Critical Release Notice

Publication number: 297-2461-021
Publication release: Standard 05.07

The content of this customer NTP supports the SN06 (DMS) and ISN06 (TDM) software releases.

Bookmarks used in this NTP highlight the changes between the baseline NTP and the current release. The bookmarks provided are color-coded to identify release-specific content changes. NTP volumes that do not contain bookmarks indicate that the baseline NTP remains unchanged and is valid for the current release.

Bookmark Color Legend

Black: Applies to new or modified content for the baseline NTP that is valid through the current release.

Red: Applies to new or modified content for NA017/ISN04 (TDM) that is valid through the current release.

Blue: Applies to new or modified content for NA018 (SN05 DMS)/ISN05 (TDM) that is valid through the current release.

Green: Applies to new or modified content for SN06 (DMS)/ISN06 (TDM) that is valid through the current release.

Attention!
Adobe® Acrobat® Reader ™ 5.0 is required to view bookmarks in color.

Publication History

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Standard release 05.07 for software release SN06 (DMS).

Updates were made to description of subfield L1FLAGS in section “DWS translations ”, “NI000004 NI0 NI-2 DWS (NTXR49AA DWS PRI)”, “Datafilling table TRKSGRP” according to CR Q01112597.

March 2004

Standard release 05.06 for software release SN06 (DMS) and ISN06 (TDM).

Change of phone number from 1-800-684-2273 to 1-877-662-5669, Option 4 + 1.

297-2461-021

DMS-100 Family

DMS SuperNode Dialable Wideband Service

Services Guide

CCM05 Standard 05.05 July 1998

northern telecom

DMS-100 Family

DMS SuperNode Dialable Wideband Service

Services Guide

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December 1995

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CCM05 Standard 05.01

- added new OM group WBTRK in *Maintaining DWS* chapter

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CCM04 Standard 04.01

- removed tables AMATKOPT and CRSFMT from the billing section
- changed the Bellcore AMA billing definition
- changed the example for table TRKGRP to reflect an ISUP ATC trunk group
- made minor miscellaneous changes

September 1994

LEC002, CDN002, LET002 Standard 03.02

- re–released due to technical problem with front cover

September 1994

LEC002, CDN002, LET002 Standard 03.01

- information from the *DMS SuperNode Dialable Wideband Service Product Guide*, 297-2461-010, was transferred to the services guide

- information on narrowband blocking was added to the *Planning and engineering DWS* chapter
- the translations section was modified to reflect functionalities and functional groups
- a TRAVER reflecting private network dialing capability was added to the *NI000004 NI0 NI-2 DWS (NTXR49AA DWS PRI)* chapter
- the DWS network configuration illustration was modified
- logs WB106, WB107, WB108, and WB109 were added
- information on OMs was modified in the *Administering DWS* chapter
- the *Understanding DWS* chapter was modified according to subject matter expert advice
- the field BLOCKNB was added to the datafill tables for TRKGRP
- references were changed to reflect the new numbering system for NTPs
- the list of terms was taken out
- an index was added

September 1993

BCS36 and up Preliminary 02.01 added miscellaneous modifications

June 1993

BCS35 and up Standard 01.04 updated peripheral information

March 1993

BCS35 Standard 01.03 added document change notice

Contents

About this document

When to use this document

This document provides an overview of Dialable Wideband Service. It is intended to assist personnel who are involved in the planning, engineering, administration, or maintenance of Dialable Wideband Service. In addition to providing a general description of the service and some possible applications, it includes sections on the service's functional architecture, as well as its hardware and software components. A list of other relevant documentation is also provided.

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.

To determine which version of this document applies to the software in your office and how documentation for your product is organized, check the release information in *DMS-10 and DMS-100 Product Documentation Directory,* 297-8991-001.

References in this document

The following documents are referred to in this document:

- *DMS-10 and DMS-100 Product Documentation Directory,* 297-8991-001
- *DMS-100 Family Commands Reference Manual*, 297-1001-822
- *Basic Administration Procedures*, 297-1001-300

- *Peripheral Module Intercept System Test (PMIST) User Guide*, TAM-1001-007
- *C7TU User Guide*, TAM-1001-015
- *BCS35 ISDN Primary Rate UNI Specification (NIS A211-1 Release 5)*
- *T1S1/LB92-08 addendum for multi-rate circuit mode bearer service in T1.113.2, 3 and 4 (Signaling System 7—ISDN User Part)*
- *DMS-100 Family Hardware Description Manual Reference Manual*, 297-8991-805
- *Office Parameters Reference Manual*
- *Log Report Reference Manual*
- *Operational Measurements Reference Manual*
- *Translations Guide*
- *Alarm and Performance Monitoring Procedures*
- *Trouble Locating and Clearing Procedures*
- *Routine Procedures*
- *Card Replacement Procedures*

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.
```

Understanding DWS

This chapter provides a brief introduction to Dialable Wideband Service (DWS).

Dialable Wideband Service on page 1-2 provides a description of the multirate service, including information on the service's benefits and applications.

DWS in the DMS network on page 1-4 provides information on signaling protocols and call routing.

Software requirements on page 1-7 outlines the necessary functionalitites required by DWS.

Software dependencies on page 1-9 discusses the common functionalities required to support DWS capabilities.

Additional software on page 1-10 gives the current optional functionality for DWS.

Dialable Wideband Service

Dialable Wideband Service (DWS) is Northern Telecom's multirate ISDN product. It is a switched service that provides flexible, wideband connectivity in the public-switched telephone network (PSTN). It offers a dialable, real-time switched service that allows the end user to establish network connections with rates from 128 kbit/s to 1.536 Mbit/s in 64-kbit/s increments. Table 1 describes the bandwidth rates available.

Table 1-1 DWS bandwidth rates

Rate multiplier	Bandwidth (kbit/s)
2	128
3	192
4	256
5	320
(HO)	384
7	448
8	512
9	576
10	640
11	704
12	768
13	832
14	896
15	960
16	1024
17	1088
18	1152
19	1216
20	1280
21	1344
22	1408

—continued—

Table 1-1 DWS bandwidth rates (continued)

Rate multiplier	Bandwidth (kbit/s)
23	1472
24 (H11)	1536
—end—	

With DWS, an end user can transmit digital information through the network without having physically hardwired and dedicated resources devoted to the user. The end user simply dials a directory number to establish the wideband connection across the PSTN to any other bandwidth-compatible DWS subscriber. The bandwidth rate is selectable for each call.

DWS is particularly useful for applications that require large continuous bandwidth for a short period of time (minutes or hours). It may also be used for multirate calls requiring longer periods of time.

Benefits

DWS allows the operating companies and carriers to offer their customers the following benefits:

- multirate subscribers can select the desired bandwidth for the call, and dial any other multirate subscriber
- call setup and maintenance is similar to a PRI call
- has standard E.164 numbering plan
- wideband calls are identified on the automatic message accounting (AMA) bill
- public network technology enables sophisticated and efficient applications such as quality videoconferencing, bulk data transfer, and image transmission
- integrated access, narrowband and wideband calls can coexist on the same PRI access facility
- provides increased revenue generation through delivery of high-bandwidth services to customers who previously did not have wideband available
- small and startup businesses can make use of wideband services
- DWS can be provisioned alongside leased lines for additional network capacity at peak periods.

Applications

Some examples of possible DWS applications include:

- video transmission and videoconferencing for applications such as business meetings, distance learning, and remote surveillance
- local area network (LAN) interconnectivity
- high-speed applications such as image processing, bulk order input, inventory, site financials, remote high-quality printing, CAD/CAM, order transaction, medical X-ray/records/search/research
- electronic data interchange (EDI) of large amounts of data or bulk data transfer

DWS in the DMS network

DWS provides local exchange carriers (LEC) with intra-LATA, fractional DS-1 connectivity using CCS7 ISDN user part (ISUP) trunking, and access to customer premise equipment (CPE) through ISDN primary rate interface (PRI). The PRI link uses an extension of standard Q.931 ISDN signaling.

The specific trunk types capable of providing DWS are the primary rate interface (PRI), intertoll (IT), and access-to-carrier ATC trunks. The PRI trunk provides the LEC with customer premises equipment (CPE) access. The ISDN user part (ISUP) IT trunk provides intra-LATA connections between equal access end offices (EAEO) and access tandems (AT). The ATC trunk connects LEC to inter-exchange carrier (IEC) wideband networks when crossing local access and transport area (LATA) boundaries.

Functional group (FG) NI000004 NI0 NI–2 DWS (NTXR49AA DWS PRI), along with functionality NI000023 Intertoll ISUP & SS7 (NTXS28AA DWS Intertoll ISUP), implement DWS for the LEC market. They provide intra-LATA, fractional DS-1 connectivity using Common Channel Signaling (CCS7) ISUP trunking, and access to CPE through ISDN PRI. The PRI link uses an extension of standard Q.931 ISDN signaling. Figure 1-1 shows a typical DWS network configuration with an optional signaling transfer point (STP) – the standard CCS7 configuration in the majority of cases.

Note: National ISDN is an agreement between several ISDN industry carriers and vendors that documents how ISDN is supported across the network. TR-NWT001203 is part of National ISDN-2 and documents how Multi-Rate ISDN (what NT calls Dialable Wideband Service) should be supported. NT's Dialable Wideband Service is highly compliant to the TR-1203 portions of NI-2 as well as TR-NWT-001268.

Functionality NI000028 DWS Carrier Acc (NTXR66AA DWS ATC ISUP) supplies DWS with Access to Carrier (ATC) trunks using Feature Group D (FGD) ISDN user part (ISUP) signaling.

The ISUP IT trunks provide intra-LATA connections between equal access end offices (EAEO) and through access tandems (AT). Together, the functionalities and functional groups provide basic DWS, including access, call control, trunking to an access tandem, and billing records. They also provide operations, administration, and maintenance capabilities. Further information on both can be found in the *DWS translations* chapter of this document.

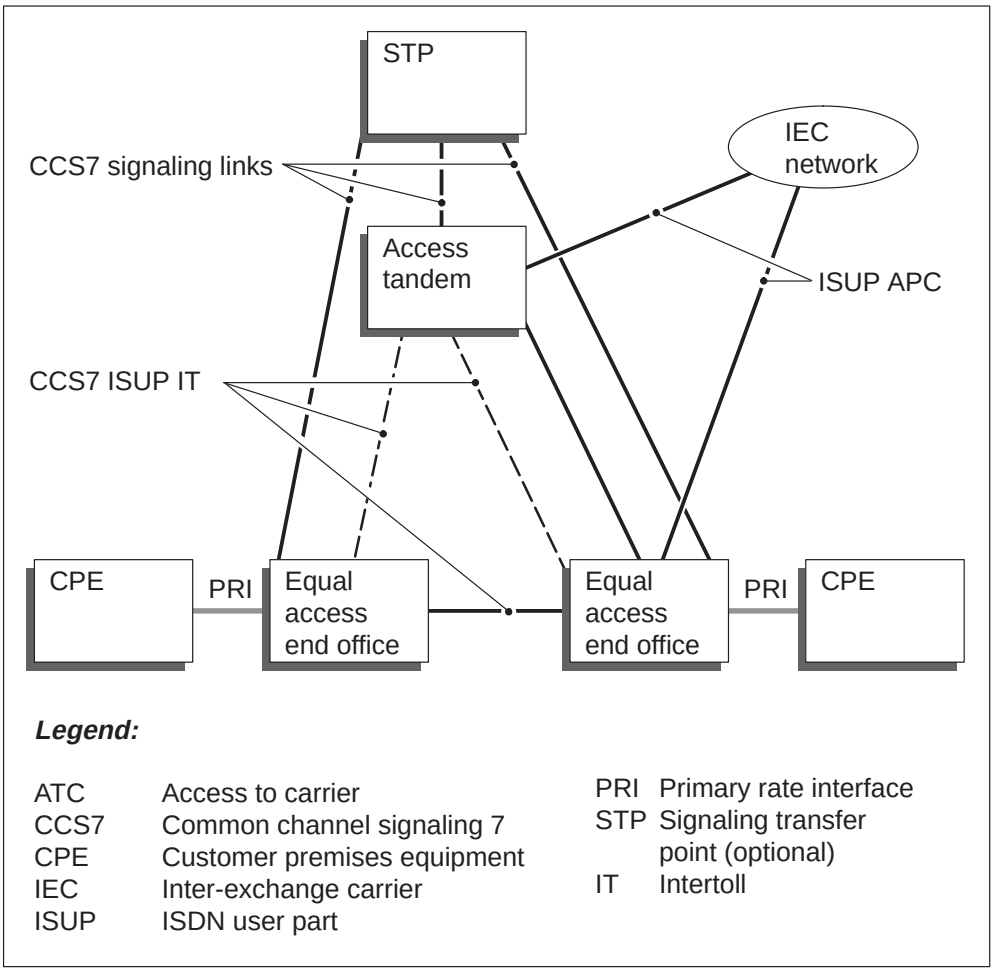
Signaling protocols

DWS uses ISDN primary rate interface (PRI) signaling to establish the user-to-network interface (UNI). For details on PRI signaling, refer to the *Translations Guide*. PRI extensions are documented in *BCS35 ISDN Primary Rate UNI Specification (NIS A211-1 Release 5)*. Extensions to Signaling System 7 (SS7) for DWS are aligned with ANSI T1 extensions proposed in letter ballot *T1S1/LB92-08 addendum for multi-rate circuit mode bearer service in T1.113.2, 3 and 4 (Signaling System 7—ISDN User Part)*.

Signaling internal to the network is based on Common Channel Signaling 7 (CCS7), allowing interoffice DWS connectivity. For full details on CCS7 signaling protocols, refer to the *Translations Guide*.

Figure 1-1 shows DWS signaling protocols and illustrates a typical DWS network configuration, with optional STP.

Figure 1-1 DWS network configuration



Call routing for DWS

DWS is provided to the subscriber through Nx64 signaling extensions to the PRI standards. N is the number of DS0s with a range from 2 to 24. Refer to the *Translations Guide* for full details on call routing through the PRI.

DWS behaves the same as a standard PRI call. The main difference between a PRI call and DWS is that the subscriber, using customer premises equipment (CPE), signals the originating equal access end office (EAEO) to indicate the required bandwidth. All information for a PRI call with DWS is included in the SETUP message.

In most cases, this end office routes the wideband call to the next wideband office in the routing topology (derived from the translations of the called party number) with CCS7 signaling. Each wideband office passes the call along until the wideband office which serves the destination number receives the call and signals the called subscriber. Once connected,

user-to-user communication occurs. The call is terminated when either party hangs up. The called party number, calling party number, call duration and bandwidth allocated for the call are recorded on the automatic message accounting (AMA) tape to allow downstream processing and billing.

Software requirements

The following table lists the basic functional groups and functionalities required for an LEC end office to support DWS capabilities.

Table 1-2 DWS base software

Functional group and functionality code and name	Feature package number and name
NI000004 NI0 NI–2 DWS	NTXS08AA – Enhanced Time Switch
	NTXS25AA – DWS Base
	NTXS26AA – DWS PRI Base
NI000004 NI0 NI–2 DWS	NTXR49AA – DWS PRI
and/or	and/or
NI000023 Intertoll ISUP & SS7	NTXS09AA – DWS SS7 Trunks
	NTXS28AA – DWS Intertoll ISUP
TEL00001 Telecom Layer	NTX142AA – DS-1 64 Kbps Clear Channel Signaling
	NTX143AA – DS-1 Extended Superframe Format

NI000004 NI0 NI-2 DWS

This functional group provides a variety of functions and services formerly described as feature packages. The following list gives the former feature package number and name and describes the function or service.

- NTXS08AA Enhanced Time Switch provides the tracking mechanism for the NTAX78AA circuit card (enhanced time switch).
- NTXS25AA DWS Base provides the base functions for DWS such as trunk selection, datafill, maintenance, channel management, integrity, network management, SWACT support, glare recovery, operational measurements, overload controls, trunk audit, and robustness.
- NTXS26AA DWS PRI Base provides wideband switched services and PRI messaging.

- NTXR49AA Dialable Wideband Service PRI implements DWS for the local exchange carrier (LEC) market according to the current standards. It provides LECs with access to customer premises equipment (CPE) through PRI. This feature package also provides PRI to ISUP intertoll (IT) interworking.

NI000023 DWS Intertoll ISUP & SS7

This functionality provides a variety of functions and services formerly described as feature packages. The following list gives the former feature package number and name and describes the function or service.

- NTXS28AA DWS Intertoll ISUP provides basic DWS service for wideband-dedicated ISUP IT trunks. The IT trunks provide intra-LATA connections between equal access end offices (EAEO) and through access tandems on a DMS-100 switch serving as an LEC.
- NTXS09AA Dialable Wideband Service SS7 Trunks provides basic wideband services for ISDN user part (ISUP) trunks.

TEL00001 Telecom Layer

This functional group provides a variety of functions and services formerly described as feature packages. The following list gives the former feature package number and name and describes the function or service.

- NTX142AA DS-1 Kbps Clear Channel Signaling provides support for clear 64-kbit/s signaling on DS-1 carriers. This package is a prerequisite for NTXS28AA.
- NTX143AA DS-1 Extended Superframe Format provides ongoing measurement of the performance of DS-1 links by way of CRC-6 code without interrupting the data being transmitted.

Software dependencies

The following table lists the common functional groups and functionalities required to support DWS capabilities.

Table 1-3 DWS software dependencies

Functional group and functionality code and name	Feature package number and name
TEL00001 Telecom Layer	NTXE01AA Enhanced Network—Basic
TEL00001 Telecom Layer	NTX041AB CCS7 MTP/SCCP
or	or
TEL00008 TEL CCS7 Base	NTXR72AA CCS7 MTP/SCCP for LPP-based Platforms
NI000022 NI0 ISDN PRI Base	NTX790AC ISDN Primary Rate Access Base
SS700001 SS7 Trunk Signaling	NTX167AB CCS7 Trunk Signaling

TEL00001 Telecom Layer

This functional group provides a variety of functions and services formerly described as feature packages. The following list gives the former feature package number and name and describes the function or service.

- NTXE01AA Enhanced Network—Basic implements the enhanced network (ENET) as a switching matrix subsystem type for DMS SuperNode systems.
- NTX041AB CCS7 MTP/SCCP modifies linkset management and allows for national and international variations of point codes.

TEL00008 TEL CCS7 Base

This functionality, formerly packaged as NTXR72AA CCS7 MTP/SCCP for LPP-based Platforms, provides a message transfer point (MTP) and signaling connection control point (SCCP) for CCS7 on DMS SuperNode systems which are based on link peripheral processors (LPP).

SS700001 SS7 Trunk Signaling

This functionality, formerly packaged as NTX167AB CCS7 Trunk Signaling, provides base CCS7 trunk signaling for use by DWS.

NI000022 NI0 ISDN PRI Base

This functionality, formerly packaged as NTX790AC ISDN Primary Rate Access Base, provides the basic services for ISDN PRI.

Additional software

The following table lists the current optional functionalities for DWS.

Table 1-4 DWS optional software

Functional group and functionality code and name	Feature package number and name
NI000027 DWS Flexible Acc	NTXR65AA Flexible DWS Access
NI000028 DWS Carrier Acc	NTXR66AA DWS ATC ISUP

NI000027 DWS Flexible Acc

This functionality, formerly packaged as NTXR65AA Flexible DWS Access, enhances LEC Dialable Wideband Service by allowing flexible wideband trunk selection on PRI and ISUP trunks.

NI000028 DWS Carrier Acc

This functionality, formerly packaged as NTXR66AA DWS ATC ISUP, implements DWS for Access to Carrier (ATC) trunks on DMS-100/200 and/or DMS-100 switches using Feature Group D (FGD) ISUP signaling. This capability is provided by interfacing wideband PRI trunks to wideband ATC FGD–ISUP trunks, using the Bellcore TR–394 protocol. ATC trunks provide dialable wideband inter–LATA access.

Planning and engineering DWS

Dialable Wideband Service (DWS) provides a multirate, switched service of wideband connectivity. This chapter outlines the requirements for implementing DWS.

Understanding DWS

With DWS, an end user can transmit digital information through the network without having physically hardwired and dedicated resources devoted to the user. The end user simply dials a directory number to establish the wideband connection across the PSTN to any other bandwidth-compatible DWS subscriber. The bandwidth rate is selectable for each call.

For further understanding of DWS, refer to *Understanding DWS* on page 1-1 in this document.

Architecture

This section describes the architecture of the key components of DWS as follows:

Exchange termination illustrates the key DMS SuperNode components required for DWS.

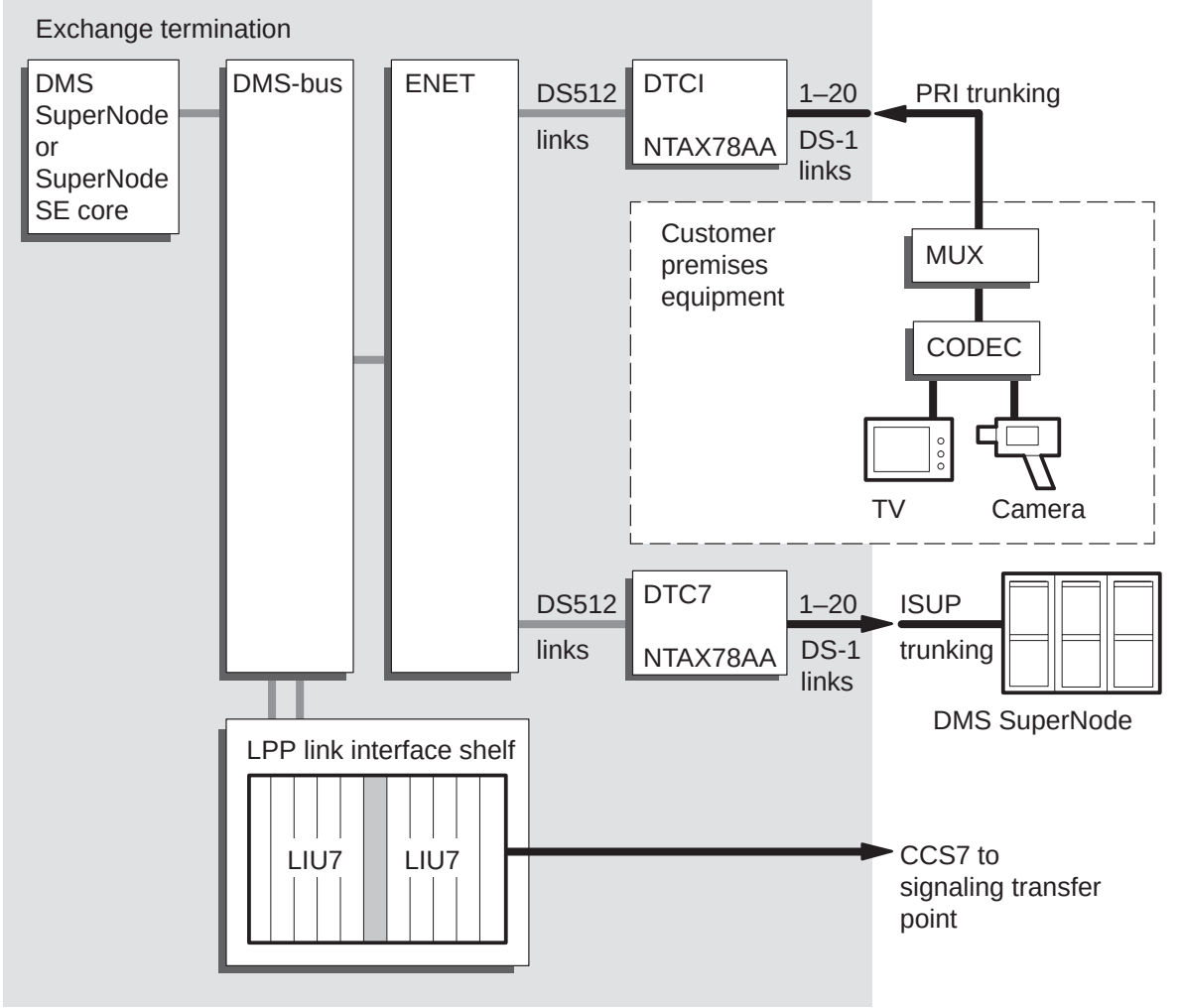
Peripheral equipment describes the peripheral equipment required to provide DWS. Equipment includes the enhanced network (ENET), ISDN digital trunk controller (DTCI), and ISUP digital trunk controller (DTC7).

Exchange termination

The exchange termination is based on standard DMS-100 Family switches, peripherals, and software. Exchange termination routes the DS-0 channels for outgoing and incoming calls through the appropriate peripheral. Signaling internal to the network is based upon Common Channel Signaling System (CCS7) and proposed extensions to these standards to allow interoffice DWS connectivity by way of a CCS7 digital trunk controller (DTC7) and over ISDN user part (ISUP) trunks.

The exchange termination can be configured for a variety of applications, using a combination of peripherals as described in the *Translations Guide*. DWS can be configured using the hardware components shown in figure 2-1. The *Translations Guide* provides full details on DMS SuperNode core components, configurations, frame and shelf layouts, and product engineering codes.

Figure 2-1 DWS system architecture



Legend:

CCS7	Common channel signaling 7	ISUP	ISDN user part
CODEC	coder-decoder	LIU7	CCS7 link interface unit
DTCI	ISDN digital trunk controller	LPP	Link peripheral processor
DTC7	Digital trunk controller 7		

Link peripheral processor (LPP)

The link peripheral processor (LPP) provides Signaling System 7 (SS7) messaging through CCS7 link interface units (LIU7).

Peripheral equipment

The DWS product requires the following switching matrix and peripherals:

- enhanced network (ENET)

- ISDN digital trunk controller (DTCI) and ISUP (CCS7) digital trunk controller (DTC7)

Enhanced network

The enhanced network (ENET) is a nonblocking, junctorless, full availability, single-stage time switch that provides a high performance switching matrix path for voice and data connections, and for peripheral-to-DMS-core messaging. Four ENET configurations are available: the single cabinet 64K (base configuration), the 16K single shelf, the 128K dual cabinet, or the SuperNode combined core (SCC) 16K single shelf version. No modifications are made to ENET configurations for DWS deployment. Refer to the *Translations Guide* for full details on ENET components.

DWS requires the nonblocking architecture of ENET to ensure that the time synchronization associated with a given DWS call (incoming DS-1 through to outgoing DS-1) retains the channel order while passing through the DMS SuperNode switch.

The DTCI connects PRI (T1) trunks using the DS-1 protocol on T1 carriers from the customer's premises to ENET. Wideband trunks are switched through ENET to the outgoing wideband trunks on the DTC7. Both the DTCI and DTC7 peripherals are modified for DWS capability by replacing the existing NT6X44AA (time switch card) housed in slot 14 of a digital trunk controller shelf with an NTAX78AA (enhanced time switch card).

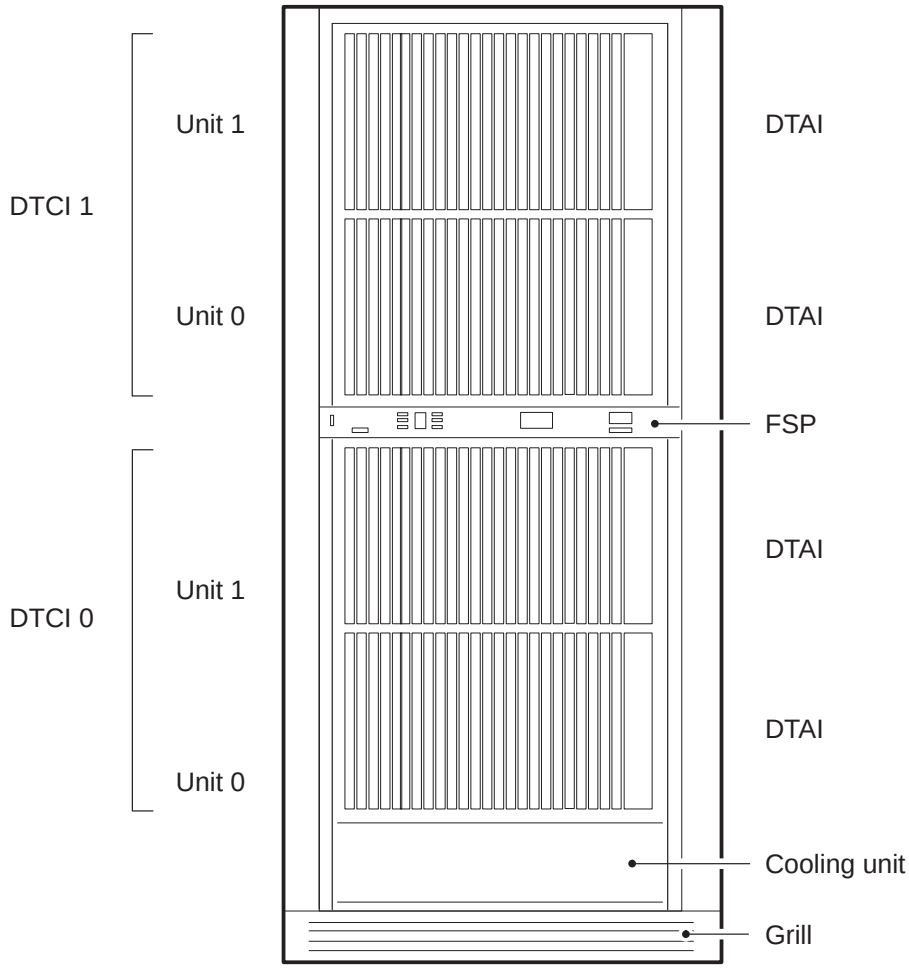
ISDN digital trunk controller and ISUP digital trunk controller

DWS capability is built on the ISDN digital trunk controller (DTCI) and ISUP digital trunk controller (DTC7), both XPM-based peripherals in the existing DMS product family.

A DTCI frame is called an ISDN digital trunk controller equipment frame (DTEI). A DTEI holds two DTCIs, a cooling unit, and a frame supervisory panel (FSP). The DTEI is illustrated in figure 2-2.

Up to five NT6X50AB cards (DS-1 interface) can be installed on each DTCI and DTC7 shelf. The maximum configuration for a DTCI provides up to 10 PRI links in each shelf and up to 20 PRI links in each module. The maximum configuration for a DTC7 would be 20 ISUP links. Both DTCI units are connected to each DS-1 interface.

Figure 2-2 ISDN digital trunk controller equipment frame NT6X01



DTEI 6X01AB

Legend:

DTAI	ISDN digital trunk array
DTCI	ISDN digital trunk controller
DTEI	ISDN digital trunk equipment
FSP	Frame supervisory panel

DTCI configuration

Each DTCI consists of two shelves, unit 0 and unit 1, and should be configured as an XPM PLUS. Refer to table 2-1 on page 2-9 and figure 2-4 on page 2-12 for XPM PLUS. Refer to table 2-2 on page 2-10 and figure 2-6 on page 2-13 for XPM.

Each shelf has the following cards providing C-side and P-side interfaces:

- DS512 interface card (C-side)
- DS-1 interface cards (P-side)

Each shelf also has the following cards providing the DTCI control complex:

- enhanced time switch (ETS) card
- message protocol and tone generator card (MPC)
- formatter (FORM) card
- channel supervision message (CSM) card
- processor cards

The XPM PLUS configuration has the following processor cards:

- enhanced ISDN signaling preprocessor (EISP) card
- unified processor (UP) card

The XPM configuration has the following processor cards:

- ISDN signaling preprocessor (ISP) card
- master processor (MP) card
- MP memory (MPM) card
- signaling processor (SP) card
- SP memory (SPM) card

The DTCI provides duplicate control complexes and interfaces, one in each shelf, and slots for up to 10 DS-1 cards, five in each of the two shelves. During normal operation, one DTCI control complex is active. The other DTCI control complex is on standby, ready to take over if the first one fails. All interfaces are connected to both DTCI control complexes. If an interface fails, all communications are switched automatically to the reserve interface.

DTC7 configuration

The DTC7 is a dual-shelf module with duplicated processors in each shelf that operate in an active and standby mode. Module 0 is located on the lower two shelves of the frame, and module 1 is on the upper two shelves.

Two digital trunk array (DTA) shelves form a DTC. The shelves are arranged in a redundant configuration. Each DTC interfaces a maximum of 480 digital trunk circuits through several types of circuit cards.

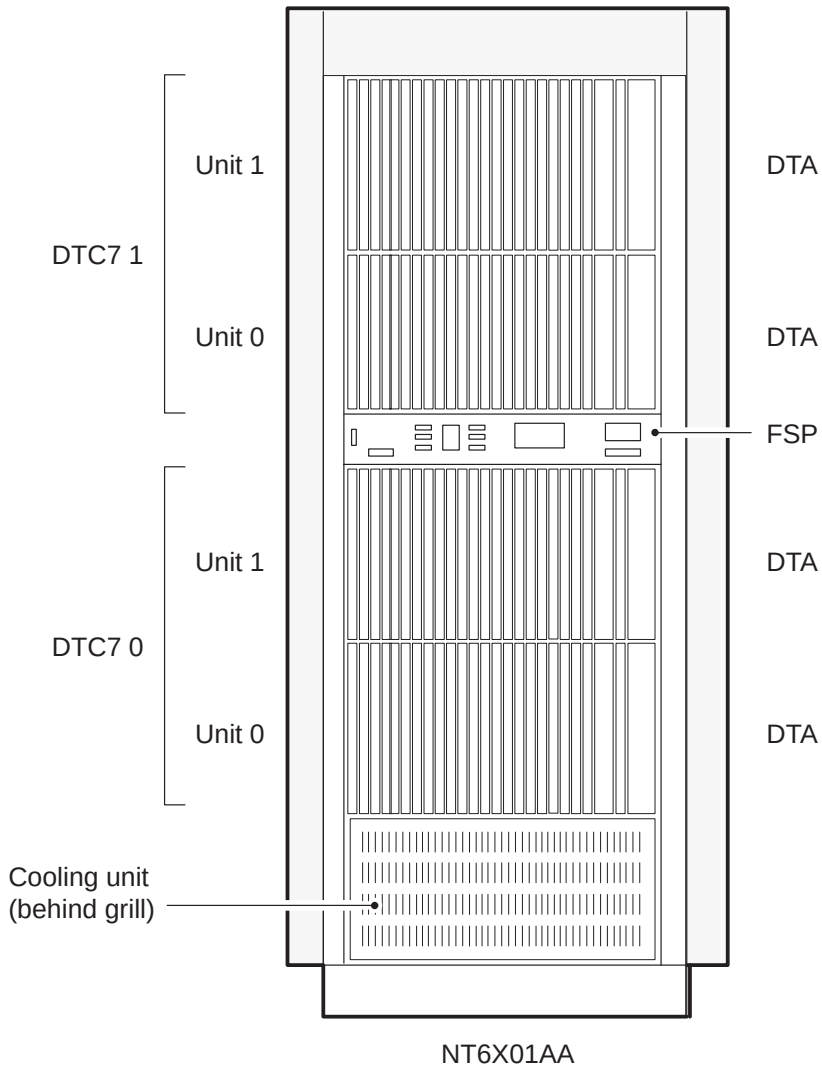
The DTC provides call processing functions that include:

- network message transmission and reception
- time switch control
- channel assignment
- digit collection

The DTC7 frame, called a digital trunk equipment (DTE) frame, is a standard DMS-100 Family equipment frame that houses two dual-shelf modules, an FSP, and a cooling unit. The DTE frame is the office peripheral controller module for digital trunking in a host location. It converts digital speech signals from the 24-channel DS-0 format to the Northern Telecom proprietary 32-channel DS30 format.

The layout of the DTE frame is illustrated in figure 2-3.

Figure 2-3 CCS7 digital trunk controller equipment cabinet NT6X01



Legend:

DTA	Digital trunk array
DTC7	CCS7 digital trunk controller
FSP	Frame supervisory panel

DTCI and DTC7 card product engineering codes

The product engineering codes (PEC) for DTCI and DTC7 cards in an XPM PLUS configuration are listed in table 2-1. The PECs for DTCI and DTC7 in an XPM configuration are listed in table 2-2.

Table 2-1 DTCI and DTC7 card product engineering codes for an XPM PLUS configuration

Slot	Card	PEC	Remarks	CPC	Status
01–05	DS–1	6X50AB	DS-1 interface; two DS-1 links on each card. Provision at least one and up to ten cards in two shelves.	N/A	STD
06–11	——	0X50	Filler faceplate	N/A	STD
12	UP	MX77	Unified processor	N/A	STD
13	——	0X50	Filler faceplate	N/A	STD
14	ETS	AX78	Enhanced time switch	N/A	STD
15	——	0X50	Filler faceplate	N/A	STD
16	EISP	BX01	Enhanced ISDN signaling preprocessor	N/A	STD
17	——	0X50	Filler faceplate	N/A	STD
18	MPC	6X69	Message protocol and tone generator	N/A	STD
19	——	0X50	Filler faceplate	N/A	STD
20	CSM	6X42	Channel supervision message	N/A	STD
21	FORM	6X41	Formatter	N/A	STD
22	DS512	6240	DS512 interface (provision 6X40FA)	N/A	STD
23–24	——	0X50	Filler faceplate	N/A	STD
25–27	PCONV	2X70	Power converter	N/A	STD

Note 1: CPC = common product code applied to products not manufactured by NT
Note 2: STD = a standard offering that is readily available from a number of manufacturers
Note 3: To enable 64-kbit/s unrestricted data capabilities, T1 carriers for both DWS PRI and ISUP must have B8ZS coding. ESF framing is required for DWS PRI and recommended for DWS ISUP. The NT6X50AB T1 interface cards must be used in the DTCI and DTC7. The 6X50AA card is not supported when the NTAX78AA card is present.
Note 4: In the DTC7, slot 13 is filled with a continuity tone detector (COT) card, PEC NT6X70AA.
Note 5: Slot 15 may be provisioned with a universal tone receiver (UTR) card, NT6X92AA.
Note 6: In the DTC7, slot 16 is filled with a filler faceplate.

Table 2-2 DTCI and DTC7 card product engineering codes for an XPM configuration

Slot	Card	PEC	Remarks	CPC	Status
01–05	DS–1	6X50AB	DS-1 interface; two DS-1 links on each card. Provision at least one and up to ten cards in two shelves.	N/A	STD
06–07	——	0X50	Filler faceplate	N/A	STD
08	MP	6X45	Master processor	N/A	STD
09	MPM	6X47	Master processor memory: the 6X47AC card replaces two 6X47AB cards.	N/A	STD
10	——	0X50	Filler faceplate	N/A	STD
11	SPM	6X46	Signaling processor memory	N/A	STD
12	SP	6X45	Signaling processor	N/A	STD
13	——	0X50	Filler faceplate	N/A	STD
14	ETS	AX78	Enhanced time switch	N/A	STD
15	——	0X50	Filler faceplate	N/A	STD
16	ISP	BX01	ISDN signaling preprocessor	N/A	STD
17	——	0X50	Filler faceplate	N/A	STD
18	MPC	6X69	Message protocol and tone generator	N/A	STD
19	——	0X50	Filler faceplate	N/A	STD
20	CSM	6X42	Channel supervision message	N/A	STD
21	FORM	6X41	Formatter	N/A	STD
22	DS512	6X40	DS512 interface (provision 6X40FA)	N/A	STD
23–24	——	0X50	Filler faceplate	N/A	STD
25–27	PCONV	2X70	Power converter	N/A	STD

Note 7: CPC = common product code applied to products not manufactured by NT
Note 8: STD = a standard offering that is readily available from a number of manufacturers
Note 9: To enable 64-kbit/s unrestricted data capabilities, T1 carriers for both DWS PRI and ISUP must have B8ZS coding. ESF framing is required for DWS PRI and recommended for DWS ISUP. The NT6X50AB T1 interface cards must be used in the DTCI and DTC7. The 6X50AA card is not supported when the NTAX78AA card is present.
Note 10: In the DTC7, slot 13 is filled with a continuity tone detector (COT) card, PEC NT6X70AA.
Note 11: Slot 15 may be provisioned with a universal tone receiver (UTR) card, NT6X92AA.
Note 12: In the DTC7, slot 16 is filled with a filler faceplate.

DTCI and DTC7 hardware product engineering codes

The PECs for DTCI and DTC7 hardware, other than cards, are listed in table 2-3.

Table 2-3 DTCI and DTC7 hardware product engineering codes

Equipment	PEC	Remarks	CPC	Status
One ISDN common peripheral controller equipment frame	6X01	Provisioned as a DTEI –NT6X01AA, AB or AD for DTC7 –NT6X01AB or AD for DTCI	N/A	STD
One ISDN common peripheral controller equipment cabinet	RX36	Provisioned as a DTEI –NTRX36AB for DTC7 –NTRX36AB for DTCI	N/A	STD
One ISDN common CP fill for each DTCI module	6X02	The common fill consists of cards required regardless of the number of DS-1 links provisioned.	N/A	STD

Note 13: CPC = common product code applied to products not manufactured by NT
Note 14: STD = a standard offering readily available from a number of manufacturers
Note 15: If the NT6X01AA frame is used for DTC7, some wiring strap additions are required on the backplane when the NTAX78AA circuit card is added.

Physical provisioning guidelines

Both the DTCI and DTC7 peripherals are modified for DWS by replacing the existing NT6X44AA (time switch card) housed in slot 14 of a digital trunk controller shelf with an NTAX78AA (enhanced time switch card).

DTCI and DTC7 card locations

The arrangement of cards in both an XPM PLUS and an XPM configuration is shown on the next two pages. The XPM PLUS uses a UP and an EISP; the XPM uses an MP, SP, MPM, SPM, and an ISP.

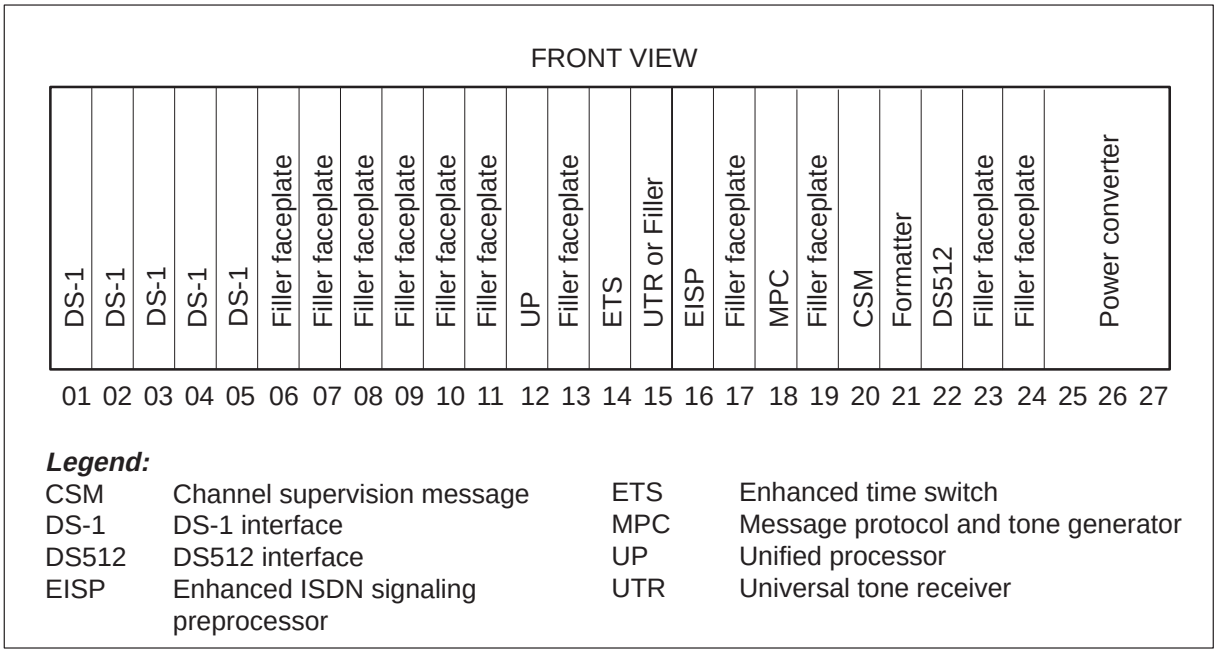
Shelf layouts for an XPM PLUS configuration:

- a DTCI — figure 2-4
- a DTC7 — figure 2-5

Shelf layouts for an XPM configuration:

- a DTCI — figure 2-6
- a DTC7 — figure 2-7

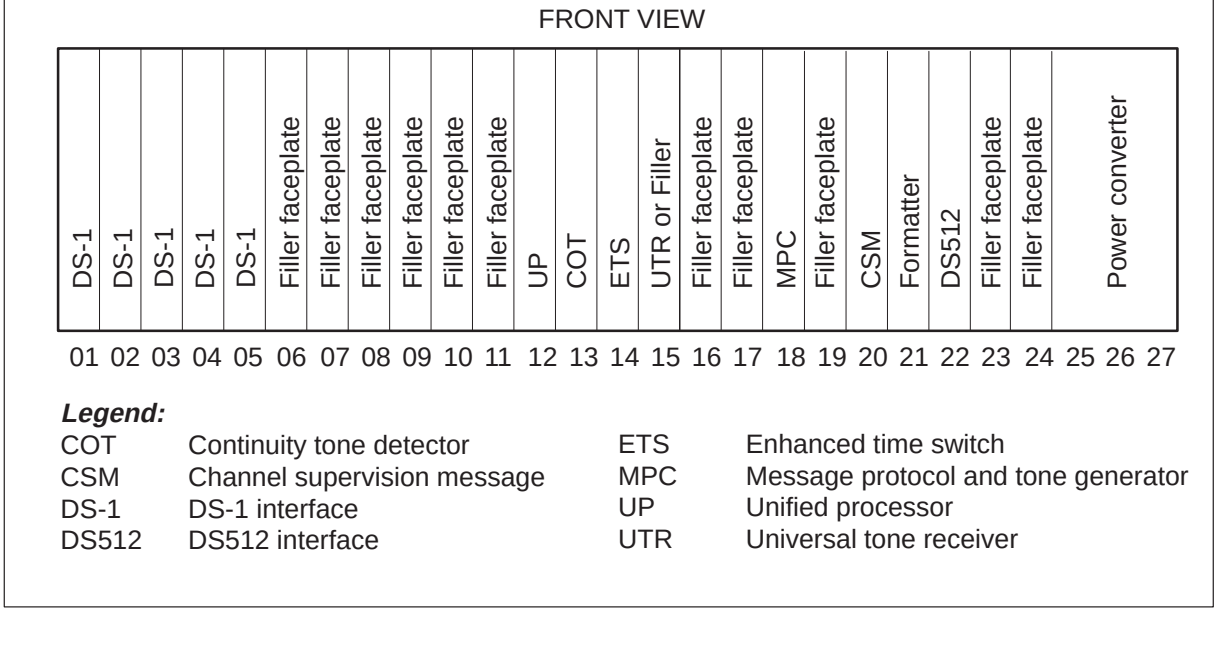
Figure 2-4 DTCI shelf layout for DWS in an XPM PLUS configuration



Legend:

CSM	Channel supervision message	ETS	Enhanced time switch
DS-1	DS-1 interface	MPC	Message protocol and tone generator
DS512	DS512 interface	UP	Unified processor
EISP	Enhanced ISDN signaling preprocessor	UTR	Universal tone receiver

Figure 2-5 DTC7 shelf layout for DWS in an XPM PLUS configuration



Legend:

COT	Continuity tone detector	ETS	Enhanced time switch
CSM	Channel supervision message	MPC	Message protocol and tone generator
DS-1	DS-1 interface	UP	Unified processor
DS512	DS512 interface	UTR	Universal tone receiver

Figure 2-6 DTCI shelf layout for DWS in an XPM configuration

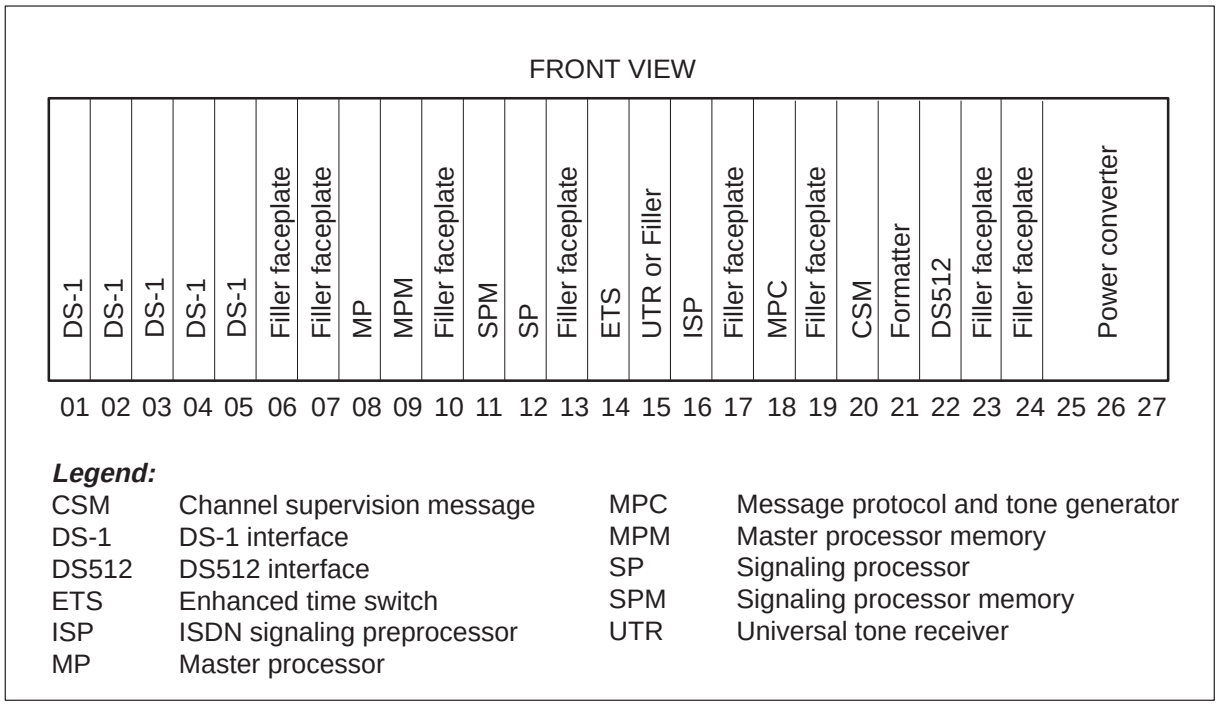
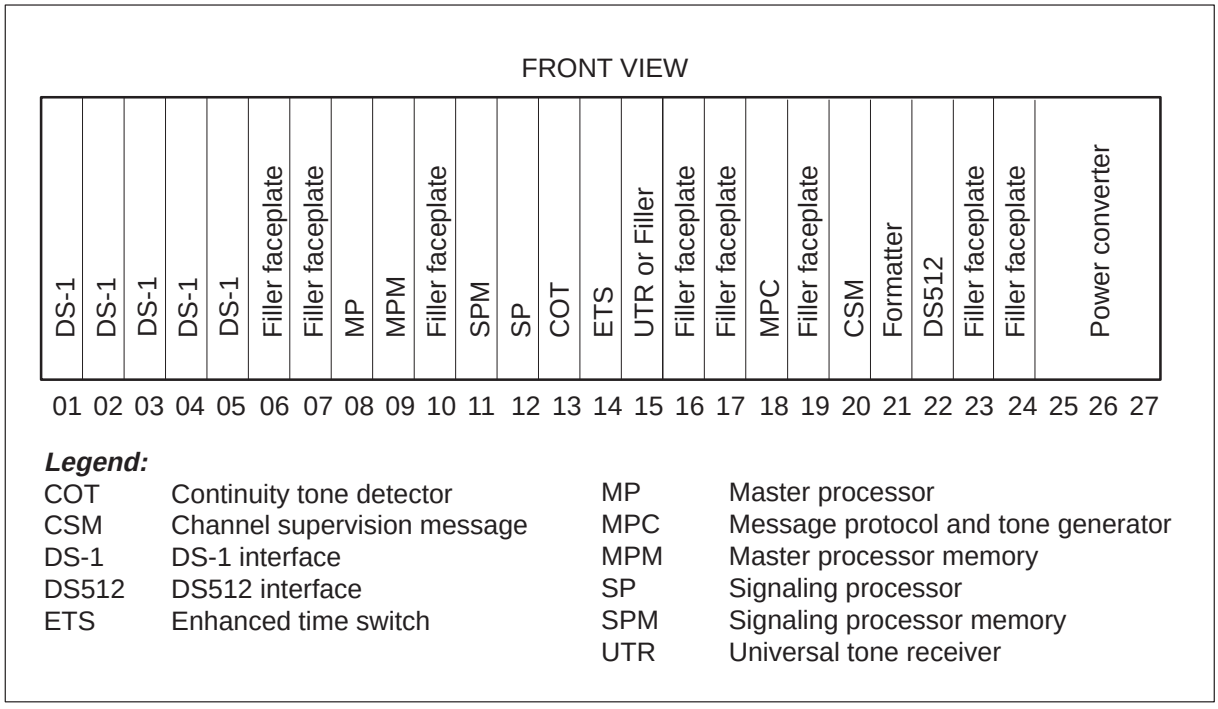


Figure 2-7 DTC7 shelf layout for DWS in an XPM configuration



Enhanced time switch card (NTAX78AA)

The enhanced time switch card provides the following functions:

- time switching of DS-0 samples with constant frame delay
- parallel-to-serial and serial-to-parallel formatting of DS-0 samples
- logic for transmission and reception of DS-1 signaling information to and from the unified processor (UP) or the signaling processor (SP)
- looparound capability for diagnostic purposes

The NTAX78AA circuit card consists of the following functional blocks:

- microprocessor interface
- switching block
- signaling block
- processor (peripheral side) interface block
- peripheral side (P-side) switch matrix block
- control side (C-side) switch matrix block
- three delay blocks
- frame generation block

Figure 2-8 shows the relationship between the functional blocks. Pinouts, descriptions, and timing diagrams for the NTAX78AA circuit card are provided in the *Hardware Description Manual Reference Manual*.

Figure 2-8 NTAX78AA functional blocks

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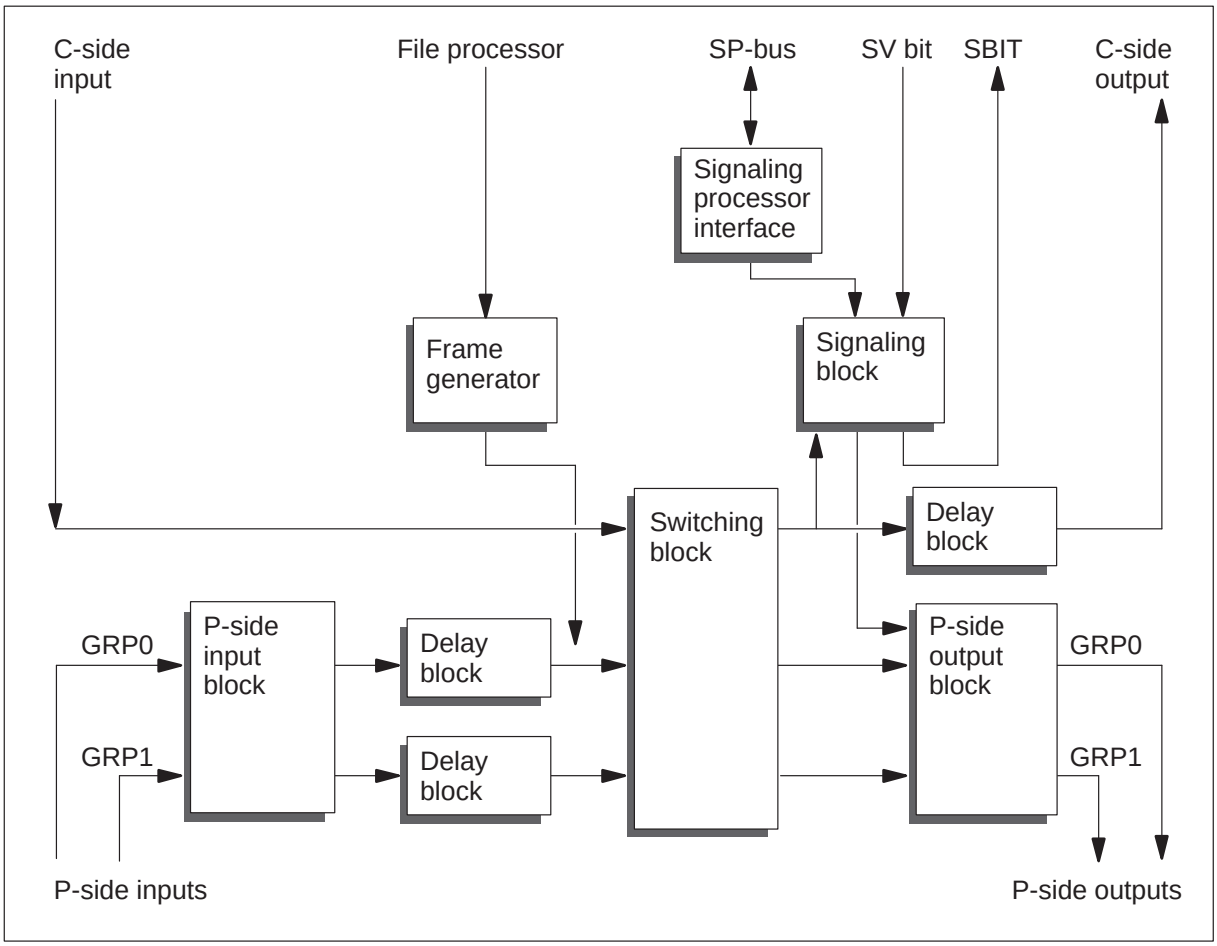


DTCI and DTC7 interface to ENET

The NT6X40AC (DS30 interface card) in slot 22 of a DTCI or DTC7 shelf must be replaced with an NT6X40FA (DS512 interface card) to make better use of ENET ports. To better use the cross-point circuit card with the DS30 speech link interface, most extended peripheral modules must be equipped for a DS512 fiber speech link interface to the enhanced network. Another circuit card, the NT9X45BA, can be used for both copper and fiber links. The DTCI and the DTC7 peripherals can use the fiber connections, while other peripherals such as maintenance trunk modules (MTM) can use the copper links of the card.

For new installations, the peripheral frames are equipped for fiber interface in the factory. In an ENET retrofit office, the mounting bracket and circuit cards can be installed in the field. All existing peripheral modules must have the appropriate messaging circuit cards, if not already equipped. DTC7

frames that are deployed require backplane strapping to accommodate DWS. New DTC7 frames are shipped with straps installed.

Trunk and channel recommendations

The following recommendations for provisioning wideband ports are based on efficient port use:

- All trunk groups which support wideband service may use multiple physical interfaces (for example, DS-1).
- Any physical interface which contains members of a trunk group which supports DWS should be fully used (for example, all 24 channels of a DS-1).
- The first fit trunk selection method should be used to minimize glare on 384- and 1536-kbit/s DWS calls.
- ESF framing is recommended, but not required, for ISUP.

Trunk and channel requirements

The following requirements for provisioning wideband ports are based on efficient port use:

- All channels which make up an instance of a wideband call termination must be located on the same physical carrier facility (DWS calls must be contained within a single DS-1).
- All T1 carriers must have B8ZS coding.
- ESF framing is required for PRI.

Channel type selection guidelines

This section outlines the three types of channel selections available for wideband — fixed, floating, and flexible — and includes restrictions and advantages of each. Narrowband is also supported on these channel selections. For full details, refer to the chapter “DWS translations” on page 3-1 in this document.

Fixed channel selection

The following conditions apply to the fixed channel selection method:

- a call must remain within the boundary of a single T1
- the H0 (384 kbit/s) DWS call starting channel must be one of channel 1, 7, 13, or 19
- only H0 or H11 wideband calls (384 kbit/s or 1.536 Mbit/s) are allowed
- contiguous channels must be selected

Note: With the restrictions of fixed channel selection, there may be times when a wideband call cannot be completed despite having sufficient DS-0 slots available.

Floating channel selection

The following conditions apply to the floating channel selection method:

- a call must remain within the boundary of a single T1
- full nx64 wideband calls are supported (n = 2 to 24)
- contiguous channels must be selected (such as 1 to 6, 2 to 7)

The advantages of floating channel selection over fixed channel selection are as follows:

- floating channel selection can use channels 19 to 23 when the D-channel consumes channel 24 for PRI
- channels can cross the artificial boundaries imposed by the fixed channel selection scheme (such as 1 to 6, 7 to 12)
- by implementing the full nx64 kbit/s range, greater flexibility is provided to end users in determining the appropriate bandwidth for their specific application. With the full nx64 range available on both originating and terminating PRI, no calls are blocked to the called party due to incompatible bandwidth selection (for example, the calling party selects n=12, 768 kbit/s, but the called party is using the fixed channel selection method and can only support n=6 or n=12).
- channel packing algorithms are also used which minimize blocking and maximize overall link efficiency

Note: With the restrictions of floating channel selection, there may be times when a wideband call cannot be completed despite having sufficient DS-0 slots available.

Flexible channel selection

The following conditions apply to the flexible channel selection method:

- a call must remain within the boundary of a single T1
- full nx64 wideband calls are supported (n = 2 to 24)
- noncontiguous channels can be selected

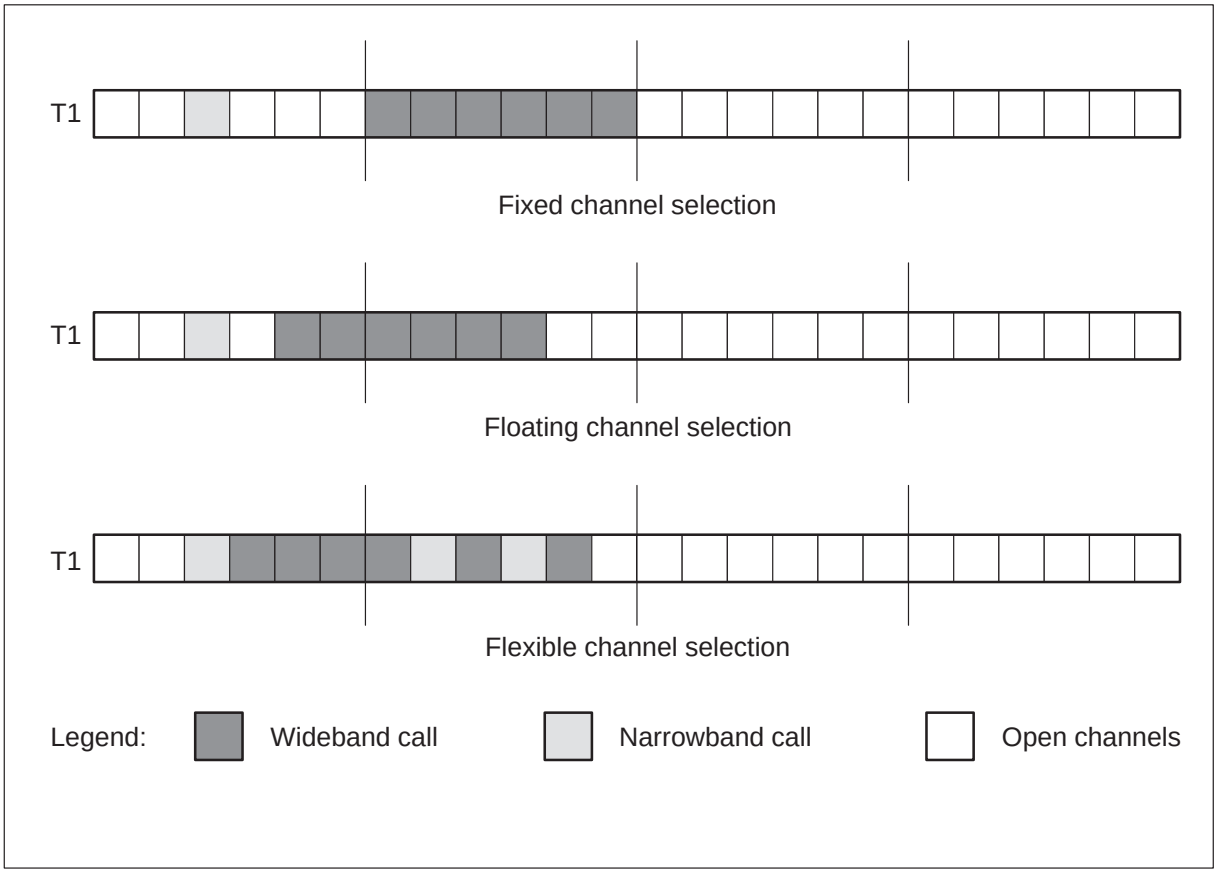
The advantages of flexible channel selection include all the benefits of floating channel selection and the following:

- allows skipping single or multiple channels in use (such as multiple narrowband calls), which prevents the blocking of certain wideband calls, instead utilizing the availability of sufficient channels.

- provides maximum flexibility in unpredictable traffic conditions, as channel packing algorithms can otherwise be thwarted by multiple calls with a long holding time
- provides the most flexibility for DWS trunk groups
- ensures, if there are sufficient DS-0s, that a call will be completed regardless of whether the available DS-0s are contiguous or noncontiguous

Figure 2-9 illustrates the three trunk selection methods.

Figure 2-9 Trunk selection methods for T1 links



Circuit and network provisioning

DWS uses either a BESTFIT or FIRSTFIT trunk selection algorithm to select the group of channels which most closely matches the desired bandwidth. BESTFIT minimizes fragmentation of the DS-1 by allowing the largest group of contiguous channels to remain unused, thus remaining available for large bandwidth calls. It is best used in conjunction with trunk groups that carry narrowband and DWS traffic, are small in size, and are one-way trunks. FIRSTFIT selects the first available channels that satisfy

the call size request. It helps to avoid glare, and should be used as trunk groups grow larger.

Glare occurs when two offices select the same trunk members of a two-way trunk group for two different calls. To reduce glare, priority is assigned for all trunk members to one of the switches. Preference may be given, with trunk group engineering, to the switch which is higher up in the hierarchical network so that terminating traffic is favored. Glare can be completely avoided by using one-way trunk groups in the network.

With fractional DS-1 service, if more than one group of channels satisfy the criteria, the first DS-1 (in order) is selected. The trunk group must specify either ascending or descending sequential selection and must use opposite schemes at adjacent offices to minimize the occurrences of dual seizure. If a DMS SuperNode family switch is connected to central office equipment supplied by another vendor, both systems must be configured so that the same channel selection method — fixed, flexible, or floating — is allowed. The systems are also configured to begin ascending or descending channel selection from opposite ends of the trunk group.

The trunks at both switches connecting the wideband trunk groups must be datafilled to indicate which selection method is supported. If a DMS SuperNode family switch is connected to customer premises equipment (CPE), both the PRI trunk and the CPE equipment must support the same channel selection capabilities, either fixed, flexible, or floating. The CPE termination may need to be configured in table DNROUTE by directory number (DN) — a MUX may not be able to accept the incoming digits.

The selection order of trunks is determined by the route list, the wideband selection sequence, and the trunk selection algorithm. The DMS-100 places the DS-1 links of a trunk group in the order within the trunk group based upon the first trunk member (DS-0) that is datfilled in TRKMEM.

The DS-1 order within a trunk group is not visible in the switch. Since the selection order chosen could be affected if both ends of two-way trunks are not datafilled properly, it is important to enter trunks in the proper sequence to ensure that the order is known. Since each wideband call must be carried within a single DS-1, it is important to ensure that the DS-1 order does not obstruct the ability of traffic managers to monitor and adjust the trunk selection algorithms on wideband trunk groups.

Hardware usage restrictions

The NT6X40AC (DS30 interface card) in slot 22 of a DTCI or DTC7 shelf must be replaced with an NT6X40FA (DS512 interface card) to make better use of ENET ports. To better use the cross-point circuit card with the DS30

speech link interface, most extended peripheral modules should be equipped for a DS512 fiber speech link interface to the enhanced network.

Another circuit card, NT9X45BA, on the ENET side, can be used for both copper and fiber links. The DTCI and DTC7 peripherals can use the fiber connections, while other peripherals such as maintenance trunk modules (MTM) can use the copper links of the card.

To enable 64-kbit/s unrestricted data capabilities for each trunk, T1 carriers for both DWS PRI and DWS ISUP must have B8ZS coding. ESF framing is required for DWS PRI and recommended for DWS ISUP. This requires that NT6X50AB T1 interface cards be used in the DTCI and the DTC7. The NT6X50AA card is not supported when the NTAX78AA card is present.

The following frame versions are available for DTC7 applications of DWS: NT6X01AA, AB or AD, or the cabinet version NTRX36AB. The following frame versions are available for DTCI applications of DWS: NT6X01AB or AD, or the cabinet version NTRX36AB.

For new installations, the peripheral frames are equipped for fiber interface in the factory. In an ENET retrofit office, the mounting bracket and circuit cards can be installed in the field. All existing peripheral modules must have the appropriate messaging circuit cards, if not already equipped.

If the NT6X01AA frame is used for DTC7, some wiring strap additions are required on the backplane when the NTAX78AA circuit card is added.

Hardware dependencies

The NT6X50AA (DS-1 interface card) is not supported when the NTAX78AA (enhanced time switch card) is present. DWS requires both the NTAX78AA and ENET. Provisioning of the NT6X50AB DS-1 interface card is mandatory.

Customer premises equipment

This section illustrates a possible customer premises equipment (CPE) configuration — a DWS application using a multiplexer interface to a central office. While the configuration described below is typical of how multiplexer and videoconferencing equipment can be used to support the DWS user-to-network interface (UNI), many other customer configurations are possible.

DWS application using a multiplexer interface to a central office

Many large offices have a private branch exchange (PBX) for voice services. The most cost-effective method of upgrading for wideband service is to use a multiplexer interface to the PBX as shown in figure 2-10. In this application, the issue of CPE D-channel ownership must be resolved to the

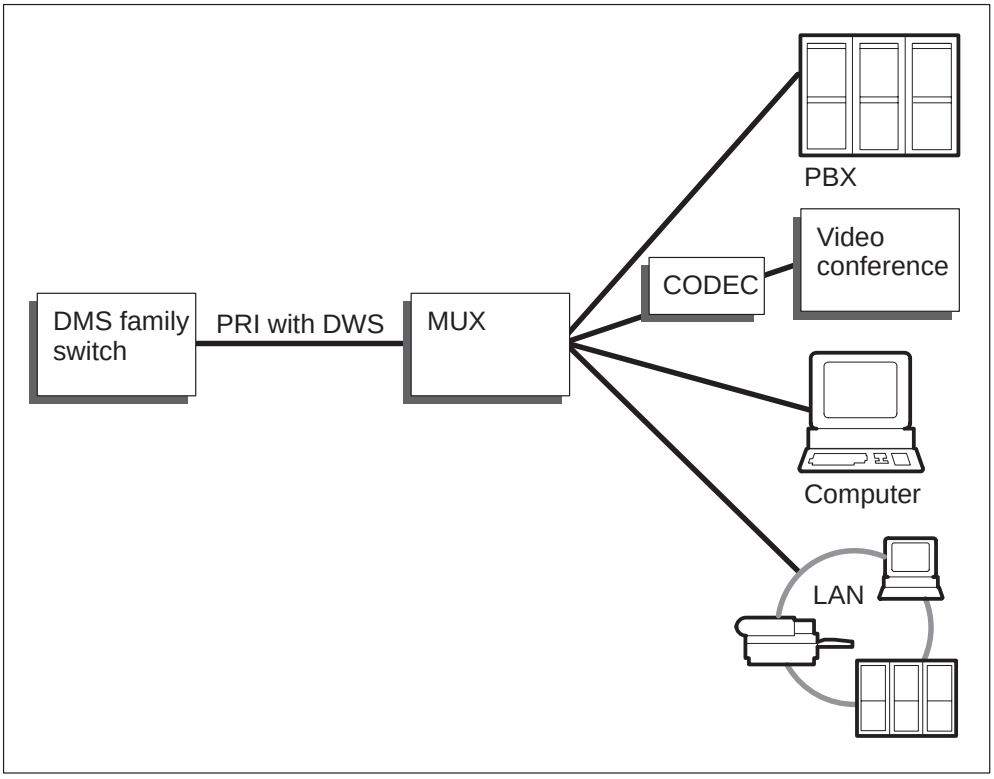
satisfaction of both narrowband and wideband users. It is recommended that multiple T1 links be used when backup D-channels are required.

The following narrowband D-channel services are not available if the multiplexer does not share the D-channel:

- Calling Number Display
- 24B access
- backup D-channel
- multiple calls per DS-1

Figure 2-10 Multiplexer interface to a central office

FW-30662



Sparing

Provisioning guidelines for the DWS product components use the standard sparing algorithms. A minimum of one to one (1:1) is the recommended sparing ratio. However, the actual sparing arrangement is ultimately determined by the operating company.

DWS software

For full details on the software required for the DWS product, refer to the chapter *DWS translations* on page 3-1 in this document, and the *Translations Guide*.

Maintenance impact

Refer to the chapter *Maintaining DWS* on page 5-1 of this document.

Network management

Network management (NWM) provides efficient use of network resources to assist in call completion during abnormal traffic situations. DWS network management, either automatically or manually, measures, monitors, and controls traffic flow in a DMS-100 central office (CO).

The controls used by DWS network management are provided to:

- prevent the spread of traffic overloads
- use all available network circuits
- give priority to the types of traffic with the highest probability of completion

Both the automatic and manual controls involve two approaches:

- a protective control which blocks traffic from reaching the network
- an expansive control which reroutes traffic to other less loaded offices

Automatic controls are triggered by traffic loads exceeding preset thresholds, while manual controls are activated from the MAP (maintenance and administration position) display. Wideband traffic can be monitored and controlled from the NWM level of the MAP display.

Traffic patterns and overflow conditions

Wideband traffic involves video and data applications. The holding time of these applications (2–3 h for videoconferencing) is very different from traditional narrowband applications (2–3 min).

The resulting traffic patterns for wideband trunk groups may be very different from the traffic patterns of a normal narrowband trunk group. Traffic patterns that would be abnormal for narrowband could be quite normal for wideband. Both basic and sophisticated network management principles and added experience will be required in order to know the proper reaction to specific wideband traffic situations.

In normal narrowband traffic situations, the following items may be involved in determining the path narrowband traffic takes through a switch:

- dialed digits
- translations
- bearer capability of the call (voice, restricted digital information, unrestricted digital information)
- route list

Wideband traffic may follow these exact same patterns except that the trunks must be provisioned as wideband trunks. Wideband trunk groups are normally added as the last group in a route list.

A consideration when designing a network is dealing with overflow traffic. Narrowband traffic, using a number of trunks, may traverse wideband trunks. The wideband trunks, which are normally processing the wideband traffic engineered for them, can suddenly be swamped with narrowband traffic, ruining the grade of service for the wideband subscriber.

Bearer capability routing can be used to limit the traffic on wideband trunks by excluding bearer capabilities other than "unrestricted digital information." This effectively excludes voice traffic from overflowing onto the wideband trunks.

Narrowband blocking functionality is available on IT ISUP and ATC ISUP trunks for DMS-100/200. Narrowband calls are prohibited from accessing a particular wideband trunk by entering the option BLOCKNB in table TRKGRP for that trunk. If option BLOCKNB is not entered for a particular wideband trunk, narrowband calls are permitted over that trunk. A narrowband call may originate and terminate in wideband trunk groups only if option BLOCKNB is not entered.

> ***Note:*** Prior to the NA03 release, a narrowband call may originate and terminate in wideband trunk groups only if field BLOCKNB is set to No (N). Narrowband calls are prohibited from accessing a particular wideband trunk by entering Yes (Y) in field BLOCKNB in table TRKGRP for that trunk.

To properly manage wideband traffic, there must be an awareness of wideband offices, the route lists connecting these offices, wideband trunk groups, and any narrowband traffic interactions.

Bearer capability routing for wideband calls

The DMS-100 can route calls based upon the bearer capability (BC) of a call. For example, the DMS-100 can route a call with a voice BC differently than a data call. The three BCs currently supported include voice, restricted

data (switched 56) and unrestricted digital information. NT's DWS implementation categorizes wideband traffic as unrestricted digital information.

This categorization allows the operating company the option of having wideband trunks that carry voice, unrestricted digital and restricted digital traffic or any combination of these BCs on a trunk group. This capability also can work either with or without the narrowband restriction feature. This allows all narrowband traffic or certain types of narrowband traffic (for example, voice) to be kept off of wideband trunks so that wideband traffic could be routed separately. Pages 3–53 and 3–78 describe narrowband restriction datafill procedures.

Network management controls

Network management controls have been designed for a voice-oriented, single-channel telephony environment. There are some differences in how they are used in a wideband environment. Table 2-4 lists the controls which apply to DWS.

Table 2-4 Network management controls

Abbreviation	Control Name
A0CR	automatic out-of-chain reroute
CANF	cancel from
CANT	cancel to
CBK	code blocking
DRE	directional reservation equipment
FRR	flexible reroute
HTRF	hard-to-reach flag
IDOC	internal dynamic overload control
ITB	incoming trunk busy
PPLN	preplanned control
PRE	protection reservation equipment
PRP	preroute peg count
RRTE	reroute control
SKIP	skip control
STR	selective trunk reservation

Automatic out-of-chain reroute

This control provides extended routing when the route has been exhausted. It is applied on a trunk group basis. If this control is applied to a wideband trunk group, it will affect wideband as well as narrowband calls. In order for this to work properly for wideband calls, the extended route list must contain at least one wideband trunk group.

Cancel from

This control diverts the traffic attempted on outgoing or two-way trunks. Calls which are affected are those which are overflowing the trunk group to which the control is applied. This command is supported for DWS calls.

Cancel to

This control limits the traffic attempted on outgoing or two-way trunks. Calls are routed to treatment. This control may be activated on a percentage of alternate routed call or on all alternate routed calls and a percentage of direct routed calls. This command is supported for DWS calls.

Code blocking

This control blocks calls to specified destinations and routes them to treatment. This command is supported for DWS calls.

Directional reservation equipment

This control applies only to two-way trunks. It reserves a number of idle trunks for incoming traffic. Originating traffic is skip-routed (route-advanced) to the next trunk group. This control does not present any problems for narrowband calls on wideband trunks groups. However, for DWS calls, there is the possibility that DWS calls could use some of the reserved trunks for completion.

Flexible reroute

FRR allows a network manager to route traffic without making table changes. This command is supported for DWS calls.

Hard-to-reach flag

This works with STR to flag traffic to specified destinations. This command is supported for DWS calls.

Incoming trunk busy

ITB is a group control that restricts incoming attempts by selectively making busy a percentage of incoming trunks that have the remote-make-busy capability. Trunk groups are defined for remote-make-busy in field REMBSY of table TRKSGRP. This will work properly for both narrowband and wideband calls on wideband trunk groups.

Internal dynamic overload control

IDOC is triggered when an overload threshold is met. This is, in general, on an office level. IDOC causes one of three signal levels to be sent to adjacent switches. Since the detection of the overload is not related to a particular call type, this control will not affect wideband trunks.

Preplanned control

This is also referred to as remote dynamic overload control (RDOC). This control is triggered when a signal is received from an external source, usually another switch. This control has no special affects on wideband calls or wideband trunks.

Preroute peg count

This control pegs OMs for calls made to specified destinations. It does not block calls. This command is supported for DWS calls.

Protection reservation equipment

This is similar to DRE except it is applied only to traffic that has been alternate-routed. For DWS calls, there is the possibility that DWS calls could use some of the reserved trunks for completion.

Reroute control

This control allows a percentage of traffic to be routed to a different route list. This does not affect wideband traffic.

Selective trunk reservation

This control is an extension of DRE and PRE. It blocks destinations defined as hard-to-reach (HTR) codes. This command is supported for DWS calls as long as wideband calls use standard translations.

Skip control

This control limits a percentage of direct routed and a percentage of alternate routed calls offered to selected outgoing trunk groups. It skip-routes (route-advances) a call to the next trunk group in the route list. This control will perform the same way for wideband calls as for narrowband calls as long as there are other wideband trunk groups in the route list.

Restrictions and limitations

Certain restrictions and limitations exist for DWS network management.

- TASI is not supported for wideband trunks groups
- when DRE and PRE controls are in place, it is possible that outgoing wideband calls could use trunks that are reserved as incoming

- any time a wideband call is alternate-routed, a wideband trunk group must be in the alternate route list. Since this restriction cannot be enforced, it is up to the operating company representative to engineer this properly.

Determining service requirements

There are many factors to be considered to determine DWS service requirements. The following sections detail these factors.

Installation considerations

When DWS is installed, the following considerations do not change from the current DMS SuperNode function:

- cabling and wiring
- protection
- bonding and grounding
- synchronization
- external power supply

Data assignment

The following data assignment requirements must be fulfilled when installing the DWS product:

- DWS must be activated for each trunk group as specified in the chapters, *Administering DWS* on page 4-1 and *Maintaining DWS* on page 5-1 of this document.
- Office parameter MAX_NUM_WIDEBAND_CALLS in table OFCENG must specify the maximum number of wideband calls allowed to be active simultaneously. See the section on memory considerations in this chapter.
- To change an existing narrowband trunk group to a WIDEBAND trunk group requires that all trunk group members and trunk subgroup members be deleted.
- Card NTAX78AA must be datafilled in the optional card list (field OPTCARD) of table LTCINV as DCTAX78 for the DTC7 or DTCI peripheral.

Blocking

DWS provides the same blocking characteristics as the existing DMS SuperNode family with ENET. Since ENET is a non-blocking matrix, no wideband traffic engineering is performed on it. All wideband traffic engineering is handled at the trunk level.

Traffic engineering guidelines

Traffic engineering for DWS is a factor of the following:

- number of calls
- bandwidth for each call
- holding time for each call (each bandwidth)
- application of traffic peaks
- forecast of service growth
- network topology

Until sufficient experience is gathered to provide exact traffic engineering guidelines, it is recommended that DWS service be overprovisioned. The following list provides preliminary traffic engineering guidelines:

- Revisit fundamental assumptions for wideband traffic engineering. Many fundamental assumptions, such as holding times, which hold true for narrowband traffic engineering may not necessarily apply to wideband traffic engineering. For example, traditional engineering guidelines assume that narrowband calls have a mean holding time of approximately 3 min. Wideband calls, which are often used for videoconferencing, may have a mean holding time of about 2 h.
- Grade of service objectives should be in the P.01 area or better. Videoconference rooms often must be scheduled by end users and therefore, connectivity to the destination room must have a high probability of completion.
- The channel selection algorithms (fixed, floating, and flexible) may have an impact on the actual carried traffic. As the trunk group size grows, the impact of the channel selection capabilities in general becomes less important, especially if trunk packing algorithms are implemented. Nevertheless, for small trunk groups, the impact of channel selection algorithms can be important and should be monitored for actual blocking results.
- The amount of blocking on a trunk group is proportional to the percentage of wideband calls and the actual values of *n*. For example, when ten active calls use six channels, a total of 60 DS-0 channels are in use. If, however, the ten active calls request 12 channels each, the total number of DS-0 channels in use is 120. The impact on the blocking experienced on trunk groups can quickly become significant if the desired bandwidth begins to shift upwards. It is important to track these trends.

- It is recommended that wideband trunks be placed at the end of the routelist. This keeps narrowband traffic off wideband trunk groups unless all narrowband trunk groups are in use.

  Note: Contact your Northern Telecom account representative for further information.

Firmware requirements

No firmware modifications are required for DWS.

Data store/program store requirements

This section discusses the memory storage requirements of DWS on the DMS-core, DTC7 and DTCI.

DMS-core

DWS requires an estimated 100 kbytes of program store. In addition to this, 460 words of data store are used by each of the two wideband extension blocks allocated for the wideband call (designated by the value of parameter MAX_NUM_WIDEBAND_CALLS in table OFCENG). This value determines the maximum number of simultaneous active wideband calls allowed. For example, to have twenty 1536-kbit/s DWS calls active simultaneously, 20 times 460, or 9200 words of additional data store are required.

DTCI and DTC7

The DWS product for either a DTCI or a DTC7 requires a maximum of 18 kbytes of additional storage, including 17 kbytes for diagnostics.

Impact on processing resources

The figures detailed in this section are incremental to existing narrowband calls and are draft estimates. Timing figures reflect use of the DMS Series 20 processor and assume that the first trunk selected is idle.

DMS-core

The impact of the DWS product is approximately 30 ms for a 384-kbit/s call and approximately 70 ms for a 1536-kbit/s call. The impact of enabling DWS for a given trunk is approximately 200 µs for a narrowband call. The impact of DWS on narrowband calls is less than 50 µs.

DTCI and DTC7

The impact of the DWS product on a given DWS CCS7 ISUP or DWS PRI call in either the master processor (MP) or the signaling processor (SP) can be determined from *System Engineering Bulletin*, SEB 93-01-001.

Connection setup

The average DWS connection setup time is lower than the time required for *n* narrowband connections. For example, the time required to establish a 1536-kbit/s connection is significantly less than the cumulative time required to set up twenty-four 64-kbit/s connections.

Real-time impact

For the number of call attempts (disregarding bandwidth), the DWS product decreases the amount of call carrying capacity on all call processing nodes (DMS-core, DTC7 and DTCI). The impact is dependent on the amount of actual wideband traffic and the number of trunks provisioned for DWS. There is less than 0.5% real-time impact to a traffic mix that does not include trunks provisioned for DWS. The real-time impact of enabling DWS for all trunk groups is less than 2% for each call.

Overload and flow controls

The DWS product does not impact on overload levels in the affected processors as compared to servicing an equal number of ports providing narrowband service.

However, the design of a network for wideband traffic must consider the eventuality of having to deal with overflow traffic, specifically voice traffic from a narrowband trunk spilling over onto the data traffic of a wideband trunk.

Messaging and throughput

Existing CCS7 and PRI messaging is used to support DWS. Extensions have been added to the SS7 ISUP and PRI protocols to support DWS.

Messaging between the CC and XPM PLUS or XPM has been changed to support DWS on the DTCI. The call setup supervision message has been modified to include information on all channels involved in the DWS call.

The DTC7 requires no messaging changes to support DWS.

Ordering information

The following sections describe the tools available to formulate a procedure within an operating company to track and administer a DMS-100 Family switch. The information increases the ability to provision memory in DMS-100 Family switches equipped with either an NT40 central control complex or DMS SuperNode. The information also aids in planning the transition from NT40 to DMS SuperNode.

Using NT-ACCESS

NT-ACCESS is an automated tool for provisioning the components of the DMS-100 Family of switches. Order capture questionnaires for host,

remote, or Dynamic Network Controller (DNC) products can be found in *NT-Access User Documentation, Volume 2, NTACCESSV2*. These questionnaires allow the NT-ACCESS programs to provision the proper feature packages to meet the requirements of the office configuration.

NT-ACCESS generates a provisioned equipment list that is electronically transferred to Northern Telecom (NT). The equipment list is reviewed and a planning price quotation is generated. When the order is ready, the information is electronically transferred to NT for confirmation and a firm price quotation. In addition to engineering initial office installations, NT-ACCESS captures, provisions, and prices subsequent changes to original parameters. It also retrieves job information for future office expansions.

NT-ACCESS features

NT-ACCESS offers the following features:

- places orders electronically
- provides provisioning capability for initial installations and expansions
- provides forward product views for planning purposes
- provides accurate prices based on holding company contracts
- manipulates office parameters for optional configurations and expansion
- changes order requirements as needed, determines office impact, and transfers change requests electronically to NT
- retrieves existing office data for expansion provisioning
- provides memory predictions through six future BCS levels using the integrated MEMCALC program
- provides office analysis and capacity reports used by operating company traffic and network design engineering groups
- reduces questionnaire input through standard and custom masking
- calculates, and submits electronically, the office parameter questionnaire
- tracks jobs for information maintenance and job sharing
- prints and downloads reports
- performs multiple tasks without batch processing
- provides product and system information through news bulletins
- gains access to the Technical Information Library (TIL) for summary information on commonly asked technical questions
- views, prints, and tracks reported system troubles
- downloads questionnaires and job files to a PC

- changes logon passwords

NT-ACCESS components and subsystems

NT-ACCESS can access several independent subsystems. Table 2-5 illustrates the primary components and subsystems of NT-ACCESS.

Table 2-5 NT–ACCESS components and subsystems

NT–ACCESS menu item	Subsystem or part
DMS-100F provisioning	PAQS100
DMS-100F pricing	NT-PRISM
creating a custom mask	part of NT-ACCESS
job maintenance	ARKIVE and current jobs
memory calculation	MEMCALC
job tracking	part of NT-ACCESS
PC interface	part of NT-ACCESS
Technical Information Library	part of NT-ACCESS
office PARMS	office PARMS module
batch processing	PAQS100 and NT-PRISM (UNIX environment)
news bulletins	part of NT-ACCESS
automated trouble log	part of NT-ACCESS
billing/account maintenance	part of NT-ACCESS

Menus are dynamic and change with each new release of the NT-ACCESS software. As changes occur, updated documentation is made available.

Using NT86xx series questionnaires

The NT86xx series questionnaires help determine what an operating company needs in a DMS-100 Family switch, based on present and projected traffic within an office. The questionnaires are used to determine the provisioning requirements for a new DMS switch or an upgrade. The questionnaires cover the entire profile of the operating office and are used to plan future needs.

Planning service expansion

Operating company engineers follow use of lines, trunks, and features through an engineering period and project needs based on forecasted growth.

The engineering period is usually two to three years following an in-service date.

Operating company and NT engineers provision memory required for DMS-100 Family switches based on operating company projections. The MEMCALC software tool is used to forecast memory requirements for future BCSs.

After the cutover of a new switch or a major addition to an existing switch, MEMCALC is run using the actual switch parameters. The MEMCALC questionnaire uses the necessary switch data to run the tool.

Adding hardware

To calculate memory requirements, use the wired capacities of all lines, trunks, and input/output (I/O) ports. Note that card equipped I/O ports should be considered as wired.

Adding software

Actual memory usage must be gathered from the switch to track the accuracy of the operating company and MEMCALC forecasts. Memory usage should be monitored monthly during the office busy hour. This actual memory use should be plotted and tracked against MEMCALC. The slope of actual usage should parallel MEMCALC but not exceed it.

Exhaust level plans and forecasts

After DWS service is installed, it is necessary to track the impact of its call processing activity on available system resources. Operational measurement data may be used to determine system resources affected. For more information about tracking DWS impact on system resources, refer to *Administering DWS* on page 4-1 of this document.

Automatic message accounting and billing

Automatic message accounting (AMA) records are generated for both intra- and inter-LATA wideband CCS7 calls to allow carriers to record the bandwidth used by the end user. The AMA record includes called number, calling number, call duration and bandwidth allocated for the call.

Bellcore AMA

Bellcore AMA uses three call type codes for DWS. Each supports call transfer rates from 2 to 24 DS0s.

The three codes are:

- 148 — intranet high bandwidth call
- 149 — originating access high bandwidth call

- 150 — terminating access high bandwidth call

For intra-LATA DWS calls, call type code 148 has been defined. It is generated when an intranetwork DWS call originates and completes at the originating switch complex within the LATA. It is associated with structure code 0190.

For inter-LATA DWS calls, two call type codes have been defined. Each is associated with structure code 0645.

- Call code 149 is generated when an internetwork DWS call originates at the originating switch complex within the LATA originating the call.
- Call code 150 is generated when an internetwork DWS call completes at the point-of-presence (POP) switch complex within the LATA terminating the call.

DWS translations

This chapter describes the translations datafill required for Dialable Wideband Service (DWS), including the datafill needed to implement the Dialable Wideband Service PRI, the DWS Intertoll ISUP, and the Flexible DWS Access functionalities.

An overview of DWS on page 3-2 gives a brief explanation of DWS.

Trunk selection on page 3-2 describes the three types of channel selection methods available for DWS.

Understanding translations on page 3-3 explains the concept of the translations process.

Translations audience on page 3-4 explains to whom the chapter on translations is intended.

Terms used in translations on page 3-5 lists the terms used in DWS translations.

Functionalities for DWS on page 3-6 lists the functionalities and functional groups required for DWS.

Datafilling DWS on page 3-7 outlines the sequence of datafilling required.

An overview of DWS

The Dialable Wideband Service PRI and DWS Intertoll ISUP functionalities implement DWS for the local exchange carrier (LEC) market.

For further understanding of DWS, refer to the *Understanding DWS* chapter in this document.

The functionalities and functional groups provide basic DWS, including access, call control, trunking to an access tandem, and billing records. They also provide operations, administration, and maintenance capabilities.

Trunk selection

DWS uses three trunk selection methods:

- fixed
- floating
- flexible

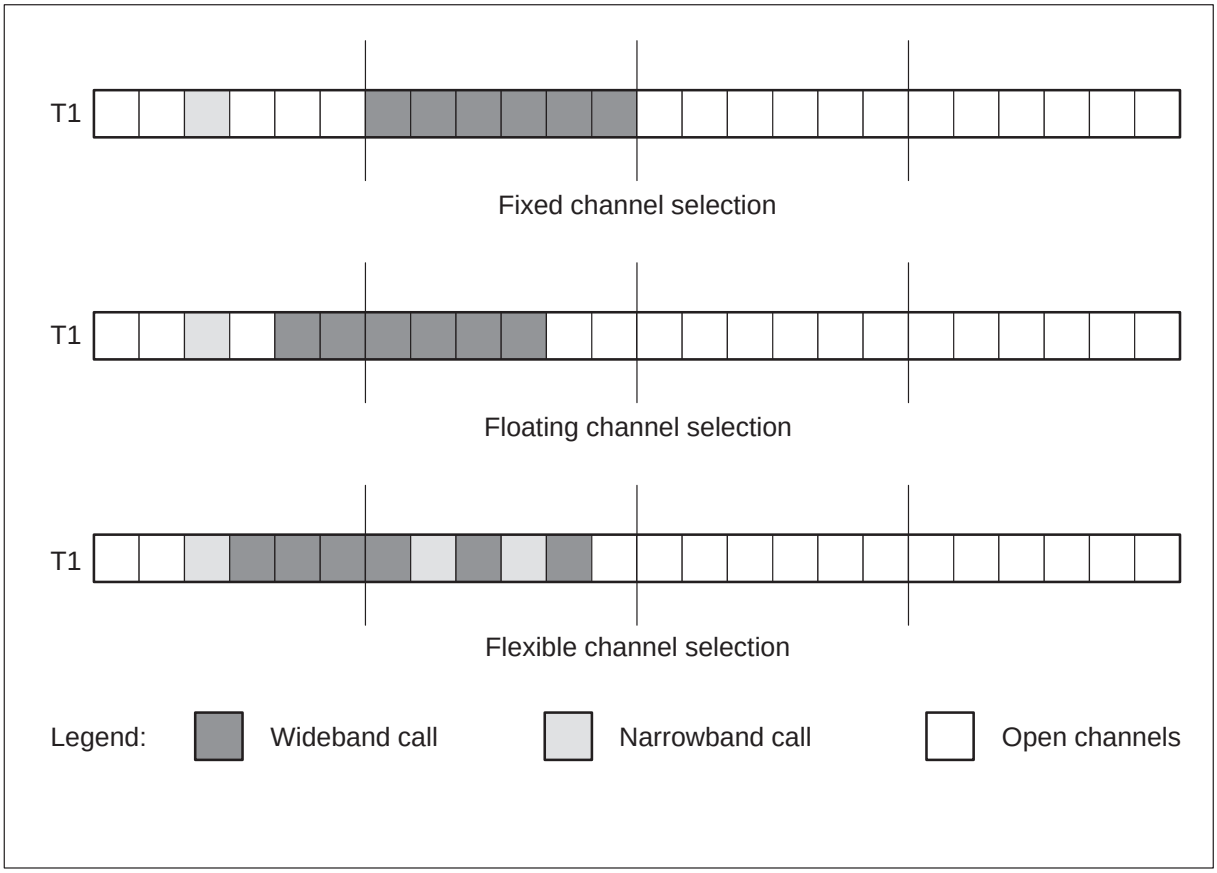
The following figure shows the three selection methods. The fixed selection method is defined by selecting 6 or 24 consecutive DS-0 channels on the same T1; the starting channel must be channel 1, 7, 13, or 19. Only H0 and H11 wideband calls are allowed (6 channels, 384 kbit/s and 24 channels, 1.536 Mbit/s respectively).

The floating selection method is defined by selecting any number of consecutive DS-0 channels on the same T1. These consecutive channels can start on any channel in the T1.

The flexible selection method is defined by selecting any number of DS-0 channels on the same T1. The channels do not have to be consecutive and they can start on any channel in the T1, but the channel order must be maintained. The flexible selection method is present only when functionality NI000027 DWS Flexible Acc (NTXR65AA Flexible DWS Access) is loaded.

For a more comprehensive understanding of trunk selection, consult the *Planning and Engineering DWS* chapter in this document.

Figure 3-1 Trunk selection methods for T1 links



Understanding translations

Translations are changes made by the DMS to dialed telephone numbers to allow the call to progress through the switch. To implement DWS, certain tables must be datafilled in a specific sequence.

Translations database

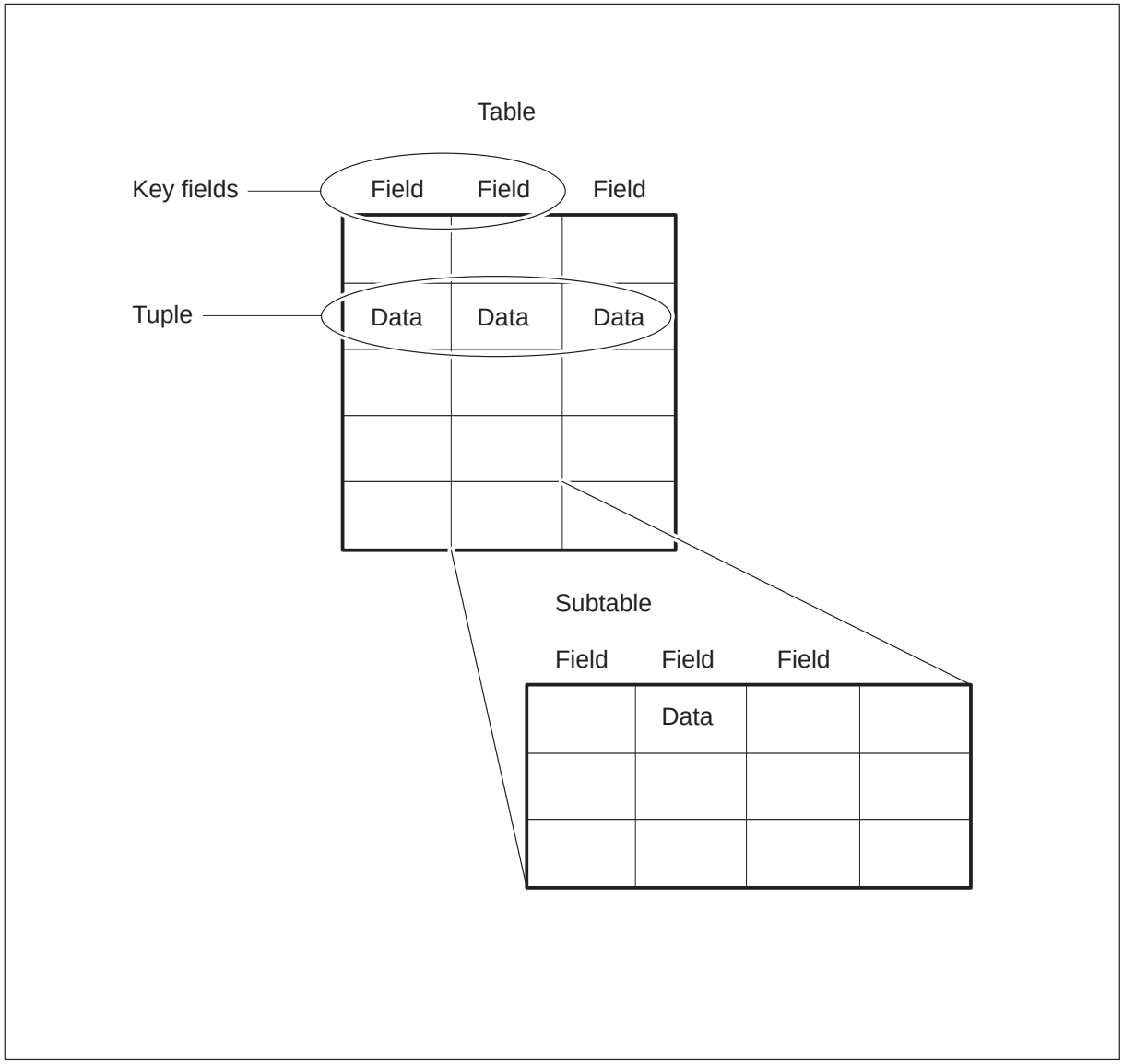
To route a call, the switch must access the translations database.

The translations database is stored in the DMS-core. It contains numerous data tables. Each table has a specific purpose and contains a certain type of data. When processing a call, the DMS switch may access many tables to collect the data needed to complete a call.

Every table has a name. For example, the table containing the data for trunk groups is named table TRKGRP. Table names are written using capital letters.

A table consists of horizontal rows and vertical columns of data. Each row contains one record of data and is called a tuple. Each column is called a field. The following figure illustrates the terminology used to describe a table.

Figure 3-2 Illustration of translations terms



Translations audience

This chapter is intended for administration personnel such as supervisors, translations personnel, and people needing specific knowledge of the DWS translations.

Terms used in translations

Data

Data is contained in fields. Each field or subfield has a specific value for that field. For example, a field called SECONDS may accept integer values from 0 through 60. A field called DAY may accept values of SUNDAY, MONDAY, TUESDAY, and so on.

Datafill

Datafill is the process of entering data into a table. Datafill used as a noun is a synonym for data.

Field

A field is one column of a table. Each field has a name that describes the content of the field. For example, a field that contains directory numbers may be named field DN.

Key field

A key field is found in each table. Tables may have more than one key field. These fields uniquely identify any tuple in the table. Knowing the key fields of a table is important when using the table editor.

Range

The range of a field is the set of all possible data values that can be entered in the field. For example, a field called NUMBER may have a range of 1 through 20. RANGE is also a command that can be entered at the switch to determine the range of the table or field.

Subfield

A subfield is a division of a field. For example, the field named line equipment number (LEN) consists of five subfields: SITE, FRAME, UNIT, DRAWER, and CIRCUIT.

Table editor

The table editor is the user interface to the translations database. It allows the user to view tables, add or delete tuples, and change data in tuples.

Tuple

A tuple is one row of data in a table.

Vector

A vector is a field that can contain more than one entry. Each entry is separated by a space; a plus (+) sign allows continuation to the next line of data input; and a dollar ($) sign indicates the end of the vector. For example, the OPTCARD field in table LTCINV can contain up to 10 optional cards; each entry is separated by a space and the vector ends with the dollar sign.

Functionalities for DWS

Use this chapter to datafill translations tables for DWS.

How to use this section

The functionalities and functional groups listed in the following table are required for DWS. Dialable Wideband Service SS7 Base, DWS Base, and DWS PRI Base are prerequisites for the others.

The PRI and intertoll (IT) trunks provide DWS. Functional group NI000004 NI0 NI–2 DWS (NTXR49AA DWS PRI) provides LECs with CPE access through PRI trunks. DWS is implemented for ISUP IT trunks through functionality NI000023 Intertoll ISUP & SS7 (NTXS28AA DWS Intertoll ISUP).

NI000028 DWS Carrier Acc (NTXR66AA DWS ATC ISUP) affords DWS for Access to Carrier (ATC) trunks using Feature Group D (FGD) ISDN user part (ISUP) signaling. The ISUP IT trunks provide intra-LATA connections between equal access end offices (EAEO) and through access tandems (AT).

NI000004 NI0 NI–2 DWS (NTXR49AA DWS PRI) is required for implementation of DWS PRI and NI000023 Intertoll ISUP & SS7 (NTXS28AA DWS Intertoll ISUP) is required for implementation of DWS ISUP.

Table 3-1 Required DWS functionalities and functional groups

Functional group or functionality code and name	Feature package number and name
NI000004 NI0 NI-2 DWS	NTXS08AA – Enhanced Time Switch
	NTXS25AA – DWS Base
	NTXS26AA – DWS PRI Base
	NTXR49AA – DWS PRI
NI000023 Intertoll ISUP & SS7	NTXS09AA – DWS SS7 Base
	NTXS28AA – DWS Intertoll ISUP

The following functionalities are optional for DWS.

Table 3-2 Optional DWS functionalities

Functional group or functionality code and name	Feature package number and name
NI000027 DWS Flexible Acc	NTXR65AA – Flexible DWS Access
NI000028 DWS Carrier Acc	NTXR66AA – DWS ATC ISUP

The following functional group and functionalities are described in subsequent sections:

- NI000004 NI0 NI–2 DWS (NTXR49AA DWS PRI)
- NI000023 Intertoll ISUP & SS7 (NTXS28AA DWS Intertoll ISUP)
- NI000027 DWS Flexible Acc (NTXR65AA Flexible DWS Access)
- NI000028 DWS Carrier Acc (NTXR66AA DWS ATC ISUP)

Datafilling DWS

The following tables require special datafill for DWS:

1 CRSFMT

2 LTCINV

3 CARRMTC

4 LTCPSINV

5 TRKGRP

6 TRKSGRP

NI000004 NI0 NI-2 DWS (NTXR49AA DWS PRI)

Functionality code

Functionality group ordering code: NI000004

Functionality ordering code: not applicable

Release applicability

LEC002, CDN002, LET002

Prerequisites

All the datafill information for this particular functionality is included in this document. However, prerequisite software or hardware may be required for complete implementation.

Description

NI000004 NI0 NI-2 DWS (NTXR49AA DWS PRI) implements DWS for the local exchange carrier (LEC) market according to current standards. It provides LECs with access to customer premises equipment (CPE) through ISDN primary rate interface (PRI). The PRI link uses an extension of standard Q.931 ISDN signaling. This functional group also provides PRI to ISUP intertoll (IT) interworking.

NI000004 NI0 NI-2 DWS (NTXR49AA DWS PRI) consists of the following:

- AD4421 – LEC DWS Trunk Selection and OMs
- AD4433 – LEC DWS ISUP to PRI Interworking
- AD4449 – LEC DWS PRI

Operation

The process of routing a wideband call on a PRI trunk, as with a narrowband call, requires four main steps:

- origination
- translations
- trunk selection
- termination

Origination

To establish a wideband call, the CPE sends a SETUP message to the DMS switch through a PRI trunk. The SETUP message contains the number called and the bandwidth desired for the wideband call.

NI000004 NI0 NI-2 DWS (NTXR49AA DWS PRI) (continued)

Translations

Existing translations methods currently provided on PRI trunk groups are used for NI000004 NI0 NI-2 DWS (NTXR49AA DWS PRI).

Trunk selection

DWS uses three trunk selection methods:

- fixed
- floating
- flexible

Further information on all three methods can be found on page 3-1.

Termination

The termination procedure for a wideband call is identical to that of a narrowband ISDN call.

Translations table flow

The NI000004 NI0 NI-2 DWS (NTXR49AA DWS PRI) translations process as shown in the table flow illustration on page 3-10 is an example only, and not necessarily the only way to provide translations for DWS. To route a call, the DMS switch accesses the tables in the flowchart. Call processing in the DMS switch begins with the trunking tables which define the attributes of the PRI trunk group.

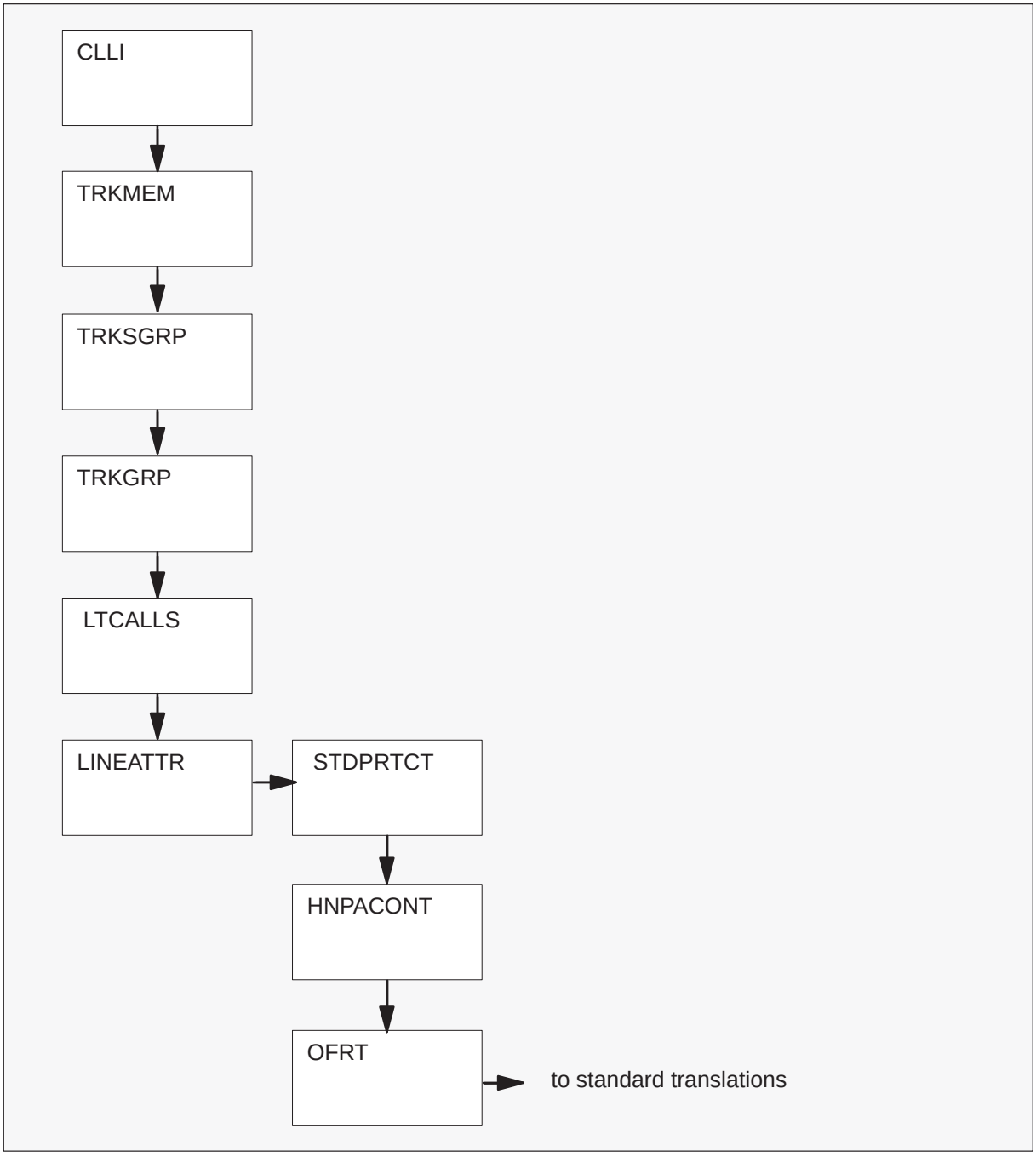
For the originating PRI call, table CLLI identifies the trunk group, and table TRKMEM determines the physical location of the circuit carrying the call. The trunk identifier (CLLI) is used to access table TRKSGRP which defines the signaling protocol used by the trunk, and table TRKGRP which provides the LTID of the trunk group. The LTID field and the call type are used to access table LTCALLS.

Table LTCALLS provides the line attribute index used to access table LINEATTR. This table provides the standard pretranslator table name (PRTNM) and the serving translation scheme (STS) for the originating trunk group.

The PRTNM value is used to access table STDPRTCT which contains the list of standard pretranslation tables. The STS value is then used to access table HNPACONT which lists the home numbering plan areas. This table provides a route reference index. The index is used to access table OFRT, which provides the information necessary to route the call to the terminating trunk group.

NI000004 NI0 NI-2 DWS (NTXR49AA DWS PRI) (continued)

Table flow for NI000004 NI0 NI-2 DWS (NTXR49AA DWS PRI)



NI000004 NI0 NI-2 DWS (NTXR49AA DWS PRI) (continued)

The following table lists the datafill content for digits dialed 214-640-0222 used in the flowchart example.

Datafill example for NI000004 NI0 NI-2 DWS (NTXR49AA DWS PRI)

Datafill table	Example data
TRKGRP	PRIFLT1DF PRA 0 NPDGP NCIT WIDEBAND DSEQ FLOATING FIRSTFIT N ISDN 104 $
LTCALLS	ISDN 104 PUB XLALEC 602 EA BNR Y $
LINEATTR	602 1FR NONE NT NSCR 0 214 SSWB LSWB NONE 0 NIL NILSFC LATA3 0 NIL NIL 00 N $
STDPRTCT	SSWB 1 0
HNPACONT	214 500 1 42 1 47 0
OFRT	601 S D PRIFLX0AF $

Limitations and restrictions

The following limitations and restrictions apply to NI000004 NI0 NI-2 DWS (NTXR49AA DWS PRI):

- All the DS-0s used in a wideband call must be datafilled in the same trunk group and must reside on the same T1.
- INBAND DTMF digit collection (PIN digits, account codes, authorization codes, etc.) is not supported. Wideband calls routed to an operator receive the ORIGINATION_DENIED treatment.
- Off-hook and on-hook queuing is not supported.
- Satellite hop is not supported.
- Internal echo canceller control is not supported.
- B-channel negotiation is not supported.
- BERT testing is supported on individual DS-0 channels but not on a group of channels.

Interactions

NI000004 NI0 NI-2 DWS (NTXR49AA DWS PRI) has no functionality interactions.

Activation/deactivation by the end user

NI000004 NI0 NI-2 DWS (NTXR49AA DWS PRI) requires no activation or deactivation by the end user.

NI000004 NI0 NI-2 DWS (NTXR49AA DWS PRI) (continued)

Billing

The NI000004 NI0 NI-2 DWS (NTXR49AA DWS PRI) uses the new Bellcore automatic message accounting (AMA) billing records described below.

Bellcore AMA

Bellcore AMA has three call type codes for DWS. Each supports call transfer rates from 2 to 24 DS0s..

The three codes are:

- 148 — intranet high bandwidth call
- 149 — originating access high bandwidth call
- 150 — terminating access high bandwidth call

For intra-LATA DWS calls, call type code 148 has been defined. It is generated when an intranetwork DWS call originates and completes at the originating switch complex within the LATA. It is associated with structure code 0190.

For inter-LATA DWS calls, two call type codes have been defined. Each is associated with structure code 0645.

- Call code 149 is generated when an internetwork DWS call originates at the originating switch complex within the LATA originating the call.
- Call code 150 is generated when an internetwork DWS call completes at the point-of-presence (POP) switch complex within the LATA terminating the call.

Station Message Detail Recording

NI000004 NI0 NI-2 DWS (NTXR49AA DWS PRI) does not support Station Message Detail Recording.

Datafilling office parameters

The following table shows the office parameters used by NI000004 NI0 NI-2 DWS (NTXR49AA DWS PRI). For more information about office parameters, refer to *Office Parameters Reference Manual.*

NI000004 NI0 NI-2 DWS (NTXR49AA DWS PRI) (continued)

Office parameters used by NI000004 NI0 NI-2 DWS (NTXR49AA DWS PRI)

Table name	Parameter name	Explanation and action
OFCENG	MAX_NUM_WIDEBAND_CALLS	The parameter value indicates the maximum number of active wideband calls at one time. The default for this parameter is 0. The parameter value ranges from 0 to 4096.
Note: A cold restart is required to decrease the value of this parameter.		

Datafill sequence

The following table lists the tables that require datafill to implement NI000004 NI0 NI-2 DWS (NTXR49AA DWS PRI). The tables are listed in the order in which they are to be datafilled.

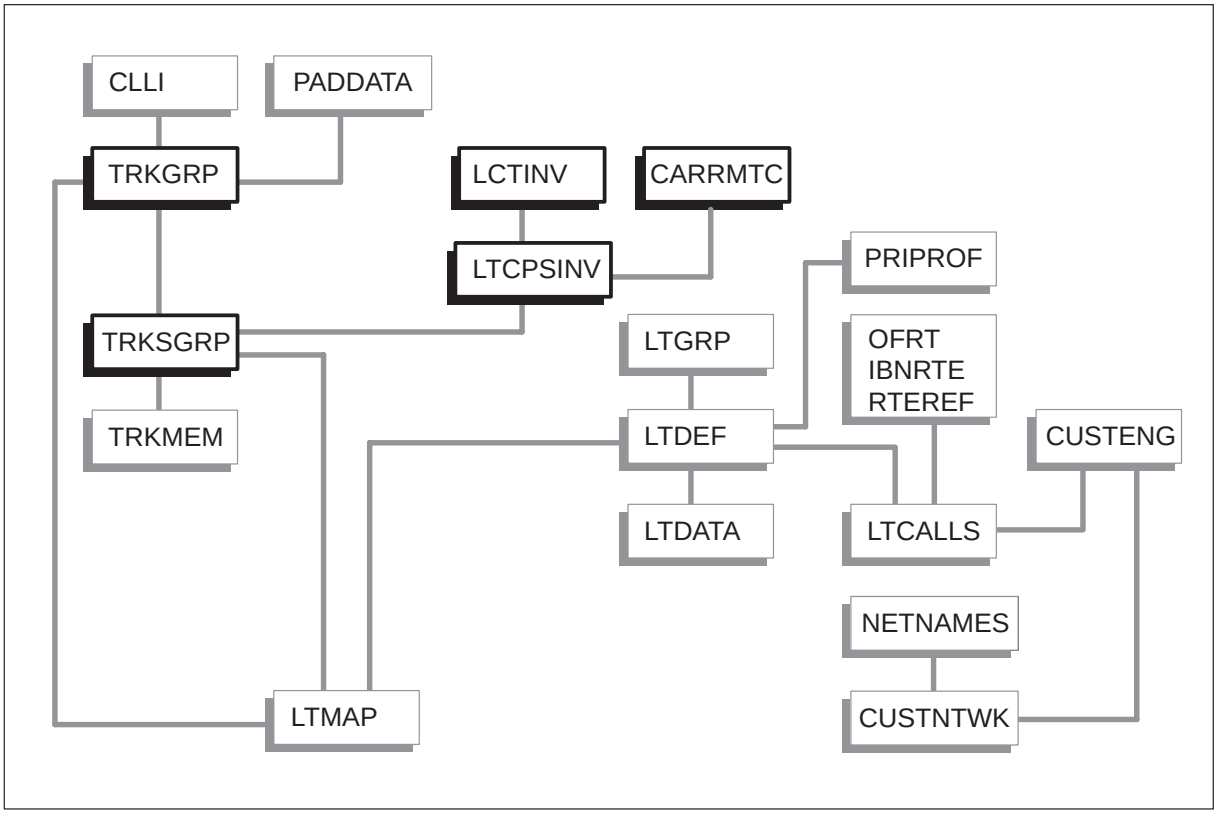
Datafill tables required for NI000004 NI0 NI-2 DWS (NTXR49AA DWS PRI)

Table	Purpose of table
LTCINV	Contains the inventory data for various peripheral modules.
CARRMTC	Allows the DMS switch administration to datafill maintenance control information in peripheral modules.
LTCPSINV	Contains the assignment of the P-side links for the peripheral modules.
TRKGRP	Lists the customer-defined data associated with each trunk group existing in the switching unit.
TRKSGRP	Lists supplementary information for each subgroup assigned to one of the trunk groups listed in table TRKGRP.

The following figure shows the datafill dependencies between the DMS-100 tables that are used for PRI. For example, table TRKGRP is dependent on data in tables CLLI and PADDATA, so tables CLLI and PADDATA must be datafilled before table TRKGRP. The tables described in this chapter are bolded in the illustration. Refer to the *Translations Guide* for a description of the other PRI tables.

NI000004 NI0 NI-2 DWS (NTXR49AA DWS PRI) (continued)

DMS–100 PRI datafill dependencies



Datafilling table LTCINV

The following table shows the datafill specific to NI000004 NI0 NI-2 DWS (NTXR49AA DWS PRI) for table LTCINV. Only those fields that apply directly to NI000004 NI0 NI-2 DWS (NTXR49AA DWS PRI) are shown. For a description of the other fields, refer to the data schema section of the *Translations Guide*.

Table LTCINV lists the inventory for DTCI peripheral modules in the DMS switch. For each DTCI used by wideband dedicated trunk groups, table LTCINV must be datafilled with the optional card required for wideband service.

NI000004 NI0 NI-2 DWS (NTXR49AA DWS PRI) (continued)

Datafilling table LTCINV

Field	Subfield or refinement	Entry	Explanation and action
LTCNAME			Peripheral module name. Enter the name of the peripheral module, DTCI, followed by its number (0 to 255).
ADNUM			External administrative number. Enter a unique external administrative number (1 to 4095) associated with the peripheral module.
FRTYPE			Frame type. Enter the frame type (DTEI) on which the peripheral module equipment is mounted.
FRNO			Frame number. Enter the frame number (0 to 511) of the frame type on which the peripheral module is mounted.
SHPOS			Shelf position. Enter the shelf position (18, 32, 51, 65) where the peripheral module is located.
FLOOR			Floor. Enter the floor (0 to 99) on which the peripheral module frame is located.
ROW			Row. Enter the row on the floor where the peripheral module equipment frame is located.
FRPOS			Frame position. Enter the bay position (0 to 99) of the peripheral module equipment frame.
EQPEC			Equipment product engineering code. Enter the product engineering code (PEC) of the peripheral module.
LOAD			Load. Enter the name of the load required for the peripheral module.
EXECTAB			Executive table. This vector is made up of subfields TRMTYPE, EXEC, and CONTMARK.
	TRMTYPE		Terminal type. Enter the type of peripheral module terminal used.
	EXEC		Executive program. Enter the set of executive programs required for the peripheral module and specified in the TRMTYPE entry. Enter PRAB DTCEX.

—continued—

NI000004 NI0 NI-2 DWS (NTXR49AA DWS PRI) (continued)

Datafilling table LTCINV (continued)

Field	Subfield or refinement	Entry	Explanation and action
	CONTMARK		Continuation mark. A plus sign (+) indicates that the vector continues on the next line. A dollar sign ($) indicates the end of the vector.
CSLNKTAB			C-side link table. This field is made up of subfields ENSHELF, ENSLOT, ENLINK, ENDS30, and CONTMARK.
	ENSHELF		ENET shelf number. Enter the shelf number (0 to 7) to which the peripheral module is assigned.
	ENSLOT		ENET slot number. Enter the crosspoint slot number to which the peripheral module is assigned, corresponding to C-side links.
	ENLINK		ENET link number. Enter the link on the crosspoint (0 to 18) to which the peripheral module is assigned, corresponding to C-side links 0 to 18 of the peripheral module.
	ENDS30		ENDS30. This field defaults to 0 when the link is a DS30. All entries must be contiguous from 0. No entry can be duplicated.
	CONTMARK		Continuation mark. A plus sign (+) indicates that the vector continues on the next line. A dollar sign ($) indicates the end of the vector.
OPTCARD			Optional card. This field is a vector that may have up to 10 entries separated by plus signs (+); the vector ends with the dollar sign ($). Enter DCTAX78.
TONESET			Tone set. Enter NORTHAM, the tone set for the switch datafilled.
PECS6X45			6X45 Equipment product engineering code. Enter the two product engineering codes of the 6X45 card. One PEC is required for each unit of the XPM.

—continued—

Datafilling table LTCINV (continued)

Field	Subfield or refinement	Entry	Explanation and action
E2LOAD			Electrically erasable programmable read only memory. Enter the EEPROM load name. If the shelf is equipped with a processor different from NTXM77, this field is automatically datafilled with NILLOAD.
OPTATTR			Optional attribute. Enter a dollar sign ($).
PEC6X40			6X40 Equipment product engineering code. Enter 6X40AC, 6X40CA, or 6X40FA, the version for ISDN of the 6X40 EQPEC card in the peripheral module.
		—end—	

Datafill example for table LTCINV

The following example shows sample datafill for table LTCINV.

MAP display example for table LTCINV

```
    LTCNAME       FRTYPE
EXECTAB
                          OPTCARD
_____________________________________________________________________
   DTCI 0   1003    DTEI    0 18 0 D 0 6X02AA DTI35CR1
(ABTRK DTCFX) (PRAB DTCEX) (AVPRATRK ADTCIX) $
(0 32 1 0) (0 32 1 1) (0 32 1 2) (0 32 1 3) (0 32 1 4) (0
32 1 5) (0 32 1 6) (0 32 1 7) (0 32 1 8) (0 32 1 9) (0 32 1
10) (0 32 1 11) (0 32 1 12) (0 32 1 13) (0 32 1 14) (0 32 1
15) $ (UTR15) (MSG6X69) (ISP16) (DCTAX78) $ NORTHAM 6X45BA
6X45BA NILLOAD $ 6X40AC
```

Datafilling table CARRMTC

The following table shows the datafill specific to NI000004 NI0 NI-2 DWS (NTXR49AA DWS PRI) for table CARRMTC. Only those fields that apply directly to NI000004 NI0 NI-2 DWS (NTXR49AA DWS PRI) are shown. For a description of the other fields, refer to the data schema section of the *Translations Guide*.

NI000004 NI0 NI-2 DWS (NTXR49AA DWS PRI) (continued)

Datafilling table CARRMTC

Field	Subfield or refinement	Entry	Explanation and action
TMPLTNM			Template name. Enter DWS.
CARD			Card. Enter NT6X50AB.
FF			Frame format. Enter ESF.
ZLG			Zero logic. Enter B8ZS.

Datafill example for table CARRMTC

The following example shows sample datafill for table CARRMTC. The first example shows the DTCI default tuple; the second example shows the DTCI tuple specific to NI000004 NI0 NI-2 DWS (NTXR49AA DWS PRI). The fields that have to change are highlighted in bold.

MAP display example for table CARRMTC

```
CMSTYPE TMPLTNM RTSML RTSOL ATTR
_____________________________________________________________
DTCI DEFAULT 255 255 DS1 NT6X50AB MU_LAW SF B8ZS BPV NILDL
N 250 1000 50 50 150 1000 3 6 864 100 17 511 4 255
_____________________________________________________________
DTCI DWS 255 255 DS1 NT6X50AB MU_LAW ESF B8ZS BPV NILDL N
250 1000 50 50 150 1000 3 6 864 100 17 511 4 255
```

Datafilling table LTCPSINV

The following table shows the datafill specific to NI000004 NI0 NI-2 DWS (NTXR49AA DWS PRI) for table LTCPSINV. Only those fields that apply directly to NI000004 NI0 NI-2 DWS (NTXR49AA DWS PRI) are shown. For a description of the other fields, refer to the data schema section of the *Translaltions Guide*.

Table LTCPSINV contains the assignment of the P-side links for the peripheral modules. The DS-1 links on the DTCI that carry wideband calls must be datafilled as B8ZS and ESF.

NI000004 NI0 NI-2 DWS (NTXR49AA DWS PRI) (continued)

Datafilling table LTCPSINV

Field	Subfield or refinement	Entry	Explanation and action
LTCNAME			Link trunk controller name. Enter the peripheral module type (DTCI) followed by its number (0 to 255).
PSLNKTAB			P-side link table. This field is a vector made up of subfields PSLINK, PSDATA, and CONTMARK. PSLNKTAB may have up to 20 entries.
	PSLINK		P-side link. Enter a number (0 to 19) to indicate the P-side port number for the DS-1.
	PSDATA		P-side data. Enter DS1PRA.
	CARRIDX		Carrier index. Enter DWS, the template name defined in table CARRMTC, if the DS-1 link carries wideband calls. Otherwise, enter DEFAULT.
	ACTION		Action. Enter Y (yes) to indicate that the carrier is removed from service when the out-of-service limit for frame, slip, errored-second, or severe-errored-second is exceeded. Otherwise, enter N (no).
	IID		Interface identifier. Enter an IID (0 to 31) that has been datafilled in the equipment that terminates the DS-1.
	LINEEQ		Line length from DS-1 circuit to first DS-1 office repeater. Enter NIL.
	CONTMARK		Continuation mark. A plus sign (+) indicates that the vector continues on the next line. A dollar sign ($) indicates the end of the vector.

NI000004 NI0 NI-2 DWS (NTXR49AA DWS PRI) (continued)

Datafill example for table LTCPSINV

The following example shows sample datafill for table LTCPSINV. In the example, DS-1 links 1 and 3 to 17 are datafilled as wideband.

MAP display example for table LTCPSINV

```
LTCNAME PSLNKTAB
_____________________________________________________________________
DTCI 1 (0 DS1PRA DEFAULT N 0 NIL) (1 DS1PRA DWS N 0 NIL) (2
DS1PRA DEFAULT N 0 NIL) (3 DS1PRA DWS N 1 NIL) (4 DS1PRA
DWS N 2 NIL) (5 DS1PRA DWS N 0 NIL) (6 DS1PRA DWS N 1 NIL)
(7 DS1PRA DWS N 2 NIL) (8 DS1PRA DWS N 0 NIL) (9 DS1PRA DWS
N 1 NIL) (10 DS1PRA DWS N 2 NIL) (11 DS1PRA DWS N 0 NIL)
(12 DS1PRA DWS N 1 NIL) (13 DS1PRA DWS N 2 NIL) (14 DS1PRA
DWS N 0 NIL) (15 DS1PRA DWS N 1 NIL) (16 DS1PRA DWS N 2
NIL) (17 DS1PRA DWS N 0 NIL) (18 DS1PRA DEFAULT N 0 NIL)
(19 DS1PRA DEFAULT N 0 NIL) $
```

Datafilling table TRKGRP

The following table shows the datafill specific to NI000004 NI0 NI-2 DWS (NTXR49AA DWS PRI) for table TRKGRP. Only those fields that apply directly to NI000004 NI0 NI-2 DWS (NTXR49AA DWS PRI) are shown. For a description of the other fields, refer to the data schema section of the *Translations Guide*.

Table TRKGRP is used by wideband call processing and trunk maintenance to recognize, choose, and route idle trunks. When the selection sequence field (SELSEQ) is set to WIDEBAND, the following subfields are displayed:

- Wideband selection sequence (WBSELSEQ). This subfield specifies whether the DS-0 channels are chosen in ascending or descending order.
- Wideband grouping (WBGRPING). This subfield specifies the trunk selection method. FIXED, FLOATING, and FLEXIBLE are valid.
- Wideband search (WBSEARCH). This subfield specifies the search method used to find a group of channels. FIRSTFIT and BESTFIT are valid.

NI000004 NI0 NI-2 DWS (NTXR49AA DWS PRI) (continued)

Datafilling table TRKGRP

Field	Subfield or refinement	Entry	Explanation and action
GRPKEY			Trunk group name. Enter the trunk group name from table CLLI.
GRPTYP			Group type. Enter the type of trunk as PRA.
TRAFSNO			Trunk separation number. Enter the outgoing traffic separation number (0 to 127) assigned to the trunk group. If the number is not required, enter 0.
PADGRP			PAD group. Enter the name of the originating PAD group from table PADDATA (subfield PADGRP1).
NCCLS			Operational measurements no circuit class. Enter the operational measurements no circuit class to indicate which OM register is incremented when treatment GNCT occurs.
SELSEQ			Selection sequence. Enter WIDEBAND.
	WBSELSEQ		Wideband selection sequence. Enter ASEQ to specify ascending order, DSEQ for descending order.
	WBGRPING		Wideband grouping. Enter FIXED, FLOATING, or FLEXIBLE. ***Note:*** The FLEXIBLE selection method is present only when NI000027 DWS Flexible Acc (NTXR65AA Flexible DWS Access) is loaded.
	WBSEARCH		Wideband search. Enter FIRSTFIT to select the first available channels, BESTFIT to select the smallest segment of idle DS-0 channels among T1s in a trunk group that can carry the bandwidth specified.

Note 1: This field is only available after NA03. Prior to NA03, use field BLOCKNB.

Note 2: This field is only available prior to NA03. After NA03, use field OPTION to enter BLOCKNB.

—continued—

NI000004 NI0 NI-2 DWS (NTXR49AA DWS PRI) (continued)

Datafilling table TRKGRP (continued)

Field	Subfield or refinement	Entry	Explanation and action
BILLDN			Billing DN. Datafill BILLDN with the 10-digit directory number to which all calls will be billed, or with N if no single-billed directory number is required. If you enter N, the number billed will be the automatic number identification (ANI) provided by the CPE. It is recommended that you enter the 10-digit directory number to avoid billing irregularities.
LTID			Logical terminal identifier. The LTID field is automatically updated by the system after you datafill the corresponding entry in table LTMAP. Enter a dollar sign ($).
Note 1: This field is only available after NA03. Prior to NA03, use field BLOCKNB. ***Note 2:*** This field is only available prior to NA03. After NA03, use field OPTION to enter BLOCKNB.			

—continued—

NI000004 NI0 NI-2 DWS (NTXR49AA DWS PRI) (continued)

Datafilling table TRKGRP (continued)

Field	Subfield or refinement	Entry	Explanation and action
OPTION (see note 1)			Option. Enter BCNAME to specify the bearer capability used by this trunk group. Enter CHGNUM to send a charge number and an originating line information parameter with an initial address message. Enter BLOCKNB to prevent narrowband calls from terminating or originating from members within this trunk group. Enter the dollar sign ($) if no option is required.
BLOCKNB (see note 2)			Block narrow band. Enter Y to prevent narrowband calls from terminating to or originating from members within this trunk group. Enter N if narrowband blocking is not required. ***Note:*** This field is only available if the FAST feature described in AD6611 is loaded and enabled in the switch.
Note 1: This field is only available after NA03. Prior to NA03, use field BLOCKNB. ***Note 2:*** This field is only available prior to NA03. After NA03, use field OPTION to enter BLOCKNB.			
—end—			

Datafill example for table TRKGRP

The following example shows sample datafill for table TRKGRP. In the example, NI000004 NI0 NI-2 DWS (NTXR49AA DWS PRI) is assigned to PRI trunk WITSPRI1.

MAP display example for table TRKGRP

```
   GRPKEY                                          GRPINFO
_____________________________________________________________
WITSPRI1
     PRA 0 NPDGP NCIT WIDEBAND DSEQ FLEXIBLE
  FIRSTFIT N (ISDN 100) $   Y
```

Note: PRA is an internal software designation for PRI.

NI000004 NI0 NI-2 DWS (NTXR49AA DWS PRI) (continued)

Error messages for table TRKGRP

The following error messages apply to table TRKGRP.

Error messages for table TRKGRP

Error message	Explanation and action
CANNOT CHANGE FROM WIDEBAND TO ASEQ	The value of SELSEQ cannot be changed from WIDEBAND to any other selection sequence. Delete the trunk group's entry and add a new one with the correct selection sequence.
CANNOT CHANGE WBGRPING. TUPLE IN TRKSGRP MUST BE DELETED FIRST.	The WBGRPING subfield can be changed only if no subgroup in table TRKSGRP is associated with the trunk group.

Datafilling table TRKSGRP

The following table shows the datafill specific to NI000004 NI0 NI-2 DWS (NTXR49AA DWS PRI) for table TRKSGRP. Only those fields that apply directly to NI000004 NI0 NI-2 DWS (NTXR49AA DWS PRI) are shown. For a description of the other fields, refer to the data schema section of the *Translations Guide*.

Table TRKSGRP specifies the recovery scheme for glare. Glare occurs when both ends of a trunk are seized at the same time. To minimize glare, the customer premises equipment B-channel glare field (BCGLARE) should be set to YIELD and the DMS-100 glare field should be set to STAND. If the CPE cannot yield, the DMS-100 can be made to YIELD; note that this setting increases blocking for calls that have already come across the network. Refer to the physical provisioning guidelines section in chapter *Planning and Engineering DWS* on page 2-1 for more information on glare.

Table TRKSGRP also specifies the ISDN protocol version used for PRI trunks. This field must be set to UNISPEC20, an extension of standard Q.931 ISDN signaling.

> ***Note:*** The order of the DS-0 datafill determines the order within the trunk group. Fur further information, consult the "Circuit and network provisioning" section of the *Planning and Engineering DWS* chapter on page 2-18.

NI000004 NI0 NI-2 DWS (NTXR49AA DWS PRI) (continued)

Datafilling table TRKSGRP

Field	Subfield or refinement	Entry	Explanation and action
SGRPKEY			Trunk group name and subgroup. Enter the name of the trunk group from table CLLI followed by 0, the only valid subgroup name for ISDN signaling.
CARDCODE			Card code. Enter DS1SIG, the card code used for ISDN PRI.
SGRPVAR			Signal protocol. Enter ISDN, the only valid protocol used for call processing.
PSPDSEIZ			Permanent signal or partial dial on seizure timing. Enter the time in seconds (2 to 30) that the trunk waits for reception of the first digit.
PARTDIAL			Partial dial timing. Enter the time in seconds (2 to 30) that the trunk waits for reception of each digit, excluding the first one.
VERSION			Protocol version. Enter UNISPEC20.
CRLENGTH			Call reference length. Enter the number of octets (1 or 2) in the call reference.
BCHNEG			B-channel negotiation. Enter N to disable B-channel negotiation.
BCHGLARE			B-channel glare. Enter STAND to allow the terminating call to complete. Enter YIELD to allow the originating call to proceed.
IFCLASS			Interface class. Enter USER if the PRA link is considered the user end of the protocol. Enter NETWORK if it is considered the network end.
CONFIG			Configuration. If broadcast procedures are used on this interface, enter PT_MLT_PT (point-to-multipoint). Otherwise enter PT_PT (point-to-point).
LOCATION			Location. Enter the location used when creating CAUSE information elements. Enter USER for user location, PVTNET for private network location, LOCALEO for local end office (public network) location.

—continued—

NI000004 NI0 NI-2 DWS (NTXR49AA DWS PRI) (continued)

Datafilling table TRKSGRP (Sheet 4 of 6)

Field	Subfield or refinement	Entry	Explanation and action
SAT			Satellite. Enter N, since the trunk group is not arranged to switch by satellite.
ECSTAT			Echo cancellor status. Enter the echo cancellor status (EXTERNAL, INNOTONE, or UNEQ). Internal echo cancellor control is not supported.
TRKGRDTM			Trunk guard timing. For outgoing or two-way trunk groups, enter the time, in 10-ms intervals (1 to 255), that the trunk waits, after sending on-hook to the far end, before putting the trunk in the idle queue.
L1FLAGS			L1FLAGS is only valid on TDM/XPMs. It indicates what may be expected as an idle code on a D-channel. Y (default) means that the idle code is 7E. Most non-Nortel equipment and Nortel M1 use this value. N(o) means that the idle code can be 7E + other value, such as 7F. This value can be used when connecting to other TDM/XPMs. See NIS-A211-1 and NIS-A233-1.
PARMNAME			ISDN parmname. Enter a 1 to 8 characterstring. This field specifies a name in table ISDNPARM and associates the informationfound in table ISDNPARM with the primary rate interface defined by the table TRKSGRP tuple.The default value is DEFAULT.
Primary D–channel			Primary D-channel. This area defines the primary D-channel to be used for this interface. It is formed of subfields PMTYPE, DTCINO, DTCICKTNO, DTCICKTTS, DCHRATE, and HDLCTYPE.
	PMTYPE		Peripheral module type. Enter DTCI for the PM type.
	DTCINO		DTCI number. Enter the DTCI number (0 to 511).
	DTCICKTNO		DS-1 circuit number. Enter the DS-1 circuit number (0 to 19).
	DTCICKTTS		D-channel time slot number. Enter the time slot number of the D-channel (1 to 24).
	DCHRATE		D-channel rate. Enter the data rate for the D-channel as 64K.
	HDLCTYPE		High level data link type. Enter HDLC.

NI000004 NI0 NI-2 DWS (NTXR49AA DWS PRI) (continued)

Datafilling table TRKSGRP (continued)

Field	Subfield or refinement	Entry	Explanation and action
Backup D–channel			Backup D-channel. This area defines the backup D-channel to be used for this interface. It is formed of subfields PMTYPE, DTCINO, DTCICKTNO, DTCICKTTS, DCHRATE, and HDLCTYPE.
	PMTYPE		Peripheral module type. Enter DTCI for the PM type.
	DTCINO		DTCI number. Enter the DTCI number (0 to 511).
	DTCICKTNO		DS-1 circuit number. Enter the DS-1 circuit number (0 to 19).
	DTCICKTTS		D-channel time slot number. Enter the time slot number of the D-channel (1 to 24).
	DCHRATE		D-channel rate. Enter the data rate for the D-channel as 64K.
	HDLCTYPE		High level data link type. Enter HDLC.
OPTIONS		$	There are no valid OPTIONS at this time. Enter a $.
		—end—	

Datafill example for table TRKSGRP

The following example shows sample datafill for table TRKSGRP. In the example, NI000004 NI0 NI-2 DWS (NTXR49AA DWS PRI) is assigned to trunk WITSPRI1.

MAP display example for table TRKSGRP

```
          SGRPKEY CARDCODE
                                                    SGRPVAR
-------------------------------------------------------------------------------
     WITSPRI1 0   DS1SIG
ISDN 15 15 UNISPEC20 2 N YIELD NETWORK PT_PT USER N UNEQ
160 PRANODE N DEFAULT DTCI 0 19 1 64K HDLC $
```

Translation verification tools

The following section provides information on the translation verification tools that can be used.

NI000004 NI0 NI-2 DWS (NTXR49AA DWS PRI) (continued)

TRAVER

The translation verification (TRAVER) utility is a diagnostic tool that allows the operating company to simulate a telephone call in software and display the line, trunk, or position to which a call is routed, the translation and routing tables that the call accesses, and any additional tables accessed as a result of call screening enhancements. The following examples show the output from TRAVER when it is used to verify NI000004 NI0 NI-2 DWS (NTXR49AA DWS PRI).

The first example shows a PRI-to-PRI call originating on trunk PRIFLT1DF and terminating on trunk PRIFLX0AF.

1 In lines 1 and 2 of the example, table TRKGRP is accessed with the trunk group PRIFLT1DF and provides the trunk group LTID, ISDN 104.

2 In lines 3 and 4, the LTID and the call type are used to access table LTCALLS, which provides the line attribute index 602.

3 In lines 6 and 7, the line attribute index 602 is used to access table LINEATTR, which provides the serving translation scheme 214 and the pretranslator name SSWB.

4 In lines 9 to 17, table STDPRTCT is accessed with the pretranslator name SSWB. Subtable STDPRT provides the pretranslator route selector N, which indicates that the next translations table is HNPACONT.

5 In lines 18 to 24, table HNPACONT is accessed with the serving translation scheme. Subtable HNPACODE is accessed with the digits 640 and provides the route reference index 2. Subtable RTEREF is then accessed with this index; this subtable provides the next translation table, OFRT, and another route reference index, 601.

6 In lines 25 and 26, table OFRT provides the terminating trunk name PRIFLX0AF.

In the TRAVER command shown in this example,

- TR indicates that a trunk name follows, and PRIFLT1DF is the trunk name
- 2146400222 represents the incoming digits
- B indicates that the type of trace required is “both,” meaning that both a table trace and a digit trace are performed

NI000004 NI0 NI-2 DWS (NTXR49AA DWS PRI) (continued)

TRAVER output example for NI000004 NI0 NI-2 DWS (NTXR49AA DWS PRI)

```
traver tr priflt1df 2146400222 b
TABLE TRKGRP
PRIFLT1DF PRA 0 NPDGP NCIT WIDEBAND DSEQ FLOATING FIRSTFIT N (ISDN 104)
$ $
TABLE LTCALLS
ISDN 104 PUB XLALEC 602 (EA BNR Y) $
Originator is not an AIN agent
therefore AIN info is not processed on originator side
TABLE LINEATTR
602 1FR NONE NT NSCR 0 214 SSWB LSWB NONE 0 NIL NILSFC LATA3 0 NIL NIL
00 N $
LCABILL OFF – BILLING DONE ON BASIS OF CALLTYPE
TABLE STDPRTCT
SSWB ( 1) ( 0) 0
 . SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE BILLING.  CALL TYPE
DEFAULT IS NP.  PLEASE REFER TO DOCUMENTATION.
 . KEY NOT FOUND
 . DEFAULT VALUE IS:   N NP 0 NA
 . SUBTABLE AMAPRT
 . KEY NOT FOUND
 . DEFAULT VALUE IS:   NONE OVRNONE N
TABLE HNPACONT
214 500 1 ( 42) ( 1) ( 47) ( 0) 0
 . SUBTABLE HNPACODE
 . 214 214 HNPA 0
 . 640 640 LRTE 2
 . SUBTABLE RTEREF
 .   2 T OFRT 601
. . TABLE OFRT
 . . 601 S D PRIFLX0AF
 . .     T RRTE 1
 . . . TABLE RRTE
 . . . . TABLE REROUTE
 . . . . 1 ( 1)
 . . . . . SUBTABLE NWMRROUT
```

NI000004 NI0 NI-2 DWS (NTXR49AA DWS PRI) (continued)

TRAVER output example for NI000004 NI0 NI-2 DWS (NTXR49AA DWS PRI)

```
 . . . . . NOT ACTIVATED
 . .    S D PRIFIX0AB
 . .    S D PRIFLT1DF
 . . EXIT TABLE OFRT
 . EXIT TABLE RTEREF
EXIT TABLE HNPACONT
TABLE LCASCRCN
214 LSWB ( 2) OPTL N
 . SUBTABLE LCASCR
 . TUPLE NOT FOUND. DEFAULT IS NON-LOCAL
TABLE PFXTREAT
OPTL NP N DD UNDT
TABLE LATAXLA
TUPLE NOT FOUND
ASSUMED TO BE DEFAULT INTRALATA, INTRASTATE, STD
TABLE EASAC
TUPLE NOT FOUND
+++ TRAVER: SUCCESSFUL CALL TRACE +++
DIGIT TRANSLATION ROUTES

1 PRIFLX0AF          N CDN E164 NA 2146400222 NIL_NSF  BC 64k DATA
2 PRIFLX0AB          N CDN E164 NA 2146400222 NIL_NSF  BC 64k DATA
3 PRIFLT1DF          N CDN E164 NA 2146400222 NIL_NSF  BC 64k DATA

TREATMENT ROUTES.  TREATMENT IS: GNCT
1 NODIAL1
2 *FRAO
+++ TRAVER: SUCCESSFUL CALL TRACE +++
```

There are two TRAVER examples. The second example shows a PRI-to-ISUP IT call. The call originates on trunk PRIFLT1DF and is routed over trunk WSS2FLT2WY. The second part of the example shows an ISUP IT-to-PRI call. The call terminates to trunk PRIFLX0AF.

1 In lines 1 and 2 of the example, table TRKGRP is accessed with the trunk group PRIFLT1DF and provides the trunk group LTID, ISDN 104.

2 In lines 3 and 4, the LTID and the call type are used to access table LTCALLS, which provides the line attribute index 602.

3 In lines 6 and 7, the line attribute index 602 accesses table LINEATTR, which provides the serving translation scheme 214 and the pretranslator name SSWB.

NI000004 NI0 NI-2 DWS (NTXR49AA DWS PRI) (continued)

4 In lines 9 to 17, table STDPRTCT is accessed with the pretranslator name SSWB. Subtable STDPRT provides the pretranslator route selector N, which indicates that the next translations table is HNPACONT.

5 In lines 18 to 23, table HNPACONT is accessed with the serving translation scheme. Subtable HNPACODE is accessed with the digits 993 and provides the route reference index 4. Subtable RTEREF is then accessed with this index; this subtable provides the next translation table, OFRT, and another route reference index, 631.

6 In lines 24 and 25, table OFRT provides the ISUP IT trunk name WSS2FLT2WY. This is the end of TRAVER example 1.

7 In lines 54 and 55 of TRAVER example 2, table TRKGRP is accessed with the trunk group WSS2FLT2WS and provides the serving numbering plan area 519 and the pretranslator name WCAR.

8 In lines 58 to 65, table STDPRTCT is accessed with the pretranslator name WCAR. Subtable STDPRT provides the pretranslator route selector N, which indicates that the next translations table is HNPACONT.

9 In lines 66 to 73, table HNPACONT is accessed with the serving numbering plan area 519. Subtable HNPACODE is accessed with the digits 640 to provide the route reference index 2. Subtable RTEREF is then accessed with this index; this subtable provides the next translation table, OFRT, and another route reference index, 601.

10 In lines 74 and 75, table OFRT provides the terminating PRI trunk name PRIFLX0AF.

In the TRAVER commands shown in this example,

- TR indicates that a trunk name follows
- B indicates that the type of trace required is “both,” meaning that both a table trace and a digit trace are performed

NI000004 NI0 NI-2 DWS (NTXR49AA DWS PRI) (continued)

TRAVER output example for NI000004 NI0 NI-2 DWS (NTXR49AA DWS PRI)

```
traver tr priflt1df 9936400222 b
TABLE TRKGRP
PRIFLT1DF PRA 0 NPDGP NCIT WIDEBAND DSEQ FLOATING FIRSTFIT N (ISDN 104)
$ $
TABLE LTCALLS
ISDN 104 PUB XLALEC 602 (EA BNR Y) $
Originator is not an AIN agent
therefore AIN info is not processed on originator side
TABLE LINEATTR
602 1FR NONE NT NSCR 0 214 SSWB LSWB NONE 0 NIL NILSFC LATA3 0 NIL NIL
00 N $
LCABILL OFF – BILLING DONE ON BASIS OF CALLTYPE
TABLE STDPRTCT
SSWB ( 1) ( 0) 0
 . SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE BILLING.  CALL TYPE
DEFAULT IS NP.  PLEASE REFER TO DOCUMENTATION.
 . KEY NOT FOUND
 . DEFAULT VALUE IS:   N NP 0 NA
 . SUBTABLE AMAPRT
 . KEY NOT FOUND
 . DEFAULT VALUE IS:   NONE OVRNONE N
TABLE HNPACONT
214 500 1 ( 42) ( 1) ( 47) ( 0) 0
 . SUBTABLE HNPACODE
 . 993 993 FRTE 4
 . SUBTABLE RTEREF
 .   4 T OFRT 631
 . . TABLE OFRT
 . . 631 S D WSS2FLT2WY
 . .     S D WSS2FIX2WY
 . .     S D WSS2FLX2WY
 . . EXIT TABLE OFRT
 . EXIT TABLE RTEREF
EXIT TABLE HNPACONT
TABLE LCASCRCN
214 LSWB ( 2) OPTL N
 . SUBTABLE LCASCR
 . TUPLE NOT FOUND. DEFAULT IS NON–LOCAL
```

NI000004 NI0 NI-2 DWS (NTXR49AA DWS PRI) (continued)

TRAVER output example for NI000004 NI0 NI-2 DWS (NTXR49AA DWS PRI)

```
TABLE PFXTREAT
OPTL NP N DD UNDT
TABLE LATAXLA
TUPLE NOT FOUND
ASSUMED TO BE DEFAULT INTRALATA, INTRASTATE, STD
TABLE EASAC
TUPLE NOT FOUND
+++ TRAVER: SUCCESSFUL CALL TRACE +++
  DIGIT TRANSLATION ROUTES
1 WSS2FLT2WY           9936400222       ST
2 WSS2FIX2WY           9936400222       ST
3 WSS2FLX2WY           9936400222       ST

TREATMENT ROUTES.  TREATMENT IS: GNCT
1 NODIAL1
2 *FRAO
+++ TRAVER: SUCCESSFUL CALL TRACE +++
------------------------------------------------------------------------
traver tr wss2flt2ws 9936400222 b
TABLE TRKGRP
WSS2FLT2WS IT 0 NPDGP NCIT 2W NIL WIDEBAND ASEQ FLOATING BESTFIT 919
WCAR NSCR 519 000 Y N $
TABLE OFCVAR
AIN_OFFICE_TRIGGRP NIL
TABLE STDPRTCT
WCAR ( 1) ( 0) 0
   SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE BILLING.  CALL TYPE
DEFAULT IS NP.  PLEASE REFER TO DOCUMENTATION.
 . 9 9 N NP 3 NA
 . SUBTABLE AMAPRT
   KEY NOT FOUND
   DEFAULT VALUE IS:   NONE OVRNONE N
TABLE HNPACONT
519 400 3 ( 12) ( 1) ( 91) ( 0) 0
 . SUBTABLE HNPACODE
 . 640 640 LRTE 2
AIN Info Collected TDP: no subscribed trigger
AIN Info Analyzed TDP: no subscribed trigger
. SUBTABLE RTEREF
 .   2 T OFRT 601
```

NI000004 NI0 NI-2 DWS (NTXR49AA DWS PRI) (continued)

TRAVER output example for NI000004 NI0 NI-2 DWS (NTXR49AA DWS PRI)

```
 . . TABLE OFRT
 . . 601 S D PRIFLX0AF
 . .     T RRTE 1
 . . . TABLE RRTE
 . . . . TABLE REROUTE
 . . . . 1 ( 1)
 . . . . . SUBTABLE NWMRROUT
 . . . . . NOT ACTIVATED
 . .    S D PRIFIX0AB
 . .    S D PRIFLT1DF
 . . EXIT TABLE OFRT
 . EXIT TABLE RTEREF
EXIT TABLE HNPACONT
+++ TRAVER: SUCCESSFUL CALL TRACE +++

DIGIT TRANSLATION ROUTES

1 PRIFLX0AF            N CDN E164 L 6400222 NIL_NSF  BC 64k DATA
2 PRIFLX0AB            N CDN E164 L 6400222 NIL_NSF  BC 64k DATA
3 PRIFLT1DF            N CDN E164 L 6400222 NIL_NSF  BC 64k DATA

TREATMENT ROUTES.  TREATMENT IS: GNCT
1 NODIAL1
2 *FRAO
+++ TRAVER: SUCCESSFUL CALL TRACE +++
```

The third example shows an abbreviated dialing using virtual facility groups (VFG) for a PRI-to-PRI DWS call. The call originates on trunk PRIFLTIDF and terminates on trunk PRIFLXOAF. This is one way of implementing abbreviated dialing for PRI.

The first TRAVER takes the trunk and provides a VFG.

1 In lines 1 and 2 of the first TRAVER, table TRKGRP is accessed with the trunk group PRIFLTIDF and provides the trunk group LTID, ISDN 104.

2 In lines 3 and 4, the LTID and the call type are used to access table LTCALLS, which provides the route and table name.

3 In lines 5 through 7, the route is used as the index into table IBNRTE which provides the VFG name.

NI000004 NI0 NI-2 DWS (NTXR49AA DWS PRI) (continued)

The second TRAVER takes the VFG and the digits and provides the terminating trunk.

1 In lines 1 and 2 of the second TRAVER, table VIRTGRPS is accessed with the VFG of VFG1 and provides the network class of service of PRADEFAULT and the IBN incoming type.

2 In lines 3 and 4, table NCOS is accessed with the NCOS of PRADEFAULT.

3 In lines 5 and 6, table CUSTHEAD is accessed with the NCOS of PRADEFAULT and provides the translator of PRAXLA.

4 In lines 10 and 11, table IBNXLA is accessed with the translator name of PRAXLA and provides the route of PRIFLXOAF.

In the TRAVER commands shown in this example,

- TR indicates that a trunk name follows, and PRIFLTIF is the trunk name
- B indicates that the type of trace required is “both,” meaning that both a table trace and a digit trace are performed
- 4002 represents the incoming digits
- PRVT sets the NSF to private

NI000004 NI0 NI-2 DWS (NTXR49AA DWS PRI) (continued)

TRAVER output example for NI000004 NI0 NI-2 DWS (NTXR49AA DWS PRI)

```
traver tr priflt1df 4002 prvt b
TABLE TRKGRP
PRIFLT1DFDWS1 PRA 0 NPDGP NCIT WIDEBAND DSEQ FLOATING FIRSTFIT N
(ISDN 104) $ $
TABLE LTCALLS
ISDN 104 PVT RTEREF IBNRTE 1 $
TABLE IBNRTE
 . 1 VFG N N N VFG1 0
EXIT TABLE IBNRTE
+++ TRAVER: SUCCESSFUL CALL TRACE +++
DIGIT TRANSLATION ROUTES
1 VFG: VFG1            4002            ST
TREATMENT ROUTES.    TREATMENT IS: GNCT
1 NODIAL1
2 *FRAO
+++ TRAVER: SUCCESSFUL CALL TRACE +++


traver v vfg1 '4002' b
TABLE VIRTGRPS
VFG1 SIZE 23 IBN N PRADEFAULT 0 0 0 Y N N $
TABLE NCOS
PRADEFAULT 0 0 0 PRAD $
TABLE CUSTHEAD: CUSTGRP, PRELIMXLA, CUSTXLA, FEATXLA, VACTRMT, AND
DIGCOL
PRADEFAULT NXLA PRAXLA NXLA 0 NDGT
TABLE DIGCOL
NDGT specified: digits collectetd individually
NCOS PRELIM XLA name is NIL.  Go to next XLA name.
CUST PRELIM XLA name is NIL.  Go to next XLA name.
TABLE IBNXLA: XLANAME PRAXLA
PRAXLA 4002 ROUTE N N N 0 N 3 10 POTS Y S DWS2
TABLE DIGCOL
POTS specified: POTS digit collection
+++ TRAVER: SUCCESSFUL CALL TRACE +++
DIGIT TRANSLATION ROUTES
1 PRIFLX0AF       N CDN PVT L 4002 NIL_NSF   BC SPEECH
TREATMENT ROUTES.  TREATMENT IS: GNCT
1 NODIAL1
2 *FRAO
+++ TRAVER: SUCCESSFUL CALL TRACE +++
```

NI000004 NI0 NI-2 DWS (NTXR49AA DWS PRI) (end)

SERVORD

NI000004 NI0 NI-2 DWS (NTXR49AA DWS PRI) does not use SERVORD.

NI000023 Intertoll ISUP & SS7 (NTXS28AA DWS IT ISUP)

Functionality code

Functionality group ordering code: not applicable

Functionality ordering code: NI000023

Release applicability

LEC002, CDN002, LET002

Prerequisites

All the datafill information for this particular functionality is included in this document. However, prerequisite software or hardware may be required for complete implementation.

Description

NI000023 Intertoll ISUP & SS7 (NTXS28AA DWS IT ISUP) is included in functional group (FG) NI000004 NI0 NI–2 DWS. It provides basic Dialable Wideband Service (DWS) for wideband-dedicated ISUP intertoll (IT) trunks. The IT trunks provide intra-LATA connections between equal access end offices (EAEO) and through access tandems on a DMS-100 Local Exchange Carrier (LEC) switch.

NI000023 Intertoll ISUP & SS7 (NTXS28AA DWS IT ISUP) implements DWS for the LEC market according to the current standards. It provides LECs with fractional DS-1 connectivity using CCS7 ISDN user part (ISUP) trunking.

Operation

The process of routing a wideband call, as with a narrowband call, requires four main steps:

- origination
- translations
- trunk selection
- termination

Further information on all three methods can be found on page 3-1.

Origination

An incoming call on the ISUP IT trunk is identified as wideband if

- the initial address message (IAM) requests a transfer rate of 128 kbit/s to 1.536 Mbit/s

NI000023 Intertoll ISUP & SS7 (NTXS28AA DWS IT ISUP) (continued)

- the IT trunk group is datafilled as wideband

Translations

Existing translations methods currently provided on IT trunk groups are used for NI000023 Intertoll ISUP & SS7 (NTXS28AA DWS IT ISUP).

Trunk selection

DWS uses three trunk selection methods:

- fixed
- floating
- flexible

Termination

The termination procedure for a wideband call is identical to that of a narrowband ISDN call.

Translations table flow

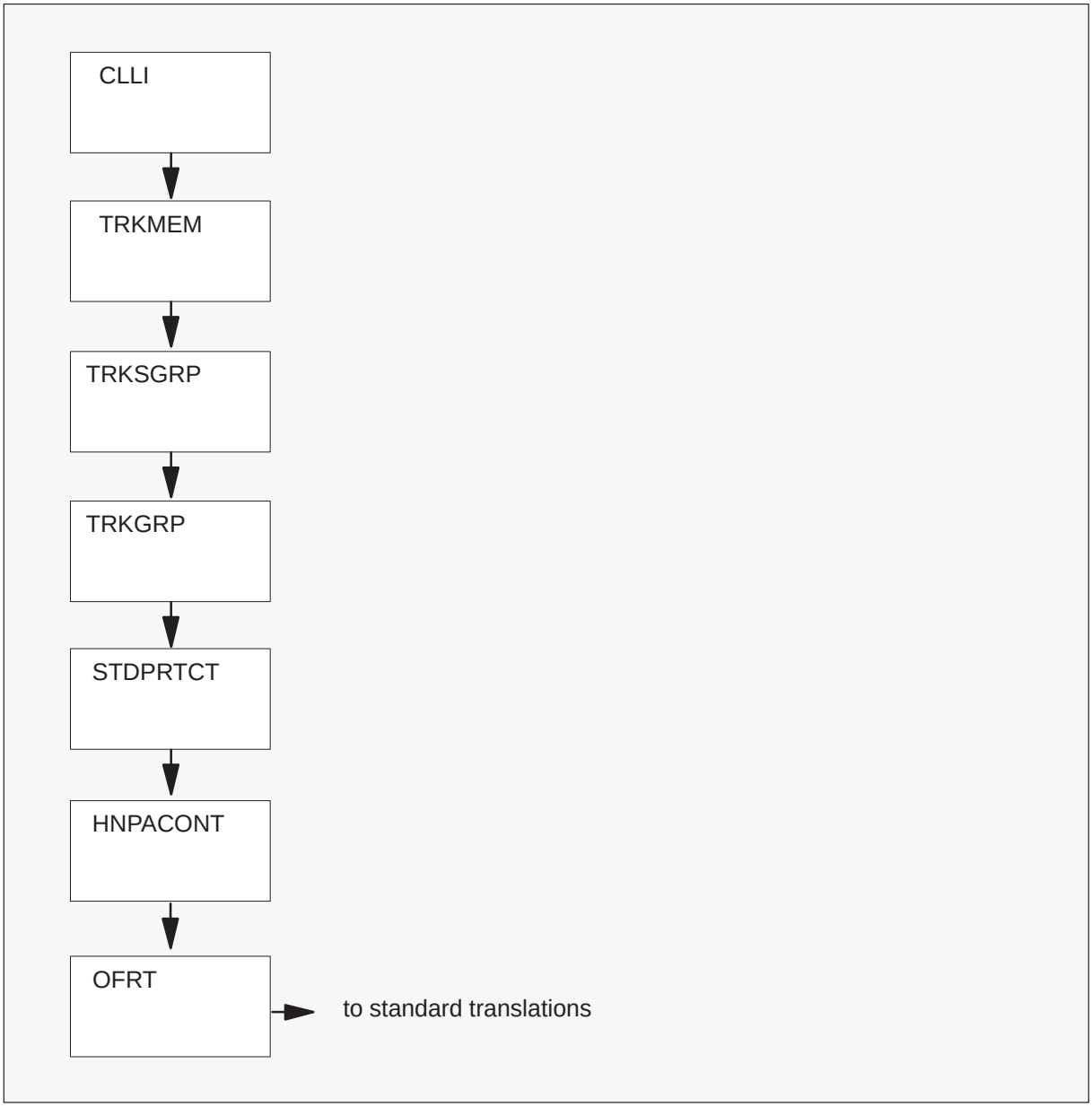
The NI000023 Intertoll ISUP & SS7 (NTXS28AA DWS IT ISUP) translations process is shown in the table flow illustration on page 3-40. Call processing in the DMS-100 switch begins with the trunking tables that define the attributes of the ISUP IT trunk group.

For the incoming call, table CLLI identifies the trunk group, and table TRKMEM determines the physical location of the circuit carrying the call. The trunk identifier (CLLI) accesses table TRKSGRP which defines the signaling protocol used by the trunk, and table TRKGRP which provides the standard pretranslator table name (PRTNM) and the serving numbering plan area (SNPA) for the originating trunk group.

The PRTNM value accesses table STDPRTCT which contains the list of standard pretranslation tables. The SNPA value is then used to access table HNPACONT that lists the home numbering plan areas. This table provides a route reference index. The index is used to access table OFRT, which provides the information necessary to route the call to the terminating trunk group.

NI000023 Intertoll ISUP & SS7 (NTXS28AA DWS IT ISUP) (continued)

Table flow for NI000023 Intertoll ISUP & SS7 (NTXS28AA DWS IT ISUP)



NI000023 Intertoll ISUP & SS7 (NTXS28AA DWS IT ISUP) (continued)

The following table lists the datafill content for digits dialed 933-640-0222 used in the flowchart example.

Datafill example for NI000023 Intertoll ISUP & SS7 (NTXS28AA DWS IT ISUP)

Datafill table	Example data
TRKGRP	WSS1FLT2WS IT 0 NPDGP NCIT 2W NIL WIDEBAND ASEQ FLOATING BESTFIT 214 WRTP NSCR 919 000 Y N $
STDPRTCT	WRTP 1 0
HNPACONT	913 300 1 16 1 38 0
OFRT	631 S D WSS2FLT2WY $

Limitations and restrictions

The following limitations and restrictions apply to NI000023 Intertoll ISUP & SS7 (NTXS28AA DWS IT ISUP):

- All the DS-0s used in a wideband call must be datafilled in the same trunk group and must reside on the same T1.
- If the IAM of the incoming call indicates a wideband transfer rate but the IT trunk is not datafilled as wideband in table TRKGRP, the BC_NOT_IMPLEMENTED (BCNI) treatment is applied.
- If the route provided by translations contains a nonwideband capable IT trunk group, the call advances through the route list until it reaches a wideband dedicated IT trunk group.
- Overlap inpulsing and outpulsing are not supported.
- Meridian Business Group (MBG) is not supported.
- Off-hook and on-hook queuing is not supported.
- BERT testing is supported on individual DS-0 channels but not on a group of channels.
- COT testing for wideband calls on ISUP is not supported.

Interactions

NI000023 Intertoll ISUP & SS7 (NTXS28AA DWS IT ISUP) has no functionality interactions.

Activation/deactivation by the end user

NI000023 Intertoll ISUP & SS7 (NTXS28AA DWS IT ISUP) requires no activation or deactivation by the end user.

NI000023 Intertoll ISUP & SS7 (NTXS28AA DWS IT ISUP) (continued)

Billing

NI000023 Intertoll ISUP & SS7 (NTXS28AA DWS IT ISUP) uses the new Bellcore automatic message accounting (AMA) billing records described below.

Bellcore AMA

Bellcore AMA has three call type codes for DWS. Each supports call transfer rates from 2 to 24 DS0s.

The three codes are:

- 148 — intranet high bandwidth call
- 149 — originating access high bandwidth call
- 150 — terminating access high bandwidth call

For intra-LATA DWS calls, call type code 148 has been defined. It is generated when an intranetwork DWS call originates and completes at the originating switch complex within the LATA. It is associated with structure code 0190.

For inter-LATA DWS calls, two call type codes have been defined. Each is associated with structure code 0645.

- Call code 149 is generated when an internetwork DWS call originates at the originating switch complex within the LATA originating the call.
- Call code 150 is generated when an internetwork DWS call completes at the point-of-presence (POP) switch complex within the LATA terminating the call.

Station Message Detail Recording

NI000023 Intertoll ISUP & SS7 (NTXS28AA DWS IT ISUP) does not support Station Message Detail Recording.

Datafilling office parameters

The following table shows the office parameters used by NI000023 Intertoll ISUP & SS7 (NTXS28AA DWS IT ISUP). For more information about office parameters, refer to *Office Parameters Reference Manual.*

NI000023 Intertoll ISUP & SS7 (NTXS28AA DWS IT ISUP) (continued)

Office parameters used by NI000023 Intertoll ISUP & SS7 (NTXS28AA DWS IT ISUP)

Table name	Parameter name	Explanation and action
OFCENG (see note)	MAX_NUM_WIDEBAND_CALLS	The parameter value indicates the maximum number of active wideband calls at one time. The default for this parameter is 0. The parameter value ranges from 0 to 4096.
OFCOPT	ISUP_SUBGRP_GLARE_AVAILABLE	The parameter values of Y (yes) and N (no) specify whether or not glare resolution is offered for ISUP.
Note: A cold restart is required to decrease the value of these parameters.		

Datafill sequence

The following table lists the tables that require datafill to implement NI000023 Intertoll ISUP & SS7 (NTXS28AA DWS IT ISUP). The tables are listed in the order in which they are to be datafilled.

Datafill tables required for NI000023 Intertoll ISUP & SS7 (NTXS28AA DWS IT ISUP)

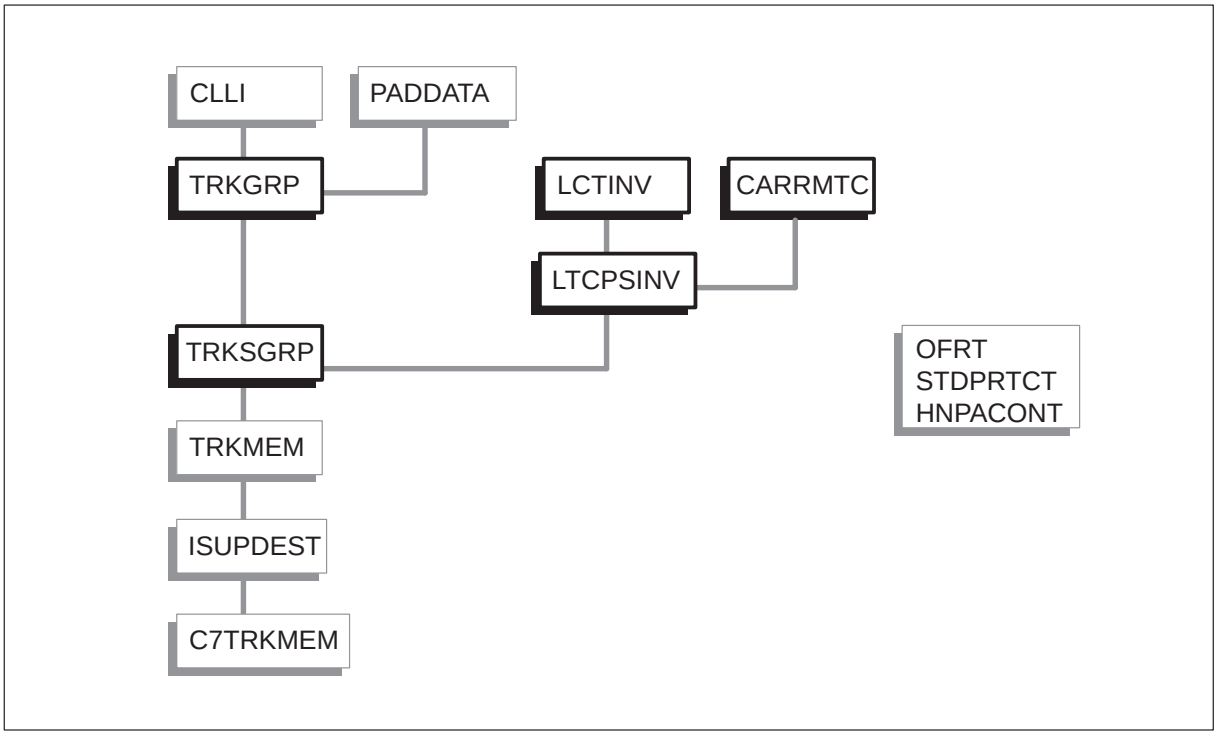
Table	Purpose of table
LTCINV	Contains the inventory data for various peripheral modules.
CARRMTC	Allows the DMS switch administration to datafill maintenance control information in peripheral modules.
LTCPSINV	Contains the assignment of the P-side links for the peripheral modules.
TRKGRP	Lists the customer-defined data associated with each trunk group existing in the switching unit.
TRKSGRP	Lists supplementary information for each subgroup assigned to one of the trunk groups listed in table TRKGRP.
—end—	

The following figure shows the datafill dependencies between the DMS-100 tables that are used for ISUP IT. For example, table TRKGRP is dependent on data in table CLLI, so table CLLI must be datafilled before table TRKGRP. The tables described in this chapter are bolded in the illustration. Refer to the data schema section of the *Translations Guide* for a description of the other tables.

NI000023 Intertoll ISUP & SS7 (NTXS28AA DWS IT ISUP) (continued)

Tables OFRT, STDPRTCT, and HNPACONT must be datafilled but not in a particular sequence.

DMS–100 ISUP IT datafill dependencies



Datafilling table LTCINV

The following table shows the datafill specific to NI000023 Intertoll ISUP & SS7 (NTXS28AA DWS IT ISUP) for table LTCINV. Only those fields that apply directly to NI000023 Intertoll ISUP & SS7 (NTXS28AA DWS IT ISUP) are shown. For a description of the other fields, refer to the data schema section of the *Translations Guide*.

Table LTCINV lists the inventory for DTC7 peripheral modules in the DMS switch. For each DTC7 used by wideband dedicated trunk groups, table LTCINV must be datafilled with the optional card required for the service.

Tables OFRT, STDPRTCT, and HNPACONT must be datafilled but not in a particular sequence.

NI000023 Intertoll ISUP & SS7 (NTXS28AA DWS IT ISUP) (continued)

Datafilling table LTCINV

Field	Subfield or refinement	Entry	Explanation and action
LTCNAME			Peripheral module name. Enter the name of the peripheral module, DTC, followed by its number (0 to 255).
ADNUM			External administrative number. Enter a unique external administrative number (1 to 4095) associated with the peripheral module.
FRTYPE			Frame type. Enter the frame type (DTE) on which the peripheral module equipment is mounted.
FRNO			Frame number. Enter the frame number (0 to 511) of the frame type on which the peripheral module is mounted.
SHPOS			Shelf position. Enter the shelf position (18, 32, 51, 65) where the peripheral module is located.
FLOOR			Floor. Enter the floor (0 to 99) on which the peripheral module frame is located.
ROW			Row. Enter the row on the floor where the peripheral module equipment frame is located.
FRPOS			Frame position. Enter the bay position (0 to 99) of the peripheral module equipment frame.
EQPEC			Equipment product engineering code. Enter the product engineering code (PEC) of the peripheral module.
LOAD			Load. Enter the name of the load required for the peripheral module.
EXECTAB			Executive table. This vector is made up of subfields TRMTYPE, EXEC, and CONTMARK.
	TRMTYPE		Terminal type. Enter the type of peripheral module terminal used.
	EXEC		Executive program. Enter the set of executive programs that are required for the peripheral module specified in the TRMTYPE entry.

—continued—

NI000023 Intertoll ISUP & SS7 (NTXS28AA DWS IT ISUP) (continued)

Datafilling table LTCINV (continued)

Field	Subfield or refinement	Entry	Explanation and action
	CONTMARK		Continuation mark. A plus sign (+) indicates that the vector continues on the next line. A dollar sign ($) indicates the end of the vector.
CSLNKTAB			C-side link table. This field is made up of subfields ENSHELF, ENSLOT, ENLINK, ENDS30, and CONTMARK.
	ENSHELF		ENET shelf number. Enter the shelf number (0 to 7) to which the peripheral module is assigned.
	ENSLOT		ENET slot number. Enter the crosspoint slot number to which the peripheral module is assigned, corresponding to C-side links.
	ENLINK		ENET link number. Enter the link on the crosspoint (0 to 18) to which the peripheral module is assigned, corresponding to C-side links 0 to 18 of the peripheral module.
	ENDS30		ENDS30. This field defaults to 0 when the link is a DS30. All entries must be contiguous from 0. No entry can be duplicated.
	CONTMARK		Continuation mark. A plus sign (+) indicates that the vector continues on the next line. A dollar sign ($) indicates the end of the vector.
OPTCARD			Optional card. This field is a vector that may have up to 10 entries separated by plus signs (+). A dollar sign ($) indicates the end of the vector. Enter DCTAX78.
TONESET			Tone set. Enter NORTHAM, the tone set for the switch datafilled.
PECS6X45			6X45 equipment PEC. Enter the two product engineering codes (PEC) of the 6X45 card. One PEC is required for each unit of the XPM.
E2LOAD			Electrically erasable programmable read only memory. Enter the EEPROM load name. If the shelf is equipped with a processor different from NTXM77, this field is automatically datafilled with NILLOAD.

—continued—

NI000023 Intertoll ISUP & SS7 (NTXS28AA DWS IT ISUP) (continued)

Datafilling table LTCINV (continued)

Field	Subfield or refinement	Entry	Explanation and action
OPTATTR			Optional attribute. Enter optional attributes, separated by a plus sign (+). The CCS7 attribute must be entered. Enter a dollar sign ($) at the end of the vector or if no attribute is required.
PEC6X40			6X40 equipment PEC. Enter the version of the 6X40 EQPEC card in the peripheral module.
		—end—	

Datafill example for table LTCINV

The following example shows sample datafill for table LTCINV.

MAP display example for table LTCINV

```
   LTCNAME       FRTYPE
EXECTAB
                        OPTCARD
_____________________________________________________________________
   DTC 0    1001    DTE 0 18 0 D 0 6X02AA DC735CR1 (ABTRK
DTCFX) (AVTRK ADTCIX) (AVACC ADTCEX) $
(0 32 0 0) (0 32 0 1) (0 32 0 2) (0 32 0 3) (0 32 0 4) (0
32 0 5) (0 32 0 6) (0 32 0 7) (0 32 0 8) (0 32 0 9) (0 32
0 10) (0 32 0 11) (0 32 0 12) (0 32 0 13) (0 32 0 14) (0
32 0 15) $ (UTR15) (MSG6X69) (STR16IC) (DCTAX78) $
NORTHAM 6X45BA 6X45BA NILLOAD (CCS7) (STRDTRE) $ 6X40AC
```

Datafilling table CARRMTC

The following table shows the datafill specific to NI000023 Intertoll ISUP & SS7 (NTXS28AA DWS IT ISUP) for table CARRMTC. Only those fields that apply directly to NI000023 Intertoll ISUP & SS7 (NTXS28AA DWS IT ISUP) are shown. For a description of the other fields, refer to the data schema section of the *Translations Guide*.

Table CARRMTC contains peripheral module maintenance data. A tuple specific to NI000023 Intertoll ISUP & SS7 (NTXS28AA DWS IT ISUP) must be added in this table. This tuple must be based on the existing default tuple for the DTC7 peripheral module. The fields that have to change are described in the following table.

NI000023 Intertoll ISUP & SS7 (NTXS28AA DWS IT ISUP) (continued)

Datafilling table CARRMTC

Field	Subfield or refinement	Entry	Explanation and action
TMPLTNM			Template name. Enter DWS.
CARD			Card. Enter NT6X50AB.
FF			Frame format. Enter SF or ESF.
ZLG			Zero logic. Enter B8ZS.

Datafill example for table CARRMTC

The following example shows sample datafill for table CARRMTC. The first example shows the DTC7 default tuple. The second example shows the DTC7 tuple specific to NI000023 Intertoll ISUP & SS7 (NTXS28AA DWS IT ISUP).

MAP display example for table CARRMTC

```
CMSTYPE TMPLTNM RTSML RTSOL ATTR
_____________________________________________________________
DTC DEFAULT 255 255 DS1 NT6X50AA MU_LAW SF ZCS BPV NILDL N
250 1000 50 50 150 1000 3 6 864 100 17 511 4 255
_____________________________________________________________
DTC DWS 255 255 DS1 NT6X50AB MU_LAW ESF B8ZS BPV NILDL N 250
1000 50 50 150 1000 3 6 864 100 17 511 4 255
```

Datafilling table LTCPSINV

The following table shows the datafill specific to NI000023 Intertoll ISUP & SS7 (NTXS28AA DWS IT ISUP) for table LTCPSINV. Only those fields that apply directly to NI000023 Intertoll ISUP & SS7 (NTXS28AA DWS IT ISUP) are shown. For a description of the other fields, refer to the data schema section of the *Translations Guide*.

Table LTCPSINV contains the assignment of the P-side links for the peripheral modules. The DS-1 links on the DTC7 that carry wideband calls must be datafilled as wideband.

NI000023 Intertoll ISUP & SS7 (NTXS28AA DWS IT ISUP) (continued)

Datafilling table LTCPSINV

Field	Subfield or refinement	Entry	Explanation and action
LTCNAME			Line trunk controller name. Enter the peripheral module type (DTC) followed by its number (0 to 255).
PSLNKTAB			P-side link table. This field is a vector made up of subfields PSLINK, PSDATA, and CONTMARK. PSLNKTAB may have up to 20 entries.
	PSLINK		P-side link. Enter a number (0 to 19) to indicate the P-side port number for the DS-1.
	PSDATA		P-side data. Enter DS1.
	CARRIDX		Carrier index. Enter DWS, the template name defined in table CARRMTC, if the DS-1 link carries wideband calls. If the DS-1 link does not carry wideband calls, enter DEFAULT.
	ACTION		Action. Enter Y (yes) to indicate that the carrier is removed from service when the out-of-service limit for frame, slip, errored-second, or severe-errored-second is exceeded. If the carrier is not removed from service, enter N (no).
	CONTMARK		Continuation mark. A plus sign (+) indicates that the vector continues on the next line. A dollar sign ($) indicates the end of the vector.

Datafill example for table LTCPSINV

The following example shows sample datafill for table LTCPSINV.. In the example, DS-1 links 0 and 2 are datafilled as wideband.

MAP display example for table LTCPSINV

```
LTCNAME PSLNKTAB
_____________________________________________________________________
DTC 0 (0 DS1 DWS N) (1 DS1 DEFAULT N) (2 DS1 DWS N) (3 DS1
DEFAULT N) (4 DS1 DEFAULT N) (5 DS1 DEFAULT N) (6 DS1
DEFAULT N) (7 DS1 DEFAULT N) (8 DS1 DEFAULT N) (9 DS1
DEFAULT N) (10 DS1 DEFAULT N) (11 DS1 DEFAULT N) (12 DS1
DEFAULT N) (13 DS1 DEFAULT N) (14 DS1 DEFAULT N) (15 DS1
DEFAULT N) (16 DS1 DEFAULT N) (17 DS1 DEFAULT N) (18 DS1
DEFAULT N) (19 DS1 DEFAULT N) $
```

NI000023 Intertoll ISUP & SS7 (NTXS28AA DWS IT ISUP) (continued)

Datafilling table TRKGRP

The following table shows the datafill specific to NI000023 Intertoll ISUP & SS7 (NTXS28AA DWS IT ISUP) for table TRKGRP. Only those fields that apply directly to NI000023 Intertoll ISUP & SS7 (NTXS28AA DWS IT ISUP) are shown. For a description of the other fields, refer to the data schema section of the *Translations Guide*.

Table TRKGRP is used by wideband call processing and trunk maintenance to recognize, choose, and route idle trunks. When the selection sequence field (SELSEQ) is set to WIDEBAND, the following subfields are displayed:

- Wideband selection sequence (WBSELSEQ). This subfield specifies whether the DS-0 channels are chosen in ascending or descending order.
- Wideband search (WBSEARCH). This subfield specifies the search method used to find a group of channels. FIRSTFIT and BESTFIT are valid.
- Wideband grouping (WBGRPING). This subfield specifies the trunk selection method. The FIXED, FLOATING, and FLEXIBLE methods are valid.

Datafilling table TRKGRP

Field	Subfield or refinement	Entry	Explanation and action
GRPKEY			Trunk group name. Enter the trunk group name from table CLLI.
GRPTYP			Group type. Enter the type of trunk as IT.
TRAFSNO			Trunk separation number. For incoming trunks, enter the incoming traffic separation number (0 to 127). For outgoing trunks, enter the outgoing traffic separation number (0 to 127). For two-way trunks, enter both. When not required, enter 0.
Note 1: This field is only available after NA03. Prior to NA03, use field BLOCKNB.			
Note 2: This field is only available prior to NA03. After NA03, use field OPTION to enter BLOCKNB.			

—continued—

NI000023 Intertoll ISUP & SS7 (NTXS28AA DWS IT ISUP) (continued)

Datafilling table TRKGRP (continued)

Field	Subfield or refinement	Entry	Explanation and action
PADGRP			PAD group. Enter the name of the originating PAD group from table PADDATA (subfield PADGRP1).
NCCLS			Operational measurements no circuit class. For incoming trunks, enter NCRT. For outgoing and two-way trunks, enter the operational measurements no circuit class to indicate which OM register is incremented when treatment GNCT occurs.
DIR			Trunk direction. Enter the trunk group direction: incoming (IC), outgoing (OG), or two-way (2W).
TRAFCLS			Traffic usage class. Enter the traffic usage class assigned to the trunk group.
SELSEQ			Selection sequence. Enter WIDEBAND.
	WBSELSEQ		Wideband selection sequence. Enter ASEQ to specify ascending order, DSEQ for descending order.
	WBGRPING		Wideband grouping. Enter FIXED, FLOATING, or FLEXIBLE. ***Note:*** The FLEXIBLE selection method is present only when NI000027 DWS Flexible Acc (NTXR65AA Flexible DWS Access) is loaded.
	WBSEARCH		Wideband search. Enter FIRSTFIT to select the first available channels, BESTFIT to select the smallest segment of idle DS-0 channels among T1s in a trunk group that can carry the bandwidth specified.

Note 1: This field is only available after NA03. Prior to NA03, use field BLOCKNB.

Note 2: This field is only available prior to NA03. After NA03, use field OPTION to enter BLOCKNB.

—continued—

NI000023 Intertoll ISUP & SS7 (NTXS28AA DWS IT ISUP) (continued)

Datafilling table TRKGRP (continued)

Field	Subfield or refinement	Entry	Explanation and action
CONNGNPA			Connecting NPA. Enter 000 for incoming trunks. For outgoing and two-way trunks, enter the three-digit NPA code of the switching unit where the outpulsed digits are translated.
PRTNM			Standard pretranslator table name. Where standard pretranslation is required, enter the name of the standard pretranslator table to which digit translation is to route after the receipt of one digit. Where pretranslation is not required, enter NPRT.
SCRNCL			Class of service screening table name. For incoming and two-way trunks requiring screening by class of service, enter the name of the class of service screening table to which digit translation is to be routed. For outgoing trunks or when class of service is not required, enter NSCR.
SNPA			Serving NPA. Enter the three-digit serving NPA code to which the trunk group belongs.
TERMTC			Terminating toll center. If the ISUP IT trunk is outgoing or two-way and if the switching unit where the outpulsed digits are translated is assigned a terminating toll center code, enter the code. For incoming trunks or when there is no terminating toll center code, enter 000.
TOLLCOMP			Toll completing. For outgoing and two-way trunks, enter Y when the trunk group is toll completing. Otherwise enter N.
CCWKVLD			Carrier connect wink. Enter N to indicate that the carrier connect wink in Equal Access international calls should not be regenerated. Otherwise, enter Y.

Note 1: This field is only available after NA03. Prior to NA03, use field BLOCKNB.

Note 2: This field is only available prior to NA03. After NA03, use field OPTION to enter BLOCKNB.

—continued—

NI000023 Intertoll ISUP & SS7 (NTXS28AA DWS IT ISUP) (continued)

Datafilling table TRKGRP (continued)

Field	Subfield or refinement	Entry	Explanation and action
OPTION (see note 1)			Option. Enter BCNAME to specify the bearer capability used by this trunk group. Enter CHGNUM to send a charge number and an originating line information parameter with an initial address message. Enter BLOCKNB to prevent narrowband calls from terminating or originating from members within this trunk group. Enter the dollar sign ($) if no option is required.
BLOCKNB (see note 2)			Block narrow band. Enter Y to prevent narrowband calls from terminating to or originating from members within this trunk group. Enter N if narrowband blocking is not required. ***Note:*** This field is only available if the FAST feature described in AD6611 is loaded and enabled in the switch.
Note 1: This field is only available after NA03. Prior to NA03, use field BLOCKNB. ***Note 2:*** This field is only available prior to NA03. After NA03, use field OPTION to enter BLOCKNB.			
—end—			

Datafill example for table TRKGRP

The following example shows sample datafill for table TRKGRP.. In the first example, NI000023 Intertoll ISUP & SS7 (NTXS28AA DWS IT ISUP) is assigned to IT trunk WSS1FIX2WS.

MAP display example for table TRKGRP

```
    GRPKEY                                          GRPINFO
_____________________________________________________________________
WSS1FIX2WS
       IT 0 NPDGP NCIT 2W NIL WIDEBAND ASEQ
FIXED BESTFIT 214 SUPR NSCR 214 000 Y N $ Y
```

Error messages for table TRKGRP

The following error messages apply to table TRKGRP.

NI000023 Intertoll ISUP & SS7 (NTXS28AA DWS IT ISUP) (continued)

Error messages for table TRKGRP

Error message	Explanation and action
CANNOT CHANGE FROM WIDEBAND TO ASEQ	The value of SELSEQ cannot be changed from WIDEBAND to any other selection sequence. Delete the trunk group's entry and add a new one with the correct selection sequence.
CANNOT CHANGE WBGRPING. TUPLE IN TRKSGRP MUST BE DELETED FIRST.	The WBGRPING subfield can be changed only if no subgroup in table TRKSGRP is associated with the trunk group.

Datafilling table TRKSGRP

The following table shows the datafill specific to NI000023 Intertoll ISUP & SS7 (NTXS28AA DWS IT ISUP) for table TRKSGRP. Only those fields that apply directly to NI000023 Intertoll ISUP & SS7 (NTXS28AA DWS IT ISUP) are shown. For a description of the other fields, refer to the data schema section of the *Translations Guide*.

Table TRKSGRP specifies the recovery scheme for glare. Glare occurs when both ends of a trunk are seized at the same time. To minimize glare, the glare type field (GLARETYP) must be set to subgroup yield (SGRPYLD). A priority is then assigned to one of the switches. Refer to the physical provisioning guidelines section in the chapter *Planning and Engineering DWS* on page 2-1 for more information on glare.

Note: The order of the DS-0 datafill determines the order within the trunk group. For further information, consult the "Circuit and network provisioning" section of the *Planning and Engineering DWS* chapter on page 2-18.

NI000023 Intertoll ISUP & SS7 (NTXS28AA DWS IT ISUP) (continued)

Datafilling table TRKSGRP

Field	Subfield or refinement	Entry	Explanation and action
SGRPKEY			Trunk group name and subgroup. Enter the name of the trunk group from table CLLI followed by the number (0 or 1) assigned to the trunk subgroup.
CARDCODE			Card code. Enter DS1SIG, the card code used for ISUP IT.
SGRPVAR			Signal protocol. Enter C7UP, the only valid protocol used for call processing.
DIR			Trunk direction. Enter the trunk group direction: incoming (IC), outgoing (OG), or two-way (2W).
ESUPR			Echo suppressor. Where the trunk group has echo suppressors, enter H (half) when a half echo suppressor is located at the near end of the trunk group. Enter N (no) when the trunk group has no echo suppressor at the near end of the trunk group. Enter F (full) when a full echo suppressor is located at the near end of the trunk group.
SAT			Satellite. Enter N, since the trunk group is not arranged to switch by satellite.
ECSTAT			Echo cancellor status. Enter the echo cancellor status (EXTERNAL, INNOTONE, or UNEQ). Internal echo cancellor control is not supported.
ABCNTL			A-bit control. Enter NONE.
PROTOCOL			Signaling protocol type. Enter Q764.
CONTCHK			Continuity check. Because continuity testing is not supported for wideband calls, enter the default value THRH.
COTREQ			Continuity test required. Because continuity testing is not supported for wideband calls, enter 0. ***Note:*** This field is displayed for outgoing and two-way trunks only.

—continued—

NI000023 Intertoll ISUP & SS7 (NTXS28AA DWS IT ISUP) (continued)

Datafilling table TRKSGRP (continued)

Field	Subfield or refinement	Entry	Explanation and action
ADJNODE			Adjacent node. Enter the name of the adjacent node from table ADJNODE.
OPTION			Enter one of the following options: VACT, ATPINDEX, CCTOBDY, DEFITC, NO_HOP, BLOCK.
TMRNAME			Timer name. Enter NIL.
GLARETYP			Glare type. Enter SGRPYLD. ***Note:*** The SGRPYLD method is present only when office parameter ISUP_SUBGRP_GLARE_AVAILABLE is set to Y (yes) in table OFCOPT. It is displayed for two-way trunks only.
GLAREYLD			Glare yield. Enter Y if the switching unit is to yield control of the trunks in this subgroup in a glare condition, otherwise enter N. ***Note:*** This field is displayed for two-way trunks only.
—end—			

Datafill example for table TRKSGRP

The following example shows sample datafill for table TRKSGRP. In the example, NI000023 Intertoll ISUP & SS7 (NTXS28AA DWS IT ISUP) is assigned to IT trunk WSS1FIX2WS.

MAP display example for table TRKSGRP

```
          SGRPKEY CARDCODE
                                                    SGRPVAR
_____________________________________________________________________
   WSS1FIX2WS 1   DS1SIG
C7UP 2W N N UNEQ NONE Q764 THRH 0 DMSNODE NIL SGRPYLD N $
```

NI000023 Intertoll ISUP & SS7 (NTXS28AA DWS IT ISUP) (continued)

Error messages for table TRKSGRP

The following error messages apply to table TRKSGRP.

Error messages for table TRKSGRP

Error message	Explanation and action
The GLARETYP for WB trunks must be SGRPYLD	The value of GLARETYP can only be SGRPYLD for wideband IT trunks.

Translation verification tools

The following section provides information on the translation verification tools that can be used.

TRAVER

The translation verification (TRAVER) utility is a diagnostic tool that allows the operating company to simulate a telephone call in software and display the line, trunk, or position to which a call is routed, the translation and routing tables that the call accesses, and any additional tables accessed as a result of call screening enhancements. The following example shows the output from TRAVER when it is used to verify NI000023 Intertoll ISUP & SS7 (NTXS28AA DWS IT ISUP).

The example shows an ISUP IT-to-ISUP IT call. The call originates on trunk WSS1FLT2WS and terminates on trunk WSS2FLT2WY.

1 In lines 1 and 2 of the example, table TRKGRP is accessed with the trunk group WSS1FLT2WS and provides the serving numbering plan area 919 and the pretranslator name WRTP.

2 In lines 5 to 13, table STDPRTCT is accessed with the pretranslator name WRTP. Subtable STDPRT provides the pretranslator route selector N, which indicates that the next translations table is HNPACONT.

3 In lines 14 to 21, table HNPACONT is accessed with the serving numbering plan area 919. Subtable HNPACODE is accessed with the digits 933 to provide the route reference index 4. Subtable RTEREF is then accessed with this index; this subtable provides the next translation table, OFRT, and another route reference index, 631.

4 In lines 22 and 23, table OFRT provides the terminating IT trunk name WSS2FLT2WY.

NI000023 Intertoll ISUP & SS7 (NTXS28AA DWS IT ISUP) (continued)

Note: In the TRAVER commands shown in this example,

- TR indicates that a trunk name follows, and WSS1FLT2WS is the trunk name
- 9936400222 represents the incoming digits
- B indicates that the type of trace required is “both,” meaning that both a table trace and a digit trace are performed

The following example shows the output from TRAVER when it is used to verify NI000023 Intertoll ISUP & SS7 (NTXS28AA DWS IT ISUP).

NI000023 Intertoll ISUP & SS7 (NTXS28AA DWS IT ISUP) (continued)

TRAVER output example for NI000023 Intertoll ISUP & SS7 (NTXS28AA DWS IT ISUP)

```
traver tr wss1flt2ws 9336400222 b
TABLE TRKGRP
WSS1FLT2WS IT 0 NPDGP NCIT 2W NIL WIDEBAND ASEQ FLOATING BESTFIT 214
WRTP NSCR 919 000 Y N $
TABLE OFCVAR
AIN_OFFICE_TRIGGRP NIL
TABLE STDPRTCT
WRTP ( 1) ( 0) 0
 . SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE BILLING.  CALL TYPE
DEFAULT IS NP.  PLEASE REFER TO DOCUMENTATION.
 . KEY NOT FOUND
 . DEFAULT VALUE IS:   N NP 0 NA
 . SUBTABLE AMAPRT
 . KEY NOT FOUND
 . DEFAULT VALUE IS:   NONE OVRNONE N
TABLE HNPACONT
919 300 1 ( 16) ( 1) ( 38) ( 0) 0
 . SUBTABLE HNPACODE
 . 933 933 FRTE 4
AIN Info Collected TDP: no subscribed trigger
AIN Info Analyzed TDP: no subscribed trigger
 . SUBTABLE RTEREF
 .   4 T OFRT 631
 . . TABLE OFRT
 . . 631 S D WSS2FLT2WY
 . .     S D WSS2FIX2WY
 . .     S D WSS2FLX2WY
 . . EXIT TABLE OFRT
 . EXIT TABLE RTEREF
EXIT TABLE HNPACONT
+++ TRAVER: SUCCESSFUL CALL TRACE +++

DIGIT TRANSLATION ROUTES

1 WSS2FLT2WY           9336400222       ST
2 WSS2FIX2WY           9336400222       ST
3 WSS2FLX2WY           9336400222       ST

TREATMENT ROUTES.  TREATMENT IS: GNCT
1 NODIAL1
2 *FRAO
+++ TRAVER: SUCCESSFUL CALL TRACE +++
```

NI000023 Intertoll ISUP & SS7 (NTXS28AA DWS IT ISUP) (end)

SERVORD

NI000023 Intertoll ISUP & SS7 (NTXS28AA DWS IT ISUP) does not use SERVORD.

NI000027 DWS Flexible Acc (NTXR65AA Flex DWS Acc)

Functionality code

Functionality group ordering code: Not applicable

Functionality ordering code: NI000027

Release applicability

LEC002, CDN002, LET002

Prerequisites

All the datafill information for this particular functionality is included in this document. However, prerequisite software or hardware may be required for complete implementation.

Description

NI000027 DWS Flexible Acc (NTXR65AA Flex DWS Acc) is included in functional group (FG) NI000004 NI0 NI–2 DWS. It improves LEC Dialable Wideband Service by allowing flexible wideband trunk selection on PRI and ISUP IT trunks.

It can be used with the following functional group and functionalities (former NTX codes and names are listed):

- NI000004 NI0 NI–2 DWS
  - — NTXR49AA DWS PRI End Office
- NI000023 Intertoll ISUP & SS7
  - — NTXS28AA DWS Intertoll ISUP
- NI000028 DWS Carrier Acc
  - — NTXR66AA DWS Carrier Acc

NI000027 DWS Flexible Acc (NTXR65AA Flex DWS Acc) consists of the following features:

- AD3879 – Power-8*64 Wideband Optionality
- AD4574 – LEC WSS Flexible Channel Assignments

Operation

The call routing process for NI000027 DWS Flexible Acc (NTXR65AA Flex DWS Acc) is identical to that of NI0 NI-2 DWS (NTXR49AA DWS PRI) for PRI trunks and to that of NI000023 Intertoll ISUP & SS7 (NTXS28AA DWS Intertoll ISUP) for ISUP IT trunks. This functionality allows the flexible trunk selection method on these trunks.

NI000027 DWS Flexible Acc (NTXR65AA Flex DWS Acc) (continued)

The following conditions apply to the flexible trunk selection method:

- a call must remain within the boundary of a single T1
- full n by 64 wideband calls are supported (n = 2 to 24)
- noncontiguous channels can be selected
- channel order, using constant frame delay, must be maintained

For an illustration of flexible trunk selection, refer to the trunk selection section on page 3-9 for NI0 NI-2 DWS (NTXR49AA DWS PRI) or page 3-39 for NI000023 Intertoll ISUP & SS7 (NTXS28AA DWS Intertoll ISUP).

With this functionality, H0 and H11 traffic (384 kbit/s and 1.536 Mbit/s, respectively) may be routed over flexible trunks while traveling through the network.

Translations table flow

The NI000027 DWS Flexible Acc (NTXR65AA Flex DWS Acc) translations process for PRI trunks is identical to the NI0 NI-2 DWS (NTXR49AA DWS PRI) process. Refer to page 3-9 for NI0 NI-2 DWS (NTXR49AA DWS PRI) translations table flow.

For ISUP IT trunks, refer to page 3-39 for NI000023 Intertoll ISUP & SS7 (NTXS28AA DWS Intertoll ISUP) translations table flow.

Limitations and restrictions

NI000027 DWS Flexible Acc (NTXR65AA Flex DWS Acc): has no limitations or restrictions.

Interactions

NI000027 DWS Flexible Acc (NTXR65AA Flex DWS Acc) has no functionality interactions.

Activation/deactivation by the end user

NI000027 DWS Flexible Acc (NTXR65AA Flex DWS Acc) requires no activation or deactivation by the end user.

Billing

NI000027 DWS Flexible Acc (NTXR65AA Flex DWS Acc) does not affect billing.

NI000027 DWS Flexible Acc (NTXR65AA Flex DWS Acc) (continued)

Station Message Detail Recording

NI000027 DWS Flexible Acc (NTXR65AA Flex DWS Acc) does not support Station Message Detail Recording.

Datafilling office parameters

NI000027 DWS Flexible Acc (NTXR65AA Flex DWS Acc) does not affect office parameters.

Datafill sequence

The following table lists the tables that require datafill to implement NI000027 DWS Flexible Acc (NTXR65AA Flex DWS Acc). The tables are listed in the order in which they are to be datafilled.

Datafill tables required for NI000027 DWS Flexible Acc (NTXR65AA Flex DWS Acc)

Table	Purpose of table
TRKGRP	Lists the customer-defined data associated with each trunk group existing in the switching unit.

Datafilling table TRKGRP

The following table shows the datafill specific to NI000027 DWS Flexible Acc (NTXR65AA Flex DWS Acc) for table TRKGRP. Only those fields that apply directly to NI000027 DWS Flexible Acc (NTXR65AA Flex DWS Acc) are shown. For a description of the other fields, refer to the data schema section of the *Translations Guide*.

Datafilling table TRKGRP

Field	Subfield or refinement	Entry	Explanation and action
SELSEQ			Selection sequence. Enter WIDEBAND.
	WBGRPING		Wideband grouping. This subfield specifies the selected method used by call processing. Enter FLEXIBLE.
Note 1: This field is only available after NA03. Prior to NA03, use field BLOCKNB. ***Note 2:*** This field is only available prior to NA03. After NA03, use field OPTION to enter BLOCKNB.			

—continued—

NI000027 DWS Flexible Acc (NTXR65AA Flex DWS Acc) (continued)

Datafilling table TRKGRP (continued)

Field	Subfield or refinement	Entry	Explanation and action
OPTION (see note 1)			Option. Enter BCNAME to specify the bearer capability used by this trunk group. Enter CHGNUM to send a charge number and an originating line information parameter with an initial address message. Enter BLOCKNB to prevent narrowband calls from terminating or originating from members within this trunk group. Enter the dollar sign ($) if no option is required.
BLOCKNB (see note 2)			Block narrow band. Enter Y to prevent narrowband calls from terminating to or originating from members within this trunk group. Enter N if narrowband blocking is not required. ***Note:*** This field is only available if the FAST feature described in AD6611 is loaded and enabled in the switch.
Note 1: This field is only available after NA03. Prior to NA03, use field BLOCKNB. ***Note 2:*** This field is only available prior to NA03. After NA03, use field OPTION to enter BLOCKNB.			
—end—			

Datafill example for table TRKGRP

The following example shows sample datafill for table TRKGRP. In the first example, NI000027 DWS Flexible Acc (NTXR65AA Flex DWS Acc)

NI000027 DWS Flexible Acc (NTXR65AA Flex DWS Acc) (end)

is assigned to an intertoll (IT) trunk. In the second example, it is assigned to a PRI trunk.

MAP display example for table TRKGRP

```
   GRPKEY                                          GRPINFO
_____________________________________________________________________
WSS1FLX2WS
       IT 0 NPDGP NCIT 2W NIL WIDEBAND ASEQ
FLEXIBLE BESTFIT 214 SUPR NSCR 214 000 Y N $
_____________________________________________________________________
  WITSPRI1
       PRA 0 NPDGP NCIT WIDEBAND DSEQ FLEXIBLE
FIRSTFIT N (ISDN 100) $     Y
```

Note: PRA is an internal software designation for PRI.

Translation verification tools

Refer to NI0 NI-2 DWS (NTXR49AA DWS PRI) translations verification tools on page 3-27 and to NI000023 Intertoll ISUP & SS7 (NTXS28AA DWS Intertoll ISUP) translations verification tools on page 3-57 for examples of the translation verification utility.

SERVORD

NI000027 DWS Flexible Acc (NTXR65AA Flex DWS Acc) does not use SERVORD.

NI000028 DWS Carrier Acc (NTXR66AA DWS ATC ISUP)

Functionality code

Functionality group ordering code: not applicable

Functionality ordering code: NI000028

Release applicability

LEC002, CDN002, LET002

Prerequisites

All the datafill information for this particular functionality is included in this document. However, prerequisite software or hardware may be required for complete implementation.

Description

NI000028 DWS Carrier Acc (NTXR66AA DWS ATC ISUP) is included in functional group NI000004 NI0 NI-2 DWS. It supplies Dialable Wideband Services (DWS) on Access to Carrier (ATC) trunks on the DMS-100/200 using Feature Group D (FGD) ISDN user part (ISUP) signaling. This capability is provided by the interworking of IT-ISUP trunks and ATC FGD-ISUP trunks, using the BELLCORE TR-394 protocol. ATC trunks provide inter-LATA access.

NI000028 DWS Carrier Acc (NTXR66AA DWS ATC ISUP) consists of the following features:

- AD4732 – LEC DWS FGD ISUP
- AD4734 – LEC DWS FGD ISUP to IT ISUP
- AD4735 – LEC DWS FGD ISUP to PRI

Operation

The process of routing a wideband call, as with a narrowband call, requires four main steps:

- origination
- translations
- trunk selection
- termination

NI000028 DWS Carrier Acc (NTXR66AA DWS ATC ISUP) (continued)

Origination

An incoming call on the ISUP-FGD ATC trunk will be determined to be a wideband call based on the existence of the following information:

- the presence of datafill for the ATC trunk group indicating the trunk group may be used for wideband calls
- the presence of a wideband transfer rate value in the information transfer rate field of the mandatory parameter user service information (USI) contained in the initial address message (IAM)
- the presence of the optional parameter channel assignment map (CAM) in the IAM for flexible calls

Translations

Existing translations methods currently provided on IT trunk groups are used for NI000028 DWS Carrier Acc (NTXR66AA DWS ATC ISUP).

The following route selectors in table FNPACONT; RTEREF are supported:

- S – standard
- N – non-standard

The following route selectors in table STDPRTCT; STDPRT are supported:

- T – table routing
- EA – equal access

The following route selectors in table OFRT are supported:

- S – standard
- N – non-standard
- CND – conditional EA route selector

Trunk selection

DWS uses three trunk selection methods:

- fixed
- floating
- flexible

Further information on all three methods can be found on page 3-2.

Termination

A wideband call as provided by this functionality must terminate to a wideband ATC or wideband IT trunk group.

NI000028 DWS Carrier Acc (NTXR66AA DWS ATC ISUP) (continued)

Translations table flow

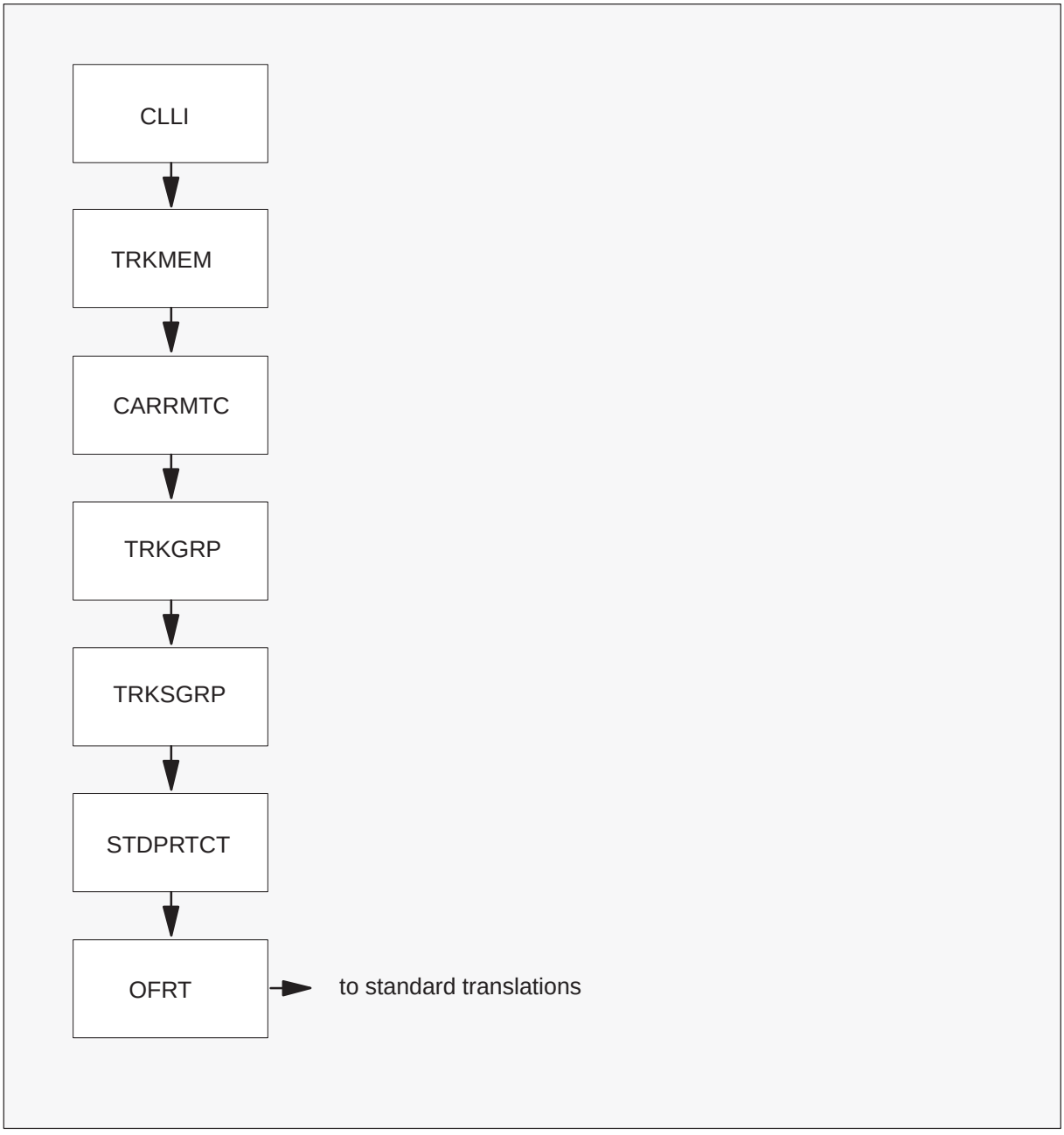
Call processing in the DMS-100 switch begins with the trunking tables that define the attributes of the ISUP IT trunk group. For the incoming call, table CLLI identifies the trunk group, and table TRKMEM determines the physical location of the circuit carrying the call. The trunk identifier (CLLI) accesses table TRKSGRP which defines the signaling protocol used by the trunk, and table TRKGRP which provides the standard pretranslator table name (PRTNM) and the serving numbering plan area (SNPA) for the originating trunk group.

The PRTNM value accesses table STDPRTCT which contains the list of standard pretranslation tables. The SNPA value is then used to access table HNPACONT that lists the home numbering plan areas. This table provides a route reference index. The index is used to access table OFRT, which provides the information necessary to route the call to the terminating trunk group.

The NI000028 DWS Carrier Acc (NTXR66AA DWS ATC ISUP) translation process is shown in the flowchart that follows.

NI000028 DWS Carrier Acc (NTXR66AA DWS ATC ISUP) (continued)

Table flow for NI000028 DWS Carrier Acc (NTXR66AA DWS ATC ISUP)



NI000028 DWS Carrier Acc (NTXR66AA DWS ATC ISUP) (continued)

The following table lists the datafill content used in the flowchart.

Datafill example for NI000028 DWS Carrier Acc (NTXR66AA DWS ATC ISUP)

Datafill table	Example data
TRKGRP	ATC 0 ELO NCRT 2W NIL WIDEBAND ASEQ FLEXIBLE BESTFIT SSWB NSCR 214 SPR Y EAPLAN N COMB N $
LTCALLS	ISDN 105 PUB XLALEC 602 (EA SPR Y) $
LINEATTR	602 1FR NONE NT NSCR 0 214 SSWB LSWB NONE 0 NIL NILSFC LATA3 0 NIL NIL 00 N $ LCABILL OFF – BILLING DONE ON BASIS OF CALLTYPE
STDPRTCT	SSWB (1) (0) 0
HNPACONT	214 500 1 (32) (1) (47) (0) 0
OFRT	892 CND EA INTNL SK 2
FNPACONT	822 10 – (2) (0) (2)
LCASCRCN	214 LSWB (2) OPTL N
PFXTREAT	OPTL DD N DD UNDT
LATAXLA	LATA3 822684 INTER INTER STD
OCCINFO	SPR 0125 EAP

Limitations and restrictions

The following limitations and restrictions apply to NI000028 DWS Carrier Acc (NTXR66AA DWS ATC ISUP):

- This functionality only applies to ISUP-FGD ATC to IT ISUP-FGD wideband trunk groups.
- If an IAM with wideband indicators is received on a non-wideband ATC ISUP-FGD agency, the call will receive BC_NOT_IMPLEMENTED (BCNI) treatment.
- All the DS-0s used in a wideband call must be datafilled in the same trunk group and must reside on the same T1.
- All the DS-0s must be on a DTC which has the NTAX78AA constant delay time switch card.
- Off-hook queuing is not supported.
- COT is allowed for narrowband calls on a wideband trunk group, but not supported for wideband calls.

NI000028 DWS Carrier Acc (NTXR66AA DWS ATC ISUP) (continued)

- If an originating wideband call is translated to attempt to terminate to a non-wideband trunk group, the call will advance through the route until a wideband trunk group is reached.
- Each wideband call requires two extension blocks per call. The number of wideband extension blocks available is defined by the office parameter MAX_NUM_WIDEBAND_CALLS in table OFCENG. The maximum number of extension blocks will be twice the maximum number of wideband calls in an office.
- Abbreviated dialing (AD) and speed calling (SC) are not supported.
- Changing/deleting wideband ATC TRKGRP tuples
  — Once a trunk is defined in table TRKGRP as WIDEBAND, it cannot be changed to anything other than WIDEBAND.
  — Changing the wideband trunk group's WBSELSEQ from ASEQ to DSEQ or vice versa is permitted.
  — The WBGRPING subfield can be changed only if no subgroup in table TRKSGRP is associated with the trunk group.
  — To remove a trunk from wideband status, it is necessary to first delete a trunk group's entry in table TRKGRP and then add a new entry for the trunk group.
- Wideband does not currently support BRI (Basic Rate Interface) access/termination or interworking with a vendor who supports BRI access/termination. Therefore, BELLCORE TR-NWT-000444, "Switching System Requirements Supporting ISDN Access using the ISDN user part," is not applicable to wideband at this time.

Interactions

The DWS interacts with the AD4735, LEC DWS FGD ISUP to PRI feature.

Activation/deactivation by the end user

NI000028 DWS Carrier Acc (NTXR66AA DWS ATC ISUP) requires no activation or deactivation by the end user.

Billing

For calls originating in the LATA, an originating access billing record is generated in the DMS-100 switch. For calls entering the LATA from the IEC, a terminating access billing record is generated at the first point the call enters the LATA, which is either the DMS-200 switch or the DMS-100 switch.

Bellcore AMA

Bellcore AMA has three call type codes for DWS. Each supports call transfer rates from 2 to 24 DS0s.

NI000028 DWS Carrier Acc (NTXR66AA DWS ATC ISUP) (continued)

The three codes are:

- 148 — intranet high bandwidth call
- 149 — originating access high bandwidth call
- 150 — terminating access high bandwidth call

For intra-LATA DWS calls, call type code 148 has been defined. It is generated when an intranetwork DWS call originates and completes at the originating switch complex within the LATA. It is associated with structure code 0190.

For inter-LATA DWS calls, two call type codes have been defined. Each is associated with structure code 0645.

- Call code 149 is generated when an internetwork DWS call originates at the originating switch complex within the LATA originating the call.
- Call code 150 is generated when an internetwork DWS call completes at the point-of-presence (POP) switch complex within the LATA terminating the call.

Station Message Detail Recording

NI000028 DWS Carrier Acc (NTXR66AA DWS ATC ISUP) does not support Station Message Detail Recording.

Datafilling office parameters

The following table shows the office parameters used by NI000028 DWS Carrier Acc (NTXR66AA DWS ATC ISUP). For more information about office parameters, refer to *Office Parameters Reference Manual*.

Office parameters used by NI000028 DWS Carrier Acc (NTXR66AA DWS ATC ISUP)

Table name	Parameter name	Explanation and action
OFCENG (see note)	MAX_NUM_WIDEBAND_CALLS	The parameter value indicates the maximum number of active wideband calls at one time. The default for this parameter is 0. The parameter value ranges from 0 to 4096.
OFCOPT	ISUP_SUBGRP_GLARE_ AVAILABLE	The parameter values of Y (yes) and N (no) specify whether or not glare resolution is offered for ISUP.

Note: A cold restart is required to decrease the value of these parameters.

NI000028 DWS Carrier Acc (NTXR66AA DWS ATC ISUP) (continued)

Datafill sequence

The following table lists the tables that require datafill to implement NI000028 DWS Carrier Acc (NTXR66AA DWS ATC ISUP). The tables are listed in the order in which they are to be datafilled.

Datafill tables required for NI000028 DWS Carrier Acc (NTXR66AA DWS ATC ISUP)

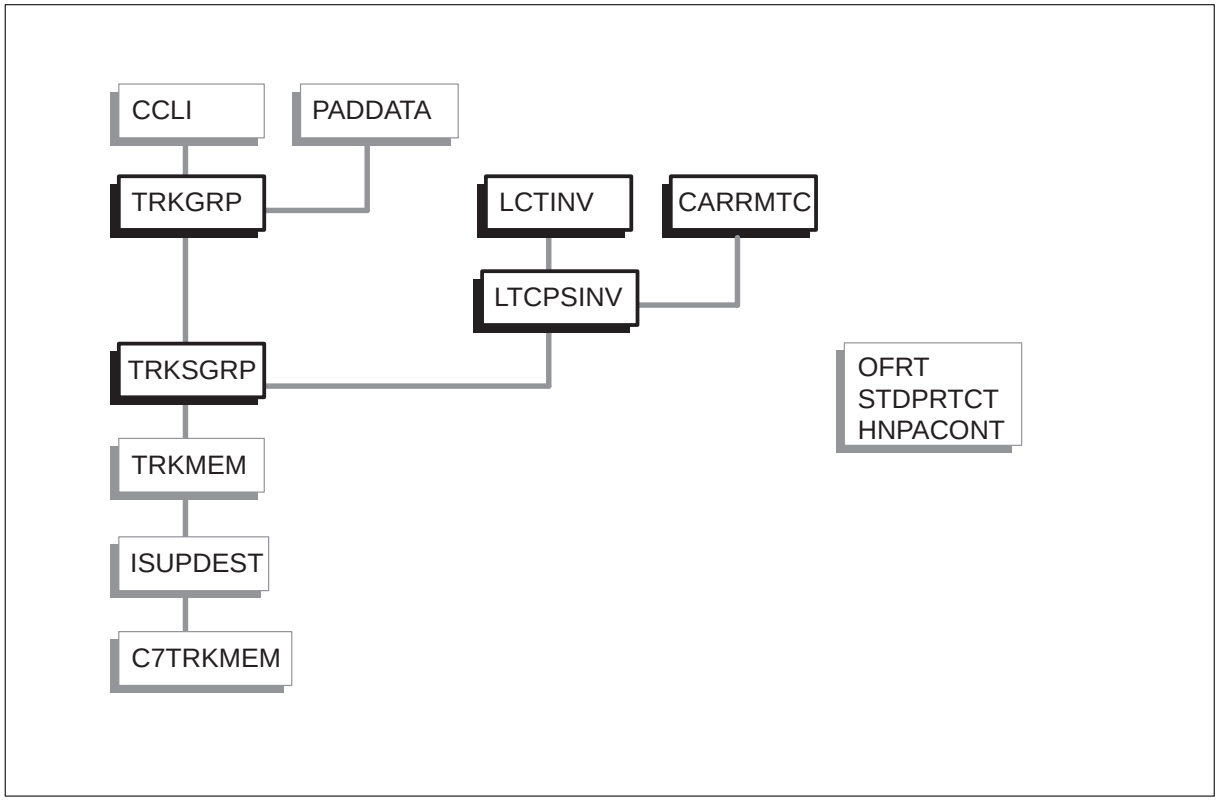
Table	Purpose of table
CARRMTC	Allows the DMS switch administration to datafill maintenance control information in peripheral modules.
TRKGRP	Lists the customer-defined data associated with each trunk group existing in the switching unit.
TRKSGRP	Lists supplementary information for each subgroup assigned to one of the trunk groups listed in table TRKGRP.

The following figure shows the datafill dependencies between the DMS-100 tables that are used for ISUP ATC. For example, table TRKGRP is dependent on data in table CLLI, so table CLLI must be datafilled before table TRKGRP. The tables described in this chapter are bolded in the illustration. Refer to the *Translations Guide* for a description of the other tables.

Tables OFRT, STDPRTCT, and HNPACONT must be datafilled but not in a particular sequence.

NI000028 DWS Carrier Acc (NTXR66AA DWS ATC ISUP) (continued)

DMS–100 ISUP ATC datafill dependencies



Datafilling table CARRMTC

The following table shows the datafill specific to NI000028 DWS Carrier Acc (NTXR66AA DWS ATC ISUP) for table CARRMTC. Only those fields that apply directly to NI000028 DWS Carrier Acc (NTXR66AA DWS ATC ISUP) are shown. For a description of the other fields, refer to the data schema section of the *Translations Guide*.

Table CARRMTC contains peripheral module maintenance data. A tuple specific to NI000028 DWS Carrier Acc (NTXR66AA DWS ATC ISUP) (the same tuple may be used for IT ISUP) must be added in this table. This tuple must be based on the existing default tuple for the DTC7 peripheral module. The fields that have to change are described in the following table.

NI000028 DWS Carrier Acc (NTXR66AA DWS ATC ISUP) (continued)

Datafilling table CARRMTC

Field	Subfield or refinement	Entry	Explanation and action
TMPLTNM			Template name. Enter DWS.
CARD			Card. Enter NT6X50AB.
FF			Frame format. Enter ESF.
ZLG			Zero logic. Enter B8ZS.

Datafill example for table CARRMTC

The following example shows sample datafill for table CARRMTC.

MAP display example for table CARRMTC

```
CMSTYPE TMPLTNM RTSML RTSOL ATTR
_____________________________________________________________
DTC DEFAULT 255 255 DS1 NT6X50AA MU_LAW SF ZCS BPV NILDL N
250 1000 50 50 150 1000 3 6 864 100 17 511 4 255
_____________________________________________________________
DTC DWS 255 255 DS1 NT6X50AB MU_LAW ESF B8ZS BPV NILDL N
250 1000 50 50 150 1000 3 6 864 100 17 511 4 255
```

Datafilling table TRKGRP

The following table shows the datafill specific to NI000028 DWS Carrier Acc (NTXR66AA DWS ATC ISUP) for table TRKGRP. Only those fields that apply directly to NI000028 DWS Carrier Acc (NTXR66AA DWS ATC ISUP) are shown. For a description of the other fields, refer to the data schema section of the *Translations Guide*.

Table TRKGRP is used by wideband call processing and trunk maintenance to recognize, choose, and route idle trunks. When the selection sequence field (SELSEQ) is set to WIDEBAND, the following subfields are displayed:

- Wideband selection sequence (WBSELSEQ). This subfield specifies whether the DS-0 channels are chosen in ascending or descending order.
- Wideband grouping (WBGRPING). This subfield specifies the trunk selection method. FIXED, FLOATING, and FLEXIBLE are valid.
- Wideband search (WBSEARCH). This subfield specifies the search method used to find a group of channels. FIRSTFIT and BESTFIT are valid.

NI000028 DWS Carrier Acc (NTXR66AA DWS ATC ISUP) (continued)

Datafilling table TRKGRP

Field	Subfield or refinement	Entry	Explanation and action
GRPKEY			Trunk group name. Enter the trunk group name from table CLLI.
GRPTYP			Group type. Enter the type of trunk as ATC.
TRAFSNO			Trunk separation number. Enter 0.
PADGRP			PAD group. Enter the name of the originating PAD group as ELO.
NCCLS			Operational measurements no circuit class. Enter the operational measurements no circuit class NCRT.
DIR			Trunk direction. Enter the trunk group direction as 2W.
TRAFCLS			Traffic usage class. Enter the traffic usage class as NIL.
SELSEQ			Selection sequence. Enter WIDEBAND.
	WBSELSEQ		Wideband selection sequence. Enter ASEQ to specify ascending order, DSEQ for descending order.
	WBGRPING		Wideband grouping. Enter FIXED, FLOATING, or FLEXIBLE. ***Note:*** The FLEXIBLE selection method is present only when NI000027 DWS Flexible Acc (NTXR65AA Flexible DWS Access) is loaded.
	WBSEARCH		Wideband search. Enter FIRSTFIT to select the first available channels, BESTFIT to select the smallest segment of idle DS-0 channels among T1s in a trunk group that can carry the bandwidth specified.
PRTNM			Standard pretranslator table name. Where standard pretranslation is required, enter the name of the standard pretranslator table to which digit translation is to route after the receipt of one digit. Where pretranslation is not required, enter NPRT.

—continued—

NI000028 DWS Carrier Acc (NTXR66AA DWS ATC ISUP) (continued)

Datafilling table TRKGRP (continued)

Field	Subfield or refinement	Entry	Explanation and action
SCRNCL			Class of service screening table name. For incoming and two-way trunks requiring screening by class of service, enter the name of the class of service screening table to which digit translation is to be routed. For outgoing trunks or when class of service is not required, enter NSCR.
SNPA			Serving NPA. Enter the three-digit serving NPA code to which the trunk group belongs.
CARRNM			Carrier name. Choose any name in the range IC_INC_CARRIER_NAME.
ANI			Enter Y or N.
SIGTYPE			Enter one of the following: BELLI, BELLII, EAPLAN, FGB.
OPRHOLD			Enter Y or N.
STNCLS			Enter one of the following: COMB, NONCOMB, INTERTOLL.
OSIND			Enter Y or N.

—continued—

NI000028 DWS Carrier Acc (NTXR66AA DWS ATC ISUP) (continued)

Datafilling table TRKGRP (continued)

Field	Subfield or refinement	Entry	Explanation and action
OPTION			Option. This field is only available after NA03. Prioir to NA03, use field BLOCKNB. Enter BCNAME to specify the bearer capability used by this trunk group. Enter CHGNUM to send a charge number and an originating line information parameter with an initial address message. Enter BLOCKNB to prevent narrowband calls from termination or originating from members within this trunk group. Enter the dollar sign ($) if no option is required.
BLOCKNB			Block narrow band. This field is only available prior to NA03. After NA03, use field OPTION to enter BLOCKNB. Enter Y to prevent narrowband calls from terminating to or originating from members within this trunk group. Enter N if narrowband blocking is not required. ***Note:*** This field is only available if the FAST feature described in AD6611 is loaded and enabled in the switch.
		—end—	

Datafill example for table TRKGRP

The following example shows sample datafill for table TRKGRP. In the example, NI000028 DWS Carrier Acc (NTXR66AA DWS ATC ISUP) is assigned to ATC trunk PRIFLX1.

MAP display example for table TRKGRP

```
   GRPKEY                                        GRPINFO
_____________________________________________________________
ATCFLX0Y
   ATC 0 ELO NCRT 2W NIL WIDEBAND ASEQ FLEXIBLE BESTFIT SSWB NSCR
   214 SPR Y EAPLAN N COMB N $
```

NI000028 DWS Carrier Acc (NTXR66AA DWS ATC ISUP) (continued)

Error messages for table TRKGRP

The following error messages apply to table TRKGRP.

Error messages for table TRKGRP

Error message	Explanation and action
CANNOT CHANGE FROM WIDEBAND TO ASEQ	The value of SELSEQ cannot be changed from WIDEBAND to any other selection sequence. Delete the trunk group's entry and add a new one with the correct selection sequence.
CANNOT CHANGE WBGRPING. TUPLE IN TRKSGRP MUST BE DELETED FIRST.	The WBGRPING subfield can be changed only if no subgroup in table TRKSGRP is associated with the trunk group.

Datafilling table TRKSGRP

The following table shows the datafill specific to NI000028 DWS Carrier Acc (NTXR66AA DWS ATC ISUP) for table TRKSGRP. Only those fields that apply directly to NI000028 DWS Carrier Acc (NTXR66AA DWS ATC ISUP) are shown. For a description of the other fields, refer to the data schema section of the *Translations Guide*.

Table TRKSGRP specifies the recovery scheme for glare. Glare occurs when both ends of a trunk are seized at the same time. To minimize glare, the glare type field (GLARETYP) must be set to subgroup yield (SGRPYLD). A priority is then assigned to one of the switches. Refer to the physical provisioning guidelines section in the chapter *Planning and Engineering DWS* on page 2-1 for more information on glare.

Note: The order of the DS-0 datafill determines the order within the trunk group. For further information, consult the "Circuit and network provisioning" section of the *Planning and Engineering DWS* chapter on page 2-18.

NI000028 DWS Carrier Acc (NTXR66AA DWS ATC ISUP) (continued)

Datafilling table TRKSGRP

Field	Subfield or refinement	Entry	Explanation and action
SGRPKEY			Trunk group name and subgroup. Enter the name of the trunk group from table CLLI followed by the number (0 or 1) assigned to the trunk subgroup.
CARDCODE			Card code. Enter DS1SIG, the card code used for ISUP IT.
SIGDATA			Signal protocol. Enter C7UP, the only valid protocol used for call processing.
DIR			Trunk direction. Enter the trunk group direction: incoming (IC), outgoing (OG), or two-way (2W).
ESUPR			Echo suppressor. Where the trunk group has echo suppressors, enter H (half) when a half echo suppressor is located at the near end of the trunk group. Enter N (no) when the trunk group has no echo suppressor at the near end of the trunk group. Enter F (full) when a full echo suppressor is located at the near end of the trunk group.
SAT			Satellite. Enter N, since the trunk group is not arranged to switch by satellite.
ECSTAT			Echo cancellor status. Enter the echo cancellor status (EXTERNAL, INNOTONE, or UNEQ). Internal echo cancellor control is not supported.
ABCNTL			A-bit control. Enter NONE.
PROTOCOL			Signaling protocol type. Enter Q764.
CONTCHK			Continuity check. Because continuity testing is not supported for wideband calls, enter the default value THRH.
COTREQ			Continuity test required. Because continuity testing is not supported for wideband calls, enter 0. ***Note:*** This field is displayed for outgoing and two-way trunks only.

—continued—

NI000028 DWS Carrier Acc (NTXR66AA DWS ATC ISUP) (continued)

Datafilling table TRKSGRP (continued)

Field	Subfield or refinement	Entry	Explanation and action
ADJNODE			Adjacent node. Enter the name of the adjacent node from table ADJNODE.
TMRNAME			Timer name. Enter NIL.
GLARETYP			Glare type. Enter SGRPYLD. ***Note:*** The SGRPYLD method is present only when office parameter ISUP_SUBGRP_GLARE_AVAILABLE is set to Y (yes) in table OFCOPT. It is displayed for two-way trunks only.
GLAREYLD			Glare yield. Enter Y if the switching unit is to yield control of the trunks in this subgroup in a glare condition, otherwise enter N. ***Note:*** This field is displayed for two-way trunks only.
—end—			

Datafill example for table TRKSGRP

The following example shows sample datafill for table TRKSGRP. In the example, NI000028 DWS Carrier Acc (NTXR66AA DWS ATC ISUP) is assigned to ATC trunk PRIFLX1.

MAP display example for table TRKSGRP

```
          SGRPKEY CARDCODE
                                                    SGRPVAR
_____________________________________________________________________
   ATCFLX1 1   DS1SIG
C7UP 2W N N UNEQ NONE Q764 THRH 0 DMSNODE NIL SGRPYLD N $
```

NI000028 DWS Carrier Acc (NTXR66AA DWS ATC ISUP) (continued)

Error messages for table TRKSGRP

The following error messages apply to table TRKSGRP.

Error messages for table TRKSGRP

Error message	Explanation and action
`The GLARETYP for WB trunks must be SGRPYLD`	The value of GLARETYP can only be SGRPYLD for wideband IT trunks.

Translation verification tools

The following section provides information on the translation verification tools that can be used.

TRAVER

The translation verification (TRAVER) utility is a diagnostic tool that allows the operating company to simulate a telephone call in software and display the line, trunk, or position to which a call is routed, the translation and routing tables that the call accesses, and any additional tables accessed as a result of call screening enhancements. The following example shows the output from TRAVER when it is used to implement NI000028 DWS Carrier Acc (NTXR66AA DWS ATC ISUP).

The first example shows an outgoing call from an equal access office to an access tandem carrier trunk — a PRI trunk to ISUP FGD ATC trunk groups call. The call originates on trunk PRIFLT1 and terminates on trunk ATCFLT1S .

1 In lines 1 and 2 of the example, table TRKGRP is accessed with the trunk group PRIFLX1.

2 In lines 12 to 22, table STDPRTCT is accessed with the pretranslator name SSWB. Subtable STDPRT provides the EA pretranslator route selector indicating the interexchange carrier's name; IC office route, 899; and a second pretranslator name, SSWB1.

3 In lines 23 to 30, table STDPRTCT is accessed with a second pretranslator name, SSWB1. Subtable STDPRT removes the leading prefix digit 1 to provide proper indexing into the translations table HNPACONT.

4 In lines 31 to 34, table HNPACONT is accessed with the serving numbering plan area 214. Subtable HNPACODE is accessed with the digits 722 and points to table FNPACONT.

NI000028 DWS Carrier Acc (NTXR66AA DWS ATC ISUP) (continued)

5 In lines 35 to 42, table FNPACONT is accessed with the digits 722 to provide the route reference index 3. Subtable RTEREF is accessed with this index and provides an office route.

6 In lines 49 and 50, table LATAXLA is accessed with the LATA name, dialed NPA, and dialed office code. This table establishes the call type as inter-LATA.

7 In lines 51 and 52, table OCCINFO is accessed with the carrier name MCI. Carrier-specific data is retrieved from this table.

8 In lines 55 to 64, a message is displayed indicating the equal access route from pretranslations as the determining route.

Note: In the TRAVER command shown in this example,

- TR indicates that a trunk name follows, and PRIFLT1 is the trunk name
- 1012117226841111 represents the dialed digits
- **b** indicates that the type of trace required is “both,” meaning that both a table trace and a digit trace are performed

The following example shows the output from TRAVER when it is used to verify NI000028 DWS Carrier Acc (NTXR66AA DWS ATC ISUP).

NI000028 DWS Carrier Acc (NTXR66AA DWS ATC ISUP) (continued)

TRAVER output example for NI000028 DWS Carrier Acc (NTXR66AA DWS ATC ISUP)

```
traver tr priflx1 1012117226841111 b
TABLE TRKGRP
PRIFLX1 PRA 0 NPDGP NCIT WIDEBAND DSEQ FLOATING FIRSTFIT N (ISDN 104) $
$
TABLE LTCALLS
ISDN 104 PUB XLALEC 602 (EA SPR Y)$TABLE CUSTSTN
TUPLE NOT FOUND
TABLE OFCVAR
AIN_OFFICE_TRIGGRP NIL
TABLE LINEATRR
602 1FR NONE NT NSCR 0 214 SSWB LSWB NONE 0 NIL NILSFC LATA3 0 NIL NIL
00 N $
LCABILL OFF – BILLING DONE ON BASIS OF CALLTYPE
TABLE STDPRTCT
SSWB (1)(0)0
 . SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE BILLING.  CALL TYPE
DEFAULT IS NP.  PLEASE REFER TO DOCUMENTATION.
 . 10121 10121 EA DD 5 P SSWB1 MCI Y OFRT 899 6 20 N
 . . TABLE OFRT
 . . 899 CND EA INTNL SK 2
 . .     S D ATCFLT1S
 . .     CND ALWAYS SK 1
 . .     N D ATCFLT1Y 15 D022 N
 . . EXIT TABLE OFRT
 . TABLE STDPRTCT
 . SSWB1 (1)(0)0
 . . SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE BILLING.  CALL TYPE
DEFAULT IS NP.  PLEASE REFER TO DOCUMENTATION.
 . . 1722 1722 EA DD 1 T NA MCI N
 . SUBTABLE AMAPRT
 . KEY NOT FOUND
 . DEFAULT VALUE IS:  NONE OVRNONE N
TABLE HNPACONT
214 500 1 (32)(1)(47)(0)0
 . SUBTABLE HNPACODE
 . 722 722 FNPA 0
```

NI000028 DWS Carrier Acc (NTXR66AA DWS ATC ISUP) (continued)

TRAVER output example for NI000028 DWS Carrier Acc (NTXR66AA DWS ATC ISUP)

```
TABLE FNPACONT
722 10 – (2)(0)(2)
 . SUBTABLE FNPACODE
 . 684 684 3 Y
 . SUBTABLE RTEREF
 . . 3 N D ITFLX1S 3 214 N
 . EXIT TABLE RTEREF
EXIT TABLE FNPACONT
TABLE LCASCRCN
214 LSWB (2) OPTL N
 . SUBTABLE LCASCR
 . TUPLE NOT FOUND.  DEFAULT IS NON-LOCAL
TABLE PFXTREAT
OPTL DD N DD UNDT
TABLE LATAXLA
LATA3 722684 INTER INTER STD
TABLE OCCINFO
MCI 0121 EAP Y Y Y Y Y N N N N Y Y LONG 14 FGRPD Y N N N N N N N Y Y N N
TABLE EASAC
TUPLE NOT FOUND
Using Equal Access (EA) route   OFRT 899 from Pretranslation
TABLE OFRT
899 CND EA INTNL SK 2
 . S D ATCFLT1S
 . CND ALWAYS SK 1
 . N D ATCFLT1Y 15 D022 N
EXIT TABLE OFRT
+++ TRAVER: SUCCESSFUL CALL TRACE+++

DIGIT TRANSLATION ROUTES
1 ATCFLT1S       7226841111       ST
TREATMENT ROUTES.  TREATMENT IS: GNCT
1 NODIAL1
2*FRA0

+++ TRAVER: SUCCESSFUL CALL TRACE+++
```

NI000028 DWS Carrier Acc (NTXR66AA DWS ATC ISUP) (continued)

The second example shows an incoming ISUP FGD ATC trunk to a PRI trunk call. The call originates on trunk ATCFLX1S and is routed over trunk PRIFLT1.

1 In lines 1 and 2, table TRKGRP is accessed with trunk group ATCFLX1S and provides the serving number plan area 214 and the pretranslator name SSWB.

2 In lines 3 to 11, table STDPRTCT is accessed with the pretranslator name SSWB. No entry is datafilled and therefore the default value is used.

3 In lines 12 to 15, table HNPACONT is accessed with the service numbering plan area 214. Subtable HNPACODE is accessed with the digits 822 and points to table FNPACONT.

4 In lines 16 to 23, table FNPACONT is accessed with the service numbering plan area 822. Subtable FNPACODE is accessed with the digits 684 to provide route reference index 3. Subtable RTEREF is then accessed with this index and provides the office route with terminating trunk name PRIFLT1.

In the TRAVER command shown in this example,

- TR indicates that a trunk name follows, and ATCFLX1S is the trunk name
- 8226841111 represents the incoming digits
- b indicates that the type of trace required is “both,” meaning that both a table trace and a digit trace are performed

NI000028 DWS Carrier Acc (NTXR66AA DWS ATC ISUP) (end)

TRAVER output example for NI000028 DWS Carrier Acc (NTXR66AA DWS ATC ISUP)

```
traver tr atcflx1s 8226841111 b
TABLE TRKGRP
ATCFLX1S ATC 0 ELO NCRT 2W NIL WIDEBAND ASEQ FLEXIBLE FIRSTFIT SSWB NSCR
214 SPR Y EAPLAN N COMB N $
TABLE STDPRTCT
SSWB (1) (0) 0
.SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE BILLING.  CALL TYPE
DEFAULT IS NP.  PLEASE REFER TO DOCUMENTATION.
.KEY NOT FOUND
.DEFAULT VALUE IS: N NP 0 NA
.SUBTABLE AMAPRT
.KEY NOT FOUND
.DEFAULT VALUE IS: NONE OVRNONE N
TABLE HNPACONT
214 500 1 (32) (1) (47) (0) 0
.SUBTABLE HNPACODE
.822 822 FNPA 0
TABLE FNPACONT
822 10 - (2) (0) (2)
.SUBTABLE FNPACODE
.684 684 3 Y
.SUBTABLE RTEREF
.. 3 N D PRIFLT1 3 214 N
.EXIT TABLE RTEREF
EXIT TABLE FNPACONT
+++TRAVER:SUCCESSFUL CALL TRACE+++
DIGIT TRANSLATION ROUTES

1 PRIFLT1      N CDN E164 NA 2146841111 NIL_NSF BC SPEECH
TREATMENT ROUTES.  TREATMENT IS: GNCT
1 NODIAL1
2 *FRA0

+++TRAVER:SUCCESSFUL CALL TRACE+++
```

SERVORD

NI000028 DWS Carrier Acc (NTXR66AA DWS ATC ISUP) does not use SERVORD.

Administering DWS

This chapter describes DWS administration procedures and the operational measurements (OM) that track how well the switches handle DWS.

Administration functions on page 4-2 outlines the duties of the DWS administrator.

Administration terms on page 4-2 lists two DWS components.

DWS performance factors on page 4-3 explains the DWS traffic engineering required.

Evaluating DWS performance factors on page 4-4 describes the procedures used for DWS performance factors.

Administration functions

Administrators are responsible for monitoring the performance of DWS. Typically, the administrator delivers DWS hardware and software performance information to the operating company's maintenance and engineering groups. The administrator collects data used by the engineering group to calculate provisioning requirements. The data is also used by the maintenance group to identify early indications of system faults.

Administrators review performance indicators such as usage and congestion to evaluate specific components and their performance. If corrective action is necessary, steps can be taken to ensure that service levels meet predetermined engineering criteria.

Administration terms

Traffic-sensitive DWS components are the specific components and resources susceptible to performance degradation based on the traffic offered. Performance degradation occurs when the traffic load on a DWS component or resource approaches or exceeds its engineered limit, or when it fails. When a component or resource fails, it is referred to as a system fault.

The traffic-sensitive components for DWS are:

- digital trunk controllers (DTCI and DTC7)
- trunks (PRI, ISUP IT, and ISUP ATC)

Traffic-sensitive components can be monitored through performance factors.

DWS performance factors

DWS performance factors are the individual components of overall performance of DWS. Performance factors indicate how well the DWS hardware and software fulfill the purpose for which they are designed. Performance is measured by indicators such as OMs. Performance factors include:

- *grade of service*, which is a measurement of the calls blocked. It is calculated by counting overflowed (or All trunks busy) calls and dividing that by the number of attempts made during the study interval.
- *glare*, which occurs when a call is dropped because the circuits seized were also seized at the other end of the trunk. It is directly measured.
- *call failures*, which occur when software or hardware errors cause a call to drop without a valid disconnect sequence. They are directly measured.

Performance indicators

Performance indicators are measurements or records of events that occur during a given period or in a time sequence. For DWS, performance indicators are operational measurements.

Operational measurements

Operational measurements (OM) are data-containing records of events occurring during a given period of time. Three basic types of OMs are peg counts, usage, and overflow. OMs are used as service level indicators and provide input for decisions relating to maintenance, hardware, and software assignment, accounting, and provisioning. OMs generally measure traffic and are used to determine traffic load. For further information about OMs, refer to the *Operational Measurements Reference Manual*.

DWS system faults

DWS system faults occur when a DWS component or resource fails. Analyzing DWS system faults is useful from a maintenance perspective. System faults indicate when DWS error and fault rates are outside engineered limits and can often highlight potential problems before they become serious.

DWS performance factors

The purpose of traffic engineering is to ensure that sufficient resources, for example trunks, are provided to handle the offered traffic. DWS traffic engineering must account for factors such as:

- number of calls
- bandwidth per call
- average holding time per call
- traffic peakedness (extent of range between low and high traffic volumes)
- service growth
- network topology

Assumptions fundamental to narrowband traffic do not apply to wideband traffic. Traditional engineering guidelines for narrowband traffic have used 3 min as an average holding time for a call. The average holding time for a wideband call varies greatly by application. Videoconferencing, which uses mostly n=2 or n=6 bandwidth, currently has holding times that average about 1.5 h. File transfer applications will likely use different values of n and holding times. Average holding times for each value of n can be obtained from the OMs and depends on the applications used in each region. Since the market is in its early stages of development, these holding times are likely to change.

Though administrators cannot use wideband traffic engineering tables and guidelines, they should try to study wideband traffic trends through performance factors.

The performance factors for DWS are listed below along with their associated OM groups.

Table 4-1 DWS performance factors and OM groups

Performance factor	OM group
Wideband traffic	WIDEBAND TRK
Grade of service	WIDEBAND
Glare	WIDEBAND
Percentage of call failures	WIDEBAND

Evaluating DWS performance factors

This section describes evaluation procedures for DWS performance factors. The OMs that record the performance of DWS are listed in this chapter in the table named ”DWS operational measurements”. Required formulas and work sheets are provided on page 4-27.

Creating a performance monitoring procedure

Planning and enabling switch-based measurement activities, including defining the operational measurement parameters, is usually the joint responsibility of operating company administration, engineering, and maintenance organizations.

Network management

Network management provides efficient use of network resources to assist in call completion during abnormal traffic situations. For a comprehensive overview of traffic management, refer to *Planning and Engineering DWS* in this document.

Monitoring DWS performance factors

The following procedure explains how to create and execute a procedure to monitor the performance of DWS.

Creating a DWS performance monitoring procedure

1 Select the appropriate performance indicators.

Operational measurements associated with the performance factors described in this chapter are in the table entitled ”DWS operational measurements”.

2 Activate the performance indicators.

After choosing the appropriate measurement options, activate them in the switch and collect the outputs. To set up OMs and route OM reports to output devices, refer to the procedures in *Basic Administration Procedures*, 297-1001-300.

The following parameters are required to set up OMs:

- class names and register assignments
- data collection schedules
- reporting schedules
- output devices

3 Analyze the results.

Review the output associated with the OMs reported in accordance with the reporting schedules set up in the previous step by

- looking for service indicators that exceed the established engineering criteria for DWS
- looking for service indicators that may indicate a maintenance or datafill problem
- capturing the appropriate OM readings that project when to add more facilities to continue meeting the engineering criteria

4 Report the results.

Notify the engineering and maintenance organizations of any service indications that require their attention.

DWS performance factors
Wideband traffic

Description

Monitoring wideband traffic helps analyze trends for bandwidth requested by end users and determine trunk requirements.

The bandwidth preferred by end users impacts traffic engineering, as shown in table 4-1.

Table 4-1 Impact of preferred bandwidth on DS–0 channels required

	Switch A	Switch B
Total number of calls	20	20
Number of 6 by 64 kbit/s calls	2	18
Number of 24 of 64 kbit/s calls	18	2
Number of DS–0s required	444 [(2X6)+(18X24)]	156 [(18X6)+(2X24)]

In switch A, most calls request a 24 by 64 kbit/s bandwidth, while the 6 by 64 kbit/s bandwidth is requested more often in switch B. As a result, 444 DS-0 channels are required in switch A compared to 156 in switch B. The impact on traffic engineering is obvious: more equipment is needed to handle 20 calls in switch A than to handle 20 calls in switch B.

Northern Telecom recommends that administrators convert wideband traffic into DS-0 units and use narrowband traffic engineering tables, preferably tables that can account for peaks. Because of high traffic growth, changing application mixes, and the fact that all DS-0s in a wideband call must reside on the same T1, administrators should add a safety margin of 20% to 30% initially. The calculations required for wideband traffic engineering can be accessed by contacting your Northern Telecom account representative. The section below describes the typical calculations used to evaluate wideband traffic.

Wideband traffic is monitored through the OM groups WIDEBAND and TRK. Refer to the section on using OMs to evaluate DWS performance for a description of the OM group WIDEBAND. Refer to the *Operational Measurements Reference Manual* for a description of the OM group TRK.

DWS performance factors
Wideband traffic (continued)

Operational measurements as performance indicators for wideband traffic

Group	Register	Log reports
WIDEBAND	TWBATMPT	None
	WBATn	None
TRK	NATTMPT	None

How to evaluate wideband traffic

To identify trends for bandwidth requested by end users, monitor registers WBAT2 to WBAT24 and register TWBATMPT.

Calculations used to evaluate wideband traffic

Use the following calculations to determine the relative percentage of total n by 64 kbit/s call attempts, for each value of n, where n=2 to 24. Use the wideband traffic work sheet on page 4-28 to record calculated information.

$$\frac{\text{WBATn}}{\text{TWBATMPT}} \times 100 = \text{percentage of n by 64 kbit/s call attempts, where n = 2 to 24}$$

Erlangs may be used to calculate, through traffic engineering tables, the proper number of trunks required to carry the offered traffic at specific grades of service.

For narrowband traffic engineering, the following formula is used:

number of calls x average holding time (in hours) = Erlangs

For wideband traffic engineering, the formula for narrowband is modified. The following formula is used:

$$\sum_{n=2}^{24} \text{number of calls (at bandwidth n) x average holding time (in hours at bandwidth n) x n} = \text{Erlangs}$$

In the example shown in table 4-2, 129 wideband calls were placed. If these calls had been narrowband, at an average holding time of 3 min (.05 h), the

DWS performance factors
Wideband traffic (continued)

total Erlangs would be 6.45 (129 X .05). According to narrowband traffic engineering tables, 13 DS-0 trunks — fewer than 1 T1 link — are needed to handle 6.45 Erlangs with a blocking rate of 1%.

Wideband calls have different average holding times per bandwidth, as shown in table 4-2. The total traffic for these calls is 397 Erlangs. According to narrowband traffic engineering tables, 528 DS-0 trunks — 422 trunks plus a 25% safety margin — are needed to handle 397 Erlangs, for a blocking rate of 1%. About 22 T1 trunks are thus needed.

The following example shows the impact of average holding time on wideband engineering. This example should be used as a reference only, since it will not be indicative of your traffic. It is provided to show the importance of understanding the holding times and distribution of bandwidth (that is, values of n) used.

Table 4-2 Impact of average holding time on wideband traffic engineering

DS–0 Column 1	DWS attempts Column 2	NATTMPT (Col 1 * Col 2) Column 3	Average holding time (hours) Column 4	Erlangs (Col1 * Col2 * Col4) Column 5
1	0	0	0	0
2	50	100	0.5	50
3	4	12	0.25	3
4	3	12	0.016	0.192
5	3	15	0.016	0.24
6	50	300	0.5	150
7	0	0	0	0
8	1	8	0.25	2
9	0	0	0	0
10	3	30	0.25	7.5
11	0	0	0	0
12	10	120	0.75	90

—continued—

DWS performance factors
Wideband traffic (continued)

Table 4-2 Impact of average holding time on wideband traffic engineering (continued)

DS–0 Column 1	DWS attempts Column 2	NATTMPT (Col 1 * Col 2) Column 3	Average holding time (hours) Column 4	Erlangs (Col1 * Col2 * Col4) Column 5
13	0	0	0	0
14	0	0	0	0
15	0	0	0	0
16	0	0	0	0
17	0	0	0	0
18	1	18	1	18
19	0	0	0	0
20	0	0	0	0
21	0	0	0	0
22	0	0	0	0
23	9	207	0.25	51.75
24	1	24	1	24
Total	129	708		397

—end—

The impact of the average holding time on traffic engineering shows that while less than 1 T1 is needed to handle 129 narrowband calls, 22 T1 links are needed to handle 129 wideband calls.

The registers in the OM group WIDEBAND are not measured on a trunk group basis but on a per office basis. Thus, when evaluating specific wideband trunk groups, administrators can only use the OM group WIDEBAND as a guide.

For OM group TRK, existing trunk usage OMs are recorded on each DS-0. For example, a narrowband call that lasts an entire hour will generate 36 CCS (hundred call seconds). A wideband call that lasts an hour will generate 36 CCS times the number of channels used in that call.

DWS performance factors
Wideband traffic (end)

Peg counts in OM group TRK for wideband calls follow the same flow as for existing OM fields, and peg once regardless of the bandwidth of the call. For example, a narrowband call will peg NATTMP (number of attempts) and CONNECT each time a call is completed. A similar wideband call, regardless of the number of channels used, will also peg these registers once per call.

Thus the key registers of OM group TRK, when examining a wideband trunk, are NOVFLATB (number of overflows, all trunks busy) and TRU (traffic busy usage).

NOVFLATB indicates if any calls have overflowed the trunk group due to an insufficiency of trunks for offered traffic. If the value is zero, the number of trunks available was sufficient to meet the offered load. If the register is pegged, further investigation may need to be performed. On PRI trunks, if NOVFLATB is pegged, more access trunks may be required by the end user. For SS7 trunks with NOVFLATB pegged, a close examination of the traffic carried and the configuration involved must be considered.

TRU provides a raw CCS count of traffic on the trunk group indicating how many of the DS-0s in that trunk group were being used for traffic. This count can be compared with traffic engineering tables to provide a view of the theoretical performance of the trunks. This value should be examined against actual oveflow recorded by NOVFLATB. Traffic tables should take into consideration the probable peakedness of wideband traffic and the long holding times of videoconferencing – one of the main applications driving wideband traffic.

In the above example, if there were no call failures or All Trunk Busy conditions, registers NATTMT and INCATOT equal the total number of DS-0 attempts (708, column 3) and register TRU is the total traffic (397 Erlangs, column 5).

DWS performance factors
Grade of service

Description

Monitoring grade of service helps ensure that the customer receives a high-quality service. The grade of service indicates the probability of a call attempted receiving a busy signal. Operating companies may use different grades of service; this document assumes the operating company is using a grade of service of 1%.

The OM group WIDEBAND monitors the grade of service. Refer to the section on using OMs to evaluate DWS performance for a description of the OM group WIDEBAND.

Operational measurements as performance indicators for grade of service

Group	Register	Log reports
WIDEBAND	TWBATMPT	None
	TWBATB	None

How to evaluate grade of service

To determine the grade of service, monitor registers TWBATMPT and TWBATB. TWBATMPT counts the number of times a wideband call is placed. TWBATB counts the number of times a wideband call is dropped because no trunks are available (all trunks busy).

Calculations used to evaluate grade of service

Use the following calculation to determine the grade of service.

$$\frac{\text{TWBATB}}{\text{TWBATMPT}} \times 100 = \text{grade of service}$$

DWS performance factors
Grade of service (end)

Data evaluation procedure

Use the following procedure to evaluate grade of service.

Evaluating grade of service

1. Use the grade of service work sheet on page 4-29 to record calculated information.
2. Calculate the grade of service for the current study period.
3. If the grade of service is lower than 1%, go to step 5.
4. If the grade of service exceeds 1%, notify the provisioning engineers so corrective action can be taken.
5. You have completed this procedure.

DWS performance factors
Glare

Description

Glare occurs when two ends of a trunk are seized at the same time. Glare is not desirable for wideband calls because cleaning up and reselecting multiple channels requires CPU resources and real time. The trunk selection algorithm is designed to prevent glare, so excessive glare indicates potential provisioning problems.

The OM group WIDEBAND measures the percentage of calls dropped because of glare. Refer to the section on using OMs to evaluate DWS performance for a description of the OM group WIDEBAND.

Operational measurements as performance indicators for glare

Group	Register	Log reports
WIDEBAND	TWBATMPT	None
	TWBGLR	None

How to evaluate glare

To evaluate glare, monitor registers TWBATMPT and TWBGLR. Register TWBATMPT counts the number of times a wideband call is placed. Register TWBGLR counts the number of times a wideband call is dropped because of glare.

Calculations used to evaluate glare

Use the following formula to evaluate the percentage of blockage due to glare.

$$\frac{\text{TWBGLR}}{\text{TWBATMPT}} \times 100 = \text{percentage of blockage due to glare}$$

Ideally, there is no glare. A percentage of glare higher than 0 should be reported to maintenance personnel and provisioning engineers. This percentage may vary from one operating company to the other.

DWS performance factors
Glare (end)

Data evaluation procedure

Use the following procedure to evaluate glare.

Evaluating glare

1. Use the glare work sheet on page 4-30 to record calculated information.
2. Calculate the percentage of glare for the current study period.
3. If the percentage of glare is zero, go to step 5.
4. If the percentage of glare is not zero, notify the provisioning engineers so corrective action can be taken.
5. You have completed this procedure.

DWS performance factors
Call failures

Description

Monitoring call failures helps ensure that the customer receives a high-quality service. A percentage of call failures higher than 1% should be reported to maintenance personnel and provisioning engineers. This percentage may vary from one operating company to the other.

The OM group WIDEBAND monitors the percentage of call failures. Refer to the section on using OMs to evaluate DWS performance for a description of the OM group WIDEBAND.

Operational measurements as performance indicators for percentage of call failures

Group	Register	Log reports
WIDEBAND	TWBATMPT	None
	TWBFAIL	None

How to evaluate percentage of call failures

To determine the percentage of call failures, monitor registers TWBATMPT and TWBFAIL. TWBATMPT counts the wideband calls placed. TWBFAIL counts the number of times a wideband call fails EXCLUDING the cases where the call is dropped with a valid disconnect sequence. An invalid address or invalid billing information gives rise to a valid disconnect sequence.

Calculations used to evaluate percentage of call failures

Use the following calculation to determine the percentage of wideband call attempt failures.

$$\frac{\text{TWBFAIL}}{\text{TWBATMPT}} \times 100 = \text{percentage of call failures}$$

DWS performance factors
Call failures (end)

Data evaluation procedure

Use the following procedure to evaluate percentage of call failures.

Evaluating percentage of call failures

1 Use the percentage of call failures work sheet on page 4-31 to record calculated information.

2 Calculate the percentage of percentage of call failures for the current study period.

3 If the percentage of percentage of call failures is lower than 1%, go to step 5.

4 If the percentage of percentage of call failures exceeds 1%, notify the maintenance personnel and provisioning engineers so corrective action can be taken.

5 You have completed this procedure.

Using OMs to evaluate DWS performance

The following table describes the operational measurements (OM) that apply to DWS. These OMs provide the carrier with information to help DWS planning and traffic engineering.

DWS operational measurements

Group	Register	Information
EXT		**Description:** EXT monitors the use of extension blocks. DWS uses key field WIDEBAND_EXT_BLOCK. **BCS history:** This group was created prior to BCS20.
	EXTHI	**Description:** EXTHI records the maximum number of wideband extension blocks in simultaneous use during the preceding OM transfer period (30 min). When the limit of EXTHI is reached, EXTHI2 automatically acts as the extension block. **BCS history:** This register was created in BCS23. **Associated registers:** EXTHI replaces EXTUSAGE which was deleted in BCS25. **Register validation:** None
	EXTOVFL	**Description:** EXTOVFL counts the number of times a wideband extension block requested for a call is not available. **BCS history:** This register was created prior to BCS20. **Associated registers:** None **Register validation:** None
	EXTSEIZ	**Description:** EXTSEIZ counts the number of times a request for a wideband extension block is successful. When the limit of EXTSEIZ is reached, EXTSEIZ2 automatically acts as the extension block. **BCS history:** This register was created prior to BCS20. **Associated registers:** None **Register validation:** None

—continued—

DWS operational measurements (continued)

Group	Register	Information
WIDEBAND		**Description:** This group monitors traffic on wideband trunks. **BCS history:** This group was created in BCS34.
	TWBATMPT	**Description:** TWBATMPT counts the number of wideband call attempts for all values of n. **BCS history:** This register was created in BCS34. **Associated registers:** WBAT1 through WBAT24 **Register validation:** The sum of all WBATn = TWBATMPT
	WBAT1	**Description:** This register is zeroed and not used. **BCS history:** This register was created in BCS34. **Associated registers:** TWBATMPT **Register validation:** None
	WBAT2	**Description:** This register counts each 2 by 64 kbit/s wideband call attempt. **BCS history:** This register was created in BCS34. **Associated registers:** TWBATMPT **Register validation:** None
	WBAT3	**Description:** This register counts each 3 by 64 kbit/s wideband call attempt. **BCS history:** This register was created in BCS34. **Associated registers:** TWBATMPT **Register validation:** None

—continued—

DWS operational measurements (continued)

Group	Register	Information
	WBAT4	**Description:** This register counts each 4 by 64 kbit/s wideband call attempt. **BCS history:** This register was created in BCS34. **Associated registers:** TWBATMPT **Register validation:** None
	WBAT5	**Description:** This register counts each 5 by 64 kbit/s wideband call attempt. **BCS history:** This register was created in BCS34. **Associated registers:** TWBATMPT **Register validation:** None
	WBAT6	**Description:** This register counts each 6 by 64 kbit/s wideband call attempt. **BCS history:** This register was created in BCS34. **Associated registers:** TWBATMPT **Register validation:** None
	WBAT7	**Description:** This register counts each 7 by 64 kbit/s wideband call attempt. **BCS history:** This register was created in BCS34. **Associated registers:** TWBATMPT **Register validation:** None
	WBAT8	**Description:** This register counts each 8 by 64 kbit/s wideband call attempt. **BCS history:** This register was created in BCS34. **Associated registers:** TWBATMPT **Register validation:** None

—continued—

DWS operational measurements (continued)

Group	Register	Information
	WBAT9	**Description:** This register counts each 9 by 64 kbit/s wideband call attempt. **BCS history:** This register was created in BCS34. **Associated registers:** TWBATMPT **Register validation:** None
	WBAT10	**Description:** This register counts each 10 by 64 kbit/s wideband call attempt. **BCS history:** This register was created in BCS34. **Associated registers:** TWBATMPT **Register validation:** None
	WBAT11	**Description:** This register counts each 11 by 64 kbit/s wideband call attempt. **BCS history:** This register was created in BCS34. **Associated registers:** TWBATMPT **Register validation:** None
	WBAT12	**Description:** This register counts each 12 by 64 kbit/s wideband call attempt. **BCS history:** This register was created in BCS34. **Associated registers:** TWBATMPT **Register validation:** None
	WBAT13	**Description:** This register counts each 13 by 64 kbit/s wideband call attempt. **BCS history:** This register was created in BCS34. **Associated registers:** TWBATMPT **Register validation:** None

—continued—

DWS operational measurements (continued)

Group	Register	Information
	WBAT14	**Description:** This register counts each 14 by 64 kbit/s wideband call attempt. **BCS history:** This register was created in BCS34. **Associated registers:** TWBATMPT **Register validation:** None
	WBAT15	**Description:** This register counts each 15 by 64 kbit/s wideband call attempt. **BCS history:** This register was created in BCS34. **Associated registers:** TWBATMPT **Register validation:** None
	WBAT16	**Description:** This register counts each 16 by 64 kbit/s wideband call attempt. **BCS history:** This register was created in BCS34. **Associated registers:** TWBATMPT **Register validation:** None
	WBAT17	**Description:** This register counts each 17 by 64 kbit/s wideband call attempt. **BCS history:** This register was created in BCS34. **Associated registers:** TWBATMPT **Register validation:** None
	WBAT18	**Description:** This register counts each 18 by 64 kbit/s wideband call attempt. **BCS history:** This register was created in BCS34. **Associated registers:** TWBATMPT **Register validation:** None

—continued—

DWS operational measurements (continued)

Group	Register	Information
	WBAT19	**Description:** This register counts each 19 by 64 kbit/s wideband call attempt. **BCS history:** This register was created in BCS34. **Associated registers:** TWBATMPT **Register validation:** None
	WBAT20	**Description:** This register counts each 20 by 64 kbit/s wideband call attempt. **BCS history:** This register was created in BCS34. **Associated registers:** TWBATMPT **Register validation:** None
	WBAT21	**Description:** This register counts each 21 by 64 kbit/s wideband call attempt. **BCS history:** This register was created in BCS34. **Associated registers:** TWBATMPT **Register validation:** None
	WBAT22	**Description:** This register counts each 22 by 64 kbit/s wideband call attempt. **BCS history:** This register was created in BCS34. **Associated registers:** TWBATMPT **Register validation:** None
	WBAT23	**Description:** This register counts each 23 by 64 kbit/s wideband call attempt. **BCS history:** This register was created in BCS34. **Associated registers:** TWBATMPT **Register validation:** None

—continued—

DWS operational measurements (continued)

Group	Register	Information
	WBAT24	**Description:** This register counts each 24 by 64 kbit/s wideband call attempt. **BCS history:** This register was created in BCS34. **Associated registers:** TWBATMPT **Register validation:** None
	TWBCONNT	**Description:** This register counts the number of times a wideband connection is made successfully. This register is pegged for all values of n. **BCS history:** This register was created in BCS35. **Associated registers:** TWBATMPT, TWBFAIL **Register validation:** None
	TWBFAIL	**Description:** This register counts the number of times a wideband call fails EXCLUDING the cases where the call is dropped with a valid disconnect sequence. An invalid address or invalid billing information gives rise to a valid disconnect sequence. This register is pegged for all values of n. **BCS history:** This register was created in BCS35. **Associated registers:** TWBCONNT, TWBATMPT **Register validation:** None
	TWBATB	**Description:** This register counts the number of times a wideband call overflows because no trunks are available. This register is pegged for all values of n. **BCS history:** This register was created in BCS35. **Associated registers:** None **Register validation:** None

—continued—

DWS operational measurements (continued)

Group	Register	Information
	TWBGLR	**Description:** This register counts the number of times a wideband call is dropped because of glare. This register is pegged for all values of n. **BCS history:** This register was created in BCS35. **Associated registers:** None **Register validation:** None
	TWBSWITCH	**Description:** This register counts the total number of wide intra–switch call attempts. **BCS history:** This register was created in BCS36. **Associated registers:** None **Register validation:** None
	TWBINTER	**Description:** This register counts the total number of wide inter–LATA call attempts. **BCS history:** This register was created in BCS36. **Associated registers:** None **Register validation:** None
	TWBINTRA	**Description:** This register counts the total number of wide intra–LATA call attempts. **BCS history:** This register was created in BCS36. **Associated registers:** None **Register validation:** None
		—end—

DWS tracking work sheets

This section contains several work sheets to track the results from performance factor monitoring. Work sheets provide a means to record data in a manner that allows a view of selected OMs over more than one study period. Trends can be observed as data is accumulated.

Work sheets may be used to track the performance of DWS by recording the following:

- percentage of n by 64 kbit/s call attempts
- grade of service
- percentage of glare
- percentage of call failures

Wideband traffic (n =)

Study period _____

WBATn	TWBATMPT	% of call attempts = (Col1 / Col2) X 100
1	2	3
Prepared by Name _____ Date_____ Tel. No._____		

Grade of service

Study period ____________________________

TWBATB	**TWBATMPT**	**% of blocking = (Col1 / Col2) X 100**	**+ / – recommended percentage**
1	**2**	**3**	**4**

Prepared by
Name ______________________________ Date_____________________ Tel. No.________________

Glare

Study period _____

TWBGLR	TWBATMPT	% of blockage = (Col1 / Col2) X 100	+ / – recommended percentage
1	2	3	4

Prepared by
Name _____ Date_____ Tel. No._____

Call failures

Study period _____

TWBFAIL	TWBATMPT	% of call failures = (Col1 / Col2) X 100	+ / – recommended percentage
1	2	3	4

Prepared by
Name _____ Date_____ Tel. No._____

Maintaining DWS

This chapter describes the maintenance required to support DWS. The following list details the sections in this chapter along with a brief explanation of each one.

Maintenance documentation on page 5-2 lists related documentation.

DWS commands on page 5-2 outlines the specific commands seen at a MAP display and details the Wideband command.

DWS test tools on page 5-7 details the test tools available for DWS testing.

DWS logs on page 5-8 lists new and modified logs.

DWS operational measurements on page 5-10 gives descriptions for specific operational measurements.

Maintenance procedures on page 5-11 explains the maintenance procedure for replacing the enhanced time switch card, NTAX78AA.

Maintenance documentation

Related maintenance documentation required to maintain peripherals and wideband (WB) trunks is found in the following books:

- *Alarm and Performance Monitoring Procedures*
- *Trouble Locating and Clearing Procedures*
- *Routine Procedures*
- *Card Replacement Procedures*
- *Log Report Reference Manual*
- *Operational Measurements Reference Manual*
- *DMS-100 Family Commands Reference Manual*

DWS commands

DWS maintenance is performed at the following MAP levels:

- CI
- TTP
- DATATTP
- MONITOR
- MANUAL
- TRKCONV

Figure 5-1 illustrates the MAP hierarchy for maintaining wideband trunks. The menu commands available at these MAP levels are illustrated in the Trunk menu commands figure 5-2. The DATATTP and TRKCONV levels are reached by typing in the name of the level. The MONITOR and MANUAL levels are reached by typing in the word LEVEL before the name of the level.

Figure 5-1 MAP level hierarchy

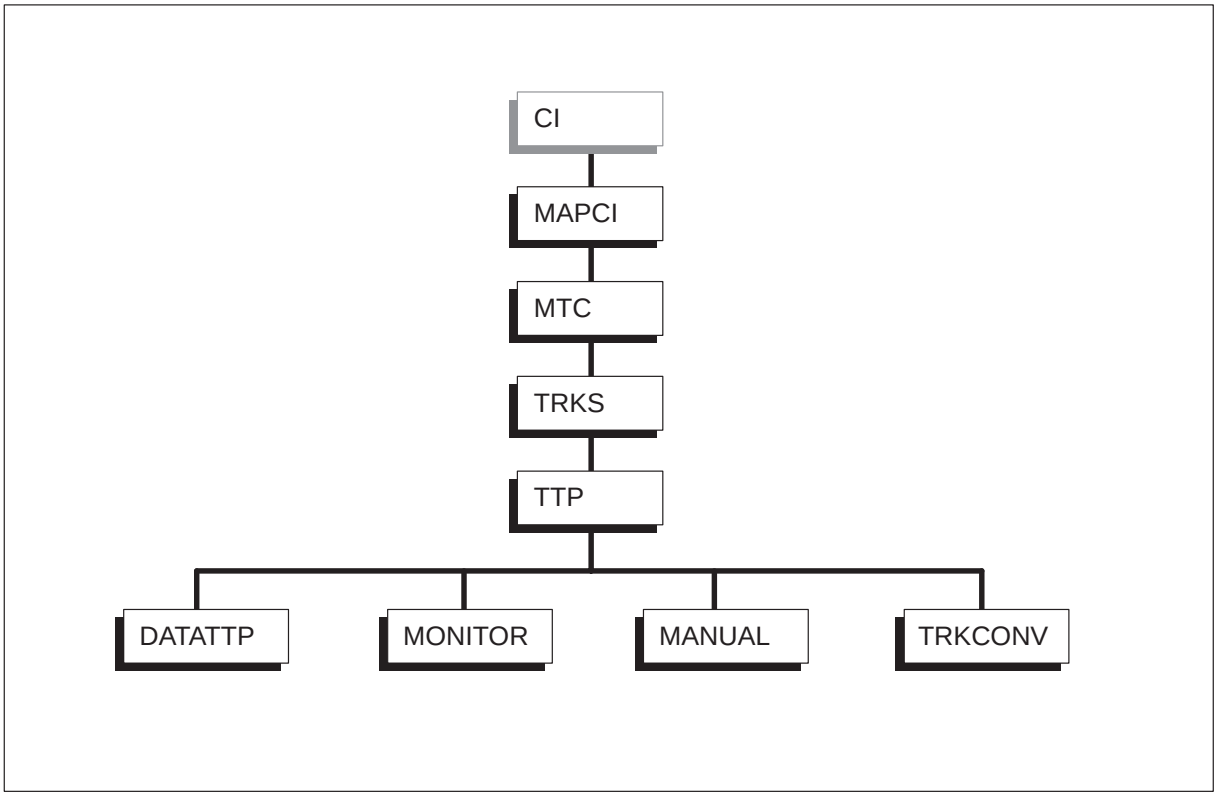
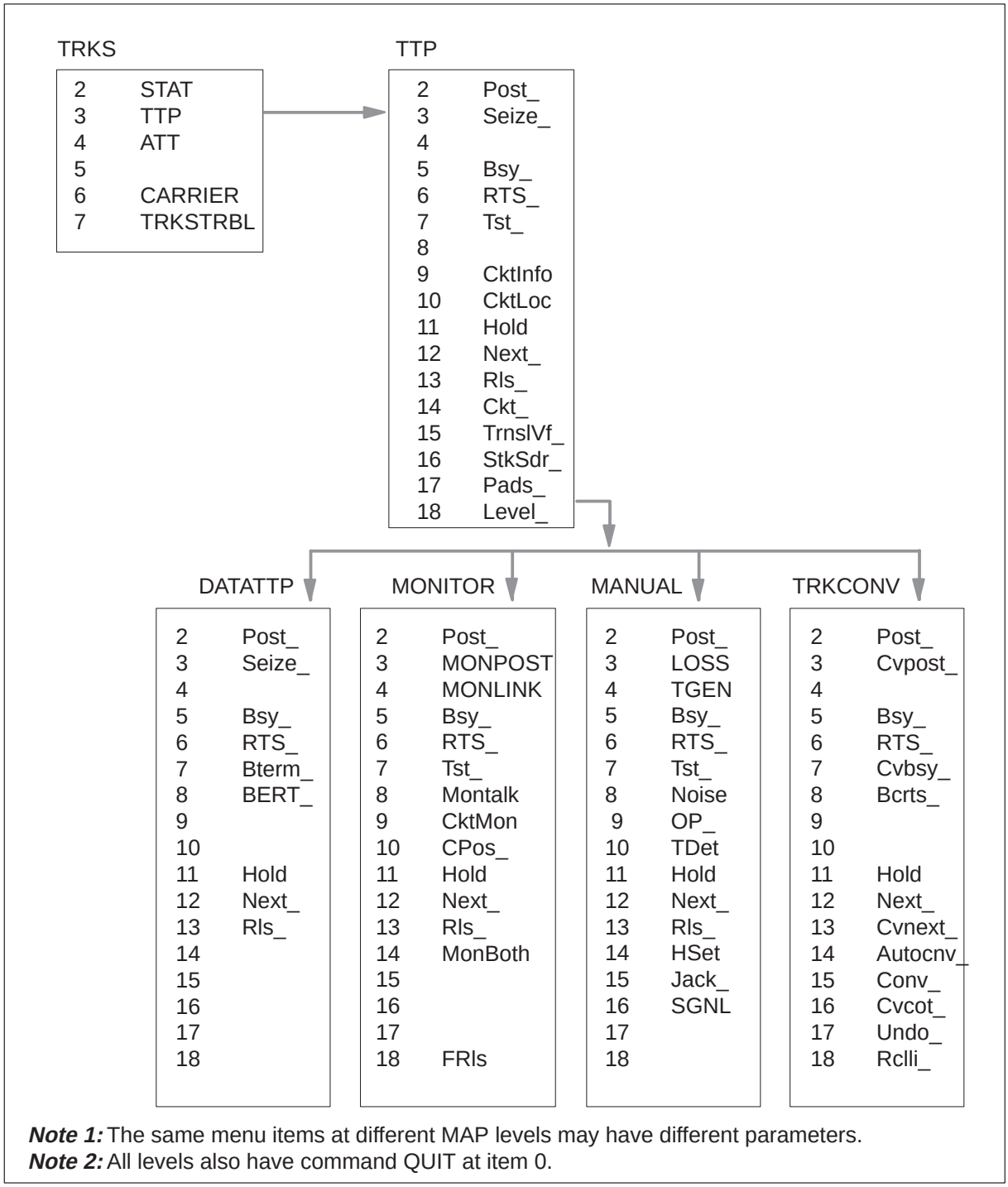


Figure 5-2 Trunk menu commands



Note 1: The same menu items at different MAP levels may have different parameters.
Note 2: All levels also have command QUIT at item 0.

The following table summarizes maintenance commands that have been either modified or created to support wideband maintenance. Refer also to the *DMS-100 Family Commands Reference Manual*.

Table 5-1 DWS maintenance commands

Command	Description
FRLS	Forces the release of a wideband call. The control position circuit is forced to a manually busy state and the remaining circuits are forced to an idle state.
POST	Using the WB option, circuits involved in a wideband call can be posted for maintenance functions.
WIDEBAND	Displays the circuits involved in a wideband call both at the originating end and the terminating end. This command is described in this chapter.

This chapter describes the WIDEBAND command, accessed from the CI or MAPCI level of the MAP display.

WIDEBAND command

The WIDEBAND command is used to display the circuits involved in a wideband call. Information is displayed in two columns showing the originating and the terminating circuits involved in a wideband call. This command can be accessed from the CI level or from the MAPCI menu level.

Table 5-2 Wideband command parameters and variables

Command	**Parameters and variables**
Widebandclli	clli, trkmem_num
Parameters and variables	**Description**
clli	This variable specifies the CLLI of the specified trunk.
trkmem_num	This variable specifies the trunk member number.

WIDEBAND command examples

The following procedure provides examples of the WIDEBAND command.

Display the circuits involved in a wideband call

At the MAP

1 From the CI level or from the MAPCI menu level, type

>Wideband wbotg 1
and press the Enter key.

where

wbotg	specifies the CLLI
1	specifies the trunk member number

Example of a MAP response

```
This circuit involved in a 2 circuit
wideband call
  TERMINATING CKTS   ORIGINATING CKTS
   WBOGT 1  WBINC 1
   WBOGT 2  WBINC 2
```

Note: For this example, WBOTG 1 is the controlling circuit on the terminating side of a two-circuit wideband call. This command displays the terminating and originating circuits involved in a wideband call from the CI level or from within the MAPCI menu level.

2 Type

>Wideband wbinc 3
and press the Enter key.

where

wbinc	specifies the CLLI
3	specifies the trunk member number

Example of a MAP response

```
This circuit involved in a 6 circuit
wideband call
  ORIGINATING CKTS   TERMINATING CKTS
   WBINC 1  WBOTG 1
   WBINC 2  WBOTG 2
   WBINC 3  WBOTG 3
   WBINC 4  WBOTG 4
   WBINC 5  WBOTG 5
   WBINC 6  WBOTG 6
```

Note: For this example, WBINC 3 is the third circuit on the originating side of a six-circuit wideband call.

The following table provides explanations of the responses to the WIDEBAND command.

Table 5-3 Responses for the WIDEBAND command

MAP output	Meaning and action
`Circuit not involved in a wideband call`	**Meaning:** You specified a trunk member number for a trunk that currently is not involved in an active wideband call. **Action:** None
`Invalid trunk circuit`	**Meaning:** You specified an invalid trunk member number. **Action:** None

DWS test tools

A series of optional test tools are available for the DMS-100 switch and may or may not be present in your office. The following optional test tools have been modified to support wideband service:

- peripheral module intercept system test (PMIST)
- common channel signaling 7 test utility (C7TU)
- primary rate interface test (PRITST)
- digital test access (DTA)

PMIST

PMIST is a low-level internal diagnostic test tool that records messages sent between the central control (CC) and the peripheral modules (PM).

PMIST monitors and records incoming and outgoing (I/O) messages to assist in determining whether the CC is responding properly to PM signals.

PMIST has been modified to display the transfer rates that are used in a wideband call. PMIST also displays the channels associated with the controlling wideband terminal identifier (TID) in the wideband call.

C7TU

The C7TU test tool permits monitoring CCS7 messages on CCS7 links, or on link interface units (LIU7).

C7TU has been modified to allow maintenance personnel to generate a wideband test call.

If your office is equipped with either of the above test tools, consult the appropriate Technical Assistance Manual (TAM), as listed below:

- TAM 1001-007 – *Peripheral Module Intercept System Test (PMIST) User Guide*
- TAM 1001-015 – *C7TU User Guide*

PRITST

The PRITST test tool allows the initiation of a DWS PRI test call from the trunk test position (TTP) level of the MAP display by use of the outpulse (OP) command.

The digits entered after the OP command correspond to an index in table PRITST. The information contained in this table is used to build the PRI messaging required to initiate and release DWS calls.

For more information, refer to feature AD4439, *DWS Test Tools and Maintenance*.

DTA

The DTA test tool is applicable with the NA004 documentation release.

DTA provides the capability of monitoring PRI primary or backup D-channels using the CONNECT command at the PRADCH sublevel at the TTP to connect the PRI D-channel to the monitoring equipment. This applies to unified processor (UP) ISDN digital trunk controllers (DTCI) using the enhanced timeswitch (ETS) NTAX-78AA.

DTA provides a refined method of monitoring ISDN channels by establishing access by replicating the digital data streams to and from the monitored point. DTA does not affect service on the channel to which it is applied.

When primary and backup D-channels exist, the channels can be monitored separately by making two DTA connections.

For more information on DTA, refer to the *ISDN Basic Rate Interface Maintenance Guide*.

DWS logs

The following table lists new and modified logs for wideband service. For more information on DWS logs, refer to the *Log Report Reference Manual*.

Table 5-4 DWS related logs

Log number	Description
AUD545	Indicates that a wideband extension block is in an invalid state.
WB100	Indicates that the initial address message (IAM) received from the customer premises equipment has included channels which are not available.
WB101	Indicates that the value of the office parameter for the number of wideband calls is too low.
WB102	Indicates that the information transfer rate has been set to an invalid value.
WB103	Indicates that a wideband IAM has been received on a trunk that does not have the wideband option (SELSEQ field) datafilled.
WB104	Indicates that an H0 call has been received on an invalid slot. H0 is supported on slots 1–6, 7–12, 13–18, and 19–24 for fixed trunks.
WB106	Indicates that when the wideband audit ran, a discrepancy was found between the trunk state in the internal wideband data structures and the actual trunk state as determined by the trunk audit.
WB107	Indicates that when the wideband audit ran, a discrepancy was found between the maximum available bandwidth for this carrier in the internal wideband data structures and the actual maximum available bandwidth for this carrier as calculated by the wideband audit.
WB108	Indicates that when the wideband audit ran, a discrepancy was found between the available bandwidth bitmap stored in the internal wideband data structures and the actual available bandwidth bitmap calculated by the wideband audit for this carrier.
WB109	Indicates that when the wideband audit ran, a discrepancy was found between the maximum available bandwidth for this trunk group in the internal wideband data structures and the maximum available bandwidth for this trunk group as calculated by the wideband audit.
—end—	

DWS operational measurements

There are two OM groups for DWS: WIDEBAND and WBTRK (wideband trunk). The following table describes the types of counts made by these OM groups. For more information on these OM groups, refer to the *Operational Measurements Reference Manual.*

Table 5-5 DWS operation measurements

Group	Register	Description
WIDEBAND	TWBATB	Counts the number of overflows that result when no trunks are available for a wideband call.
	TWBATMPT	Counts the number of wideband call attempts.
	TWBCONNT	Counts the number of successful wideband connections.
	TWBFAIL	Counts the number of unsuccessful wideband call attempts.
	TWBGLR	Counts the number of times a wideband call attempt is blocked due to glare.
	WBAT2, WBAT3, WBAT4, WBAT5, WBAT6, WBAT7, WBAT8, WBAT9, WBAT10, WBAT11, WBAT12, WBAT13, WBAT14, WBAT15, WBAT16, WBAT17, WBAT18, WBAT19, WBAT20, WBAT21, WBAT22, WBAT23, WBAT24	Counts the number of wideband call attempts on the indicated PRI channel (2 to 24).
WBTRK	EQINCTOT	Counts the number of DS0 channels used on a wideband trunk group for an incoming narrowband or wideband call attempt over any trunk in that trunk group.

—continued—

Table 5-5 DWS operation measurements (continued)

Group	Register	Description
	EQATTMPT	Counts the number of DS0 channels requested on a wideband trunk group by a narrowband or wideband call attempting to terminate on any trunk in that trunk group.
	EQOVATB	Counts the number of DS0 channels requested on a wideband trunk group by a narrowband or wideband call attempting, but unable, to terminate on any trunk in that trunk group due to overflow all trunks busy (OVATB).
		—end—

Maintenance procedures

This chapter contains a procedure for replacing the ETS card (NTAX78AA) in a DTCI or CCS7 digital trunk controller (DTC7) shelf.

The procedure contains the following:

- explanatory and context-setting information
- summary flowchart
- step-action instructions

Explanatory and context-setting information

In the procedure, the paragraphs titled “Application” and “Action” contain important explanatory notes and context-setting information. Read these sections before you try to perform the maintenance task. The paragraph titled “Common procedures” lists the names of procedures you may be asked to perform as you follow the step-action instructions. Go to these common procedures only when directed to do so.

Summary flowchart

The flowchart is only a summary of the main actions, decision points, and possible paths you may take. Do not use the summary flowchart to perform the procedure. Instead, use it to preview and prepare for what you will do. For example, if these instructions involve another office, you can advise that office before you begin the step-action instructions.

Step-action instructions

The step-action instructions tell you how to perform the procedure. Normally, you perform the steps in order, but you may be directed to return to a previous step and repeat a sequence. The successful completion of a step

may depend on previous steps; therefore, always perform the steps in the order specified.

While following the step-action instructions, you may be sent to another NTP for a related procedure. When this happens, you are told when to return to the original instructions and to which point in those instructions to go.

The step-action instructions provide the command syntax and machine output required to perform this procedure. For help on DMS commands or output, see the *About this document* chapter at the beginning of this document for the appropriate NTP number.

NTAX78AA in a DTCI or DTC7 shelf

Application

Use this procedure to replace the NTAX78AA card in an ISDN digital trunk controller (DTCI) or CCS7 digital trunk controller shelf.

PEC	Suffixes	Name
NTAX78	AA	Enhanced time switch

Common procedures

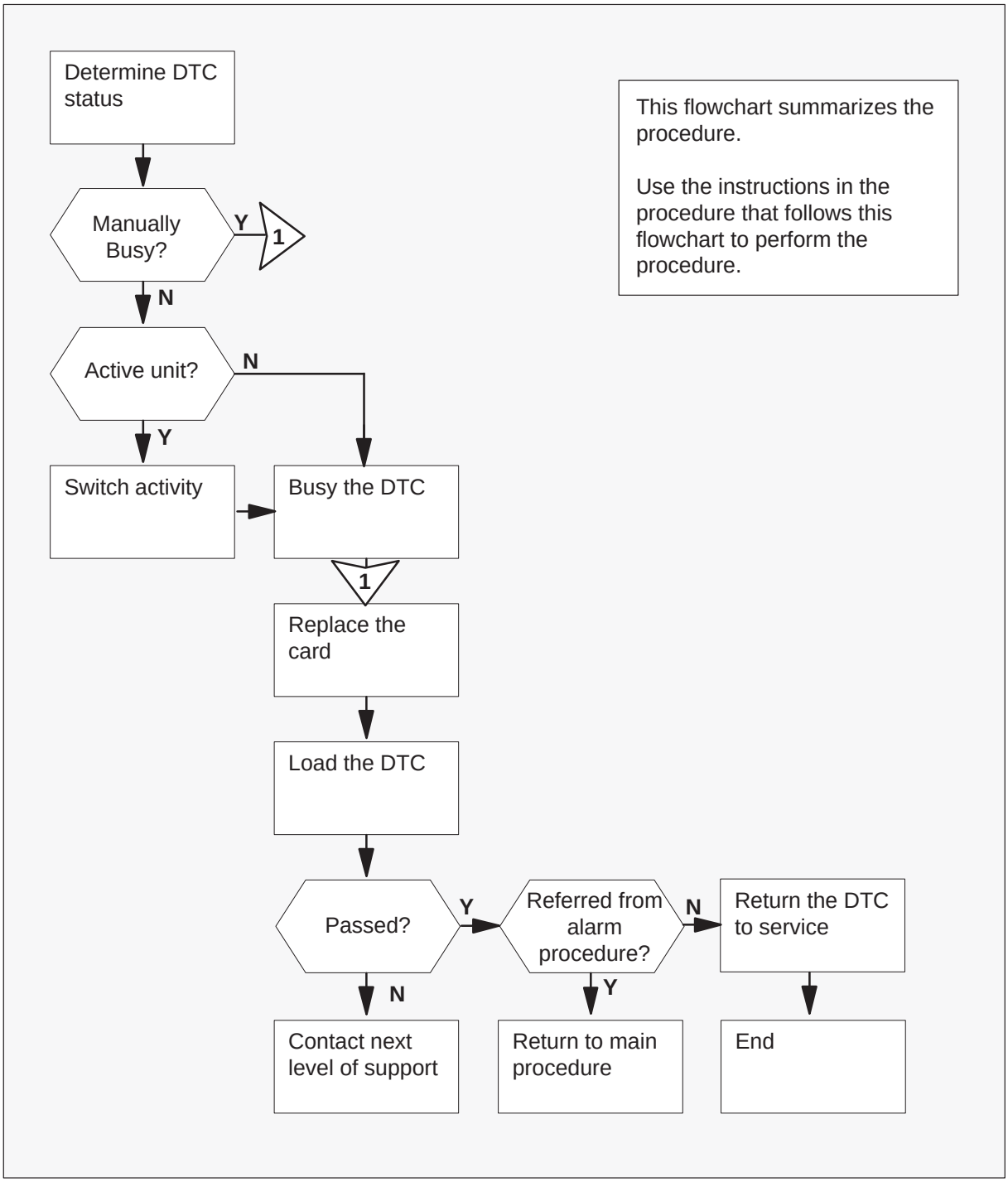
None

Action

The following flowchart is only a summary of the procedure. To replace the card, use the instructions in the step-action procedure that follows the flowchart.

NTAX78AA in a DTCI or DTC7 shelf (continued)

Summary of card replacement procedure for NTAX78AA card in a DTCI or DTC7 shelf



NTAX78AA in a DTCI or DTC7 shelf (continued)

Replacing an NTAX78AA in a DTCI or DTC7 shelf

At the MAP

1 Access the PM level of the MAP and post the PM that contains the card to be replaced by typing

>MAPCI;MTC;PM;POST pm_type pm_no
and pressing the Enter key.

where

pm_type is the PM type (DTCI, DTC7)
pm_no is the PM identification number (0 to 999)

Example of a MAP display input:

MAPCI;MTC;PM;POST DTCI 0

Example of a MAP response:

```
          SysB    ManB    OffL    CBsy    ISTb    InSv
PM          1       0       7       0       7       4
DTCI        1       0       0       0       2       0

DTCI   0 ISTb  Links_OOS: CSide  0,  Pside 1
Unit 0:  Act  Insv
Unit 1:  Inact Insv
```

2 Check the status of the PM.

If PM status is	Do
SysB, OffL, CBsy, ISTb, or InSv	step 3
ManB	step 7

3 Determine whether the card you are replacing is in the active or inactive unit of the PM.

If card is in the	Do
active unit	step 4
inactive unit	step 6

NTAX78AA
in a DTCI or DTC7 shelf (continued)

4

CAUTION
Loss of service
Service is lost if you remove the circuit card from the active unit of the peripheral module (PM).

Perform a switch of activity so the unit that contains the faulty card becomes the inactive unit by typing

>SWACT
and pressing the Enter key.

Example of a MAP response:

```
DTCI 0      A Warm SwAct will be performed after
            data sync of active terminals
Please confirm (“YES”, “Y”, “NO”, or “N”):
```

5 Confirm the switch of activity by typing

>YES
and pressing the Enter key.

Example of a MAP response:

```
DTCI 0     SwAct Passed
```

6 Busy the inactive unit of the PM that contains the card by typing

>BSY INACTIVE FORCE
and pressing the Enter key.

where

unit_no is 0 or 1

Example of a MAP response:

```
DTCI 0 Unit 0 Bsy passed
```

7 Obtain a replacement card. Ensure that the replacement card has the same product engineering code (PEC), including suffix, as the card being removed.

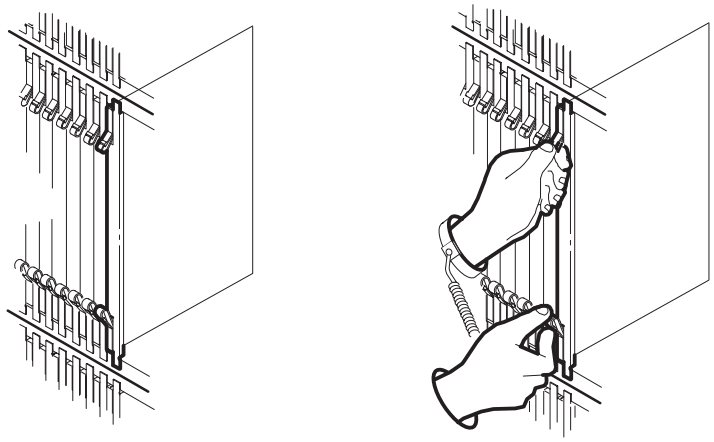
NTAX78AA
in a DTCI or DTC7 shelf (continued)

At the DTCI or DTC7

8

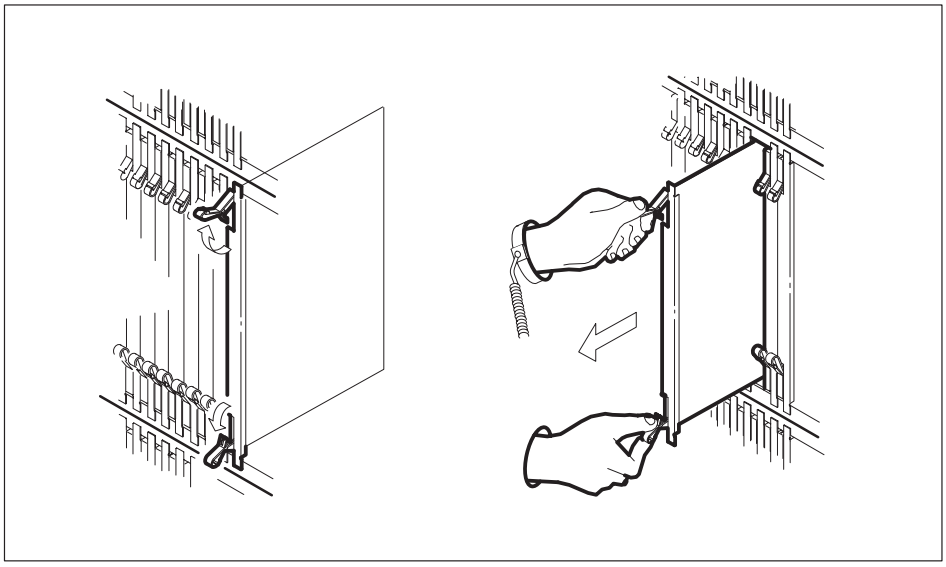
WARNING
Static electricity damage
Wear a wrist strap connected to the wrist strap grounding point of the frame supervisory panel (FSP) while handling cards. This strap protects the cards against damage caused by static electricity.

Locate the NTAX78AA card in slot 14 on the appropriate shelf.



NTAX78AA
in a DTCI or DTC7 shelf (continued)

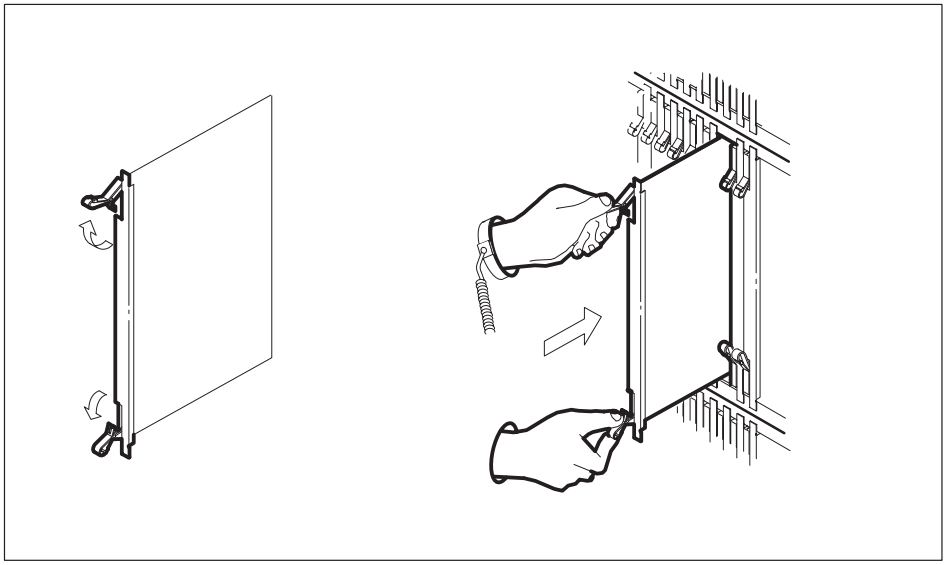
9 Gently pull the card towards you until it clears the shelf.



10 Place the card you removed in an electrostatic discharge (ESD) protective container.

11 Ensure that the replacement card has the same PEC, including suffix, as the card just removed.

12 Open the locking levers on the replacement card. Align the card with the slots in the shelf and gently slide the card into the shelf.

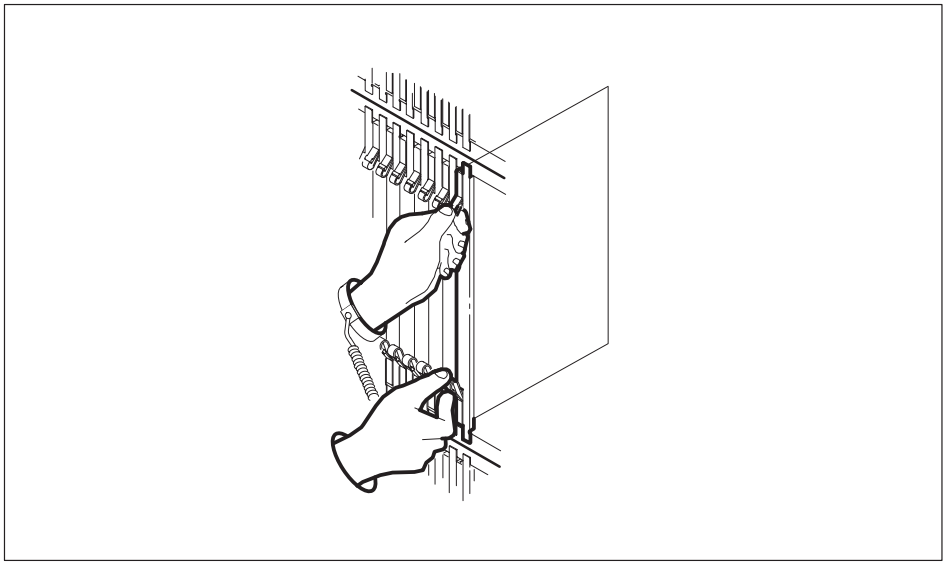


NTAX78AA
in a DTCI or DTC7 shelf (continued)

13 Seat and lock the card:

a. Using your fingers or thumbs, push on the upper and lower edges of the faceplate to ensure that the card is fully seated in the shelf.

b. Close the locking levers.



At the MAP

14 Perform a firmware reset by typing

>PMRESET INACTIVE NORUN
and pressing the Enter key.

Example of a MAP response:

```
DTCI 0 Unit 1 PMReset Passed
```

If the PMRESET	Do
passed	step 15
failed	step 37

NTAX78AA
in a DTCI or DTC7 shelf (continued)

15 Load the inactive unit by typing

>LOADPM INACTIVE CC FULL FORCE
and pressing the Enter key.

where

unit number is the number of the unit (0 or 1) to be loaded

Example of a MAP response:

```
DTCI 0 Unit 1 LoadPM Passed
```

If the LOADPM	Do
passed	step 34
failed	step 16

16 Determine why the load failed.

If the load failed and	Do
the MAP response is PM Failed to Initialize	step 32
a card list is generated	step 17
the MAP response is Load File not in directory	step 19

17 Record the locations and PECs, including suffixes, of the cards on the card list.

18 Perform the appropriate procedure in *Card Replacement Procedures* then return to step 32 in this procedure.

19 Access the disk utility level by typing

>DISKUT
and pressing the Enter key.

20 List and record the volumes on the SLM disks by typing

>LISTVOLS CM
and pressing the Enter key.

Example of a MAP response:

```
Volumes found on the node CM:
-----------------------------
NAME TYPE TOTAL      USED      FREE     TOTAL     OPEN      ITOC LARGEST
          BLOCKS     BLOCKS    BLOCKS   FILES     FILES     FILES FREE
                                                                 SEGMENT
-------------------------------------------------------------------------
S00DIMAGE1     STD  614389    471835    142554     28   0     0  81715
S00DPMLOADS    STD  614389    476915    137474     83   0     0  82386
S00DDLOG       STD    8185      3190      4995     49   0     0    586
S01DIMAGE1     STD  614389    584953     29436     39   0     0   7320
S00DPMLOADS    STD   51189     50944       245    116   0     0     78
S01DDLOG       STD    8185      7588       597     15   0     0    134
Total number of volumes found on node CM : 6
```

Note: In the above example, there are two volumes which contain PM load files. These are S00DPMLOADS and S01DPMLOADS.

21 Determine from office records which volumes contain the PM load files.

22 List the files on the PMLOADS volume and look for the DTCI load file by typing

>LISTFL disk_volume_name
and pressing the Enter key.

where

disk — is the name of the SLM disk (S00D or S01D)
volume_name — is the volume that contains the PM load files

23 Determine if the DTCI load file is present on the SLM disk.

If the load file is	Do
present	step 30
not present	step 24

24 Obtain the latest backup tape.

At the SLM

25 Mount the backup tape onto the appropriate SLM tape drive unit.

NTAX78AA
in a DTCI or DTC7 shelf (continued)

At the MAP

26 Insert the tape by typing

>INSERTTAPE device_name
and pressing the Enter key.

where

device_name — is S00T if you are working on SLM 0, or S01T if you are working on SLM 1

27 List the files on the backup tape by typing

>LISTFL device_name
and pressing the Enter key.

where

device_name — is S00T or S01T

28 Copy the file from the tape to the disk by typing

>RESTORE FILE disk_volume_name file_name
and pressing the Enter key.

where

disk — is the name of the SLM disk (S00D or S01D)
volume_name — is the volume that contains the PM load files
file_name — is the DTCI load file name

29 Confirm that the file copied to the disk by typing

>LISTFL disk_volume_name
and pressing the Enter key.

where

disk — is the name of the SLM disk (S00D or S01D)
volume_name — is the volume that contains the PM load files

30 Exit the disk utility level by typing

>QUIT
and pressing the Enter key.

31 Load the PM unit by typing

>LOADPM INACTIVE CC FULL FORCE
and pressing the Enter key.

where

unit_no — is the number of the unit (0 or 1) to be loaded

loadname is the load file that is present on the SLM disk

If the LOADPM command	Do
passed	step 34
failed, and the reason is different from the first time LOADPM failed	step 16
failed, and the reason is the same as the first time LOADPM failed	step 37
failed, and you have not replaced all the cards listed in step 17	step 33
failed, and you have replaced all the cards listed in step 17	step 37

32 Load the PM unit by typing

>LOADPM INACTIVE CC FULL FORCE
and pressing the Enter key.

where

unit_no is the number of the unit (0 or 1) to be loaded

If the LOADPM command	Do
passed	step 34
failed, and the reason is different from the first time LOADPM failed	step 16
failed, and the reason is the same as the first time LOADPM failed	step 37
failed, and you have not replaced all the cards listed in step 17	step 33
failed, and you have replaced all the cards listed in step 17	step 37

33 Replace the next card on the card list.

a. Perform the appropriate procedure in *Card Replacement Procedures*.

b. Return to step 32 in this procedure.

NTAX78AA in a DTCI or DTC7 shelf (end)

34 Your next action depends on your reason for performing this procedure.

If you were	Do
directed here from an alarm clearing procedure	step 36
not directed here from an alarm clearing procedure	step 35

35 Return the unit to service by typing

>RTS INACTIVE FORCE
and pressing the Enter key.

If the RTS	Do
passed	step 38
failed	step 37

36 Return to the maintenance procedure that sent you to this procedure and continue as directed.

37 For further assistance, contact the personnel responsible for the next level of support.

38 You have completed this procedure.

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DMS-100 Family

DMS SuperNode Dialable Wideband Service

Services Guide

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Northern Telecom
P.O. Box 13010
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