILR restrictions affect only outgoing calls. Toll calls can complete.
- No Double Connect (INDC): when active, this feature denies TBI.
- Malicious Call Trace (MCT): this feature comes before TBI if the call is in the conference state. The conference state occurs when the operator does not activate ringing on either party.
- Subscriber Premise Meter (SPM): this feature denies TBI for calls between offices and calls within an office. The feature denies TBI if the subscriber is the originator of the call and SPM is active.
- Toll Break In (TBI): when in progress, this feature denies a subsequent TBI.
- Wake-Up Call: when in progress, this feature denies TBI.
- Warm Line (WLN): TBI does not affect this feature.
- Three Way Calling (3WC): when active on a call, this feature denies TBI. The TBI caller receives the treatment to order again.
- Six Way Calling (6WC): when active on a call, this feature denies TBI. The TBI caller receives the treatment to order again..

Circuit multiplication equipment and TASI-B

Time assignment speech interpolation - type B (TASI-B) is a group control. The TASI-B allows you to establish more calls over long distance circuits than the number of wires allows. To perform this assembly, multiplex the voice channels of analog or digital trunks.

You can use TASI-B with both analog circuit multiplication equipment (CME) and digital circuit multiplication equipment (DCME). The CME/DCME for the DMS-300 is a dynamic load control unit (DLC). You can use a maximum of 60 DLC on one DMS-300.

The TASI-B is compatible with completely compelled signaling techniques like N5 signaling. The R1 and R2 signaling that transmits over digital links can use speech interpolation if the interface is implemented correctly.

How TASI-B works

The TASI-B works as follows. Long distance transmission systems use four-wire trunk circuits. Each pair of wires is a channel, or one-way speech path. Voice frequencies transmit in one direction on one channel and in the opposite direction on the other. Each channel is idle for approximately half of the time while one party talks and the other one listens. A TASI-B system assigns a talker to an available bearer circuit (logical circuit) for the duration of the speech burst. A speech burst is also called a talk spurt. The system can use the bearer circuit in the other direction for another conversation.

When the talker pauses, another conversation switches to this bearer circuit. When the talker starts to talk again, the system finds the next available bearer circuit and connects the conversation again.

The DMS-300 monitors signals to make sure heavy traffic does not affect speech quality. The absence of enough available bearer circuits during heavy traffic can affect speech quality. During heavy traffic, the DMS-300 blocks the start of calls on TASI trunks, but does not interfere with calls in progress.

TASI is automatically active, but you can list or remove the TASI manually at the GRPCTRL level of the MAP display.

DLC unit, TASI-B trunks, and interface cards

TASI equipment interfaces with the DMS-300 through the dynamic load control (DLC). The DLC supports a maximum of 16 TASI-only trunks and a maximum of 16 TASI-and-through trunks. The TASI-only trunks are available when the TASI-B system is in service. The TASI-and-through trunks are available even when the TASI-B system is out-of-service.

The DLC and the TASI terminal exchange messages to control or restrict new traffic. This traffic originates on one of the trunk types.

Controlling the TASI-B interface

Datafill entries control the operation of a TASI-B interface. You must datafill the TASI-B trunks in tables CLLI and CLLIMTCE.

You can make modifications to the operation of a TASI-B interface at the MAP display. Make the changes through the trunk test position (TTP) and network management (NWM) commands.

Troubleshooting chart

The following problem solving chart provides operating company personnel with easy access to problem solving procedures for trunks subsystem alarms. Table 9-1 describes the alarm status codes that can appear in the display banner at the top of the MAP display. Table 9-2 describes some of the trouble conditions that can appear at the top of the MAP display. *Alarm and Performance Monitoring Procedures*, and *Trouble Locating and Clearing Procedures* provide more complete problem solving methods for trunks.

Table 9-1
Trunks alarm clearing

Alarm condition	Possible cause	Action
Critical	The number of circuits out of service in a minimum of one group exceeds the critical alarm level for the group(s). Take immediate maintenance action.	Refer to *Alarm and Performance Monitoring Procedures*.
	The set of circuits in EX, MB, and SB states exceeds the set level.	Refer to *Trouble isolation and Clearing Procedures*.
Major	The number of circuits out of service in a minimum of one group exceeds the Major alarm level for the group(s). The number does not exceed the Critical alarm level. The number of circuits out of service severely affects service. The trunks require quick maintenance action.	Refer to *Alarm and Performance Monitoring Procedures*.

—continued—

Table 9-1
Trunks alarm clearing (continued)

Alarm condition	Possible cause	Action
Major (continued)	The set of circuits in EX, MB, and SB states exceeds the set level, but not the Critical alarm level.	Refer to *Trouble Locating and Clearing Procedures*.
Minor (blank)	A minor alarm occurs when an indication is present in the second line. The number of circuits out of service in a minimum of one group exceeds the Minor alarm level for the group(s). The number does not exceed the major alarm level. The number of circuits out of service can affect traffic under heavy load conditions. When no alarm condition is present, a dot (.) is present on the second line. No alarm condition is present when the system is completely in service.	Refer to *Alarm and Performance Monitoring Procedures*.
	The set of circuits in EX, MB, and SB states exceeds the set level, but not the Critical alarm level.	Refer to *Trouble Locating and Clearing Procedures*.
—end—		

Table 9-2
Trunks trouble locating

Trouble condition	Possible cause	Action
EX	Out of service condition of circuits in the group is External Busy (Most Serious External Busy).	Refer to *Trouble Locating and Clearing Procedures*.
MB	Out of service condition of circuits in the group is Manual Busy (Most Serious Manual Busy).	Refer to *Trouble Locating and Clearing Procedures*.
SB	Out of service condition of circuits in the group is System Busy (Most Serious System Busy).	Refer to *Trouble Locating and Clearing Procedures*.

Advanced troubleshooting procedures

There are no advanced problem solving procedures that associate with the Trunks subsystem.

Task list

There is no task list.

Advanced problem locating procedures

There are no problem isolation procedures.

Powering up trunks

There are no procedures to power up trunks.

Powering down trunks

There are no procedures to power down trunks.

Common procedures

There are no common procedures.

List of terms

ADTC

Austrian-digital trunk controller.

AIM

Analog interface module.

ANI

Automatic number identification.

ATME

Automatic-transmission measuring equipment, automatic trunk maintenance equipment.

ATMS

Automatic-transmission measuring system.

ATT

Automatic trunk testing.

Austrian-digital trunk controller (ADTC)

A PCM-30 digital trunk controller (DTC) adapted for use by Austrian Northern Telecom licensees. *Refer to also* digital trunk controller.

automatic number identification

A service that allows the operator to enter the calling number manually.

automatic-transmission measuring equipment (ATME)

Equipment that makes transmission measurements on circuits that terminate on long distance switching centers.

automatic-transmission measuring system (ATMS)

A system that tests the transmission ability of trunk circuits and reports the results.

automatic trunk testing (ATT)

Hardware and software that provides automatic tests for outgoing trunks and the outgoing sections of two-way trunks.

batch change supplement (BCS)

A DMS-100 Group software release.

BCS

batch change supplement.

BERT

Bit error ratio test.

bit error rate test

A test that measures the transmission quality of a loop. The BERT transmits a known bit pattern over a line and compares the reflected signal with the sent signal.

call

In DMS, a request to establish a connection through the switch. Call is also a unit of telephone traffic. Call has the same meaning as cue.

call processing (CP)

The software that handles processes for the establishment of connections through the DMS-100 Group network between calling and called parties.

call processing busy (CPB)

The state in which call processing occurs. Maintenance actions cannot seize the equipment involved.

call processing deload (CPD)

The state when a line is in use by a subscriber, and a maintenance request to busy the equipment is pending. The state changes when the call is complete.

card

A plug in circuit pack that contains components. In DMS switch, card is the name for a printed circuit pack or printed circuit board card.

CARPAC

Carrier pretest and cut over.

carrier pretest and cutover (CARPAC)

A software subsystem that tests a digital carrier and cuts the carrier in to service. The CARPAC cuts over both 30-channel international carriers and 24-channel domestic carriers. The 30-channel international carriers connect into a DMS switch through one of the following:

- an international-digital trunk controller
- an international-line trunk controller
- an international remote cluster controller

The 24-channel domestic carriers connect to a DMS switch through one of the following:

- a digital trunk controller
- a line trunk controller
- a digital carrier module
- a remote cluster controller

CC

Central control

CCS

1. Hundred call seconds. 2. Common channel signaling.

CCS7

Common Channel Signaling 7.

central control (CC)

A part of the NT40 processor that contains the data processing functions with the associated data store (DS) and program store (PS).

central side (C-Side)

The side of a node that faces the central control. C-side contrasts with P-side.

CI

Command interpreter.

circuit pack (CP)

In a DMS-Supernode processor, CP has the following components:

- multiple-layered process control block (PCB)
- through-hole electric components

- back panel connector
- faceplate
- lock latches
- stiffeners

CLLI

Common-language location identifier.

command

1. A control signal. 2. In user interface language, the specification of an expected action or function by the system.

command interpreter (CI)

A component in the Support Operating System (SOS) that functions as the main interface between machine and user. The principle roles of the CI are:

- to read lines entered by a terminal user
- to break each line in to recognizable units
- to analyze the units
- to recognize command items numbers on the input lines
- to activate these commands

common channel signaling (CCS)

A signaling method in which information that relates to many marked messages transmits over a single channel. The information transmits through use of time-division multiplex (TDM) digital techniques.

common channel signaling (CCS7)

A digital message network signaling standard defined by the CCITT. CCS7 separates call signaling information from voice channels so that signaling between offices exchanges over a separate signaling link.

common-language location identifier (CLLI)

A standard identification method for trunk groups in the form:

- **aaaa bb xx yyyy**
- Where:
- aaaa=City code
- bb=Province/state code
- xx=Trunk group identity

- yyy=Trunk number

Refer to short-common-language location identifier.

CP

1. Call processing. 2. circuit pack. 3. control processor.

CPB

Call processing busy.

CPD

Call-processing deload.

C-side

Central side.

DCM

Digital carrier module.

digital carrier module (DCM)

A peripheral module (PM) in a digital carrier equipment (DCE) frame. A DCM provides information and signaling interfaces between a DS30 network port and digital trunks. A DCM has a maximum of five line cards.

digital multiplex system (DMS)

A central office switching system that converts all external signals to digital data and stores the signals in assigned time slots. To perform the switching, the system changes the assignment of the original time slots.

digital trunk controller (DTC)

A peripheral module that connects DS-30 links from the network with digital trunk circuits.

DMS

Digital Multiplex System.

DMS-100 Family switches

A group of digital multiple switch systems. The group includes:

- DMS-100
- DMS-100/200
- DMS-100 switch cluster
- DMS-100 switching network

- DMS-200
- DMS-250
- DMS-300

DTC

Digital trunk controller.

EML

Expected measured loss.

ESMS

Echo-suppressor measuring set.

echo-suppressor measuring set (ESMS)

A test in the Automatic-Transmission Measuring System (ATMS). ESMS measures the return loss of a band-limited white noise signal over a trunk circuit.

expected measured loss (EML)

The expected reading, in decibels, at the test point at one end of a trunk. The system generates the reading when a test point at the other end of the trunk receives a sending power of specified value.

frame

- One complete cycle of events in time-division multiplexing. The frame normally includes a sequence of time-slots for the different channels, and additional bits. The additional bits are used for control or framing.
- A unit of hardware in DMS that normally contains one bay, and can contain two or more functionally-related bays.

HSET

Headset trunk.

head set (HSET)

A card in the trunk module (TM) used in line test position line test access (LTPLTA) test configurations. Also known as 101-communication test line circuit.

IANL

Immediate action noise limit.

IC

Incoming.

IDTC

International digital trunk controller.

ILGC

international line group controller.

ILTC

international line trunk controller.

immediate action noise limit (IANL)

A transmission noise level. When noise levels exceed the IANL, noise levels can affect service and require immediate corrective action.

incoming (IC)

IC refers to the direction of a signal with reference to the described module or unit. An IC signal is on the receive path of the unit. IC contrasts with outgoing.

international digital trunk carrier (IDTC)

A digital trunk controller (DTC) that interfaces between a DMS switch and PCM-30 trunks.

international line group controller (ILGC)

A three-processor line group controller that connects PCM-30 links from the network to international line concentrating modules (ILCM). *Refer to also* line group controller.

international line trunk controller (ILTC)

A peripheral module (PM) that collects the international line group controller (ILGC) and the international digital trunk controller (IDTC). The ILTC provides all the services of both controllers. *Refer to also* line trunk controller.

LCGA

Local carrier group alarm.

LCM

Line concentrating module.

line concentrating module (LCM)

A peripheral module (PM) that connects the line trunk controller (LTC) or line group controller (LGC) and a maximum of 640 subscriber lines. The LCM uses two to six DS30A links in its connections. *Refer to also* international line concentrating module.

LTC

1. Line trunk controller. 2. Local test cabinet.

line trunk controller (LTC)

A peripheral module (PM) that collects the line group controller (LGC) and the digital trunk controller (DTC). The LTC provides all of the services offered by both controllers. The LTC supports the line concentrating module (LCM) and AB trunks. *Refer to also* international line trunk controller.

local carrier group alarm (LCGA)

A fault that indicates that the carrier detects an excess of bipolar violations (BPV) or frame loss. A minor alarm is 25 percent of the group. A major alarm is 50 percent of the group. A critical alarm is 75 percent of the group.

ManB

Manual busy.

manual busy

A busy state manually imposed on a trunk by operation of a panel control or command entry at a VDU keyboard. Manual busy is the state of a trunk circuit removed from service by this method. *Refer to also* system busy.

man–machine interface (MMI)

See user interface.

maintenance noise limit (MNL)

A transmission noise-level. When noise levels exceed the MNL, noise levels do not affect service. When noise levels exceed the MNL, noise levels require maintenance action.

maintenance trunk module (MTM)

A peripheral module (PM) in a trunk module equipment (TME) frame that has test and service circuit cards. The MTM also has special buses to accommodate test cards for maintenance. The MTM interfaces between the DMS-100 Family digital network and digital or analog test and service circuits.

ManB

Manual busy (MB).

manual busy

A busy state that is manually imposed on a trunk by operating a panel control or entering a command at the keyboard of a VDU. Manual busy is the state of a trunk circuit that has been removed from service in this manner. *See also* system busy.

MAP

Maintenance and administration position. A group of components that provides a user interface between operating company personnel and the DMS-100 Family switches. The interface contains a visual display unit (VDU) and keyboard, a voice communications module, test facilities, and special furniture.

message switch and buffer (MSB)

A peripheral module (PM). DMS-100 Family switches use the MSB and a signaling terminal (ST) to connect to and operate in a common channel signaling environment. The MSB supports the ST. The MSB routes messages received by the ST through the network module (NM) to the digital trunk controller (DTC). The MSB also receives messages sent from the central control (CC). The MSB routes messages from the CC through the ST to the signaling link (SL). A different configuration of the MSB is present for each of the two protocols used to implement common channel signaling. *Refer to also* message switch and buffer 6, message switch and buffer 7.

MMI

man-machine interface. Preferred term is user interface.

MNL

Maintenance noise limit.

MSB

Make set busy; message switch and buffer.

MTM

Maintenance trunk module.

NM

Network module.

NMS

Noise measuring set.

Northern telecom (NT)

A part of the corporate structure that contains Bell-Northern Research, Bell Canada, and Northern Telecom Ltd.

Northern telecom publication (NTP)

A document that contains information about DMS-100 Family hardware and software modules and procedures to test and maintain the system. These documents are part of the standard documentation package provided to an operating company.

NT

Northern Telecom.

NTP

Northern Telecom Publication.

OG

Outgoing.

OM

Operational Measurements.

OOS

Out of service.

operational measurements (OM)

The hardware and software resources of the DMS-100 Family switches that control the collection and display of operation system measurements. The OM subsystem organizes the measurement data and manages the transfer of the data to displays and records. Maintenance, traffic, accounting, and equipment decisions use the OM data.

outgoing (OG)

OG refers to the direction of a signal with reference to the described module or unit. An OG signal is on the transmit path of the unit. OG contrasts with incoming.

out of service (OOS)

An equipment state in which either operating company personnel (manually) or the system (automatically) removes equipment from service.

PCM

Pulse code modulation.

PCM-30 digital trunk controller (PDTC)

A digital trunk interface that has the hardware configuration of an international-digital trunk controller (IDTC). The PDTC runs the software of a digital trunk controller (DTC).

PCM level meter (PLM)

A test circuit card in the maintenance trunk module (MTM). The test circuit card measures the equivalent analog level of pulse code modulated information or tone samples.

PCM-30 line group controller (PLGC)

A line group controller that has the hardware configuration of an international-line group controller, and runs the software of a line group controller.

PDTC

PCM-30 digital trunk controller.

PEC

Product engineering code.

peripheral module (PM)

A generic term that refers to all hardware modules in the DMS-100 Family switches. These hardware modules interface with external line, trunk, or service facilities. A PM contains peripheral processors (PP) that perform local routines. The PPs relieve the load on the CPU.

peripheral side (P-side)

The side of a node that faces away from the central control and toward the peripheral modules. *Refer to also* central side.

per trunk signaling (PTS)

A standard telephony method of signaling that multiplexes the control signal of a call with voice or data over the same trunk.

PLGC

PCM30 line group controller.

PLM

Pulse code modulation level meter.

PM

Peripheral module.

product engineering code (PEC)

An eight-character identifier for each hardware item that Northern Telecom manufactures.

P-side

Peripheral side.

PTS

Per trunk signal.

RCC

Remote cluster controller.

RCS

Remote concentrator SLC-96.

remote cluster controller (RCC)

A two-shelf peripheral module that provides a master controller for all units at the remote switching center. The host line trunk controller controls the RCC.

remote concentrator SLC-96 (RCS)

A peripheral module that provides remote subscriber loop concentration for an SLC-96 subscriber carrier system. The RCS supports a maximum of 96 subscriber lines over two to four DS-1 links.

remote line module (RLM)

A pair of line modules at a distance. The RLM interfaces between digital carrier modules (DCMs) at the host office and a maximum of 1280 subscriber lines. The interface travels over two eight DS-1 links.

remote operator Number identification (RONI)

The equipment used to bring a remote operator in to the circuit. Remote operators check calling numbers when subscribers direct-dial long distance calls charged on an itemized bill base by CAMA equipment.

RLM

Remote line module.

RONI

Remote operator number identification.

SCLLI

Short common language location identifier.

service trunk module (STM)

A peripheral module (PM) in the DMS-100 Family switches that contains two compact maintenance trunk modules (MTM).

short common language location identifier (SCLLI)

Short version of the CLLI, used in data tables to identify the transmission paths between offices.

SMR

Subscriber carrier module-100 rural.

SMS

Subscriber carrier module-100S.

SMSR

Subscriber carrier module-100S remote.

SMU

Subscriber carrier module-100 urban.

STM

Service trunk module.

subscriber carrier module-100 rural (SMR)

A subscriber carrier module that interfaces between:

- the remote concentrator terminal of a DMS-1 and
- the central office of a DMS-100 Family switch

subscriber carrier module-100S (SMS)

A subscriber carrier module that interfaces between:

- the remote concentrator SLC-96 of an SLC-96 system and
- the central office of a DMS-100 Family switch

subscriber carrier module-100S remote (SMSR)

A subscriber carrier module that interfaces between:

- the remote concentrator SLC-96 of an SLC-96 system and
- a remote switching center

subscriber carrier module-100 urban (SMU)

A subscriber carrier module that interfaces between:

- the remote carrier urban of a DMS-1 and
- the central office of a DMS-100 Family switch

SysB

System busy.

system busy (SysB)

- A busy state automatically imposed by equipment in response to a problem condition.
- The status of trunk circuits that fail the tests that the automatic trunk test facilities perform. The system takes failed trunks out of service and adds the trunks to a list of out-of-service trunks. Operating company personnel can access the list of out-of-service trunks.
- The equipment state that occurs when the central control (CC) removes equipment from normal service.

TAN

Test access network.

TDF

Trunk distribution frame.

test access network (TAN)

A peripheral module. TAN provides metal connections between trunk test positions or test trunks and access buses on special DMS-300 system trunk modules.

test signal generator (TSG)

In a DMS switch, a test circuit card used with the maintenance trunk module (MTM). The TSG provides digital tones for trunk test purposes. You can select different levels and filters under software control.

TM

Trunk module.

transmission test trunk (TTT)

In DMS, the trunk test position uses this facility to provide circuits for loss and noise measurements.

transmission test unit (TTU)

A digital signal processor used to perform transmission measurements on DMS lines and trunks.

trunk distribution frame (TDF)

A distribution frame dedicated to trunk circuits.

trunk module (TM)

A peripheral module (PM), in a trunk module equipment (TME) frame. The TM provides voice and signaling interfaces between a DS30 network port and analog trunks.

trunk test center (TTC)

The part of the MAP terminal used as a trunk test position in a DMS-100 Family office.

trunk test position (TTP)

A MAP terminal equipped to perform trunk-testing.

TSG

Test signal generator.

TTC

Trunk test center.

TTP

Trunk test position.

TTT

Transmission test trunks.

TTU

Transmission test unit.

user interface

The series of commands and responses used by operating company personnel to communicate with the DMS-100 Family system machines. Users interface through the MAP terminal and other input and output devices.

VDU

Visual display unit.

virtual private network (VPN)

A call event that makes use of the public network to support a private numbering plan. The VPN comes with CCITT No. 7 Signaling (N7) user part supplementary services. The DMS-300 integrated services switch unit (ISSU) in a VPN provides tandem access to other national networks.

visual display unit (VDU)

An electronic output device that displays data to a terminal user in the form of a television graphic. In a DMS switch, the VDU is part of the MAP terminal. Along with a keyboard, the VDU provides the main user interface in the DMS-100 Family switches.

VPN

Virtual private network.

XMS-based peripheral module (XPM)

The generic name for XMS peripherals, which use the Motorola 68000 microprocessor. An XPM has two processors in a hot standby configuration. The two processors are a signaling processor and a master processor.

XPM

XMS-based peripheral module.

Northern Telecom Publications Customer Feedback Form

This form provides you with a means of communicating comments and concerns about Northern Telecom publications (NTP). Please return your comments to the address shown on the reverse and include your name and address. For urgent documentation-related issues, use the Documentation Hotlines: 1-800-684-2273 (U.S. only) or 905-452-4588 (Canada/International). To fax comments and supporting information, use the Documentation Hotline fax numbers: 919-481-5854 (U.S. only) or 905-452-5423 (Canada/International).

Please identify this NTP's medium: *Paper*____ *CD*____

Number: 297-1001-595 05.03 *Date:* November 1999 *BCS/Release:* TL10

Use this space for your comments, concerns, or problems encountered
For specific problems, please identify the appropriate page and volume numbers.

If you would like a reply, please provide:

Your name: _____

Address: _____

_____

City, State/ Province: _____ *ZIP/ Postal code:* _____

Phone no.: _____ *Ext.:* _____

If you care to send us a letter, please do so. We always appreciate your comments.

Please fold along dotted lines and tape closed.

northern telecom

NO POSTAGE NECESSARY IF MAILED IN THE UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 1024 DURHAM, NC

POSTAGE WILL BE PAID BY ADDRESSEE

Northern Telecom Inc.
Product Documentation
Department 3423 / 200 PPK
P. O. Box 13010
Research Triangle Park, NC 27709

DMS-100 Family
Trunks
Maintenance Guide

Product Documentation—Dept 3423
Northern Telecom
P.O. Box 13010
RTP, NC 27709–3010
1–800–684–2273
(1–800–NTI–CARE)

© 1993, 1995, 1996, 1997, 1998 1999 Northern Telecom
All rights reserved

NORTHERN TELECOM CONFIDENTIAL: The information contained in this document is the property of Northern Telecom. Except as specifically authorized in writing by Northern Telecom, the holder of this document shall keep the information contained herein confidential and shall protect same in whole or in part from disclosure and dissemination to third parties and use same for evaluation, operation, and maintenance purposes only.

Information is subject to change without notice. Northern Telecom reserves the right to make changes in design or components as progress in engineering and manufacturing may warrant.This equipment has been tested and found to comply with the limits for a Class A digital device pursuant to Part 15 of the FCC Rules, and the radio interference regulations of the Canadian Department of Communications. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at the user's own expense
Allowing this equipment to be operated in such a manner as to not provide for proper answer supervision is a violation of Part 68 of FCC Rules, Docket No. 89-114, 55FR46066
The SL-100 system is certified by the Canadian Standards Association (CSA) with the Nationally Recognized Testing Laboratory (NRTL).
This equipment is capable of providing users with access to interstate providers of operator services through the use of equal access codes. Modifications by aggregators to alter these capabilities is a violation of the Telephone Operator Consumer Service Improvement Act of 1990 and Part 68 of the FCC Rules
DMS, DMS SuperNode, LOGIC, MAP, and NT are trademarks of Northern Telecom.
Publication number: 297-1001-595
Product release: TL10
Document release: Standard 05.03
Date: November 1999
Printed in the United States of America