Meridian SL-100

Dialable Wideband Services (DWS)

Services Guide

NORTEL NETWORKS™

Meridian SL-100

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Services Guide

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Version 02.02, MSL05, Standard. This version is for MSL05 and contains review changes for feature AD7654, Dialable Wideband CALLP Matrix-to-Crossheads Additions (MSL WBAND functional group; MSL Wideband PRI IBN Dialable Wideband functionality).

Contents

About this document

Purpose and audience

This document contains Dialable Wideband Services (DWS) information for the Meridian SL-100. Information includes translations, log messages, operational measurements (OM), and card replacement procedures. This document's audience is service provisioning, installation, and administrative personnel.

Structure

This document contains the following sections:

- **Introduction to ISDN DWS translations** – introduces Dialable Wideband Services.
- **Datafilling Meridian SL-100 Dialable Wideband Services** – describes how to datafill DWS on the Meridian SL-100.
- **DWS logs** – describes the logs that DWS generates.
- **DWS OMs** – describes the OMs that DWS generates.
- **DWS card replacement procedures** – provides a procedure for replacing the NTAX78AA card in a DTCI.
- **List of terms** – contains acronyms and abbreviations of terms used in this document.

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 re-released in the same software release cycle. For example, the second release of a document in the same software release cycle is 01.02.

FOR MORE INFORMATION

To determine whether you have the latest version of this document and how documentation for your product is organized, check the release information in the *Meridian SL-100 Master Index of Publications*.

References in this document

This guide references the following documents:

- *Meridian SL-100 Customer Data Schema,* 555-4031-851
  or 555-4021-851 for the DSN version

- *Meridian SL-100 Card Replacement Procedures,* 555-4031-547
  or 555-4021-851 for the DSN version

- *Meridian SL-100 Office Parameters Reference Manual,*
  555-4031-855
  or 555-4021-855 for the DSN version

- *DMS Basic Administration Procedures,* 297-1001.

- *DMS SuperNode DWS Product Guide, 297, 2461-010*

- *DMS SuperNode DWS Services Guide, 297, 2461-021*

Introduction to ISDN DWS translations

Understanding ISDN DWS

Dialable Wideband Service (DWS) is Nortel Network's multirate ISDN switched service aimed at satisfying end-user needs for flexible, wideband connectivity. DWS offers a dialable, real-time switched service that allows the end user to establish network connections with rates from 128 kbps to 1.536 Mbps in 64-kbps increments. Table 1 describes the bandwidth rates available.

Table 1
DWS bandwidth rates

Rate multiplier	Bandwidth (kbps)
2	128
3	192
4	256
5	320
6 (H0)	384
7	448
8	512
9	576
10	640
11	704
12	768
13	832
14	896
15	960

Table 1
DWS bandwidth rates (Continued)

Rate multiplier	Bandwidth (kbps)
16	1024
17	1088
18	1152
19	1216
20	1280
21	1344
22	1408
23	1472
24 (H11)	1536

Note: Two T1 spans are needed to provide H11 (1.536 Mbps) bandwidth: one T1 for 24 B-channels and one T1 for D-channel signaling.

With DWS, the end user dials a directory number to establish the wideband connection 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); however, the end user is also able to establish connections, which are maintained for hours, days, or months.

DWS in the DMS network

DWS provides Meridian SL100 users with DS-1 and fractional DS-1 bandwidth to the CPE through ISDN primary rate interface (PRI). The PRI link uses an extension of standard Q.931 ISDN signaling.

Figure 1 on page 15 and Figure 2 on page 15 illustrate typical DWS network configurations in an Meridian SL-100 environment.

Figure 1
Single node application of DWS

Customer Premises Equipment — PRI — Meridian SL-100 — PRI — Customer Premises Equipment

G100136
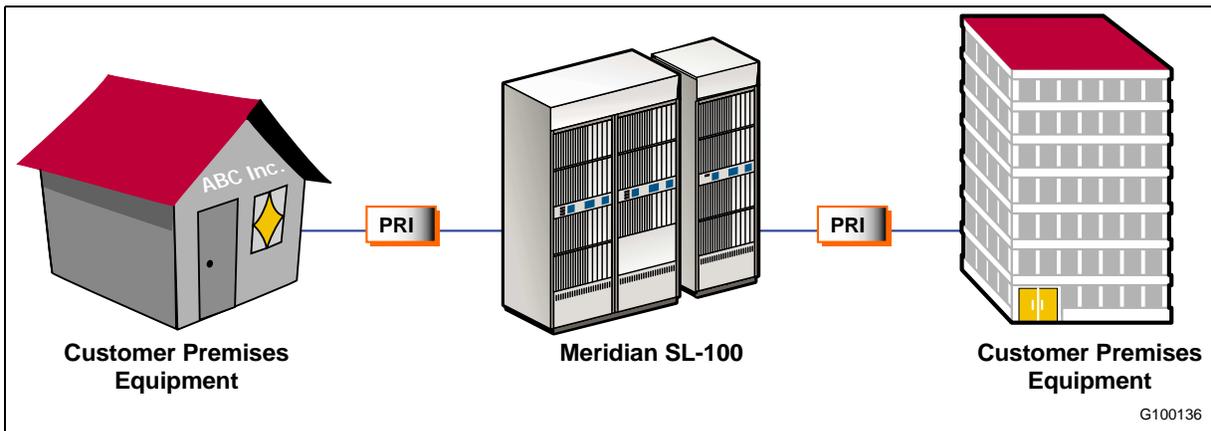
Figure 2
DWS shared access

Meridian SL-100 — PRI — MUX — Mainframe Computer — LAN — Codec — Videoconference

G100137
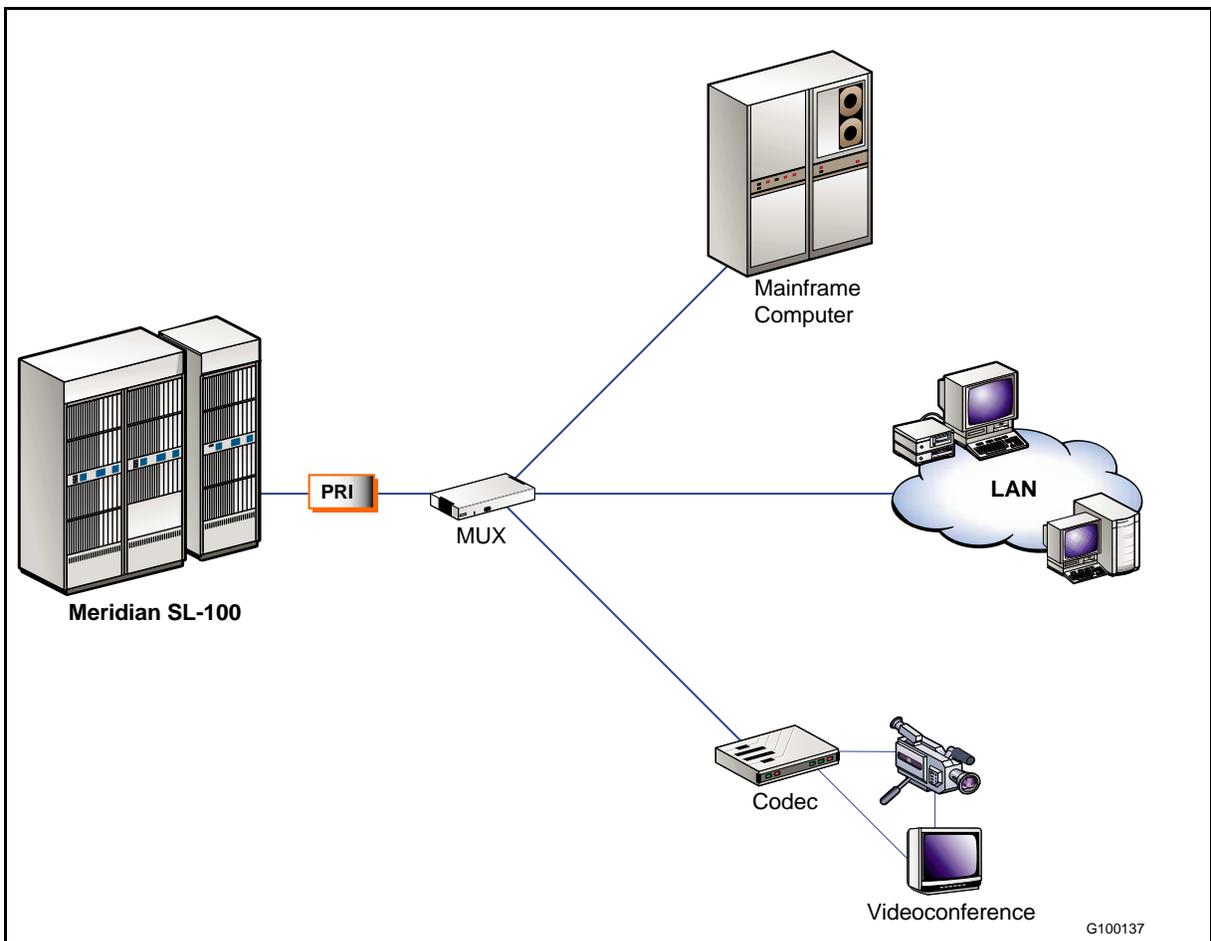
Call routing for DWS

DWS is provided to the subscriber through nx64 signaling extensions to the PRI standards. 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 Meridian SL-100 to indicate the required bandwidth. All information for a PRI call with DWS is included in the SETUP message.

Based on the translations of the called party number, the Meridian SL-100 routes the wideband call to the terminating customer premise equipment (CPE) using PRI signaling. Once connected to the called subscriber, user-to-user communication occurs. The call is terminated when either party hangs up.

Billing for DWS

The called party number, calling party number, call duration, and bandwidth allocated for the call are recorded on the automatic message accounting (AMA) system to allow downstream processing and billing.

Limitations and restrictions

Dialable Wideband Service in the Meridian SL-100 market is initially offered with the following limitations and restrictions:

- IBN agent interworking and IBN translations are not supported.
- All B-channels used on an incoming or outgoing wideband call must reside on the same physical PRI facility and be in the same trunk group.
- Wideband and narrowband calls should not share the same T1 facility.
- The DWS PRI product currently supports only the existing Bellcore AMA billing system. Station Message Detail Record (SMDR) billing is not currently supported for DWS.
- INBAND DTMF digit collection (PIN digits, account codes, and authorization codes) is not supported.
- Wideband calls routed to an operator receive the ORIGINATION_ DENIED treatment.
- Offhook and onhook queueing are not supported for wideband trunk groups.
- A satellite hop is not supported.
- Internal echo canceller control is not supported.
- B-channel negotiation is not supported.

- Testing and support for the AT&T P41449 or ANSI T1.607 protocols are not provided.

- BERT testing is supported on individual DS-0 channels, but not on a group of channels.

- Wideband test calls are not supported.

- Continuity testing is not supported for wideband trunk group agencies.

Software requirements

Table 2 lists the basic functional groups and functionalities required to support DWS capabilities.

Table 2
DWS base software

Functional group and name	Functionality code and name	Feature package number and name
NI000004 NI0 NI-2 DWS	None None None None None NI000027 DWS Flexible Acc	NTXS08AA, Enhanced Time Switch NTXS25AA, DWS Base NTXS26AA, DWS PRI Base NTXR49AA, DWS PRI NTXR27AA, DWS PRI Test Tools NTXR65AA, Flexible DWS Access
NI000007 NI0 ISDN Base	None	NTXS36AA, XPM PLUS on DTCI
BAS00003 BAS Generic	None None	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, enhanced time switch circuit card.

- 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 according to the current standards. It provides access to the CPE through PRI.

- NTXS27AA, DWS PRI Test Tools, 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.

- NI000027, formerly NTXR65AA DWS Flexible PRI Access, enhances Dialable Wideband Service by allowing flexible wideband trunk selection on PRI trunks. NI000027 DWS Flexible Access is included in functional group NI000004 (NTXR49AA DWS PRI).

    Note: NI000004 (NTXR49AA DWS PRI) and NI000027 (NTXR65AA Flexible DWS Access) require translations datafill, which is described in "Datafilling Meridian SL-100 Dialable Wideband Services" on page 33.

NI000007 NI0 ISDN Base

This functional group, formerly NTXS36AA XPM PLUS on DTCI, supports a Unified Processor (UP) load, which replaces the Master Processor (MP) and Signaling Processor (SP) loads of the XPM product. XPM PLUS on DTCI is required for software releases MSL03 and higher.

BAS00003 BAS Generic

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

- DS11 Kbps Clear Channel Signaling provides support for clear 64-kbps signaling on DS-1 carriers.

- 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

Table 3 lists the common functional groups and functionalities required to support DWS capabilities.

Table 3
DWS software dependencies

Functional group and name	Feature package number and name
BAS00003 BAS Generic	NTXE01AA, Enhanced Network, Basic
NI000022 NI0 ISDN PRI Base	NTX790AC ISDN Primary Rate Access Base

BAS00003 BAS Generic

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:

- Enhanced Network – Basic implements the enhanced network (ENET) as a switching matrix subsystem type for DMS SuperNode systems.

NI000022 NI0 ISDN PRI Base

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

Architecture

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

Exchange termination – describes the key DMS SuperNode components required for DWS.

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

Exchange termination

The exchange termination is based on standard DMS-100 Family switches, peripherals, and software. Exchange termination routes the B- and D-channels for outgoing and incoming calls through the appropriate peripheral.

The exchange termination can be configured for a variety of applications, using a combination of peripherals. DWS can be configured using the hardware components shown in . Full details on DMS SuperNode core components, configurations, frame, cabinet, and shelf layouts are described in subsequent paragraphs.

Figure 3
DWS system architecture

G100139
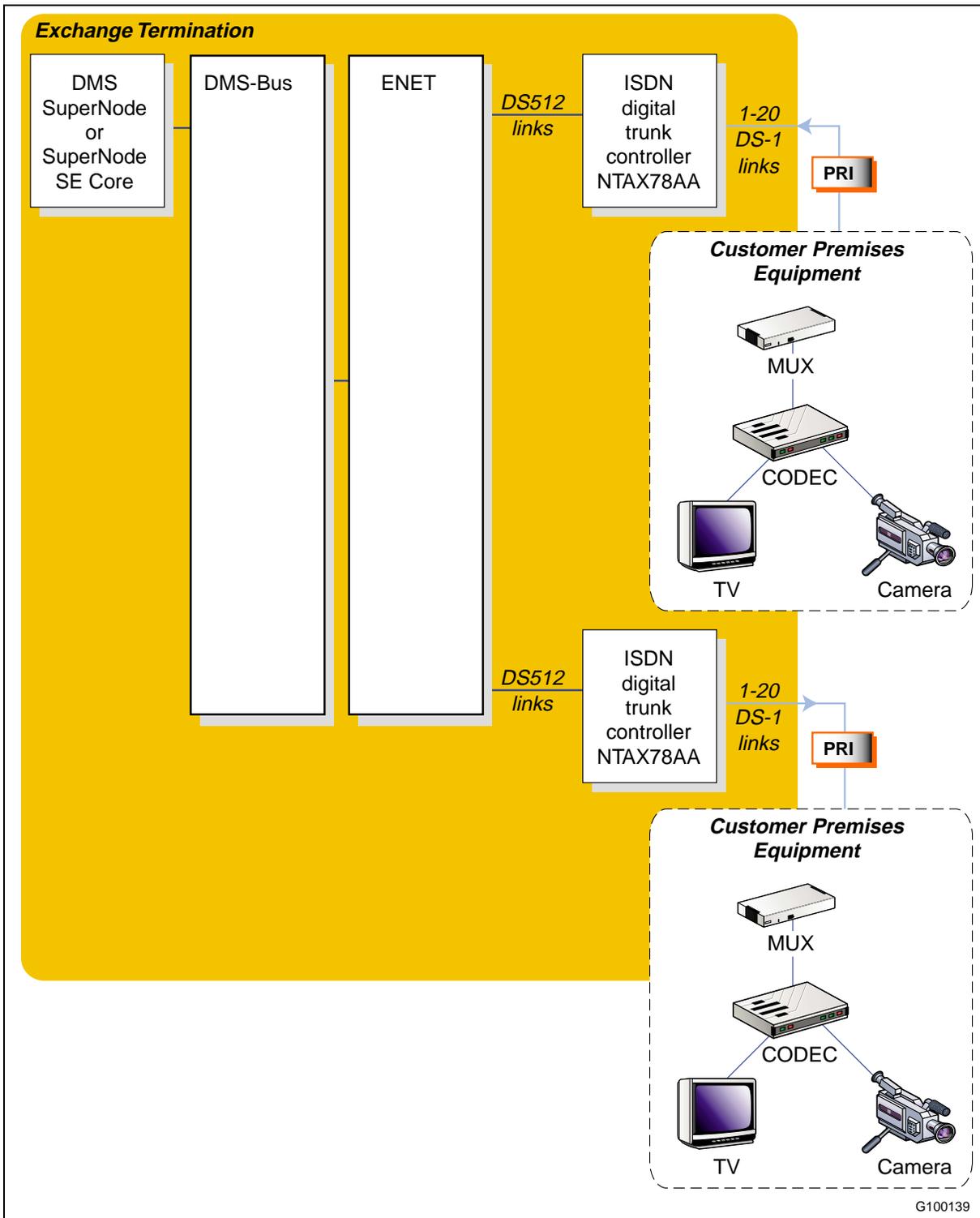
Peripheral equipment

The DWS product requires the following switching matrix and peripherals:

- ENET

- DTCI

Enhanced network

The 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.

DWS requires the nonblocking architecture of ENET to ensure that the time synchronization associated with a given DWS call (incoming DS-1 to outgoing DS-1) retains the channel alignment 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. The DTCI peripheral is 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

DWS capability is built on the DTCI XPM PLUS-based peripheral in the existing DMS product family. DTCIs reside in either an ISDN Meridian cabinet trunk module (MCTMI) or ISDN digital trunk controller equipment (DTEI) frame.

Both MCTMI and DTEI hold two DTCIs, a cooling unit, and a frame supervisory panel (FSP). The MCTMI and DTEI are illustrated in Figure 4 on page 22 and Figure 5 on page 22.

Up to five NT6X50AB cards (DS-1 interface) can be installed on each DTCI 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.

Figure 4
ISDN Meridian cabinet trunk module (MCTMI) NTNX33

Frame supervisory panel

ISDN digital trunk controller (DTCI) 1

Unit 1

Unit 0

ISDN digital trunk controller (DTCI) 2

Unit 1

Unit 0

Cooling unit

Grill

ISDN Meridian cabinet trunk module NTNX33

G100143
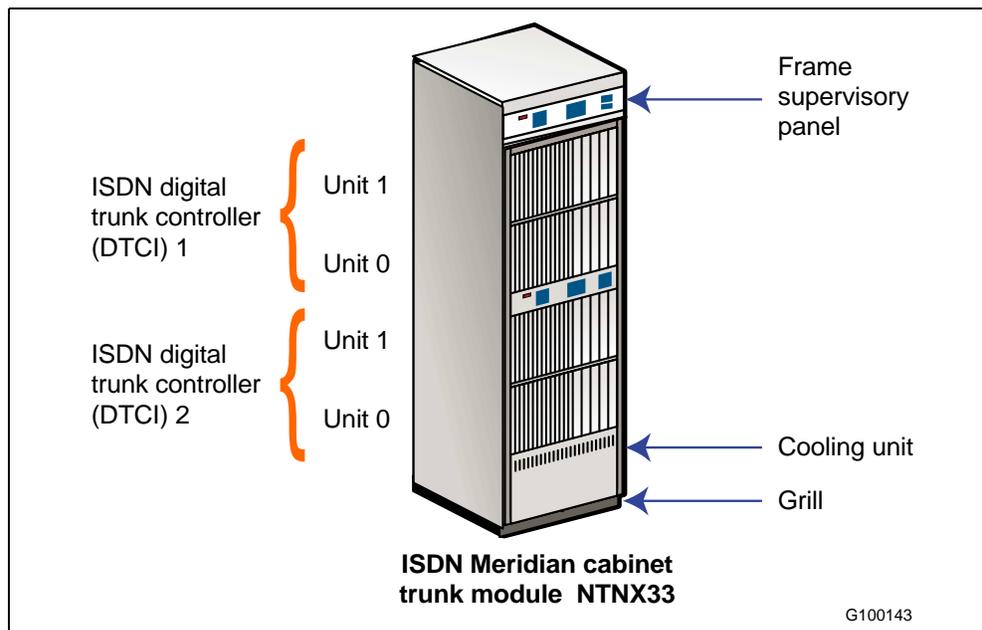
Figure 5
ISDN digital trunk controller equipment (DTEI) frame NT6X01

ISDN digital trunk controller (DTCI) 1

Unit 1

Unit 0

ISDN digital trunk controller (DTCI) 2

Unit 1

Unit 0

ISDN digital trunk array

Frame supervisory panel

ISDN digital trunk array

Cooling unit

Grill

ISDN digital trunk equipment NT6X01

G100144
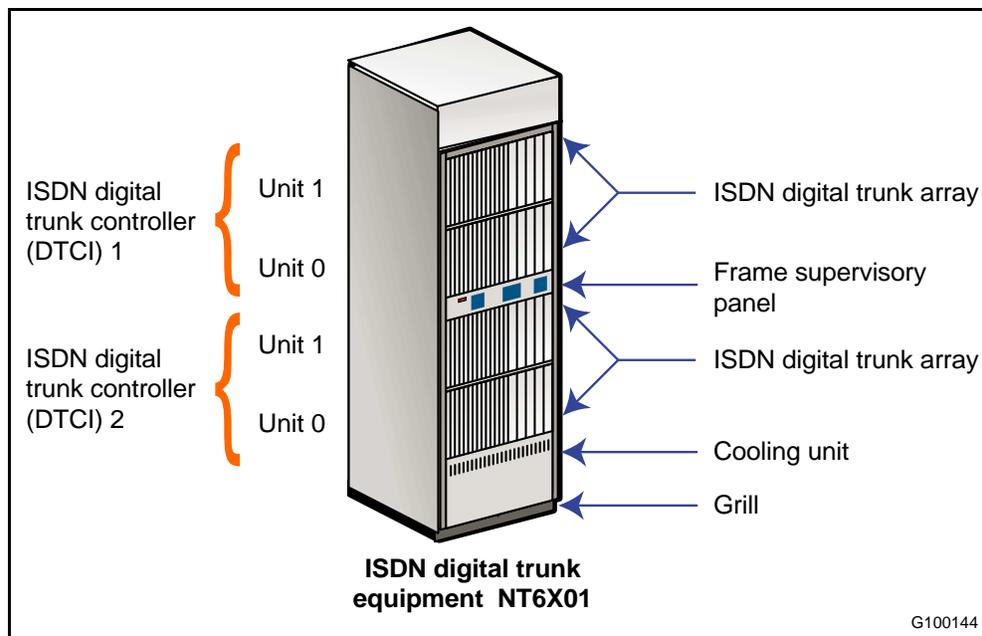
DTCI configuration

The following engineering rules apply to DTCI DWS configurations:

- To enable 64-kbps unrestricted data capabilities, T1 carriers for DWS PRI must have B8ZS coding.

- ESF framing is required.

- The NT6X50AB, DS-1 interface card, is required for Dialable Wideband Service, since it supports ESF framing. The NT6X50AA, DS-1 card, may be included in the same shelf as the NT6X50AB, but can only be used for non-DWS trunks.

- Slot 15 can be provisioned with a universal tone receiver (UTR) card, NT6X92AA.

- XPM PLUS is required.

DTCI card locations

The arrangement of cards in an XPM PLUS configuration is shown in Figure 6. The XPM PLUS uses a unified processor (UP) and an Enhanced ISDN signaling preprocessor (EISP).

Figure 6 illustrates the shelf layout of an XPM PLUS configuration for DWS.

Figure 6
DTCI shelf layout for DWS in an XPM PLUS configuration

	Legend		
CSM	Channel supervision message (NT6X42)	ETS	Enhanced time switch (NTAX78)
DS-1	DS-1 interface (NT6X50AB)	MPC	Message protocol and tone generator (NT6X69)
DS512	DS512 interface (NT6X40)	UP	Unified processor (NTMX77)
EISP	Enhanced ISDN signaling preprocessor (NTBX01)	UTR	Universal tone receiver (NT6X92)

G100145
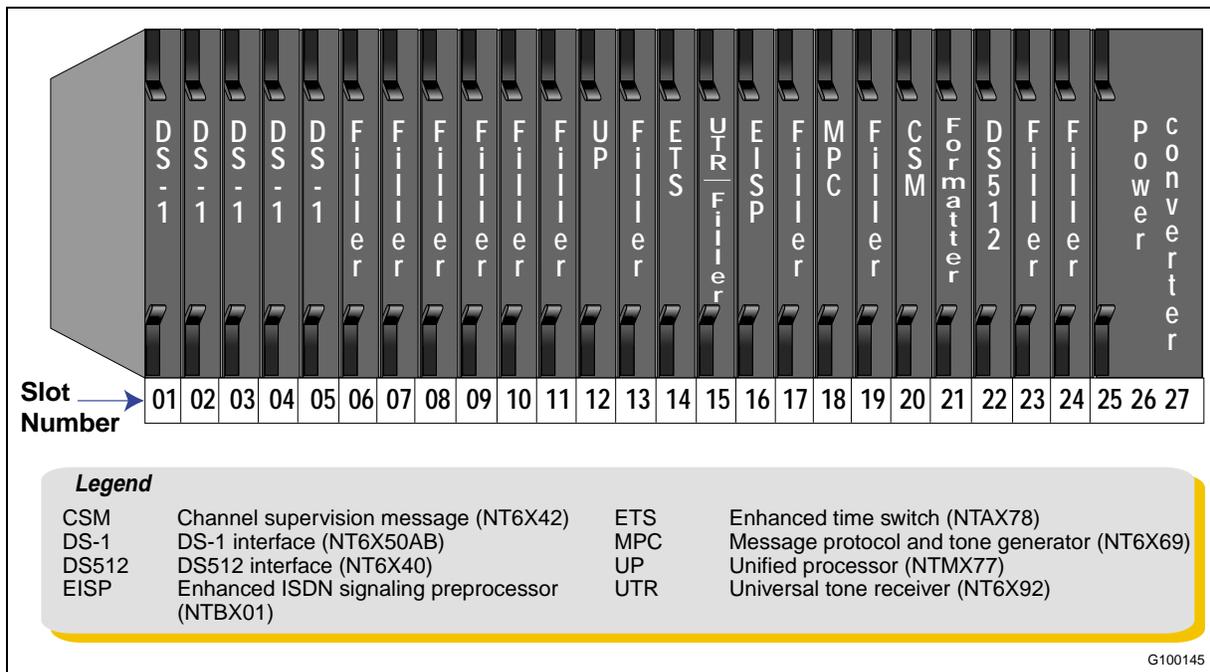
Enhanced time switch card (NTAX78AA)

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

- 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

DTCI interface to ENET

To make better use of ENET ports, the NT6X40AC (DS30 interface card) in slot 22 of a DTCI shelf is replaced with an NT6X40FA (DS512 interface card). 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 peripheral can use the fiber connections, while other peripherals such as maintenance trunk modules (MTM) can use the copper links of the card.

Trunk and channel recommendations

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

- All channels that 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 DS-0 members located on the DS-1 should be members of the same trunk group.

- Any physical interface that contain 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 must be used to minimize glare on 384- and 1536-kbps DWS calls.

- To support DWS, all T1 carriers must have B8ZS coding.

- ESF framing is required for DWS.

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.

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 only values supported are n = 6 or 24. For n = 6, the H0 (384 kbps) DWS call starting channel must be one of channel 1, 7, 13, or 19. For n = 24 (H11), all channels (1-24) on a T1 are used.

- only H0 or H11 wideband calls (384 kbps or 1.536 Mbps) 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.

- 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 kbps range, greater flexibility is provided to end users in determining the appropriate bandwidth for their specific application. Additionally, with the full nx64 range available, no calls are blocked to the called party due to incompatible bandwidth selection (for example, the calling party selects n = 12 [768 kbps], but the called party is using the fixed channel selection method and can only support n = 6 or n = 24).
- Channel packing algorithms are also used to minimize blocking and maximize overall link efficiency.

  Note: With the restrictions of floating channel selection, there may be times when a wideband call cannot complete 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 plus the following:

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

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

Figure 7 illustrates the three trunk selection methods.

Figure 7
Trunk selection methods for T1 links
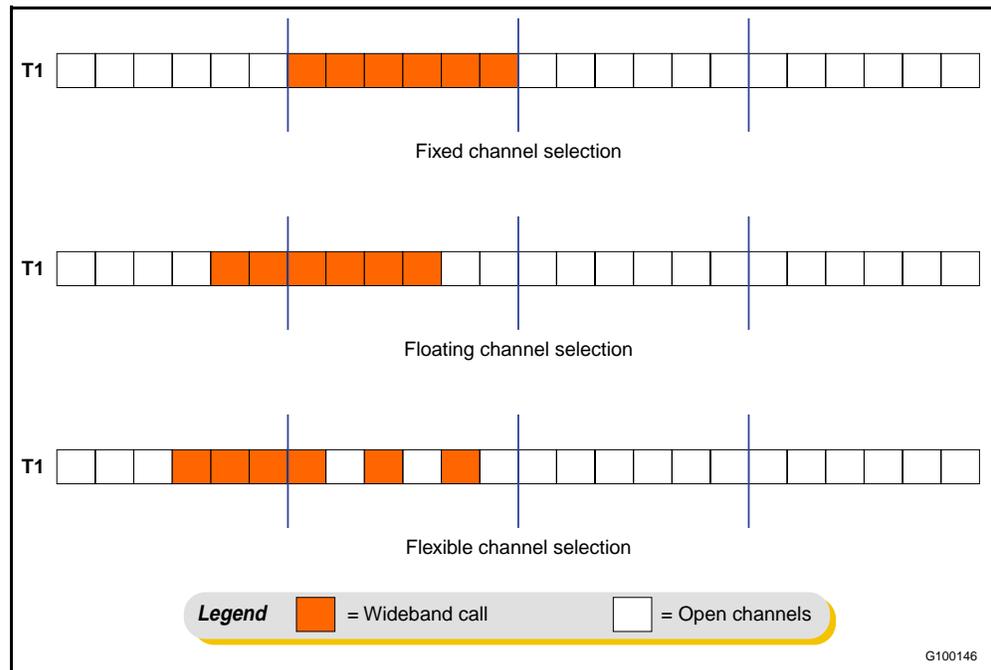
Circuit and network provisioning

DWS uses either a BESTFIT or FIRSTFIT trunk selection algorithm to select the group of channels that 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. FIRSTFIT selects the first available channel that satisfies the call size request. It helps avoid glare.

Glare occurs when two offices simultaneously 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, through 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 carrier must specify either ascending or descending sequential selection and must use opposite schemes at adjacent offices to minimize the occurrences of dual seizure.

The trunks at both switches connecting the wideband trunk groups must be datafilled to indicate which selection method is supported. If an Meridian SL-100 switch connects to customer premise equipment, both the PRI trunk and the CPE equipment support the most restrictive channel selection capabilities, either fixed or floating.

The selection order of trunks is determined by the route list, the wideband selection sequence, and the trunk selection algorithm. The Meridian SL-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 datafilled in TRKSGRP.

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.

Network management

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 4 lists the controls that apply to DWS.

Table 4
Network management controls

Abbreviation	Control name
AOCR	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

Table 4
Network management controls (Continued)

Abbreviation	Control name
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. This command is supported for DWS calls.

Cancel from

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

Cancel to

This control limits the traffic attempted on outgoing or two-way trunks. Calls route to treatment. This control may be activated on a percentage of alternate routed calls 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 skip-routes (route-advances) to the next trunk group. However, 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 works properly for 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 route 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 performs the same way for wideband calls as for narrowband calls as long as there are other wideband trunk groups in the route list.

Network management restrictions and limitations

Certain restrictions and limitations exist for DWS network management as follows:

- 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 alternate-routes, 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.

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 32 ms for a 384-kbps call and approximately 71 ms for a 1536-kbps call.

DTCI

The impact of the DWS product on a given DWS PRI call in the unified processor can be determined from the *System Engineering Bulletin*, SEB 93-03-001 (Issue 2 and up).

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-kbps connection is significantly less than the cumulative time required to set up twenty-four 64-kbps 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 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.

DWS test tools

The following test tools have been modified to support wideband service:

- peripheral module intercept system test (PMIST)

- primary rate interface test (PRITST)

PMIST

PMIST is a low-level internal diagnostic 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 displays the transfer rates that are used in a wideband call. PMIST also displays the channels associated with the controlling wideband TID in the wideband call.

For more information, refer to technical assistance manual TAM-1001-007, *PMIST User's Guide*.

PRITST

The PRI test 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*.

Datafilling Meridian SL-100 Dialable Wideband Services

NI000004 NI0 NI-2 DWS (NTXR49AA DWS PRI)

Ordering codes

Functional group ordering code: NI000004.

Functionality ordering code: Not applicable.

Release applicability

MSL03 and up.

NI000004 NI0 NI-2 DWS (NTXR49AA DWS PRI) was introduced in BCS36.

Prerequisites

To operate, NI000004 NI0 NI-2 DWS (NTXR49AA DWS PRI) requires the following functional groups (FG) (former NTX codes and names are also listed):

- BAS00003 BAS Generic
    - NTX142AA DS-1 64 kbps Clear
    - NTX143AA DS 1 ESF
    - NTXE01AA Enhanced Network-Basic
- NI000004 NI0 NI-2 DWS
    - NTXS08AA Enhanced Time Switch
    - NTXS25AA DWS Base
    - NTXS26AA DWS PRI Base
    - NTXS27AA DWS PRI Test Tools

- NI000007 NI0 ISDN Base
  — NTXS36AA XPM PLUS on DTCI
- NI000022 NI0 ISDN PRI Base
  — NTX790AC ISDN Primary Rate Access Base

Description

NI000004 NI0 NI-2 DWS (NTXR49AA DWS PRI) implements DWS for the Meridian SL-100 market according to current standards. It provides access to customer premise equipment through ISDN primary rate interface (PRI). The PRI link uses an extension of standard Q.931 ISDN signaling.

NI000004 NI0 NI-2 DWS (NTXR49AA DWS PRI) features applicable to the initial release of Meridian SL-100 DWS consist of the following:

- AD4421, LEC DWS Trunk Selection and OMs
- 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 Meridian SL-100 switch through a PRI trunk. The SETUP message contains the number called and the bandwidth desired for the wideband call.

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 in the

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) translation
process is shown in the flowchart that follows. This is an example only,
and not necessarily the only way to provide translations for DWS. To
route a call, the Meridian SL-100 switch accesses the tables in the
flowchart. Call processing in the Meridian SL-100 switch begins with
the trunking tables that 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) accesses table TRKSGRP that
defines the signaling protocol used by the trunk and table TRKGRP that
provides the LTID of the trunk group. The LTID field and the call type
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 accesses table STDPRTCT that contains the list of
standard pretranslation tables. The STS 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.

Figure 8
Table flow for NI000004 NI0 NI–2 DWS (NTXR49AA DWS PRI)
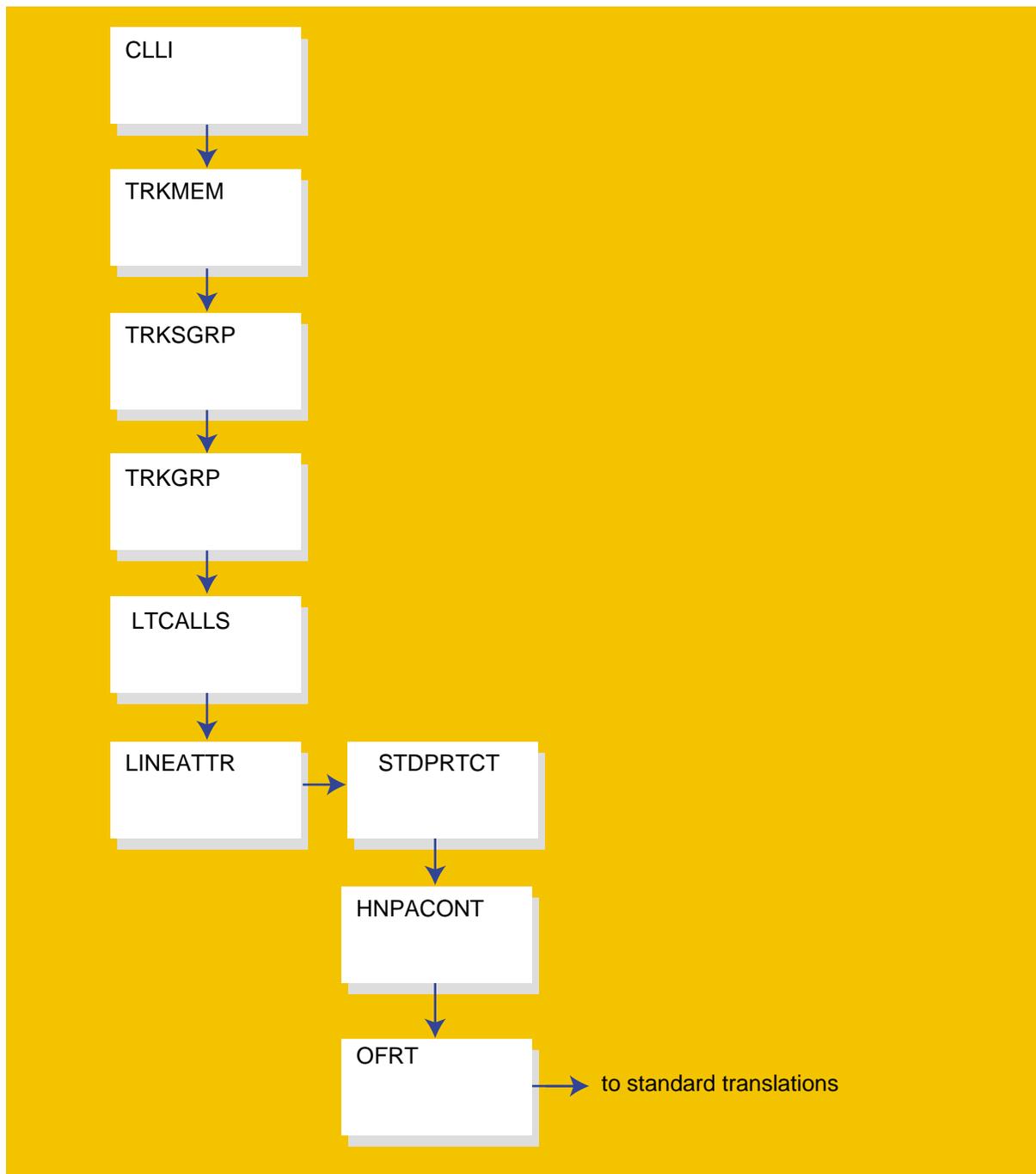
G100295

Table 5 lists the datafill content for digits dialed 214-640-0222 used in the flowchart.

Table 5
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 the initial release of Meridian SL-100 DWS PRI:

- All the B-channels used on an incoming or outgoing wideband call must reside on the same physical PRI facility and be in the same trunk group.

- Wideband and narrowband calls should not share the same T1 facility.

- To change an existing narrowband trunk group to a wideband trunk group requires that all trunk group members be deleted.

- INBAND DTMF digit collection (PIN digits, account codes, authorization codes) is not supported. Wideband calls routed to an operator receive the ORIGINATION_DENIED treatment.

- Offhook and onhook queueing are not supported for wideband trunk groups.

- Satellite hop is not supported.

- Internal echo canceller control is not supported.

- B-channel negotiation is not supported.

- Testing and support for the AT&T P41449 or ANSI T1.607 protocols are not provided.

- BERT testing is supported on individual D-0 channels, but not on a group of channels.

- Wideband test calls are not supported.
- Continuity testing is not supported for wideband trunk group agencies.

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.

Billing

NI000004 NI0 NI-2 DWS (NTXR49AA DWS PRI) uses existing Bellcore AMA billing record, field DATA RATE INDICATOR, to produce billing for DWS calls routed over PRI trunks.

The DATA RATE INDICATOR field records the total bandwidth used for a given wideband call. From this value, you can determine the number of B-channels that are grouped together to form the wideband call. For example, if the DATA RATE INDICATOR value is 384 Kbps, the number of B-channels used for that wideband call is 6 (384/64).

Datafilling table CRSFMT

Table CRSFMT must be datafilled to activate AMA billing for wideband calls over PRI trunks. Only those fields that apply directly to NI000004 NI0 NI-2 DWS (NTXR49AA DWS PRI) are shown. For a description of the other fields, see the *Meridian SL-100 Customer Data Schema Reference Manual*.

To activate the AMA billing system, the billing format for the AMA tuple must be datafilled to BCFMT (Bellcore Format).

Table 6
Datafilling table CRSFMT

Field	Subfield or refinement	Entry	Explanation and action
FORMAT		BCFMT	Billing format. Enter BCFMT.

Datafill example for table CRSFMT
The following example shows sample datafill for table CRSFMT.

Figure 9
MAP display example for table CRSFMT

```
KEY FORMAT DATADUMP CDRSRCH ALARMS TIMERDMP TIMERVAL
_____
AMA BCFMT         N   NIL_FM     N        N        0
```

Station Message Detail Recording

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

Datafilling office parameters

Table 7 shows the office parameters used by NI000004 NI0 NI-2 DWS
(NTXR49AA DWS PRI). For more information about office parameters,
see the *Meridian SL-100 Office Parameters Reference Manual*.

Table 7
Office parameters used by NI000004 NI0 NI-2 DWS (NTXR49AA DWS PRI)

Table	Parameter	Explanation and action
OFCENG	MAX_NUM_WIDEBAND_CALLS	The parameter specifies the number of wideband extension blocks that are engineered for a switch. The number of extension blocks chosen indicates the maximum number of active wideband calls that can exist on a switch 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.
OFCOPT	LAMA_OFFICE	The parameter specifies whether the switching unit has Local Automatic Message Accounting (LAMA) feature. Set this parameter to Y (yes).

Datafill sequence

Table 8 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 must be datafilled.

Table 8
Datafill tables required for NI000004 NI0 NI-2 DWS (NTXR49AA DWS PRI)

Table	Purpose
LTCINV	Contains the inventory data for various peripheral modules.
CARRMTC	Allows the Meridian SL-100 switch administration to datafill maintenance control information in peripheral modules.

Table 8
Datafill tables required for NI000004 NI0 NI-2 DWS (NTXR49AA DWS PRI)

Table	Purpose
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.

Figure 10 shows the datafill dependencies between the Meridian SL-100 tables 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. See the appropriate sections in the *Meridian SL-100 Translations Guide* for a description of other PRI tables.

Figure 10
PRI datafill dependencies
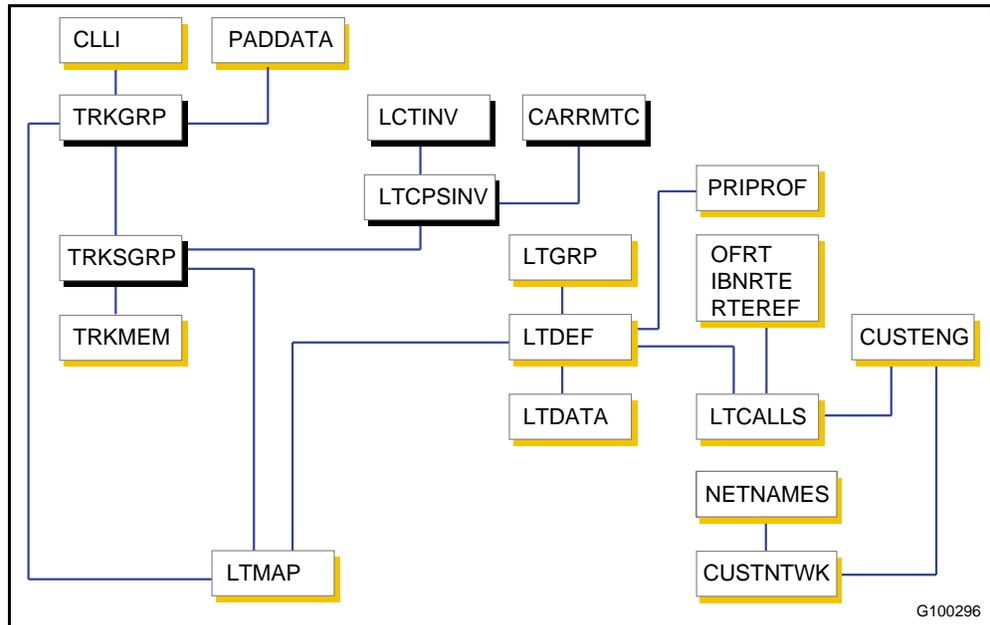
Datafilling table LTCINV

Table 9 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, see the *Meridian SL-100 Customer Data Schema Reference Manual*.

Table LTCINV lists the inventory for DTCI peripheral modules in the Meridian SL-100. For each DTCI used by wideband dedicated trunk groups, table LTCINV must be datafilled with the optional card required for wideband service.

Table 9
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 Meridian cabinet (MCTM) or frame type (DTEI) on which the peripheral module equipment is mounted.
FRNO			Frame number. Enter the cabinet or frame number (0 to 511) 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 cabinet or frame is located.
ROW			Row. Enter the row on the floor where the peripheral module cabinet or frame is located.
FRPOS			Frame position. Enter the bay position (0 to 99) of the peripheral module cabinet or 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.

Table 9
Datafilling table LTCINV

Field	Subfield or refinement	Entry	Explanation and action
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 specified in the TRMTYPE entry. Enter PRAB DTCEX.
	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.
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.

Table 9
Datafilling table LTCINV

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.
EXTINFO		Y or N	Extension info. This field requires a boolean entry of yes or no. If no is entered field string ends. If yes is entered system will prompt for extension shelf refinements that include the following subfields.
	EXTFRTYP		Extension frame type. Enter the Meridian cabinet extension or frame type on which the peripheral module equipment is mounted.
	EXTFRNO		Extension frame number. Enter the extension cabinet or extension frame number on which the peripheral module is mounted.
	EXTSHPOS		Extension shelf position. Enter the extension shelf position where the peripheral module is located.
	EXFLOOR		Extension floor. Enter the extension floor (0 to 99) on which the peripheral module cabinet or frame is located.
	EXTROW		Extension row. Enter the extension row on the floor where the peripheral module cabinet or frame is located.
	EXTFRPOS		Extension frame position. Enter the extension bay position (0 to 99) of the peripheral module cabinet or frame.
	EXTEQPEC		Extension equipment product engineering code. Enter the extension product engineering code (PEC) of the peripheral module.
	EXTSIDE		Extension side. Enter the extension side to where the peripheral module equipment resides. Entry is L or R.

Datafill example for table LTCINV

shows sample datafill for table LTCINV.

Figure 11
MAP display example for table LTCINV

```
   LTCNAME       FRTYPE
EXECTAB
                  OPTCARD
_____
   DTCI 0   8   DTEI   0 18 0 D 0 6X0215 ELI06BH (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 MX77AA
MX77AA MX77NB03 $ 6X40FA N
```

Datafilling table CARRMTC

Table 10 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, see the *Meridian SL-100
Customer Data Schema Reference Manual*.

Table 10
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
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.

Figure 12
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

Table 11 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, see the *Meridian SL-100 Customer Data Schema Reference Manual*.

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.

Table 11
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).

Table 11
Datafilling table LTCPSINV (Continued)

Field	Subfield or refinement	Entry	Explanation and action
	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.

Datafill example for table LTCPSINV
Figure 13 shows sample datafill for table LTCPSINV. In the example, DS-1 links 1 and 3 to 17 are datafilled as wideband.

Figure 13
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
Table 12 on page 47 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 *Meridian SL-100 Customer Data Schema Reference Manual*.

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 display:

- 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.

Table 12
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.

Table 12
Datafilling table TRKGRP (Continued)

Field	Subfield or refinement	Entry	Explanation and action
	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.
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 system automatically updates the LTID field after the corresponding datafill entry in table LTMAP. Enter a dollar sign ($).
BLOCKNB			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.

Datafill example for table TRKGRP
Figure 14 shows sample datafill for table TRKGRP. In the example,
NI000004 NI0 NI-2 DWS (NTXR49AA DWS PRI) is assigned to PRI
trunk WITSPRI1.

Figure 14
MAP display example for table TRKGRP

```
     GRPKEY                                      GRPINFO
   _____
   WITSPRI1
        PRA 0 NPDGP NCRT WIDEBAND DSEQ FLOATING
     FIRSTFIT N (ISDN 100) $    Y
```

Note: PRA is an internal software designation for PRI.

Error messages for table TRKGRP
Table 13 shows the error messages apply to table TRKGRP.

Table 13
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

Table 14 on page 50 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, see the *Meridian SL-100 Customer Data Schema Reference Manual*.

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 Meridian SL-100 glare field must be set to STAND. If the CPE cannot yield, the Meridian SL-100 can be made to YIELD.

Note: This setting increases blocking for calls that have already come across the network.

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. For further information, see .

Table 14
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.
CARCODE			Card code. Enter DS1SIG, the card code used for ISDN PRI.
SIGDATA			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.

Table 14
Datafilling table TRKSGRP (Continued)

Field	Subfield or refinement	Entry	Explanation and action
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. For Meridian SL-100 DWS, the CPE is considered the USER and the switch is considered the NETWORK. Enter NETWORK in this field. ***Note:*** An invalid setting in field IFCLASS may result in D-channel communications problems even though the system indicates the D-channel is functioning properly.
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.
SAT			Satellite. Enter N, since the trunk group is not arranged to switch by satellite.
ECSTAT			Echo canceller status. Enter the echo canceller status (EXTERNAL, INNOTONE, or UNEQ). Internal echo canceller 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			Layer 1 flags. Enter Y to indicate that the DTCI sends layer 1 flags when the D-channel is in flagfill mode, N to indicate that it does not.
PARMNAME			ISDN parmname. Enter a 1 to 8 character string. This field specifies a name in table ISDNPARM and associates the information found in table ISDNPARM with the primary rate interface defined by the table TRKSGRP tuple. The default value is DEFAULT.

Table 14
Datafilling table TRKSGRP (Continued)

Field	Subfield or refinement	Entry	Explanation and action
DCHNL			D-channel. This field defines the 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.

Datafill example for table TRKSGRP
Figure 15 shows sample datafill for table TRKSGRP. In the example, NI000004 NI0 NI-2 DWS (NTXR49AA DWS PRI) is assigned to trunk WITSPRI1.

Figure 15
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 60
PRANODE Y DEFAULT DTCI 0 19 1 64K HDLC $
```

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 routes, 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 NI000004 NI0 NI-2 DWS (NTXR49AA DWS PRI).

The example in Figure 16 on page 54 and Figure 17 on page 55 shows a PRI-to-PRI call originating on trunk PRIFLT1DF and terminating on trunk PRIFLX0AF as follows:

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 accesses 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.

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.

Figure 16
TRAVER output example for NI000004 NI0 NI-2 DWS (NTXR49AA DWS PRI) (part 1 of 2)

```
traver tr priflt1df 2146400222 b
TABLE TRKGRP
PRIFLT1DF PRA 0 NPDGP NCRT 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 Ð 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
```

Figure 17
TRAVER output example for NI000004 NI0 NI-2 DWS (NTXR49AA DWS PRI) (part 2 of 2))

```
    . . . . . 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 NONÐLOCAL
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 +++
```

SERVORD

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

NI000027 DWS Flexible Acc (NTXR65AA Flex DWS Acc)

Ordering codes

Functional group ordering code: NI000004.

Functionality ordering code: NI000027.

Release applicability

MSL03 and up.

NI000027 DWS Flexible Acc (NTXR65AA Flex DWS Acc) was introduced in BCS36.

Prerequisites

To operate, NI000027 DWS Flexible Acc (NTXR65AA Flex DWS Acc) requires the following functional group (the former NTX code and name are listed):

- NI000004 NI0 NI-2 DWS
  - — NTXS25AA DWS Base

Description

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

It can be used with the following functional group (former NTX code and name are listed):

- NI000004 NI0 NI-2 DWS
  - — NTXR49AA DWS PRI End Office

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

- AD3879 – Power – Nx64 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. This functionality allows the flexible trunk selection method on these trunks.

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, see "Flexible channel selection" on page 26.

With this functionality, H0 and H11 traffic (384 kbps and 1.536 Mbps, 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 as shown in Figure 18 on page 58.

Figure 18
Table flow for NI000027 DWS Flexible Acc (NTXR65AA Flex DWS Acc)
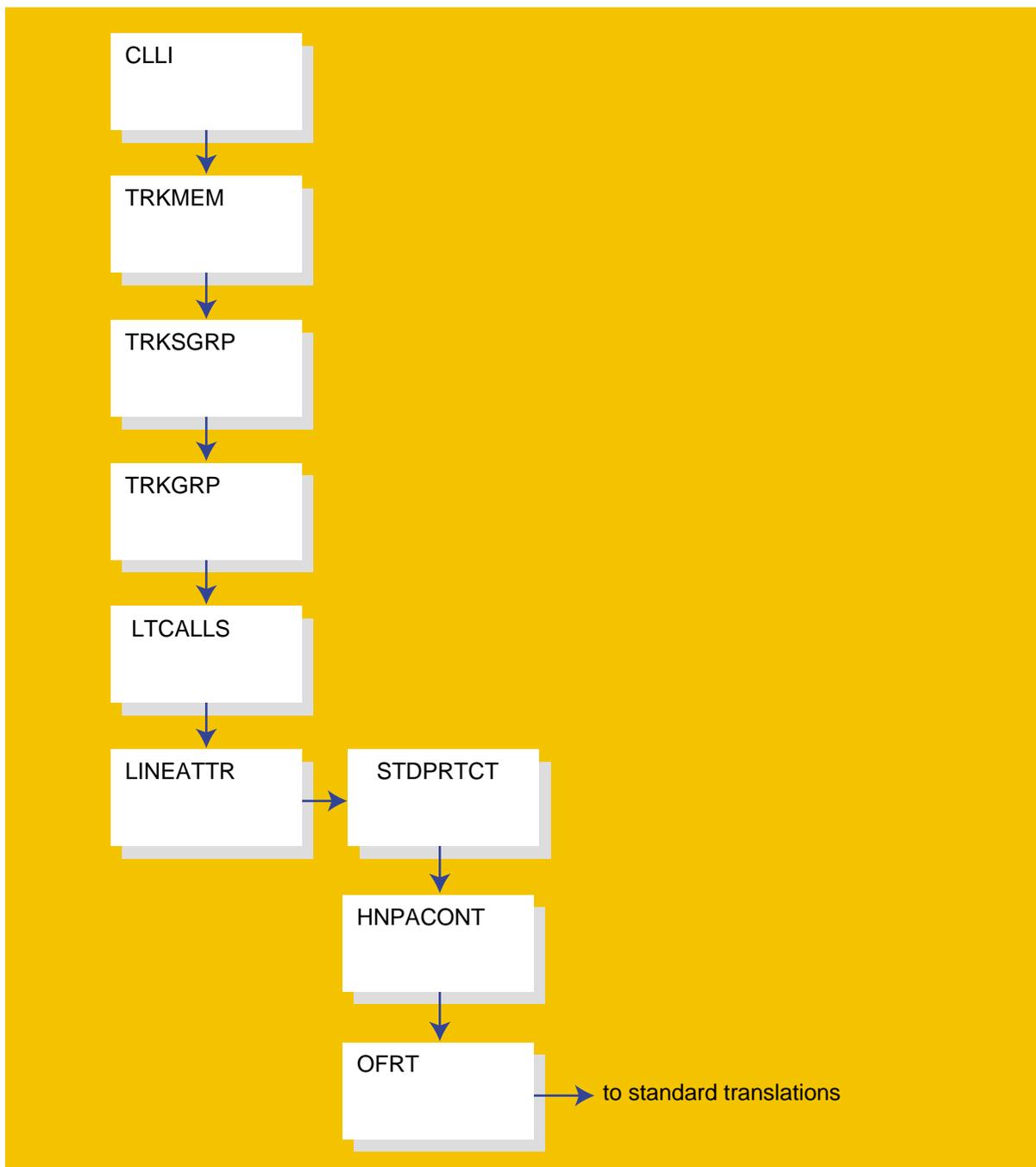
G100297

Table TRKGRP is the only table that contains NI000027-specific data and is described in this section.

For descriptions of the other tables shown in the flowchart, see
.

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.

Station Message Detail Recording

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

Datafilling office parameters

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

Datafill sequence

Table 15 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.

Table 15
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

Table 16 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, see the *Meridian SL-100 Customer Data Schema Reference Manual*.

Table 16
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.
BLOCKNB			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.

Datafill example for table TRKGRP

The following example shows sample datafill for table TRKGRP. In the example, NI000027 DWS Flexible Acc (NTXR65AA Flex DWS Acc) is assigned to a PRI trunk.

Figure 19
MAP display example for table TRKGRP

```
  GRPKEY                                        GRPINFO
_____
 WITSPRI1
      PRA 0 NPDGP NCRT WIDEBAND DSEQ FLOATING
FIRSTFIT N (ISDN 100) $      Y
```

> *Note:* PRA is an internal software designation for PRI.

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 routes, 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 NI000027 DWS Flexible Acc (NTXR65AA Flex DWS Acc).

and show an example of 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 provides access to table LTCALLS, which provides the line attribute index 602.

3. In lines 6 and 7, the line attribute index 602 provides access to 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.

Figure 20
TRAVER output example for NI000027 DWS Flexible Acc (NTXR65AA Flex DWS Acc) (part 1 of 2)

```
traver tr priflt1df 2146400222 b
TABLE TRKGRP
PRIFLT1DF PRA 0 NPDGP NCRT 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 Ð 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
```

Figure 21
TRAVER output example for NI000027 DWS Flexible Acc (NTXR65AA Flex DWS Acc) (part 2 of 2)

```
   . . . . . 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 NONĐLOCAL
 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 +++
```

SERVORD

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

DWS logs

This chapter contains Meridian SL-100 log reports associated with Dialable Wideband Services (DWS). These reports represent messages output by the Meridian SL-100 system whenever a significant dialable wideband-related event occurs in the switch or one of its peripherals.

Log reports include status and activity reports, as well as reports on hardware or software faults, test results, changes in state, and other events or conditions likely to affect dialable wideband performance. The system generates log reports in response to both system and manual actions.

This chapter contains descriptions of the following log reports:

- WB100
- WB101
- WB102
- WB103
- WB104
- WB106
- WB107
- WB108
- WB109

WB100

Explanation

The Wideband (WB) subsystem generates this report when the SETUP message from the customer premise equipment (CPE) includes channels that are not available.

Format

The format for log report WB100 follows:

```
switch WB100 mmmdd hh:mm:ss ssdd INFO INVALID TRUNK STATE
    TRUNK_STATE = state
    CALLID = number
```

Example

An example of log report WB100 follows:

```
SL100 WB100 NOV12 18:14:33 3900 INFO INVALID TRUNK STATE
TRUNK_STATE = MB
CALLID = 458762
```

Field descriptions

Table 17 explains each of the fields in the log report.

Table 17
WB100 log report fields

Field	Value	Description
INFO INVALID TRUNK STATE	Constant	The SETUP message from the CPE includes channels that are not available.
TRUNK_STATE	Variable (Examples are MB, CFL, LO, SB, NMB, PMB, and CPB)	Identifies the state of the trunk that received the SETUP message.
CALLID	nnnnnnnn	Contains the callid of the call that received the SETUP message.

Action
None.

Associated OM registers
None.

WB101

Explanation

The Wideband (WB) subsystem generates this report to indicate no wideband extension block was available for the call. Hence, the call did not complete.

Format

The format for log report WB101 follows:

switch WB101 mmmdd hh:mm:ss ssdd INFO NO WIDEBAND EXT BLOCK

Example

An example of log report WB101 follows:

```
SL100 WB101 NOV12 18:14:33 4000 INFO NO WIDEBAND EXT BLOCK
```

Field descriptions

Table 18 explains each of the fields in the log report.

Table 18
WB101 log report fields

Field	Value	Description
INFO NO WIDEBAND EXT	Constant	No wideband extension block was available.

Action

No action is required to continue monitoring extension block availability using the current office parameter setting. Otherwise, increase the value of office parameter, MAX_NUM_WIDEBAND_CALLS.

Associated OM registers

None.

WB102

Explanation

The Wideband (WB) subsystem generates this report when the transfer rate indicated in the Bearer Capability information element in the SETUP message is undefined or unsupported. For example, if only FIXED wideband is supported and a transfer rate of 8 is received, the call does not complete. Only 6 and 24 are supported for FIXED.

Format

The format for log report WB102 follows.

switch WB102 mmmdd hh:mm:ss ssdd INFO INVALID TRANSFER RATE
    WB SIZE = number
    CALLID = number

Example

An example of log report WB102 follows:

```
SL100 WB102 NOV12 18:14:33 4100 INFO INVALID TRANSFER RATE
   WB SIZE = 0
   CALLID = 99090436
```

Field descriptions

Table 19 explains each of the fields in the log report.

Table 19
WB102 log report fields

Field	Value	Description
INFO INVALID TRANSFER RATE	Constant	The information transfer rate is set to an invalid value.
WB SIZE	Numeric	Indicates the information transfer rate received in the SETUP message.
CALLID	nnnnnnnn	Contains the callid of the call that received the SETUP message.

Action
None.

Associated OM registers
None.

WB103

Explanation

The Wideband (WB) subsystem generates this report when a request to set up a wideband call is received on a non-wideband trunk.

Format

The format for log report WB103 follows:

switch WB103 mmmdd hh:mm:ss ssdd INFO WB ON NON WB TRUNK

Example

An example of log report WB103 follows:

```
SL100 WB103 NOV12 18:14:33 4200 INFO WB ON NON WB TRUNK
```

Field descriptions

Table 20 explains each of the fields in the log report.

Table 20
WB103 log report fields

Field	Value	Description
INFO WB ON NON WB TRUNK	Constant	A request to set up a wideband call is received on a non-wideband trunk.

Action
None.

Associated OM registers
None.

WB104

Explanation

The Wideband (WB) subsystem generates this report when a request for a fixed H0 call is received, but the call is not on the correct boundary (slots 1-6, 7-12, 13-18, and 19-24).

Format

The format for log report WB104 follows:

switch WB104 mmmdd hh:mm:ss ssdd INFO NONBOUNDED ON FIXED

Example

An example of log report WB104 follows:

```
SL100 WB104 NOV12 18:14:33 4300 INFO NONBOUNDED ON FIXED
```

Field descriptions

Table 21 explains each of the fields in the log report.

Table 21
WB104 log report fields

Field	Value	Description
INFO NONBOUNDED ON FIXED	Constant	A request for a fixed H0 call is received, but the call is not on the correct boundary.

Action
None.

Associated OM registers
None.

WB106

Explanation

The Wideband (WB) subsystem generates this report when a discrepancy occurs between the trunk state stored in the internal wideband data structures and the actual trunk state as determined by the wideband audit.

If a discrepancy is found, the information stored in the internal wideband data structure is replaced with the value calculated by the wideband audit.

The frequency of the wideband audit is controlled by office parameter, AUDIT_INTERVAL, which also controls the trunk audit. The default for this parameter is 15 minutes.

Format

The format for log report WB106 follows:

switch WB106 mmmdd hh:mm:ss ssdd INFO CONFLICTING TRUNK STATE
    CKT cp_id
    ACTUAL BITMAP = longword
    STORED BITMAP = longword

Example

An example of log report WB106 follows:

```
SL100 WB106 NOV12 18:14:33 7200 INFO CONFLICTING TRUNK STATE
CKT WBTRKGRP01
ACTUAL BITMAP = 00000000
STORED BITMAP = F5FF00FD
```

Field descriptions

Table 22 explains each of the fields in the log report.

Table 22
WB106 log report fields

Field	Value	Description
CONFLICTING TRUNK STATE	Constant	A discrepancy is found between the trunk state stored in the internal wideband data structures and the actual trunk state as calculated by the wideband audit.
CKT	Variable	CKT is the first circuit of the trunk group where the corruption was found. In this case, each trunk in a trunk group has either 24 or 32 circuits.
ACTUAL BITMAP	00000000 to FFFFFFFF	ACTUAL BITMAP is a hex representation of the idle bitmap for this particular trunk group as calculated by the wideband audit. The idle bitmap indicates which circuits within a trunk group are idle.
STORED BITMAP	00000000 to FFFFFFFF	STORED BITMAP is a hex representation of the idle bitmap for this particular trunk group as determined by the Computing Module. This value is stored in the internal wideband data structures. If STORED BITMAP differs from ACTUAL BITMAP, the STORED value is considered corrupted.

Action
None.

Associated OM registers
None.

WB107

Explanation

The Wideband (WB) subsystem generates this report when a discrepancy is found between the maximum available bandwidth for a particular trunk in a trunk group as stored in the internal wideband data structures and the actual maximum available bandwidth for a particular trunk in a trunk group as calculated by the wideband audit.

If a discrepancy is found, the information stored in the internal wideband data structure is replaced with the value calculated by the wideband audit.

The frequency of the wideband audit is controlled by office parameter, AUDIT_INTERVAL, which also controls the trunk audit. The default for this parameter is 15 minutes.

Format

The format for log report WB107 follows:

switch WB107 mmmdd hh:mm:ss ssdd INFO CONFLICTING MAX
AVAIL BANDWIDTH
   CKT cp_id
   ACTUAL MAX_AVAIL_BAND = integer
   STORED MAX_AVAIL_BAND = integer

Example

An example of log report WB107 follows:

```
SL100 WB107 NOV12 18:14:33 7300 INFO CONFLICTING MAX AVAIL
BANDWIDTH
CKT WBTRKGRP01
ACTUAL MAX_AVAIL_BAND = 0
STORED MAX_AVAIL_BAND = 24
```

Field descriptions

Table 23 explains each of the fields in the log report:

Table 23
WB107 log report fields

Field	Value	Description
INFO CONFLICTING MAX AVAIL BANDWIDTH	Constant	A discrepancy is found between the maximum available bandwidth for a particular trunk in a trunk group as stored in the internal wideband data structures and the actual maximum available bandwidth calculated by the wideband audit.
CKT	Variable	CKT is the first circuit of the trunk group where the corruption was found. In this case, each trunk in a trunk group has either 24 or 32 circuits.
ACTUAL MAX_AVAIL_BAND	0 to 32	ACTUAL MAX_AVAIL_BAND is the largest available bandwidth for this trunk as calculated by the wideband audit.
STORED MAX_AVAIL_BAND	0 to 32	STORED MAX_AVAIL_BAND is the largest available bandwidth for this trunk as determined by the Computing Module. This value is stored in the internal wideband data structures. If STORED MAX_AVAIL_BAND differs from ACTUAL MAX_AVAIL_BAND, the STORED value is considered corrupted.

Action
None.

Associated OM registers
None.

WB108

Explanation

The Wideband (WB) subsystem generates this report when a discrepancy is found between the available bandwidth bitmap stored in the internal wideband data structures and the actual available bandwidth bitmap calculated by the wideband audit.

If a discrepancy is found, the information stored in the internal wideband data structure is replaced with the value calculated by the wideband audit.

The frequency of the wideband audit is controlled by office parameter, AUDIT_INTERVAL, which also controls the trunk audit. The default for this parameter is 15 minutes.

Format

The format for log report WB108 follows:

switch WB108 mmmdd hh:mm:ss ssdd INFO CONFLICTING AVAIL BAND BM
    CKT cp_id
    ACTUAL AVAIL BITMAP = longword
    STORED AVAIL BITMAP = longword

Example

An example of log report WB108 follows:

```
SL100 WB108 NOV12 18:14:33 6500 INFO CONFLICTING AVAIL BAND
BM
CKT WBTRKGRP01
ACTUAL AVAIL BITMAP = 00000000
STORED AVAIL BITMAP = 00000080
```

Field descriptions

Table 24 explains each of the fields in the log report.

Table 24
WB108 log report fields

Field	Value	Description
INFO CONFLICTING AVAIL BAND BM	Constant	A discrepancy is found between the available bandwidth bitmap stored in the internal wideband data structures and the available bandwidth bitmap calculated by the wideband audit.
CKT	Variable	CKT is the first circuit of the trunk group where the corruption was found. In this case, each trunk in a trunk group has either 24 or 32 circuits.
ACTUAL AVAIL BITMAP	00000000 to FFFFFFFF	ACTUAL AVAIL BITMAP is a hex representation of the available bandwidth bitmap for this particular trunk as calculated by the wideband audit. The available bandwidth bitmap indicates the bandwidths available for use on this trunk.
STORED AVAIL BITMAP	00000000 to FFFFFFFF	STORED AVAIL BITMAP is a hex representation of the available bandwidth bitmap for this particular trunk as determined by the Computing Module. This value is stored in the internal wideband data structures. If STORED AVAIL BITMAP differs from ACTUAL AVAIL BITMAP, the STORED value is considered corrupted.

Action
None.

Associated OM registers
None.

WB109

Explanation

The Wideband (WB) subsystem generates this report when a discrepancy is found between the maximum available bandwidth for this trunk group as stored in the internal wideband data structures and the actual maximum available bandwidth for this trunk group as calculated by the wideband audit.

If a discrepancy is found, the information stored in the internal wideband data structure is replaced with the value calculated by the wideband audit.

The frequency of the wideband audit is controlled by office parameter, AUDIT_INTERVAL, which also controls the trunk audit. The default for this parameter is 15 minutes.

Format

The format for log report WB109 follows:

switch WB109 mmmdd hh:mm:ss ssdd INFO CONFLICTING MAX
TRKGRP BANDWIDTH
    CKT cp_id
    ACTUAL WB_MAX_AVAIL_BAND = integer
    STORED WB_MAX_AVAIL_BAND = integer

Example

An example of log report WB109 follows:

```
SL100 WB109 NOV12 18:14:33 7200 INFO CONFLICTING MAX TRKGRP
BANDWIDTH
CKT WBTRKGRP01
ACTUAL WB_MAX_AVAIL_BAND = 24
STORED WB_MAX_AVAIL_BAND = 15
```

Field descriptions

Table 25 explains each of the fields in the log report.

Table 25
WB109 log report fields

Field	Value	Description
INFO CONFLICTING MAX TRKGRP BANDWIDTH	Constant	A discrepancy is found between the maximum available bandwidth of a trunk group as stored in the internal wideband data structures and the actual maximum available bandwidth calculated by the wideband audit.
CKT	Variable	CKT is the first circuit of the trunk group where the corruption was found. In this case, each trunk in a trunk group has either 24 or 32 circuits.
ACTUAL WB_MAX_AVAIL_BAND	0 to 32	ACTUAL WB_MAX_AVAIL_BAND is the largest available bandwidth for this trunk group as calculated by the wideband audit.
STORED WB_MAX_AVAIL_BAND	0 to 32	STORED WB_MAX_AVAIL_BAND is the largest available bandwidth for this trunk group as determined by the Computing Module. This value is stored in the internal wideband data structures. If STORED WB_MAX_AVAIL_BAND differs from ACTUAL WB_MAX_AVAIL_BAND, the STORED value is considered corrupted.

Action
None.

Associated OM registers

None.

DWS OMs

This chapter contains Meridian SL-100 Operational Measurements (OM) associated with Dialable Wideband Services (DWS).

The Meridian SL-100 system organizes the collection, display, and recording of OM data. Hardware and software OM data is collected for activities such as traffic, feature use, and equipment use. OM data can be used as a basis for maintenance, provisioning, network management, administration, and planning purposes.

The wideband OM counts the number of wideband call attempts on PRI trunks.

OM group WIDEBAND

OM description

Wideband

WIDEBAND counts the number of wideband call attempts on PRI trunks. There are 23 different wideband possibilities defined by n x 64 kbytes, where the value of n is 2 to 24. For each wideband call attempt, the appropriate WBATn register increments.

Note: Register WBAT1 is not used.

Release history

OM group WIDEBAND was introduced in BCS34.

BCS36
Registers TWBINTRA, TWBINTER, and TWBSWTCH are added. In the initial release of Meridian SL-100 DWS, TWBINTRA and TWBINTER registers were not used.

BCS35
Registers TWBCONNT, TWBFAIL, TWBATB, and TWBGLR are added for new measurements.

Registers

OM group WIDEBAND registers display on the MAP terminal as follows:

```
TWBATMPT    TWBCONNT    WBAT2       WBAT3
WBAT4       WBAT5       WBAT6       WBAT7
WBAT8       WBAT9       WBAT10      WBAT11
WBAT12      WBAT13      WBAT14      WBAT15
WBAT16      WBAT17      WBAT18      WBAT19
WBAT20      WBAT21      WBAT22      WBAT23
WBAT24      TWBFAIL     TWBATB      TWBGLR
TWBSWTCH    TWBINTER    TWBINTRA
```

Group structure

OM group WIDEBAND provides one tuple per office.

Key field: None.
Info field: None.

Associated OM groups

None.

Associated functional groups

The following functional groups are associated with OM group WIDEBAND:

- LEC Wideband

Associated functionality codes

The functionality code associated with OM group WIDEBAND is NI000004 NI0 NI-2 DWS.

Figure 22
OM group WIDEBAND registers
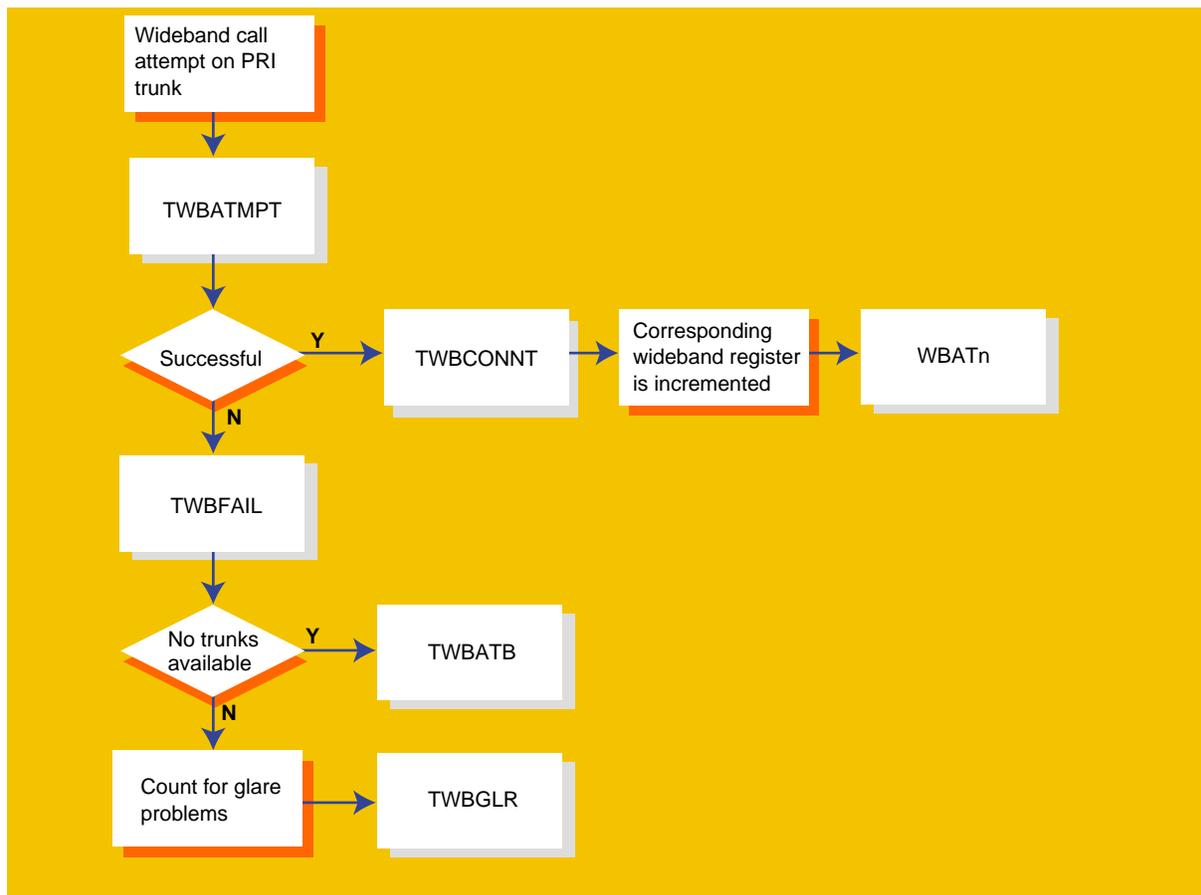
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Register descriptions
Table 26 describes the OM group WIDEBAND registers.

Table 26
OM group WIDEBAND registers

Item	Description
Register TWBATB	
Total wideband call attempts blocked	TWBATB counts the total number of wideband calls rejected due to no trunks available.
Register TWBATB release history	TWBATB was introduced in BCS35.
Associated registers	None
Associated logs	None

Table 26
OM group WIDEBAND registers

Item	Description
Register TWBATMPT	
Total wideband call attempts	TWBATMPT counts the total number of wideband call attempts, regardless of type.
Register TWBATMPT release history	TWBATMPT was introduced in BCS34.
Associated registers	WBAT2 through to WBAT24 TWBATMPT = the sum of all WBATn
Associated logs	None
Register TWBCONNT	
Total wideband call connections	TWBCONNT counts the number of successful wideband call connections.
Register TWBCONNT release history	TWBCONNT was introduced in BCS35.
Associated registers	TWBATMPT counts the total number of wideband attempts, regardless of type. TWBFAIL counts the number of wideband attempts that fail. TWBCONNT = TWBATMPT – TWBFAIL
Associated logs	None
Register TWBFAIL	
Total wideband call failures	TWBFAIL counts the total number of wideband call attempts that fail.
Register TWBFAIL release history	TWBFAIL was introduced in BCS35.
Associated registers	TWBATMPT counts the total number of wideband attempts, regardless of type. TWBCONNT counts the number of successful wideband call connections. TWBFAIL = TWBATMPT – TWBCONNT
Associated logs	None

Table 26
OM group WIDEBAND registers

Item	Description
Register TWBGLR	
Total wideband call glare problems	TWBGLR counts the number of wideband calls that encounter glare problems. Glare occurs when different users seize both ends of a line or trunk simultaneously. These calls may still complete through route advance.
Register TWBGLR release history	TWBGLR was introduced in BCS35.
Associated registers	None
Associated logs	None
Register TWBINTER	
Total number of wideband interLATA call attempts	In the initial release of Meridian SL-100 DWS, this register is not used.

TWBINTER increments for each wideband interLATA call attempt. |
Register TWBINTER release history	TWBINTER was introduced in BCS36.
Associated registers	None
Associated logs	None
Register TWBINTRA	
Total number of wideband intraLATA call attempts	In the initial release of Meridian SL-100 DWS, this register is not used.

TWBINTRA increments for each wideband intraLATA call attempt. |
Register TWBINTRA release history	TWBINTRA was introduced in BCS36.
Associated registers	None
Associated logs	None

Table 26
OM group WIDEBAND registers

Item	Description
Register TWBSWTCH	
Total number of wideband intraswitch call attempts	TWBSWTCH is incremented for each wideband intraswitch call attempt.
Register TWBSWTCH release history	TWBSWTCH was introduced in BCS36.
Associated registers	None
Associated logs	None
Register WBAT2	
2 x 64 kbyte wideband call attempts	WBAT2 increments for each 2 x 64 kbyte wideband call attempt.
Register WBAT2 release history	WBAT2 was introduced in BCS34.
Associated registers	TWBATMPT
Associated logs	None
Register WBAT3	
3 x 64 kbyte wideband call attempts	WBAT3 increments for each 3 x 64 kbyte wideband call attempt.
Register WBAT3 release history	WBAT3 was introduced in BCS34.
Associated registers	TWBATMPT
Associated logs	None
Register WBAT4	
4 x 64 kbyte wideband call attempts	WBAT4 increments for each 4 x 64 kbyte wideband call attempt.
Register WBAT4 release history	WBAT4 was introduced in BCS34.
Associated registers	TWBATMPT
Associated logs	None

Table 26
OM group WIDEBAND registers

Item	Description
Register WBAT5	
5 x 64 kbyte wideband call attempts	WBAT5 increments for each 5 x 64 kbyte wideband call attempt.
Register WBAT5 release history	WBAT5 was introduced in BCS34.
Associated registers	TWBATMPT
Associated logs	None
Register WBAT6	
6 x 64 kbyte wideband call attempts	WBAT6 increments for each 6 x 64 kbyte wideband call attempt.
Register WBAT6 release history	WBAT6 was introduced in BCS34.
Associated registers	TWBATMPT
Associated logs	None
Register WBAT7	
7 x 64 kbyte wideband call attempts	WBAT7 increments for each 7 x 64 kbyte wideband call attempt.
Register WBAT7 release history	WBAT7 was introduced in BCS34.
Associated registers	TWBATMPT
Associated logs	None
Register WBAT8	
8 x 64 kbyte wideband call attempts	WBAT8 increments for each 8 x 64 kbyte wideband call attempt.
Register WBAT8 release history	WBAT8 was introduced in BCS34.
Associated registers	TWBATMPT
Associated logs	None

Table 26
OM group WIDEBAND registers

Item	Description
Register WBAT9	
9 x 64 kbyte wideband call attempts	WBAT9 increments for each 9 x 64 kbyte wideband call attempt.
Register WBAT9 release history	WBAT9 was introduced in BCS34.
Associated registers	TWBATMPT
Associated logs	None
Register WBAT10	
10 x 64 kbyte wideband call attempts	WBAT10 increments for each 10 x 64 kbyte wideband call attempt.
Register WBAT10 release history	WBAT10 was introduced in BCS34.
Associated registers	TWBATMPT
Associated logs	None
Register WBAT11	
11 x 64 kbyte wideband call attempts	WBAT11 increments for each 11 x 64 kbyte wideband call attempt.
Register WBAT11 release history	WBAT11 was introduced in BCS34.
Associated registers	TWBATMPT
Associated logs	None
Register WBAT12	
12 x 64 kbyte wideband call attempts	WBAT12 increments for each 12 x 64 kbyte wideband call attempt.
Register WBAT12 release history	WBAT12 was introduced in BCS34.
Associated registers	TWBATMPT
Associated logs	None

Table 26
OM group WIDEBAND registers

Item	Description
Register WBAT13	
13 x 64 kbyte wideband call attempts	WBAT13 increments for each 13 x 64 kbyte wideband call attempt.
Register WBAT13 release history	WBAT13 was introduced in BCS34.
Associated registers	TWBATMPT
Associated logs	None
Register WBAT14	
14 x 64 kbyte wideband call attempts	WBAT14 increments for each 14 x 64 kbyte wideband call attempt.
Register WBAT14 release history	WBAT14 was introduced in BCS34.
Associated registers	TWBATMPT
Associated logs	None
Register WBAT15	
15 x 64 kbyte wideband call attempts	WBAT15 increments for each 15 x 64 kbyte wideband call attempt.
Register WBAT15 release history	WBAT15 was introduced in BCS34.
Associated registers	TWBATMPT
Associated logs	None
Register WBAT16	
16 x 64 kbyte wideband call attempts	WBAT16 increments for each 16 x 64 kbyte wideband call attempt.
Register WBAT16 release history	WBAT16 was introduced in BCS34.
Associated registers	TWBATMPT
Associated logs	None

Table 26
OM group WIDEBAND registers

Item	Description
Register WBAT17	
17 x 64 kbyte wideband call attempts	WBAT17 is incremented for each 17 x 64 kbyte wideband call attempt.
Register WBAT17 release history	WBAT17 was introduced in BCS34.
Associated registers	TWBATMPT
Associated logs	None
Register WBAT18	
18 x 64 kbyte wideband call attempts	WBAT18 is incremented for each 18 x 64 kbyte wideband call attempt.
Register WBAT18 release history	WBAT18 was introduced in BCS34.
Associated registers	TWBATMPT
Associated logs	None
Register WBAT19	
19 x 64 kbyte wideband call attempts	WBAT19 is incremented for each 19 x 64 kbyte wideband call attempt.
Register WBAT19 release history	WBAT19 was introduced in BCS34.
Associated registers	TWBATMPT
Associated logs	None
Register WBAT20	
20 x 64 kbyte wideband call attempts	WBAT20 increments for each 20 x 64 kbyte wideband call attempt.
Register WBAT20 release history	WBAT20 was introduced in BCS34.
Associated registers	TWBATMPT
Associated logs	None

Table 26
OM group WIDEBAND registers

Item	Description
Register WBAT21	
21 x 64 kbyte wideband call attempts	WBAT21 increments for each 21 x 64 kbyte wideband call attempt.
Register WBAT21 release history	WBAT21 was introduced in BCS34.
Associated registers	TWBATMPT
Associated logs	None
Register WBAT22	
22 x 64 kbyte wideband call attempts	WBAT22 increments for each 22 x 64 kbyte wideband call attempt.
Register WBAT22 release history	WBAT22 was introduced in BCS34.
Associated registers	TWBATMPT
Associated logs	None
Register WBAT23	
23 x 64 kbyte wideband call attempts	WBAT23 increments for each 23 x 64 kbyte wideband call attempt.
Register WBAT23 release history	WBAT23 was introduced in BCS34.
Associated registers	TWBATMPT
Associated logs	None
Register WBAT24	
24 x 64 kbyte wideband call attempts	WBAT24 increments for each 24 x 64 kbyte wideband call attempt.
Register WBAT24 release history	WBAT24 was introduced in BCS34.
Associated registers	TWBATMPT
Associated logs	None

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 specified 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.

Table 27 lists the DWS performance factors along with their associated OM groups.

Table 27
DWS performance factors

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

Monitoring DWS performance factors
Procedure 1 explains how to create and execute a procedure to monitor the performance of DWS.

Procedure 1
Create a DWS performance monitoring

1   Select the appropriate performance indicators.

       The Operational Measurement (OM) registers defined at the beginning of this section are performance indicators.

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 *DMS Basic Administration Procedures*.

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.

This procedure is now complete

DWS performance factor-wideband traffic

Monitoring wideband traffic helps analyze trends for bandwidth requests by end users and determines trunk requirements.

The bandwidth preferred by end users impacts traffic engineering, as shown in the Table 28.

Table 28
End users' preferred bandwidth

	Switch A	Switch B
Total number of calls	20	20
Number of 6 by 64 kbps calls	2	18
Number of 24 by 64 kbps calls	18	2
Number of DS-0s required	444 [(2x6)+(18x24)]	156 [(18x6)+(2x24)]

In switch A, most calls request a 24 by 64 kbps bandwidth, while the 6 by 64 kbps 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.

Nortel Networks 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 following section describes the typical calculations used to evaluate wideband traffic.

Wideband traffic is monitored through the OM groups WIDEBAND and TRK. Table 29 shows the registers to be monitored. Refer to OM group TRK.

Table 29
WIDEBAND and TRK registers monitored

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 kbps call attempts, for each value of n, where n = 2 to 24.

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

Using traffic engineering tables, Erlangs may be used to calculate 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 $\times$ average holding time (in hours) = Erlangs

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

$$\sum_{n=2}^{24} \text{number of calls (at bandwidth n)} \times \text{avg hold time (in hours at bandwidth n)} \times n = \text{Erlangs}$$

The Table 30 example shows that 129 wideband calls were placed. If these calls had been narrowband, at an average holding time of 3 min (.05 h), the total Erlangs would be 6.45 (calculated using 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 the table on the following page. The total traffic for these calls is 397 Erlangs. According to narrowband traffic engineering tables, 528 DS-0 trunks (calculated using 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 30
Impact of average holding time on wideband traffic engineering

DS0 Column 1	DWS attempts Column 2	NATTMPT (Col1 x Col 2) Column 3	Average holding time (hours) Column 4	Erlangs (Col1 x Col2 x 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

Table 30
Impact of average holding time on wideband traffic engineering (Continued)

DS0 Column 1	DWS attempts Column 2	NATTMPT (Col1 x Col 2) Column 3	Average holding time (hours) Column 4	Erlangs (Col1 x Col2 x Col4) Column 5
9	0	0	0	0
10	3	30	0.25	7.5
11	0	0	0	0
12	10	120	0.75	90
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

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 generates 36 CCS (hundred call seconds). A wideband call that lasts an hour generates 36 CCS times the number of channels used in that call.

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, pegs 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.

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 overflow 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 previous 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) and register TRU is the total traffic (397 Erlangs).

DWS performance factor-grade of service

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

To determine the grade of service, monitor OM group WIDEBAND, 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).

Table 31
WIDEBAND group TWBATMPT and TWBATB registers

Group	Register	Log reports
WIDEBAND	TWBATMPT	None
	TWBATB	None

Calculations used to evaluate grade of service
Use the following calculation to determine the grade of service.

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

Data evaluation procedure
Use Procedure 2 to evaluate grade of service.

Procedure 2
Evaluate grade of service

1   Calculate the grade of service for the current study period.

2   If the grade of service is lower than 1%, this procedure is complete.

3   If the grade of service exceeds 1%, notify the provisioning engineers so corrective action can be taken.

This procedure is now complete

DWS performance factor-glare
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. 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.

Table 32
WIDEBAND group TWBATMPT and TWBGLR registers

Group	Register	Log reports
WIDEBAND	TWBATMPT	None
	TWBGLR	None

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

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

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.

Data evaluation procedure
Use the Procedure 3 to evaluate glare.

Procedure 3
Evaluate glare

1   Calculate the percentage of glare for the current study period.

2   If the percentage of glare is zero, this procedure is complete.

3   If the percentage of glare is not zero, notify the provisioning engineers so corrective action can be taken.

This procedure is now complete

DWS performance factor-call failures
Monitoring call failures helps ensure that the customer receives 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 another.

To determine the percentage of call failures, monitor OM group WIDEBAND, registers TWBATMPT and TWBFAIL. TWBATMPT counts the wideband calls placed. TWBFAIL counts the number of times a wideband call is dropped.

Table 33
WIDEBAND Group TWBATMPT and TWBFAIL registers

Group	Register	Log reports
WIDEBAND	TWBATMPT	None
	TWBFAIL	None

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

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

Data evaluation procedure
Use Procedure 4 to evaluate percentage of call failures.

Procedure 4
Evaluating percentage of call failures

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

2   If the percentage of call failures is lower than 1%, this procedure is complete.

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

This procedure is now complete

OM group WBTRK

OM description

Wideband Trunk

OM group WBTRK provides three Dialable Wideband Service (DWS) OM registers that are implemented on a per-trunk group basis. A per-trunk group OM group supports a group of trunks and keeps separate counts for each trunk supported. The OM group WBTRK is defined on a per-trunk group basis for wideband trunks only.

WBTRK OM registers indicate the number and size of calls handled by a wideband trunk group by counting the number of DS0 channels on a DS1 link used by calls occurring on all trunks in that trunk group.

When the WBTRK OM registers are pegged by a call of size n, they are incremented n times. A call on a wideband trunk group can be of size n, where n = 1-24 and corresponds to the number of DS0s used by that call. Therefore, n = 1 corresponds to a narrowband call and n = 2-24 corresponds to a wideband call. These measurements are then used by traffic engineers to provision wideband trunk groups more efficiently.

WBTRK OM registers are for wideband trunk groups only; therefore, they gather information on trunks that are datafilled in table TRKGRP with the wideband option selected (SELSEQ = WIDEBAND). Attempts to use OMSHOW to display WBTRK peg counts for trunks other than wideband trunks are treated as invalid.

Release history

OM group WBTRK was introduced in NA005.

Registers

OM group WBTRK registers display on the MAP terminal as follows:

```
        EQINCTOT           EQATTMPT            EQOVATB

  1021 PRIFLX1

                 4                 8                  4
```

Group structure

The number of WBTRK OM tuples is equal to the number of wideband trunk groups in table TRKGRP.

Key field: None.
Info field: Trunk group CLLI name.

Associated OM groups

The following OM groups are associated with WBTRK.

- TRK
- WIDEBAND

WBTRK OMs and TRK OMs are both per-trunk-group OMs and are pegged under similar conditions. However, TRK OMs are only incremented once when pegged by any call, regardless of the size of the call, whereas WBTRK OM registers are pegged *n* times by a call of size *n*. In addition, TRK OM tuples exist for all trunk groups, whereas WBTRK OM tuples exist for wideband trunk groups only.

Table 34 shows the comparison of similar WBTRK and TRK OM registers and the conditions that peg both associated registers.

Table 34
Associated WBTRK and TRK registers

WBTRK	TRK	Conditions that peg both
EQINCTOT	INCATOT	Any size incoming call attempt on a wideband trunk group.
EQATTMPT	NATTMPT	Any size terminating call attempt on a wideband trunk group.
EQOVATB	NOVFLATB	Any size terminating overflow all trunks busy (OVATB) call attempt on a wideband trunk group. *Note:* OVATB is a condition that occurs when a termination call attempt on a trunk is rerouted due to an insufficient number of available circuits on that trunk.

OM group WBTRK is also similar to OM group WIDEBAND in that both OM groups provide data on the sizes of wideband calls; however, OM group WIDEBAND does so only on a per-office basis. Unlike WBTRK, WIDEBAND provides no information on narrowband calls.

Table 35 shows the comparison of similar WBTRK and WIDEBAND OM registers and the conditions that peg both associated registers.

Table 35
Associated WBTRK and WIDEBAND registers

WBTRK	WIDEBAND	Conditions that peg both
EQINCTOT	TWBATMPT	Incoming wideband call attempt on a wideband trunk group.

Table 35
Associated WBTRK and WIDEBAND registers

WBTRK	WIDEBAND	Conditions that peg both
EQINCTOT	WBATn, where n = 2,3,...24	An incoming wideband call of size n.
EQOVATB	TWBATB	Terminating OVATB wideband attempt on a wideband trunk group.

Associated functional groups

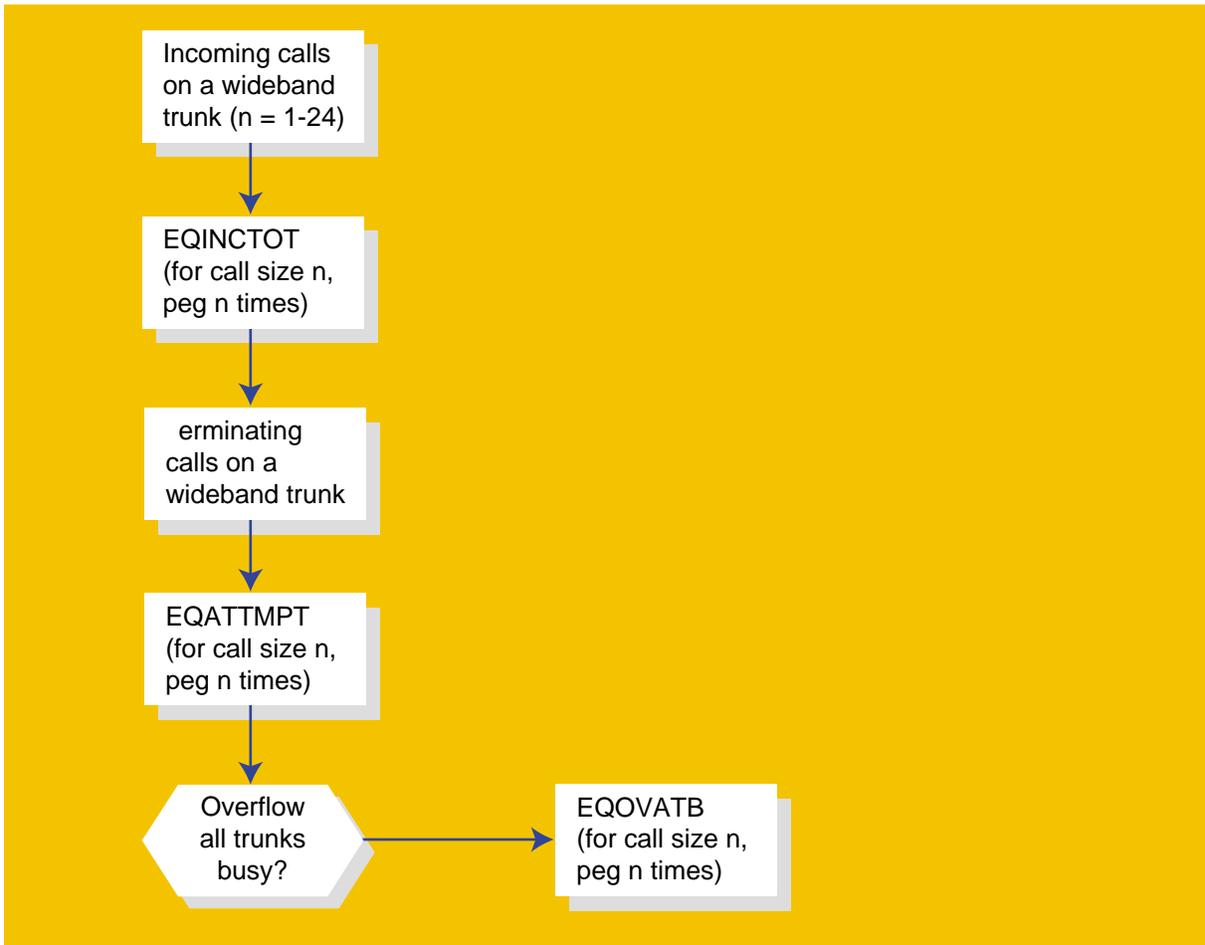Dialable Wideband Services (DWS).

Associated functionality codes

The functionality codes associated with OM group WBTRK are shown in Table 36.

Table 36
Functionality codes

Functionality	Code
DWS Access to Carrier (Access Tandem)	NTXR66AA
DWS PRI	NTXR49AA
DWS Intertoll ISUP	NTXS28AA

Figure 23
OM group WBTRK registers

```
Incoming calls
on a wideband
trunk (n = 1-24)
        │
        ▼
EQINCTOT
(for call size n,
peg n times)
        │
        ▼
 erminating
calls on a
wideband trunk
        │
        ▼
EQATTMPT
(for call size n,
peg n times)
        │
        ▼
  Overflow              EQOVATB
  all trunks   ──────▶  (for call size n,
  busy?                 peg n times)
```

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Register descriptions

Table 37 describes the OM group WBTRK registers.

Table 37
OM group WBTRK registers

Item	Description
Register EQINCTOT	
Equivalent incoming total attempts	EQINCTOT counts the number of DS0 channels used on a wideband trunk group for an incoming call attempt over any trunk in that wideband trunk group.
Register EQINCTOT release history	Register EQINCTOT was introduced in NA005.
Associated registers	INCATOT, TWBATMPT, WBATn (n = 2, 3,...24)
Associated logs	None
Extension registers	None
Register EQATTMPT	
Equivalent terminating attempts	EQATTMPT counts the number of DS0 channels requested on a wideband trunk group by a call attempting to terminate on any trunk in that wideband trunk group.
Register EQATTMPT release history	Register EQATTMPT was introduced in NA005.
Associated registers	NATTMPT
Associated logs	None
Extension registers	None
Register EQOVATB	
Equivalent overflow all trunks busy terminating attempt	EQOVATB counts the number of DS0 channels requested on a wideband trunk group by a call attempting, but unable, to terminate on any trunk in that wideband trunk group due to all trunks busy.
Register EQOVATB release history	Register EQOVATB was introduced in NA005.
Associated registers	NOVFLATB, TWBATB
Associated logs	None
Extension registers	None

DWS card replacement procedures

This chapter contains Meridian SL-100 card replacement procedures associated with Dialable Wideband Services (DWS). The card replacement task provides the following information:

- explanatory and context-setting information
- summary flowchart
- step-action instructions

Explanatory and context-setting information

The "Application" section identifies the card PECs and the shelves or frames to which this procedure applies. Read this section before you perform the step-action instructions.

Summary flowchart

The flowchart provides 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 the flowchart to preview what is to be done and to prepare for it.

Step-action instructions

The step-action instructions provide the command syntax and machine output you use or see while performing this procedure. The successful completion of a step in a sequence may depend on previous steps; therefore, always perform the steps in the order specified.

Application

Use this procedure to replace the NTAX78AA card in an ISDN digital trunk controller (DTCI) shelf.

Table 38
Card PEC and name

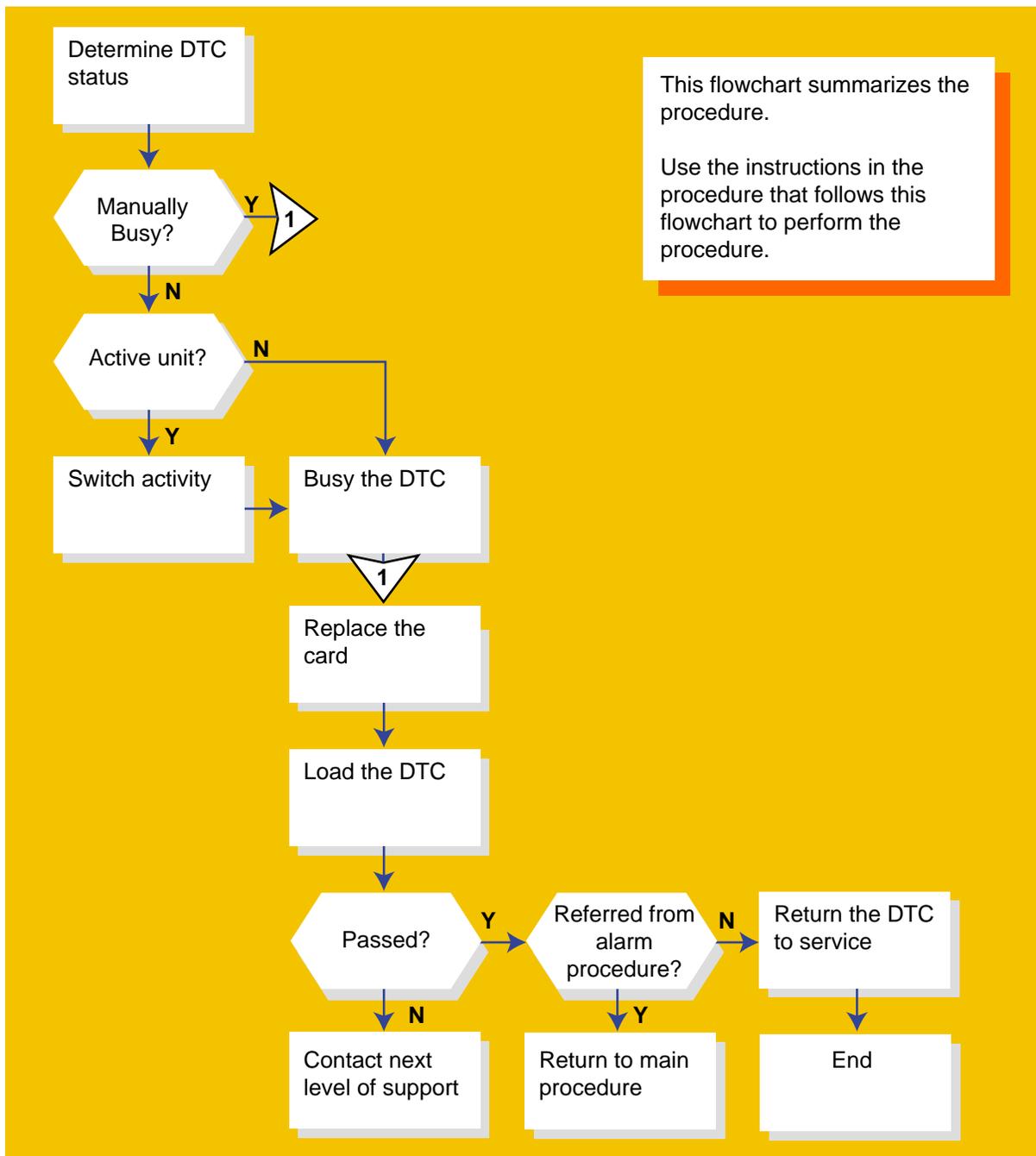| PEC	Suffixes	Name
NTAX78	AA	Enhanced time switch

Common procedures

None.

Action

Figure 24 on page 105 shows a flowchart that summarizes of the procedure. To replace the card, use the instructions in the procedure that follows the flowchart.

Figure 24
Summary of card replacement procedure for NTAX78AA card in a DTCI shelf

G100300

Procedure 5
Replace an NTAX78AA in a DTCI shelf

At the MAP terminal

1 Access the PM level of the MAP terminal 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 terminal display input:

MAPCI;MTC;PM;POST DTCI 0

Example of a MAP terminal 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 SysB
```

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

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 terminal 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 terminal response:

```
DTCI 0      SwAct Passed
```

6   Busy the inactive unit of the PM that contains the card by typing

>BSY UNIT unit_no

and pressing the **Enter** key.

where

unit_no   is 0 or 1

Example of a MAP terminal 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.

At the DTCI

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.

G100301
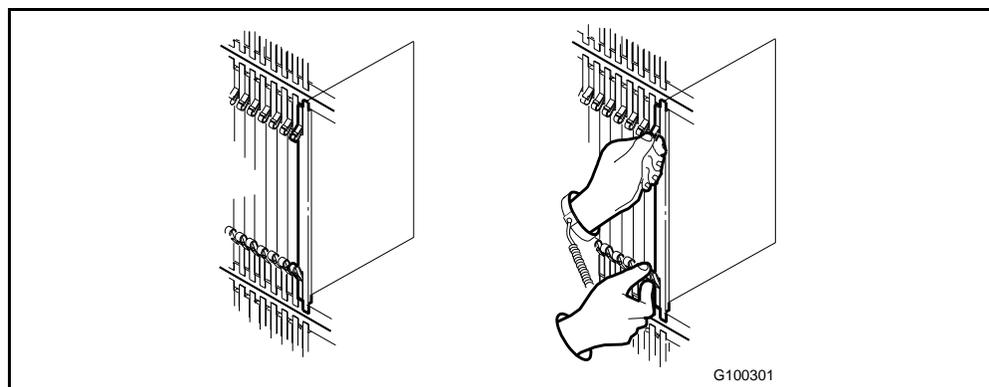
9 Open the locking levers on the face of the card. While grasping the locking levers, gently pull the card towards you until it clears the shelf.


G100302
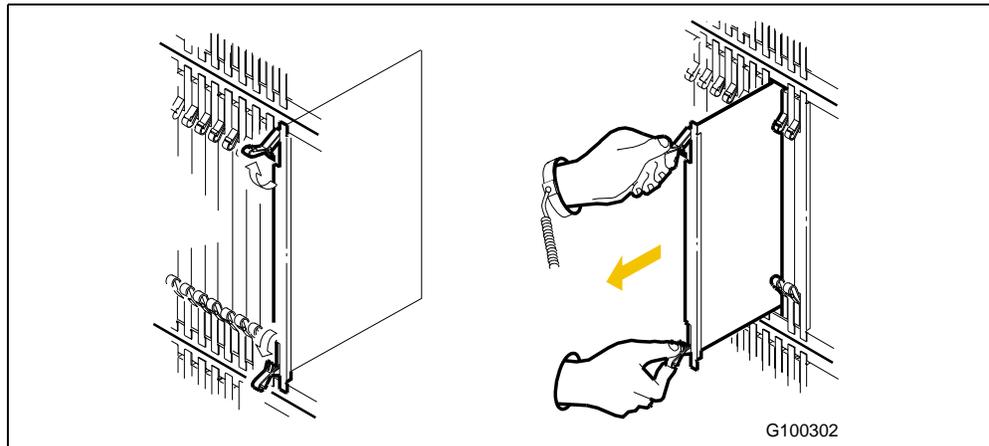
> ### WARNING
>
> **Do not hold card by levers only**
>
> Holding a card by the levers only can result in lever breakage. Once the card has been pulled half way out of the shelf, carefully grasp the card underneath for more secure support and continue to remove the card from the shelf. Avoid touching wires or internal parts on the card.

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.

G100303
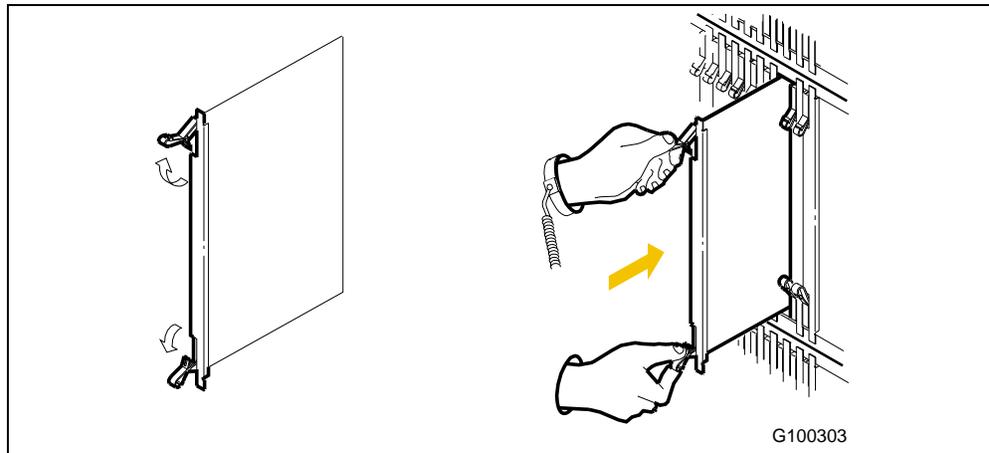
13 Seat and lock the card:

    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.

G100304
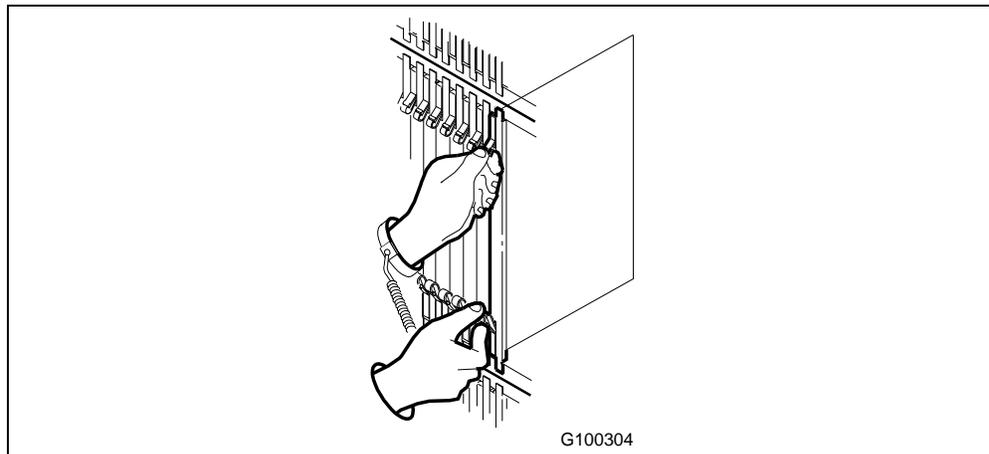
At the MAP terminal

14 Perform a firmware reset by typing

>PMRESET UNIT unit_no NORUN

and pressing the **Enter** key.

Example of a MAP terminal response:

DTCI 0 Unit 1 PMReset Passed

If the PMRESET	Do
passed	Step 15
failed	Step 37

15 Load the inactive unit by typing

>LOADPM UNIT unit_no

and pressing the **Enter** key.

where

unit number   is the number of the unit (0 or 1) to be loaded

Example of a MAP terminal 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 terminal response is "PM Failed to Initialize"	Step 32
a card list is generated	Step 17
the MAP terminal 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 *Meridian SL-100 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 terminal 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

Example of a MAP terminal response:

```
File                                    File        File    In
Name                                    Org.        Code    ITOC
_____     _____       _____   _____

ECL06BH                                 0           IMG
ELI06BH                                 0           IMG
ESR06BH                                 0           IMG
ED706BJ                                 0           IMG
```

   Note: In the above example, ELI06BH is the load file name for a DTCI.

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.

At the MAP terminal

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 UNIT unit_no loadname

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 UNIT unit_no`

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 *Meridian SL-100 Card Replacement Procedures*.

  b   Return to Step 32 in this procedure.

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 UNIT unit_no`

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.

This procedure is now complete

List of terms

AMA

See automatic message accounting (AMA) system.

automatic message accounting (AMA) system

An automatic recording system that documents all the necessary billing data of subscriber-dialed long distance calls.

basic rate interface (BRI)

A type of access to ISDN service provided by a set of time-division multiplexed digital channels of information, including two B-channels, one D-channel, and one or more maintenance channels, often described as 2B (channels) + D (channel). A BRI is typically used on lines between customer premises and a central office switch. See B-channel, D-channel, and primary rate interface (PRI). Formerly known as basic rate access.

B-channel

A 64-kbps digital bidirectional channel used by ISDN for carrying either circuit-switched voice or data, or packet-switched data. See also D-channel, basic rate interface (BRI), and primary rate interface (PRI).

BERT

See bit error rate test (BERT).

bit error rate test (BERT)

A test that is used to measure the transmission quality of a loop. A BERT transmits a known bit pattern over a line and compares the reflected signal against the initial pattern.

BRI

See basic rate interface (BRI).

CCS

See common channel signaling (CCS) or hundred call seconds (CCS).

channel supervision message (CSM)

A message received and transmitted continuously on each connected voice channel of a peripheral module (PM). The CSM contains a connection data byte, which includes the channel supervision bit (CSB), and an integrity byte, which issues call path integrity.

CLLI

See common language location identifier (CLLI).

CODEC

See coder-decoder (CODEC).

coder-decoder (CODEC)

A unit that consists of an encoder and a decoder, and is used to convert analog input to digital and digital input to analog.

common channel signaling (CCS)

A signaling method in which information relating to many labeled messages is transmitted over a single channel using time-division multiplex (TDM) digital techniques.

common language location identifier (CLLI)

A standard identification method for trunk groups using the city code (aaaa), province or state code (bb), trunk group identifier (xx), and trunk number (yy), in that order.

CPE

See customer premise equipment.

CSM

See channel supervision message (CSM).

customer premise equipment (CPE)

Equipment, such as ISDN terminals, that is located on the customer's premises.

D-channel

A channel that carries call control messages between a terminal on an ISDN interface and the exchange termination. Call control messages are used to set up, maintain, or clear a circuit-switched call on a B-channel. The D-channel also carries low-speed packet data between a terminal on an ISDN interface and a terminal in the packet data network. For BRI, the D-channel is a 16-kbps bidirectional channel. For PRI, the D-channel is a 64-kbps bidirectional channel. See also B-channel, basic rate interface (BRI), and primary rate interface (PRI).

dialable wideband service (DWS)

This service provides flexible, wideband network connections with rates from 128 kbps to 1.536 Mbps in 64-kbps increments.

digital trunk controller (DTC)

A peripheral module (PM) that connects DS30 links from the network with digital trunk circuits.

directory number (DN)

The full complement of digits required to designate a subscriber's station within one numbering plan area (NPA) – usually a three-digit central office (CO) code followed by a four-digit station number.

DN

See directory number (DN).

dual tone multi-frequency (DTMF)

A signaling method using standardized combinations specific voice-band frequencies generated by the touchtone keypad on a telephone set. Each combination comprises one relatively high frequency and one relatively low frequency and corresponds to one of the keys on the keypad.

DS-0

A protocol for data transmission that represents one channel in a 24-channel DS-1 trunk.

DS-1

The 8-bit 24-channel 1.544-Mbps digital signaling format used in the DMS-100 Family switches. The DS-1 signal is the North American standard for digital trunks. It is a closely specified bipolar pulse stream. DS-1 is the standard signal used to interconnect Nortel Networks digital systems. DS-1 carries 24 information channels of 64 kbps each (DS-0s).

DS-512

The DS512 is used for connecting the computing module (CM) to the message switch. The fiber optic transmission link implemented in the DMS SuperNode processor. One DS512 fiber link is the equivalent of 16 DS30 links.

DTAI

ISDN digital trunk array

DTC

See digital trunk controller (DTC).

DTCI

See ISDN digital trunk controller (DTCI).

DTEI

See ISDN digital trunk equipment (DTEI).

DTMF

See dual tone multi-frequency (DTMF).

DWS

See dialable wideband service (DWS).

EEPROM

Electrically erasable programmable read-only memory.

EISP

See enhanced ISDN signaling preprocessor (EISP).

ENET

See enhanced network (ENET).

enhanced ISDN signaling preprocessor (EISP)

A card in the ISDN remote cluster controller (RCCI) that provides interfaces to the unified processor (UP) and to the speech bus (SB). The EISP terminates a single message link for each D-channel handler (DCH) and processes layer 3 information. Signaling information extracted by the DCH routes to the unified processor (UP) through the EISP. The EISP replaces the ISDN signaling preprocessor in XPM-PLUS modules.

enhanced network (ENET)

A channel-matrixed time switch that provides pulse code modulated voice and data connections between peripheral modules (PM). ENET also provides message paths to the DMS-bus components.

ESD

Electrostatic discharge

ESF

See extended superframe format (ESF).

ETS

Enhanced time switch

extended multiprocessor system (XMS)

A workstation-based microcomputer with networking capabilities based on a Motorola 68000 microprocessor with system software written in Nortel Networks Pascal.

extended superframe format (ESF)

A DMS SuperNode configuration consisting of 24 consecutive DS-1 frames.

frame supervisory panel (FSP)

A hardware device that accepts the frame battery feed and ground return from the power distribution center (PDC). The FSP distributes the battery feed, by means of subsidiary fuses and feeds, to the shelves of the frame or bay in which it is mounted. The FSP also contains alarm circuits.

FSP

See frame supervisory panel (FSP).

glare

A condition that results from the simultaneous seizure of a two-way trunk at both ends. Also known as double seizure.

HDLC

See high-level data link control (HDLC).

high-level data link control (HDLC)

The channel by which high-level control messages from the central control are carried between the digital carrier module (DCM) and remote line modules (RLM).

hundred call seconds (CCS)

The unit of telephone traffic in the United States. The rest of the world uses the erlang, which is one circuit continuously occupied for 1 hour. One erlang is equal to 36 CCS. Formerly known as centum call seconds.

IBN

See integrated business network (IBN).

integrated business network (IBN)

A special business services package that uses the data-handling capabilities of DMS-100 Family offices to provide a centralized telephone exchange service.

ISDN

See integrated services digital network (ISDN).

ISDN digital trunk controller (DTCI)
> A peripheral module (PM) that connects DS30 links from the network with ISDN digital trunk circuits.

ISDN digital trunk equipment (DTEI) frame
> A frame containing up to two dual-shelf ISDN digital trunk controllers.

ISDN user part (ISUP)
> A Common Channel Signaling 7 (CCS7) message-based signaling protocol that acts as a transport carrier for ISDN services. The ISUP provides the functionality in a CCS7 network for voice and data services.

ISUP
> See ISDN user part (ISUP).

integrated services digital network (ISDN)
> A set of standards proposed by the CCITT to establish compatibility between the telephone network and various data terminals and devices. ISDN is a fully digital network, in general evolving from a telephone integrated digital network. It provides end-to-end connectivity to support a wide range of services, including circuit-switched voice, circuit-switched data, and packet-switched data over the same local facility.

LAMA
> See local automatic message accounting (LAMA) system.

LAN
> See local area network (LAN).

LGC
> See line group controller (LGC).

line group controller (LGC)
> A peripheral module (PM) that connects DS30 links from the network to line concentrating modules (LCM).

line trunk controller (LTC)
> A peripheral module (PM) that is a combination of the line group controller (LGC) and the digital trunk controller (DTC) and provides all the services offered by both. It supports line concentrating module (LCM) and AB trunks.

local area network (LAN)

A network that permits the interconnection and intercommunication of multiple computers, primarily for the sharing of resources such as data storage devices and printers.

local automatic message accounting (LAMA) system

A system similar to automatic message accounting (AMA) but providing local collection and recording of billing information. LAMA consists of a combination of AMA equipment and automatic number identification (ANI) equipment in the same office. Such a system can automatically process a subscriber-dialed toll call without operator assistance.

LTC

See line trunk controller (LTC).

maintenance and administration position (MAP)

A group of components that provides a user interface between operating company personnel and the DMS–100 Family switches. The interface consists of a video display unit (VDU) and keyboard, a voice communications module, test facilities, and special furniture.

maintenance trunk module (MTM)

In a trunk module equipment (TME) frame, a peripheral module (PM) that is equipped with test and service circuit cards and contains special buses to accommodate test cards for maintenance. The MTM provides an interface between the DMS-100 Family digital network and the test and service circuits.

MAP

See maintenance and administration position (MAP).

MCTMI

ISDN Meridian cabinet trunk module

message protocol and tone generator (MPC)

The MPC interprets and transfers signaling and control messages exchanged between the network and various peripheral modules (PM). It converts parallel data received from the network to serial data for transmission to the PM, and converts serial data sent from the PM to parallel data for transmission to the network. Also known as the common peripheral processor (CPP) message protocol and tone card.

MPC

See message protocol and tone generator (MPC).

MTM

See maintenance trunk module (MTM).

multiplexer (MUX)

A unit that splits a single channel into multiple channels using either time division multiplexing or frequency division multiplexing.

MUX

See multiplexer (MUX).

PEC

See product equipment code.

peripheral module (PM)

Any hardware module in the DMS-100 Family switches that provides an interface between external line, trunk, or service facilities. A PM contains peripheral processors (PP), which perform local routines, thus relieving the load on the CPU.

PM

See peripheral module (PM).

PRI

See primary rate interface (PRI).

primary rate interface (PRI)

An interface that carries nB+D channels over a digital DS-1 facility (23B+D in North America and 30B+D in Europe). PRI is used to link private networking facilities, such as private branch exchanges (PBX), local area networks (LAN), and host computers with a standardized architecture acting as the bridge between private switching equipment and the public network. Formerly known as primary rate access. See also B-channel, D-channel.

Product engineering code

A unique identifier made up of alphanumeric characters used to identify Nortel Networks hardware and software products.

RDOC

See remote dynamic overload control (RDOC).

remote dynamic overload control (RDOC)

A network management (NWM) control applied automatically in response to an external signal or an overload condition from a subtending office. This service consists of preplanned controls that are activated by scan point or through the MAP terminal.

SLM

See system load module (SLM).

SMDR

See station message detail recording (SMDR).

station message detail recording (SMDR)

A system that provides recording facilities for the details of billable and nonbillable calls for each IBN customer group.

SWACT

See switch of activity (SWACT).

switch of activity (SWACT)

In a DMS fault-tolerant system, a reversal of the states of two identical devices devoted to the same function. A SWACT makes an active device inactive and an inactive device active.

system load module (SLM)

A mass storage system in a SuperNode processor that stores office images. New loads or stored images can be booted into the computing module (CM) from the SLM.

T1

The standard 24-channel 1.544-Mbps pulse code modulation (PCM) system used in North America. This digital carrier carries a signal whose designation is a DS-1 link.

TASI

See time assignment speech interpolation (TASI).

time assignment speech interpolation (TASI)

A technique used on certain long frequency-division multiplex (FDM) links to make better use of voice channels. An additional subscriber can be switched onto a channel temporarily idled by the pauses in the original subscriber's speech. When the original subscriber resumes speaking, the additional subscriber is in turn switched to any channel that happens to be idle.

translation verification (TRAVER)

A diagnostic tool that allows the operating company to access and simulate a telephone call in software and display the tables and tuples used to establish the lines, trunks, or positions to which a call is routed.

TRAVER

See translation verification (TRAVER).

TTP

See trunk test position (TTP).

trunk test position (TTP)

A MAP terminal specially equipped to perform trunk testing.

unified processor (UP)

A processor that replaces the master processor (MP), signaling processor (SP), and the memory cards associated with these processors. This replacement upgrades the ISDN remote switching center.

universal tone receiver (UTR)

An optional service card in the peripheral module (PM) that serves as a Digitone receiver for lines and as a multifrequency receiver for trunks. Universal tone receiver cards located in a particular digital trunk controller (DTC), line group controller (LGC), or line trunk controller (LTC) module service all lines and trunks connected to that module. The UTR is a 32-channel tone receiver. Thirty channels detect dual-tone multifrequency (DTMF) tones and analyze the samples.

UP

See unified processor (UP).

UTR

See universal tone receiver (UTR).

XMS

See extended multiprocessor system (XMS).

XMS-based peripheral module (XPM)

The generic name for peripheral modules (PM) that use the Motorola 68000 microprocessor. An XPM has a unified processor.

XMS-based peripheral module product life upgrade strategy (XPM-PLUS)

The integration of a new processor complex into the existing XPM architecture.

XPM

See XMS-based peripheral module (XPM).

XPM-PLUS

See XMS-based peripheral module product life upgrade strategy (XPM-PLUS).

Meridian SL-100

Dialable Wideband Services (DWS)

Services Guide

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