Communication Server 2100

Communcation Server 1000 Interworking

Services Guide

SE08   Standard   09.02   August 2005

NORTEL

Communication Server 2100

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Services Guide

Publication number: 555-4001-026
Product release: SE08
Document release: Standard 09.02
Date: August 2005

Publication history

June 2005

Version 09.02, SE08, Standard release. Starting with this release, information relevant to the Communication Server 2100 and Communication Server 1000 are added to the existing Meridian SL-100 and Meridian 1 information. This supports the migration of Meridian SL-100 and Meridian 1 to IP telephony (for more information refer to "About this document" on page xi). This version includes new chapters covering Release Link Trunks over H.323, IP telephone survivability (S1-S2), and Succession H.323 (CS 2100/CS 1000 Voice Mail interworking).

June 2002

Version 08.05, MSL17, Standard. First standard version for MSL17. Meridian SL-100/Meridian 1 ISDN/IP trunking interworking chapter added for this release.

May 2001

Version 07.01, MSL15, Standard. This version represents an up-issue of the standard release of this document.

Contents

About this document

Purpose and audience

This document details how the Communication Server 2100 and Communication Server 1000 switches operate in the same network. This document also includes legacy information from the Meridian SL-100 and Meridian 1 platforms which is relevant to interworking Communication Server 2100 and 1000 platforms. The guide describes the interworking features used across a hybrid network, and known feature compatibilities and incompatibilities. This guide is applicable to sites using Communication Server 2100 (CS 2100) and Communication Server 1000 (CS 1000) switches in the same network. This document's audience is administrative, provisioning, and installation personnel.

Structure

This document contains the following sections:

- **Basic call service** – shows how to set up basic call service between the Meridian SL-100 and the Meridian 1.

- **Integrated Services Access** – describes the Integrated Services Access (ISA) over PRI and provides configuration information.

- **Network Ring Again** – describes activation of the Meridian Customer Defined Network (MCDN) Network Ring Again (NRAG) feature in a network that consists of the Meridian 1 and the Meridian SL-100 switches.

- **Network Message Waiting** – shows how Network Message Waiting can extend voice message capabilities across a hybrid network of Meridian SL-100 and Meridian 1 switches.

- **Succession H.323 (CS 2100/CS 1000) Voice Mail interworking** - describes the centralized voice mail service where a Call Pilot hanging off a CS 2100 provides voice mail services to telephones in the CS 2100 as well as to telephones in all CS 1000s within an IP network

- **Anti-Tromboning** – describes how to eliminate tromboning, and maximize trunk usage, between Meridian SL-100 and Meridian 1 switches.

- **H.323 Release Link Trunks** - describes RLT over H.323 in a network of CS 1000s and CS 2000/2100s

- **Meridian SL-100/Meridian 1 ISDN/IP trunking interworking** – describes how to create an ISDN/IP gateway between the Meridian SL-100 and the Meridian 1.

- **Managing and maintaining the switch** – outlines the tools available for managing the Meridian SL-100 and the Meridian 1.

- **Using M3900 Meridian digital telephones on the two systems** – shows the differences in M3900 set feature operation between the two systems, as well as hardware and software requirements.

- **Feature compatibility and application comparisons** – describes compatibility of features when a Meridian 1 is connected to the Meridian SL-100, as well as operational differences.

- **IP Telephone Survivability (S1-S2)** - extends the CS 1000 Network Wide Redundancy sub-feature of the Geographic Redundancy to small systems in the CS 1000 to provide survivability of IP telephones registered with the CS 2100

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/Communication Server 2100 Master Index of Publications*.

References in this document

This guide references the following documents:

- *Meridian SL-100 Basic Call Service*
- *Meridian SL-100 MCDN Integrated Services Access*
- *Meridian SL-100 Primary Rate Interface (PRI) Maintenance*
- *Installing and Configuring Optivity Telephony Manager*
- *Using Optivity Telephony Manager*
- *Using Optivity Telephony Manager Telemanagement Applications*

Basic call service

Purpose

This chapter describes how to set up basic call service between the Meridian SL-100 and the Meridian 1.

The chapter includes the following sections:

- **Introduction** – introduces the concepts behind Integrated Service Digital Network and basic call service.

- **Network implementation of basic call service** – defines the call types supported by each switch type and describes Electronic Switched Network (ESN) signaling capabilities.

- **Meridian 1 implementation** – shows how to configure ISDN basic call service and ESN on the Meridian 1.

- **Meridian SL-100 implementation** – shows how to configure ISDN basic call service and ESN on the Meridian SL-100.

Introduction

For networks that include both the Meridian 1 and the Meridian SL-100 it is important to note the many interworking features, as well as any known feature incompatibilities or differences. Though the architecture of the two switches varies in many ways, the systems provide compatibility across Nortel Networks platforms, using standard open interfaces wherever possible.

Integrated Services Digital Network (ISDN) provides standards for digital interfaces between telephones, terminals, and telecommunications networks. ISDN uses one transport to carry multiple information types. ISDN combines networks for voice, data, images, or video conferencing onto one common high-speed transport.

FOR MORE INFORMATION

For additional basic call service information, refer to *Basic Call Service Network Services, 555-8001-101*.

Network implementation of basic call service

The primary rate interface (PRI) protocol links private network facilities to other private network facilities or public networks. Although public networks generally use Signaling System #7 (SS7) links, they can also use PRI links. Figure 1 shows the network elements of basic call service.

Figure 1
Network elements of basic call service

| User | | PRI | | Network |

Meridian 1 PBX		BOC end office	— NT DMS-100
Meridian SL-100		(see *Note 2*)	— NT DMS-250
			— AT&T#4ESS

Private ISDN network, node, or service   Common carrier SS7 network, node, or service

Notes:
1. User terminals can be ISDN or non-ISDN.
2. Calling features are limited to basic call and calling number delivery.
3. ISDN private networks are PRI. However, you can use SS7 instead of PRI in a Meridian SL-100 < > Meridian SL-100 link.
4. Depending on customer requirements, you can use PRI links instead of SS7 between public network nodes.

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Basic call connections

An ISDN node can function as an originating or terminating endpoint, or as a direct access tandem in a private or public network. Table 1 shows compatible network connections for the Meridian 1 and Meridian SL-100.

Table 1
Network connections supported for the Meridian 1 and Meridian SL-100

Meridian 1	PRI	QSIG	NI-2	ETSI	ESN	ETN	ISDN AP (Meridian link)	Analog/Digital PTS
Meridian SL-100	PRI	SS7	NI-1	NI-2	ESN	ETN		FGD

Note 1: Connectivity to other vendors equipment and ISDN services increases with each software release.

Note 2: A single customer group can have a mix of ISDN/non-ISDN terminals, access, and facilities.

Network calling features

Information elements (IEs) within call control messages enable other ISDN services. displays IEs for ISDN features supported on PRI/SS7 trunk group types. If non-ISDN links are included, basic call service provides call control functions only; no feature processing is available.

Figure 2
PRI IEs for network features

Figure 2 shows "Basic call" (Notes 1-3, CDN, BC, CID, PI, CSE) at center connected to:
- Electronic switched network — **ESN** — NPI
- Integrated services access (Note 4) — **ISA** — NSF, NPI
- Calling Name Delivery — **CND**
- Network Ring Again — **NRAG** — CGN
- Calling Number Display — **CGN** — Note 5
- Connected Number Display — **CN** — Note 5
- Network Call Redirection — **NCR** — RGN, RNN, CN

Notes:
1. PRI IEs used for a basic call are defined in Table 2.
2. Message elements are derived from datafill parameters and collected digits (translations).
3. The call reference, protocol discriminator, and message type IEs are mandatory in all messages.
4. Also known as call-by-call service.
5. ISDN terminals or terminals with display are required for some features.

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PRI information elements

Table 2 lists the PRI call control message elements. Figure 2 shows the IEs associated with different calling features.

The call reference identifies messages associated with the call request at the local user-network interface. The protocol discriminator distinguishes call control messages from other message types, such as maintenance messages. Message type identifies the call message, such as setup or disconnect.

Table 2
PRI message elements

Element	Definition	Options	Comments
BC	Bearer Capability defines the transmission characteristics associated with a call.	Speech (see Note 1), 3.1 KHz, 64 Kbps clear, 64 Kbps restricted, 56 Kbps.	Voice, Voiceband data, B8ZS data, 64 Kbps B7 data, 56 Kbps (see Note 2), DS-1 data, 56 Kbps.
CDN	Called Number.		Used for routing.

Table 2
PRI message elements (Continued)

Element	Definition	Options	Comments
TON	Type of Number.	International, national, local, directory number (DN), unknown.	
NPI	Numbering Plan Indicator.	Public (E.164) or private (ESN).	
IA5 Digits	Dialed digits.	0 through 9, * and #.	
CID	Channel ID.	Identifies the PRI trunk.	Must coordinate with far end.
IID	The interface ID identifies the DS-1 span.	2-15 (Meridian 1 only) or 0 to 31.	In the Meridian 1, 0 is reserved for the D-channel; 1 is reserved for the backup D-channel.
Channel Number	Channel number on that DS-1.	1-23 (Meridian 1 only) or 1 to 24.	Channel 24 is reserved for the D-channel in Meridian 1. For NI-2, channel 24 is reserved for the D-channel for all Customer Premises Equipment (CPE).
PI	The Progress Indicator describes events that can affect call handling.	Call is not end-to-end ISDN.

In-band information now available. | Used when the call originates or terminates on non-ISDN trunk. When the call terminates to non-ISDN line, audible ringing or tones sent inband to originating PRI. |
| CSE | Cause. | See Cause tables in each switch section. | Identifies why a call cannot be completed or that there is an inband treatment (such as busy). |
| NSF | Network Specific Facilities (used for ISA routing). | The service selector specifies the type of call service. The service ID selects a specific trunk facility. | The NSF explicitly identifies the network facilities requested for call routing. Applies to incoming and outgoing calls.

Examples of call service include foreign exchange (FX) and terminal interface equipment (TIE). |
| RGN | Redirecting Number. | Includes TON, NAP, IA5 Digits, and reason for redirection. | Identifies the number invoking call redirection. |
| RNN | Redirection Number. | Includes TON, NAP, IA5 Digits, and reason for redirection. | Identifies the number to which call redirection is invoked. |

Table 2
PRI message elements (Continued)

Element	Definition	Options	Comments
TNS	Transit Network Selector	To be supported in a later release.	The TNS requests a transit network, such as an IEC, for call routing.
Note 1: All non-ISDN sets are assumed to have speech BC.			
Note 2: Also referred to as AMI, ZCS, and inverted HDLC. With 64K restricted, the encoding scheme produces an effective data rate of 56 Kbps.			

PRI interface characteristics

The switch processes ISDN calls using a sequence of call set up and release messages provided by the PRI interface. You configure the message elements for routing and features, as well as parameters, for error control as part of PRI installation.

During PRI installation, you must coordinate several interface and transmission parameters configured in datafill at the near and far end.

The following sections summarize PRI interface characteristics. Not all of these characteristics apply to all equipment types.

B- and D-channel configuration

The PRI access structure is usually 23B+D, in which 23B, or "bearer" channels are controlled by a D, or signaling, channel. Each channel occupies one timeslot on a DS-1 span (a DS-1 span carries 24 channels). The D-channel carries call control information according to International Telecommunications Union (ITU) recommendation Q.931.

> *Note:* The NI-2 standard requires that the D-channel occupy the 24th channel in the 23B+D structure.

In non-associated signaling, a D-channel on another DS-1 span controls the B-channels (that is, nB+D). For nB+D, the DS-1 span for the B-channels must be appropriately identified across the PRI interface using the channel ID IE.

The system can use the B-channels for any user information (voice or data). The B-channels are 56 Kbps or 64 Kbps trunks. PRI trunks provide simultaneous, bidirectional digital transmission. The 56 Kbps option accommodates all equipment types.

A PRI trunk carries voice or data calls. Define the B-channel trunk group in the software. The switch can use each B-channel simultaneously and independently. The D-channel is 56 Kbps or 64 Kbps.

Backup D-channel
You can configure a backup D-channel for reliability if the primary D-channel fails. Configure the backup D-channel in datafill. When you configure a backup D-channel, the system automatically switches to the backup D-channel when the D-channel fails. When call control is transferred to the backup D-channel, there can be an interruption in service.

If the primary D-channel recovers, you can configure the system to switch control back to the primary D-channel. Configure this option in the software.

Channel identifier
The system identifies B-channels using the channel identifier (CID) IE. The CID includes the interface identifier (IID) or DS-1 span, a D-channel number. The trunk group can contain several CIDs. The switch cannot complete the call unless the CIDs are identical end-to-end.

The receiving node assumes that the channel specified is on the same DS-1 as the associated D-channel if the IID field is omitted.

B-channel allocation
The B-channel (DS-1 timeslot) is always identified by the originator and dedicated to that call for outgoing calls. According to the search method defined in the software, the switch selects the next available, or idle, member in the trunk group and reserves it for that call. No B-channel negotiation is supported. The switch identifies the selected B-channel in the call setup message using the CID IE.

   Note: The channel ordering sequence for channel format D2 is different from that used for formats D3, D4, and extended superframe format (ESF).

The switch routes a call to the next trunk group in the route list if all B-channels in the PRI are busy. For incoming calls, the network allocates the B-channel in the same manner.

Network vs. user
In a PRI connection, one end functions as the network for the exchange of call control messages. The other end functions as the user. These parameters define the ends of the link for the local connection only.

They do not have end-to-end significance. The software for the trunk group identifies the user or network function.

B-channel glare

When call termination and origination occur simultaneously on a single trunk member, glare occurs. To minimize glare, datafill opposite ends of a PRI connection so that the system allocates B-channels in a different selection sequence. Configure this in the software.

Call treatments

Call treatments are announcements or inband tones (such as subscriber busy) applied during call processing. When the switch routes a call to treatment, an attempt is made to map the treatment to a cause (CSE), with the following results:

- If the CSE cannot be mapped to a treatment, the switch supplies a default treatment inband to the originator.

- If the treatment can be mapped to CSE, the switch sends a disconnect message with the CSE element to the PRI interface. The switch pegs the CSE in the operational measurements (OMs).

The switch determines the source of the treatment as follows:

- According to datafill, the local public network node, or the originating office, provides the caller with an inband treatment.

- If the call is not end-to-end ISDN, the node where interworking occurs supplies the treatment.

Digital recorded announcement machines and recorded announcements

The switches use recorded announcements (RAN – Meridian 1 only), or digital recorded announcement machines (DRAM) to provide announcements to PRI interfaces. When specifying a route list, or when specifying an announcement to be applied to a treatment, the switches can use DRAMs.

Bearer capability screening

Bearer capability screening operates on three levels depending on switch type:

- station-to-station (DN-to-DN)

- line-to-trunk

- trunk-to-trunk

When BC screening operates between originating and terminating DNs, the terminating switch screens all call requests to ensure compatibility of the user terminals, before completing the connection. The switch checks the BC in the setup message from the incoming call against the BC assigned to the terminating DN. If the software shows the terminals to be compatible, the switch competes the call. If they are not compatible, the switch does not complete the call and gives the originator call not accepted (CNAC) treatment.

For outgoing calls, the BC information determines if a device with that BC can terminate to that PRI trunk group. If the call BC is compatible, the system passes it to the outgoing call setup message. No BC screening is done for non-PRI trunks. The Meridian 1 uses trunk BCs only to disallow 64 Kbps clear data calls over non-PRI trunks.

For tandem calls, calls originating on trunks configured with a particular BC can terminate to trunks with a compatible BC, when you implement BC screening.

ISDN terminals do not require this feature, because they have the capability to screen incoming calls based on the information the network sends them.

Routing
The following two types of routing are available:

* dedicated trunk routing and integrated services access (ISA)

* call-by-call type service (see *Meridian SL-100 Meridian Customer Defined Network* (*MCDN) Integrated Services Access*, 555-8001-102 and *Meridian 1 ISDN PRI Description and Administration*, 553-2901-100)

Dedicated trunk routing for PRI ESN and plain ordinary telephone service (POTS) calls uses existing translations tables and routing procedures. Routing associates a call type of public or private with each incoming and outgoing call. For all incoming and outgoing calls, the call type is in the call setup message The switch uses the call type to select the appropriate translation and routing tables.

Incoming calls – For incoming calls, the switch looks at the Called Number (CDN), which includes the type of number (TON), numbering plan indicator (NPI), and called digits.

The network specific facilities information element (NSF IE), if included, applies only to ISA calls. The system maps these elements to a call type according to the following rules:

- If the NPI is specified, the call type = NPI (PUBLIC or PRIVATE).

- If there is no NPI, the default for the call type is PUBLIC.

If the dialed digits in the CDN include any prefix digits, the switch translates the digits into the appropriate NPI. The CDN can include prefix digits for a preferred interLATA carrier (10xxx), because the system does not support the transit network selector (TNS).

Table 3 shows the supported call types for incoming PRI calls.

Table 3
PRI call types

Meridian 1	Meridian SL-100 or MDC	DMS-100	DMS-250
Central office terminal (COT)	Public (PUB)	PUB	PUB
Direct inward dial (DID)	Private (PVT)	Not applicable	PVT
TIE	TIE	Not applicable	TIE
WAT	WATS	WATS	WATS
FX	FX	FX; not applicable	FX; INWATS
PVT from DMS-250			
Note: All switches support all call types for incoming calls.			

For calls incoming to the Meridian 1, existing translations and routing apply. The Meridian 1 treats TIE calls as private calls. It treats all other call types as public calls.

Table 4 displays call processing and routing combinations for the Meridian SL-100, DMS-100, and DMS-250 systems.

Table 4
PRI routing for incoming calls (Meridian SL-100, DMS-100, DMS-250 switches)

IE	Call type	Dialing plan	XLARTSEL	Comments
NSF	FX, TIE, INWATS	The NSF is used for ISA routing.		

Table 4
PRI routing for incoming calls (Meridian SL-100, DMS-100, DMS-250 switches)

IE	Call type	Dialing plan	XLARTSEL	Comments
NPI	Private	ESN or ETN.	XLAIBN.	PBX or MDC.
			RTEREF table name.	Direct routing – no translation, but can require digit manipulation (for example, WATS or FX application).
			XLAIEC (DMS-250).	References CALLATTR table.
	Public	Standard E.164	XLALEC.	POTS translations; references LINEATTR table.
			RTEREF table name.	Direct routing – no translation, but can require digit manipulation (for example, WATS application).
			XLAIEC (DMS-250 only).	References CALLATTR table.

Outgoing calls – Table 5 lists the call types that the switch supports for outgoing calls.

Table 5
Outgoing call types

Meridian 1	Meridian SL-100 or MDC	DMS-100	DMS-250
COT	PUB	PUB	PUB
DID	PVT	Not applicable	PVT
TIE	TIE	Not applicable	TIE
WAT	WATS	WATS	
FEX	FX	FX; not applicable	FX; INWATS
PVT (to DMS-250)			
Note: All switches support all call types for outgoing calls.			

For outgoing calls, the setup message incorporates the TON, NPI, and call digits in the CDN. The setup message also includes the BC.

In the Meridian 1, you configure the ISDN route and trunk type for the call type in the customer database. Normal translations and routing apply. The facility selected determines the route for the call. The Meridian 1 treats TIE calls as private calls. It treats all other call types as public calls.

The Meridian SL-100, DMS-100, and DMS-250 translate calls and route them according to standard routing selectors. The switches collect dialed digits and translate them according to datafill. The translations tables index the appropriate routing table, which reference the trunk group CLLI (or ISA if specified for call-by-call routing). See *MCDN Integrated Services Access*, 555-8001-102. The CLLI table indexes table TRKGRP to obtain the logical trunk identification (LTID). The switch then uses the LTID to access the service tables.

The system defines a call type for each route (trunk LTID) in table LTCALLS. The call type maps to the NPI for the setup message for the outgoing call. The switch obtains translation attributes from XLARTE in LTCALLS. The switch adds translated digits to the CDN IE for the outgoing setup message.

Note: All digits must be present, before sending the setup message.

Table 6 shows valid routing combinations for PRI routing on outgoing calls for the Meridian SL-100, DMS-100, and DMS-250.

The only valid call types for dedicated trunk routing are as follows:

- PRIVATE with an NPI of PRIVATE and nil NSF
- PUBLIC with PUBLIC NPI and nil NSF

Table 6
Valid routing combinations for PRI routing on outgoing calls

Call Type	NPI	NSF (see Note 1)	XLARTE	Comments
Private (PBX to PBX)	Private (PBX to PBX) (see Note 2).	Nil.	XLAIBN or RTEREF.	Private dialing plan over a direct PBX-PBX connection.
	Private.	Private (ISA only).	XLAIBN or RTEREF.	Private dialing over private facilities.
	Public (see Note 4).	Private (ISA only).	XLAIBN or RTEREF.	E.164 dialing over private facilities.

Table 6
Valid routing combinations for PRI routing on outgoing calls (Continued)

Call Type	NPI	NSF (see Note 1)	XLARTE	Comments
Public	Public [see Note 3].	Nil.	XLAIBN, XLALEC, XLAIEC (DMS-250 only) or RTEREF, such as IBNRTE.	E.164 dialing over public network facilities (PSTN).
TIE	Private.	TIE (ISA only).	XLAIBN or RTEREF.	Private dialing plan over Central Office provided facilities. The switch ignores the FACNUM.
WATS	Public.	WATS (ISA only).	XLAIBN, XLALEC, XLAIEC (DMS-250 only), or RTEREF, such as IBNRTE.	You can specify a zone number or auto zoning can occur.
FX	Public.	FX (ISA only).	XLALEC or RTEREF.	The system ignores the FACNUM.

Note 1: The call type maps to an NSF for ISA calls only.

Note 2: When call type = PRIVATE, the translations datafill determines the dial plan. Calls can be routed over the private network with overflow to the public network as configured datafill.

Note 3: The setup message for PUBLIC calls does not include the NPI. If no NPI is specified in an incoming call, the default call type is PUBLIC.

Note 4: When you specify an ISA selector and CALLTYPE = PUBLIC, the switch requires an NPI field with options PVT or PUB.

Tandem calls – In a PRI-to-PRI tandem call, the switch delivers the CDN of the originating call to the outgoing route.

Electronic switched network calls
There are many types of dialing plans for a network. Electronic switched network (ESN) is one type of dialing plan that Nortel Networks private networks traditionally use. PRI supports all PBX/Centrex ESN features for ISDN networking or provides identical features in Meridian customer defined network (MCDN) calling services. ESN calling operates over private or central office (CO) facilities.

Electronic tandem network compatibility
Electronic tandem network (ETN) is compatible with ESN dialing. ETN is a type of private network dialing plan. The switch processes ETN calls identically to ESN calls, except that it appends a traveling class of service (TCOS) to the outgoing CDN. For incoming calls, the PRI changes the TCOS to a network class of service (NCOS).

When a Nortel Networks switch receives NCOS information that includes TCOS information, it provides access to ETN. The NCOS and TCOS are interchangeable, as long as the NCOS assignments are uniform throughout the network.

Data calls
Data calls are normal calls over PRI (using standard PRI signaling) with a BC of 56 or 64 Kbps. The system assigns voiceband data calls (with modems) a BC of 3.1 KHz.

> *Note:* 64 Kbps calls do not terminate to 56 Kbps trunks. 56 Kbps calls do terminate to 64 Kbps or 56 Kbps trunks.

The switch transports all data calls over a PRI B-channel with bit transparency by removing the packet assembly/disassembly (PAD) associated with the PRI trunk.

> *Note:* 64 KC tandem data calls must switch to voice a PAD with 00 value.

The switch supports the following data devices:

- asynchronous interface module (AIM)
- asynchronous interface line unit (AILU)
- low-speed data unit (LSDU)
- high-speed data unit (HSDU)

Call authorization
In the Meridian SL-100, each call originating over a PRI has an authorization code (authcode) associated with it. The Meridian SL-100 performs call authorization against four characteristics:

- authcodes
- personal identification number (PIN) digits
- account codes
- calling line ID

In the Meridian 1, authcodes include network authcodes and basic authcodes.

Electronic switched network signaling
In addition to traditional private links between PBX and Centrex offices, SS7 and PRI links support ESN.

The switch provides the following ESN services over ISDN PRI:

- Call Back Queuing

- Coordinated Dialing Plan

- ESN Route Selection

- Network Authorization Codes

- Network Call Detail Recording (CDR) or Station Message Detail Recording (SMDR)

- Network Control Signaling

- Network Speed Call

- Network Traffic and Operational Measurements

- Off-hook Queuing

- Priority Queuing

The Meridian 1 provides only the following features:

- Coordinated Call-Back Queuing

- Call-Back Queuing to Conventional Main

- Network Call Transfer

There are specific datafill requirements for ESN signaling for the Meridian SL-100 when connected to a Meridian 1. You must datafill tables PACMAN, COSMAP, and COSDATA to accommodate ESN digits incoming from the Meridian 1. You must datafill table DIGMAN for calls outgoing to the Meridian 1.

Meridian 1 implementation

The Meridian 1 supports PRI links only for ISDN networks. A link includes the signaling link and associated trunks as follows:

- PRI links use the message-based, Common Channel Signaling Protocol 23B+D. The D-channel provides call control signaling (Q.931). The B-channels provide voice and data trunks. The PRI interface carries the B- and D-channels on one or more DS-1 spans, also called T1 spans.

- ISA links combine routing parameters from the PRI database with PRI signaling so that a single trunk can carry multiple call types. ISA is a routing application on a PRI link.

- Integrated service links (ISL) add an out-of-band D-channel to existing analog or digital trunk facilities for a PRI-like interface. ISLs provide ISDN features and faster connections over non-ISDN trunks. In shared (SHA) mode, the D-channel supports both ISL and PRI trunks. In dedicated (ISLD) mode, the D-channel supports ISL trunks only.

Table 7 describes the Meridian 1 network options for basic call service.

Table 7
Meridian 1 network options for basic call service

Trunk	PRI	ISA	ISL (see notes 1-2)
DCH mode	PRI	PRI	ISLD or SHA.
Restrictions	None	Not available on Meridian 1 to Meridian 1 network.	TIE trunk (Meridian 1 to Meridian 1 network only).
X11 software	Release 13 min.	Release 13 min.	Release 13 min.
Capacity (varies by system type)	Up to 16 DS-1 spans (1D + 383B). Min.: 1D + 23B Max: 1D + 383B. D-channel: 1 min. to 8 max B-channel: 1 min. to 383 max.		**SHA mode** min: 1D + 1B + 1 ISML max: 1D + 383B or ISL. **ISLD mode** min: 1D + 1 ISL max: 1D + 383 ISL (for DTI) max: 1D + n ISL (for ATI).
ESN support	Yes	Yes	Yes
Note 1: ISL supports CLID, CLID in CDR, ESN, Network Ring Again (NRAG), and Network Call Redirection.			
Note 2: ISL is not the same as inband ANI (also called digital inband, PTS trunks, or T1 with AB signaling), which is non-D-channel.			

PRI interface considerations

Configure basic call service as part of the PRI or SS7 interface installation. Table 8 shows PRI interface requirements and networking considerations for the Meridian 1 and provides an overview of database implementation. Refer to *MCDN Integrated Services Access*, 555-8001-102, for the database parameters associated with ISA.

Table 8
Meridian 1 PRI interface considerations

Mode	PRI	SHA	ISLD
Feature packages	PRA, ISDN; IEC is required for DMS-250 or ESS#4 connection.	ISDN, ISL, PRA.	ISDN, ISL, PRA.

Table 8
Meridian 1 PRI interface considerations (Continued)

Implementation	The DCHI card provides D-channel signaling. The PRI card provides the DS-1 link, which is synched to an external clock.	Requires a PRI interface with an active D-channel.	A dedicated connection using a dedicated leased line, dial-up modem, or DTI trunk, provides D-channel signaling.
Requirements	For 64 Kbps clear end to end, all repeaters and DS-1 interfaces must be set to B8ZS.	You do not require the QPC720 card to implement ISL. For ISLD operation, external clock (CLOK in LD17) requires a modem or ASIM. ISL SHA requires the HSDM. Channel IDs must match at the endpoints.	
Networking considerations	The D-channel occupies channel 24 on the DS-1 link. A DS-1 span can carry only one D-channel. Backup D-channel is only available for Meridian 1 to Meridian 1 PRI links. Compression is not available on D-channels implemented over existing T1 networks (T1 multiplexers).	Does not require a B-channel on the PRI. Must configure as TIE. This is the only trunk type allowed for a Meridian 1 to Meridian 1 link. With auto recovery, when the D-channel fails, ISL-configured trunks automatically revert to inband trunk signaling (release 14 and later). Backup D-channel is available for ISL links. Compression is not available on D-channels implemented over existing T1 networks (T1 multiplexers).	
Database configuration	Use LD 17 (USR prompt) to identify the D-channel mode. Associate the D-channel with the trunk group in LD17 (PRI prompt).	Enable ISL trunks on a per-trunk group basis: • Identify the D-channel type in LD17 (USR prompt) • Assign the ISL trunks a channel ID in LD14 (CHID prompt) for the trunk group	

Meridian 1 basic call service considerations

Table 9 shows the requirements, networking considerations, and sample datafill for basic call service on the Meridian 1.

Table 9
Meridian 1 basic call service considerations

Link	PRI.
Feature packages	Requires ISDN PRI feature packages only.
Implementation	Configure basic call service as part of PRI installation. Bearer capability screening uses the CLS (VCE or DTA) assigned to the Meridian 1 set in LD11. There is no BC screening for the route or trunk, except that data calls with a BC = 64KC are not allowed over non-PRI trunks.
Requirements	Meridian 1 to DMS-100 links require a uniform dialing plan (CDP or NARS) configured on the Meridian 1.
Networking considerations	It is recommended that route selection be set up to select the PRI trunk first with overflow re-routing to the non-PRI trunks. The Meridian 1 supports the following BC for incoming calls: speech, 3.1 KHz, 64KC, 64KR, and 56K. For outgoing calls, the Meridian 1 assigns BCs of speech, 64KC, or 56K. Outgoing data calls (CLS = DTA) are 56K, unless the unit is QMT21 (HSDU) and is set for 64K clear, then BC = 64KC. Assign all outgoing voice calls a BC of speech. Incoming calls with a BC of speech or 3.1 KHz must terminate to a voice terminal (CLS = VCE). Incoming calls with a BC of 64KC, 64KR, and 56K must terminate on a terminal with CLS = DTA. Non-PRI trunks do not support data calls with a BC = 64KC.
Database configuration	There is no datafill for bearer capability. The switch handles this transparently.

Software requirements

Table 10 shows the Meridian 1 software dependencies for basic call service. ESN requires no new options for ISDN networking.

Table 10
Meridian 1 basic call service and ESN feature packages (release 15 and later)

Basic call		
SW0000A	Base package.	Includes PBX interface (PBXI) for DTI/CPI (Option 75).
SW0300A	Basic ISDN features.	Requires base package.

Table 10
Meridian 1 basic call service and ESN feature packages (release 15 and later)

Basic call		
ISDN (Option 145 and 118)		Includes ISDN signaling, CLID, and CLID in CDR.
SW0301A	ISDN PRA.	Provides basic call on PRI and ESN signaling on PRI.
PRA (Option 146)		Requires base package and SW0300A.
SW0302A	ISDN signaling link.	Requires base package and SW0300A for dedicated mode.
ISL (Option 147)		Also requires SW0301A for shared mode.
SW0304A	Inter-exchange carrier.	Requires SW0301A.
IEC (Option 149)		Required with DMS-250 and AT&T #4ESS connection.
SW0305A	Call-by-call service.	Refer to *MCDN ISA Guide* (555-8001-102).
CBC (Option 117)		

Hardware requirements

Figure 3 shows the hardware architecture for Meridian 1 PRI links.

Figure 3
Meridian 1 PRI hardware configuration

QPC775 clock controllers
ref1
ref2
loop
QPC414 network card
QPC720 PRI
T1
DCHI
T1 interface to external digital carrier
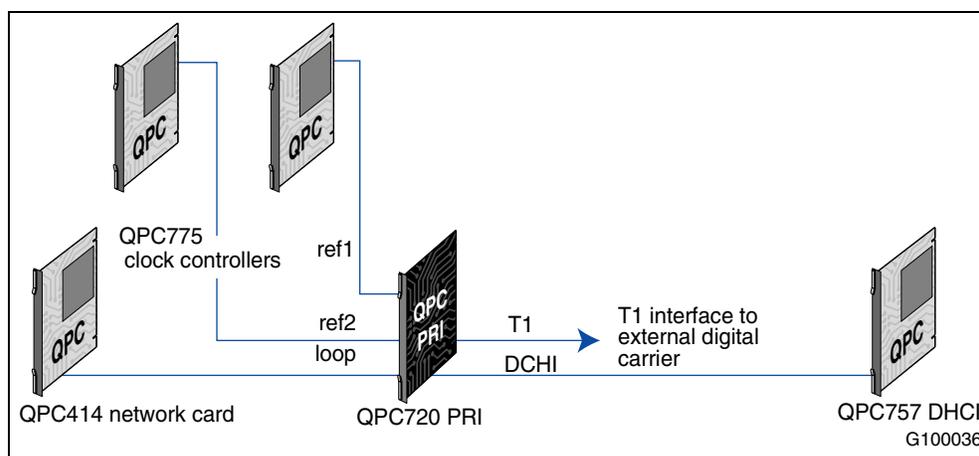QPC757 DHCI
G100036

Table 11 shows the hardware requirements for PRI links. You can require additional hardware or ROM depending on system configuration. Additional items include the: channel service unit (CSU); echo canceller (satellite transmission); X.25 packet assembler/disassembler (PAD); and QMT21 high-speed data module (HSDM).

Table 11
Meridian 1 PRI and ISL hardware description

Card	Abbreviation	PEC	Comments
D-channel interface	DCHI	QPC757D	Only one DCHI per PRI card. Up to eight DCHI cards allowed; one D-channel port (J2) per card. Port # switch settings must match DCHI in LD17. Set jumpers for high or low speed (ISL).
PRI (DS-1 span) (see Note 1)	PRI	QPC720B	Each PRI provides 24 channels. Up to 16 cards per D-channel (DCHI).
Clock controller (see Note 2)	CC	QPC471 or QPC775	Release 15 or later requires vintage B. Canada and international only.
Network card	N/A	QPC414	One network loop per card.
4-wire E&M TIE trunk	N/A	QPC237	ISL only.
High-speed data module	HSDM	QMT21	ISL only; required for DTI 64K clear data. Requires B8ZS line coding on PRI in LD17. Replaces ASIM and ADM in release 15 (see Note 3).

Note 1: Because PRI is T1-compatible, DTI applications also use QPC720 (release 5 and up). However, extended superframe format (ESF) PRI and DTI require a minimum of release 13.

Note 2: You cannot mix the QPC471 and QPC775 clock controllers in one system.

Note 3: The ISLD link requires ASIM or HSDM with DTI.

Meridian 1 database PRI datafill considerations

to show the database parameters associated with configuring PRI, ISL, and ESN capabilities.

lists the PRI interface datafill dependencies.

The correlation tables show the parameters you must coordinate with the far end for network service.

These tables describe datafill for dedicated trunking only.

Note: You must configure PRI loops in software, before defining D-channel association.

Table 12 summarizes the datafill sequence for installing the PRI interface.

Table 12
Meridian 1 PRI datafill sequence

Step # and LD	Description	Initial install
1. LD73 (DDB)	Set error detection thresholds and clock synchronization control.	✔
2. LD15 (CDB)	Equip customers with PRI capability.	✔
3. LD17 (CFN)	Configure all PRI loops (DS-1 spans) before associating the D-channel link.	✔
4. LD17 (CFN)	Add the associated D-channel (DCHI card) and configure the D-channel link.	✔
5. LD16 (RDB)	Configure PRI routes.	✔
6. LD14	Configure PRI trunks (B-channels).	✔
7. LD86 (DGT)	Add ESN dialing capability (skip this step if you do not require ESN).	Optional

The following tables provide examples of the steps in Table 12. The tables do not show all fields; they only show fields relevant to PRI, ISL, basic call service, or ESN signaling. Refer to the *Meridian 1 Software Input/Output Guide*, 553-3001-311, for complete field information.

Table 13
Step 1: LD73 (DDB) – Set maintenance thresholds and clock control for PRI loop

Prompt	Options	Description	Requirements	Comments
PREF	0-159 or *<cr>*	Primary clock or free run.		
SREF	0-159 or *<cr>*	Secondary clock or free run.		Appears if PREF = 0-159.
TRSH	0-15	Reference #.	Match TRSH in LD17 on DLOP.	
RALM	1-3-128	Yellow alarm 24-hr out-of-service limit.	Must be enabled in LD60.	You must manually restore service.
BIPC	0-2-128	24-hr limit for times returned to service.	Uses BIPV out-of-service limit.	0 restores service automatically.
LFAC	0-3-128	24-hr limit for times returned to service.	Uses LFAL out-of-service limit.	0 restores service automatically.
BIPV	1-3-4 1-2-4	Bit error rate maintenance and out-of-service limits (BPV and CRC).	1 => 10K in 6.6 sec 2 => 10K in 66 sec 3 => 10K in 660 sec 4 => 10K in 6600 sec.	

**Table 13
Step 1: LD73 (DDB) – Set maintenance thresholds and clock control for PRI loop
(Continued)**

Prompt	Options	Description	Requirements	Comments
SRTK	1-5-24 1-30-360	Slip count (tracking) maintenance and out-of-service limits.		Appears if PREF = 0-159. You must manually restore service.
SRNT	1-15-1024 1-3-1024	Slip rate (free run) maintenance and out-of-service limits (time, in secs, for 10 slips).		Appears if PREF = <cr>. If AUTO = NO, you must manually restore service.
LFAL	1-17-10240 1-511-10240	Loss of frame alignment maintenance and out-of-service limits (daily count).		If the condition clears for 15 secs, the switch automatically restores service.

**Table 14
Step 2: LD15 (CDB) – Define PRI customer**

Prompt	Options	Description	Requirements	Comments
CUST	0-31			
... AWU	<cr>			
ISDN	YES	Change ISDN parameters.		
PNI	1-32700	Customer private network identifier.	Must be unique; must be the same throughout the network. Must match PNI in RDB (LD16).	Prompted if ISDN = Y in LD17 and there is at least one configured PRI link.
HNPA	100-999	Area code for customer's Meridian 1.		
HNXX	100-999	CO prefix (exchange) for customer's Meridian 1.		
HLOC	100-999	Home location code (NARS).		
LSC	1-9999 or <cr>	1- to 4-digit local steering code in coordinate dialing plan (CDP); press <cr> to transmit CDP DN.		Appears only if user has a 5- or 6-digit dialing plan.
CNTP	LDN or PDN	Select customer's listed DN or the set's prime DN as default for CLID.		Attendant consoles can have only an LDN.

Table 14
Step 2: LD15 (CDB) – Define PRI customer (Continued)

Prompt	Options	Description	Requirements	Comments
RCNT	0-5	Maximum internode hops in a network redirection call.	Enter 0 to disallow network redirection; otherwise, enter a number greater than 0.	The switch only checks the RCNT prompt for redirected calls when LD15 prompt ISDN is YES.
AC2	aaa NPA NXX INTL SPN LOC	Call types that use access code. E.164 national. E.164 subscriber. International. Special number. Location code.		Appears only when ISDN = Y and NARS is installed. You can enter multiple responses. If you do not enter a call type here, the system automatically defaults to access code 1.

Table 15
Step 3: LD17 (CFN) – Configure PRI network loops

Prompt	Options	Description	Requirements
PWD2	<cr>		
ISDN	<cr>		
PARM	<cr>		
CEQU	YES	*Note:* You must configure all PRI network loops, before associating the D-channel for those loops. See step 4.	
... XCT			
DLOP	lll dd ff lll = 0-159 dd = 0 ff = D2-D3-D4-ESF	lll = network loop#. dd = # of data calls. ff = frame format.	dd = 0 for PRI. Basic PRI handles bearer capability (voice or data). There is no need to configure additional parameters.
MODE	PRI		No default.
LCMT	B8S or AMI	B8S = B8ZS. AMI = B7 (or ZCS).	Use B8S for Meridian 1 to Meridian 1. AMI requires 56K for DRAT. B8S requires 64KC for DRAT.
YALM	FDL or DG2	Facility data link (FDL) or digit 2 (DG2) yellow alarm signaling.	Use FDL with ESF in U.S.; use DG2 with ESF in Canada.
TRSH	0-15	PRI threshold set.	Same as TRSH in LD73.
DTIC	0-159	Starting network loop card slot for PRI.	The loop# must be even.

Table 16
Step 4: LD17 (CFN) – Add DCHI and configure D-channel link

Prompt	Options	Description	Requirements	Comments
PWD2	<cr>			
ISDN	YES	**Note:** You must configure all PRI network loops, before associating the D-channel for those loops.		
DCHI	1-15	I/O port address of DCHI card (J2) for primary D-channel.	Must match switch settings on DCHI card.	J2 is always odd.
BCHI	1-15	I/O port address of DCHI card (J2) for backup D-channel.	Must match switch settings on DCHI card.	J2 is always odd.
USR	PRA-ISL D-SHA	D-channel signaling mode.		There is no default.
RCVP	NO or YES	Recovery to backup D (N) or primary D when primary re-established (Y).	If this does not match the far end, both sides default to NO.	
ISLM	1-382	Count of ISL trunks controlled by the D-channel.		Prompted if MODE = ISLD or SHA.
DCHL	0-159	Network loop for primary D-channel.	You must configure all PRI network loops served by the D-channel first.	Not prompted if USR = ISLD. The D-channel does not require a PRI channel.
BCHL	0-159	Network loop for backup D-channel.	You must configure all PRI network loops served by the D-channel first.	Not prompted if USR = ISLD.
OTBF	1-16-127	# of output request buffers.		
DRAT	56K-64K C-64KI	D-channel transmission rate: 56 Kbps (56K); 64 Kbps clear (64KC); or 64 Kbps restricted, inverted HDLC (64KI).	Must match the far end.	56K is the default when LCMT = AMI. 64KC is the default when LCMT = B8S.
PRI	lll xx lll = 0-159 xx = 2-15	lll = network loop for primary D-channel. xx = interface ID for identifying multiple DS-1s per trunk group.	Same as DCHL. Must match the far end; must use a unique xx for each DS-1.	System automatically assigns 0 (primary D) and 1 (backup D) for field xx. Not prompted if USR = ISLD.

**Table 16
Step 4: LD17 (CFN) – Add DCHI and configure D-channel link (Continued)**

Prompt	Options	Description	Requirements	Comments
IFC	D100 ESS4 SL-1 S-100 D250	Near-end mode.		
SIDE	MAS or SLAV	Identify controlling side for channel allocation in case of all collisions.	MAS allocates channels in ascending sequence (1 to 24). SLAV allocates in descending sequence (24 to 1).	Prompted if IFC = Meridian 1 PBX. MAS = network. SLAV = user.
RLS	xx	Release ID for the D-channel for network features NRAG, NMS-MC, or NACD.	Enter 1; this applies to Meridian 1, Meridian SL-100, DMS-100, DMS-250, and AT&T switches.	These features are described in separate Network Services Guides.
CLOK	EXT or INT	D-channel clock.	Use INT for DCHI rollback testing only.	See *PRA Maintenance* (553-2901-500).
LAPD	NO or YES	Change LAPD parameters (Y) or use defaults (N) for timers T23 through K.		
T23	1-20-31	Interface guard timer (time-out for DCHI response to system).	Enter in 1/2 sec. units (for example, 20 = 10 secs).	Appears if LAPD = Y.
T200	2-3-40	Re-transmission timer.	Enter in 1/2-second units.	Appears if LAPD = Y.
N200	1-3-8	Maximum # of octets in information field.		Appears if LAPD = Y.
N201	4-260	Maximum # of octets in information field.		Appears if LAPD = Y.
T203	2-10-40	Maximum time (secs) allowed without frame exchange.	Release 15 requires a non-zero value.	Appears if LAPD = Y.
K	1-7-32	Maximum # of NAKS (unacknowledged or outstanding frames).		Appears if LAPD = Y.

Table 17
Step 5: LD16 (RDB) – Configure PRI routes

Prompt	Options	Description	Requirements	Comments
CUST	0-99	Customer #.		
ROUT	0-127 or 0-511	Route #: 0-511 for options NT, RT, ST, XT, 21, 51, 61, and 71; 0-127 all others.		Route 31 is no longer reserved for private route (release 14 and later).
TKTP	COT FEX WAT DID TIE ISA	ISDN route being configured.	TIE is required for Meridian 1 to Meridian 1 (PRI or ISL mode).	Only TIE appears if USR = ISLD or SHA in LD17. Refer to the *MCDN Integrated Services Guide* (555-8001-102) for configuring ISA routes.
... RCLS				
DTRK	NO or YES	Analog (N) or digital (Y) trunk.		
DGTP	DTI or PRI	Digital trunk type.	Use DTI for ISLD only.	Prompted if DTRK = Y.
ISDN	YES	ISDN customer.		Prompted if DTRK = Y.
MODE	PRA or ISLD	Mode of D-channel that controls the ISA route.	Use PRA for ISL SHA.	No default; prompted if TKTP = ISA.
DCHI	1-15	DCHI port number.	Must match DCHI in LD17.	Prompted only when MODE = ISLD.
PNI	1-32700	Customer private network identifier.	Must be unique; must be the same throughout the network; must match PNI in CDB (LD15).	Prompted if ISDN = Y in LD17 and there is at least one configured PRI link.
IFC	D100 ESS4 SL-1 S100 D250	Near end node.	Same as IFC in LD17.	
SRVC	ACC SDN M800 MEG	Service type for: AT&T #4ESS connection; accunet data service (ACC); switched digital network (SDN); MEGACOM 800 service (M800); or Megawatts (MEG)	Requires TKTP = TIE.	Prompted if IFC = ESS4.
NCNA	No or Yes	Network call name allowed.		

Table 17
Step 5: LD16 (RDB) – Configure PRI routes (Continued)

Prompt	Options	Description	Requirements	Comments
NCRD	No or Yes	Allow (Y) network call redirection message (including CLID) or disallow (N).		
CHTY	ABCH or BCH	D-channel (BCH) or AB bit signaling (ABCH) for B-channels.	Use BCH for PRI or ISL trunks. ABCH is for DTI.	Prompted if DTRK = Y.
CTYP	UKWN INTL NPA NXX LOC CDP SPN	Identifies call type for ESN access code insertion at receiving switch: unknown (UKWN); international # (INTL); national # (NPA); subscriber # (NXX); location code (LOC); coordinated dialing plan (CDP); or special # other than international format (SPN).		Prompted if TKTP = TIE; applies only to direct dialing using trunk access codes (not NARS or BARS dialing).
INAC	NO or YES	Insert access code to incoming ESN call from a private network.		Prompted if TKTP = TIE. If INAC = Y, the system bypasses the digit insertion option (INST).
INAC	NO or YES	Insert access code to incoming ESN call from a private network.		Prompted if TKTP = TIE. If INAC=Y, the system bypasses the digit insertion option (INST).
ISAR	N	Designate ISA route.	Enter N for No for dedicated trunks.	See the *MCDN Integrated Services Guide* (555-8001-102) for configuring ISA routes.
IEC	001-999	Interexchange carrier ID.		Prompted if ISDN = Y and TKTP = COT, FEX, or WAT.
SRCH	LIN or RRB	Linear (LIN) or round robin (RRB) search for outgoing trunk.	Coordinate with far end to minimize B-channel glare.	Applies to outgoing trunk selection.
SIGO	ESN2 ESN3 ESN5 STD ETN	ESN signaling arrangement: ESN2; ESN3; ESN5; non-ESN (STD); or electronic tandem network (ETN).	Requires BARS, NARS, and CDP software.	Prompted if TKTP = TIE. Use ESN5 for DTI for data applications.

Table 18
Step 6: LD14 – Configure PRI trunks

Prompt	Options	Description	Requirements	Comments
TYPE	COT FEX WAT DID TIE ISA	Trunk type.	You require TIE for Meridian 1 to Meridian 1 (PRI or ISL mode).	Refer to the *MCDN Integrated Services Access Guide* (555-8001-102) for configuring ISA trunks.
TN	l ch or lscu l = 0-159 ch = 1-23 s = 0-1 c = 1-10 u = 0-7	Terminal # address: PRI loop# PRI channel#.	Must match DLOP lll in LD17; use loop# and D-channel# for PRI links; use loop# shelf#, card# and unit# for ISL links.	Refer to the *MCDN Integrated Service Access Guide* (555-8001-102) for configuring ISA TNs.
... RTMB				
CHID	1-382	Channel# for ISL trunk.	Must match the far end.	LD17 (ISLM prompt) specifies the number of ISL trunks allowed for the D-channel.

Table 19
Step 7: LD86 (DGT) – Add ESN dialing capability

Prompt	Options	Description	Requirements
CUST	0-99	Customer#.	
FEAT	DGT	Digit manipulation data block.	Home location codes require digit manipulation tables. Assign home location codes in LD90, prompt HLOC.
DMI	1-255	Digit manipulation index (number table) for NARS/BARS.	
CTYP	NCHG INT NPA NXX LOC CDP SPN UKWN	Modifies the call type according to the DMI: no change (NCHG); special international # (INT); area code (NPA); local exchange (NXX); location code (LOC); coordinated dialing plan (CDP); special # (other than international); and unknown (UKWN).	The far end switch must recognize the call type.

PRI datafill dependencies

Table 20 lists the datafill dependencies in the DS-1 span. Enter these parameters in LD17.

Table 20
Meridian 1 PRI datafill dependencies

Signaling	DLOP ff	LCMT	LCMT	YALM	error checking
A/B for D2, D3, D4 (12 frames) (see note)	D2, D3, or D4 (SF format)	AMI B8S	56K or 64KI 64KI	DG2 DG2	BPV BPV
A/B/C/D (24 frames)	ESF	B8S	64KC	DG2 or FDL	BPV and CRC
Note: Channel bank format D3 interfaces one DS-1 span; channel bank format D4 interfaces two DS-1 spans.					

Correlation tables

Figure 4 on page 43 and Figure 5 on page 44 show the correlation tables parameters that you must coordinate between the near end and far end for network service. Because ISDN is an evolving architecture, there can be differences in datafill between product types.

Figure 4
Meridian 1 to Meridian 1 correlation table

Meridian 1 ◄──────►		Meridian 1	
(Note 1)			
	LD17		LD17
DLOP	(field ff) D3 or ESF	DLOP	(field ff) D3 or ESF
MODE	PRI	MODE	PRI
LCMT	B8S	LCMT	B8S
YALM	FDL or DG2	YALM	FDL or DG2
DCHI	1-15	DCHI	1-15
USR	PRA or SHA or ISLD	USR	PRA or SHA or ISLD
RCVP	Yes	RCVP	Yes
DCHL	0-159	DCHL	0-159
DRAT	64KC or 56K	DRAT	64KC or 56K
PRInn	2-15	PRInn	2-15
iFC	M-1	iFC	M-1
SIDE	MAS or SLAV	SIDE	MAS or SLAV
(Note 2)			
	LD16		LD16
MODE	PRA or ISLD	MODE	PRA or ISLD
SRCH	RRB or LIN	SRCH	RRB or LIN
(Note 3)			
	LD14		LD14
TN	111 ch 111=0-159 ch=1-23	TN	111 ch 111=0-159 ch=1-23
CHID	1-382	CHID	1-382
	LD60		LD60
ENYL loop# or		ENYL loop# or	
DSYL loop#		DSYL loop#	

Note 1:
Refer to Meridan 1 datafill, PRI datafill dependencies for required consistencies in the PRI interface at the node level.

Note 2:
The endpoints must have opposite values.

Note 3:
The endpoints must be identical: both must be LIN or both must be RRB.

KEY
Prompts appear in *italics.*

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Figure 5
Meridian 1 to Meridian SL-100 correlation table

Meridian 1 (Note 1)		Meridian SL-100	
	LD17		CARRMTC
DLOP	(field ff) D3 or ESF	*FF*	SF or ESF
MODE	PRI		LTCPSINV
LCMT (Note 2)	B8S or AMI	*PSDATA*	DS1PRA
YALM	FDL or DG2		CARRMTC
DCHI	1-15	*ZLG* *DLK*	B8ZS or ZCS NILDL
DRAT	Note 3		TRKSGRP
		DTCICKTNO	0-19
*PRI*nn	2-15	*CDHRATE* *HDLCTYPE*	Note 3 Note 3
			LTCPSINV
		IID	0-31
iFC	MSL-100		ADJNODE
		PRODUCT	M-1
			TRKSGRP
SIDE	SLAV	*IFCLASS*	NETWORK
	LD60		CARRMTC
DISY loop # or ENYL			
loop # command		*IAT*	Y or N
	LD16		TRKGRP
SRCH (Note 4)	RRB or LIN	*SELSEQ*	ASEQ or MIDL
	LD14		TRKMEM
TN 111 ch ch=1-23		*DTCCKTSS*	1-24

Note 1:
Refer to Meridian 1 datafill, PRI datafill dependencies for required consistencies in the PRI interface at the node level.

Note 2:
The following combinations are valid:

M-1	MSL-100
B8S	B8ZS
AMI	ZCS

Note 3:
The following combinations are valid:

M-1	MSL-100	
DRAT	*DCHRATE*	*HDLCTYPE*
56K	56K	HDLC
64KC	64K	HDLC
64KI	64K	INVHDLC

Note 4:
The following combinations are valid:

M-1	MSL-100
LIN	ASEQ
RRB	MIDL

KEY
Prompts appear in *italics.*

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Trunk and route (TFC002)

The switch reports traffic measurements on PRI trunk routes as normal according to group number. There are no additional traffic measurements specific to basic call service. The trunk and route report (TFC002) is part of the scheduled traffic report.

D-channel statistics (TFS009)

To include D-channel measurements in the scheduled traffic reports, use the set system traffic options (SOPS) command. For example, to enable option 9 use:

• LD2

• SOPS 9

To print current D-channel measurements, use the invoke system traffic (INVS) command. For example, to enable option 9, use:

• LD2

• INVS 9

Figure 6 shows the TFS009 report that provides measurements by D-channel port number.

Figure 6
Meridian 1 TFS009 report format

```
TFS009
DCH <port#>
VAS IS <VAS ID#>
<# inc msgs>                          <# out msgs>
<# inc CP msgs>                       <# out CP msgs>
<# of inc MGMT msgs>                  <# of out MGMT msgs>
<# of inc <MTCE msgs>                 <# of out <MTCE msgs>
<avg inc bytes/msg>                   <avg out bytes/msg>
<inc DCH usage time>                  <out DCH usage time>
<avg queue size RQBUF>
<# fails output msg (no output req    <# of msgs with no EOM>
    buffer available>
<# of protocol errors>
<# times DCH down since last report>  <DCH down time (in 2-sec units, for
                                          example, if the value is 10, downtime
                                          = 20 sec)>
```

Circuit traffic

Circuit statistics for PRI links use existing traffic measurements. There are no new statistics for circuit traffic.

Maintenance logs

The protocol log (PLOG) stores the count of D-channel errors as follows (see Figure 7):

- The PLOG prints automatically when a protocol counter overflows.
- PLOG counters clear after the PLOG prints or the DCHI card enables.
- If there are high error counts in counter 10, there is most likely a problem. If there are low error counts in these counters, but high error counts elsewhere, report a protocol problem to your Nortel Networks representative.

To print the D-channel statistics log use the following:

- LD96
- PLOG DCHI port#

Figure 7
Meridian 1 protocol log format

```
DCHI n l xxxx

yy zz 00 00 00 00 00 00  00 00 00 00 00 00  00 00 00 00
       1  2  3  4  5  6   7  8  9  10 1112  13 1415 16

where:
n = D-channel #

xxxx = system real time (in hexadecimal)

yy = maintenance indication primitive ID

zz = maintenance indication task ID


counter 1 = count of missing PRI handshakes

counter 2 = count of peer-initiated re-establishment link

counter 3 = count of unsuccessful retransmit N200 or SABME

counter 4 = count of unsuccessful retransmit N201 or DISC

counter 5 = count of N(R) errors

counter 6 = count of I fields with length greater than N201

counter 7 = count of undefined frames

counter 8 = not used

counter 9 = count of FRMR frames

counter 10 = count of CRC error frames

counter 11 = count of REJ frames

counter 12 = count of messages with less than 4 octets

counter 13 = count of undefined protocol discriminators

counter 14 = count of messages missing one or more mandatory information elements

counter 15 = count of messages missing one or more undefined information elements
counter 16 = count of messages missing one or more undefined information elements
```

Alarms

Table 21 lists common PRI alarms that affect basic call service. The system provides automatic detection and recovery for most faults.

Table 21
Meridian 1 alarms

Message	Effects	Remedy
Yellow alarm (remote alarm) T1 connection exists, but far end not ready (FAR END FAULT)		
DTA005 Yellow alarm	Switch disables PRI; YEL and DIS LED on PRI ON. Switch increments yellow alarm counter.	1. Contact far end. 2. System restores PRI when it no longer receives yellow alarm.
DTA006 24-hr out-of-service limit	Switch takes PRI out of service when count reaches RALM in LD73. Switch raises red alarm and clears the error counter.	1. Cleared when far end is up. When fault clears, enter: *LD60 DISL* loop# *ENLL* loop#. 2. Run a loopback test.
DTA00 *7* Cleared	Switch restores PRI.	
DTA008 Disabled		To enable, enter:*LD60ENYL* loop#.
Red alarm (local alarm) PRI card or transmission fault (NEAR END FAULT)		
(No message)	Switch takes PRI out of service; RED and DIS LED on PRI ON. Switch sends yellow alarm pattern to far end.	1. Check PRI status:*LD60STAT* loop#. 2. Check PRI counters: LD60LCNT loop#. Switch automatically restores the PRI to service when the condition clears, provided the 24-hour threshold is not exceeded.
DCHI alarm: DCHI card disabled (NEAR END FAULT)		
(No message)	DCHI LED is ON. Switch takes PRI out of service.	Run DCHI self tests. *Note:* If you configure both ports, the LED is ON only when both ports are disabled.
Bit error rate alarms: link transmission errors (NEAR END FAULT)		
DTA011 Maintenance limit	Switch increments counter.	Midnight routines print # of errors and clear the counters.
DTA012 Out-of-service limit	Switch takes PRI out of service and raises red alarm.	PRI automatically returns to service when rate improves.

Table 21
Meridian 1 alarms (Continued)

Message	Effects	Remedy
DTA013 24-hr out-of-service limit	If BIPC = 0 in LD73, switch automatically restores trunks. Otherwise, it takes PRI out of service and raises a red alarm.	To restore service manually, enter: *LD60DISL* loop#*ENLL* loop#.
DTA014 Cleared	PRI is restored.	
Frame slip: clock sync error (NEAR END FAULT)		
DTA015 Maint limit (tracking mode)	Switch increments counter.	Midnight routines print # of errors and clear the counters.
DTA016 Out-of-service limit (tracking mode)	Switch takes PRI out of service and raises red alarm.	To restore service, enter: *LD60DISL* loop#*ENLL* loop#.
DTA017 Maint limit (free run mode)	Switch increments counter.	Midnight routines print # of errors and clear the counters.
DTA018 Out-of-service limit (free run mode)	Switch takes PRI out of service and raises red alarm.	Check DLOP, LCMT, DRAT, and YALM (LD17) with far end. To restore service, enter:*LD60DISL* loop#*ENLL* loop#.
DTA026 Guard timer started for automatic recovery	Switch takes PRI out of service and starts guard timer according to SRGT in LD73.	1. Disable and enable loop: LD60 DISL loop# ENLL loop# 2. Run a loopback test to isolate the problem to the near or far end.
DTA027 Guard timer expired	Switch keeps PRI out of service.	1. Disable and enable loop: *LD60 DISL* loop# *ENLL* loop# 2. Check tracking status in LD60 with the TRCK PCK command.
DTA028 SRIM timer expired without improvement in slip rate; maintenance message count (SRMM in LD73) is exceeded.	Switch keeps PRI out of service and restarts guard timer.	Same as DTA027.
DTA029 The # of allowable maintenance messages (SRMM in LD73) is not exceeded.	Switch restores PRI.	Same as DTA027.

Table 21
Meridian 1 alarms (Continued)

Message	Effects	Remedy
Frame alignment: out-of-frame error (NEAR END FAULT)		
DTA019 Maint limit		Check DS-1 connection to far end.
DTA020 Out-of-service limit	If LFAC = 0 in LD73, switch automatically restores trunks. If not, switch takes PRI out of service, raises red alarm, and clears the error counter.	1. To restore service, enter: *LD60 DISL* loop# *ENLL* loop# 2. If alarm is raised again, run a loopback test.
DTA021 Errors continued for three seconds.	Switch takes PRI out of service.	1. To restore service, enter: *LD60 DISL* loop# *ENLL* loop# 2. Run a loopback test.
DTA022 Errors cleared for at least 15 seconds.	Switch restores PRI service.	
DTA023 PRI loop is up		
PRI automatic loop test: status (NEAR END FAULT)		
DTA024 Self test failed	Switch disables all channels; red alarm.	1. For repeated failures, replace the DTI card. 2. Check all other hardware, including cabling.
DTA025 Self test passed after being disabled.	Switch restores channels and removes red alarm.	

Table 22 lists common status messages that affect basic call service.

Table 22
Meridian 1 status messages

Message	Remedy
Yellow alarm	
DTI031 Loop is enabled, but PRI is in yellow alarm.	Wait for far end to respond. Contact the far end to resolve the situation.

Table 22
Meridian 1 status messages (Continued)

Message	Remedy
B-channel	
PR100 loop# ch# The B-channel specified is locked out, because far end is using a different channel.	Disable and enable the channel (using the ENCH and DNCH commands) to try to seize the channel. If it fails, contact the far end to resolve the problem.
PRI101 loop# ch# B-channel specified is locked out. Cause (c#) = 82 channel does not exist; c = 44 requested D-channel not available; or c = 6 alternate section acceptable.	If cause = 82, contact the far end to program the channel. If cause = 44, trace the channel to see if there is a valid call on it. Call the far end to resolve the problem. If cause = 6, check the routing tables.
D-channel	
DCH1003 device# protocol layer# error#protocol error	Check DLOP, LCMT, DRAT, and YALM (LD17) with far end. For D-channel status, see note. *LD96 STAT DCHI* port# ***Note:*** For ISL links, use *LD36, STAT* loop# shelf# card# unit# to check D-channel status. To print protocol log: *LD96 PLOG DCHI* port# To test DCHI: TEST 100 channel# TEST 101 channel# TEST 200 channel# TEST 201 channel#
DCH1006 Far end D-channel is down	1. To check D-channel status: *LD96 STAT DCHI* port# 2. Check PRI and DCHI cable. 3. Contact the far end.

Table 23 lists the tests for verifying network operation at the trunk or link level.

Table 23
Meridian 1 tests

Manual tests		
PRI self test (or local loopback test)	Tests transmitted and received DS-1 signal. (XMT signal sent to REC signal on PRI card.) LBK LED is ON.	1. Disable DCHI: *LD96 DIS DCHI* port#. 2. Disable PRI and start test: *LD60 DISL* loop# *SLFT* loop# (all channels) or *SLFT* loop# ch# Responds SLFT OK or DTAxxx if test fails.
DCHI self test		1. Disable DCHI and start test: *LD96 DIS DCHI* port# *SLFT DCHI* port#. 2. To test DCHI: *TEST* 100 channel# *TEST* 101 channel# *TEST* 200 channel# *TEST* 201 channel#.

Table 23
Meridian 1 tests (Continued)

Manual tests (Continued)		
Remote loopback test	Checks PRI integrity to far end and back; causes far end to raise and clear yellow alarm.	1. Contact service engineer at the far end to set up loopback mode (specify frame or channel): *LD96 DIS DCHI* port# *LD60 DISL* loop# *RLBK* loop# 2. After loopback mode is confirmed, start test: *LD96 DIS DCHI* port# *LD60 DISL* loop# *RMST* loop# Receives a DTIxxx message if the test fails.
Automatic tests		
PRI self test	Performed when PRI card is plugged.	Test failure shows:*DTI009* loop# channel#.
PRI automatic loop test	Same as PRI self test but run automatically with midnight routines. This automatically clears all counters.	1. Make sure ATLP = 1 for all channels or ATLP = 0 for one channel (random channel selected) in LD60.

Meridian SL-100 implementation

The Meridian SL-100 supports PRI and SS7 links for ISDN networks. An ISDN link includes the signaling link and associated trunks. summarizes the Meridian SL-100 network options for basic call service.

PRI links use a message-based, Common Channel Signaling protocol, nB + D. The D-channel provides call control signaling (Q.931). The B-channels serve as voice/data trunks. The PRI interface carries the B- and D-channels on one or more DS-1 spans.

SS7 (or CCS7) links also use a message-based, Common Channel Signaling protocol that separates the signaling link for call control from the voice/data trunks. SS7 trunks are ISDN User Part (ISUP) trunks. ISUP is the call control signaling protocol in SS7.

Note: The signaling link for both PRI and SS7 signaling can reside on the same facility as the voice/data trunks or it can be a separate facility.

Table 24 contains network options for the Meridian SL-100.

Table 24
Meridian SL-100 network options

Trunk	PRI only		SS7
Mode	PRI only	ITA (PRI + T1 A/B) (see Note 1)	SS7
Restrictions			Not available for Meridian 1 to Meridian SL-100.
BCS software	BCS 29 minimum		BCS 26 minimum; ESN signaling requires BCS 27.

Note 1: With integrated trunk access (ITA), the switch supports both PRI trunks and PTS trunks (trunks with inband A/B signaling) on the same DS-1 span. However, you cannot use special tone receivers (STR) on A/B trunks in ITA configurations.

Note 2: One D-channel supports up to 497 B-channels. However, for reliability, Nortel Networks recommends a lower D-channel to B-channel ratio (1D:47B or one D-channel per two DS-1 links)

PRI interface considerations

Configure basic call as part of PRI or SS7 interface installation. Table 25 shows PRI interface requirements, networking considerations, and sample datafill for the Meridian SL-100.

Table 25
Meridian SL-100 PRI interface summary

Link	PRI
Feature packages	The Digital Trunk Controller-ISDN (DTCI) Peripheral Module (PM) provides the PRI interface. The DTCI is similar to the DTC PM, except that it supports both PRI and non-PRI trunk signaling and does not support the special tone receiver (STR) card. All trunk types valid on DTCs are valid on DTCIs, except for SS7. An ISDN signaling preprocessor (ISP) card provides D-channel signaling for the PRI interface. Associate the B- and D-channels with DS-1 spans in datafill.
Requirements	The DTCI requires the 6X69xx message switch card, the BX01xx ISDN signaling preprocessor (ISP) card, and a special load that includes the load for the ISP card. Datafill four C-side ports in LTCINV to connect the DTCI to the network.

Table 25
Meridian SL-100 PRI interface summary (Continued)

Networking considerations	A DS-1 channel is a B-channel, a D-channel, or a nailed up (provisioned) channel. By convention, assign the D-channel to channel 24. A DS-1 span carries multiple B-channels. The D-channels only support B-channels on the same DTCI. Because the DTCI also supports non-PRI trunks, configure backup trunk groups on the same DTCI. However, for reliability, use non-PRI trunk groups for backup, preferably on a different PM. The switch transports all data calls over a PRI B-channel with bit transparency by removing the PADS associated with the PRI trunk.
Database configuration for PRI	Define a PRI trunk group by: • Entering IBNT2 for the trunk type in table TRKGRP. • Entering ISDN for the signaling type and defining the D-channel in table TRKSGRP. • Defining each B-channel in table TRKMEM. • Assigning an LTID to the PRI interface (as defined in tables LTDEF, TMAP, and LTCALLS) which routes calls.

Meridian SL-100 basic call service considerations

Table 26 lists basic call service and networking requirements, and provides a brief overview of datafill for basic call service on the Meridian SL-100.

Table 26
Meridian SL-100 datafill for basic call service

Link	PRI.
Feature packages	Requires ISDN PRI feature packages only.
Implementation	Configure basic call as part of PRI installation.
Requirements	No additional.

Table 26
Meridian SL-100 datafill for basic call service (Continued)

Networking considerations	Set up route selection to select the PRI trunk first with overflow re-routing to the non-PRI trunks. Bearer capability allows restriction of trunk groups in order to carry data only, voice only, voiceband data, or a combination of services. If you disallow the capability, calls requiring that service cannot originate or terminate on the PRI interface. Bearer capability is compatible with all existing features, although it is not fully supported in hunt groups. UCD or ACD lines do not support BC. Conference calls only support speech BC. All private call originations on a PRI are intragroup. This is overridden in IBN translations by datafilling the INTRAGRP flag to N in table IBNXLA.
Database configuration for basic call	The call type (received in the setup message NSF IE) and LTID associated with the trunk indexes table LTCALLS for translations and routing. The configuration supports an NPI of private or public. Normal routing applies. Authorized bearer services for the PRI trunk are datafilled in LTDEF as a characteristic of LTID, field OPTIONS. Tables BCDEF, BCCOMPAT, and KSETFEAT define the bearer capabilities, BC compatibilities, and assign BCs for Meridian SL-100 terminals. If the Meridian SL-100 tables show that the BCs are compatible, the call completes. If the BCs are not compatible, the call does not complete and the originator is given a CNAC. No BC screening is done for non-PRI trunks. Access to a particular network is accomplished in several ways: • datafilling the DFLNET option in table NCOS to allow stations within a customer group and NCOS to automatically access a particular network • datafilling the LOGNET option in table IBNXLA to allow stations in a customer group to use dialed codes to access different networks

ESN signaling considerations for the Meridian SL-100

Both PRI and SS7 links support ESN signaling in an ISDN network. SS7 supports the same ESN features as PRI. Table 27 describes the Meridian SL-100 requirements for implementing ESN signaling on PRI links.

Table 27
Meridian SL-100 summary for ESN signaling

Link	PRI.
BCS software	BCS 25 minimum.
Feature packages	In addition to the ISDN PRI packages, you require the current ESN packages to support ESN on PRI.
Implementation	PRI supports all PBX/Centrex ESN features for ISDN networking or provides identical features in MCDN calling services.
Requirements	There are no special datafill requirements for ESN signaling for the Meridian SL-100 when connected to a Meridian 1. You must datafill Tables PACMAN, COSMAP, and COSDATA to accommodate ESN digits incoming from the Meridian 1, and table DIGMAN for calls outgoing to the Meridian 1.

Table 27
Meridian SL-100 summary for ESN signaling (Continued)

Networking considerations	No additional.
Database configuration for ESN	Define a call type of PRIVATE for the LTID in the table LTCALLS and obtain the translations attributes from the translations selector (XLARTE) specified in table LTCALLS. Table COSDATA maps TCOS to NCOS for compatibility between two Meridian SL-100 switches.

Software requirements

Table 28 shows the software dependencies for basic call service and ESN signaling for BCS 30 and above. The table includes only those capabilities related to PRI, basic call service, or ESN signaling on a PRI link.

Table 28
Meridian SL-100 PRI basic call and ESN feature packages

Number	Description	Comments
NTX790AB	ISDN PRI	PRI links to Meridian 1, Meridian SL-100, and DMS-250 switches. Includes ESN signaling support.
NTX794AA	PRI/SS7 interworking	Call completion between PRI and SS7 switches.

Table 29 shows MSL software ordering information.

Table 29
MSL software ordering

Order code	Master tracking code (MTC)	Description	Comments
00033464	MSL00105	ISDN PRI	The purchase of the ISDN PRI option provides the right to use (RTU) for all available PRI features.

Hardware requirements

Figure 8 on page 56 shows the basic hardware architecture for PRI links. Required equipment includes the following:

- **An ISDN DTCI** – the DTCI uses the same two-shelf arrangement as the DTC.

- **A network termination (NT1)** – the NT1 performs the terminating functions for the T1 transmission loop and is usually at the subscriber premises.

The DTCI accommodates both PRI and A/B bit trunks within the same shelf. With ITA, provision both A/B bit and PRI trunks on the same DS-1 span.

Note: The DTCI does not support SS7 (CCS7 ISUP) trunks or the STR card. The DTCI requires ISP16, UTR15, and MSG6X69.

Figure 8
Meridian SL-100 PRI hardware configuration

* One MP and ISP is active while the other remains in standby mode.

G100039
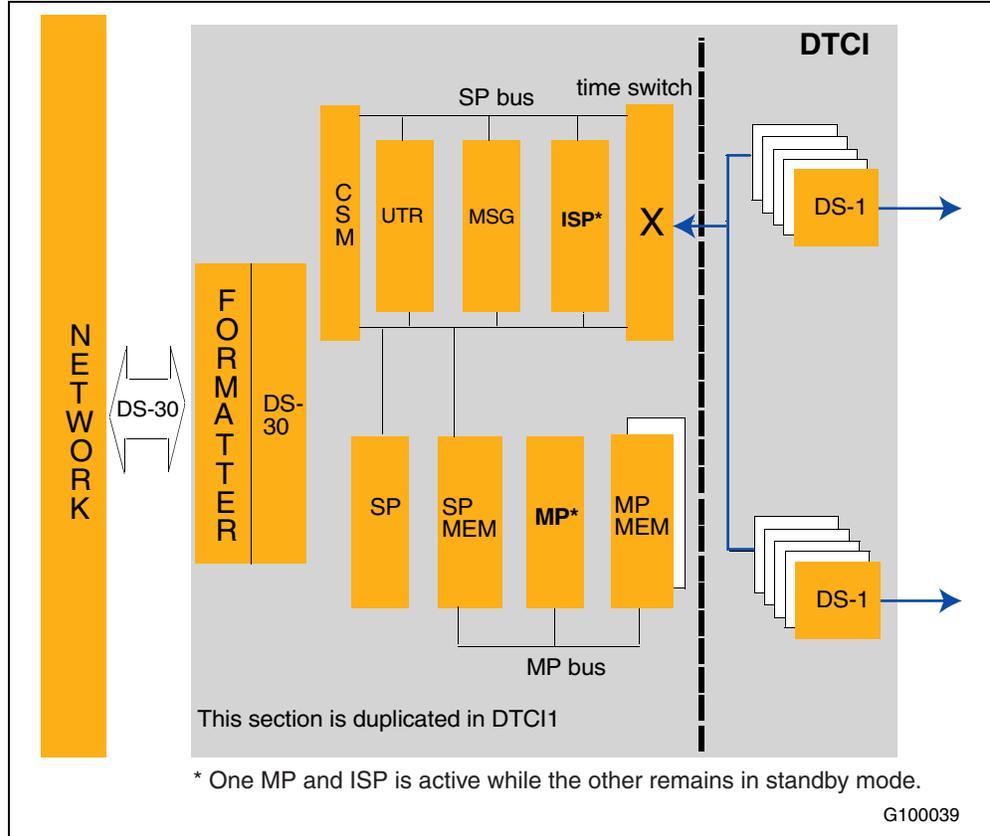
Table 30 shows the hardware requirements for PRI links.

Table 30
Meridian SL-100 PRI hardware description

Card	Abbreviation	NT_PEC	Comments
ISDN common peripheral controller or ISDN cabinet trunk controller	CPEI (Meridian SL-100) (see Note 1) MCT Meridian 1 (cabinetized Meridian SL-100)	6X01AB NX33AA	Up to two DTCI units: DTCI and DTCI2.
ISDN digital trunk controller	DTCI	N/A	The DTCI consists of two shelves (0 and 1) supporting up to 20 DS-1 links (10 DS-1 cards) for 480 channels. DS-1 cards per shelf: 1 min., 5 max. Each DS-1 card serves both DTCI units. The currently active DTCI unit controls it.
DS-1 interface cards	DS-1	6X50AA or 6X50AB (see Note 2)	Slots 0-5 in DTCI. Each card supports two DS-1 links (24 channels). Set switch settings according to distance to cross-connect.
ISDN signaling preprocessor	ISP	BX01AA	Slot 16 in DTCI. Supports up to 32 D-channels.
Master processor	MP	6X45AC	Slot 8 in DTCI.

Note 1: The DTEI (used on other equipment types) is essentially the same as the CPEI.

Note 2: NT6X50AB card supports both ZCS (AMI) and B8ZS coding and SF or ESF framing formats. NT6X50AA supports ZCS and SF only.

Installation rules

Table 31 shows rules and recommendations that apply to PRI installation.

Table 31
MSL-100 PRI installation rules

Node
1   Install a maximums of 30 DS-1 links for each DTCI.
2   Datafill the Meridian SL-100 with the appropriate entries as described in the Meridian SL-100 datafill section of this chapter.

Table 31
MSL-100 PRI installation rules (Continued)

Node (Continued)	
3	The following recommendations apply to configuring channels: • Each 6X50 card supports two DS-1 spans. Install one DS-1 card for every two D-channels (assuming 23B + D). • Distribute the D-channels over as many DS-1 cards as possible. • Nortel Networks recommends a minimum of one D-channel for two DS-1 links. • Do not datafill unused B-channels or provision them as PTS trunks. *Note:* If you are configuring the DS-1 link for ITA, datafill A/B trunks on non-PRI channels of the DTCI. If you are configuring the DS-1 link for ITA, datafill A/B trunks on non-PRI channels of the DTCI.
4	After datafill, load the DTCI and return it to service from the PM level of the MAP terminal using the following commands: PM POST DTCI <DTCI#> BSY PM RTS PM.
5	Return the carrier to service using the following commands: MAPCI; TRK; CARRIER POST DTCI <DTCI#> BSY ALL RTS ALL.
6	Post the B-channels from the MAP terminal and return the B-channels to service using the following MAP commands: • to enter the PRADCH level of the MAP terminal – MAPCI; MTC; TRKS; TTP; PRADCH • to post the B-channels – POST G <trunk CLLI> • to MB the DCH if INB – BSY ALL • to RTS the posted DCH – RTS ALL The D-channels go to the DMB state (D-channel mode busy)
7	Post the D-channels from the MAP terminal and return the D-channels to service using the following MAP commands: • to enter the PRADCH level of the MAP terminal – MAPCI; MTC; TRKS; TTP; PRADCH • to post the D-channel – POST GD <trunk CLLI> or POST D <circuit#> • to MB the DCH if INB – BSY • to RTS the posted DCH – RTS
8	Run internal continuity tests on the D-channel.
Network	
1	When service is available end-to-end, run external continuity tests on the D-channels.

Meridian SL-100 PRI datafill considerations

The following tables show the database parameters for configuring PRI and ESN capabilities. These tables describe datafill for dedicated trunking only. To configure ISA on the PRI link, refer to the *MCDN Integrated Services Access Network Services Guide,* 555-8001-102.

The tables list only entries for the DTCI configuration. The PRI interface datafill dependencies are listed in Table 20 on page 42. Correlation tables show the parameters that you must coordinate with the far end for network service.

Datafill presentation

In the following datafill tables, example tuples appear at the end of a table. An example that is one continuous record is shown on more than one line due to space limitations. Tables do not show all fields; they show only fields relevant to PRI, basic call service, or ESN signaling.

The following datafill considerations apply:

- The CLLI name for the trunk group must be consistent throughout the datafill tables.

- Before deleting a code from the CLLI table, you must delete the code from all tables that reference it (except for the CLLI maintenance table, which requires that you first delete the name from table CLLI).

- To extend the CLLI or TRKGRP table, change the value of the field SIZE for the table in the system data table (SYSDATA) and do a cold restart. To increase the size of table TRKMEM, change field TRKGRSIZ in table CLLI. You do not require a restart.

- With the table editor in interactive mode, to increase the value of the trunk group size, delete all trunk members in TRKMEM (the trunk group size is set to 0). Then reset to the higher value.

- When changing data for a trunk member, you must place that member in the INB state.

- You cannot change or delete a TRKSGRP tuple, unless the D-channel is in INB state.

PRI datafill sequence

Table 32 on page 60 shows the datafill sequence for the PRI interface and basic call service on the Meridian SL-100. Configure the PRI interface first (steps 1-10), then fill the basic call service tables (steps 11-15).

You must complete steps 11 through 15 to define the type and level of services to be provided on the PRI interface, including bearer capabilities for the PRI trunks. The mapping of these logical attributes to the physical interface is done through table LTMAP. Datafill the bearer services tables last.

Table 32
Meridian SL-100 PRI datafill sequence

Step	Description	Initial install	Add a trunk member	Add DS-1 span	Add a C-side link
1. CLLI	Define the trunk group name and size.	✔			
2. PADDATA	Define the transmit and receive pad values for the trunk group. (Optional; switch provides a default pad set).	Optional			
3. TRKGRP	Configure the trunk group.	✔			
4. OFCENG	Define the number of allowable simultaneous PRI/SS7 calls.	✔			
5. LTCINV	Identify the DTCIs to the system software (C-side port #).	✔			✔
6. CARRMTC	Configure DS-1 carrier and set error rates and alarms. (Optional; switch provides a default tuple for 64K clear).	Optional			
7. LTCPSINV	Identify the DS-1 cards that are associated with a DTCI to the software (P-side port #) and datafill IID for PRI.	✔		✔	✔
8. ADJNODE	Define the connection type and software versions of adjacent nodes.	✔			
9. TRKSGRP (sub of TRKGRP)	Define the D-channel for the trunk group.	✔			
10. TRKMEM	Define the trunks (B-channels) for the trunk group.	✔	✔	✔	✔
11. LTDEF	Define the logical terminal (LT) and access privileges.	✔			
12. LTDATA	Specify additional service-related data for the LTID.	✔			

Table 32
Meridian SL-100 PRI datafill sequence (Continued)

Step	Description	Initial install	Add a trunk member	Add DS-1 span	Add a C-side link
13. LTCALLS	Reference the initial translations associated with the call.	✔			
14. LTMAP	Map an LTID to the trunk group CLLI.	✔			
15. CUSTNWK	Define the customer networking features, including the display.	✔			

Steps 1 through 10 define the PRI facilities for basic call processing.

CLLI table – The maximum number of CLLI codes is 8191.

Table 33
Step 1: CLLI – Define the trunk group name and size

Field	Entry	Description	Requirements	Comments
CLLI	alphanumeric (up to 12 characters)	Trunk group name.	Same as GRPKEY in TRKGRP. Use a period (.) or underline (_) to separate fields (leave no blanks).	Nortel Networks recommends that you include PLACE, PROV, BLDG, TRAFUNIT, SUFX in this entry.
ADNUM	0 or 1 less than the CLLI table size	Administrative trunk group number.		
TRKGRSIZ	0-2047	The # of trunk group members.	Use a number greater than the number of initial working trunks.	Because the trunk members must be on the same DTCI, the maximum number of PRI trunks is 480.
ADMININF	alphanumeric (up to 32 characters)	Administrative information used by the operating company.	Use alphanumeric characters and underscores only. Use a period (.) or underline (_) to separate fields (leave no blanks).	Nortel Networks recommends that you use TRAFCLS, OFFCLS, TRKGRTYP for this entry.
Example: *K2CPR64CL 100 24 PH_43_IT*				

PADDATA table – Use the default pad values the switch provides or enter new values according to distance and hardware constraints.

Table 34
Step 2: PADDATA – Define the transmit and receive pad values (optional)

Field	Entry	Description	Requirements	Comments
PADKEY		Equals subfields PADGRP1 and PADGRP2.	Must match field PADGRP in table TRKGRP.	Switch automatically allocates memory for 64 pad groups. You can define up to 23 pad groups.
PADGRP1	alphanumeric (up to 4 characters)	Pad group 1 name.	Enter NPDGP if no PADS are desired.	PRAP is reserved for Meridian SL-100 PRI.
PADGRP2	alphanumeric (up to 4 characters)	Pad group 2 name.	Enter NPDGP if no PADS are desired.	Use a reserved or a customer-defined pad group.
PAD1TO2	0 to 14L	The network transmit pad.		If you use a reserved pad group, the switch automatically sets this value.
PAD2TO1	0 to 14L	The network receive pad.		If you use a reserved pad group, the switch automatically sets this value.
Example: *PRAP PRAP 0 0*				

TRKGRP table – Maximum size = 2048 trunk groups; maximum # of LTIDs = 1022.

Table 35
Step 3: TRKGRP – Configure the trunk group

Field	Entry	Description	Requirements	Comments
GRPKEY		Equals subfield CLLI.		
CLLI	alphanumeric (up to 12 characters)	CLLI name for the trunk group.	Same as trunk group name in CLLI table.	
GRPTYP	IBNT2	Trunk group type.	Use IBNT2 for Meridian SL-100 PRI.	This entry determines what fields you require.
TRAFSNO	0-15 or 0-127	Traffic separation number for the trunk group. Allows peg counts by type of call.	If not required, enter 0.	0-127 with optional software NTX085AA.

Table 35
Step 3: TRKGRP – Configure the trunk group (Continued)

Field	Entry	Description	Requirements	Comments
PADGRP	alphanumeric (up to 10 characters)	Pad group name assigned to the trunk group.	Enter NPDGRP if no PADS are desired. Must match PADKEY in table PADDATA.	
NCCLS	NCRT, NCTC, NCLT, NOSC, NCBN, NCID, NCOT, NCIT, NCIC, NCON, NCOF	No circuit class type used to select OM register for unavailable facilities and GNCT.		
SELSEQ	ASEQ, DSEQ, or MIDL	Select sequence. Selects the next idle trunk member in ascending (ASEQ), descending (DSEQ), or most idle (MIDL) sequence.	Meridian SL-100, DMS-100, and DMS-250: must have opposite values (ASEQ or DSEQ) at each end. Meridian 1: Use ASEQ with LIN in the Meridian 1, or use MIDL with RRB in the Meridian 1.	Used to reduce B-channel glare. See Meridian SL-100 datafill correlation tables.
NCOS	0-255	Network class of service defines the access privileges of a user.		Index to NCOS table.
BILLDN		Use CGN (N) or DN (Y) for billing for PRI interface.		
LTID	$	Equals subfields LTGRP + LTNUM.	Enter a $ Each trunk CLLI requires an LTID.	This is a read-only field. If the trunk group is not associated with an LTID in table LTMAP, this field displays $. The PRI is inaccessible.
LTGRP		Logical terminal group name.	This field is updated with the LTGRP entry in LTMAP.	Not prompted.
LTNUM		Logical terminal group#.	This field is updated with the LTNUM entry in LTMAP.	Not prompted.
Example: *K2CPR64CL IBNT2 0 NPDGP NCRT COMNORTEL 0 ASEQ 60 N ... (ISDN 6) $*				

OFCENG table

Table 36
Step 4: OFCENG – Define the number of allowable simultaneous PRI/SS7 calls

Field	Entry	Description	Requirements
PARMNAME	NO_OF_HIS_ CONTROL_BLKS	Parameter name.	
PARMVAL	1	Parameter value.	Nortel Networks recommends one HCB per trunk member.
PARMNAME	NO_OF_HIS_DATA_ BLKS	Parameter name.	
PARMVAL	1	Parameter value.	Nortel Networks recommends one HDB per trunk member.

LTCINV table – Switch automatically allocates memory for a maximum of 128 tuples.

Table 37
Step 5: LTCINV – Identify the DTCIs to the system software (C-side port#)

Field	Entry	Description	Requirements	Comments
LTCNAME		Equals subfields XPMTYPE + XPMNO.		Automatically adds entries to LTCPSINV.
XPMTYPE	DTCI	Peripheral module type.		
XPMNO	0-127	Peripheral module#.		
FRTYPE	CPEI	Frame type for the XPM.		Enter MCTM for cabinetized DMS-100.
FRNO	0-511	Frame# for FRTYPE.		
SHPOS	18, 32, 51, or 65	Shelf position of the frame (inches).		
FLOOR	0-99	Floor location of PM.		
ROW	A-H, J-N, P-Z, AA-HH, JJ-NN, PP-ZZ	Row location of PM.		
FRPOS	0-99	Floor position of PM.		
EQPEC	6X01AB	The PEC of the XPM (CPEI).		
LOAD	alphanumeric (up to 8) characters	Issue of the peripheral module software.		The DTCI load includes the ISP load.

Table 37
Step 5: LTCINV – Identify the DTCIs to the system software (C-side port#)

Field	Entry	Description	Requirements	Comments
EXECTAB	vector with 1-8 members	Equals TRMTYPE + EXEC subfields.	Must enter PRAB DTCEX for PRI. Requires at least one entry.	For ITA, the Meridian SL-100.
TRMTYP	PRAB or ABTRK	PM terminal type: ABTRK for A/B bit trunks or PRAB for PRI trunks.		
EXEC	DTCEX	Specifies the set of executive programs for TRMTYP.	Maximum # is 8.	
CSLINKTAB	vector with 3-16 members	Equals subfields NMNO + NMPORT + CONTMARK.		
NMNO	0-31	The network module# assigned to XPM.	Must correspond to C-side links 0-15 of the PM.	
NMPORT	0-63	Network port# for NMNO.		
OPTCARD	ISP16, MSG6X69, and UTR15	Defines XPM optional cards.	Enter ISP16, UTR15, and MSG6X69 – all are required for the DTCI.	Switch supports UTRs only in slot 15.
PECS6X45	6X45AC	PEC for master processor.	Each unit of the XPM requires one PEC. Enter PEC for unit 0 first.	
OPTATTR	$	Optional attributes.	Enter $	Applies only to DTC CCS7 ISUP trunks.
PEC6X40	6X40AA, 6X40AB, or 6X40AC	PEC for DS-30 interface card.		
Example: *DTCI 0 DTE 0 18 0 A 7 6X01AB DTI29BP1 (PRAB DTCEX) (ABTRK DTCEX) $ (0 20 (0 21)(1 20) (1 22) (0 4) (1 4) (0 6) (1 6) (0 22) (1 21) (0 23) (1 23) (0 5)(1 5) (0 7) (1 7) $ (UTR15) (MSG6X69) (ISP16)$ 6X45AC 6X45AC $ 6X40AC*				

CARRMTC table – You can use the default tuple for 64K clear or enter new values in the CARRMTC table. If you enter DEFAULT for CARRIDX in table LTCPSINV, the table does not appear. Table LTCPSINV, field CARRIDX references data contained in this table. Data in this table must be consistent with the datafill in TRKSGRP.

Table 38
Step 6: CARRMTC – Configure DS-1 carrier and set error rates and alarms (optional)

Field	Entry	Description	Requirements	Comments
CSPMTYPE	DTCI	C-side node PM type.		
TMPLTBM	DEFAULT or alphanumeric (up to 16 characters)	The template name for the PM.	DEFAULT is the initial entry provided. You cannot delete DEFAULT templates. Only the operating company can change them.	Referred to in table LTCPSINV to provide maintenance for DS-1 links. If you select DEFAULT, the system omits fields RTSMAL, RTSOL, ATTR, and SELECTOR.
RTSML	0-255	Warning limit for times returned to service during the audit interval.		Enter 255 to disable this feature.
RTSOL	0-255	Out-of-service limit for the audit interval.		Enter 255 to disable this feature.
ATTR		Equals subfield SELECTOR.		
SELECTOR	DS1	Carrier type.	Enter DS1 when CSPMTYPE = DTCI.	This entry determines what fields you require.
CARD	NT6X50AA, NT6X50AB, or NT6X50EC	PEC code for DS-1 card.	See Meridian SL-100 PRI datafill considerations on page 44.	NT6X50AA does not support 64K clear data links or ESF.
If CARD = NT6X50EC, you require the following field:				
ECHOI	ACCESS or NETWORK	Specifies that echo cancellers are positioned on the ACCESS side or on the NETWORK side.		
You require the following fields for all CARD types:				
VOICELAW	MU_LAW or A_LAW	Voice law used by the carrier.	Enter MU_LAW	This is the 1.544 Mbps, 24-channel PCM system North America uses. A_LAW is common in international switches.

Table 38
Step 6: CARRMTC – Configure DS-1 carrier and set error rates and alarms (optional) (Continued)

Field	Entry	Description	Requirements	Comments
FF	SF or ESF	Frame format: superframe (SF) or extended superframe (ESF).	Must correspond with DS-1 card code.	
ZLG	ZCS or B8ZS	Zero logic line coding scheme for the DS-1.	Use ZCS if repeaters or near end switch cannot handle B8ZS.	ZCS results in 56 Kbps data rate; B8ZS results in 64 Kbps (64K clear).
BERB	BPV or CRC	Bit error rate base.	See Meridian SL-100 PRI datafill considerations on page 44.	
DLK	NILDL, FDL1, or FDL2	Data link.	Enter NILDL for nil data link. See Meridian SL-100 PRI datafill considerations on page 44.	FDL is for transmitting yellow alarm. Currently, the switch supports only NILDL.
IAT	Y or N	Inhibit alarm transit; transmit yellow alarm (N) or inhibit yellow alarm (Y).		
LCGAST	1-250-9999	Local carrier alarm group set threshold in units of 10 msecs.		
LCGACL	1-1000-9999	Local carrier alarm clear threshold in units of 10 msecs.		
RCGAST	1-50-9999	Remote carrier alarm set threshold in units of 10 msecs.	For problems bringing carrier into service, use 1000 (10 secs.).	
RCGACL	1-50-9999	Remote carrier alarm clear threshold in units of 10 msecs.	For problems bringing carriers into service, use 1000 (10 secs.).	
AISCL	1-1000-9999	Alarm indicator signal clear threshold in units of 10 msecs.		
BEROL	3-6	BER out-of-service limit.		3 => 10K in 6 secs. 4 => 10K in 66 secs. 5 => 10K in 660 secs. 6 => 10K in 6600 secs.
BERML	4-6-7	BER maintenance limit.		4 => 10K in 66 secs. 5 => 10K in 660 secs. 6 => 10K in 6600 secs. 7 => 10K in 66000 secs.

Table 38
Step 6: CARRMTC – Configure DS-1 carrier and set error rates and alarms (optional) (Continued)

Field	Entry	Description	Requirements	Comments
ES	0-864-9999	Error second threshold in units of 10 msecs.		
SES	0-100-9999	Severe error second threshold in units of 10 msecs.		
FRAMEML	0-17-9999	Maintenance limit for frame loss.		Table OFCENG also records this limit.
FRAMEOL	0-511-9999	Out-of-service limit for frame loss.	FRAMEOL must be larger than FRAMEML or the switch uses only FRAMEOL.	Table OFCENG also records this limit.
SLIPML	0-4-9999	Maintenance limit for frame slip.		Table OFCENG also records this limit.
SLIPOL	0-255-9999	Out-of-service limit for frame slip.	SLIPOL must be larger than SLIPML or switch uses only SLIPOL.	Table OFCENG also records this limit.
Example for 64K clear (this is the default tuple): *DTCI DEFAULT 255 255 DS1 NT6X50AB MU_LAW SF B8ZS BPVNILDL N 250 1000 50 50 150 1000 3 6 864 100 17 511 4 255 $* Example for 64K restricted and 56K:*DTCI ZCS 255 255 DS1 NT6X50AB MU_LAW SF ZCS BPVNILDL N 250 1000 50 50 150 1000 3 6 864 100 17 511 4 255 $*				

LTCPSINV table – The system automatically adds an entry in this table when you add a DTCI to table LTCINV. The switch automatically allocates memory for a maximum of 128 tuples.

Table 39
Step 7: LTCPSINV – Identify the DTCIs to the software (P-side port#) and datafill field IID for PRI

Field	Entry	Description	Requirements	Comments
LTCNAME		Equals subfields XPMTYPE + XPMNO.		
XPMTYPE	DTCI	Peripheral module type.		
XPMNO	0-511	Peripheral module#.		
PSLNKTAB	vector with 0-19 members	Equals subfields PSLINK + PSDATA + CARRIDX + ACTION + IID.	Use DS1PRA for PRI or ITA. Use DS-1 for AB bit signaling without ISDN.	DTCI supports DS1 and DS1PRA.

Table 39
Step 7: LTCPSINV – Identify the DTCIs to the software (P-side port#) and datafill field IID for PRI (Continued)

Field	Entry	Description	Requirements	Comments
PSLINK	0-19	P-side port#.		
PSDATA	DS1PRA or NILTYPE	P-side interface.	If carrier requires ISDN, enter DS1PRA. Enter NILTYPE if that carrier is not equipped on the DTCI.	DTCI supports DS1 and DS1PRA. For DS1, datafill CARRIDX and ACTION. For DS1PRA, datafill CARRIDX, ACTION, and IID.
CARRIDX	DEFAULT or valid template name datafilled in CARRMTC	Index into table CARRMTC.	An entry for the PM type must already exist in table CARRMTC.	See Meridian SL-100 PRI datafill considerations on page 44.
ACTION	Y or N	Remove carrier from service if FRAMEOL, SLIPOL, ES, or SES is exceeded.		
IID	0-31	The interface ID identifies the DS-1 spans associated with the D-channel.	For a single DS-1 span, use 0. For multiple DS-1 spans per trunk group, the switch requires a different IID for each DS-1 in the trunk group.	Do not use 1 if connected to the Meridian 1 PBX.
Example: *DTCI 0 (0 DS1PRA DEFAULT N 0) (1 DS1PRA DEFAULT N 0) (2 DS1PRA DEFAULT N 0) (3 DS1PRA DEFAULT N 0) (4 DS1PRA DEFAULT N 0) (5 DS1PRA DEFAULT N 0) (6 DS1 DEFAULT N) (7 DS1 DEFAULT N) (8 DS1 DEFAULT N) (9 DS1 DEFAULT N) $*				

ADJNODE table – The maximum number of tuples is 4096. Many different TRKSGRP entries use the tuples in this table.

Table 40
Step 8: ADJNODE – Define the connection type and software version of adjacent nodes

Field	Entry	Description	Requirements	Comments
ADJNODEK	alphanumeric (up to 12 characters)	Adjacent node key – enter the names for each adjacent switch.	Nortel Networks recommends that you use type and version to identify the adjacent switch.	Refer to table TRKSGRP, field ADJNODE.
SIGDATA	PRA	Equals PRODUCT + VERNUM subfields.	Enter PRA for a PRI trunk.	
PRODUCT	For PRI: DMS, Meridian 1, OTHER	Adjacent switch type.		

Table 40
Step 8: ADJNODE – Define the connection type and software version of adjacent nodes (Continued)

Field	Entry	Description	Requirements	Comments
VERNUM	0-32767	Software version in adjacent switch.	Eliminate the decimal if it appears. You must update this field if the software is updated in the adjacent node.	Use the BCS for DMS nodes; use the release number for Meridian 1 PBXs.
Example: *PRASL115 PRA Meridian 1 28*				

TRKSGRP table – Table size is automatically set at two times the number of trunk groups. Maximum size: 2048 trunk subgroups.

Table 41
Step 9: TRKSGRP – Define the D-channel for the trunk group

Field	Entry	Description	Requirements	Comments
SGRPKEY		Equals CLLI + SGRP subfields.		To configure ITA on the DTCI, datafill the non-PRI trunk subgroups in table TRKSGRP along with the PRI trunk subgroups.
CLLI		CLLI trunk group name.		
SGRP	0	Subgroup#.		The switch allows only one subgroup (subgroup 0) per PRI interface.
CARDCODE	DS1SIG	Card code.	ISDN PRI requires DS1SIG.	
SGRVAR		Equals subfields SIGDATA through DCHBCKUP below.		
SIGDATA	ISDN	The call processing protocol.	ISDN is the only valid field for a PRI trunk.	This entry determines what fields appear.
PSPDSEIZ	2-30	The time, in seconds, that the trunk must wait to receive the first digit.		Applies only to inband DTMF digits.
PARTDIAL	2-30	The time, in seconds, that the trunk must wait to receive each digit after the first digit.		Applies only to inband DTMF digits.

Table 41
Step 9: TRKSGRP – Define the D-channel for the trunk group (Continued)

Field	Entry	Description	Requirements	Comments
VERSION	87Q931	The D-channel protocol version.	This is the only supported value.	
CRLENGTH	2	Call reference length (# of octets).	The only supported value is 2.	
BCHNEG	Y or N	Allow B-channel negotiation (Y) or disallow (N).	The only supported value is N.	Not currently supported.
BCHGLARE	YIELD or STAND	The near end has priority in call collisions (STAND) or the far end has priority (YIELD).		When a call collision occurs, an entry of YIELD causes the switch to take the call and select another trunk.
IFCLASS	NETWORK or USER	The interface class defines the ends of the link for PRI message exchange.	The Meridian SL-100 is always USER with the following exceptions: For Meridian SL-100 to Meridian SL-100 one end must be USER and the other end must be NETWORK. For Meridian 1 to Meridian SL-100, the Meridian SL-100 is NETWORK; the Meridian 1 is USER.	USER always yields to NETWORK.
CONFIG	PT_PT	The broadcast procedure for the PRI interface.	PT_PT is the only supported PRI option.	Only BRA uses Broadcast links (PT_MLT_PT).
LOCATION	USER	The Q.931 progress indicator (PI IE) location.		Datafill the far end according to equipment type: LOCALEO for DMS-100; USER for Meridian 1 or DMS-250.
SAT	Y or N	Satellite switched – yes (Y) or no (N).	N is the only supported value.	

Table 41
Step 9: TRKSGRP – Define the D-channel for the trunk group (Continued)

Field	Entry	Description	Requirements	Comments
ECSTAT	INTERNAL EXTERNAL INNOTONE UNEQ	Echo canceller status.	Enter INTERNAL when the echo cancellers are equipped on the NT6X50EC card in the DTCI frame and call processing enables them when the call is not a data call. This value is not allowed when you enable an echo suppressor. Enter EXTERNAL when external equipment perform echo cancellations and no call processing is involved. Use INNOTONE when internal echo cancellers are to be used, but the 2100 Hz tone is turned off. This value is not allowed when you enable the echo suppressor. Enter UNEQ when no echo cancellers are equipped on this subgroup.	
TRKGRDTIM	1-30-255	Trunk guard timer in units of 10 msecs. This is the time that the trunk waits after sending a DISCONNECT message and before putting the trunk into IDLE.	For PRI, Nortel Networks recommends a minimum value of 30 (300 msec.).	If the timer expires again after a second disconnect attempt, the B-channel is put into LO state until a restart procedure finishes.
ADJNODE	alphanumeric (up to 12 characters)	Index into table ADJNODE.	Same as ADJNODEK in table ADJNODE.	
L1FLAGS	Y or N	Indicates whether or not the DTCI sends Layer 1 flags when the D-channel is in flagfill mode.	Enter N for DMS-to-DMS connections and Y for DMS-to-other vendor connections.	
DCHNL		The primary D-channel for this PRI interface; it includes subfields PMTYPE through HDLCTYPE below.		You cannot change or delete this field, unless the D-channel is in INB state.

Table 41
Step 9: TRKSGRP – Define the D-channel for the trunk group (Continued)

Field	Entry	Description	Requirements	Comments
PMTYPE	DTCI	PM type.	Use DTCI for BCS 30 and later.	
DTCINO	0-511	DTCI PM#.		
DTCICKTNO	0-19	DS-1 span on the DTCI for the D-channel.		
DTCICKTTS	1-24	DS-1 timeslot for the D-channel.		
DCHRATE	64K or 56K	D-channel transmission rate.	See Meridian SL-100 PRI datafill considerations on page 44.	The D-channel rate must match the data rate datafilled for the DS-1 carrier.
HDLCTYPE	HDLC or INVHDLC	Indicate the bit format for PRI message as follows: HDLC for high level data link or INVHDLC for inverted HDLC.	See Meridian SL-100 PRI datafill considerations on page 44.	INVHDLC is a format in which all 0s are changed to 1s and vice versa. Some ISDN vendors use INVHDLC for PRI.
DCHBCKUP		The backup D-channel; it includes subfields PMTYPE through HDLCTYPE above.	The switch supports backup D-channels for both NTNA (NI-1) and NI-2.	
Example: *K2CPR64CL 0 DS1SIG ISDN 10 20 87Q931 2 N STAND +NETWORK PT_PT USER N UNEQ 30 PRASL115 DTCI 10 0 24 64KHDLC $*				

TRKMEM table – The switch automatically determines the table size according to field TRKGRPSIZ in table CLLI for each trunk group you configure.

Table 42
Step 10: TRKMEM – Define the B-channels for the trunk group

Field	Entry	Description	Requirements	Comments
CLLI		CLLI name for the trunk group.	Must match trunk group name in CLLI table.	
EXTRKNM	0-9999	The external trunk#.	The first digit in the tuple must be the same as the channel# to ensure correct trunk selection.	
SGRP	0	Trunk subgroup#.	Same as SGRP in table TRKSGRP.	Always 0 for PRI trunks.

Table 42
Step 10: TRKMEM – Define the B-channels for the trunk group (Continued)

Field	Entry	Description	Requirements	Comments
MEMVAR		Equals subfields PMTYPE + DTCNO + DTCCKTNO + DTCCKTTS.		
PMTYPE	DTCI	PM type.		
DTCNO	0-511	DTCI# for the trunk group.	Must match DTCINO in table TRKSGRP.	The B-channels must be on the same DTCI as the D-channel.
DTCCKTNO	0-19	DS-1 span on the DTCI for the B-channel.	You must datafill this carrier in LTCPSINV as DS1PRA.	
DTCCKTTS	1-24	DS-1 timeslot for this trunk member.		

Example: *K2CPRA64CL 1 0 DTCI 10 0 1*
       K2CPRA64CL 2 0 DTCI 10 0 2
       K2CPRA64CL 3 0 DTCI 10 0 3
       K2KABTRK1 1 0 DTCI 10 0 4
       K2KABTRK1 1 0 DTCI 10 0 5				

LTDEF table

Table 43
Step 11: LTDEF – Define the logical terminal (LT) and access privileges

Field	Entry	Description	Requirements	Comments
LTKEY		LTID.	Same as LTID in table LTDATA.	You must first datafill the LT group of the LTID in LTGRP if you use anything other than ISDN.
LTAP	B	LT access privileges.	Enter B for PRI (circuit-switched).	
CLASSREF		Equals subfield LTCLASS.		
LTCLASS	PRA	The LT class.		Defines the required fields and the allowed services.
NUMBCHNL	1-479	Number of B-channels in the trunk group.		

Table 43
Step 11: LTDEF – Define the logical terminal (LT) and access privileges

Field	Entry	Description	Requirements	Comments
NUMCALLS	1-479	Number of calls allowed on the LTID at one.	This entry must be the same as the NUMBCHNL entry. The sum of the incoming calls and outgoing calls must be less than or equal to the number of allowed calls.	
INCCALLS	0-479	The number of reserved incoming-only calls allowed on the LTID at one time.		Not used; enter any number.
OUTCALLS	0-479	The number of reserved outgoing-only calls allowed on the LTID at one time.		Not used; enter any number.
OPTIONS	vector with up to four members: NOVOICE NOVBD NOCMD NOPMD	Defines the bearer capabilities for the LTID; it defines the types of calls not allowed: NOVOICE for no voice calls, NOVBD for no voice-band data calls, NOCMD for no circuit-mode data calls, and NOPMD for no packet-mode data calls.	System supports packet mode data for NTNA and NI-1.	Applies to incoming and outgoing calls.
Example: *ISDN 555 B PRA 5 5 1 1 NOPMD $*				

LTDATA table

Table 44
Step 12: LTDATA – Specify additional service-related data for the LTID

Field	Entry	Description	Requirements	Comments
LTID		Equals subfields LTGRP + LTNUM.		
LTGRP	ISDN	The LT group type.	same as LTKEY in table LTDEF	Datafill non-ISDN groups if you first datafill table LTGRP.
LTNO	1-1022	LT# within the group.		

Table 44
Step 12: LTDATA – Specify additional service-related data for the LTID

Field	Entry	Description	Requirements	Comments
DATATYPE	NIL, DN, or SERV	Data type for the services associated with this LTID.		
When DATATYPE = DN, you require the following fields:				
DFLTCGN	10 digits: NPA + NNX + XXXX	The 10-digit DN (default) if no CGN is supplied on outgoing calls; with CGN screening, this DN is the only DN that originates calls.	You must datafill appropriate digits in table THOUGRP.	Only supports one 10-digit number. Also used for billing if the BILLDN field in table TRKGRP is Y.
OPTIONS	CUSTGRP	Select CUSTGRP option.	Enter $ if you require no options.	Only one entry allowed. Optional when DATATYPE = DN.
CUSTGRP	alphanumeric	Enter the customer group name.		
When DATATYPE = SERV, you require the following fields:				
AUDTRMT	N or Y	Audible treatments; specify whether the switch provides inband tones and announcements instead of "disconnect with cause" for treatments from this LTID.		
CGNREQD	N or Y	Specify whether the calling user switch must provide the CGN.		
CGNDELV	NEVER, SCREENED, ALWAYS	Specify when the switch must provide the CGN.	Use SCREENED when the switch must not send the CGN (when it is screened for privacy).	
CDNDELV	NEVER or ALWAYS	Specify whether the switch must deliver the CDN to the called interface.		
OPTION	TBO or CHG	Specify the terminating billing option for the trunk CLLI or the charge number in calling number digits when no calling number is available.		Up to two entries allowed.

Table 44
Step 12: LTDATA – Specify additional service-related data for the LTID

Field	Entry	Description	Requirements	Comments
CALLCODE	800-999	Enter a generic call code in this range.		Required when OPTION = TBO.
SFPRNT	N or Y	Specify whether the service feature is present or not.		Required when OPTION = TBO.
SFEATVAL	800-999	Enter a service feature value.		Required when SFPRNT = Y
Example: *ISDN 555 DN 6137221234 $*				

LTCALLS table

Table 45
Step 13: LTCALLS – Provides the initial translations associated with the call type

Field	Entry	Description	Requirements	Comments
LTID		The LTID from table LTDATA.		
CALLTYPE	PUB, PVT, WATS, INWATS, FX, or TIE	Defines the call type allowed on this PRI interface.		If XLARTSEL = XLALEC, the following call types are not valid: PVT, INWATS, and TIE.
XLARTSEL		Equals subfield XLARTE.		
XLARTE	XLAIBN, XLALEC, or RTEREF	The translation route selector: XLALEC for POTS, PBX, or Centrex; XLAIBN for PBX or MDC only; or RTEREF, which refers to a specific table and index, such as OFRT or IBNRTE.		Only one selector is allowed; this entry determines the other required fields. If CALLTYPE = PRIVATE, the system does not allow XLALEC.
When you enter XLALEC, you require the following field:				
LINEATTR	0-1023	Index to table LINEATTR.		Indexes table LINEATTR for public calls.
When you enter XLAIBN, you require the following fields: If CALLTYPE = PUB, the switch uses LINEATTR to index table LINEATTR. If CALLTYPE = PVT, the switch uses CUSTGRP, SUBGRP, and NCOS to index IBNXLA.				
CUSTGRP	alphanumeric	Customer name associated with an IBN station.		

Table 45
Step 13: LTCALLS – Provides the initial translations associated with the call type

Field	Entry	Description	Requirements	Comments
SUBGRP	0-7	Subgroup number for the CUSTGRP.		
NCOS	0-255	The network class of service, which defines access privileges for the user.		
When you select RTEREF, you require the following fields (CALLTYPE is irrelevant):				
RTEID	OFRT or IBNRTE and a number from 1 to 1023	The routing table and index into that table.		
OPTIONS	$		Enter $	
Example: *ISDN 555 PUB XLAIBN 52 $*				

LTMAP table

Table 46
Step 14: LTMAP – Map the LTID to the CLLIs of the PRI trunk groups

Field	Entry	Description	Requirements	Comments
LTID		LTKEY from table LTDEF indexes this table.		Automatically updates LTID field in table TRKGRP.
MAPTYPE	CLLI			Always set to CLLI for PRI.
CLLI		The CLLI name for the trunk group.	Must match CLLI name in table TRKGRP.	
OPTIONS	TEI 0	ISDN terminal equipment identifier.	Enter TEI 0 for every LTID entry.	TEI is the only supported option for PRI.
Example: *ISDN 555 CLLI K2CPR64CL TEI 0 $*				

CUSTNTWK table – Table CUSTNTWK is a table within table
CUSTENG.

Table 47
Step 15: CUSTNTWK – Define the customer networking features, including the display

Field	Entry	Description	Requirements
CUSTNAME	alphanumeric (up to 16 characters)	Customer group name.	Must match CUSTNAME in table CUSTENG.
NETNAME	PUBLIC	The network assigned to customer group.	Use PUBLIC for Meridian SL-100.
NETCGID	1-4096	Network customer ID#.	Use 1 for Meridian SL-100.
DNREVXLA	$	DN reverse translators.	Use $ for Meridian SL-100.
OPTIONS	CLID or NTWKRAG	MCDN feature options.	
CLIDOPT	ONNET or OFFNET	Calling line ID options.	Enter OFFNET to enable the NETCGID on all networks.
Example:*GRP1 PUBLIC 1 $ CLID OFFNET*			

Routing tables

The Meridian SL-100 uses the following routing tables for basic call
service or ESN over PRI:

- OFRT provides the routing for IBN and POTS calls.

- IBNRTE provides the routing for IBN calls.

- HNPACONT.RTEREF provides the routing for local calls.

- FNPACONT.RTEREF provides the routing for toll calls.

There are no changes to these tables for dedicated trunk routing. For
ISA routing, refer to *MCDN Integrated Services Access Network
Services Guide* (555-8001-102).

  Note: You must datafill these tables, before datafilling table
  LTCALLS.

Configuring backup trunk groups

Because the DTCI also supports non-PRI trunks, you can configure
backup trunk groups on the same DTCI. Configure the backup trunk
group as a single two-way trunk group or as two-way trunk groups.
Figure 9 on page 80 is an example tuple for table OFRT that shows how
to implement this.

Figure 9
Table OFRT tuple

99	S N N N	DMS2MSLPRA
	S N N N	DMS2MSLDAL

In this example, when a user dials the code for the PRI trunk, the switch routes the call using route OFRT 99. The system first offers calls using the PRI group DMS2MSLPRA. If this trunk group is 100 percent busy, out of service, or experiences protocol failure during the call setup, the system re-offers the call on the DAL trunk DMS2MSLDAL. You must handle calls incoming on DMS2MSLDAL the same way as calls incoming on DMS2MSLPRA.

PRI datafill dependencies

The datafill you enter for table CARRMTC must be consistent with the datafill in table TRKSGRP. Table 48 shows the Meridian SL-100 PRI datafill dependencies.

Table 48
Meridian SL-100 PRI datafill dependencies

CARRMTC					TRKSGRP	
CARD	FF	ZLG	BERB	DLK	DCHRATE	HDLCTYPE
NT6X50AA	SF	ZCS	BPV	NILDL	56K or 64K	HDLC or INVHDLC
NT6X50AB	SF	ZCS	BPV	NILDL	56K or 64K	HDLC or INVHDLC
		B8ZS	BPV	NILDL	64K	HDLC or INVHDLC
	ESF	ZCS	CRC	NILDL	56K or 64K	HDLC or INVHDLC
		B8ZS	CRC	NILDL	64K	HDLC or INVHDLC

Note 1: When you enter CRC, the switch uses both BPV and CRC.

Note 2: DLK is for transmitting yellow alarms. Use NILDL for nil data link, use FLD1 for input from timeslot 2, or FLD2 for input from external interrupt. Currently, the system supports only NILDL.

Correlation tables

Figure 10 on page 81 and Figure 11 on page 82 show the parameters that you must coordinate between the near and far end. Note that there can be differences in datafill between product types.

Figure 10
Meridian SL-100 to Meridian 1 correlation table

Meridian 1 ⟷ **Meridian SL-100**
(Note 1)

Meridian 1		Meridian SL-100	
TRKGRP		**LD16**	
SELSEQ *(Note 2)*	**ASEQ** or MIDL	*SRCH* *(Note 2)*	**LIN** or RRB
CARRMTC		**LD17**	
FF	SF or ESF	*DLOP*	(field ff) **D3** or ESF
ZLG	ZCS or B8ZS	*LCMT*	AMI or **B8S**
BERB	BPV or CRC	bit error rate: preset; if DLOP ff=ESF, then CRC; otherwise, BPV.	
DLK	**NIL** DL	*YALM*	FDL or DG2
IAT	Y or N	*DSYL loop#* or *ENYL loop# command*	**LD60**
LTCPSINV		**LD17**	
PSDATA	DS1PRA	*MODE*	PRI
IID	0-31	*PRI*	(field nn) 2-15
ADJNODE			
PRODUCT	M-1	*IFC*	MSL-100
VERNUM	15	use the release number (there is no corresponding M1 prompt)	
TRKSGRP			
IFCLASS	**NETWORK**	*SIDE*	SLAV
DTCICKTNO	0-19	*DCHI*	1-15
DTCICKTTS	24	The D-channel is always channel 24	
DCHRATE	(Note 3)	*DRAT*	(Note 3)
HDLCTYPE	(Note 3)		
TRKMEM		**LD14**	
DTCCKTSS	1-24	*TN*	1 11 ch ch=1–23

Note 1:
Refer to MSL-100 datafill, PRI datafill dependencies for required consistencies in the PRI interface.

Note 2:
The following combinations are valid:

MSL-100	**M-1**
ASEQ	LIN
MIDL	RRB

Note 3:
The following combinations are valid:

MSL-100		**M-1**
DCHRATE	HDLCTYPE	DRAT
		56K
		64KC
		64KI

KEY
Prompts appear in *italics;* defaults appear in **boldface.**

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Figure 11
Meridian SL-100 to Meridian SL-100 correlation table

Meridian SL-100 ← → Meridian SL-100	
(see Note)	*(see Note)*

Meridian SL-100 (see Note)			Meridian SL-100 (see Note)		
	TRKGRP			**TRKGRP**	
SELSEQ	**ASEQ**		*SELSEQ*	**DSEQ**	
BILLDN	**N**		*BILLDN*	**N**	
	CARRMTC			**CARRMTC**	
FF	SF or ESF		*FF*	SF or ESF	
ZLG	ZCS or B8ZS		*ZLG*	ZCS or B8ZS	
BERB	BPV or CRC		*BERB*	BPV or CRC	
DLK	**NILDL**		*DLK*	**NILDL**	
IAT	Y or N		*IAT*	Y or N	
	LTCPSINV			**LTCPSINV**	
PSDATA	DS1PRA		*PSDATA*	DS1PRA	
IID	0-31		*IID*	0-31	
	ADJNODE			**ADJNODE**	
PRODUCT	DMS		*PRODUCT*	DMS	
VERNUM	30		*VERNUM*	30	
	TRKSGRP			**TRKSGRP**	
CRLENGTH	2		*CRLENGTH*	2	
BCHGLARE	STAND		*BCHGLARE*	STAND	
IFCLASS	**NETWORK**		*IFCLASS*	**NETWORK**	
LOCATION	USER		*LOCATION*	USER	
DTCICKTNO	0-19		*DTCICKTNO*	0-19	
DTCICKTTS	1-24		*DTCICKTTS*	1-24	
DCHRATE	64K or 56K		*DCHRATE*	64K or 56K	
HDLCTYPE	HDLC or INVHDLC		*HDLCTYPE*	HDLC or INVHDLC	
	TRKMEM			**TRKMEM**	
EXTTRKMEM	0-9999		*EXTTRKMEM*	0-9999	
DTCCKTSS	1-24		*DTCCKTSS*	1-24	

Note:
Refer to MSL-100 datafill,
PRI datafill dependencies
for required consistencies
in the PRI interface.

KEY
Prompts appear in
italics; defaults appear
in **boldface.**

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Bearer services datafill considerations

BC screening makes sure that the switch connects calls only between
compatible terminals. Datafill tables BCDEF, BCCOMPAT, KSETFEAT,
and LTDEF to provide the necessary BC parameters:

- Table BCDEF defines the different BCs available.

- Table BCCOMPAT defines what BCs are compatible with one
  another.

- Table KSETFEAT associates the call (by terminal type) with the
  bearer capability desired.

• Table LTDEF (for the LTID OPTIONS) defines which BCs can terminate on a specific PRI trunk group.

You must datafill these tables for basic call service to work correctly.

Datafill presentation

The following datafill tables show example tuples at the end of a table. An example that is one continuous record appears on more than one line due to space limitations. The tables do not show all fields; they only show those fields relevant to bearer services. You can alter the datafill for the bearer service tables if required, with the following exceptions:

• You cannot delete BCs mapped to themselves in table BCCOMPAT.

• To change a BC of a device in table KSETFEAT, you must enter the BC name as defined in table BCDEF in the OPTIONS field. If you do not use the BC OPTIONS, the switches uses a default BC.

Note: All non-ISDN sets (500/2500 sets, EBSs, and ACs) are assumed to have SPEECH BC.

Default BC summary

Table 49 summarizes the default values associated with tables BCDEF, BCCOMPAT, and KSETFEAT. Table 43 on page 74 describes the OPTIONS field in table LTDEF.

Table 49
Meridian SL-100 default Bearer Capability summary

Device	Encoded BC	Compatible incoming BC
500/2500	Speech	Speech/3_1KHZ
P-phone	Speech	Speech/3_1KHZ
Attendant	Speech	Speech/3_1KHZ
ADM/SADM/DTI	56K Data	56K Data
HSDU	56K/64K Data	56K/64K Data [Note 1]
LSDU	19.2K Data	19.2K Data
DTI/TRK	Speech	Speech/3_1KHZ
Modem Phone	3_1KHZ	3_1KHZ [Note 2]
ISDN BRAKS	Speech	Speech/3_1KHZ

Table 49
Meridian SL-100 default Bearer Capability summary (Continued)

Device	Encoded BC	Compatible incoming BC
ISDN BRAKS	56K/64K Data	56K/64K Data [Note 3]
Note 1: Although the BC for data units is sent out as 56K in the call processing messages, this BC can accommodate 56K or 64K data rates. If 64K is to be used, datafill table KSETLINE for 64KDATA.		
Note 2: An ISDNKSET is BC datafilled as 3_1KHZ.		
Note 3: You must datafill 56KDATA or 64KDATA in table KSETFEAT for an ISDN BRAKS.		

Bearer services datafill sequence

Table 50 shows the datafill sequence for the bearer service tables. Datafill table LTDEF, field OPTIONS, as part of the service tables datafill sequence. You must datafill table BCDEF, before table BCCOMPAT.

Table 50
Meridian SL-100 BC datafill sequence

Step	Description	Initial install	Add a trunk member	Add DS-1 span	Add a C-side link
1. BCDEF	Define the available BCs.	✔			
2. BCCOMPAT	Define what BCs are compatible with one another.	✔			
3. KSETFEAT	Assign a bearer capability to the terminal type.	✔			

BCDEF table

Table BCDEF contains five default bearer capabilities that are available for PRI, datafilled as follows in Table 51. One of these values defines the BC for the line or logical terminal. If the switch receives a BC other than these five, it rejects the call.

Table 51
Table BCDEF default BC compatibility

Field	Default BC for PRI (See Note)				
BCNAME	Speech	64K Data	64K REST	56K Data	3_1KHZ
XFERCAP	Speech	UNRESDIG	RESDIG	UNRESDIG	3_1KHZ
XFERMODE	Circuit	Circuit	Circuit	Circuit	Circuit
CODINGST	CCITT	CCITT	CCITT	NETWORK	CCITT

Table 51
Table BCDEF default BC compatibility (Continued)

Field	Default BC for PRI (See Note)				
PROTOTYP				DTU	
PROTOCOL				NONE	
SYNC				Y	
DATARATE				56 Kbps	
DISCRIM					
Note: Blank fields indicate that particular parameter does not apply (there are no prompts for those fields).					

If it is necessary to change this table, Table 52 shows the fields you can datafill. You must define this table, before defining table BCCOMPAT.

Table 52
Table BCDEF summary

Field	Entry	Description	Requirements	Comments
BCNAME	alphanumeric (up to 7 characters)	Bearer capability name.		Define a maximum of 59 BCs.
BCDATA		Equals subfields XFERCAP + XFERMODE + CODINGST.		
XFERCAP	SPEECH UNRESDIG RESDIG	The type of data being transmitted: SPEECH is for voice calls, UNRESDIG is for packet mode calls, and RESDIG is for 56 Kbps data calls.		
XFERMODE	CIRCUIT, NETWORK	The coding standard for BC: CCITT or a network-specific coding standard.		
CODINGST	CCITT, NETWORK	The coding standard for BC: CCITT or a network-specific coding standard.		This selector determines what other fields you require.
When CODINGST = NETWORK, you require the following fields:				
PROTOTYP	MODEM, DTU, OTHER	The physical device at the endpoint determines the protocol used.		

Table 52
Table BCDEF summary (Continued)

Field	Entry	Description	Requirements	Comments
When PROTOTYP = MODEM, you require the following fields:				
MODEMPRO	alphanumeric	Identify the modem protocol.	You must define the name used in table MODEMPRO.	
MODEMSNC	Y or N	Synchronous (Y) or async (N) communications.		
MODEMRTE	75BS, 150BS, 300BS, 600BS, 1200BS, 2400BS, 3600BS, 4800BS, 7200BS, 8KBS, 9600BS, 14400BS, 16KBS, 19200BS, 32KBS, 48KBS, 56KBS, AUTO	Modem data rate.		
When PROTOTYP = DTU, you require the following fields:				
DTUPRO	alphanumeric	Protocol name.	Must define in table DTUPRO.	
DTUSYNC	Y or N	Synchronous (Y) or async (N) communications.		
DTURATE	75BS, 150BS, 300BS, 600BS, 1200BS, 2400BS, 3600BS, 4800BS, 7200BS, 8KBS, 9600BS, 14400BS, 16KBS, 19200BS, 32KBS, 48KBS, 56KBS, AUTO	Modem data rate.		
When PROTOTYP = OTHER, you require the following field:				

Table 52
Table BCDEF summary (Continued)

Field	Entry	Description	Requirements	Comments
DISCRIM	0-63	Identifies OTHER devices.		
Example: *SPEECH SPEECH CIRCUIT CCITT64KDATA UNRESDIG CIRCUIT CCITT3_1KHZ SPEECH CIRCUIT CCITTDATAUNIT RESDIG CIRCUIT NETWORK DTU TLINK YAUTO*				

BCCOMPAT table

Table BCCOMPAT controls the mapping of BC compatibilities. This table shows the mapping of default BCs provided in table BCDEF. Other BC pairs are mapped, provided you first define them in table BCDEF. Table 53 is an example of table BCCOMPAT.

Note: These tuples are entered at load build time. You can map a maximum of 3906 BC pairs.

Table 53
Table BCCOMPAT summary

Field	Entry	Description	Requirements	Comments
KEY		= subfields CALLBC and TERMBC		Used to define compatible combinations. By default, any bearer capability is compatible with itself – no tuples need to be entered. For bi-directional compatibility, you must define two tuples.
CALLBC		BC name	Must define in BCDEF.	
TERMBC		BC name	Must define in BCDEF.	
Example: *64KRES DATAUNITDATAUNIT 64KRES*				

KSETFEAT table

You configure the BC feature in table KSETFEAT. This table lists the line features assigned to the business sets, data units, and ISDN terminals listed in the KSETLINE table as follows:

- All non-ISDN sets (500/2500 sets, EBSs, and ACs) are assumed to have SPEECH BC.

- SPEECH is used if a data terminal is attached to a terminal adapter.

- ISDN terminals require a BC, because they have the ability to screen incoming calls on the basis of information sent to them by the network. ISDN terminals use the BC assigned to that LTID in table LTDEF.

To change the BC assigned to a terminal in KSETFEAT, select the BC feature and enter the BC name (as defined in table BCDEF). If you do not define the BC, the switch uses a default BC. Table 54 is an example of table KSETFEAT.

Table 54
Table KSETFEAT summary

Field	Entry	Description	Comments
FEATKEY	Equals subfields LTGRP + LTNUM + KEY + FEAT.		
LTGRP		Logical terminal group.	
LTNUM		Logical terminal number.	
KEY	1-69	Enter the number associated with the DN appearance to which the feature is being assigned.	M2317 telephones use only keys 1-11.
FEAT	BC	Selects BC option.	
KVAR		Equals subfield FEAT + BCNAME.	
FEATURE	BC	Enter BC feature.	
BCNAME	SPEECH 64KDATA 56KDATA DATAUNIT 3_1KHZ 64KRES	The bearer capability associated with this line or LTID.	The 64KX25 BC does not apply to basic call.
Example: *ISDN 555 8 BC 64KDATA*			

ESN TCOS to NCOS mapping

shows the datafill used for TCOS compatibility between two Meridian SL-100s. Datafill these parameters in table COSDATA as follows:

- Mapping TCOS to NCOS is one-to-one (for example, the 0-255 NCOSs are mapped one-to-one to 0-7 TCOSs).

- Mapping NCOS to TCOS involves an algorithm that transforms the TCOS value to a number between 0 and 7 for all NCOSs over 7.

Table 55
TCOS to NCOS mapping

COSNAME	NCOS	TCOS
ETN	0	0
ETN	1	1
ETN	2	2
ETN	3	3
ETN	4	4
ETN	5	5
ETN	6	6
ETN	7	7
ETN	8	0
ETN	9	1
... and so on		

Operational measurements (OMs)

DS1CARR OMs

The DS1CARR OMs monitor the performance of DS-1 lines for each carrier. This OM group replaces the CARR OM group. Provisioning for the registers in the DS1CARR group is per DS-1 carrier.

Note: These OMs correspond to layer 1 (physical layer) in the open systems interconnection (OSI) model.

Table 56 shows the OM pegs that the switch accumulates for each DS-1 carrier for 24 hours and resets when DS1LOF and DS1SLP are reset.

Table 56
DS-1 OM pegs

Peg	Description
DS1OMINFO	Key to digital carrier equipment table.
DS1LCGA	DS-1 local carrier group alarm.
DS1RCGA	DS-1 remote carrier group alarm.
DS1BER	DS-1 bit error rate maintenance or out-of-service limit exceeded.

Table 56
DS-1 OM pegs (Continued)

Peg	Description
DS1LOF	DS-1 framing lost on the incoming side.
DS1SLP	DS-1 frame slip.
DS1SBU	DS-1 carrier busied out by the system-originated commands.
DS1MBU	DS-1 carrier busied out by commands from the MAP terminal.
DS1CBU	DS-1 carrier in CSBY state (DTCI out of service).
DS1PBU	DS-1 carriers in PSBY state.
DS1BER	DS-1 bit error ratio (replaces DS1BPV).
DS1ES	DS-1 error second.
DS1SES	DS-1 sever error second.
DS1UAS	DS-1 unavailable second.

DCH OMs

The PRADCHL2 group contains the OMs for the D-channel signaling link (layer 2 protocol). The switch pegs this OM group in the DTCI and collects it from the PM just before the OM transfer from the active to the holding registers.

Note: These OMs correspond to layer 2 (link layer) in the OSI model.

Table 57 shows the PRADCHL2.

Table 57
DCH OM pegs

Peg	Description
PRDDISCT	Count of discarded transmit frames accumulated during one minute.
PRDS0RX	Count of successfully received SAPI 0 (circuit-switched data) frames accumulated over one minute.
PRDRNRRX	Count of RNR (receiver not ready) frames received from peer accumulated over one minute.
PRDCRC	Count of frames received with CRC (cyclic redundancy check) errors accumulated over one minute.
PRDSBMTX	Count of link resets caused by ISP accumulated over one minute.

Table 57
DCH OM pegs (Continued)

Peg	Description
PRDREJTX	Count of REJ (reject) frames transmitted by ISP.
PRDDISCR	Count of received frames discarded due to other errors accumulated over one minute.
PRDSBMRX	Count of link resets caused by peer accumulated over one minute.
PRDS0TX	Count of successfully transmitted SAPI 0 (circuit-switched data) frames accumulated over one minute.
PRDRNRTX	Count of RNR (receiver not ready) frames transmitted by ISD to peer accumulated over one minute.

TRK OMs

TRK OMs monitor call processing performance of the trunk group. Provisioning for the registers in the TRK group is for each trunk group.

Note: These OMs correspond to layer 3 (network layer) in the OSI model.

Table 58 shows the OM pegs the switch accumulates over 24 hours and resets when DS1LOF and DS1SLP are reset.

Table 58
TRK OM pegs

Peg	Description
OM2TRKINFO	Trunk information fields: direction; total circuits; and working circuits.
INCATOT	Incoming seizures.
PRERTEAB	Abandoned incoming call attempts.
INFAIL	Call origination attempts terminated unsuccessfully.
NATTMPT	Calls routed to this trunk group.
NOVFLATB	Call processing overflows.
GLARE	Dropped calls due to glare.
OUTFAIL	Unsuccessful outgoing seizures.
DEFLDCA	Routed calls prevented from using this trunk group by network management.
DREU	Directional reservation activated.

Table 58
TRK OM pegs (Continued)

Peg	Description
PREU	Protective reservation activated.
TRU	Trunks found in tk_cp_busy, tk_cp_busy_deload, and tk_lockout.
SBU	Trunks found in tk_remote_busy, tk_pm_busy, tk_system busy, tk_carrier_fail, tk_seized, and tk_nwm_busy.
MBU	Trunks found to be in tk_man_busy, tk_seized, and tk_nwm_busy.
OUTMTCHF	Incoming calls initially routed to an outgoing trunk group.
CONNECT	Outgoing seizures resulting in successful calls.
TANDEM	Incoming calls initially routed to an outgoing trunk group.
AOF	Incoming ANI failures (does not apply to PRI trunks).
TOTU	Sum of TRU, SBU, and MBU counts.

Treatment OMs

Treatment OMs monitor trunk group call processing performance. The switch routes treatments to the originating PRI with the cause value in a DISC message. The system accumulates peg counts according to the following five groups:

- customer unauthorized (CU)
- customer misc. (CM)
- equipment related (ER)
- feature related (FR)
- resource shortage (RS)

The switch maps the treatments to these groups as follows (important items are in italics):

- Customer unauthorized: ADBF, ANBB, ANIA, CACE, CCNA, CCNV, CNDT, CNOT, D950, DACD, DCFC, *DNTR*, DODT, FDNZ, *FNAL*, HNPI, ILRS, INAC, INAU, INCC, IVCC, LCAB, MSCA, MSLC, N950, NACD, *NACK*, NOCN, ORSSRSDT, TDND, TESS, TINV, UMOB, UNCA, UNIN, UNOW, UNPR
- Customer misc.: ANCT, ANTO, ATBS, ATADT, BLDN, BLPR, CFWV, DISC, OPRT, *PDIL*, *PSIG*, TDBR, TRBL, UNDN, UNDT, VACS, *VACT*, VCCT

- Equipment related: AIFL, *CONP*, ERDS, FDER, INOC, NCFL, NCUN, NMZN, NONT, PNOH, PTOF, RODR, SSTO, STOB, STOC, SYFL

- Feature related: *BUSY*, CCTO, CONF, MANL, MHLD, NCII, NCIX, NCTF, NINT, ORAC, ORAF, ORMC, ORMF, PGTO, PMPT, PRSC, RRPA, SRRR, TRRF

- Resource shortage: CGRO, CQOV, EMR1, EMR2, EMR3, EMR4, EMR5, EMR6, FECG, GNCT, *NBLH*, NBLN, *NCRT*, NECG, *NOSC*, NOSR, SORD, TOVD

Basic call OMs

BCS 30 does not provide any OMs specific to basic call service. Use the trunk OMs to monitor call processing performance of the trunk group. There are no other applicable PRI OMs.

Logs

Table 59 lists the Meridian SL-100 system logs that apply to DS-1 carriers.

Table 59
Meridian SL-100 system logs

Report ID	Alarm info	Event type	Event ID	Equip type	Equip ID
PM109	No change	SYSB Generated when SYSB due to loss of sync, remote alarms, or DS-1 card is removed.	CARRIERCARRIER_NO:line_#REASON:char_string	pmtype	pmnbr
PM110	NOALARM	INFO Generated when BPV or SLIP, MTCE, or OOS limits are set or cleared, or when the DS-1 card fails maintenance or is replaced.	CARRIERCARRIER_NO:line_#REASON:char_string	pmtype	pmnbr
PM111	NOALARM	INFO Generated when a system-busy carrier is returned to service.	CARRIERCARRIER_NO:line_#REASON:char_string	pmtype	pmnbr

Table 59
Meridian SL-100 system logs (Continued)

Report ID	Alarm info	Event type	Event ID	Equip type	Equip ID
PM112	NOALARM	INFO Generated when a carrier slip counter is initialized.	CARRIER_SLIP_INIT	pmtype	pmnbr
PM186	NOALARM	INFO Generated as a general information log for carriers.	CARRIERCARRIER_NO:line_# REASON:char_string optchar_string	pmtype	pmnbr

Maintenance

Maintenance for the DTCI is the same as for the DTC. For successful call processing on the Meridian SL-100:

- The carrier must be in service (INSV).
- The PRI trunk must be in service (IDL).
- The calling and called lines must be in service (IDL).

DS-1 carrier alarms/display

Table 60 lists DS-1 carrier alarms that the MAP terminal displays in the CARRIER level. To access the carrier level of the MAP terminal, use the following command: *MAPCI;MTC;TRKS;CARRIER*.

Alarms are either visual or audible. The system provides automatic detection and recovery for most faults. If the system recovers, it cancels the alarm and enters the event into the system log. The occurrence of errors is controlled by limits you enter in table CARRMTC.

Table 60
Meridian SL-100 DS-1 carrier alarms/display

Message	Effects	Remedy
RCGA remote carrier group alarm (yellow alarm) FAR END RESULT	Indicates remote alarm detection in receive path. The switch increments the yellow alarm counter by 1 for every 10 secs of remote alarm. When the counter reaches 34, it no longer increments the counter and removes the trunk from service.	Check the far end.

Table 60
Meridian SL-100 DS-1 carrier alarms/display (Continued)

Message	Effects	Remedy
LCGA local carrier group alarm (red alarm) NEAR END FAULT	Indicates a DS-1 card or transmission fault for transmit path. The switch removes the DS-1 from service and sends a remote alarm pattern to far end.	1. Make sure that transmission parameters are correctly set at both ends. See correlation tables. 2. Run a loopback test. 3. Run a continuity test.
BER approximated bit error rate DS-1 DISPLAY	The switch increments the counter for every 1K-bit errors for each day. For ESF, the switch reports both BPV and CRC errors.	Alter alarm settings by changing table CARRMTC.
FRME Frame loss error	The switch increments the counter for every 1K bit errors for each day. If frame loss continues for 3 secs or more, the switch removes the trunk from service. The switch restores it automatically when it receives frame sync continuously for 15 secs.	Alter alarm settings by changing table CARRMTC.
SLIP frame slip (clock sync) error DS-1 DISPLAY	The switch increments the counter for each frame slip per day.	Alter alarm settings by changing table CARRMTC.
ES errored seconds DS-1 DISPLAY		Alter alarm settings by changing table CARRMTC.
SES Severe errored seconds		Alter alarm settings by changing table CARRMTC.
UAS unavailable seconds		
State carrier state	Shows INSV, MANB, SYSB, UNEQ (trunks off-line)	

DTCI commands

provides the maintenance commands for the DTCI. This is the same set of commands as those used for the DTC. Use the following MAP command to enter the DTCI level of the MAP terminal: *MAPCI;MTC;PM;POST DTCI xx*

Table 61
DTCI MAP commands

Command	Function
POST	Places the specified DTCI in the command position of the MAP terminal.
LISTSET	Displays the current or all PMs in the post set.
TRNSL	Displays the status, message condition, and capability of the C- or P-side links.
TST	Performs a controller self-diagnostic.
BSY	Busies the DTCI, one unit, or P-side link.
RTS	Returns to service the DTCI, one unit, or P-side link.
OFFLINE	Puts DTCI node off-line (both DTCI must be in MANB first) [(see Note)].
LOADPM	Loads both units.
DISPLAY	Displays the PM types and numbers associated with a particular state.
NEXT	Puts the next PM type in the posted set in the MAP terminal command position.
QUERYPM	Displays the equipment location, load information, and the status of the DTCI.
QUERYPM FLT	Displays the fault (if any) for each unit of the DTCI.
QUERYPM CNTRS	Displays the name of the load for the DTCI.
SWACT	Causes an activity switch to the inactive unit of the DTCI.
Note: An off-line DTCI remains in this state over all restarts.	

DS-1 carrier commands
The carrier level performs all maintenance for PRI (DTCI) DS-1s. To access the carrier level of the MAP terminal, use the following command: *MAPCI;MTC;TRKS;CARRIER;POST DTCI xx*

The display option command displays the carrier options for the posted circuit, such as card code, options, and alarm thresholds. A carrier is looped toward the near (1) or far end (r) by using the following command. The loop is cleared using the (c) option: *LOOP n <l/c/r>*

D- and B-channel commands

Although the PRADCH is designed mainly for D-channel maintenance, the system also uses it for PRI B-channel maintenance (except for commands CONT and LOOPBK).

> *Note:* The system clears the control and post position displays when exiting the PRADCH level.

Use the following MAP command to enter the PRADCH level of the MAP terminal: *MAPCI;MTC;TRKS;TTP;PRADCH*

> *Note:* You cannot post the D-channel at the trunk test position (TTP) level of the MAP terminal. You must post it from the PRADCH level under the TTP level. Post a B-channel at the TTP, MANUAL, MONITOR, or PRADCH level of the MAP terminal.

Table 62 lists the Meridian SL-100 system PRADCH maintenance commands.

Table 62
Meridian SL-100 PRADCH maintenance commands

Command	Function
POST	Post one or more DS-1 circuits for maintenance. The options supported are: *GD*<CCLI> (post by group – use D-channel CLLI),*BD*<CCLI> (post D and B-channels),*D DTCI*<DTCI#> (post by PM>*D DTCI*<DTCI# CKT> (post by circuit#)*D DTCI*<DTCI# CKT TS> (post by circuit and timeslot)*T*<CLLI> <MEM> (post by trunk member – for B-channels only). The STA (State) field shows the state of the D-channel.
BSY	Busy out a circuit or put a circuit in the INB state using BSY INB.
RTS	Return the specific channel to service [see Note].
NEXT	Put the next circuit in the post set in control position.
CONT	Run a continuity test on the posted PRI D-channel (internal or external).
LOOPBK	Set loopback mode so that the far end is able to run an external continuity test.
HOLD	Place circuit in the hold position.
Note: If the DCH is INB, put the DCH in MB state with BSY, before RTS.	

DTCI states

Table 63 lists the possible states for the DTCI. Note that each unit of the DTCI has a separate state and both units can be in the same state. For the states OFFL and CBSY, both units are always in the same state.

Table 63
Meridian SL-100 DTCI states

State	Description
CBSY	Both message links to network are out of service.
INSV	PM is in-service with no problems.
ISTB	One or both units installation busy. PM overloaded. PM load name does not match load name in LTCINV. Static data mismatch. CSlinks out of service. Node redundancy lost. Major CSlink failure. Critical CSlink failure. WARM SWACT turned off. Warm SWACT not OK.
MANB	Service engineer has busied the PM.
OFFL	PM is off-line (software state).
SYSB	System busy during CC initialization. Diagnostics failed. All C-side links are down. Reset while in-service. Trap message received from PM. Autonomous activity drop. Unsolicited messages limit exceeded. Self-test failed. PM audit detect fault. Inactive unit lost data sync. REX in progress. REX failed. RTS failed. PM SWACTCS cleared RTS. Audit detected inconsistent PM activity. Audit detected inconsistent PM state. No response from XPM during audit. Require data load. RTS rippling from C-side messaging fail. Reset limit exceeded. ESA translation data downloading failed. Data message threshold exceeded. SWER message threshold exceeded. Fault msg threshold exceeded. Load corruption suspected. Data corruption suspected/detected. Incoming message overload condition.
MANB	Manual busy. DS-1 removed from service by engineer for maintenance.
INSV	DS-1 is in service; no alarms present.
OFFL	The DS-1 is off-line.
SYSB	The DS-1 is system busy from a remote or local alarm.
UNEQ	The p-side port for the DTCI is unequipped (no datafill exists in table LTCPSINV). Any trunks datafilled for that facility are off-line.

DS-1 carrier states

Table 64 lists the possible states for the DS-1 carrier.

Table 64
Meridian SL-100 DS-1 carrier states

State	Description
MANB	Manual busy. DS-1 removed from service by engineer for maintenance.
INSV	DS-1 is in service; no alarms present.
OFFL	The DS-1 is off-line.
SYSB	The DS-1 is system busy from a remote or local alarm.
UNEQ	The p-side port for the DTCI is unequipped (no datafill exists in table LTCPSINV); any trunks datafilled for that facility are off-line.

D-channel states

Table 65 lists the possible states for the D-channels.

Table 65
Meridian SL-100 D-channel states

State	Description
CFL	Carrier fail – the carrier is out of service or SYSB.
INB	Installation busy – D-channel is configured in datafill, but is not in service.
INSV	D-channel is in service and available.
LO	Lockout – link level (layer 2) or physical level (layer 1) failure.
MANB	Manual busy – D-channel removed from service at the MAP terminal.
PMB	Peripheral is MANB.
RNR	Remote not responding – the link is established and ready, but the far end is not responding to PRI messages.

B-channel states

Table 66 lists the possible states for the B-channels.

Table 66
Meridian SL-100 B-channel states

State	Description
CFL	Carrier failed – associated DS-1 failure.
CPB	Call processing busy – currently carrying traffic (service busy).
CPD	Call processing deload – circuit carrying traffic, but another entity, such as MTCE, has requested to be informed when CP releases circuit.
DEL	Deload – CPD circuit is now available.
DFL	D-channel fail – the D-channel is not in service so no signaling for B-channels can take place.
DMB	D-channel manually busy – the D-channel is MB.
IDL	Circuit in service and available; D-channel is in service.
INB	Installation busy – circuit is installed, but not yet in service.
INI	Initialized – CPB circuits are initialized after a system restart.
LO	Local failure of a circuit (no response from far end for this circuit).
MB	Manual busy – circuit removed from service by service engineer for maintenance.
NEQ	Not equipped – circuit hardware not provided.
PMB	Peripheral manual busy – the associated DTCI is out of service.
RMB	Remote manual busy – trunk for incoming calls removed from service by far end.
SB	System busy – circuit removed from service by system maintenance.
SZD	Seized – circuit is seized for manual or system action.

Tests

lists the tests for verifying network operation at the trunk or link level.

Be sure to BSY the PM at the DTCI level of the MAP terminal before running the tests.

Table 67
Tests for verifying network operation

Test	Description	Procedure
DTCI diagnostic	Performs a self-test on the DTCI PM.	1. Enter the DTCI level of the MAP terminal. 2. Enter *TST* to test the posted DTCI. 3. The switch generates card list if the diagnostic fails. 4. If test fails, check the PM logs for additional information.
Internal continuity test	Verifies D-channel operation at the node level.	1. Enter the PRADCH level of the MAP terminal. 2. Enter *POST GD* to identify the DCH. 3. Enter *CONT INT* to start testing.
External continuity test	Verifies D-channel continuity to the far end and back. The loopback at the far end must be set at the far end.	1. Enter the PRADCH level of the MAP terminal. 2. Enter *POST GD* to identify the DCH. 3. Contact the far end to make sure loopback mode is set using the *LOOPBACK SET* command. 4. Enter *CONT EXT* to start testing. 5. Make sure that the far end removes loopback mode with the *LOOPBACK TAKEDOWN* command.

TRAVER enhancements

TRAVER is enhanced to include additional translation tables accessed by PRI call processing. These enhancements do not affect translations for non-PRI trunks.

The TRAVER command line format is changed as follows: traver <ORIG> <NPI> <DIGITS> <OPT> <TRACE>

The new fields NPI and OPT are optionally added for PRI. Use these fields for calls originating on a PRI trunk. These fields do not affect any other type of trunk agency even if they are entered. The information contained in the OPT field is:

- NSF (optional)

- BC (optional)

This information, supplied in the PRI call setup message, enables the translation path for PRI.

Troubleshooting

Table 68 provides troubleshooting procedures for common problems.

Table 68
Troubleshooting procedures

Symptom	Procedure
The DCH is locked out (LO).	Verify the data rate in table TRKSGRP matches that of the far end.
	Verify the IFCLASS in table TRKSGRP. If connected to another DMS-250, the endpoints of the local connection should have opposite values. Otherwise, the DMS-1 = 250 is always NETWORK.
	Verify that the appropriate NT6X50 is in the DS-1 and correctly datafilled in table CARRMTC.
	Verify the correlation of the transmission characteristics for the link: frame format and line encoding, for example.
	Use the protocol analyzer to verify frame synchronization.
When FF = ESF, a yellow alarm indicates that no yellow alarm is being transmitted from the far end.	Put the carrier back into SF format.
	Make sure the far end is not transmitting yellow alarms and wait for the LCGA to clear.
	Return the carrier to ESF format.

Integrated Services Access

Purpose

This chapter describes Integrated Services Access (ISA) over PRI. The chapter provides ISA configuration steps for the Meridian 1, Meridian SL-100, and DMS families.

This chapter contains the following sections:

- **ISA on the Meridian 1** – shows how to configure ISA on the Meridian 1.

- **ISA on the Meridian SL-100** – shows how to configure ISA on the Meridian SL-100.

ISA on the Meridian 1

ISA gives the Meridian 1 the ability to combine calls of different types on a single DS-1 link. The available call types include terminal interface equipment (TIE), foreign exchange (FX), direct inward dialing (DID), inward wide area telephone service (INWATS), and outward wide area telephone service (OUTWATS). This allows dynamic call-by-call service selection and provides the capability to match trunk requirements to peak call usage periods.

Figure 12 shows an example of ISA on PRI for the Meridian 1.

Figure 12
Meridian 1 Integrated Services Access on PRI
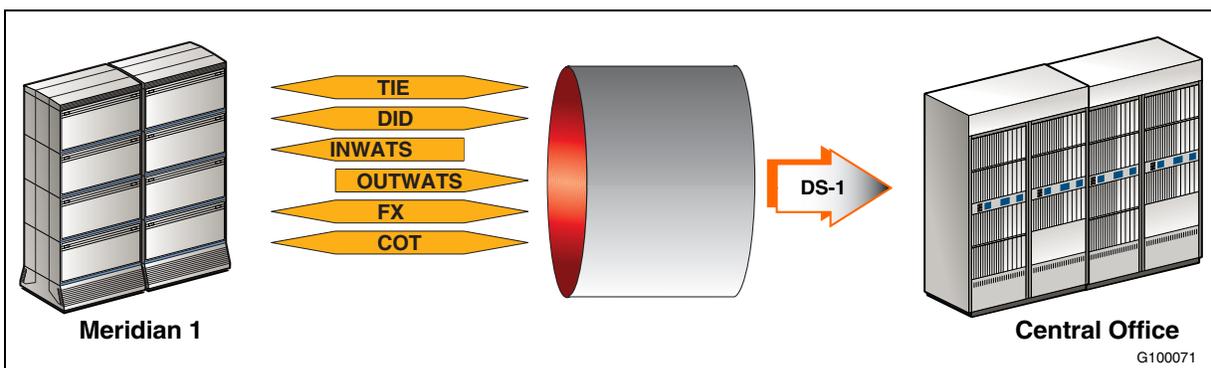
Figure 13 shows how PRI B-channels can be adjusted to allow a telemarketer more DID calls than Central Office Trunk (COT).

Figure 13
Varying Meridian 1 B-channel assignments by call type
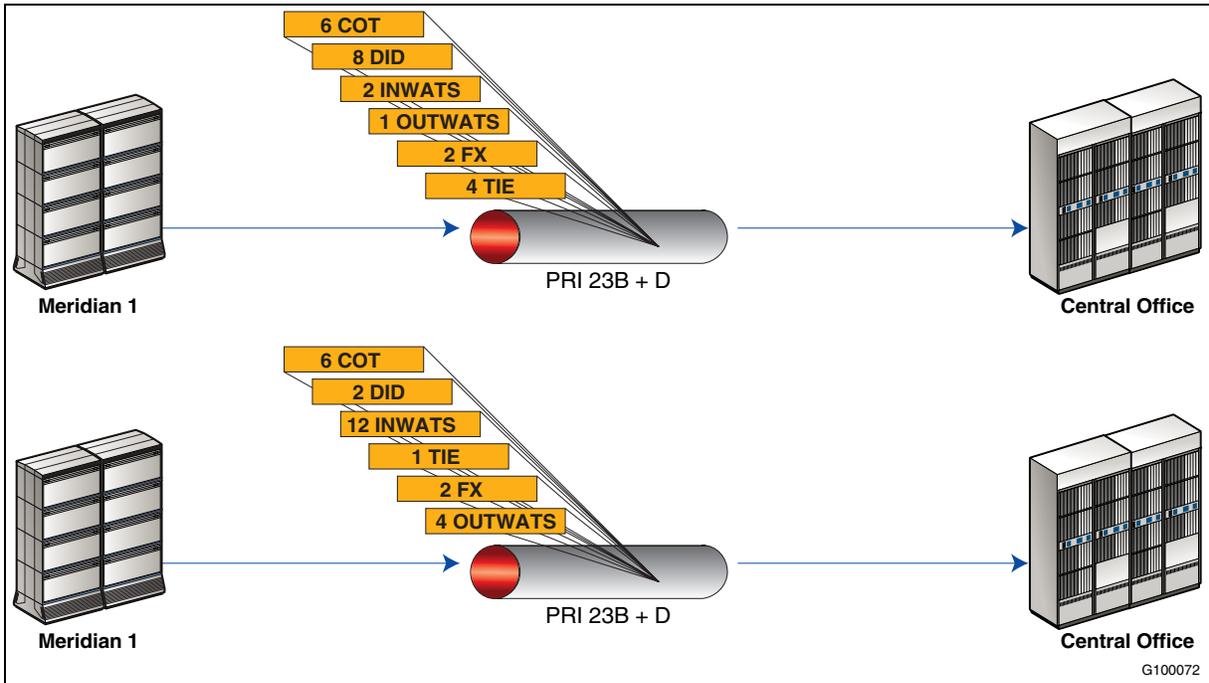
The Meridian 1 makes the selection of call type on a per-call basis, which provides a service-based architecture. The system sends a SETUP message with each ISA call. This message includes information elements which the Meridian 1 uses to determine call type. The Meridian 1 accomplishes control of ISA features through existing overlays (that is, LDs).

The ISA feature provides control over trunk usage based on call type. For example, a user can define the following:

- the maximum and minimum number of simultaneous calls of each type allowed on a PRI trunk

- the total number of calls allowed for each service route

- the number of B-channels reserved for ISA use

The Meridian 1 creates ISA routes through service changes in LD16. An ISA route contains a list of PRI B-channels that are available for use.

Routing of ISA calls is controlled by one of two methods:

- Central office (CO) control performs alternate route selection (ARS) on all calls across the PRI interface. You set up routing tables in the CO by using service orders. The Meridian 1 collects dialed digits only. The CO performs actual translation and routing.

- Shared, or co-located control, requires routing and translation data to be stored at both the CO and the Meridian 1. In this case, the Meridian 1 retains control of the routing for leased trunk facilities residing at the CO.

The Meridian 1 provides ISA over the PRI between the following switches:

- Meridian 1 to Meridian SL-100
- Meridian 1 to DMS-100
- Meridian 1 to DMS-250
- Meridian 1 to AT&T #4ESS (call-by-call service)
- Meridian 1 to Lucent #5ESS (call-by-call service)

ISA between Meridian 1s is not supported.

When a Meridian SL-100 is serving as a local exchange carrier (Class 5 central office), the Meridian 1 provides ISA selection of the following trunks on a per-call basis:

- TIE
- FX
- DID
- DOD
- COT
- OUTWATS
- INWATS

Hardware provisioning

You must provision the Meridian 1 for PRI. There are no special hardware rules or requirements for ISA on the Meridian 1.

Software provisioning

NI-2 ISA (call-by-call) requires Release 23.

The Meridian 1 requires Release 15 and the following options for ISA:

- SW0000X: Base package (old Option 75, PBXI)
- SW0051X: ISDN PRI (old Option 145, ISDN, 146, PRI, 147, ISL, 291, NI-2)
- SW0053X: interexchange carrier (old Option 149, IEC, 117, CBC)

Note: The Meridian SL-100 and DMS require BCS 30 or later for ISA connectivity to the Meridian 1.

Datafill considerations

Prior to datafilling the Meridian 1 for ISA, you must configure all appropriate PRI-related LDs. Define existing PRI routes as ISA routes by performing the Procedure 1.

Procedure 1
Define PRI routes as ISA routes

1   Define an ISA route in LD16.

2   Configure ISA trunks in LD14.

3   Configure all the service routes (FX, TIE, INWATS, OUTWATS, COT, DID) in LD16.

Assign an ISA route number to each service route. Be sure the route does not have any dedicated trunk members. You cannot allocate a B-channel trunk as a service route.

Record the service identification number of each route, and coordinate routing tables with the local CO. The Meridian 1 uses the service ID to route incoming calls.

Define the minimum and maximum number of simultaneous calls allowed for each type of service route. Minimum/maximum values apply only when network specific facilities (NSF) = YES. The total minimum value of each service route cannot exceed the total number of ISA trunks you define in LD14. For example, if you define 15 ISA trunks in LD14, the minimum number of call types guaranteed completion cannot exceed 15.

Note: The IFC of a service route and its ISA route must match.

This procedure is now complete

Figure 14
Creating and defining Meridian 1 PBX ISA routes
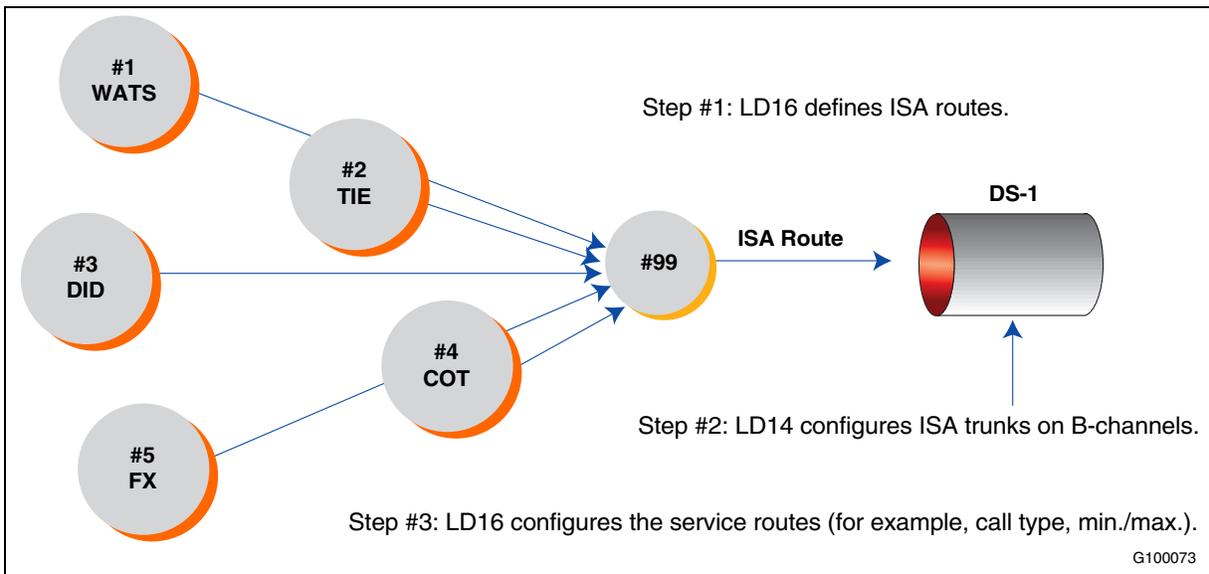
The following tables show how to set up ISA on the Meridian 1. Default values appear in brackets.

Table 69
Step 1: LD16 – Create a Meridian 1 ISA route

Prompt	Range	Description
PNI	1-32700	Private number identifier – one per customer. Use the same PNI in both the customer data block (LD15) and route data block (LD16).
IFC	[D100] ESS4 ESS5 Meridian 1 D250	DMS-100. AT&T #4ESS. Lucent #5ESS. Meridian 1 (to Meridian 1). DMS-250.
... SRVC		
NSF	[NO], YES	Network specific facility – prompted if IFC is anything other than Meridian 1. If NSF is YES, min./max. is valid.
COTR	nnn	DID/CO route number – prompted if IFC is anything other than Meridian 1. If NSF is YES, min./max. is valid.
TIER	nnn	TIE route number – prompted if IFC is anything other than Meridian 1. If NSF is YES, min./max. is valid.
WATR	nnn	WATS route number – prompted if IFC is anything other than Meridian 1. If NSF is YES, min./max. is valid.

Table 69
Step 1: LD16 – Create a Meridian 1 ISA route (Continued)

Prompt	Range	Description
ICOG	IAO ICT OGT	Incoming and outgoing trunk. Incoming trunk. Outgoing trunk.
SRCH	[LIN] RRB	LIN – linear search. RRB – round-robin search (use for outgoing trunks).
Note: The IFC of an ISA route and its associated service route must match.		

Table 70
Step 2: LD14 – Create a Meridian 1 ISA trunk

Prompt	Range	Description
REQ	NEW, CHG, MOV, OUT	ISA trunk type.
TYPE	ISA	Integrated Services Access.
TN	lll ch: 0-159 1-24	Terminal number – address loop number created in LD17. PRI loop number. PRI channel.
TOTN	lll ch: 0-159 1-24	New loop and channel. PRI loop number. PRI channel.
CUST	xx	Customer number.
RTMB	0-511, 1-254	Route and member numbers.

Table 71
Step 3: LD14 – Configure a Meridian 1 ISA service route

Prompt	Range	Description
REQ	NEW, CHG, OUT	Add, change, or remove.
TYPE	RDB	Route data block.
CUST	0-99	Customer number.
ROUT	0-511	Route number.
TKTP	TIE DID INWATS OUTWATS COT FX	Types of ISDN service routes: TIE trunk. Direct inward dialing. Inbound WATS. Outbound WATS. Central office trunk. Foreign exchange.
DTRK	YES, [NO]	Digital trunk.

Table 71
Step 3: LD14 – Configure a Meridian 1 ISA service route (Continued)

Prompt	Range	Description
DGTP	PRI	Digital trunk type.
ISDN	[NO], YES	ISDN option.
MODE	PRA	PRA network-side route for ISA.
IFC	[D100] ESS4 SL-1 D250	DMS-100. AT&T #4ESS. Meridian 1 (to Meridian 1). DMS-250.
SRVC	[ACC], SDN, M800, MEG	Service type for #4ESS (only prompted for #4ESS).
SRPM	0-9	WATS band.
ISAR	YES [NO]	Stepping to ISA allowed. ISAR can only be YES when there are no trunk assignments in LD14. Stepping to ISA not allowed.
RTN	0-127	Select route number of any configured ISA route. Prompted only when ISAR is YES.
FACY	YES, NO	NSF facility.
SID	0-127, [ROUT]	Service identifier for route. Prompted if NSF is YES and IFC is other than Meridian 1. The SID must match the number at the receiving end.
MIN	0-254	Minimum number of channels reserved on the ISA route (service-dependent). Prompted if ISAR is YES and IFC is other than Meridian 1.
MAX	1-254	Maximum number of channels reserved on the ISA route (service-dependent). Prompted if ISAR is YES and IFC is other than Meridian 1.
ICOG	IAO, ICT, OGT	Incoming and outgoing trunk, incoming trunk, outgoing trunk.
NCOS	0-99	Network Class of Service.
ACOD	XXXX	Trunk route access code.
Note: The IFC of an ISA route and its associated service route must match.		

For more detailed information, see *Meridian 1 ISDN PRI Description and Administration*, 553-2901-100.

Further prompts follow the standard sequence for configuring service routes.

Operational measurements

Traffic measurements associated with ISA routes include additional information on ISA trunks used by the route. Table 72 shows traffic measurements for a trunk route.

Table 72
Trunk route traffic measurements

System ID	TFC002
<Customer Number>	
<Group Number>	COT
<Trunks Equipped>	<Trunks Working>
<Incoming usage>	<Incoming PC>
<Outgoing usage>	<Outgoing PC>
<Outgoing Overflow>	<All Trunks Busy>
<Outgoing ISA Peg Count>	<Incoming ISA Peg Count>
<Group Number>	ISA
<Incoming usage>	<Incoming PC>
<Outgoing usage>	<Outgoing PC>
<Outgoing Overflow>	<All Trunks Busy>
<Toll PC>	
<Outgoing ISA Peg Count>	<Incoming ISA Peg Count>

Table 73 shows traffic measurements for an ISA route.

Table 73
ISA route traffic measurements

System ID	TFC002
<Customer Number>	
<Group Number>	ISA
<Trunks Equipped>	<Trunks Working>
<Incoming usage>	<Incoming PC>
<Outgoing usage>	<Outgoing PC>

Table 73
ISA route traffic measurements (Continued)

System ID	TFC002
<Outgoing Overflow>	<All Trunks Busy>
<Toll PC>	
<Outgoing ISA Peg Count>	<Incoming ISA Peg Count>

Logs

There are no logs for ISA on the Meridian 1. For traffic analysis and maintenance purposes, refer to the history file in LD22.

Service orders

There are no services for ISA on the Meridian 1.

Testing

Test each PRI trunk to make sure that the Meridian 1 completes an ISA call. Run the following tests for each of the available call types: TIE, FX, CO, INWATS, OUTWATS, and DID.

Procedure 2
Test the Meridian 1 ISA PRI trunk setup

1   Select a PRI to test.

2   Access LD60. Start all pertinent B-channels.

3   Set all the Min./Max. values in all service routes to 1.

4   Make a test call on a trunk route that accesses the PRI being tested. Be sure the test call is to a valid destination.

5   Use LD80 to ensure a B-channel from the ISA pool is in use. Then:

    a   Place the call on hold.

    b   Make another call.

       You should receive an overflow signal (fast busy).

    c   Repeat this procedure for every outgoing service route.

6   Disconnect both calls.

7   Ask the terminating end to place an incoming call for each incoming call type. Then, place the call on hold. Ask the terminating end to place another call. The terminating end should receive an overflow signal (fast busy).

8   Disconnect both calls.

This procedure is now complete

ISA on the Meridian SL-100

ISA gives the Meridian 1/Meridian SL-100 combination the ability to combine calls of different types on a single trunk group. Available call types include: PUBLIC, PRIVATE, OUTWATS, INWATS, FX, or TIE. This allows call-by-call service selection and provides the capability to match trunk requirements to peak periods of call usage.

Figure 15 shows an example of ISA on PRI for the Meridian SL-100.

Figure 15
Meridian SL-100 Integrated Services Access on PRI
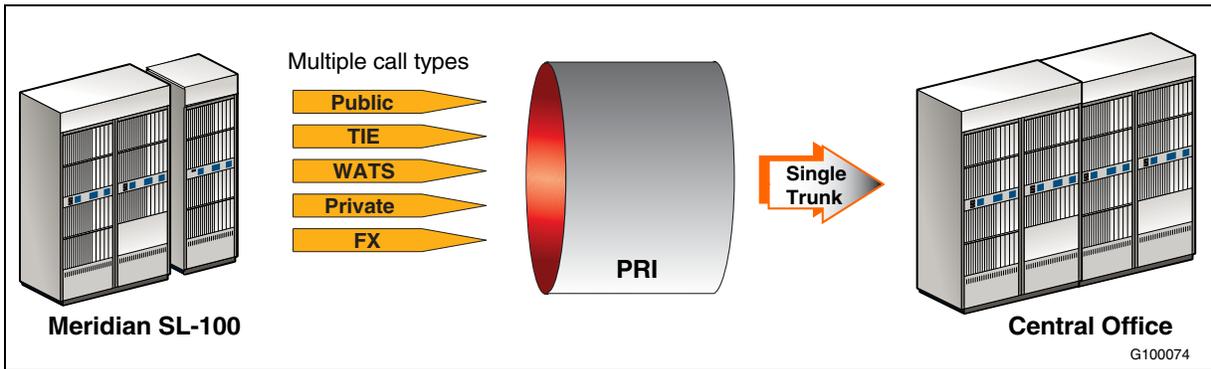
You can adjust PRI B-channels to allow a telemarketer more INWATS calls when needed, as shown in Figure 16 on page 113. The selection of call type occurs on a per-call basis, which provides a service-based architecture. The switch sends a SETUP message with each ISA call. This message includes information elements which the Meridian SL-100 uses to determine call type.

You accomplish control of ISA features by adding or modifying the Meridian SL-100 datafill through existing tables.

Figure 16
Varying Meridian SL-100 B-channel allocation by call type
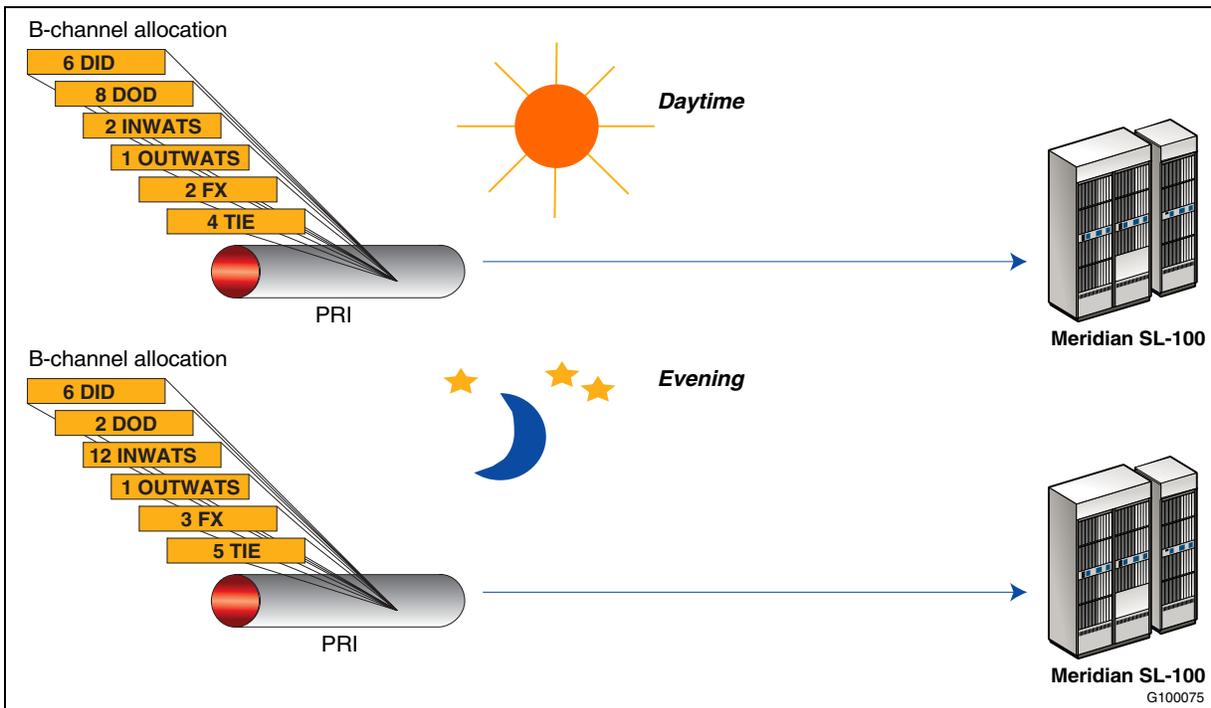
The Meridian SL-100 provides ISA over the PRI between the following:

- Meridian SL-100 to Meridian 1
- Meridian SL-100 to Meridian SL-100
- Meridian SL-100 to DMS-100

The system provides NI-2 ISA call-by-call service for the following:

- Meridian SL-100 to Meridian 1 (for release MSL07 and later)
- Meridian SL-100 to DMS-100
- Meridian SL-100 to Meridian SL-100

Hardware provisioning

You must provision the Meridian SL-100 for ISDN PRI capability, including the ISDN digital trunk controller (DTCI) for BCS 30 and later.

Software provisioning

ISA requires feature package NTX793AA and BCS 30 or later. The components of NTX793AA are the LTCALLS table control and the ISA routing table control.

ISA uses the following related features:

- Trunk Group tables for PRI
- Call Processing Environment for ISDN PRI
- Signaling Manager for ISDN Functional Signaling
- Connection Manager for ISDN PRI
- PRI 250 to Transaction Capabilities Application Part (TCAP) interworking
- BELLCORE Automatic Message Accounting (AMA) ENHANCED Automatic Route Selection (ARS) Translations

Datafill considerations

Since ISA is a software feature, accurate datafill is critical. Although an incoming call defaults to PUBLIC if there is missing ISA data, the switch blocks outgoing calls, unless properly datafilled.

You must datafill PRI-related tables, before adding ISA-specific data. For Meridian SL-100s equipped with the ISDN DTCI, the PRI tables include:

- CARRMTC
- LTCINV
- LTCPSINV
- LTGRP
- LTDEF
- LTMAP
- LTCALLS
- TRKGRP
- TRKSGRP
- TRKMEM

ISA uses the following tables to define, translate, and route calls:

- LTCALLS (logical terminal calls)
- IBNRTE (integrated business network routing table)
- OFRT (office route table)
- RTEREF (route reference table)
- VIRTGRPS (virtual facility group tables)

Call type significance

The dialed digits determine trunk selection for non-PRI calls. The Meridian SL-100 routes ISA calls based on the call type datafilled in tables. However, there is no global significance to the call type at any given point. Different legs of the same call can have different call types.

SETUP message

The switch includes a SETUP message with each call. The information elements are as follows:

- bearer capability

- channel ID

- network specific facilities

- progress indicator

- calling party number

- called party number

Numbering plan indicator

The Meridian SL-100 uses the numbering plan indicator (NPI) for translations. The NPI is part of the customer defined network (CDN) element of the SETUP message. The two values for the NPI are PUBLIC and PRIVATE.

When the NPI value is E.164 (PUBLIC), the Meridian SL-100 uses the public switched telephone network (PSTN) facilities to route the call.

When the NPI value is PRIVATE, the Meridian SL-100 uses the datafill in existing tables for translations. This datafill includes the use of electronic switching network (ESN) information signal digits. The datafill determines whether the switch uses private (PVT) or TIE lines to route the call.

Network specific facilities

The network specific facilities (NSF) element indicates which type of service a call requires. The NSF contains two elements:

- The service selector (binary code facility coding value) specifies the type of service requested, such as TIE, WATS, or FX.

- The service identifier is an optional element which specifies the actual facility used to route the call.

Originating ISA table flow

Figure 17 on page 116 shows the tables the Meridian SL-100 uses when a PRI trunk member originates an ISA call.

Figure 17
Originating ISA table flow (Meridian SL-100)

G100076
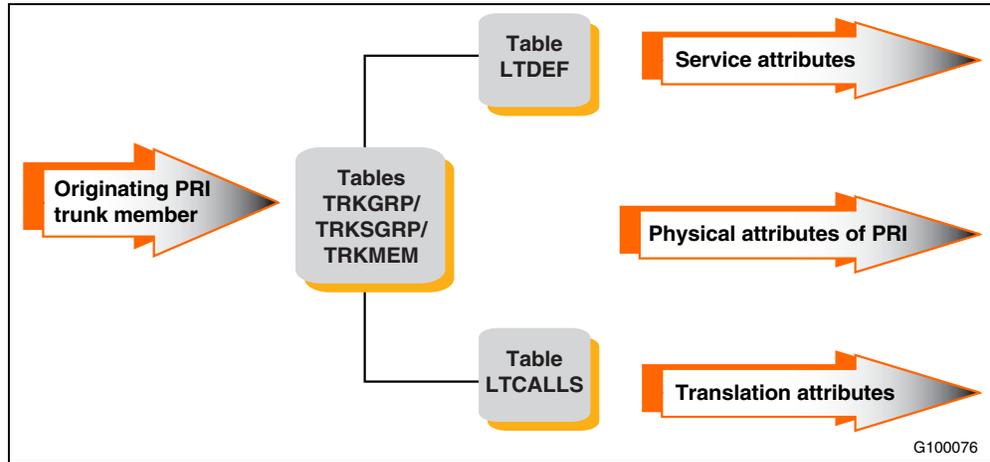
Terminating ISA table flow

Figure 18 shows the tables the Meridian SL-100 uses when a PRI trunk member terminates an ISA call.

Figure 18
Terminating ISA table flow (Meridian SL-100)

G100077
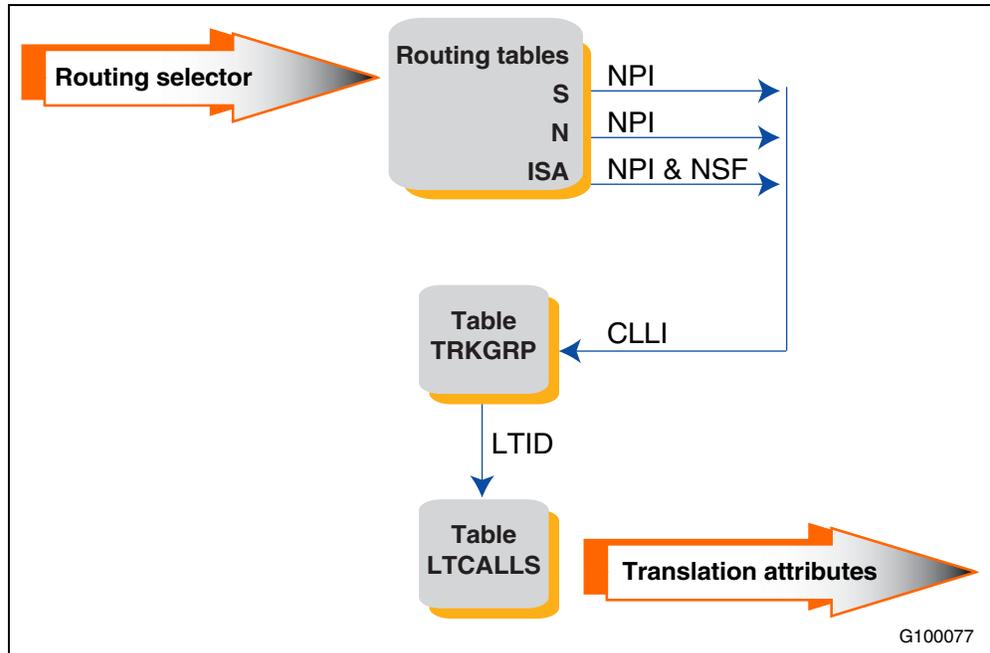
Logical terminal tables

The logical terminal tables provide the Meridian SL-100 with identification, service, and translation information about the terminals connected to a PRI. Nortel Networks recommends that you datafill the logical terminal tables in the following order:

1 LTGRP

2 LTDEF

3 LTDATA

4 LTCALLS

5 KSETINV

6 KSETLINE

7 KSETFEAT

8 LTMAP

> *Note:* Although tables KSETINV, KSETLINE, and KSETFEAT are not logical terminal tables, datafill them before table LTMAP.

Figure 19 shows the tables that define the physical attributes of an ISA member and where the system obtains the service and translation attributes. An explanation of the datafill for each table follows Figure 19.

Figure 19
Meridian SL-100 logical terminal tables
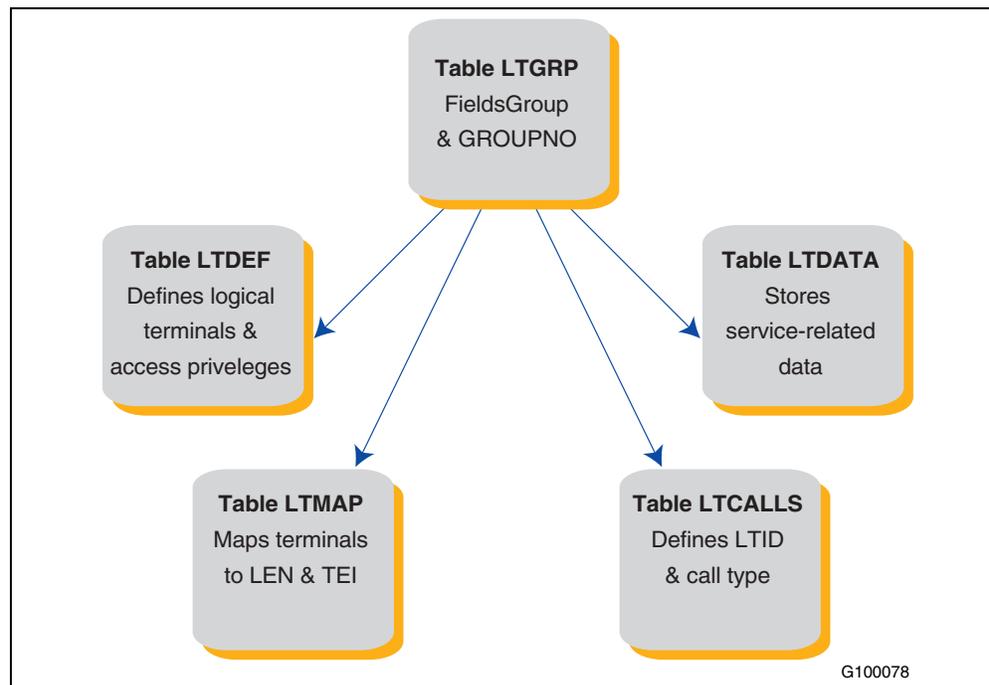
Table LTGRP
Table LTGRP defines a logical terminal group based on terminal type. The options field defines the terminal type for each group. The switch automatically fills the group ISDN as a permanent entry. You cannot change or delete it.

Note: You must datafill Table LTGRP before tables LTDEF, LTDATA, LTCALLS, and LTMAP.

Table 73 shows the fields and values for table LTGRP.

Table 74
Meridian SL-100 table LTGRP parameters

Field name	Range	Default value	Description
GROUP	8 characters: A-Z, 0-9	ISDN	Name of a group of logical terminals.
GROUPNO	0-31	The system automatically assigns default group ISDN as GROUPNO 0.	Number assigned to a group name.
OPTIONS	SAPI16, $	$	The type of terminals allowed in a group; the only current option is SAPI16, to allow packet and circuit switched terminals.
Note: The system automatically assigns the default group ISDN as SAPI16.			

The GROUP field is an important element in the following four other logical terminal tables:

- LTDEF
- LTMAP
- LTDATA
- LTCALLS

These tables control how the Meridian SL-100 processes ISA calls. The datafill for these tables must match the value for GROUP in table TRKGRP.

Figure 20 on page 119 shows an example of a tuple for table LTGRP.

Figure 20
Table LTGRP tuple

group	groupno	options
ISDN	0	SAPI16

Table LTDEF
Table LTDEF defines logical terminals and specifies access privileges.
Table 75 shows the fields and values for table LTDEF.

Table 75
Meridian SL-100 table LTDEF parameters

Field name	Range	Description
LTKEY	alphanumeric	Consists of subfields LTGRP and LTNUM.
(subfield) LTGRP	alphanumeric, 8 characters	The name of the logical terminal group. Must match the GROUP field value in table LTGRP.
(subfield) LTNUM	1-1022	Assigns a number to individual terminals within groups.
LTAP	B, D, BD, PB	Assigns the access privilege for each terminal: B = circuit switched. D = D-channel packet switched. BD = combined switching. PB = B-channel packet switching.
LTCLASS	BRAKS, BRAFS, PRI	Assigns the set of services allowed for a terminal. ISA requires PRI.

When the value of LTCLASS is PRI, the subfields shown in Table 76 appear.

Table 76
Meridian SL-100 table LTCLASS subfields

Field name	Range	Description
NUMBCHNL	1-383	The number of B-channels this terminal can use at one time. The sum of this value for all LTIDs must not exceed the number of B-channels specified for the interface.
NUMCALLS	1-383	Number of calls allowed on the interface. Must be greater than or equal to the sum of INCCALLS and OUTCALLS.
INCCALLS	1-383	Number of reserved incoming-only calls allowed at one time.
OUTCALLS	0-383	Number of reserved outgoing-only calls allowed at one time.

Table 76
Meridian SL-100 table LTCLASS subfields (Continued)

Field name	Range	Description
OPTION	NOVOICE, NOVBD, NOCMD, NOPMD	NOVOICE = no voice calls. NOVBD = no voice band data calls. NOCMD = no circuit mode data calls. NOPMD = no packet mode data calls.
CONTMARK	+, $	Continuation mark; enter a plus mark (+) when the data continues to next line. Enter $ to signify end of string.

Figure 21 shows an example of a tuple for table LTDEF.

Figure 21
Table LTDEF tuple

ltgrp	ltnum	ltap	ltclass					
				num bchnl	num calls	inc calls	out calls	options
ISDN	7	B	PRI	6	6	3	2	NOPMD $

Table LTDATA
Table LTDATA stores service-related data for logical terminals. LTGRP and LTNUM define the terminals. The values you enter in these fields of table LTDATA must match those in tables LTDEF, LTGRP, LTCALLS, and LTMAP. Table 77 shows the fields and values for table LTDATA.

Table 77
Meridian SL-100 table LTDATA parameters

Field name	Range	Description
LTDKEY	alphanumeric	Logical terminal datakey consists of subfields LTGRP, LTNUM, and DATATYPE.
(subfield) LTGRP	alphanumeric, 8 characters	Logical terminal group name.
(subfield) LTNUM	1-1022	Logical terminal number of the individual member of the group.
(subfield) DATATYPE	DN	Logical terminal datatype. The only valid entry is DN.
LTDRESULT	alphanumeric	Logical terminal result consists of the DATATYPE and DFLTCGN subfields.

Table 77
Meridian SL-100 table LTDATA parameters (Continued)

Field name	Range	Description
(subfield) DFLTCGN	10-digit DN	Default calling party number. Enter the 10-digit DN to which the call will default if no CGN is supplied on originations. When CGN screening is enabled, this is the only DN that can originate calls on this interface.
OPTIONS	alphanumeric	Consists of the subfields OPTIONS and CUSTGRP.
(subfield) OPTIONS	CUSTGRP	Options. Enter the option CUSTGRP.
(subfield) CUSTGRP	alphanumeric	Customer group name.

Figure 22 shows an example of a tuple for table LTDATA.

Figure 22
Table LTDATA tuple

LTDKEY			LTDRESULT		OPTIONS	
ltgrp	ltnum	datatype	datatype	dfltcgn	options	custgrp
ISDN	7	DN	DN	7035693781	CUSTGRP	NAVCC

Table LTCALLS
Table LTCALLS creates the logical terminal identifier (LTID) from the LTGRP and LTNUM values. This table also assigns a call type to each terminal and controls ISA translations. You must datafill tables LINEATTR, STDPRTCT, HNPACONT, ZONEORDR, OFRT, IBNRTE, LTGRP, LTDEF, and LTDATA before table LTCALLS.

Table 78 shows the fields and values for table LTCALLS.

Table 78
Meridian SL-100 table LTCALLS parameters

Field name	Range	Description
LTID	alphanumeric	Logical terminal identifier consists of the subfields LTGRP, LTNUM, and CALLTYPE.
(subfield) LTGRP	alphanumeric, 8 characters	Logical terminal group name must match the values in tables LTGRP, LTDEF, LTDATA, and LTMAP.
(subfield) LTNUM	1-1022	The logical terminal number of the member within the group must match the values in tables LTGRP, LTDEF, LTDATA, and LTMAP.

Table 78
Meridian SL-100 table LTCALLS parameters (Continued)

Field name	Range	Description
(subfield) CALLTYPE	PUB PVT WATS, INWATS FX TIE	Defines the call type assigned to a terminal. PUB = public. PVT = private. WATS = Outbound WATS. INWATS = Inbound WATS. FX = foreign exchange. TIE = private lines between PBXs.
XLARTE	XLALEC XLAIBN XLAIEC RTEREF	Selects the translation route. XLALEC = local exchange carrier. XLAIBN = integrated business network. XLAIEC = inter exchange carrier. RTEREF specifies translations by a routing table, such as OFRT and IBNRTE.
LINEATTR	0-1023	Selects the index the switch uses to access table LINEATTR for service-related data.
If the XLARTE selector is XLAIBN, the following subfields appear:		
LINEATTR	0-1023	Selects the index the switch uses to access table LINEATTR for service-related data.
CUSTGRP	alphanumeric	Customer group name.
SUBGRP	0-7	Subgroup number the switch uses to further define CUSTGRP.
NCOS	0-255	Network class of service determines the facilities to which each terminal has access.
If the XLARTE selector is RTEREF, the following subfields appear:		
RTEID	1-1023	Route index. The index number the switch uses to select a route within the table specified in XLARTE.
OPTIONS	$	Enter $ to end entry. No options are currently available.

Figure 23 on page 123 shows an example of a tuple for table LTCALLS if the XLARTE selector is XLALEC.

Figure 23
Table LTCALLS tuple

```
      LTID

ltgrp  ltnum  calltype  xlarte    lineattr

ISDN    7     PVT      XLALEC    37
```

The following tuple is an example of the datafill for table LTCALLS if the XLARTE selector is XLAIBN.

```
      LTID

ltgrp  ltnum  calltype  xlarte    lineattr  custgrp  subgrp  ncos

ISDN    7     PVT      XLAIBN    37  NAVCC    4       4
```

The following tuple is an example of the datafill for table LTCALLS if the XLARTE selector is RTEREF:

```
      LTID

ltgrp  ltnum  calltype  xlarte    rteid     options

ISDN    7     PVT      RTEREF    12        $
```

Table LTMAP

Table LTMAP maps the logical terminals defined in the previous tables to a line equipment number (LEN) and a terminal equipment interface (TEI). This table uses the LTKEY used in the previous logical terminal tables You must datafill this table with the same values found in LTGRP and LTNUM for a given tuple. You must datafill table LTMAP after tables LTGRP, LTDEF, LTDATA, and LTCALLS.

Table 79 shows the fields and values for table LTMAP.

Table 79
Meridian SL-100 table LTMAP parameters

Field name	Range	Description
LTKEY	alphanumeric	Logical terminal key consists of the subfields LTGRP and LTNUM.
(subfield) LTGRP	alphanumeric, 8 characters	Logical terminal group name.
(subfield) LTNUM	1-1022	The logical terminal number of the member within the group.
MAPPING	LEN, CLLI	Logical terminal mapping. For PRI, the mapping must be to CLLI.
CLLI	alphanumeric, 16 characters	The common language location identifier of the PRI trunk to which the terminal is assigned.

Table 79
Meridian SL-100 table LTMAP parameters (Continued)

Field name	Range	Description
LEN	alphanumeric	Consists of the subfields SITE, FRAME, UNIT, DRAWER, and CIRCUIT.
(subfield) SITE	alphanumeric or blank	Consists of the subfields SITE, FRAME, UNIT, DRAWER, and CIRCUIT.
(subfield) UNIT	0-99	Line module frame number. The line module or line concentrator module unit number.
(subfield) DRAWER	0-23	Line drawer or line subgroup. The number of the line drawer of the LM unit or the line subgroup of the LCM unit.
(subfield) CIRCUIT	0-31	Line card circuit number. The line card circuit number of the line drawer or line subgroup shelf to which the line is assigned.
OPTION	TEI, PHI, BCH, DCHCHNL, LTBYTE	Only TEI is valid for PRI.
If the OPTION selector is TEI, the following subfield appears:		
TEI	0-63	Terminal endpoint identifier number.

Figure 24 shows an example of a tuple for table LTMAP.

Figure 24
Table LTMAP tuple

ltgrp	ltnum	mapping	options
ISDN	7	CLLI DAL349VA	TEI 0 $

Routing ISA calls

The Meridian SL-100 obtains ISA routing information from tables IBNRTE, OFRT, and RTEREF. ISA routing selectors contained in the logical terminal tables index these tables. The ISA routing selector uses the CLLI to route calls to a specific trunk group.

Table IBNRTE provides routing information for integrated business network (IBN) calls. Table OFRT provides routing for IBN calls, as well as plain old telephone service (POTS) calls. Table RTEREF is a subtable of tables HNPACONT, FNPACONT, and FNPASTS.

The fields and values of all three tables are the same, with the exception of the first field. For table IBNRTE, the name of the first field is IBNRTESEL. For tables OFRT and RTEREF, the name of the first field is RTESEL. The function and values of these fields are the same for all three tables.

Tables IBNRTE, OFRT, and RTEREF
Table 80 shows the fields and values for tables IBNRTE, OFRT, and RTEREF.

Table 80
Meridian SL-100 tables IBNRTE, OFRT, and RTEREF parameters

Field name	Range	Description
RTESEL, (IBNRTE: table IBNRTE only)	ISA, N, S	Route selector.
OHQ	NO, YES	Selects off-hook queuing.
CBQ	NO, YES	Selects call-back queuing.
EXP	NO, YES	Designates this route as expensive.
CLLI	alphanumeric, 8 characters	Designates the PRI trunk group on which routing terminates.
CALLTYPE	TIE, INWATS, WATS, FX, PVT, PUB	ISA call type.
(subfield) FX, TIE		
FACNUM	0-1023	The facility number the system includes in the NSF selector.
DMI	0-32767	Digit manipulation index – used to modify CDN before transmission.
(subfield) WATS		
ZONE	0-9, A, B, C, AUTO	OUTWATS zone number the system includes in the NSF selector.
DMI	0-32767	Modifies the CDN before transmission.
(subfield) INWATS		
DMI	0-32767	Modifies the CDN before transmission
(subfield) PVT		
NPI	E164, PVT	Selects the type of numbering plan.

Table 80
Meridian SL-100 tables IBNRTE, OFRT, and RTEREF parameters (Continued)

Field name	Range	Description
DMI	0-32767	Modifies the CDN before transmission.
(subfield) PUB		
OATYPE	NONE, 0P, 0M	Type of operator access you require.
TNS	0-999, N, C	Transit network number requested in SETUP message. If you require none, specify N. If the call's originator determines the TNS, specify C.
DMI	0-32767	Modifies the CDN before transmission.
Note: Only CLLIs you define as PRI (in table CLLI) are valid entries in this field.		

Figure 25 shows an example of the datafill for tables IBNRTE, OFRT, and RTEREF.

Figure 25
Tables IBNRTE, OFRT, and RTEREF datafill

rtesel	ohg	cbg	exp	clli	calltype		(facnum dmi)
ISA	N	N	N	DAL349VA	TIE	402	8

Special datafill for ISA INWATS routing to a Meridian 1

Follow Procedure 3 when specifying routing for an INWATS call to a station on a Meridian 1.

Procedure 3
Configure ISA INWATS routing to a Meridian 1

1   Route INWATS incoming calls from table DN to an IBNRTE that uses the IW selector and a datafilled virtual facility group (VFG) previously assigned in table VIRTGRPS.

2   Datafill table DIGMAN to remove the incoming digits and include a new DN. See the following figures for examples.

3   If you use a customer group, use POTS digit collection in table IBNXLA and route the call to an INW LINEATTR. See the following figures.

4   Use table DN to route the new DN to a previously assigned IBNRTE that has the ISA selector for the desired PRI trunk group and specifies call type TIE.

5   Return to table DIGMAN. Remove the previous new DN and substitute the actual four digit extension of the Meridian 1 station.

Note 1: The switch sends the incoming DMS INWATS call to the Meridian 1 as a TIE call. The DMS correctly generates the INWATS automatic message accounting (AMA) record.

Note 2: The IBNRTE TIE FACNUM must match the service identifier (SID) parameter in the Meridian 1 TIE service route.

Note 3: The Meridian 1 does not need an INWATS service route. The switch always send four digits to the PBX. You cannot use this workaround if the customer needs both TIE and INWATS services.

This procedure is now complete

Figure 26 and Figure 27 on page 128 show translations verifications (TRAVER) example datafill the system uses to route ISA INWATS calls to the Meridian 1.

Figure 26
Meridian SL-100 to Meridian 1 INWATS TRAVER example 1

```
        traver tr tcvr2w 6344300 b
        TABLE TRKGRP
        TCVR2W T2  61  TLD  NCRT MI LIDL 0 Y N INC0 NSCR 702 NLCL Y
        7  7
        TABLE STDPRTCT
        INC0  (1)    (0)
            *  SUBTABLE STDPRT
            *  63  6490000 N NP 0 NA
            *  SUBTABLE AMAPRT
            *  KEY NOT FOUND
            *  DEFAULT VALUE IS:  NONE N
        TABLE HNPACONT
        702 445  0  (53)    (1)    (0)
            *  SUBTABLE HNPACODE
            *  634 634 DN 702 634
        TABLE THOUGRP
        702 634 4 Y C
        TABLE DN
        702 634 4300 T IBNRTE 182
        TABLE DNATTRS
        TUPLE NOT FOUND
        TABLE IBNRTE
        182 IW 10 732 IWPRI 169
            *  TABLE DIGMAN
            *  169  (CL BEG)    (REM7)    (INC 7328021)
            *  EXIT TABLE DIGMAN
        EXIT TABLE IBNRTE

        +++ TRAVER:  SUCCESSFUL CALL TRACE +++

        DIGIT TRANSLATION ROUTES
        1 VFG:  IWPRI               7328021
        1 OVFLTONE
        +++ TRAVER:  SUCCESSFUL CALL TRACE +++
```

Figure 27
Meridian SL-100 to Meridian 1 INWATS TRAVER example 2

```
      traver tr v iwpri 7328021 b
     TABLE VIRTGRPS
     IWPRI SIZE 2 IBN 7026344300 IBTS 0 0 2 Y N N $
     TABLE NCOS
     IBTS 2 0 10 INWATS  (XLAS  IBX2  NXLA  NDGT)  $
     TABLE CUSTHEAD:  CUSTGRP, PRELIMXLA, CUSTXLA, FEATXLA,
     VACTRMT, DIGCOL
     IBTS NXLA IBX1 NXLA 1 NDGT
     TABLE DIGCOL
     NDGT specified:  digits collected individually
     TABLE IBNXLA:  XLANAME IBX2
      IBX2 7328021 NET N N 0 N POTS N Y DOD N 10 NONE
     TABLE DIGCOL
      POTS specified:  POTS digit collection
     TABLE LINEATTR
     10 INW WAT0 NT NSCR 0 702 NPRT NLCA NONE N 16 NIL NILSFC
     NILLATA 0 NIL NIL 00
     TABLE HNPACONT
     702 445 0 (53)   (1)   (0)
           *  SUBTABLE HNPACODE
           *  7328 7329 DN 702 732
     TABLE THOUGRP
     702 732 8 Y C
     TABLE DN
     702 732 8021 T IBNRTE 167
     TABLE DNATTRS
     TUPLE NOT FOUND
     TABLE DNGRPS
     TUPLE NOT FOUND
     TABLE IBNRTE
     167 ISA N N N PRITEST TIE 3 E164 172
         *  TABLE TRKGRP
         *  PRITEST PRA 10 NPDGRP NCRT ASEQ N (ISDN 1)  $
         *  TABLE LTCALLS
         *  ISDN 1 TIE XLAIBN 0 IBTS 0 1 $
         *  TABLE DIGMAN
         *  172  (CL BEG)   (REM 7)   (INC 7919)
         *  EXIT TABLE DIGMAN
     EXIT TABLE IBNRTE
     +++ TRAVER:  SUCCESSFUL CALL TRACE +++
     DIGIT TRANSLATION ROUTES
     1 PRITEST                E164 7919 TIE 3 BC SPEECH
     TREATMENT ROUTES.  TREATMENT IS: GNCT
     1 OVFLTONE
      +++ TRAVER:  SUCCESSFUL CALL TRACE +++
```

Operational measurements, logs, and service orders

There are no operational measurements, logs, or service orders for ISA on PRI.

Testing

Testing of ISA calls requires PRI hardware with an ISDN DTCI.

Procedure 4
Test the ISA configuration

1   Use a valid PRI trunk to test an ISA originating and terminating call for each of the six call types (PUB, PVT, WATS, INWATS, FX, and TIE).

2   Perform the TRAVER first to check datafill.

A successful TRAVER does not necessarily indicate that a call completed. TRAVERs are part of a complete testing plan and not a guarantee.

3   Verify each call by actual completion.

This procedure is now complete

Call type verification

The following lists show information about using the table routing selectors to establish a test route for each originating and terminating call type. The test call must use a valid PRI trunk. Check the datafill in all PRI-related tables, as well as those specific to ISA.

Table 81 describes the call types and provides recommended actions.

Table 81
Call type information

Call type	Action
Public call type verification (originating PRI)	Set the XLARTE selector in table LTCALLS to XLALEC. Make sure the CALLTYPE selector is set to PUB and verify that a call completes using this route.
	Set the XLARTE selector in table LTCALLS to XLAIBN. Make sure the CALLTYPE is set to PUB and verify that a call completes using this route.
	Set the XLARTE selector in table LTCALLS to RTEREF. Make sure the CALLTYPE is set to PUB and verify that a call completes using this route.
Public call type verification (terminating PRI)	Verify that a PUB ISA call completes to a PRI trunk using a route defined in table RTEREF.
	Verify that a PUB ISA call completes to a PRI trunk using a route defined in table IBNRTE.
	Verify that a PUB ISA call completes to a PRI trunk using a route defined in table OFRT.

Table 81
Call type information (Continued)

Call type	Action
Private call type verification (originating PRI)	Set the XLARTE selector in table LTCALLS to XLAIBN. Make sure that the CALLTYPE selector is set to PVT and verify that a call completes using this route. Set the XLARTE selector in table LTCALLS to RTEREF. Make sure the CALLTYPE selector is set to PVT and verify that a call completes using this route.
Private call type verification (terminating PRI)	Set the NPI to PVT. Verify that a PVT ISA call completes to a PRI trunk using a route defined in table IBNRTE. Set the NPI to PVT. Verify that a PVT ISA call completes to a PRI trunk using a route defined in table OFRT. Set the NPI to E164. Verify that a PVT ISA call completes to a PRI trunk using a route defined in table OFRT.
OUTWATS call type verification (originating PRI)	You must verify OUTWATS calls for user-specified zone, PBX autobanding, and CO autobanding. Set the XLARTE selector in table LTCALLS to XLALEC. Make sure the CALLTYPE selector is set to PUB and verify that a call completes using this route. Set the XLARTE selector in table LTCALLS to XLAIBN. Make sure the CALLTYPE selector is set to PUB and verify that a call completes using this route. Set the XLARTE selector in table LTCALLS to RTEREF. Make sure the CALLTYPE selector is set to PUB and verify that a call completes using this route.
OUTWATS call type verification (terminating PRI)	Verify that a PUB ISA call completes to a PRI trunk using a route defined in table RTEREF. Verify that a PUB ISA call completes to a PRI trunk using a route defined in table IBNRTE. Verify that a PUB ISA call completes to a PRI trunk using a route defined in table OFRT.
INWATS call type verification (originating PRI)	Set the XLARTE selector in table LTCALLS to XLAIBN. Make sure the CALLTYPE selector is set to PUB and verify that a call completes using this route. Set the XLARTE selector in table LTCALLS to RTEREF. Make sure the CALLTYPE selector is set to PUB and verify that a call completes using this route.
INWATS call type verification (terminating PRI)	Set the XLARTE selector in table LTCALLS to XLAIBN. Verify that a PUB ISA call completes to a PRI trunk using a route defined in table IBNRTE. Set the XLARTE selector in table LTCALLS to RTEREF. Verify that a PUB ISA call completes to a PRI trunk using a route defined in table OFRT.
TIE call type verification (originating PRI)	Set the XLARTE selector in table LTCALLS to XLAIBN. Make sure the CALLTYPE selector is set to PUB and verify that a call completes using this route. Set the XLARTE selector in table LTCALLS to RTEREF. Make sure the CALLTYPE selector is set to PUB and verify that a call completes using this route.

Table 81
Call type information (Continued)

Call type	Action
TIE call type verification (terminating PRI)	Verify that a PUB ISA call completes to a PRI trunk using a route defined in table IBNRTE. Verify that a PUB ISA call completes to a PRI trunk using a route defined in table OFRT.
FX call type verification (originating PRI)	Set the XLARTE selector in table LTCALLS to XLALEC. Make sure the CALLTYPE selector is set to PUB and verify that a call completes using this route. Set the XLARTE selector in table LTCALLS to XLAIBN. Make sure the CALLTYPE selector is set to PUB and verify that a call completes using this route. Set the XLARTE selector in table LTCALLS to RTEREF. Make sure the CALLTYPE selector is set to PUB and verify that a call completes using this route.
FX call type verification (terminating PRI)	Verify that a PUB ISA call completes to a PRI trunk using a route defined in table RTEREF. Verify that a PUB ISA call completes to a PRI trunk using a route defined in table IBNRTE. Verify that a PUB ISA call completes to a PRI trunk using a route defined in table OFRT.

Translation verification (TRAVER)

Run a TRAVER for originating and terminating PRI calls of each call type. The format for entering a TRAVER from the MAP terminal is: traver <ORIG> <NPI> <DIGITS> <OPT> <TRACE>.

Figure 28 shows an example of the command format for a Meridian SL-100 TRAVER.

Figure 28
Sample Meridian SL-100 TRAVER command format
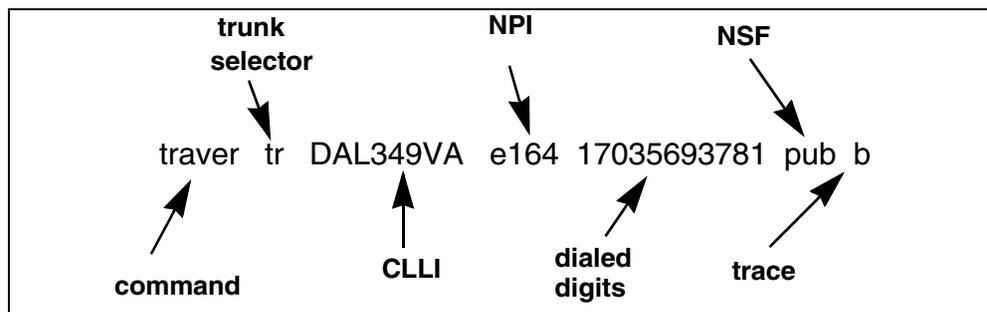
Table 82 shows the range of values and descriptions of the parameters of a TRAVER.

Table 82
Meridian SL-100 TRAVER parameters and values

Field name	Range	Description
ORIG		
Trunk	TR trunk originator	CLLI name.
CGN	string	Calling party number for line calls.
NPI	E164, PVT, PUB	Numbering plan indicator.
Digits	string	Called party number.
OPT	FX, TIE, WATS, PUB, PVT	Options.
NSF		Network specific facility.
FACNUM	0-1023 (FX & TIE only)	Facility number.
ZONE	0-9, A, B, C (OWT only)	OUTWATS zone.
BC	string	Bearer capability.
TRACE	T NT B	T – trace all tables used. NT – display outpulsed digits. B – display tables and digits.

Sample TRAVERs   Figure 29 through Figure 37 on page 135 show TRAVERs for each ISA call type. They show a TRAVER for both terminating and originating ISA calls, where applicable.

Figure 29
Public ISA call using routing from table OFRT TRAVER

```
traver l 7224020 `406211234' bTABLE KSETLINEHOST 00 0 00 16 1 DN Y 7224020 COMNORTEL 0 25 613
(RAG)TABLE DNATTRSTUPLE NOT FOUNDTABLE DNGRPS613 722 4020 4020(PUBLIC ( NAME COMI) $)
$TABLE NCOSCOMNORTEL 25 0 0 KPRA ( XLAS KPRA25 KPRA25 NDGT) ( OHQ 0)TABLE CUSTHEAD:
CUSTGRP, PRELIMXLA, CUSTXLA, FEATXLATABLE DIGCOLKDK 4 COL L 2TABLE IBNXLA: XLANAME
KPRA25KPRA25 40 ROUTE N N 2 Y 3 15 NDGT N T OFRT 400TABLE DIGCOLNDGT specified: digits collected
individually TABLE OFRT400 ISA N N N ATOB PUB NONE N 0    TABLE TRKGRP    ATOB PRA 0 PRAC NCRT
ASEQ N (ISDN 952) $    TABLE LTCALLS    ISDN 952 PUB XLALEC 0 $EXIT TABLE OFRT+++ TRAVER:
SUCCESSFUL CALL TRACE +++ATOB    E164    6211234 NIL_NSF    BC SPEECHTREATMENT ROUTES.
TREATMENT IS: GNCT1 *OFLO2 LKOUT+++ TRAVER: SUCCESSFUL CALL TRACE +++
```

Figure 30
Originating public ISA call TRAVER

traver tr btoa `6211234' bNOTE: NPI=PUB is the default and is therefore not needed in the inputTABLE TRKGRPBTOA PRA 0 PRAC NCRT DSEQ N (ISDN 953) $TABLE LTCALLSISDN 953 PUB XLALEC 0 $TABLE LINEATTR1FR NONE NT FR01 0 613 P621 L613 TSPS N 10 NIL NILSFCTABLE STDPRTCTP621 (1)   (0) SUBTABLE STDPRT   621 632 N NP 0 NA   SUBTABLE AMAPRT   KEY NOT FOUND   DEFAULT VALUE IS: NONE NTABLE HNPACONTE   613 601 1 (32)   (1)   (84)   SUBTABLE HNPACODE   621 621 DN 613 621TABLE THOUGRP613 621 1 Y CTABLE DN613 621 1234 L HOST 00 0 14 00**TABLE LCASCRCN613 L613 (11) OPTL N   SUBTABLE LCASCR   621 622TABLE PFXTREATOPTL NP Y NP UNDTTABLE CLSVSCRCKEY NOT FOUNDDEFAULT IS TO LEAVE XLA RESULT UNCHANGED+++ TRAVER: SUCCESSFUL CALL TRACE

*OFLO+++ TRAVER: SUCCESSFUL CALL TRACE +++

Figure 31
Terminating private ISA call TRAVER

traver l 7224020 `443325020' bTABLE KSETLINEHOST 00 0 00 16 1 DN Y 7224020 COMNORTEL 0 0 613 (RAG)TABLE DNATTRSTUPLE NOT FOUNDTABLE DNGRPS613 722 4020 4020   (PUBLIC (NAME COMI) $) $TABLE NCOSCOMNORTEL 0 0 0 KDK0 (OHQ 0 TONE_OHQ) (CBQ 0 3 N 2) $TABLE CUSTHEAD: CUSTGRP, PRELIMXLA, CUSTXLA, FEATXLATABLE IBNXLA: XLANAME KPRA25KPRA25 44 NET N N 2 Y NDGT N Y GEN (LATTR 0) (RTE OFRT 406)TABLE DIGCOLNDGT specified: digits collected individuallyTABLE LINEATTR1FR NONE NT FR01 0 613 P621 L613 TSPS N 10 NIL NILSFCTABLE STDPRTCTP621 (1)   (0) SUBTABLE STDPRT   3 407 N NP 0 NA   SUBTABLE AMAPRT   KEY NOT FOUND   DEFAULT VALUE IS: NONE   NTABLE HNPACONT613 601 1 (30)   (1)   (84)   SUBTABLE HNPACODE   332 332 LRTE 601 SUBTABLE RTEREF   601 N D A5TOB3 0 N N   N D A3TOB3 0 N N   EXIT TABLE RTEREFEXIT TABLE HNPACONTTABLE LCASCRCN613 L613 (11)   OPTL N   SUBTABLE LCASCRTUPLE NOT FOUND. DEFAULT IS NON-LOCALTABLE PFXTREATOPTL NP N DD UNDTTABLE CLSVSCRCKEY NOT FOUNDDEFAULT IS TO LEAVE XLA RESULT UNCHANGEDUSING ROUTE FROM IBNXLA GEN SELECTOR RTE OPTION+++ TRAVER: SUCCESSFUL CALL TRACE +++

Figure 32
Originating private ISA call TRAVER

traver tr ctob pvt `3325020' prvt bTABLE TRKGRPCTOB PRA 0 PRAC NCRT DSEQ N (ISDN 952) $TABLE LTCALLSISDN 952 PVT XLAIBN 0 CENTESN 0 25 $TABLE IBNXLA: XLANAME CPRA25CPRA25 332 EXTN N Y 613 722 7 $TABLE THOUGRP613 722 5 Y CTABLE DN613 722 5020 ILC HOST 00 0 09 07TABLE DNATTRSTUPLE NOT FOUNDTABLE DNGRPS613 722 5020 5020   (PUBLIC (NAME COMI) $)$+++ TRAVER: SUCCESSFUL CALL TRACE +++DIGIT TRANSLATION ROUTES1 LINE 6137225020TREATMENT ROUTES. TREATMENT IS: GNCT1 *OFLO+++ TRAVER: SUCCESSFUL CALL TRACE +++

Figure 33
Terminating TIE ISA call TRAVER

traver l 7224020 `4627020' bTABLE KSETLINEHOST 00 0 00 16 1 DN Y 7224020 COMNORTEL 0 0 613 (RAG)TABLE DNATTRSTUPLE NOT FOUNDTABLE DNGRPS613 722 4020 4020   (PUBLIC (NAME COMI) $)$TABLE NCOSCOMNORTEL 0 0 0 KDK0 (OHQ 0 TONE_OHQ)   (CBQ 0 3 N 2) $TABLE CUSTHEAD: CUSTGRP, PRELIMXLA, CUSTXLA, FEATXLATABLE DIGCOLKDK OCT RPTNCOS OCT XLA name is NIL. Go to next XLA nameTABLE IBNXLA: XLANAME KPRA25KPRA25 46 ROUTE N N 2 Y 3 15 NDGT N T OFRT 402TABLE DIGCOLNDGT specified: digits collected individuallyTABLE OFRT402 ISA N N N ATOB TIE 7 0 TABLE TRKGRP   ATOB PRA 0 PRAC NCRT DSEQ N (ISDN 953) $ TABLE LTCALLS   ISDN 242 TIE XLAIBN 0 COMNORTEL 0 25 $EXIT TABLE OFRT+++ TRAVER: SUCCESSFUL CALL TRACE +++DIGIT TRANSLATION ROUTES1 ATOB   PVT 27020 TIE 7   BC SPEECHTREATMENT ROUTES. TREATMENT IS: GNCT1 *OFLO2 LKOUT+++ TRAVER: SUCCESSFUL CALL TRACE +++

Figure 34
Originating TIE ISA call TRAVER

> traver tr ctob pvt `27020' tie bTABLE TRKGRPBTOA PRA 0 PRAC NCRT ASEQ N (ISDN 240) $TABLE
> LTCALLSISDN 241 TIE XLAIBN 0 COMNORTEL 0 25 $TABLE IBNXLA: XLANAME KPRA25KPRA25 2 EXTN
> N Y 613 722 5 $TABLE THOUGRP613 722 7 Y CTABLE DN613 722 7020 IMC SCA 3TABLE DNATTRSTUPLE
> NOT FOUNDTABLE DNGRPS613 722 7020 7020   (PUBLIC (NAME COMI) $)$+++ TRAVER: SUCCESSFUL
> CALL TRACE +++DIGIT TRANSLATION ROUTES1 LINE 6137227020TREATMENT ROUTES.
> TREATMENT IS: GNCT1 *OFLO+++ TRAVER: SUCCESSFUL CALL TRACE +++

Figure 35
OUTWATS ISA call TRAVER

> traver l 2993333 65005503333 bTABLE KSETLINEHOST 00 0 00 28 1 ACD Y 2993333 COMNORTEL 0 0 200
> INCALLS Y NACDA 0 N (RAG)   (MSB) (ACDNR) $TABLE DNATTRS200 299 3333 (BNR (NAME GEORGE
> BRODY) $) (PUBLIC (NAME G_BRODY) $) $ $TABLE DNGRPS200 299 3333 3333 (BNR (ADDRESS DDD
> 220 NNNN) $)$TABLE CUSTHEAD: CUSTGRP, PRELIMXLA, CUSTXLA, FEATXLA, VACTRMT, AND
> DIGCOLCOMNORTEL NXLA PXLA FXLA 0 KDKTABLE DIGCOLKDK 6 COL L 7TABLE IBNXLA: XLANAME
> C000C000 6 NET N N 1 Y NDGT N Y GEN (LATTR 0)   (ESN) $TABLE LINEATTR0 IBN NONE NT NSCR 0 100
> POTS NLCA N NONE N 0 NIL NILSFC LATA1 0 NIL NIL 00 NLCABILL OFF - BILLING DONE ON BASIS OF
> CALLTYPETABLE STDPRTCTPOTS (1)   (0)*   SUBTABLE STDPRT*   KEY NOT FOUND* DEFAULT VALUE
> IS: N NP 0 NA*   SUBTABLE AMAPRT* KEY NOT FOUND*   DEFAULT VALUE IS: NONE OVERNONE NTABLE
> HNPACONT100 64 0 (20)   (1)   (0)   (0)*   SUBTABLE HNPACODE*   50 50 HNPA 0* 55 55 LRTE 14*
> SUBTABLE RTEREF* 14 ISA N N N S100AD100APR WATS 0 E164 0* TABLE TRKGRP* S100AD100APR IBNT2
> 0 NPDGP NCRT COMNORTEL 0* ASEQ 5 N ANSDISC 0 Y N N N N N Y Y 0 10 N 0* 0 0 0 N N N N N N N N N
> (LTID ISDN 501) $* TABLE LTCALLS* ISDN 501 WATS XLALEC 0 $*   EXIT TABLE RTEREFEXIT TABLE
> HNPACONTLATA IS NIL, THEREFORE NOT AN EQUAL ACCESS CALL+++ TRAVER: SUCCESSFUL CALL
> TRACE +++DIGIT TRANSLATION ROUTESS100AD100APR   N CDN E164 5005503333 OWT 0 BC
> 3.1KHZ_AUDTREATMENT ROUTES1 T1202 LKOUT+++ TRAVER: SUCCESSFUL CALL TRACE +++

Figure 36
INWATS ISA call TRAVER

> traver tr btoa 7224020 iwt bTABLE TRKGRPBTOA PRA 0 NPDGRP NCRT DSEQ N (ISDN 241) $TABLE
> LTCALLSISDN 241 INWATS XLAIBN 0 COMNORTEL 0 25 $TABLE LINEATTR0 1FR NONE NT FR01 0 613 P621
> L613 TSPS N 10 NIL NILSFCTABLE STDPRTCTP621 (1) (0) SUBTABLE STDPRT 7 810 N NP 0 NA
> SUBTABLE AMAPRT KEY NOT FOUND   DEFAULT VALUE IS: NONE NTABLE HNPACONT613 601 1 (54) (1)
> (84) SUBTABLE HNPACODE   722 722 DN 613 722TABLE THOUGRP613 722 4 Y CTABLE DN613 722 4020
> IMC SCA 3TABLE DNATTRS613 722 4020   (PUBLIC (NONUNIQUE) $) $TABLE DNGRPSTUPLE NOT
> FOUNDTABLE LCASCRN613 L613 (11) MNDT N   SUBTABLE LCASCR   TUPLE NOT FOUND. DEFAULT IS
> NON-LOCALTABLE PFXTREATTUPLE NOT FOUND. DEFAULT IS TO LEAVE XLA RESULT
> UNCHANGEDTABLE CLSVSCRCKEY NOT FOUNDDEFAULT IS TO LEAVE XLA RESULT UNCHANGED+++
> TRAVER: SUCCESSFUL CALL TRACE +++DIGIT TRANSLATION ROUTES1 LINE 6137224020TREATMENT
> ROUTES. TREATMENT IS: GNCT1 T120+++ TRAVER: SUCCESSFUL CALL TRACE +++

Figure 37
FX ISA call TRAVER

```
traver l 2993333 65005303333  bTABLE KSETLINEHOST 00 0 00 28 1 ACD Y 2993333 COMNORTEL 0 0 200
INCALLS     Y NACDA 0 N  (RAG)     (MSB)     (ACDNR)  $TABLE DNATTRS200 299 3333     (BNR  (NAME
GEORGE_BRODY) $)    (PUBLIC  (NAME G_BRODY $)  $  $TABLE DNGRPS200 299 3333 3333(BNR
(ADDRESS DDD 220 NNN) $)  $TABLE NCOSCOMNORTEL 0 0 0 C000 (XLAS C000 NXLA NDGT)  $TABLE
CUSTHEAD:  CUSTGRP, PRELIMXLA, CUSTXLA, FEATXLA, VACTRMT, AND DIGCOLCOMNORTEL NXLA
PXLA FXLA 0 KDKTABLE DIGCOLKDK 6 COL L 7TABLE IBNXLA:  XLANAME C000C000 6 NET N N 1 Y GEN
(LATTR 0  (ESN)  $TABLE DIGCOLNDGT specified:  digits collected individuallyTABLE LINEATTR0 IBN NONE
NT NSCR 0 100 POTS NLCA N NONE N 0 NIL NILSFC LATA1 0 NIL NIL 00 NLCABILL OFF - BILLING DONE
ON BASIS OF CALLTYPETABLE STDPRTCTPOTS  (1) (0)*     SUBTABLE STDPRT* KEY NOT FOUND*
DEFAULT VALUE IS: N NP 0 NA*     SUBTABLE AMAPRT* KEY NOT FOUND* DEFAULT VALUE IS: NONE
OVRNONE NTABLE HNPACONT100 64 0  (20) (1) (0)     (0)*     SUBTABLE HNPACODE* 50 50 HNPA 0* 56 56
LRTE 15* SUBTABLE RTEREF* 15 ISA N N N S100AD100APR FX 0 E164 0* TABLE TRKGRP* S100AD100APR
IBNT2 0 NPDGP NCRT COMNORTEL 0 ASEQ* 5 N ANSDISC 0 Y N N N N N Y Y 0 10 N 0 0 0 * 0 N N N N N N
N N N (LTID ISDN 501)  $* TABLE LTCALLS* ISDN 501 FX XLALEC 0 $*     EXIT TABLE RTEREFEXIT TABLE
HNPACONTLATA IS NIL, THEREFORE NOT AN EQUAL ACCESS CALL+++ TRAVER:  SUCCESSFUL CALL
TRACE +++DIGIT TRANSLATION ROUTES1 S100AD100APRN CDN E164 5005603333 FX 0 BC 3.1 KHZ_AUD
TREATMENT ROUTES, TREATMENT IS:  GNCT1  T1202  LKOUT+++ TRAVER:  SUCCESSFUL CALL TRACE
+++
```

Billing information

For ISA, you must set billing options for three call types:

- PVT
- TIE
- FX

Table 83 shows the billing options for ISA call types.

Table 83
Meridian SL-100 billing options

ISA call type	Billing option
PUB	None.
PVT	Tandem TIE trunk.
OUTWATS	None.
INWATS	None.
TIE	Tandem TIE trunk.
FX	FX.

Network Ring Again

Purpose

This chapter describes how to activate the Meridian Customer Defined Network (MCDN) Network Ring Again (NRAG) feature in a network consisting of Meridian 1 and Meridian SL-100 switches. The NRAG feature extends the local, or nodal, Ring Again feature to members of the same customer group residing on different Nortel Networks switches.

The chapter contains the following sections:

- **Feature description** – provides an example of how Network Ring Again works in a Meridian 1/Meridian SL-100 network.

- **NRAG on the Meridian 1** – shows how to configure NRAG on the Meridian 1.

- **NRAG on the Meridian SL-100** – shows how to configure NRAG on the Meridian SL-100.

Feature description

An NRAG sequence originates and terminates at sets served by either a Meridian 1 or an Meridian SL-100 operating as a centralized exchange. If user A receives a busy signal at set B, the user presses a designated NRAG key or dials a SPRE code (for a 500 set). When user B's set becomes idle, user A's set rings. User A acknowledges the recall and the call is set up normally.

Figure 38 on page 138 shows an example of NRAG in this type of network.

Figure 38
NRAG within a Meridian 1/Meridian SL-100 network

Ring Again

PDN

ISDN PRI

Meridian 1

Meridian SL-100

* Network Ring Again within the PRI network.
* The terminating switch determines when the called party becomes idle and notifies the originating switch using an alert tone, therefore notifying the originator.
* NRAG uses facility messages on ISDN PRI for transporting the TACP information.

G100042

NRAG on the Meridian 1

NRAG enables a user who receives a busy signal at a destination set on a different switch, but within the same network, to have the PBX notify the user when the set of the called party goes on hook.

Note: NRAG on the Meridian 1 requires PRI from end to end.

The following is a successful NRAG sequence:

1 User A (the originator) calls user B (the terminator) and receives a busy signal.

2 User A activates the NRAG feature and receives a tone that confirms activation. User A returns on hook.

a When user A activates NRAG, T5, the originating switch's message response timer, begins to count. When user A receives the confirmation tone, T5 stops and T6 begins. T6, the originating switch's duration timer, limits the amount of time an NRAG request remains outstanding.

b   When the terminating switch accepts user A's NRAG request, it starts T7, the terminating switch's duration timer. T7 stops counting either when user B's set is free and user A accepts the recall or when User A cancels the NRAG request.

3   When user B goes on hook, user A's set rings with a special cadence and the Ring Again lamp flashes for digital sets. User A goes off hook and the call is automatically set up to user B.

a   When user B goes on hook, T6 stops and T2 starts. T2, the recall timer, limits the amount of time user A has to answer the special ringing cadence. When user A accepts the recall and initiates the call set-up, T2 stops.

b   If user A's 500 set is busy when the recall arrives, the switch cancels the NRAG request.

4   User B's set rings.

Note: You cannot initiate NRAG from an attendant station.

If one of the timers expires before an NRAG sequence completes, the switch cancels the NRAG request.

When more than one caller activates NRAG on a terminating station, the switch queues calls on a first-come, first-served basis. When the called station becomes idle, the switch signals only the first caller in the queue. The switch signals the second caller in the queue only after the Queue Advance Timer (four seconds) expires.

Once you activate NRAG, the switch monitors the called party status until one of the following events occurs:

1   The line is idle and the switch attempts a new call setup.

2   The switch deactivates the call when a customer-defined timer expires.

3   The caller manually deactivates the call.

NRAG requires a number of timers to control the feature functions on both the originating and terminating switches.

Incomplete NRAG sequences

The following are some of the reasons for an incomplete NRAG sequence (user A is considered the originating set, user B the terminating set):

• Having been notified that user B is free, user A initiates the call set-up and finds that user B has once again become busy.

• User A is busy when the terminating switch communicates that user B is idle.

• User A cancels a pending NRAG request.

• The terminating switch rejects user A's NRAG request.

• The terminating switch cancels an NRAG request after accepting its activation.

• The originating switch's duration timer (T6) expires.

• The terminating switch's duration timer (T7) expires.

• The originating switch receives no response to its NRAG request.

• User A fails to answer the notification that user B is idle.

• User B's set is subject to a call modification (such as Call Forward).

• User A's request encounters a conflicting feature at user B's set.

Meridian 1 originating switch NRAG functions

The Meridian 1 originating switch performs the following functions to support the NRAG feature:

• Handles NRAG activations

— receives and recognizes the NRAG activation request from user A (for example, the switchhook flash and reset circuit group acknowledgement (RGA) button) and generates the INVOKE NRAG REQUEST to the terminating switch

• From information available within itself, and from the terminating switch, verifies the following:

— the authority of the originating user's group and/or set to make an NRAG request

— the presence of an end-to-end ISDN PRI connection to the terminating switch

— the existence of a route capable of transporting a facility message with Transaction Capabilities Application Part (TCAP) information to and from the terminating switch

> — the presence of an active, compatible NRAG package on the terminating switch

> — the ability of the terminating switch to process an NRAG transaction

- Starts and stops the NRAG originating switch duration timer (T6) and generates a cancellation message when the timer expires.

- Denies an NRAG request by not activating the RGA lamp, not providing feature confirmation messages, and by delivering denial tones (which vary depending on the Meridian 1 set).

- Receives the calling party's NRAG cancellation and passes it to the terminating switch. Also cancels an NRAG request when notified that the terminating switch's duration timer (T7) expires.

- Receives from the terminating switch the CALLED PARTY FREE notification and passes it to the originator. The form of the notice to the user varies depending on the set type.

- Delays an NRAG offer to a 500/2500 set when the calling party's set is busy and cancels a request when the originator duration timer (T6) expires. For a now-busy calling party with any other kind of set, enables that party to accept the NRAG offer or to ignore it and re-try the NRAG call later.

- Provides interfaces for different sets.

Meridian 1 originating switch timers

The timers listed in Table 84 control the NRAG functions of the Meridian 1 when it is acting as an originating switch. The NRAG software controls the duration of the timers.

Note: When one of the timers expires during an NRAG request, the switch cancels that request.

Table 84
Meridian 1 originating switch timers

Designation	Name and function	Duration
T2	**Recall timer** – limits the time between the notification of the originating user that the destination set is free and the acceptance by the originating user of that recall.	30 seconds
T5	**Message response timer** – limits the time between an originating switch's NRAG request and the acceptance or rejection of that request by the terminating switch.	4 seconds
T6	**Originating switch duration timer** – limits the time the originating switch waits for notification that the destination set is free.	30 minutes

Meridian 1 terminating switch NRAG functions

The Meridian 1 terminating switch performs the following functions to support the NRAG feature:

- Handles NRAG requests, such as the following:

  — receiving the INVOKE NRAG REQUEST from the network

  — sending the originating switch an NRAG REQUEST REJECT if it is unable to honor an NRAG request; giving the originating switch a reason for failing to honor the request

- Puts the INVOKE NRAG REQUEST into a queue against the destination directory number (DN) on a first come, first serve basis.

- Monitors the idle/busy status of the destination set and notifies the originating switch when the set becomes idle.

- Generates the NRAG cancellation message when the termination switch duration timer (T7) expires or when the switch experiences difficulties and is unable to honor an NRAG request.

- Runs the queue advance timer (QAT) that allows the originating switch time to recall user A and then respond with a new call set-up.

- Handles feature interactions; allows the user of the terminating set to activate Meridian 1 features while an NRAG request is pending against it.

Meridian 1 terminating switch timers

The timers shown in Table 85 control the NRAG functions of the Meridian 1 when it is acting as a terminating switch. NRAG software controls the duration of the timers.

Note: When one of the timers expires during an NRAG request, the switch cancels that request.

Table 85
Meridian 1 Meridian 1 terminating switch timers

Designation	Name and function	Duration
T7	**Terminating switch duration timer** – limits the time between the acceptance of the NRAG request and either the acceptance of the recall by the originating switch or the cancellation of the request.	30 seconds
QAT	**Queue advance timer** – limits the time between the Called Party Free message to the originating switch and the cancellation of the NRAG request in the absence of an acceptance by the originating switch of the recall.	4 seconds

Operating parameters

Meridian 1 Release 14 is the first to support NRAG for 500/2500 phone sets. All other sets carry NRAG beginning with Release 12, except those sets which require a later software release to work.

The Meridian 1 does not support scanning of the destination set by the originating switch.

A single line phone can maintain only one NRAG request active at a time. Activating a second NRAG request with one already pending overwrites the first request. It is possible for a multiline phone to keep more than one NRAG request active at the same time, but the set must use a separate NRAG key for each request.

The number of pending incoming and outgoing NRAG requests on a Meridian 1 is limited to 25 percent of the call register.

Having made an NRAG request, the originator of the request can cancel it at any time.

The Meridian 1 provides NRAG connectivity to the following switches:

- Meridian 1 to Meridian 1

- Meridian 1 to Meridian SL-100

- Meridian SL-100 to DMS-100

- Meridian 1 through DMS-250

When a user requests the NRAG feature, the network verifies the following:

- the presence of end-to-end SS7 and/or PRI signaling

- the capability of both the originating and terminating switches and stations to process the NRAG feature

The successful operation of the NRAG feature depends on a PRI communication system that supports a TCAP equivalent over PRI. The NRAG response time between Meridian 1s on a network depends of the number of signaling links and their characteristics.

To support NRAG the Meridian 1 must have the PRI and D-channel interface (DCHI) cards (for DCHI, at least firmware version 2.1).

NRAG Meridian 1 network configurations

Figure 39 and Figure 40 show the Meridian 1 and Meridian SL-100 network configurations supporting NRAG.

Figure 39
Meridian 1 to Meridian 1 network
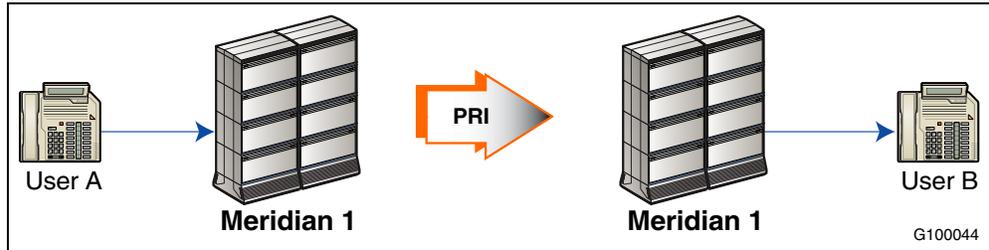
Figure 40
Meridian 1 to Meridian SL-100 network
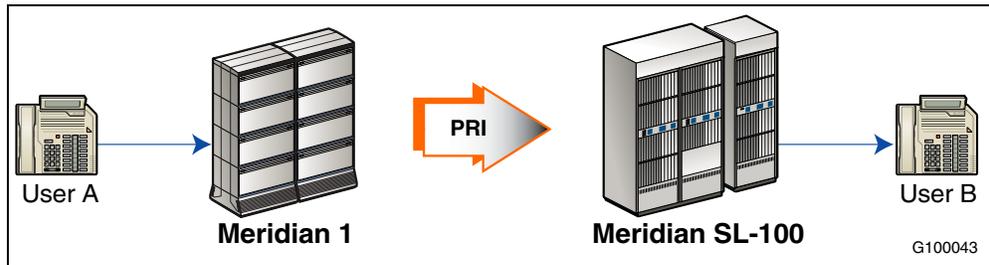
Software requirements

Meridian 1 Release 12, is the first release to support the NRAG feature. Subsequent releases also support it. The NRAG package number is 148.

The prerequisites of the NRAG package are the following:

- DTI – package 75
- ISDN – package 145

Configuration

Service changes are necessary to set up the database to enable a network to support NRAG. The following tables show these service changes.

Configure LD10 and LD11, for 500/2500 sets and digital sets respectively, to enable those sets to activate NRAG.

Table 86
LD10 – specify class of service single-line set entries for NRAG

Prompt	Range	Description
REQ	CHG	Change.
TYPE	500	Type of telephone set.
TN	lll s cc uu	Terminal number.
ECHG	YES	Easy change.
ITEM	CLS XRA	CLS = Ring Again allowed.

Table 87
LD11 – specify a key on multi-line sets to initiate an NRAG request

Prompt	Range	Description
REQ	CHG	Change.
TYPE	xxx	Type of telephone set.
TN	lll s cc uu	Terminal number.
ECHG	YES	Easy change.
ITEM	KEY xx RGA	xx = key number RGA = Ring Again key

The privacy network indicator (PNI) in LD15 and LD16 enables the entering of a private network identifier, which allows the NRAG feature to work.

Note: Nortel Networks recommends defining the same PNI value for each Meridian 1 customer and route within a customer's network. When it is not possible to make the PNI value for each customer and route on a network the same, a route must have the same PNI as the customer PNI in the switch to which it leads.

shows an example of Meridian 1s and routes that have the same PNI value within a network. shows different PNI values within the same network.

Figure 41
Same PNI value within a network
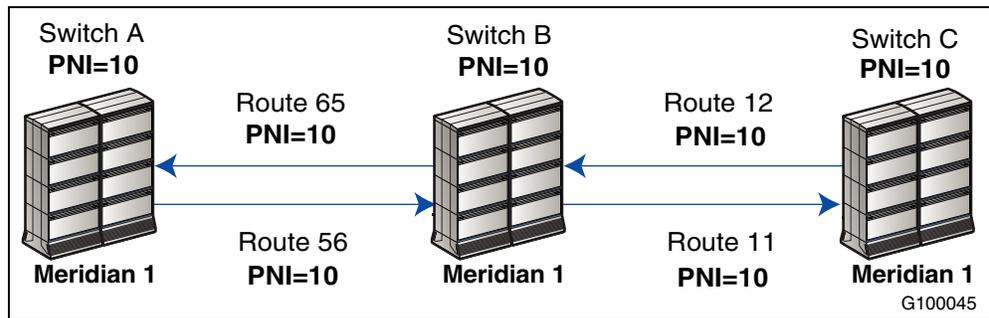
Figure 42
Different PNI value within a network
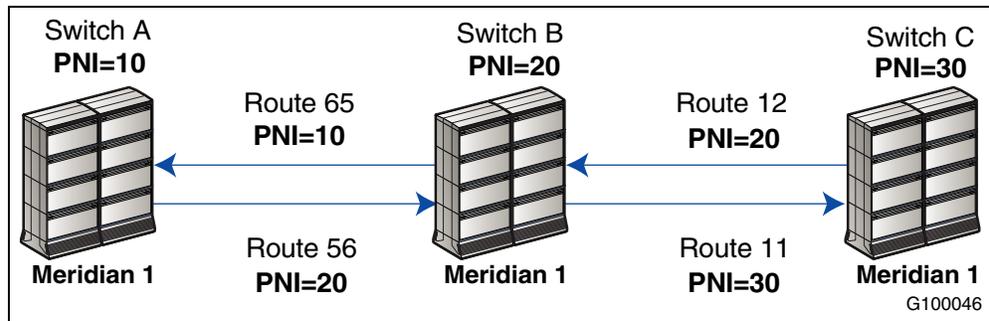
In Figure 42 the PNI value of each route is the same as the next Meridian 1 it encounters. Each customer group within the same Meridian 1 must have a unique PNI.

Set up PNI mapping between call type translator home location code (HLOC), local steering code (LSC), home numbering plan area (HNPA), or HNXX for proper calling line identification (CLID) construction.

Proceed in LD15 as Table 88 shows.

Table 88
LD15 – customer data block NRAG entries

Prompt	Range	Description
REQ	CHG	Change.
TYPE	CDB	Customer data block.
CUST	0-99	Customer number.
ISDN	YES	Answer YES to make the PNI prompt appear.
PNI	1-32700	Private network identifier; enables the NRAG feature to work.

For a network alternate route selector (NARS) call, you must specify a home location code (HLOC). For coordinated dialing plan (CDP), you must specify a local steering code (LSC). For ESN, if a switch is receiving public call types over the same PRI route at the terminating switch, you must specify those call types under access code 2 (AC2).

Set up duration timer NRAG, PNI, and insertion of ESN insert net access codes (INAC). Enter a PNI value for each route leading to a switch.

For example, switch B in requires a PNI value for both route 12 and for route 56.

Table 89
LD16 – route data block NRAG entries

Prompt	Range	Description
REQ	CHG	Change.
TYPE	RDB	Route data block.
CUST	0-99	Customer number.
ROUT	0-511	Route number.
TKTP	XXX	Trunk route type.
ISDN	YES	Answer YES to make the PNI prompt appear.
IFC	D100 = DMS-100 D250 = DMS-250 SL1 = Meridian 1 S100 = Meridian SL-100 ESS = AT&T ESS4 SS12 = Norwegian SYS112	Switch to which this route connects.
PNI	1-32700	PNI must be the same as the switch to which this route leads.

To permit the automatic adding of an ESN access code to an incoming ESN call, you must use the INAC field.

Specify the software release or BCS number and the interface switches by modifying LD17 (see Table 90). Set the software release ID of the far end.

Table 90
LD17 – configuration record NRAG entries

Prompt	Range	Description
REQ	CHG	Change.
TYPE	CFN	Configuration data block.
ISDN	YES	Answer YES to make the RLS prompt appear.
RLS	XX	Release or BCS number of the switch at the far end of the D-channel.
IFC	D100 = DMS-100 D250 = DMS-250 SL1 = Meridian 1 S100 = Meridian SL-100 ESS = AT&T ESS4 SS12 = Norwegian SYS112	Switch to which this switch connects.

You must specify the HLOC in LD15 for NRAG to work for NARS calls.

The following entries must be made for CDP calls:

- LD15 – LSC

- LD86 – ESN data block: CDP; maximum number of steering codes (MXSC); number of digits in CDP DN (NCDP)

- LD87 – LSC: distant steering code (DSC)

Feature testing

To verify NRAG, perform the steps in Procedure 5.

Procedure 5
Test the Meridian 1 NRAG configuration

1   Coordinate with far end personnel. Place a call to a busy station at the far end over a PRI trunk.

2   Verify that the calling terminal can activate NRAG and that any Ring Again indicator lamps are lit.

3   When the far end call disconnects, verify that the calling terminal is notified.

4   Verify that the far end has disconnected.

5   Initiate NRAG capabilities.

The calling party answers.

6   Disconnect the call.

Note: Verify this procedure against different terminal types.

This procedure is now complete

Feature interactions

Table 91 describes the Meridian 1 feature interactions.

Table 91
Feature interaction summary for NRAG on the Meridian 1

Feature	Interaction
Make Set Busy	You can originate NRAG from a station in the Make Set Busy (MSB) mode. You can also activate it against a station in the MSB mode, assuming no Call Forward All Calls DN.
Do Not Disturb	The system supports Ring Again originating from a station with Do Not Disturb (DND) active. However, you cannot activate NRAG against a terminating station that has DND activated.
Call Waiting/ Camp-On	If Call Waiting or Camp-On is active on the terminating station it does not send a notification.

NRAG on the Meridian SL-100

The switch sends NRAG messages over SS7 links or the PRI. NRAG on SS7 uses the TCAP for signaling. The system includes the TCAP message in the Signaling Connection Control Part (SCCP) for transmission over SS7 links.

NRAG on PRI also uses TCAP messages, which the system includes with the PRI facility message (FAC). The facility message contains the network ID of the destination switch, along with the DN of the called number.

When the destination switch receives the TCAP information, it strips off the TCAP information from the FAC message. The destination switch performs further processing and scanning of the busy line, as in nodal RAG.

NRAG requires the PRI or SS7 base packages. NRAG requires BCS 30 or later and software package NTXA36AA01; NTX791AA02 for PRI.

Datafill and translations

Proper datafill is critical at each switch on the network to prevent the system from blocking an NRAG request or recall. The significant tables for NRAG on PRI are tables NETNAMES, CUSTNTWK, MSGRTE, DNGRPS, and TCAPTRID.

Table NETNAMES

Table NETNAMES gives a unique name and numerical ID for each switch on the private network. It provides a field for specifying interworking of NRAG messages between PRI and SS7. Table 92 provides an example of the fields and values for table NETNAMES.

Table 92
Fields and values for table NETNAMES

Field	Range	Description
NETNAME	alphanumeric, 1-32 characters	The private network name. This name must be consistent on all switches or NRAG does not work.
EXTNETID	1-32767	The external network identifier. Each switch must have a unique number.

Table 92
Fields and values for table NETNAMES (Continued)

Field	Range	Description
NETDIGS	0-10	A value representing the number of digits used by the logical network. Extracts the correct number of digits from the stored DN.
NETOPTS	$ NINTNRAG NMRTNRAG FACREJ NMDSP SUPPRESS	Network options. Enter $ to allow interworking of NRAG messages between PRI and SS7. Select NINTNRAG to send signaling messages to the NRAG subsystem instead of the INTERWRK subsystem. Select NMRTNRAG to prevent table MSGRTE from routing NRAG on SS7 messages. The system rejects a tuple if you select NINTNRAG without also selecting NMRTNRAG. FACREJ determines whether the switch sends the facility reject message to the originator when it cannot route the PRI facility message to the destination. NRAG does not use NMDSP and SUPPRESS.

There is no change to the datafill sequence. Figure 43 provides sample datafill for table NETNAME.

Figure 43
Sample datafill for table NETNAME

netname	extnetid	netdigs	netopts	netopts
NETWORK1	125	7	(NINTNRAG)	(NMRTNRAG)

Table CUSTNTWK
Table CUSTNTWK associates a customer name with the NETNAME defined in table NETNAMES, assigns a global customer group identifier, and provides a field for selecting the NRAG option. Table 93 shows the fields and values for table CUSTNTWK.

Table 93
Fields and values for table CUSTNTWK

Field	Range	Description
CUSTNAME	alphanumeric, 1-16 characters	The customer group name.
NETNAME	alphanumeric, 1-32 characters	Must be the same as the NETNAME you datafill in table NETNAMES.
NETCGID	1-4096	Network customer group identifier.
DNREVXLA	$	DN reverse translators. Enter $.
OPTIONS	NTWKRAG	Enter NTWKRAG to enable NRAG. No other options are available.

There is no change to the datafill sequence. Figure 44 provides sample datafill for table CUSTNTWK.

Figure 44
Sample datafill for table CUSTNTWK

custname	netname	netcgid	dnrvxla	options
NTELCOM	NETWORK1	39	$	NTWKRAG

Table MSGRTE
Table MSGRTE provides the routing information for the FAC message the switch uses to transmit NRAG signaling messages. This table provides a selector to specify PRI or SS7 routing for the signaling messages. Table 94 shows an example of the fields and values for table MSGRTE.

Table 94
Fields and values for table MSGRTE

Field	Range	Description
NETID	alphanumeric, 1-32 characters	Network identifier. Enter the same value as in the NETNAMES field of table NETNAMES.
FROMDIGS	numeric	For NRAG, this is the outpulsed digits of the calling party. For other applications, FROMDIGS specifies the first number of a range of digits.
TODIGS	numeric	For NRAG, enter the same value as in FROMDIGS. For other applications, TODIGS specifies the last number of a range of digits.
MSGRTSEL	LOCAL, PRA, SS7	Message route selector. Enter PRA or SS7 if the switch routes the message over a specific D-channel or SS7 route set. Enter LOCAL if the message is to terminate at this switch.
(LOCAL subfield) DELDIGS	numeric	Number of digits the switch deletes.
(LOCAL subfield) PREDIGS	numeric	The digit string the switch prefixes to the destination address.
(PRA subfield) DELDIGS	numeric	Number of digits the switch deletes from destination address.
(PRA subfield) PREDIGS	numeric	The digit string the switch prefixes to the destination address.
(PRA subfield)	alphanumeric	Enter NEWNET.

Table 94
Fields and values for table MSGRTE (Continued)

Field	Range	Description
(SS7 subfield) DPC	alphanumeric	Destination point code. Enter the CLLI name.
(SS7 subfield) DELDIGS	0-10	Number of digits the switch deletes from destination address.
(SS7 subfield) PREDIGS	numeric	The digit string the switch deletes from destination address.
(SS7 subfield) OPTIONS	alphanumeric	Enter NEWNET.

You must datafill the NETNAME in table NETNAMES, before you can assign the NETID field in table MSGRTE. Figure 45 provides sample datafill for table MSGRTE.

Figure 45
Sample datafill for table MSGRTE

netid	fromdigs	todigs	msgrtsel	
NETWORK1	515	815	SS7	DALLASPC 0 N $

Table DNGRPS is necessary if the terminating switch contains a tuple for an ADDRESS option for a called party's NETNAME. Table 95 shows the fields and values for table DNGRPS.

Table 95
Fields and values for table DNGRPS

Field	Range	Description
SNPA	numeric, 3 digits	Serving numbering plan area. The first three numbers of the DN.
OFC	numeric, 3 digits	Office code; the next three numbers of the DN.
FROMDIGS	numeric, 4 digits	Beginning number of a range of the last four digits of DNs.
TODIGS	numeric, 4 digits	Ending number of a range of the last four digits of DNs.
NETOPTS	NETNAME, OPTION, NAME, ADDRESS, NONUNIQUE	Network options; consists of subfields OPTION and NETNAME. Use OPTION to assign a calling party's NAME and ADDRESS.

You must datafill the NETNAME in table NETNAMES before you can assign it in the NETOPTS field of table DNGRPS. Figure 46 provides sample datafill for table DNGRPS.

Figure 46
Sample datafill for table DNGRPS

snpa	ofc	fromdigs	todigs	netopts
214	301	2000	5000	BNR NAME

Table TCAPTRID
Table TCAPTRID assigns the number of TCAP identifiers that NRAG requires. To calculate the number of required IDs, multiply the number of incoming calls receiving busy tone by the percentage of these calls attempting NRAG. Then, multiply the result by 2.

For example:

$$
\begin{array}{r}
240 \quad \text{calls receiving busy tone} \\
\times \quad 10\% \quad \text{requesting NRAG} \\
\hline
= 24
\end{array}
\qquad
\begin{array}{r}
24 \\
\times \quad 2 \\
\hline
= 48 \quad \text{TCAPTRIDs required}
\end{array}
$$

Table 96 contains the fields and values for table TCAPTRID.

Table 96
Fields and values for table TCAPTRID

Field	Range	Description
TCAPAPPL	ACBAR, DNVAL, NACD, NMS, NRAG, PVN, NIL, CMS, NSSTCN, MAP, MAX	Type of TCAP application. Enter NRAG.
NUMTRIDS	0-32767	Number of transaction IDs.

There is no change to the datafill sequence. provides sample datafill for table TCAPTRID.

Figure 47
Sample datafill for table TCAPTRID

tcapappl	numtrids
NRAG	20
PVN	10
ACBAR	35
DNVAL	12
NMS	10

CAUTION

Cold restart required – Changes or additions to table TCAPTRID do not take effect until after a cold restart.

Sample Meridian SL-100 datafill for NRAG on PRI

Figure 48 and the following examples show the datafill necessary for implementing NRAG on PRI.

Figure 48
Meridian SL-100 NRAG on PRI network example

Switch A

Switch B

PRI   PRI   PRI

Switch C

User A

User B

(214) 555-1234
ESN 123-1234

(703) 555-5678
ESN 456-5678

G100047
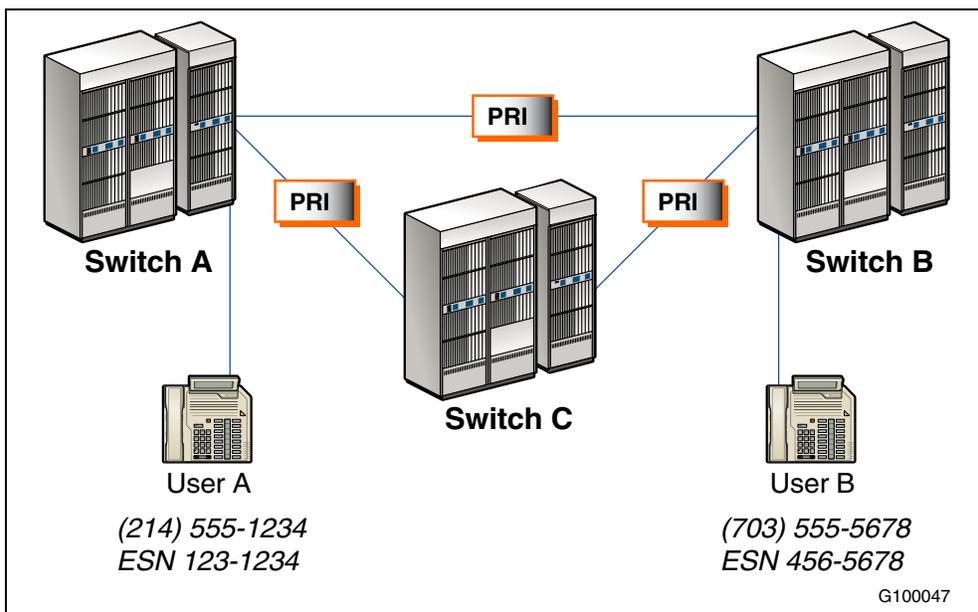
User A is in CUSTGRPA on switch A, while user B is in CUSTGRPB on switch B. Assume user A calls user B by dialing 6-456-5678. The switch removes digit 6 during translation and prefixes 111.

Before datafilling the switches, keep the following in mind:

- Datafill table MSGRTE with the private DNs in the origination and destination elements of the FAC message.

- Datafill table MSGRTE so that the digits leaving the originating station are the ESN DN of the called party (user B).

- If the network routes FAC message through an intermediate switch (such as switch C in the previous figure), you require only the ESN codes of the originating and terminating stations in that switch's datafill. You do not require the public DNs.

Switch A datafill
Figure 49 shows the datafill necessary to enable NRAG on switch A in the Figure example.

Figure 49
Switch A datafill

```
Table NETNAMES
netname        extnetid       netdigs      netopts
NETABC         63             0            $

Table CUSTNTWK
custname       netname        netcgid      dnrevxla       options
CUSTABC        NETABC         121          $              NTWKRAG

Table MSGRTE
msgrtkey                      msgrtres
NETABC 111456 111456            PRA   PRAATOB  3 N $
(outpulsed digits)              PRA   PRAATOC  3 N $

NETABC 123    123               LOCAL  3  214555
(incoming digits)

NETABC 456    456               PRA   PRAATOB  0 N $
(reply digits DNGRPS)           PRA   PRAATOC  0 N $

NETABC 555    555               PRA   PRAATOB  3 456 $
(reply digits norm.)            PRA   PRAATOC  3 456 $
```

The reply digits tuple (NETABC 456 456) is necessary if table DNGRPS on the terminating switch (B) contains a tuple for a range of DNs that contains user's DN with an ADDRESS option for network NETBAC (see).

Figure 50
Table DNGRPS (on switch B)

snpa		ofc	fromdigs	todigs	netopts
703	555	0000	9999		NETBAC (ADDRESS 000 456 NNNN) $

Switch B datafill
Figure 51 shows the datafill necessary to enable NRAG on switch B.

Figure 51
Switch B datafill

Table NETNAMES

netname	extnetid	netdigs	netopts
NETBAC	63	0	$

Table CUSTNTWK

custname	netname	netcgid	dnrevxla	options
CUSTBAC	NETBAC	121	$	NTWKRAG

Table MSGRTE

msgrtkey		msgrtres
NETBAC 111123 111123 (outpulsed digits)		PRA PRABTOA 3 N $ PRA PRABTOC 3 N $
NETBAC 123 123 (reply digits DNGRPS)		PRA PRABTOA 0 N $ PRA PRABTOC 0 N $
NETBAC 456 456 (incoming digits)		LOCAL 3 703555
NETBAC 555 555		PRA PRABTOA 3 456 $

The reply digits tuple (NETBAC 123 123) is necessary if table DNGRPS on the terminating switch (A) contains a tuple for a range of DNs that contains user A's DN with an ADDRESS option for network NETABC (see Figure 52).

Figure 52
Table DNGRPS (on switch A)

snpa	ofc	fromdigs	todigs	netopts
214	555	0000	9999	NETABC (ADDRESS 000 123 NNNN) $

Switch C datafill
shows the datafill necessary to enable NRAG on switch C.

Figure 53
Switch C datafill

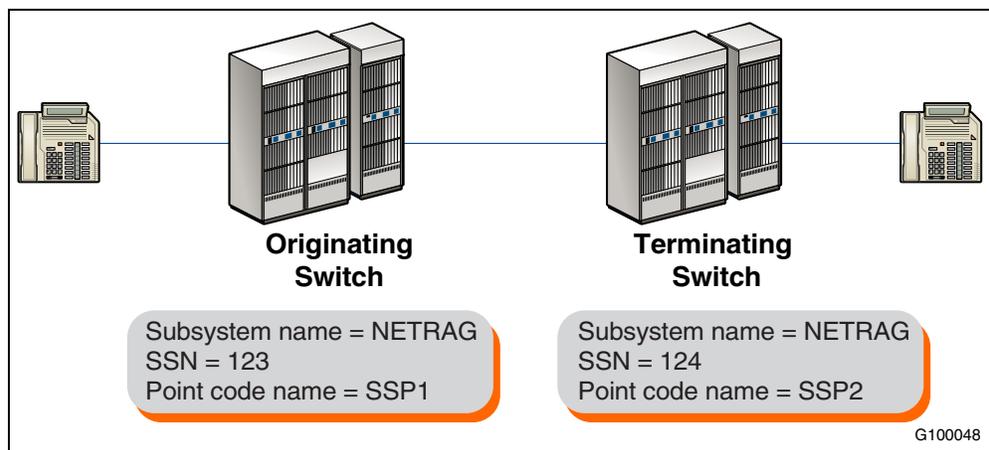**Table NETNAMES**

netnames	extnetid	netdigs	netopts
NETCAB	63	0	$

Table MSGRTE

msgrtkey		msgrtres
NETCAB 123 (incoming digits)	123	PRA PRACTOA 0 N $
NETCAB 456 (incoming digits)	456	PRA PRACTOB 0 N $

Sample Meridian SL-100 datafill for NRAG on SS7

In addition to table MSGRTE, you must datafill Tables C7LOCSSN and
C7NETSSN to implement correct routing of NRAG messages over SS7
links. Each switch must have the same subsystem name, with a unique
subsystem number.

Refer to Figure 54 and the following examples for the datafill necessary
for implementing NRAG on SS7.

Figure 54
Meridian SL-100 NRAG on SS7 network example

Originating Switch

Terminating Switch

Subsystem name = NETRAG
SSN = 123
Point code name = SSP1

Subsystem name = NETRAG
SSN = 124
Point code name = SSP2

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Datafill at originating switch
Table C7LOCSSN Table C7NETSSNNETRAG 123 1 N N $ SSP2
NETRAG 124

Datafill at terminating switch
Table C7LOCSSN Table C7NETSSNNETRAG 124 1 N N $ SSP1
NETRAG 123

Feature interactions

Table 97 describes the interactions between NRAG and the called party's features.

Table 97
Feature interaction summary for NRAG on Meridian SL-100

Feature	Interaction
Call Forwarding	No interaction if called party has Call Forward Universal (CFU), Call Forward Intragroup (CFI), or Call Forward Don't Answer (CFD). The switch forwards the NRAG if the called party has CFB.You cannot make an NRAG request on SS7 if forwarded to station is busy. The system does not forward NRAG recalls if the originator has CFU, CFI, or CFD.
Call Pickup	There is no interaction with the called party's Call Pickup function. An originator cannot pick up NRAG recalls.
Call Waiting/ Attendant Camp-On	The system allows an NRAG if the called party has call/calls waiting. Any calls waiting take precedence over NRAG recalls. The same limitation is present on Attendant Camp-On.
Three-Way/ Conference Calling	The originator activates NRAG against a station involved in Three-Way/ Conference Call. The originator does not activate NRAG while on second leg of Three-Way call. 500/2500 set does not activate NRAG while on second leg of Three-Way call. EBS users can deactivate NRAG at any time except during recall.
Make Set Busy/ Do Not Disturb	The originator can receive NRAG recalls even if MSB/DND is activated. The originator receives reject message if called party has MSB/DND activated.
Hunt Groups	The originator can activate NRAG request against any station in a Directory Number Hunt (DNH), Multiline Hunt (MLH), or Distributed Line Hunt (DLH) group. The request applies to any member in the logical group. When any member becomes free, the switch recalls the originator.
Uniform Call Distribution	You cannot activate NRAG cannot against any UCD directory number of a UCD group. You can activate NRAG against the individual station's DN.
Automatic Call Distribution	You cannot activate NRAG against any ACD directory number in an ACD group.
Multiple Appearance Directory Number	The system assigns NRAG on a line-by-line basis. Only one NRAG request is possible on each MADN member.

Table 97
Feature interaction summary for NRAG on Meridian SL-100 (Continued)

Feature	Interaction
Call Back Queuing	You activate CBQ and NRAG/RAG by the same method, depending on type of set. DMS determines which feature to us as follows: • If the originator receives busy treatment, the DMS uses nodal RAG. • If the destination is an ISUP trunk and the originator receives busy treatment, the DMS uses NRAG. • If the destination is a trunk and the user receives Generalized No Circuit Treatment (GNCT), the DMS uses CBQ. Only one NRAG/RAG or CBQ request can be pending at one time.
Attendant Console	You cannot activate NRAG against an attendant console. You can activate NRAG against a busy station talking to an attendant console.

Interaction with call types

NRAG supports the PRIVATE call type only. However, a Meridian SL-100 using the MCDN ISA application can specify a terminal interface equipment (TIE) call type.

Operational measurements

NRAG on PRI provides operational measurements (OMs) for the message traffic PRI D-channels generate. These OMs are part of the primary rate access facility (PRAFAC) group and include origination, termination, and tandem messages. The OM register increases each time an event occurs.

Table 98 shows the individual registers in the PRAFAC group.

Table 98
Meridian SL-100 OM registers for PRAFAC

Register	Description
FACMSGOR	The number of facility messages that originate at the switch.
FACMSGTM	The number of facility messages that terminate at the switch.
FACMSGTR	The number of facility messages the switch transmits.
DISNORTX	The number of facility messages the switch discards, because no route list was found in table MSGRTE.
DISCNGST	The number of facility messages the switch discards due to congestion at the switch.
DISRTUNA	The number of facility messages the system discards because no outgoing route was available (D-channel not in service).

Table 98
Meridian SL-100 OM registers for PRAFAC (Continued)

Register	Description
REJCNGST	The number of facility reject messages the switch rejects due to application or network congestion at the switch.
REJMSGOR	The number of facility reject messages that originate at the switch.
REJMSGTM	The number of facility reject messages that terminate at the switch.
REJMSGTR	The number of facility reject messages the switch transmits.
REJMSGDS	The number of facility reject messages the switch discards.
REJNORTX	The number of facility reject messages the switch rejects because no routing translation exists for the destination.
REJRTUNA	The number of facility reject messages the switch discards because no outgoing route was available.

Logs

There are no special log considerations for NRAG on the Meridian SL-100.

Service orders

Datafill the NRAG option on the Meridian SL-100 switch on a line-by-line basis using the customer group RAG option assigned to the set.

Testing

There are no special testing considerations for NRAG on the Meridian SL-100.

Billing

There are no special billing considerations for NRAG on the Meridian SL-100.
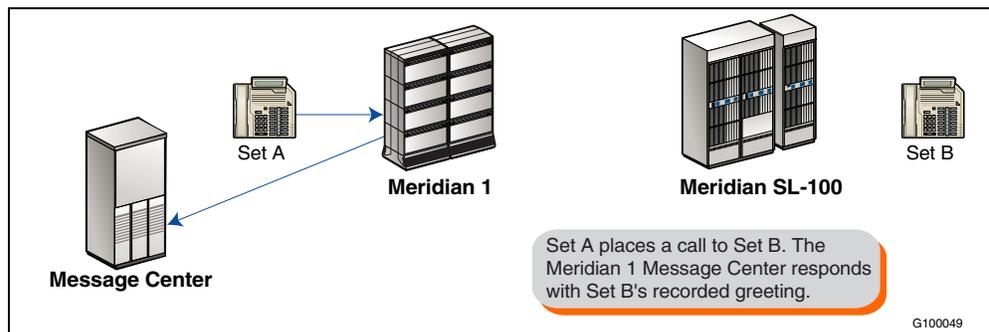
Network Message Waiting

Purpose

This chapter shows how Network Message Waiting (NMW) can extend voice messaging capabilities across a hybrid network of Meridian SL-100 and Meridian 1 switches. The chapter contains the following sections:

- **Feature description** – provides examples of how NMW works in a Meridian 1/Meridian SL-100 network.

- **Software requirements** – describes the NMW software requirements for both switch types.

- **Hardware requirements** – describes the NMW hardware requirements for both switch types.

- **Network Message Waiting datafill** – shows how to configure NMW. Describes logs, OMs, and interactions.

Feature description

Network Message Waiting provides a message center that can reside at the Meridian SL-100 or Meridian 1 node. Subscribers to the message center can be located at any node and can be local or remote users. Figure 55 through Figure 58 on page 164 show how NMW works, with the Meridian 1 host to the Meridian SL-100 and the Meridian SL-100 host to the Meridian 1.

Figure 55
Meridian 1 host to Meridian SL-100 switch

Set A

Meridian 1

Meridian SL-100

Set B

Message Center

Set A places a call to Set B. The Meridian 1 Message Center responds with Set B's recorded greeting.

G100049

Figure 56
Meridian 1 host to Meridian SL-100 switch (part 2)

Set A

Message Center

Meridian 1

Meridian SL-100

Set B

The Meridian 1 Message Center sends a message to the Meridian 1. The Meridian 1 sends a facility message to the Meridian SL-100 (using the D-channel). The Meridian SL-100 illuminates Set B's message lamp.
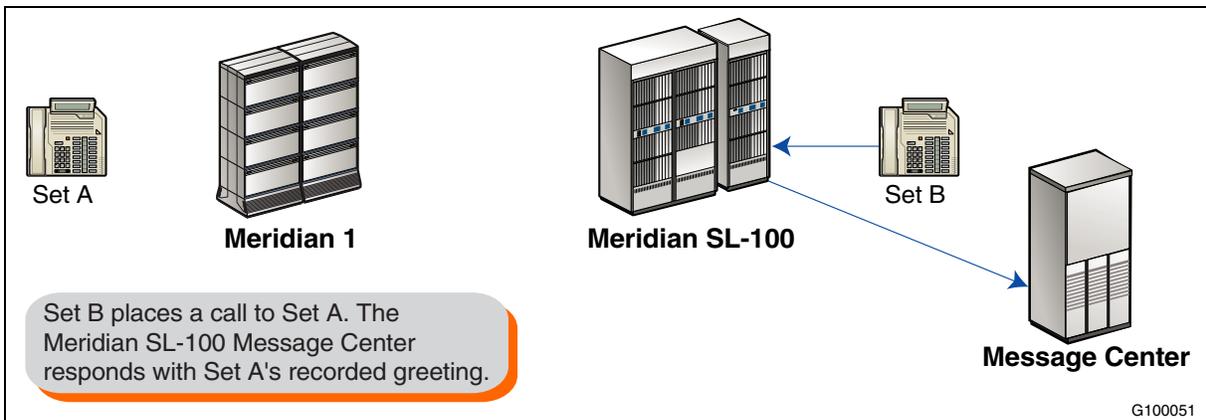
G100050
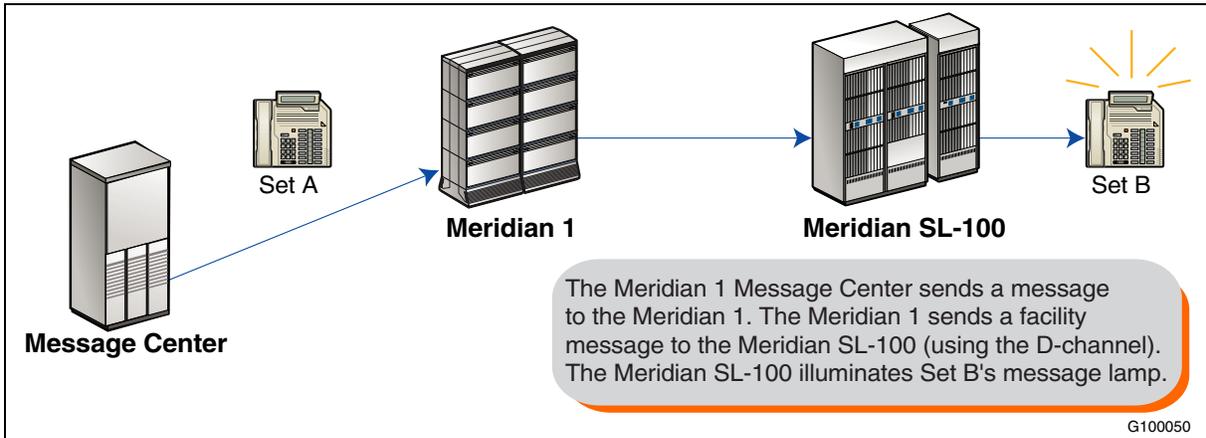
Figure 57
Meridian SL-100 host to Meridian 1 switch

Set A

Meridian 1

Meridian SL-100

Set B

Message Center

Set B places a call to Set A. The Meridian SL-100 Message Center responds with Set A's recorded greeting.

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Figure 58
Meridian SL-100 host to Meridian 1 switch (part 2)

Set A

Meridian 1

Meridian SL-100

Set B

Message Center

The Meridian SL-100 Message Center sends a message to the Meridian SL-100. The Meridian SL-100 sends a facility message to the Meridian 1 (using the D-channel). The Meridian 1 illuminates Set B's message lamp.

G100052
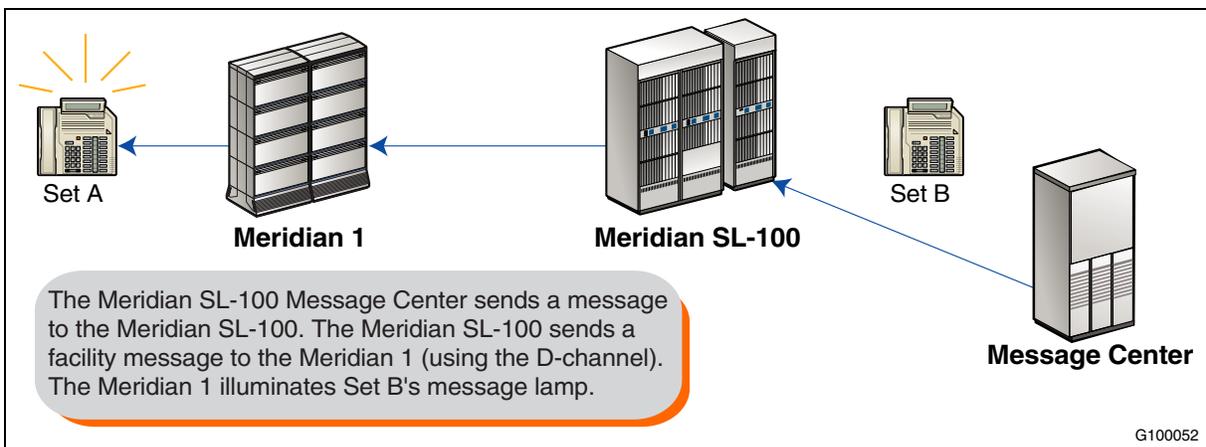
Software requirements

NMW requires release 19 software on a Meridian 1 and BCS36 or greater software on a Meridian SL-100, plus certain software packages.

Meridian Mail requires either release 7 or 8, depending on the host node.

Meridian 1 software requirements
Message center host node
NMW requires release 19 or later software. Table 99 shows the required packages for a Meridian 1 message center host node.

Table 99
Meridian 1 message center host node packages

Package	Description
219	Message waiting indication (MWI), if connected to a DMS with BCS 36 software.
10	End-to-end signaling (EES).
35	Integrated message system (IMS).
40	Basic automatic call distribution (BACD).
45	Automatic call distribution (ACD)-A (ACDA).
46	Message center (MWC).
77	Command status link (CSL).
145	Integrated Services Digital Network (ISDN) signaling.
146 or 147	ISDN PRI (PRI). ISDN signaling link (ISL), for Meridian 1 to Meridian 1 switches.
148	ISDN advanced network service (NTWK).
175	Network message service (NMS).

Message center remote/tandem nodes
NMW requires release 19 or later software. Table 100 shows the required software packages for Meridian 1 message center remote nodes.

Table 100
Meridian 1 message center remote/tandem node packages

Package	Description
219	MWI, if connected to a DMS with BCS 36 * (see note).
10	EES.
40	BACD.
45	ACD-1 – required only if the ACD-DN is the message center directory number (DN).
46	MWC.
145	ISDN *.
146 or 147	ISDN PRI (PRA) *. ISL for Meridian 1 to Meridian 1 switches *.
148	NTWK *.
175	NMS.
Note: Asterisks designate those packages needed for tandem nodes.	

Meridian SL-100 software requirements

Message center remote/tandem nodes

NMW on the Meridian SL-100 requires BCS 36 or later software. Table 101 shows the required packages for message center user and tandem nodes.

Table 101
Meridian SL-100 message center remote/tandem node packages

Package	Description
NTX797AA NTXN34AA	PRI: MWI. ISUP/PRA to Simplified Message Desk Interface (SMDI) interworking.
NTX791AA NTX000AA NTX001AA NTX100AA NTX101AA NTX119AA NTX106AA NTX750AB NTX790AB NTX901AA NTX167AB	PRI: Network Ring Again (NRAG). Bilge. Common basic. Integrated Business Network (IBN) basic. Enhanced features IBN. Message Service. Electronic telephone sets (if using business sets). ISDN Basic Access. ISDN PRI. Local features 1. Common Channeling System No.7 (CCS7) trunk signaling (if using CCS7).
NTXA68AA01 NTX550AA02	Network Message Service. CCS7 Transaction Service Support.

Message center host nodes

NMW on the Meridian SL-100 requires BCS 36 or later software. Table 102 shows the required packages for Message center host nodes.

Table 102
Meridian SL-100 message center host node packages

Package	Description
NTX732AA NTX000AA NTX001AA NTX100AA NTX101AA NTX119AA NTX730AA NTX901AA	Simplified Message Desk Interface (SMDI). Bilge. Common basic. IBN basic. Enhanced features IBN Message Service. Multilink ASCII device driver. Local features 1.
NTX791AA NTX106AA NTX750AB NTX790AB NTX901AA	PRI: NRAG. Electronic telephone sets (if using business sets). ISDN Basic Access. ISDN PRI. Local features 1.

Meridian Mail software

Remote and host nodes

Meridian 1 and Meridian SL-100 remote nodes require only ISDN software packages and none specific to Meridian Mail.

A Meridian SL-100 host with an SMDI link must have Meridian Mail release 8 or later to support the transfer of 10 digits.

A Meridian 1 host must have Meridian Mail release 7 or later. In addition to the Meridian Mail base software (release 8, 7000D or release 9, 7000E), Meridian 1 host nodes require the 7008 (NMS) software package.

In addition to the GP Meridian Mail software, Meridian SL-100 host nodes serving multiple customers require the 7041B (release 8, multi-customer) or the 7041C (release 9, multi-customer) software package.

Hardware requirements

The NMW feature requires special hardware only at the voice message host node of a network. Remote nodes require only standard ISDN hardware.

Meridian 1 hardware requirements

NMW on the Meridian 1 requires the following hardware:

- a voice message unit on a Meridian 1 host node

- a Meridian Mail link on a Meridian 1 host node

- PRI and per trunk signaling (PTS) trunks

Meridian SL-100 hardware requirements

NMW on the Meridian SL-100 switch requires the following hardware:

- a message interface in the form of an SMDI link between the Meridian SL-100 host node and the voice mail unit

- Meridian SL-100 system lines

- PRI, CCS7, and PTS trunks

Network Message Waiting datafill

On a Meridian 1 voice message host node, you must specify a value-added server in the virtual segment ID (VSID) field in LD17, which the VSID fields in LD15 and LD23 recognize. Datafill LD17 before LD15 and LD23.

For the Meridian SL-100 system, while the datafill for tables IBNLINES, IBNFEAT, and KSETFEAT is included here, you datafill these tables by service order (and it is recommended that they be so datafilled).

The Meridian SL-100 tables NETNAMES and MSGRTE require a public tuple in order for the NMW feature to work. The example MSGRTE tuples in this chapter show public and private network tuples for both incoming and outgoing facility messages.

Meridian 1 switch datafill

LD17 – Configuration record
Use LD17 to enable the D-channel to handle Message Waiting at an adjacent switch. This datafill presumes the existence of a PRI link between the Meridian 1 and a Meridian SL-100.

Table 103
LD17 – Configuration record

Prompt	Response	Description
REQ	CHG	Change the configuration record.
TYPE	CFN	Configuration record.
ADAN	CHG DCH xx where: CHG = change DCH = D-channel, and xx = 0-63	Change the primary D-channel (must first disable the D-channel).
RLS	19 or 36	Release number or BCS release of the switch at the adjacent node. *Note:* 19 and 36 are the minimum values.
RCAP	MWI	Specify the NMW capability of a D-channel to a remote switch.

LD15 – Customer data block
Modify the customer data block to enable the message service (OPT field), to configure access code 2 (AC2 field) to insert an ESN access code at the terminating node, and to enter a private network indicator PNI value (PNI field).

Table 104
LD15 – Customer data block

Prompt	Response	Description
REQ	CHG	Change the customer data block.
TYPE	CDB	Customer data block.
CUST	0-99	Customer number.

Table 104
LD15 – Customer data block (Continued)

Prompt	Response	Description
ATDN	xxxx	Attendant directory number.
OPT	MCI	Enable the message center; MCI = message center included.
IMS	YES	Enable the integrated messaging system (IMS).
FNAD	FDN	Forward no-answer direct inward dialing (DID) calls to flexible Call Forward No Answer (CFNA) DN.
FNAT	FDN	Forward no-answer non-DID calls to flexible CFNA DN.
FNAL	FDN	Forward no-answer local calls to flexible CFNA DN (with CFCT activated).
CFTA	YES	Call Forward to trunk access code.
MDID	YES	Route DID no-answer calls to the message center.
NDID	YES	Route no-answer non-DID calls to the message center.
MWFB	YES	Route DID calls to busy sets to the message center.
VSID	0-15	ID of the value-added server that provides voice messaging service; must be the same as the value you enter in the VSID field in LD17.
AC2	numbering plan area (NPA) = E.164 national	Enter the call types that use access code 2. You can make multiple entries. If you do not make an entry, the system defaults to access code 1.
ISDN	YES	Change ISDN options.
PNI	1-32700	Private network identifier; each customer group within the same Meridian 1 network must have a unique PNI. While Nortel Networks recommends that the customer and trunk route PNI value be the same, it is not required. For an outgoing message, when these PNI values are different, the route PNI (LD16) must match the customer PNI (LD15) on the Meridian 1 or the EXTNETID table NETNAMES on the Meridian SL-100 at the adjacent node. For an incoming message, the customer PNI (LD15) must match the route PNI (LD16) on the Meridian 1 or the EXTNETID table NETNAMES on the Meridian SL-100 at the adjacent node.
HNPA	100-999	Home number plan area code; area code of the Meridian 1.
HNXX	100-9999	Prefix of the central office.
HLOC	100-999	Home location code (ESN).
LSC	1-9999	You set up the local steering code (LSC) in the coordinated dialing plan (CDP). This field appears only in the case of a five- or six-digit dialing plan.

LD23 – Automatic Call Distribution (ACD)

Define an ACD group for the voice messaging DN. Datafill other ACD fields to fit your ACD group requirements. Set Voice Message, Express Messaging, and Voice Menu ACD groups to Night Call Forward at the message center DN. Assign no agents to these ACD groups.

On a voice message Meridian 1 remote node, the IMS, CMS, IMA, AVMS, VSID, and ALOG fields do not appear.

Table 105
LD23 – Automatic Call Distribution (ACD)

Prompt	Response	Description
REQ	ADD or CHG	Add or change the ACD data block.
TYPE	ACD	ACD data block.
CUST	0-99	Customer number.
ACDN	A switch with the DNXP package allows up to seven digits. Otherwise, only four digits are allowed.	ACD directory number; for a Meridian 1 host, enter the ACD DN of the remote node. For a Meridian 1 remote node, enter the DN of the voice mail service.
MWC	YES	Message waiting center, for a Meridian Mail Meridian 1 host.
IMS	YES	Integrated messaging for Meridian 1 Meridian Mail host. Field appears if MWC = YES.
CMS	YES	For Meridian Mail Meridian 1 host, command and status link; appears if MWC = YES.
IMA	YES	For Meridian Mail Meridian 1 host, enables the IMS attendant; appears if MWC = YES and IMS = YES.
IVMS	YES	For Meridian Mail Meridian 1 host, integrated voice messaging service; prompted if MWC = YES and IMS = YES.
VSID	0-15	For Meridian Mail Meridian 1 host, value-added server ID; must match VSID field in LD17. Prompted if IMS = YES.
MAXP	1-1000 for options XT and 71; 1-500 1-500 for options NT, 51 and 61; 1-240 for options XN, RT, VLE, XL; and 211-120 for options LE, N, or ST1-70 for options M, S, or MS.	For Meridian Mail Meridian 1 host, maximum number of agent positions; equal to or greater than the number of voice channels in the voice processor cards.
ALOG	YES	Provide automatic log-in for ACD agents associated with this DN. Prompted if IMS = YES.
NCFW	Up to 23 digits (a public DN (10 digits) prefixed by an ESN access code; an ESN number prefixed by an ESN access code).	Night Call Forward to DN of main ACD queue for direct access to Meridian Mail. Do not specify an agent for the automatic call redirection to the ACD Night Call Forward DN when you define the message center DN.

LD11 – Multi-line telephone set administration

Use LD11 to define an agent of the message service ACD group and a voice mail subscriber. Assign an agent only to the message service ACD group and not to the other voice service ACD groups.

Table 106
LD11 – Multi-line telephone set administration

Prompt	Response	Description
REQ	NEW or CHG	Add or change a telephone set.
TYPE	xxxx	Type of telephone set.
TN	l s c u, where l (loop) = 0-159 s (shelf) = 0-3 c (card) = 1-10 u (unit) = 0-15	Terminal number.
CUST	0-99	Customer number.
CLS	VMA HTA, MWA, FNA, FBA	Class of service. For an ACD agent, server voice messaging allowed. For a voice mail subscriber, hunt allowed; message waiting allowed; call forward no-answer allowed; call forward busy allowed.
FDN	xxx . . . x	Flexible Call Forward No-Answer to message center DN. This field requires a CLS value of MWA or FNA. The system uses this field only if you specify one or more of the following in LD15: FNAD = FDN FNAT = FDN FNAL = FDN
EFD	xxx . . . x	Flexible Call Forward No-Answer DN for external calls, when CLS = CFTA. The system uses this field only if one or more of the following are specified in LD15: FNAD = FDN FNAT = FDN FNAL = FDN
EHT	xxx . . . x	External hunt DN; accepted only if CLS = CFTA.

Table 106
LD11 – Multi-line telephone set administration (Continued)

Prompt	Response	Description
HUNT	xxx . . . x	Hunt to message center DN.

KEY	xx ACD yyyy zzzz, where:
	xx = key number
	yyyy = ACD DN or message
	        center DN
	zzzz = agent position ID
	
	xx SCR yyyy, where:
	xx = key number
	yyyy = single-call ringing DN
	
	xx MWK yyyy, where:
	xx = key number
	yyyy = ACD DN or message
	        center DN
		For an ACD agent:
		Specify an ACD agent key.
		Specify keys for Make Set Busy (MSB), Not Ready (NRD), Call Transfer (TRN), Conference (A03 or A06), and Release (RLS).
		
		For a voice mail subscriber:
		Specify a single-call ringing DN key.
		
		Specify a message-waiting key.

LD16 – Route data block
Modify the datafill for the trunk route that connects to a DMS or a Meridian 1.

Table 107
LD16 – Route data block

Prompt	Response	Description
REQ	CHG	Change the route data block.
TYPE	RDB	Route data block.
CUST	0-99	Customer number.
ROUT	0-511	Route number.
ISDN	YES	ISDN PRI option; appears if ISDN = YES in LD15; accesses the PNI, NCRD, and INAC fields.
PNI	1-32700	Private network identifier; each customer within the same Meridian 1 network must have a unique PNI. Within one network, the PNI must be the same in LD15 and LD16. When interworking other networks, the LD16 PNI of this switch must match the LD15 PNI of the remote switch.
NCRD	YES	Allow the sending of call redirection messages.
INAC	YES	Allow the switch to automatically add an ESN access code to an incoming ESN call from a private network. This field appears only if the route is a TIE trunk.
INST	0-99999999	Insert digits in front of leading digits when a non-TIE trunk connects to a DMS.

LD90 – ESN translation tables
Use LD90 to configure a home location code and a home NPA for a facility message to terminate at a user's switch from either a Meridian 1 or a DMS message center.

Use LD90 to configure a home location code for a private ESN uniform dialing plan. For the public numbering plan, where a 10-digit public number is used, configure LD90 to terminate the facility message at the user's DN.

Table 108
LD90 – ESN translation tables

Prompt	Response	Description
REQ	ADD or CHG	Add or change the record.
CUST	0-99	Customer number.
FEAT	NET	Specify the network translation tables.
TRAN	AC1 or AC2	Specify access code 1 or 2.
TYPE	HLOC = home location code HNPA = home NPA translation NXX = office code translation	Specify the type of translation.
HLOC	3-7 digits	Specify the home location code.
HNPA	100-999	Specify the home NPA.
NXX	200-999 for three-digit numbers; 1200-1999 for 1-plus dialing	Office code translation (for central office translation).
RLI	0-255	Route list index (for central office translation).
SDRR	LDID	Supplemental restriction or recognition; specify local DID codes (for central office translation).
DMI	1-255	Digit manipulation index. The DMI must delete three digits for the NXX.
LDID	XXX	Local DID number recognized within the NPA and NXX.

Meridian SL-100 switch datafill
Table TERMDEV
Table TERMDEV defines the parameters of the SMDI link to the voice messaging system.

Datafill sequence – There is no change to the datafill sequence.

Sample datafill – MCSMDI 1   4   SMDI   B1200 EIA   1X67FA   EVEN N NONE ALL

Figure 59 on page 175 through Figure 69 on page 177 provide information about the individual fields in the table TERMDEV sample tuple.

Figure 59
TERMDES field in table TERMDEV

MCSMDI   1   4   SMDI   B1200   EIA   1X67FA   EVEN   N   NONE   ALL

TERMDES field

The TERMDES field is the terminal description field; specifies the device name of the SMDI link.

Value:
Alphanumeric; 1-7 characters required when using the 1X67FA card.

Figure 60
IOCNO field in table TERMDEV

MCSMDI   **1**   4   SMDI   B1200   EIA 1X67FA   EVEN   N   NONE   ALL

IOCNO field
Specify the input/output controller number.

Range of values: 0-19

Figure 61
CKTNO field in table TERMDEV

MCSMDI   1   **4**   SMDI   B1200   EIA 1X67FA   EVEN   N   NONE   ALL

CKTNO field
Specify the circuit number of the input/output controller.
Range of values: 0-35

Figure 62
NETOPTS field in table TERMDEV

MCSMDI   1   4   **SMDI**   B1200   EIA   1X67FA   EVEN   N   NONE   ALL

NETOPTS field
Specify the terminal type.
Value: SMDI

Figure 63
BAUDRT field in table TERMDEV

MCSMDI   1   4   SMDI   **B1200**   EIA 1X67FA EVEN N NONE ALL

BAUDRT **field**
Specify the baud rate of the terminal.
Value: B1200

Figure 64
INTYP field in table TERMDEV

MCSMDI   1   4   SMDI   B1200 **EIA**   1X67FA EVEN N NONE ALL

INTYP **field**
Specify the interface type.
Values: EIA, CL

Figure 65
PECCODE field in table TERMDEV

MCSMDI   1   4   SMDI   B1200 EIA   **1X67FA** EVEN N NONE ALL

PECCODE **field**
Specify the product engineering code of
the SMDI circuit card.
Values: 1X67FA or 1X67EA

Figure 66
PRTY field in table TERMDEV

MCSMDI   1   4   SMDI   B1200 EIA 1X67FA **EVEN** N NONE ALL

PRTY **field**
Specify the parity of the SMDI.
Values: ODD, EVEN, NONE

Figure 67
GAUR field in table TERMDEV

MCSMDI   1   4   SMDI   B1200 EIA 1X67FA EVEN **N**   NONE ALL

GAUR **field**
Guaranteed device field. Enter Y (YES) if
the device continues to run despite the
call processing or maintenance load. The
default is N (NO).
Values: Y, N

Figure 68
MODEM field in table TERMDEV

MCSMDI   1   4   SMDI   B1200   EIA   1X67FA   EVEN   N   **NONE**   ALL

MODEM **field**

Specify the type of modem connected to
the corresponding port.
Value: NONE

Figure 69
COMCLASS field in table TERMDEV

MCSMDI   1   4   SMDI   B1200   EIA   1X67FA   EVEN   N   NONE   **ALL**

COMCLASS **field**

Specify the command classes allowed
for the terminal.
Values: 0-30, NONE, ALL

Table SLLNKDEV
Table SLLNKDEV specifies the characteristics of the SMDI datalink
table TERMDEV defines.

Datafill sequence – You must define the SMDI link in table TERMDEV
before datafilling table SLLNKDEV.

Sample datafill – MCSMDI   1X67 NONE NONE   INOUTLK
SMDIDATA   NMSPVT 10 NUMDIGS

Figure 70 through provide information about the
individual fields in the table SLLNKDEV sample tuple.

Figure 70
DEVNAME field in table SLLNKDEV

MCSMDI   1X67   NONE   NONE   INOUTLK   SMDIDATA   NMSPVT
                                                              10   NUMDIGS

DEVNAME **field**
Device name specified in the
TERMDES field of table TERMDEV.
Value: 1-7 alphanumeric characters

Figure 71
DEVTYPE field in table SLLNKDEV

MCSMDI   `1X67`   NONE   NONE   INOUTLK   SMDIDATA   NMSPVT
                                                      10   NUMDIGS

DEVTYPE **field**
Specify the device type.
Value: 1X67

Figure 72
XLATION field in table SLLNKDEV

MCSMDI   1X67   `NONE`   NONE   INOUTLK   SMDIDATA   NMSPVT
                                                      10   NUMDIGS

XLATION **field**
Translation field; NMW requires no
translation of incoming or outgoing
datalinks.
Value: NONE

Figure 73
PROTOCOL field in table SLLNKDEV

MCSMDI   1X67   NONE   `NONE`   INOUTLK   SMDIDATA   NMSPVT
                                                      10   NUMDIGS

PROTOCOL **field**
The SMDI link for NMW uses no
protocol for connecting and starting
messages.
Value: NONE

Figure 74
DRECTION field in table SLLNKDEV

MCSMDI   1X67   NONE   NONE   `INOUTLK`   SMDIDATA   NMSPVT
                                                      10   NUMDIGS

DRECTION **field**
Specify the direction the data travel
through the SMDI link.
Value: INOUTLK

Figure 75
XFERS field in table SLLNKDEV

MCSMDI   1X67   NONE   NONE   INOUTLK   `SMDIDATA`   NMSPVT
                                                      10   NUMDIGS

XFERS **field**
Transfers field: specify the report type
currently allowed on the SMDI link.
Value: SMDIDATA

Figure 76
OPTION field in table SLLNKDEV

MCSMDI   1X67 NONE   NONE   INOUTLK   SMDIDATA   NMSPVT
                                                      10 NUMDIGS

OPTION field

Datafill the option refinement if the XFERS field entry is SMDIDATA. Enter up to seven options. If fewer are required, end the list with $.

Values:

DNSUPPR, for DN suppression, with refinements CALLING and FWDING
LASTFWDN, for last forward DN
NMSPVT, for NMS private; required for interworking with a Meridian 1; for sending a private DN across the link to the message center
NONMS, for no network message service
NUMOFDIGS, for number of digits, with refinement NUMDIGS (7 or 10)
SPLITNNX, for split NNX code

Table LNINV

Table LNINV defines the line circuits used for voice ports to the voice message system.

Datafill sequence – There is no change to the datafill sequence.

Sample datafill – 2 0 0 2   6X18AB   STDLN   WORKING   Y   NL   Y

Figure 77 through Figure 83 on page 180 provide information about the individual fields in the table LNINV sample tuple.

Figure 77
LEN field in table LNINV

2 0 0 2   6X18AB   STDLN   WORKING   Y   NL   Y

LEN field

Line equipment number; specify values in subfields SITE, FRAME, UNIT, DRAWER, and CIRCUIT.

Value: numeric

Figure 78
CARDCODE field in table LNINV

2 0 0 2   6X18AB   STDLN   WORKING   Y   NL   Y

CARDCODE field

Enter the line card's product engineering code (PEC).

Value: alphanumeric

Figure 79
PADGRP field in table LNINV

2 0 0 2   6X18AB   **STDLN**   WORKING   Y   NL   Y

PADGRP **field**

Name of the line card's pad
group assigned in table PADDATA

Value: alphanumeric

Figure 80
STATUS field in table LNINV

2 0 0 2   6X18AB   STDLN   **WORKING**   Y   NL   Y

STATUS **field**

Specify the line inventory
availability status.

Value: WORKING

Figure 81
GND field in table LNINV

2 0 0 2   6X18AB   STDLN   WORKING   **Y**   NL   Y

GND **field**

Enter Y to specify ground
start line.

Value: Y

Figure 82
BNV field in table LNINV

2 0 0 2   6X18AB   STDLN   WORKING   Y   **NL**   Y

BNV **field**

Specify the balanced network value.

Values: L = loaded network
          NL = non-loaded network

Figure 83
MNO field in table LNINV

2 0 0 2   6X18AB   STDLN   WORKING   Y   NL   **Y**

MNO **field**

Enables manual override. Prevents
on-hook balance network test from
updating BNV field.

Values: Y, N

Table UCDGRP
Use table UCDGRP to specify a universal call distribution (UCD) group
for access to the voice message system. The resulting voice message
group must use message desk number 63.

Datafill sequence – Datafill this table before table DNROUTE.

Sample datafill – VSGROUP N NORTH 10   60   10   Y   0   5   90
90   UCD_SMDI   MCSMDI   63

Figure 84 through provide information about the
individual fields in the table UCDGRP sample tuple.

Figure 84
UCDNAME field in table UCDGRP

VSGROUP   N   NORTH 10   60   10   Y   0   5   90   90
UCD_SMDI   MCSMDI   63

UCDNAME **field**
Specifies the name assigned to the
ACD group.
Values: alphanumeric

Figure 85
ACD field in table UCDGRP

VSGROUP   N   NORTH 10   60   10   Y   0   5   90   90
UCD_SMDI   MCSMDI   63

ACD **field**
NMW does not support ACD. Enter
N.
Values: N

Figure 86
CUSTGRP field in table UCDGRP

VSGROUP   N   NORTH 10   60   10   Y   0   5   90   90
UCD_SMDI   MCSMDI   63

CUSTGRP   **field**
Specify the customer group to which
this UCD group belongs.
Value: alphanumeric

Figure 87
UCDRNGTH field in table UCDGRP

VSGROUP N NORTH `10` 60 10 Y 0 5 90   90
UCD_SMDI   MCSMDI   63

> ***UCDRNGTH* field**
>
> Specify the number of seconds after which an unanswered call to a UCD agent is forwarded.
>
> ***Range of values:***   0-63

Figure 88
PRIOPRO field in table UCDGRP

VSGROUP N NORTH 10 `60` 10 Y 0 5 90   90
UCD_SMDI   MCSMDI   63

> ***PRIOPRO* field**
>
> Specify the maximum number of seconds a call can wait in a queue.
>
> ***Range of values:***   0-255

Figure 89
MAXPOS field in table UCDGRP

VSGROUP N NORTH 10 60 `10` Y 0 5 90   90
UCD_SMDI   MCSMDI   63

> ***MAXPOS* field**
>
> Specify the maximum number of UCD agents active at one time.
>
> ***Range of values:***   0-1023

Figure 90
DBG field in table UCDGRP

VSGROUP N NORTH 10 60 10 `Y` 0 5 90   90
UCD_SMDI   MCSMDI   63

> ***DBG* field**
>
> Specify whether billing starts when a UCD agent answers a call.
>
> ***Range of values:***   Y, N

Figure 91
DEFPRIO field in table UCDGRP

VSGROUP   N   NORTH 10   60   10   Y   **0**   5   90   90
   UCD_SMDI   MCSMDI   63

> *DEFPRIO* **field**
>
> Specify the default priority number applicable to local calls terminating on the primary UCD number.
>
> ***Range of values:***   0-3

Figure 92
RLSCNT field in table UCDGRP

VSGROUP   N   NORTH 10   60   10   Y   0   **5**   90   90
   UCD_SMDI   MCSMDI   63

> *RLSCNT* **field**
>
> Specify the maximum number of unanswered calls allowed to terminate at a UCD station.
>
> ***Range of values:***   0-31

Figure 93
MAXCQSZ field in table UCDGRP

VSGROUP   N   NORTH 10   60   10   Y   0   5   **90**   90
   UCD_SMDI   MCSMDI   63

> *MAXCQSZ* **field**
>
> Specify the maximum number of calls the incoming call queue contains.
>
> ***Range of values:***   0-511

Figure 94
MAXWAIT field in table UCDGRP

VSGROUP   N   NORTH 10   60   10   Y   0   5   90   **90**
   UCD_SMDI   MCSMDI   63

> *MAXWAIT* **field**
>
> Specify the maximum number of seconds an incoming call can wait in the queue.
>
> ***Range of values:***   0-1800

Figure 95
OPTIONS field in table UCDGRP

VSGROUP N NORTH 10 60 10 Y 0 5 90 90
UCD_SMDI   MCSMDI   63

OPTIONS **field**
Specify that a UCD group uses SMDI.
Value: UCD_SMDI

Figure 96
TERMDES field in table UCDGRP

VSGROUP N NORTH 10 60 10 Y 0 5 90 90
UCD_SMDI   MCSMDI   63

TERMDES **field**
Specify the device name of the SMDI link; the same value as in the TERMDES field in table TERMDEV.
Value: Alphanumeric; 1-7 characters required when using the 1X67FA card.

Figure 97
DSKNO field in table UCDGRP

VSGROUP N NORTH 10 60 10 Y 0 5 90 90
UCD_SMDI   MCSMDI   63

DSKNO **field**
Specify the message desk number.
Value: 63 for the first UCD group on a datalink

Table IBNLINES
Use table IBNLINES to define the UCD voice agents for the voice messaging UCD group. Specify UCD and cutoff on disconnect (COD) in the OPTLIST field to create a voice agent. You can enter this information using SERVORD.

Datafill sequence – There is no change to the datafill sequence.

Sample datafill – 2 0 0 2   0   DT STN IBN 6845051 NORTH 0 0 214 COD UCD

Figure 98
LEN field in table IBNLINES

2 0 0 2   0   DT   STN   IBN   6845051   NORTH   0   0   214   COD   UCD

LEN **field**

The line equipment number of the agent; set this value in table LNINV. Includes subfields SITE, FRAME, UNIT, DRAWER, and CIRCUIT.

Value: numeric

Figure 99
DNNO field in table IBNLINES

2 0 0 2   **0**   DT   STN   IBN   6845051   NORTH   0   0   214   COD   UCD

DNNO **field**

Directory number field; specify to which DN on the LEN is being referrenced.

Value: 0

Figure 100
SIGTYPE field in table IBNLINES

2 0 0 2   0   **DT**   STN   IBN   6845051   NORTH   0   0   214   COD   UCD

SIGTYPE **field**

Specify digitone or dial pulse signaling.

Value: DT, DP

Figure 101
FORMAT field in table IBNLINES

2 0 0 2   0   DT   **STN**   IBN   6845051   NORTH   0   0   214   COD   UCD

FORMAT **field**

Specify the format for an IBN or RES station.
Value: AC, STN

Figure 102
LCC field in table IBNLINES

2 0 0 2   0   DT   STN   **IBN**   6845051   NORTH   0   0   214   COD   UCD

LCC **field**

The line class code; for an integrated business network, specify IBN; for residential stations, specify RES.
Value: IBN, RES

Figure 103
DN field in table IBNLINES

2 0 0 2   0   DT   STN   IBN   **6845051**   NORTH   0   0   214   COD   UCD

DN field
The directory number assigned to the voice agent.
Values: 7 digits

Figure 104
CUSTGRP field in table IBNLINES

2 0 0 2   0   DT   STN   IBN   6845051   **NORTH**   0   0   214   COD   UCD

CUSTGRP field
Specify the line's customer group. For NMW, use the UCD voice message customer group.
Values: alphanumeric

Figure 105
SUBGRP field in table IBNLINES

2 0 0 2   0   DT   STN   IBN   6845051   NORTH   **0**   0   214   COD   UCD

SUBGRP field
Specify the subgroup of the customer group.
Range of values: 0-7

Figure 106
NCOS field in table IBNLINES

2 0 0 2   0   DT   STN   IBN   6845051   NORTH   0   **0**   214   COD   UCD

NCOS field
Specify the network class of service.
Range of values: 0-255

Figure 107
SNPA field in table IBNLINES

2 0 0 2   0   DT   STN   IBN   6845051   NORTH   0   0   **214**   COD   UCD

SNPA field
Specify the serving numbering plan area of the agent.
Values: XXX

Figure 108
OPTLIST field in table IBNLINES

2 0 0 2 0 DT STN IBN 6845051 NORTH 0 0 214 **COD** **UCD**

> ***OPTLIST* field**
> Specify the UCD options. For NMW,
> enter COD (cutoff on disconnect)
> and UCD (uniform call distribution).
> ***Values:*** UCD, COD, 3WC

Table IBNFEAT
Use table IBNFEAT to assign SMDI, CNF C06, and EMW options to
UCD agents. You can enter this information by using SERVORD.

Datafill sequence – There is no change to the datafill sequence.

Sample datafill – 2 0 0 2 0 SMDI 1 USGROUP Y 2 0 0 2 0
CNF CNF 3 0 0 3 0 MWT MWT 4 0 0 4 0 EMW EMW MWL
CLASSA

Figure 109 through Figure 117 on page 190 provide information about
the individual fields in the table IBNFEAT sample tuple.

Figure 109
LEN field in table IBNFEAT

2 0 0 2 0 SMDI 1 USGROUP Y
2 0 0 2 0 CNF CNF
2 0 0 2 0 MWT MWT
2 0 0 2 0 EMW EMW MWL CLASSA

> ***LEN* field**
> The line equipment number of the
> agent; set this value in table LNINV.
> Includes subfields SITE, FRAME,
> UNIT, DRAWER, SHELF, SLOT, and
> CIRCUIT.
> ***Values:*** numbers

Figure 110
DNNO field in table IBNFEAT

```
2 0 0 2  0  SMDI   1    USGROUP   Y

2 0 0 2  0  CNF    CNF

2 0 0 2  0  MWT    MWT

2 0 0 2  0  EMW    EMW    MWL    CLASSA
```

DNNO **field**

Directory number field; specify to
which DN on the LEN is being
referenced.

Values: 0

Figure 111
DF field in table IBNFEAT

```
2 0 0 2  0  SMDI   1    USGROUP   Y

2 0 0 2  0  CNF    CNF

2 0 0 2  0  MWT    MWT

2 0 0 2  0  EMW    EMW    MWL    CLASSA
```

DF **field**

Specify the data feature. Depending
on how the NMW feature is activated,
enter SMDI, CNF (conference),
MWT (IBN sets), or EMW (executive
message waiting).

Value: SMDI, CNF, MWT, or EMW

Figure 112
LINENO field in table IBNFEAT

```
2 0 0 2  0  SMDI   1    USGROUP   Y

2 0 0 2  0  CNF    CNF

2 0 0 2  0  MWT    MWT

2 0 0 2  0  EMW    EMW    MWL    CLASSA
```

LINENO **field**

Specify the line number of the SMDI
desk.

Range of values: 1-1024

Figure 113
FEATURE field in table IBNFEAT

```
2 0 0 2   0   SMDI   1     USGROUP   Y

2 0 0 2   0   CNF     CNF

2 0 0 2   0   MWT     MWT

2 0 0 2   0   EMW     EMW    MWL    CLASSA
```

FEATURE field
Specify the flexible station-controlled conference feature, the message waiting feature (for IBN sets), or the executive message waiting feature.
Values: CNF, MWT, or EMW

Figure 114
UCDGRP field in table IBNFEAT

```
2 0 0 2   0   SMDI   1     USGROUP   Y

2 0 0 2   0   CNF     CNF

2 0 0 2   0   MWT     MWT

2 0 0 2   0   EMW     EMW    MWL    CLASSA
```

UCDGRP field

Specify the voice messaging UCD group.
Values: 1-16 alphanumeric characters

Figure 115
NOTICE field in table IBNFEAT

```
2 0 0 2   0   SMDI   1     USGROUP   Y

2 0 0 2   0   CNF     CNF

2 0 0 2   0   MWT     MWT

2 0 0 2   0   EMW     EMW    MWL    CLASSA
```

NOTICE field
The type of NMW notice to be given
Values: MWL, for message waiting lamp
STD, for stuttered dial tone

Figure 116
AUTOLOG field in table IBNFEAT

```
2 0 0 2   0   SMDI   1    USGROUP   Y

2 0 0 2   0   CNF     CNF

2 0 0 2   0   MWT     MWT

2 0 0 2   0   EMW     EMW   MWL   CLASSA
```

AUTOLOG field

Use this field to activate the autolog
feature. For NMW, set to Y.
Value: Y

Figure 117
MAILBOX field in table IBNFEAT

```
2 0 0 2   0   SMDI   1    USGROUP   Y

2 0 0 2   0   CNF     CNF

2 0 0 2   0   MWT     MWT

2 0 0 2   0   EMW     EMW   MWL   CLASSA
```

MAILBOX field

Enter the mailbox class of service
assigned to the LEN.
Values: CLASSA, CLASSB,
             CLASSC, . . . CLASSP

Table DNROUTE
Use table DNROUTE to define the message service DN for the voice
message UCD group on the host node.

Datafill sequence – Datafill table UCDGRP before table DNROUTE.

Sample datafill – 214 684 5000 FEAT UCD USGROUP PRIM 0

Figure 118 through Figure 125 on page 192 provide information about
the individual fields in the table DNROUTE sample tuple.

Figure 118
AREACODE field in table DNROUTE

```
214   684   5000   FEAT   UCD    USGROUP    PRIM    0
```

AREACODE field

Specify the serving numbering plan
area of the voice message host
node.
Value: three digits

Figure 119
OFCCODE field in table DNROUTE

214   **684**   5000   FEAT   UCD   USGROUP   PRIM   0

OFCCODE **field**

The NXX of the numbering plan area (NPA).
Value: three digits

Figure 120
STNCODE field in table DNROUTE

214   684   **5000**   FEAT   UCD   USGROUP   PRIM   0

STNCODE **field**

The DN of the voice service
Value: four digits

Figure 121
DNSEL field in table DNROUTE

214   684   5000   **FEAT**   UCD   USGROUP   PRIM   0

DNSEL **field**

The DN select field; specify that the number entered in the previous three fields is assigned to a feature.
Value: FEAT

Figure 122
FEAT field in table DNROUTE

214   684   5000   FEAT   **UCD**   USGROUP   PRIM   0

FEAT **field**

Specify a UCD group.
Value: UCD

Figure 123
UCDGRP field in table DNROUTE

214   684   5000   FEAT   UCD   **USGROUP**   PRIM   0

UCDGRP **field**

The UCD group previously specified in the UCDNAME field in table UCDGRP
Value: alphanumeric

Figure 124
DNTYPE field in table DNROUTE

| 214 | 684 | 5000 | FEAT | UCD | USGROUP | **PRIM** | 0 |

***DNTYPE* field**
Specify the primary group.
Value: PRIM

Figure 125
TOLLPRI field in table DNROUTE

| 214 | 684 | 5000 | FEAT | UCD | USGROUP | PRIM | **0** |

***TOLLPRI* field**
Specify the toll call priority.
Range of values: 0-3

Table NMSDATA
Use table NMSDATA to differentiate customers on a message center
host node with multiple customers.

Datafill sequence – There is no change to the datafill sequence.

Sample datafill – 2146841000   NORTHPVT   2146842384

Figure 126 through Figure 128 on page 193 provide information about
the individual fields in the table NMSDATA sample tuple.

Figure 126
KEY field in table NMSDATA

| **2146841000** | NORTHPVT | 2146842384 |

***KEY* field**
The NMS data key consists of the
subfields SVGNPA, NNX, and
DEFGDIGS; the same digits as in the
AREACODE, OFCCODE, and
STNCODE fields of table DNROUTE.
Value: a 10-digit number

Figure 127
NETNAME field in table NMSDATA

2146841000   NORTHPVT   2146842384

***NETNAME* field**

Customer group name; the same as
the NETNAME field in table
NETNAMES

Value: 1-32 alphanumeric
          characters

Figure 128
NMSID field in table NMSDATA

2146841000   NORTHPVT   2146842384

***NMSID*   field**

The network message service
identifier

Value: a number of up to 10-digits

Table KSETFEAT
Use table KSETFEAT to assign the MWI key to voice message
subscribers with key sets. You can enter this information using
SERVORD.

Datafill sequence – There is no change to the datafill sequence.

Sample datafill – 4 0 0 0 8 MWT YES ALL NO

Figure 129 through provide information about
the individual fields in the table KSETFEAT sample tuple.

Figure 129
LEN field in table KSETFEAT

4 0 0 0   8   MWT   YES   ALL   NO

***LEN* field**

The line equipment number of the
subscriber; set this value in table
LNINV. Includes subfields SITE,
FRAME, UNIT, DRAWER, and
CIRCUIT.

Values: numeric

Figure 130
KEY field in table KSETFEAT

4 0 0 0   **8**   MWT   YES   ALL   NO

KEY **field**
Specify the key used on a set which
activates NMW.
Value: key number

Figure 131
FEAT field in table KSETFEAT

4 0 0 0   8   **MWT**   YES   ALL   NO

FEAT **field**
Use this field to assign the message
waiting feature.
Value: MWT

Figure 132
CAR field in table KSETFEAT

4 0 0 0   8   MWT   **YES**   ALL   NO

CAR **field**
Specify Y if the line makes call
requests against other lines or
receives them from other lines.
Value: Y, N

Figure 133
CRRCFW field in table KSETFEAT

4 0 0 0   8   MWT   YES   **ALL**   NO

CRRCFW **field**
Allow call request retrieval to forward.
Value: ALL

Figure 134
CRX field in table KSETFEAT

4 0 0 0   8   MWT   YES   ALL   **NO**

CRX **field**
Exempt line from having call requests
placed by other lines.
Value: N (No, default)

Table NETNAMES
Table NETNAMES allows you to assign a unique name and numerical ID to each switch on a private network. NMW requires a public tuple.

Datafill sequence – There is no change to the datafill sequence.

Sample datafill – NORTHPVT 1 7 ? FACREJ NMSTBRTE PUBLIC 1 7 ? FACREJ NMSTBRTE

Figure 135 through Figure 138 on page 196 provide information about the individual fields in the table NETNAMES sample tuple.

Figure 135
NETNAME field in table NETNAMES

NORTHPVT	1	7	?	FACREJ	NMSTBRTE
PUBLIC	1	7	?	FACREJ	NMSTBRTE

NETNAME **field**
Assigns a name to a private network; identifies a customer group.
Value: 1-32 alphanumeric characters

Figure 136
EXTNETID field in table NETNAMES

NORTHPVT	1	7	?	FACREJ	NMSTBRTE
PUBLIC	1	7	?	FACREJ	NMSTBRTE

EXTNETID **field**
The external network identifier; each switch must have a unique number.
Value: 1-32767

Figure 137
NETDIGS field in table NETNAMES

NORTHPVT	1	7	?	FACREJ	NMSTBRTE
PUBLIC	1	7	?	FACREJ	NMSTBRTE

NETDIGS **field**
A value representing the number of digits used by the logical network; used to extract the correct number of digits from the stored DN
Range of values: 0-10

Figure 138
NETOPTS field in table NETNAMES

NORTHPVT	1	7	**?**	**FACREJ**	**NMSTBRTE**
PUBLIC	1	7	**?**	**FACREJ**	**NMSTBRTE**

NETOPTS field
Specify the network options for NMW.
Values:
FACREJ: Determines whether the facility reject method is sent to the originator when the PRI facility reject message cannot be routed to the destination.
NMSTBRTE: Allows TCAP NMW messages to be routed through table MSGRTE.

Table CUSTNTWK
Table CUSTNTWK associates a customer name with the NETNAME defined in table NETNAMES and assigns a global customer group identifier.

Datafill sequence – Datafill the NETNAME field in table NETNAMES before doing this table.

Sample datafill – NORTH NORTHPVT 1 ?

Figure 139 through Figure 142 on page 197 provide information about the individual fields in the table CUSTNTWK sample tuple.

Figure 139
CUSTNAME field in table CUSTNTWK

NORTH	NORTHPVT	1	?

CUSTNAME field
Customer group name
Value: 1-16 alphanumeric characters

Figure 140
NETNAME field in table CUSTNTWK

NORTH	NORTHPVT	1	?

NETNAME field
Must be the same as the NETNAME field in table NETNAMES
Value: 1-32 alphanumeric characters

Figure 141
NETCGID field in table CUSTNTWK

<div>

NORTH   NORTHPVT   **1**   **?**

NETCGID field

Network customer group identifier;
must be the same as the EXTNETID
in table NETNAMES
Value: 1-4096

</div>

Figure 142
OPTION field in table CUSTNTWK

<div>

NORTH   NORTHPVT   1   **?**

OPTION field

Enter NTWKEMW to assign the
network executive message waiting
feature.

</div>

Table MSGRTE

Table MSGRTE provides the routing information for the facility
message. It determines whether the message terminates on the local
switch or is sent to another switch. NMW requires a public network
tuple. The first and third tuples route messages to a remote node. The
second and fourth tuples route facility messages from a remote node.

Datafill sequence – You must datafill the network name in table
NETNAMES before assigning the NETID field in table MSGRTE.

Sample datafill – MSGRTKEY MSGRTRES NORTHPVT 646 646
(PRA PRITRK 0 N $) $ NORTHPVT 444 444 (LOCAL 3 214684) $
PUBLIC 684   684 (PRA PRITRK 0 N $) $ PUBLIC 444 444 (LOCAL 3
214684) $

Figure 143 through provide information about
the individual fields in the table MSGRTE sample tuple.

Figure 143
MSGRTKEY field in table MSGRTE

```
MSGRTEKEY                                    MSGRTES

NORTHPVT    646    646    (PRA    PRITRK    0   N   $)  $

NORTHPVT    444    444    (LOCAL    3    214684)  $

PUBLIC      684    684    (PRA    PRITRK    0   N   $)  $

PUBLIC      444    444    (LOCAL    3    214684)  $
```

MSGRTKEY **field**
Determines whether facility messages
are routed by the network ID or by
a range of digits

Figure 144
MSGRTRES field in table MSGRTE

```
MSGRTEKEY                                    MSGRTES

NORTHPVT    646    646    (PRA    PRITRK    0   N   $)  $

NORTHPVT    444    444    (LOCAL    3    214684)  $

PUBLIC      684    684    (PRA    PRITRK    0   N   $)  $

PUBLIC      444    444    (LOCAL    3    214684)  $
```

MSGRTRES **field**
The message route result field
contains a list of the routes used to
transmit facility messages. Up to
four routes can be datafilled. Enter
MSGRTSEL.

Figure 145
NETID field in table MSGRTE

```
MSGRTEKEY                                    MSGRTES

NORTHPVT    646    646    (PRA    PRITRK    0   N   $)  $

NORTHPVT    444    444    (LOCAL    3    214684)  $

PUBLIC      684    684    (PRA    PRITRK    0   N   $)  $

PUBLIC      444    444    (LOCAL    3    214684)  $
```

NETID **field**
Network name; must first be
datafilled in table NETNAMES. The
highlighted entries are for outgoing
and incoming private networks.
Value: 1-32 alphanumeric
           characters

Figure 146
FROMDIGS field in table MSGRTE

MSGRTEKEY			MSGRTES
NORTHPVT	**646**	646	(PRA PRITRK 0 N $) $
NORTHPVT	**444**	444	(LOCAL 3 214684) $
PUBLIC	**684**	684	(PRA PRITRK 0 N $) $
PUBLIC	**444**	444	(LOCAL 3 214684) $

FROMDIGS field
Specify the first number of a range of destination digits.
Value: numeric

Figure 147
TODIGS field in table MSGRTE

MSGRTEKEY			MSGRTES
NORTHPVT	646	**646**	(PRA PRITRK 0 N $) $
NORTHPVT	444	**444**	(LOCAL 3 214684) $
PUBLIC	684	**684**	(PRA PRITRK 0 N $) $
PUBLIC	444	**444**	(LOCAL 3 214684) $

TODIGS field
Specify the last number of a range of destination digits. Can be the same value as FROMDIGS.
Value: numeric

Figure 148
MSGRTSEL (PRA) field in table MSGRTE

```
MSGRTEKEY                                          MSGRTES
NORTHPVT    646    646    (PRA    PRITRK   0      $)  $

NORTHPVT    444    444    (LOCAL    3   214684) $

PUBLIC      684    684    (PRA    PRITRK   0   N  $)  $

PUBLIC      444    444    (LOCAL    3   214684) $
```

MSGRTSEL field

Message route selector. Enter PRA for outgoing routes. The PRA
subfields are:

TRKCLLI: Trunk CLLI name, 1-16 alphanumeric characters
DELDIGS: Number of digits (0-10) deleted from the destination
address
PREDIGS: Number of digits (up to 11) added to the destination
address
OPTIONS: Enter $ or NEWNET to access subfield NETNAME.
NETNAME: Name used to replace the network identifier in the
facility message. Must first be specified in table NETNAMES.

Figure 149
MSGRTSEL (LOCAL) field in table MSGRTE

```
MSGRTEKEY                                          MSGRTES
NORTHPVT    646    646    (PRA    PRITRK   0   N  $)  $

NORTHPVT    444    444    (LOCAL    3   214684) $

PUBLIC      684    684    (PRA    PRITRK   0   N  $)  $

PUBLIC      444    444    (LOCAL    3   214684) $
```

MSGRTSEL field

Message route selector. Enter LOCAL for incoming routes on a
private network. The LOCAL subfields are:
DELDIGS: Number of digits (0-15) to be deleted
PREDIGS: Digit string (up to 11 digits) to be prefixed to the
destination address

Figure 150
MSGRTSEL (PRA) field in table MSGRTE

```
MSGRTEKEY                                    MSGRTES
NORTHPVT   646   646   (PRA   PRITRK   0   N   $) $

NORTHPVT   444   444   (LOCAL    3   214684) $

PUBLIC     684   684   (PRA   PRITRK   0       $) $

PUBLIC     444   444   (LOCAL    3   214684) $
```

MSGRTSEL field

Message route selector. Enter PRA for outgoing routes. The PRA subfields are:

TRKCLLI: Trunk CLLI name, 1-16 alphanumeric characters
DELDIGS: Number of digits (0-15) deleted from the destination address
PREDIGS: Number of digits (up to 11) added to the destination address
OPTIONS: Enter $ or NEWNET to access subfield NETNAME.
NETNAME: Enter PUBLIC
TYPEOFRT: Enter PUB

Figure 151
MSGRTSEL (LOCAL) field in table MSGRTE

```
MSGRTEKEY                                    MSGRTES
NORTHPVT   646   646   (PRA   PRITRK   0   N   $) $

NORTHPVT   444   444   (LOCAL    3   214684) $

PUBLIC     684   684   (PRA   PRITRK   0   N   $) $

PUBLIC     444   444   (LOCAL    3   214684) $
```

MSGRTSEL field

Message route selector. Enter LOCAL for incoming routes on a public network. The LOCAL subfields are:

DELDIGS: Number of digits (0-15) to be deleted
PREDIGS: Digit string (up to 11 digits) to be prefixed to the destination address

Feature interactions

Network Message Waiting creates interactions with Network Call Redirection and Meridian Mail.

Network Call Redirection

Network Message Waiting uses the calling party and original call party (OCN) information elements created by the Network Call Redirection feature.
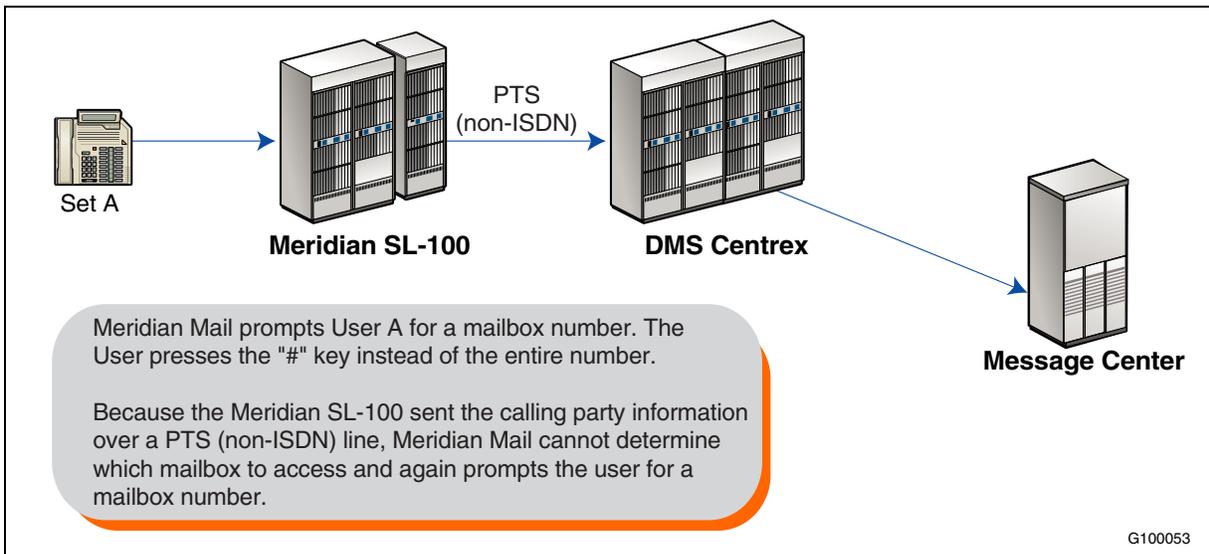
During redirected calls to Meridian Mail – Meridian Mail uses the OCN of the first redirecting party. The OCN determines whether a valid mailbox exists and whether Meridian Mail uses an internal or external greeting.

During direct calls to Meridian Mail – Meridian Mail uses the calling party information to determine whether the user must enter a mailbox number during the logon procedure.

Meridian Mail: Unknown mailbox number – Figure 152 shows what happens when Meridian Mail does not receive calling party information and cannot determine which mailbox to access.

Figure 152
Meridian Mail: Unknown mailbox number

PTS
(non-ISDN)

Set A

Meridian SL-100

DMS Centrex

Message Center

Meridian Mail prompts User A for a mailbox number. The User presses the "#" key instead of the entire number.

Because the Meridian SL-100 sent the calling party information over a PTS (non-ISDN) line, Meridian Mail cannot determine which mailbox to access and again prompts the user for a mailbox number.

G100053

Operational measurements
Meridian 1 operational measurements
There are no NMW operational measurements on the Meridian 1.

Meridian SL-100 operational measurements
The following operational measurements on the Meridian SL-100 relate to NMW:

- **TCAPUSAG** – TCAP messages sent to activate NMW.

- **TCAPERRS** – TCAP errors.

- **SLLNK** – Meridian SL-100 outgoing link; peg count of NMW by customer group.

- **SLLNKINC** – Meridian SL-100 incoming link; peg count of NMW by customer group.

- **MWTCAR** – Message waiting call request; peg count of NMW feature use, traffic measurements, and software or hardware failures that affect NMW feature usage.

- **MWTCAR2** – Message waiting call request; peg count of the number of times a message is queued against a line with NMW.

Logs

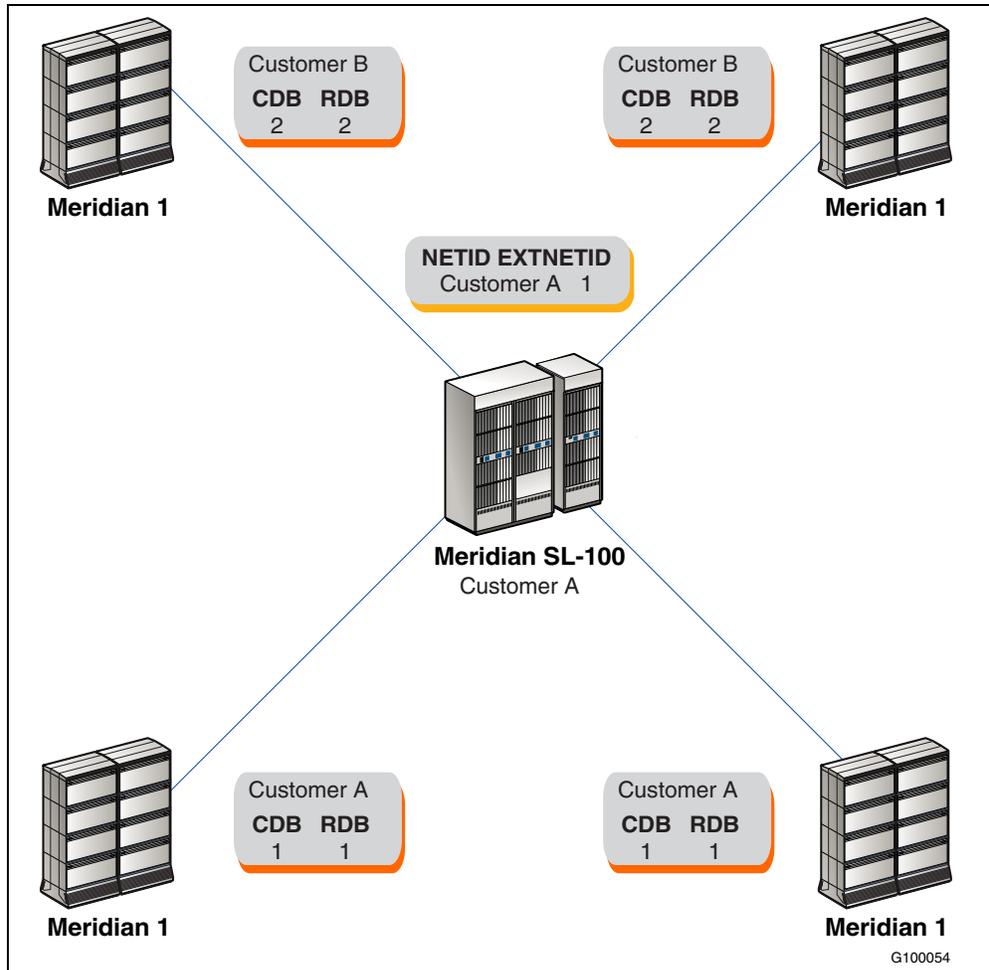There are no NMW logs on the Meridian 1 or the Meridian SL-100.

Service orders

For the Meridian SL-100, while the datafill for tables IBNLINES, IBNFEAT, and KSETFEAT is included in the datafill and translation section of this chapter, you datafill these tables by service order (SERVORD).

Interworking

Figure 153 on page 204 shows the Meridian SL-100 EXTNETID values and the Meridian 1 PNI values in a hypothetical, multi-customer network.

**Figure 153
EXTNETID and PNI values on a Meridian 1/Meridian SL-100
network**

Customer B
CDB   RDB
  2   2

Customer B
CDB   RDB
  2   2

Meridian 1

Meridian 1

NETID EXTNETID
Customer A   1

Meridian SL-100
Customer A

Customer A
CDB   RDB
  1   1

Customer A
CDB   RDB
  1   1

Meridian 1

Meridian 1

G100054

H.323 (CS 2100/CS 1000) Voice Mail interworking

Overview

H.323 (CS2100/CS 1000) Voice Mail interworking is a feature available in networks of Communication Server 2100s and 1000s that are connected by H.323 Virtual Trunks. This functionality provides Message Waiting (MWT) service access using an H.323 network. In this feature, the Communication Server 1000 (CS 1000) telephone voice mail boxes are configured in a Call Pilot that hangs off the Communication Server 2100 (CS 2100). Meridian Customer Defined Networking (MCDN) peer-to-peer calls within the private network (or Virtual Private Network) use Private Network Identifiers (PNIs). The CS 2100 does not support PNIs and, consequently, the facility messages carrying Message Waiting Indicator (MWI) information from the CS 2100 are not processed on the CS 1000 end. The end result is that the telephones in the CS 1000 do not get MWI. With this feature, the CS 1000 assigns the value of "1" to any PNI place holder in incoming facility messages. Consequently, MWI facility messages from the CS 2100 side can be processed.
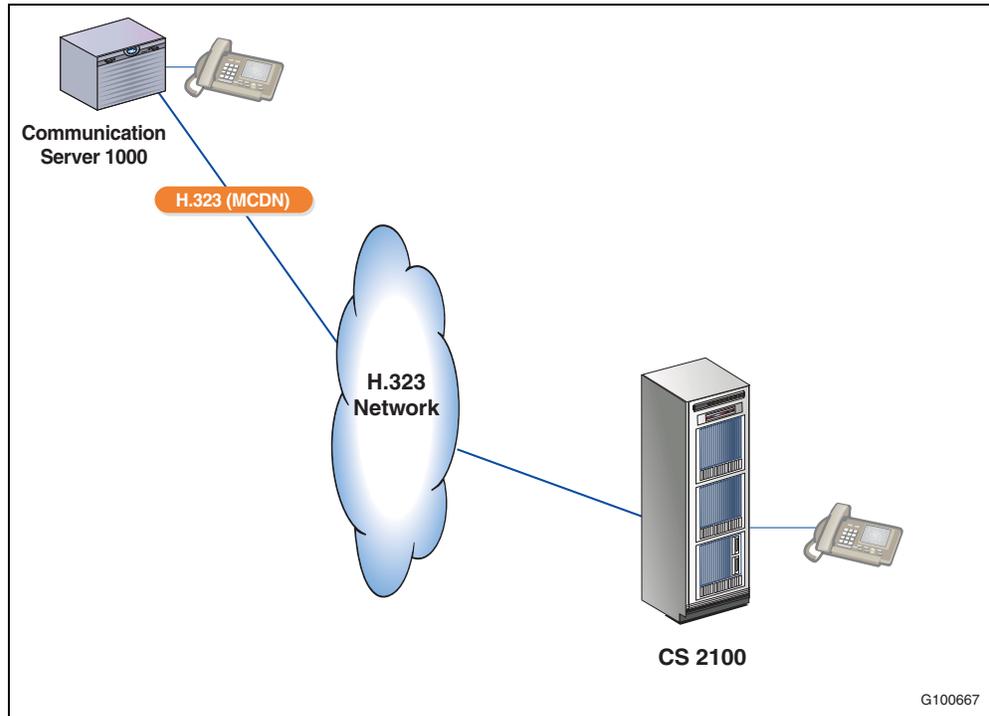
The following figure depicts a centralized and H.323 Voice Mail system in interworking CS 2100s.

Figure 154
Centralized Voice Mail

G100666
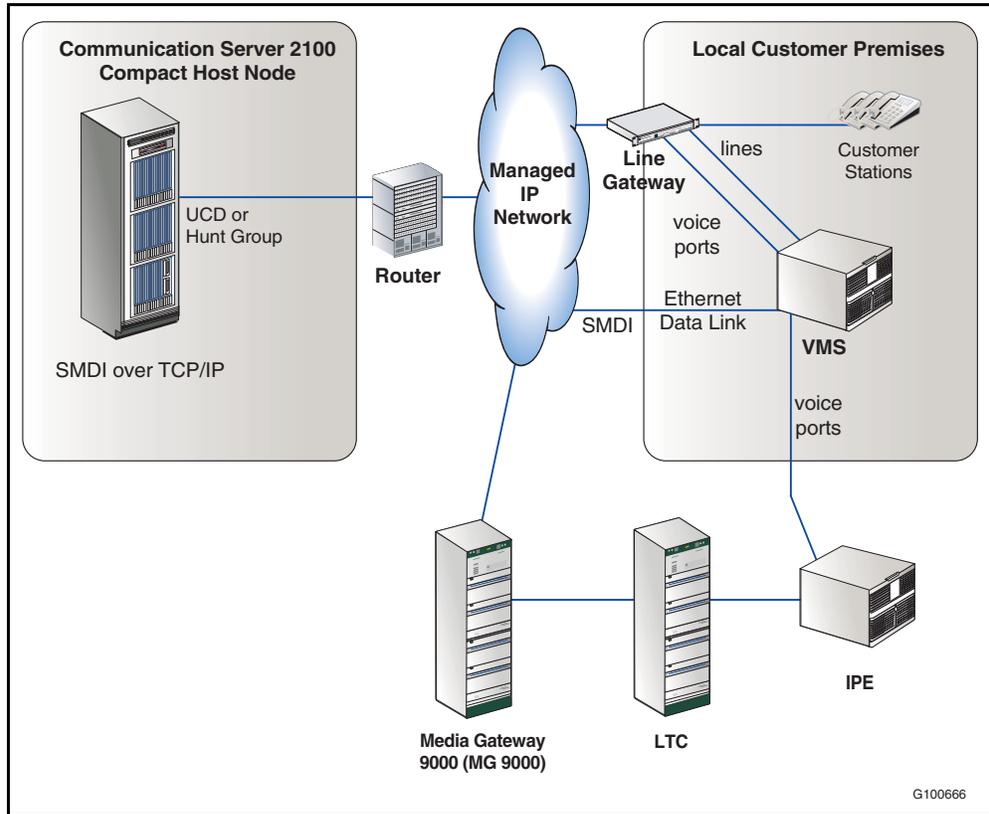
The following figure shows H.323 CS 2100 to CS 1000 Voice Mail interworking

Figure 155
H.323 CS 2100 to CS 1000 Voice Mail interworking

Network Message Waiting Service access using H.323 network

The Message Waiting (MWT) service is a Communication Server 2100(CS 2100) Core based service. MWT includes the following:

- a Voice Mail system (VM) to record and retrieve voice messages

- a communication link between the CS 2100 Core and VM

- the MWT service control in the core

- end-user devices to provide MWT indication (MWI) and CS 2100 core-based redirection services, such as Call Forward Do Not Answer (CFD)

The MWT functionality was expanded to use the H.323 protocol in a converged network, and support H.323 communication between the Communication Server 2100 and a Communication Server 1000.

Message Waiting service access using H.323 supports

- traditional phones such as IBN, KSET, MBS and TAURUS.

- IPCM IP sets.

- traditional SMDI and UCD/HUNT group to VM.

- Network VM using a public SS7 network.

- Network VM using a private network (PRA).

- Network VM connected to a CS 1000 or CS 1000M using MCDN data in H.450 private data messages.

This feature develops a converged network with Message Waiting where VM or Message Server (MsgSrv) and the user device, respectively, can reside in any network. This feature supports the communication required for MWT in this architecture.

This feature provides MWT support across different types of networks and offers the following advantages:

- support of MWI on the user's choice of device

- consolidation of the VM system in the network

- converged network support

- MWI to CS 1000 or CS 1000M

Supported configurations

The following two configurations (described below) are supported:

- Voice Mail or MsgSrv system configurations

  — Network Voice Mail communication using H.323 protocol – This configuration considers the VM is connected to an H.323 node such as a CS 1000 or CS 1000M which communicates to the CS 2100 through the H.323 network

- Configurations of lines or clients – the following configurations are separated by the protocol used for communication between the CS 2100 and the line/client

  — Lines connected through ELCM/IPE/LCM/LCME – a phone line connected through ELCM/IPE/LCM/LCMEs using a PSTN network connected to the host node is supported.

  — Lines connected through Gateways. Lines connected through an MG9000 operate in the same way as traditional lines connected

to the CS 2100 through the ELCM/IPE/LCM/LCME. There is no change in set-up or operation.

— Lines connected to a remote node. Lines connected to a remote node (for instance, a PBX or another switch) are treated as network lines. For these lines, Network Message Waiting (NMS) service is provided.

— Single physical line with Multiple VM access. In the CS 2100 a single physical line may have access to multiple VM systems. This existing feature is introduced by datafilling the Call Forward on the single physical line.

— Multiple lines with single VM access (existing feature). For a VM to support multiple lines in a given CS 2100, the VM has each line provisioned as an individual user.

— Multiple lines with multiple VM access.

SOC control

The new functionality is controlled by the following Software Optionality Control (SOC):

• CS2C0004 – H.232 Network Support. The SOC becomes visible in pure CS 2100 and CS 2100 Hybrid systems.

• SMDI0001 – SMDI over IP Support.

Hardware requirements

There are no new hardware requirements for the Communication Server 2100.

Software requirements

This feature requires SE08 software load for the Communication Server 2100 and Release 4.5 for the Communication Server 1000.

Limitations and restrictions

The following limitations or restrictions apply to CS 2100:

• H.450.7 Message Waiting is not supported due to the limitations RADIVISION stack (third party).

• CS 1000 or CS 1000M are the only remote H.323 systems supported by this feature.

• H.323 public message waiting using Digital Private Network Signaling System (DPNSS) is not supported.

• The Call Request Retrieval (CRR) functionality cannot be invoked as the second leg of a Three Way Call (TWC). This is a fraud prevention limitation.

- The MWT functionality is only provided to a Multiple Appearance Directory Number (MADN) primary member.

- The MWT functionality is only provided to HUNT group primary members.

- Only Message Center ID (MSRID), and originating Endpoint (REQUESTOR) information, will be provided in the optional data. Remaining optional data is neither supported nor allowed.

- All existing MWT and NMS service limitations apply to this feature.

- In cases where a line is connected to a CS 2100, the VM is connected to a CS 1000 or CS 1000M, and a G729 compatible codec is used for interconnect voice paths, the remote H.323 node or device must support RFC 2833 for out-of-band signaling. This also applies when the line is connected to a remote H.323 (for example, an IP PBX) and VM is connected to a CS 2100.

- The CS 2100 must send only MCDN data in the H.323 message when communicating with the remote H.323 node.

- The CS 2100 receives only MCDN data in the H.323 message when communicating with the remote H.323 node. If H.450.7 data is included, the CS 2100 will discard it. Only MCDN data is used.

- E.164 qualified DNs are supported in H.323 networks. However, if the VM communication is based on SMDI, only 10-digit DNs are allowed because of existing limitations within SMDI.

Limitations and restrictions for the CS 1000 Message Waiting service access using H.323 are as follows:

- Does not support 450.7.

- Does not cover development needed in a Voice Mail system and H.323 gateways.

- Supports only Meridian Customer Defined Networking (MCDN) based MWT service.

Interactions

Existing MWT and NMS service software is used for this feature and, therefore, existing interactions apply for this feature.

Datafill

The following example is a sample datafill for this feature.

Figure 156
Sample datafill

```
TABLE MSGRTE
----------------
PUBLIC 214238 214238 (LOCAL 0 $) $
PUBLIC 214727 214727 (PRA PRAH323 0 $ (NEWNET MTL1) $)$

TABLE NETNAMES
----------------
PUBLIC 0 10 (NMDSP SETUP) (FACREJ ) (NMSTBRTE ) $
MTL1 1 10 (NMDSP QUERY) (NINTNRAG ) (NMRTNRAG ) (FACREJ ) (NMSTBRTE ) $
```

Operational Measurements

This feature introduces OM group NMSH323 in the DMS/CS 1000 Core and in the Session Server (NGSS) to track the message traffic between the CS 2100 Core and the H.323 Gateway Controller (GWC).

OM Group NMSH323 tracks the message traffic between the CS 2100 Core and the H.323 GWC.

The following table lists the OM fields and descriptions for OM group NMSH323.

Table 109
OM Registers in OM Group NMSH323

OM field	Description	Associated Logs
NMSFACST	NMSFACST records number of NMS FAC messages sent to the H.323 GWC.	NMSH111
NMSREJST	NMSREJST records number of NMS FACREJ messages sent to the H.323 GWC.	NMSH112
NMSFACRV	NMSFACRV records number of NMS FAC messages received from the H.323 GWC.	NMSH113
NMSREJRV	NMSREJRV records number of NMS FAC REJ messages received from the H.323 GWC.	NMSH114

The OM group NMSH323 registers display on the MAP terminal as in the following figure.

Figure 157
OM group NMSH323 registers on MAP terminal

```
NMSH323

CLASS: ACTIVE
START:2004/10/08 18:00:00 FRI; STOP: 2004/10/08 18:29:29 FRI;
SLOWSAMPLES:      18 ; FASTSAMPLES:      177 ;

    NMSFACST  NMSREJST  NMSFACRV  NMSREJRV

  0

          0      0      0      0
```

Logs

This feature adds four new logs in the NMS and MWT software.

The format for these Logs is:
<Switch ID>NMS111<DATE><TIME>INFO FAC_ERR_SNT_REPORT
Error occurred while sending NMS FAC MESSAGES TO H323 network.

The new logs that are generated when the associated OMs are not
pegged are described in the following table. These logs are also
generated when the CS 2100 encounters traffic congestion associated
with the H.323 Gateway.

Table 110
New Session Server (NGSS) Logs in CS 2100

Log	Associated OM	Description
NMSH111	NMSFACST	Log NMSH111 is generated when an error occurs while a non-CallIP NMS FAC message is being sent to an H.323 network. Example of Log: RTP308AS NMSH111 OCT01 12:54:31 7510 INFO FAC_ERR_SNT_REPORT Error occurred while sending NMS FAC messages to H323 network.
NMSH112	NMSREJST	Log NMSH112 is generated when an error occurs while a non-CallIP NMS FAC REJ message is being sent to an H.323 network. Example of log: TP308AS NMSH112 OCT01 11:54:31 5510 INFO FAC_ERR_SNT_REPORT Error occurred while sending NMS FAC REJ messages to H323 network.

Table 110
New Session Server (NGSS) Logs in CS 2100

Log	Associated OM	Description
NMSH113	NMSFACRV	Log NMSH113 is generated when an error occurs while a non-CallIP NMS FAC message is being received from an H.323 network. The FACILITY message received is corrupted. Example of Log: RTP308AS NMSH114 OCT01 13:10:31 9610 INFO REJ_ERR_RCV_REPORT Error occurred while receiving NMS FAC REJ messages from H323 network.
NMSH114	NMSREJRV	Log NMSH114 is generated when an error occurs while a non-CallIP NMS FAC REJ message is being received from an H.323 network. The FACILITY REJECT message received is corrupted. Example of Log: RTP308AS NMSH114 OCT01 13:10:31 9610 INFO REJ_ERR_RCV_REPORT Error occurred while receiving NMS FAC REJ messages from H323 network.

Action
When any of these logs are generated, check the communication between the CS 2100 and H.323 Gateway.

Billing
This feature does not affect billing.

References

lists related documents.

Table 111
Related documents

Document number	Document title
NTP 555-4001-806	*Communication Server 2100 Product Guide*
NTP 555-4001-124	*Voice Message Exchange Interface General Description*
NTP 555-4001-127	*Simplified Message Desk Interface Description and Implementation*
NTP 555-7101-100	*Call Pilot Networking Planning Guide*
NTP 555-7101-224	*Call Pilot Installation and Configuration (Part 3 T1/SMDI and Call Pilot Server Configuration)*

Anti-Tromboning

Purpose

This chapter describes how to eliminate tromboning, and maximize trunk usage, between Meridian 1 and Meridian SL-100 switches.

The chapter contains the following sections:

- **Introduction** – introduces the concepts behind anti-tromboning and provides a network example.
- **Meridian SL-100 configuration** – shows how to configure the Release Link Trunk (RLT) feature on the Meridian SL-100.
- **Meridian 1 configuration** – shows how to configure the Trunk Anti-tromboning (TAT) feature on the Meridian 1.
- **RLT/TAT anti-tromboning scenarios** – shows tromboning scenarios and example illustrations.
- **Operating parameters** – describes the operating parameters for anti-tromboning.
- **Feature interactions** – describes the anti-tromboning feature interactions.

  Note: Refer to **H.323 Release Link Trunks** for information and configuration details on that feature. The RLT over H.323 feature allows Communication Server 1000 customers to optimize calls over both RLT and TAT. That chapter also describes the interaction of Communication Server 1000s and Communication Server 2000/2100s in relation to these technologies in a network that includes CS 1000s and CS 2x00s.

Introduction

Tromboning is a situation in which the network uses two trunks in parallel for the same call. One trunk is established to handle an incoming call from a calling set at the originating node to a called set at the terminating node. A second trunk is then established to handle the loop-back of the same call that is redirected from the called station back to a different set at the originating node. The loop-back can result from

a call being treated by Network Message Services (for example, Meridian Mail, Network Call Redirection such as Network Call Forward All Calls, Network Call Forward No Answer, Network Call Forward Busy and Network Hunting). The loop-back can also be from call modification such as Call Transfer and Conference. These tromboned trunks are redundant.

Release Link Trunk was developed on the Meridian SL-100 in MSL07. RLT releases two PRI trunks while it bridges one call originating from the Meridian SL-100, redirected back from the Meridian 1 and terminating to a second call on the Meridian SL-100 after the call is answered. Trunk Anti-Tromboning (TAT) was developed on the Meridian 1 in release 21.35 to provide the same functionality as RLT on the Meridian SL-100. TAT eliminates the redundant trunks after the call is answered. TAT can interface to a DMS-100, DMS-250, Meridian SL-100 using RLT, and another Meridian 1 using TAT.

RLT works as network side ISDN protocol to a TAT user side protocol on the Meridian 1. The trunks must be setup this way for RLT and TAT to work.

Figure 158
Example of RLT/TAT
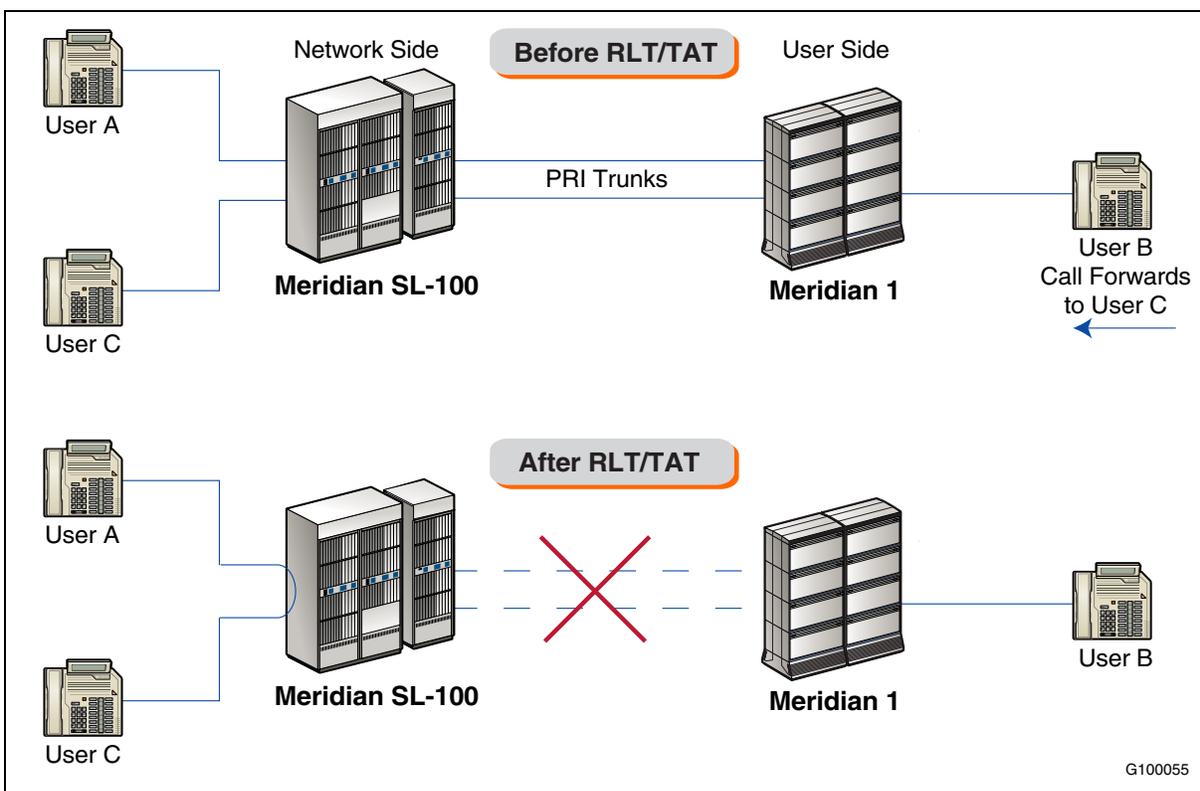
Meridian SL-100 configuration

The Meridian SL-100 requires the following software:

- MSL07
- ISDN Base platform support NI000007
- ISDN PRI platform support NI000022

The Meridian SL-100 requires the following hardware:

- NTX6X50AB T1 circuit card, one slot in the ISDN Digital Trunk Controller (DTCI)
- NTBX01AB enhanced ISDN signaling processor, one slot in the DTCI

Table datafill

Figure 159 shows table TRKGRP datafill needed for RLT.

Figure 159
Table TRKGRP datafill

```
TABLE:  ISDNPARM
Heading
NAME    MSGTYPE    MSGDIR    DFLTACT    PARMACT
TEST         SETUP        BOTH         MAP      $
Table TRKGRP
   Heading
   CLLI                                                          OPTION
RLTTEST   IBNT2  0  ELO  NCRT  CUSTGRP 0 0 5551212 ANDISC ....    MRLT


 TABLE:  TRKSGRP
 Heading
   CLLI
RLTTEST 0 DS1SIG ISDN 15 15 87Q931 2 N STAND NETWORK PT_PT USER N UNEQ
16 N   TEST   DTCI 0 6 18 64K HDLC $ $
```

The MRLT option allows the switch to enable RLT functionality on that trunk group. You must activate RLT using software optionality control (SOC).

Figure 159 also shows the datafill for table ISDNPARM. This table was datafilled so that the setup message was understood by the Meridian 1. Note that the name TEST is the name used in table TRKSGRP. This is what maps the two together.

Meridian 1 configuration

The Meridian 1 requires the following software:

- Release 21.35
- Package 312 Trunk Anti-Tromboning (TAT)
- Package 222 Multi-purpose Serial Data Link (MSDL)
- Package 145 Integrated Services Digital Network (ISDN)
- Package 146 1.5 Mbps Primary Rate Access (PRA) or Package 147 Integrated Services Digital Network Signaling Link (ISL)
- Package 148 Advanced ISDN Network Services (NTWK)

The Meridian 1 requires the following hardware:

- Option 51-81C:
  — NT6D80xx Multi-purpose Serial Data Link (MSDL circuit card) for the D-channel
  — QPC720 DTI/PRI circuit card
  — QPC414 Network circuit card
  — NTBX51xx D-channel daughter circuit card can be inserted into the NT5D12
- Option 11, 11E, and 11C:
  — NTAK09 DTI/PRI circuit card. Occupies one slot in the IPE shelf (that is, 1-9).
  — NTBK51 downloadable D-channel daughterboard.

Meridian 1 datafill

You must datafill LD 17 (Configuration record)

Table 112
LD 17 – Configuration record

Prompt	Response	Description
REQ	CHG	Change existing data.
Type	ADAN	Type of change.
- ADAN	NEW DCH xCHG DCH x	Action device and number. Add D-channel x. Change D-channel x.
CTYP	MSDL	Card type. MSDL = Multi-purpose Serial Data Link (for Options 51C, 61C, 81, and 81C) MSDL = Downloadable D-channel for Option 11.

Table 112
LD 17 – Configuration record

Prompt	Response	Description
CDNO	1-10	For the Option 11 only the card number for the downloadable D-channel.
PORT	0-3	Port number on MSDL cards. Only port 1 is valid for the Option 11.
- IFC	SL1 S100 D100 D250	Interface type for D-channel. You can enter SL1, S100, D100, or D250.
- RLS	xx	Release ID of the switch at the far end of the D-channel. You must enter Release 21 or higher.
- RCAP	TAT	Remote capabilities. You must enter TAT to enable Trunk Anti-Tromboning.

RLT/TAT anti-tromboning scenarios

The following scenarios are from the Meridian SL-100 standpoint. The examples show various anti-tromboning scenarios between the Meridian 1 and Meridian SL-100. The Meridian SL-100 is equipped with RLT functionality

The RLT/TAT functionality implements the network side of RLT on a Meridian SL-100 over PRI. This functionality works with the Meridian 1 TAT feature, but can work with other devices that follow the user-side RLT protocol described in ISDN Primary Rate User-Network interface specification, NIS A211-1.

In all cases, RLT and TAT involves the release of two B-channels that run between the network side at the Meridian SL-100 office and the user side at the Meridian 1. These two B-channels can be on the same PRI trunk group or on different PRI trunk groups on the Meridian SL-100. If the B-channels are on different PRI trunk groups, they must connect to the same Meridian SL-100 office and Meridian 1. The two Meridian 1 B-channels must belong to the same customer group and same D-channel. One B-channel carries a call that originates from the network side and terminates on the user side. This channel is referred to as channel 1. The call that is carried over the channel 1 is referred to as call 1.

The other B-channel carries a call that originates from the user side and terminates on the network side. This channel is referred to as channel 2. The call that is carried over channel 2 is referred to as call 2.

In order to invoke RLT/TAT, you must datafill the trunk groups that can involve RLT/TAT traffic for RLT on the Meridian SL-100 and TAT on the Meridian 1.

RLT/TAT anti-tromboning operation for network call redirection (example 1)

In Figure 160, RLT/TAT is applied to a network call redirection scenario (using call forward) with two Meridian 1s interworking with a Meridian SL-100:

- Station A is located at an originating switch (public CO or PBX) node. It makes an internodal call through the Meridian SL-100 and a tandem Meridian 1 node to Station B located at the terminating Meridian 1 node. This is represented in Figure 160 as the first call.

- Station B, which is located at the terminating Meridian 1 node, is call-forwarded through the tandem Meridian 1 node and the Meridian SL-100 to Station C. Station C is located at the originating switch. This is represented in Figure 160 as the redirected call.

4 Station C answers.

5 Station A connects to Station C.

Figure 160
RLT/TAT anti-tromboning for network call redirection (example 1)
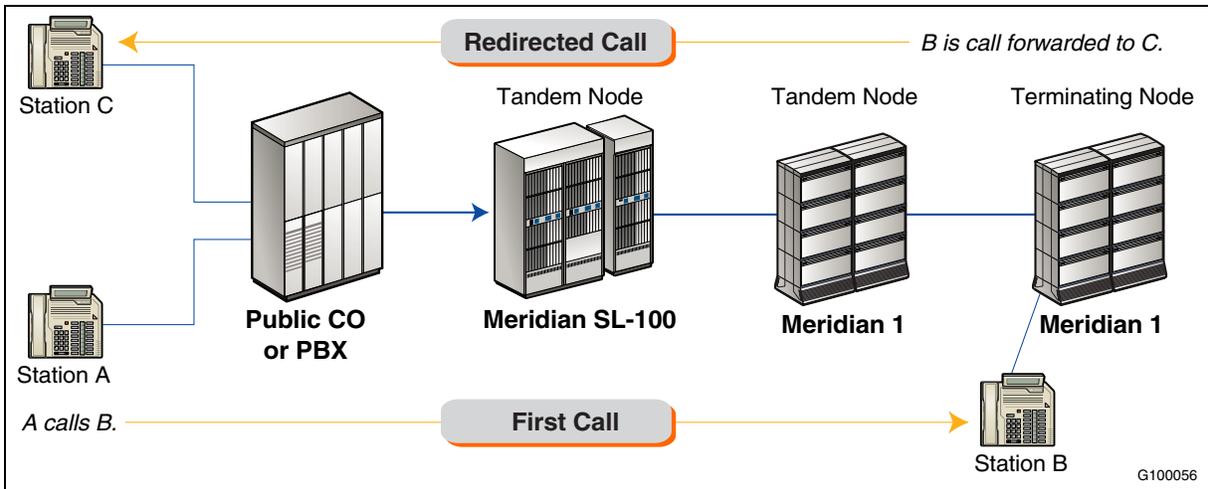

Figure 161 on page 221 shows the results of anti-tromboning after Station C answers the call.

1 The call is bridged at the Meridian SL-100 tandem node between Stations A and C.

2 TAT releases the trunks between the terminating Meridian 1 node and the tandem Meridian 1 node.

3 RLT releases the trunks between the tandem Meridian 1 and
Meridian SL-100 nodes.

Figure 161
Results of RLT/TAT anti-tromboning for network call redirection (example 1)
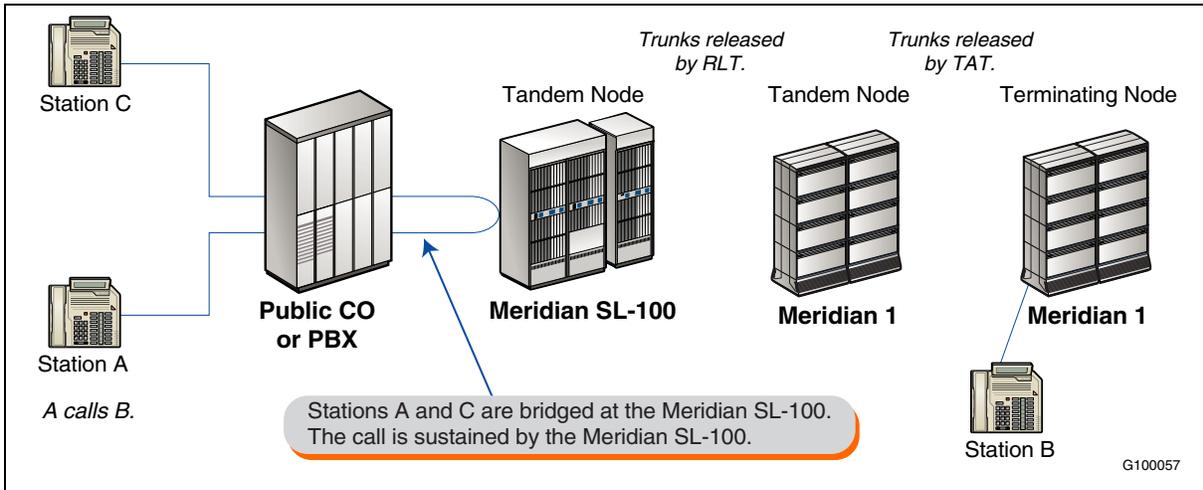
RLT/TAT Anti-tromboning operation for network call redirection (example 2)

Figure 162 on page 222 provides another example of RLT/TAT
optimizing redundant trunks due to call forwarding. In this example, the
trunks between a terminating Meridian 1 node and a tandem Meridian
1 node are optimized. The Meridian SL-100 acts as the originating
node. Station C is a centralized attendant or a Meridian Mail position.

1 Station A is located at an originating switch (public CO or PBX). It
makes an internodal call through tandem Meridian SL-100 and
Meridian 1 nodes to Station B, which is located at a terminating
Meridian 1 node. This is represented in Figure 162 on page 222 as
the first call.

2 Station B, which is located at the terminating Meridian 1 node, is
call-forwarded to Station C at the tandem Meridian 1 node. Station
C is either a centralized attendant or Meridian Mail position. This is
represented in Figure 162 on page 222 as the redirected call.

3 Station C answers.

4 Station A connects to Station C.

Figure 162
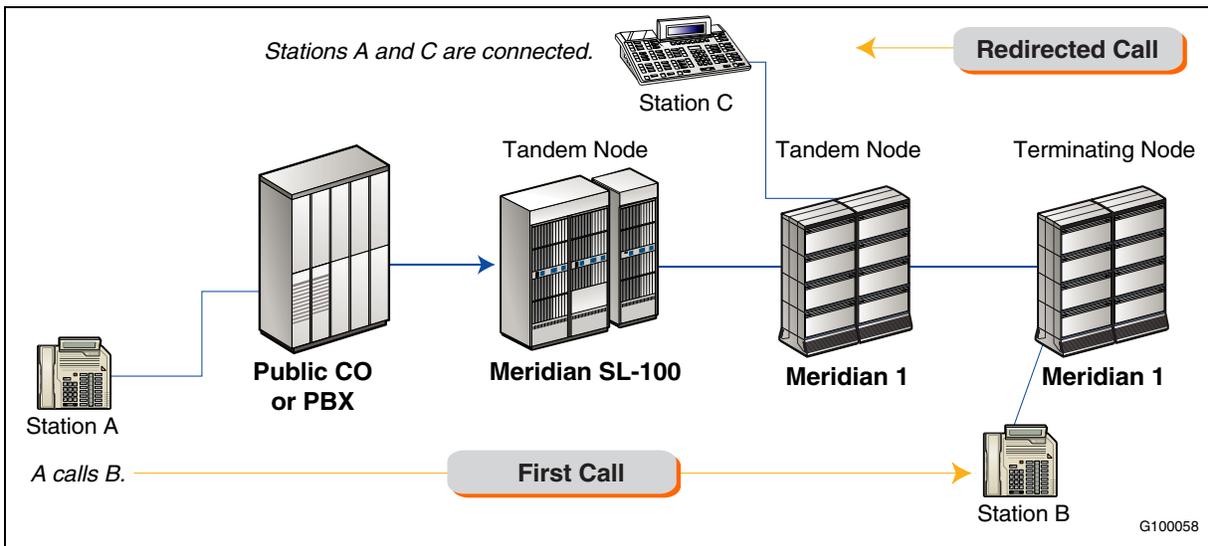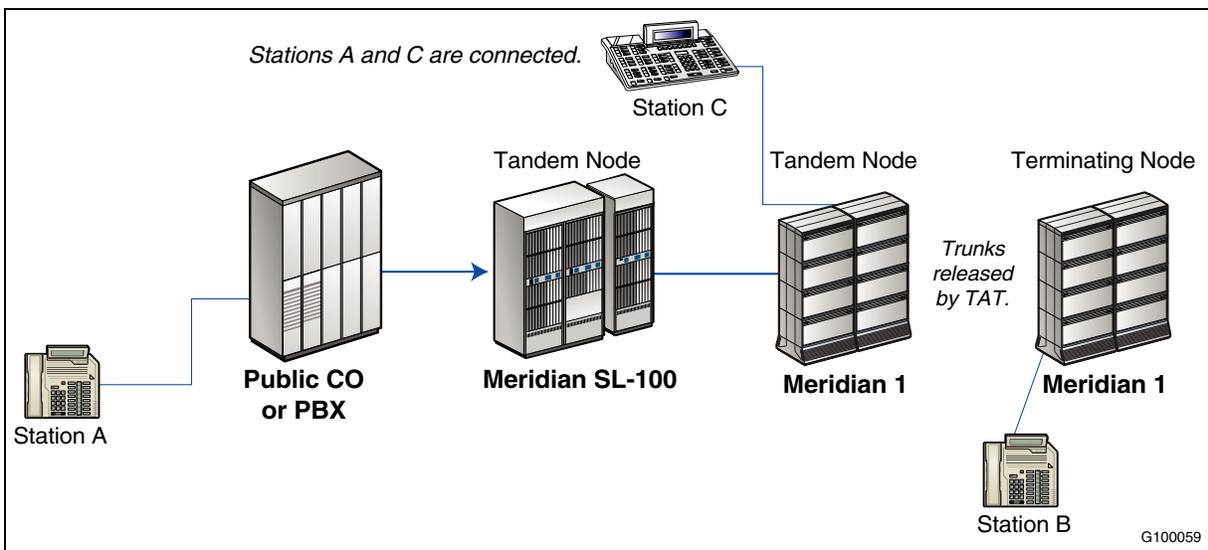**RLT/TAT anti-tromboning for network call redirection (example 2)**

Figure 163 shows the results of anti-tromboning after Station C answers the call.

1   TAT releases the trunks between the terminating Meridian 1 node and the tandem Meridian 1 node.

2   Stations A and C remain connected.

Figure 163
Results of RLT/TAT anti-tromboning for network call redirection (example 2)

RLT/TAT Anti-tromboning operation for call modification

Figure 164 shows RLT/TAT as applied to a call modification scenario with an Meridian SL-100 interworking with a Meridian 1 (using call transfer). Note that the same effect would occur if Station B conferences Station C into the call then drops out. This would still leave Stations A and C connected.

1   Station A is located at an originating Meridian 1 node and makes an internodal call through a tandem Meridian SL-100 node to Station B, which is located at a terminating Meridian 1 node. This is represented in Figure 164 as the first call.

2   Station B, which is located at a terminating Meridian 1 node, answers the call. Station B initiates a call transfer, through the tandem Meridian SL-100 node, to Station C, which is located at the originating Meridian 1 node. This is represented in Figure 164 as the second call.

3   Station C answers.

4   Station B completes the call transfer.

Figure 164
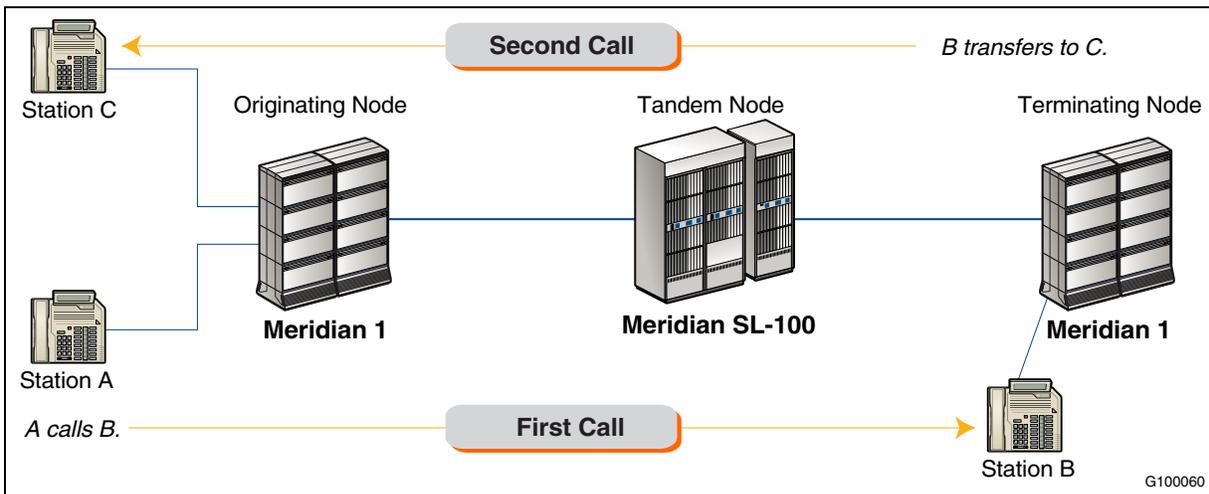**RLT/TAT anti-tromboning for call modification**

Figure 165 on page 224 shows the results of RLT/TAT anti-tromboning after Station C answers the call.

1   The call is bridged at the Meridian 1 originating node between Stations A and C.

2   RLT releases the trunks between the Meridian 1 terminating node and the Meridian SL-100 node and between the Meridian SL-100 node and the Meridian 1 originating node.

Figure 165
Results of RLT/TAT anti-tromboning for network call transfer
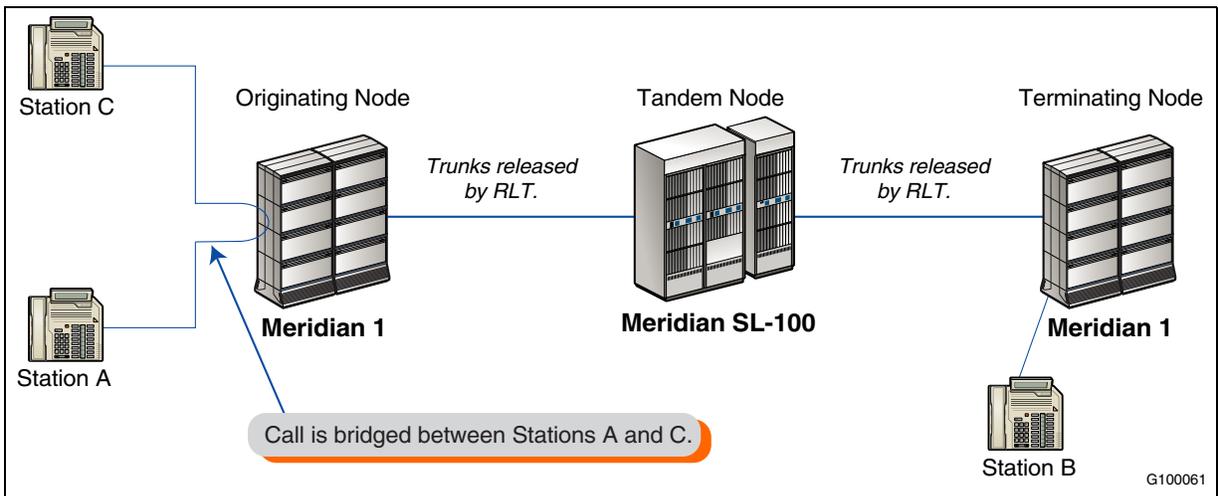
Operating parameters

The system performs anti-tromboning only after the third party answers provided that:

- the tromboned trunks are associated with the same primary D-channel (with or without a backup D-channel)

- the trunks are associated with the same customer

The system does not perform anti-tromboning for a tromboned call between two attendants on the same node.

There are two types of protocols used for TAT operations depending on the interface type. One protocol is for the Meridian 1 to Meridian 1 interface. The other protocol is for an Meridian 1 to Meridian SL-100 interface in which the Meridian SL-100 office is equipped with the RLT feature.

If non-ISDN trunks are involved in a call transfer call, the switch cannot send ISDN signaling messages, and does not perform anti-tromboning.

The system does not perform anti-tromboning for tromboned trunks associated with a call originated on a set that is routed back to the same set.

TAT can cause a momentary interruption in data transmission during optimization. When the network performs TAT operations at multiple tandem nodes, this effect is cumulative (in the milliseconds range). The impact of this loss is dependent on the terminals on each end of the transmission and can be recovered through retransmission.

Feature interactions

Table 113 shows the feature interactions.

Table 113
Anti-tromboning feature interactions

Feature	Interaction
Attendant	If an attendant position activates Busy Verify or Barge-in at the time that it receives a message to invoke TAT, the switch aborts the anti-tromboning operation.
Automatic Call Distribution (ACD)	The TAT feature performs anti-tromboning operations to eliminate the PRI trunks associated with the same D-channel due to the following ACD operations: • Enhanced Network Call Forward • Network ACD, Interflow Options • Enhanced Interflow If a supervisor is observing an ACD agent when the agent receives a message to invoke TAT, the switch aborts the anti-tromboning operation. If an incoming PRI call that is in the ACD queue receives a recorded announcement answer, the switch performs the anti-tromboning operation only after an ACD agent answers the call.
Call Park Network Wide	The system invokes the RLT/TAT feature if programmed at all interim PBXs involved in the call.
Conference	If the Conference feature is activated, the RLT/TAT feature performs the anti-tromboning operations only when there are two parties remaining in the call and the two parties are using PRI trunks associated with the same D-channel.
External Recorded Announcement	If an attendant originates a call that, through call modification or call redirection, creates tromboned trunks and eventually terminates on recorded announcement equipment, TAT does not optimize the trunks. TAT does not release tromboned trunks resulting from an attendant initiating an outgoing call.
Meridian Mail	The RLT/TAT feature does not release tromboned trunks arising from the application of Auto Attendant, Thru-Dialing, and Operator Revert capabilities of Meridian Mail. If Network Message Services is activated, the associated Call Sender capability does not create an additional trunk when it is activated. The switch does not apply TAT.
Network Attendant Service (NAS)	If both TAT and NAS are equipped in the network, the NAS feature takes precedence over TAT, if NAS is equipped end-to-end. There is no interworking between NAS and TAT.

Table 113
Anti-tromboning feature interactions

Feature	Interaction
Network Call Pickup	The TAT feature optimizes tromboned trunks arising from the operation of the Network Call Pickup feature.
Network Call Redirection	The RLT/TAT features eliminate tromboned trunks resulting from the operation of any of the following Network Call Redirection features of the Meridian 1: • Network Call Forward Unconditional • Network Call Forward No Answer • Network Call Forward Busy • Network Call Forward by Call Type • Network Hunt • Internal Call Forward

H.323 Release Link Trunks

Purpose

This chapter describes the H.323 Release Link Trunk feature (A00009153) and the interaction between Communication Server 2000 and 2100 and the Communication Server 1000 using this feature.

Feature description

The SE08 Release Link Trunk feature enables interworking Communication Server 2100s and Communication Server 1000s to optimize trunk usage and resources.

Note: For purposes of this document, the terms Communication Server 2100, IPCM, and SE08 also mean Communication Server 2000, CICM, and SN08, respectively. CS 2100 means Communication Server 2000 or 2100, unless otherwise stated.

Release Link Trunk (RLT) is used to free up (release) unused call signaling paths resulting from call path changes such as call forwarding and call transfers. RLT is a Nortel proprietary technology that was originally developed for Primary Rate Interface (PRI) trunks and, therefore, the RLT functionality is used only by Nortel H.323 gateways such as the Communication Server 1000.

Note: Third-party H.323 gateways do not use the RLT functionality.

For instructions on how to provision the Communication Server 2100 for H.323 RLT, see "H.323 RLT configuration for Communication Server 2100" on page 234.

The feature provides the same appearance with RLT between the Communication Server 1000 and Communication Server 2100 over H.323 as existed over PRI, without losing any Trunk Anti-tromboning

(TAT) capability between Communication Server 1000 end points that is not supported by RLT. In other words:

- any call that could successfully complete a PRI RLT will complete an H.323 RLT

- any call that would not complete a PRI RLT will not complete an H.323 RLT

- when RLT is not possible, but Meridian Customer Defined Networking Peer-to-Peer (MCDN P-P) over H.323 allows a TAT to occur, the TAT is still allowed

- when an RLT is possible, but MCDN P-P over H.323 does not allow a TAT to occur RLT is still allowed

This enables the customer to use both RLT and TAT to optimize trunk resources. Figure 166 on page 230 shows a call optimized by RLT and Figure 169 on page 233 shows a call optimized by both RLT and TAT.

Changes on the Communication Server 1000 infrastructure include:

- modification of data storage on the Signaling and Call Servers to support the necessary data structures and structure changes

- the overlay interface (command line interface) on the Call Server is provided to allow the customer to provision the data

- Signaling to provide this information to the Call Server from the Signaling Server is provided to both servers

- A small quantity of infrastructure for message passing and reading the FACILITY Information Element is also provided

Two redundant calls (or signaling streams) result when a call is made from Call Server "A" to a user on Call Server "B" who then forwards the call back to Call Server "A". Nortel developed the Release Link Trunk (RLT) feature for the DMS-100 (now used in the Communication Server 2000 and 2100) to eliminate the redundant trunks. A similar feature, Trunk Anti-Tromboning (TAT) was developed for Nortel PBXs and is now supported on the Communication Server 1000.

Both features rely on a feature message to trigger call simplification, including an identifier to link the two calls. RLT uses signaling during call establishment to get the ID while, TAT does not. The lack of an ID makes the TAT feature dependent on a single D-Channel, whereas RLT relies on an identifier that is not based on a single D-channel, so it can be used across several D-channels. TAT uses simpler messaging and has more capability within a pure Communication Server 1000 or mixed Communication Server 1000 and Communication Server 500 network.

The Communication Server 1000 and other Enterprise-based systems use "direct routing" where calls travel from one gateway directly to another without intermediate systems providing any control. TAT, therefore, is an end to end function within the IP domain. The message has to be truly valid at both ends. PRI is point to point, so the call references are known on a one to one basis (if the TAT is valid at one D channel, it will also be valid at the other). IP is point to multipoint so the call reference at a remote gateway can easily match that at another gateway. This provides the potential for ambiguity and call failures. Because of "direct routed signaling", a TAT invocation that has two distinct remote gateways must be blocked because, there is no intermediary node to handle the message.

RLT is an alternative optimization process. This is a capability that exists between the Communication Server 1000 (and other devices capable of supporting it) and the Communication Server 2100 and 2000. Communication Server 2100 calls to and from Communication Server 1000 systems tandem through the Communication Server 2100 gatekeeper. The presence of an extra device (the gatekeeper) in the middle of the call paths provides the opportunity for RLT to perform a partial optimization of the calls.

The following two figures illustrate two kinds of behavior scenarios that are possible where the RLT functionality has been provisioned into the CS 2100 and applied to all the NTNA PRI trunk groups. These two behaviors are:

- User-side RLT capability
- Network-side RLT capability

   Note: For instructions on how to provision the Communication Server 2100 for H.323 RLT, see "H.323 RLT configuration for Communication Server 2100" on page 234.

The two frames in Figure 166 on page 230 show an example of user-side RLT optimizing a call that originates on one Communication Server 1000 to another and then forwarded to a third passing through a Communication Server 2100 on each leg of the call.

The call goes from Communication Server A to B through the Communication Server 2100, and then a return call goes from B to C through the Communication Server 2100 in the first frame. It would not be possible to optimize the call with TAT. The second frame shows the same call, with RLT invoked by B, allowing the Communication Server 2100 to bridge the calls so that the call goes from A to C directly through the Communication Server 2100. Using this approach takes advantage of using the Communication Server 2100 as the gatekeeper and using

RLT for optimization. At least one of the bridged calls must originate from the Communication Server 1000 B through or to the Communication Server 2100 for RLT to function (this is not a requirement for TAT). This design allows the Communication Server 1000 to interoperate with the Communication Server 2100 RLT, but still retain the TAT capability for those rare cases where TAT can optimize and RLT cannot, such as when both calls terminate on the Communication Server 1000.

Figure 166
Phone call optimized by RLT feature (User side)
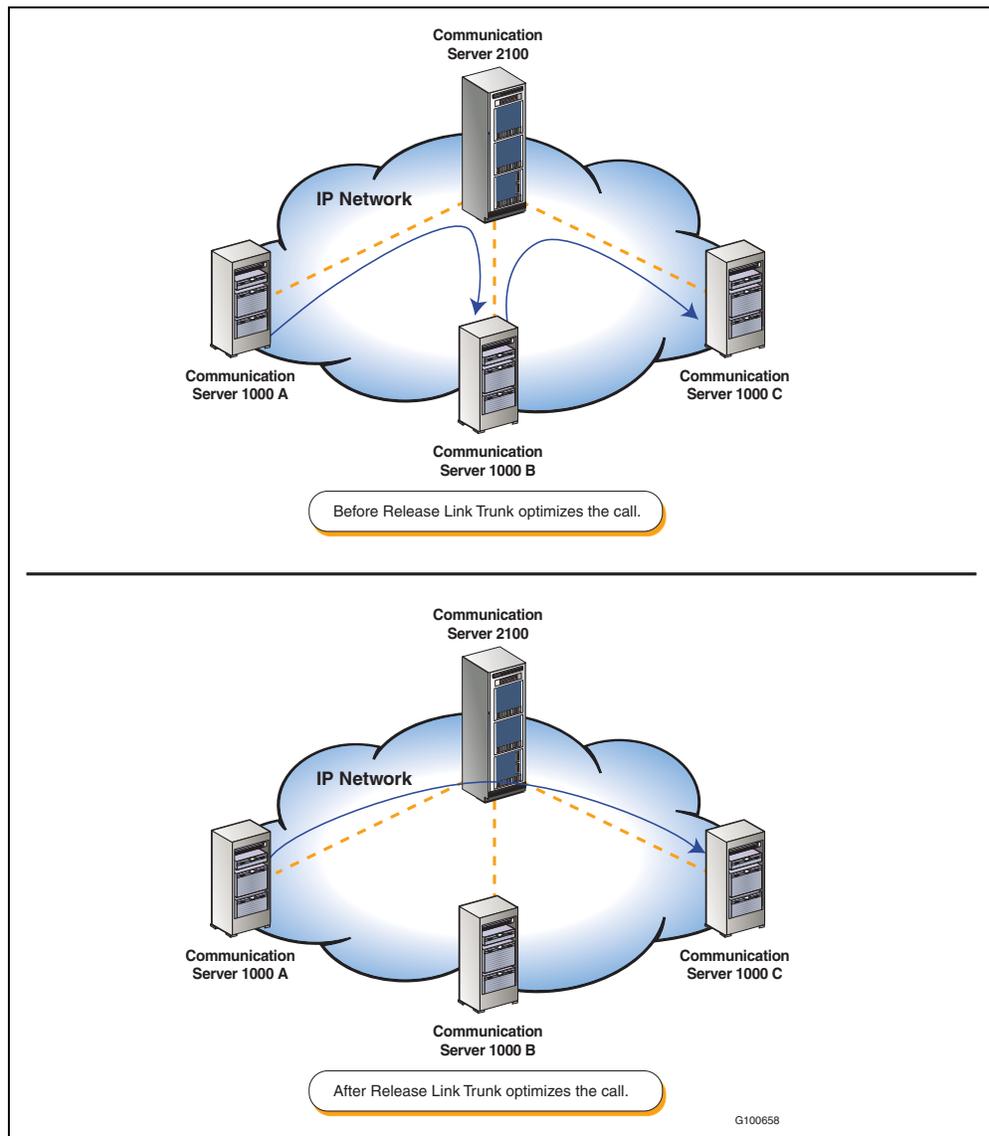
The illustration in Figure 167 on page 231 shows RLT behavior on the "network side". Communication Server 1000 A is calling an H.323 gateway connected to the Communication Server 2100, which forwards the call back to Communication Server 1000 A. The Communication Server 2100 invokes RLT which allows CS 1000 A to bridge the Signaling for the call, making a new call directly to the second user on CS 1000 A, freeing up the signaling path between the CS 2100 and CS 1000 C. This scenario also applies to call transfer in the CS 2100 (the CS 2100 is the initiator of the RLT and, therefore, is performing the network side RLT function).

Note: The Communication Server 2000 is only capable of processing RLT that is initiated by another H.323 gateway such as Communication Server 1000 and, therefore, is only capable of user-side RLT.

Figure 167
Phone call optimized by network side RLT (CS 2100 only)
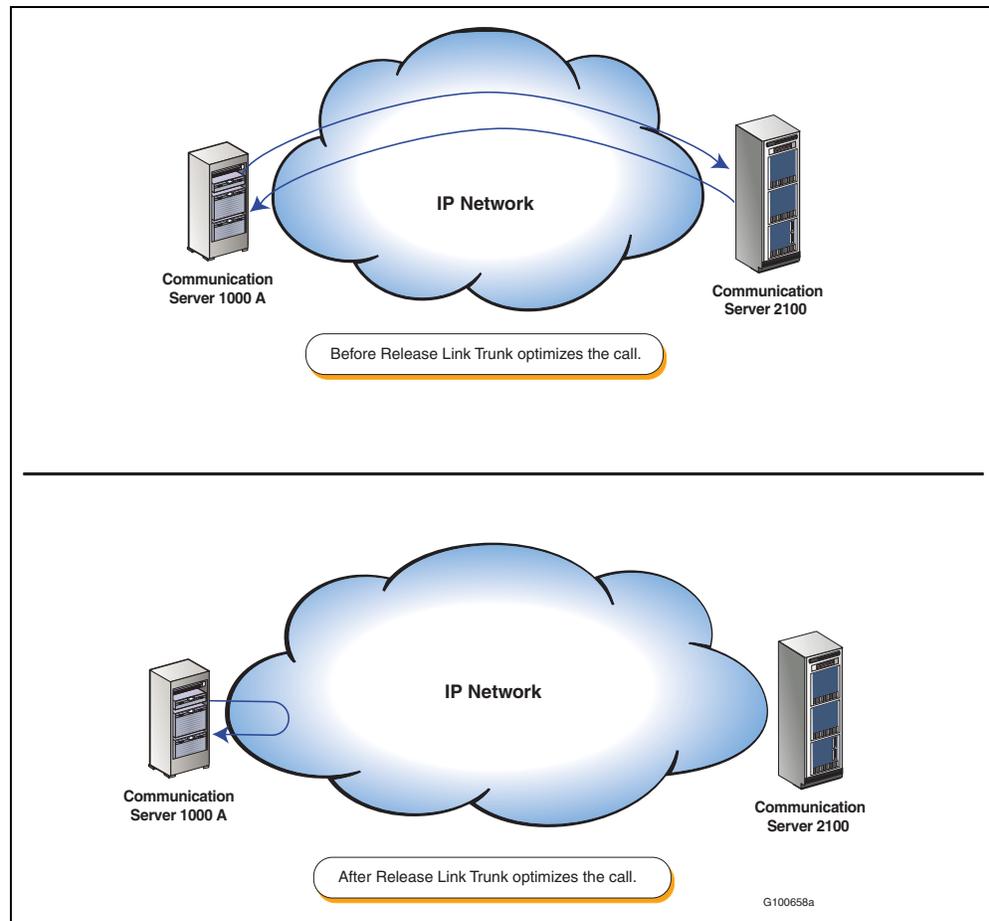
The same result can occur if the Communication Server 2100 had a call redirection during the prior parts of the call (see Figure 168 on page 232). That is, if the initial call from A to B was redirected in the Communication Server 2100 back to A prior to the call reaching the gateway B, and the resulting call then redirected to gateway C, call IDs may have been provided since RLT would be invoked. Node A would be unaware of the fact that it had a loop-back at the CS 2100 due to the topology of the call.

Figure 168
Prior redirection resulting in RLT opportunities (CS 2100 only)
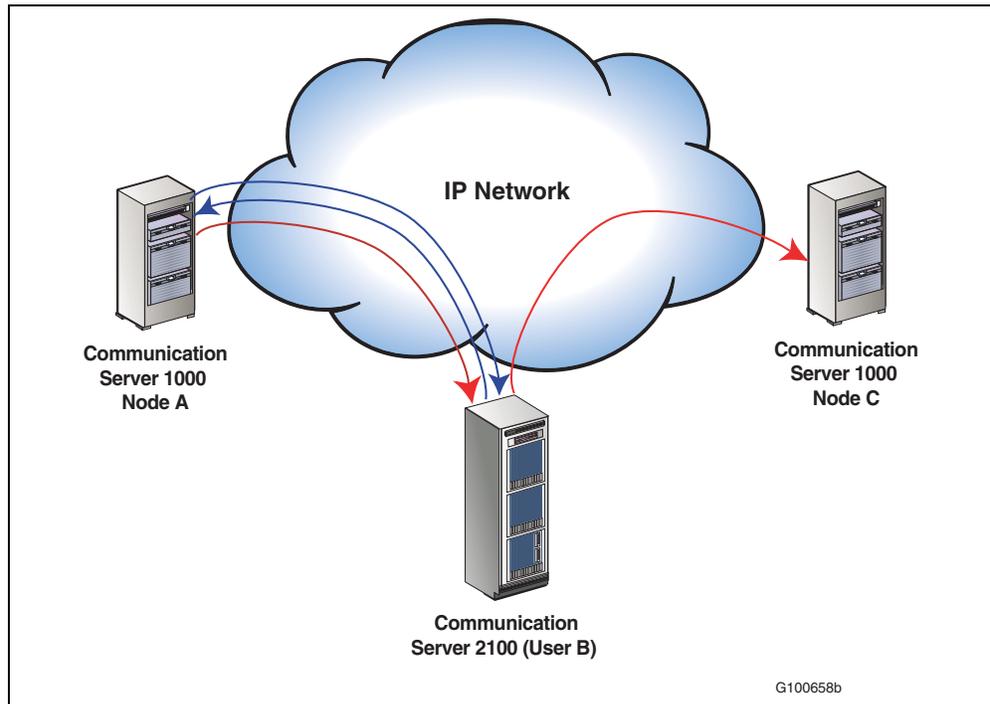

IP Network

Communication
Server 1000
Node A

Communication
Server 1000
Node C

Communication
Server 2100 (User B)

G100658b

Using RLT alone will provide better service than TAT alone, because RLT implies a Communication Server 2100 in the middle. The Communication Server 2100, which uses gatekeeper routing, is a signaling tandem for all calls, so it knows the capabilities and destinations of all calls. Therefore the calls can optimize to the center of the IP network on the Communication Server 2100. In a direct-routed Communication Server network, TAT is preferable to RLT for call optimization.

While Figure 166 on page 230 shows the optimization by RLT, which collapses the call back into a simple tandem at the Communication Server 2100, Figure 169 on page 233 shows how the TAT collapses the call the rest of the way into the Communication Server 1000 node. As a result, TAT takes precedence when a call completely optimizes at the

Communication Server 1000. No trunk facilities are used in this scenario.

Figure 169
Optimization by both RLT and TAT (or RLT and RLT-CS 2100 and redirection)
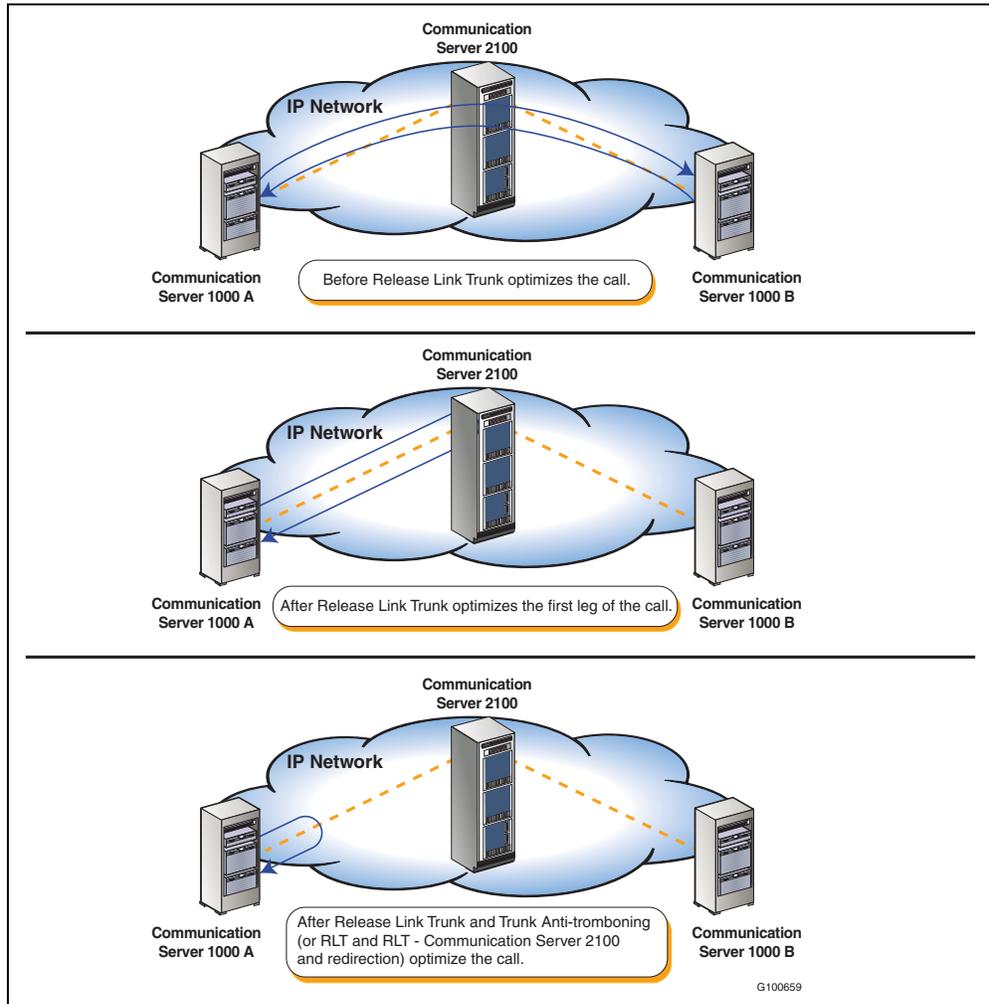
The following table lists the gateways capable of interoperating and interworking with RLT.

Table 114
TAT and RLT interoperability

Supported function	Description	CS 2000 (SN09)	CS 2100	IP Trunk
H.323 Basic call	Call connection with Calling Line ID	Supported	Supported	Supported
TAT	Trunk Anti-Tromboning	Not supported	Not supported	Supported
RLT from CS 1000	Release Link Trunks, triggered by TAT at the CS 1000	Supported	Supported	Not supported
RLT to CS 1000	Release Link Trunks, triggered by TAT at the CS 2100	Not supported	Supported	Not supported

Table 115 lists related documents.

Table 115
Related documents

Document number	Document title
NTP 555-4001-806	*Communication Server 2100 Product Guide*
NTP 555-4001-106	*Meridian SL-100 ISDN Primary Rate Interface Specification (NTNA)*
NIS A211-1	*Nortel ISDN Primary Rate Interface Reference Manual*
Note: Although NIS A211-1 is a TDM PRI document, this feature uses the NIS A211-1 RLT message structure, format, and flow as per the Standard Release 08.01 August, 1998 to provide the same function over IP.	

H.323 RLT configuration for Communication Server 2100

The following two procedures show how to configure the CS 2100 for H.323 RLT.

> *Note:* Refer to Communication Server 1000 documentation for RLT provisioning.

Configure RLT capability

Set and verify the SOC option to configure the RLT on NI-1 PRI capability on the CS 21000 by following the steps in .

Procedure 6
Set and verify SOC option

1   >soc; soc debug; select option NI000024; (RLT on NI-1PRI)

2   assign rtu <Pass Code> to NI000024

3   assign state on to NI000024

OPTION	NAME	RTU	STATE	USAGE	LIMIT	UNITS	LAST CHG
NI000024	RLT on NI-1 PRI	Y	ON	-	-	-	04/11/17

This procedure is now complete

RLT trunk provisioning

Provision each trunk group for RLT capability in Table TRKGRP by using the existing MRLT option (developed for NTNA PRI) by performing the steps in Procedure 7.

Procedure 7
Provision RLT Trunks (add MRLT to Table TRKGRP)

1   >table trkgrp; format pack; pos <h323-clli> ; change *(option set to MRLT)*

2   <h323-clli> PRA 0 NPDGP NCRT ASEQ N (ISDN 100) $ (**MRLT**) $

This procedure is now complete

H.323 and Q.931 messaging

The H323 call control Signaling is defined in the ITU-T H.225.0 standard. This includes messaging based on the ITU-T Q.931 standards, and referred to within the H.323 messaging as "Q.931 messages". The H.323 call processing messaging uses Q.931 based messages and messaging capabilities within the H.323 message, to facilitate mapping into and out of Q.931 ISDN Signaling. This is used here to simplify mapping the RLT messaging into and out of its native PRI messages.

The Gateway Controller (GWC) receives the H.323 messages and creates new Q.931 messages and any Q.931 contents within it, and using this data creates new Q.931 messages to send to the CS 2100. When the GWC receives the CS 2100 response, it will create new H.323 messages from the content of the received message. Therefore, data does not pass from the H.323 interface to the CS 2100 interface transparently. Every component of the Q.931 message is examined and a decision is made within the GWC whether to pass this data. For example, a CS 2100 DISCONNECT message is translated to a RAS message for H.323.

RLT H.323 Message components

The RLT functionality is accomplished by adding a message component to the SETUP and ALERT messages and uses a new FACILITY message to invoke RLT. The following sections show RLT message components.

> *Note:* References to "CS2K" in the following messages refer to Communication Server 2100.

H.323 SETUP message

When provisioned to do so, CS 1000 H.323 SETUP messages for new calls will all contain the facility RLT.

Figure 170
CS 1000 SETUP message for new call


```
CS1K ━━━━━━━━━━━━━━━━━━━━━▶ CS2K

      Message type: SETUP (0x05)
   ▷ Information element: Facility
      Length: 10
      Data: 11BEA1060201010201 01
```
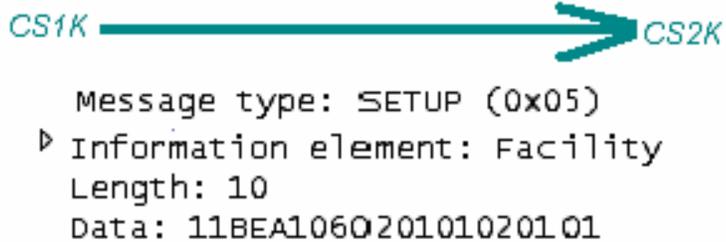
CS 2100 H.323 SETUP messages for call forward or call transfer will contain the same facility RLT.

Figure 171
CS 1000 SETUP message for call forward or call transfer


```
CS2100 ━━━━━━━━━━━━━━━━━━━▶ CS1K

      Message type: SETUP (0x05)
   ▷ Information element: Facility
      Length: 10
      Data: 11BEA1060201010201 01
```
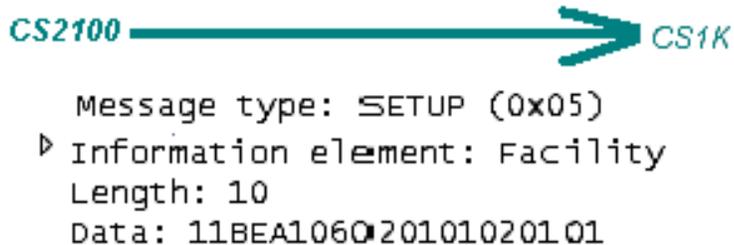
H.323 ALERT from CS 2100

When CS 2100 is H.323 RLT provisioned and it receives an RLT Facility in the SETUP message, CS 2100 ALERT response messages will have the call-id in the facility RLT.

Figure 172
CS 2100 H.323 ALERT with call-id in the facility id

CS1K ◄━━━━━━━━━━━━━━ CS2K

▷ Message type: ALERTING (0x01)
▷ Information element: Facility
   Length: 17
   Data: 11BEA20D0201013008020101800302005C   call-id

When the CS 2100 is NOT RLT provisioned and it receives an RLT Facility in the SETUP message, the CS 2100 ALERT response message will have an error indicating no RLT support.

Figure 173
CS 2100 ALERT with error indicating no RLT support

CS1K ◄━━━━━━━━━━━━━━ CS2K

▷ Message type: ALERTING (0x01)
▷ Information element: Facility
   Length:10
   Data: 11BEA306020101020112   error

H.323 ALERT from CS 1000

When the CS 2100 sends an H.323 RLT Facility in the SETUP message, if CS 1000 is RLT provisioned, it will send an ALERT response message with the call-id in the facility RLT.

Figure 174
ALERT from CS 1000 with call-id in the facility RLT

CS 2100 ◄━━━━━━━━━━━━━━ CS1K

▷ Message type: ALERTING (0x01)
▷ Information element: Facility
   Length: 18
   Data: 11 BE 02 0E 02 01 01 30 09 02 01 01 80 04 02 00 13 00   call-id

When the CS 2100 sends an RLT Facility in the SETUP message, but the CS 1000 is NOT RLT provisioned it will receive an ALERT response message with error indicating no RLT support.

Figure 175
ALERT from CS 1000 with error indicating no RLT support

CS 2100 ◄──────────────────── CS1K

▷ Message type: ALERTING (0x01)
▷ Information element: Facility
  Length:10
  Data: 11 0F 03 06 02 01 01 02 01 |12| error
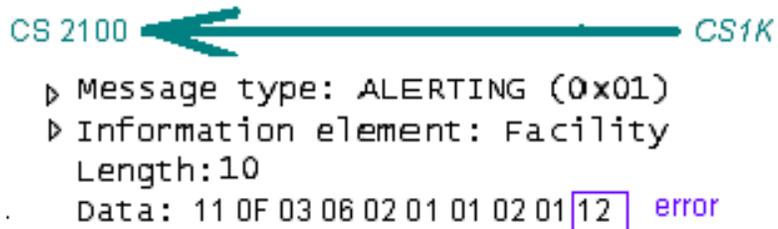
H.323 FACILITY RLT

After a successful call forward or call transfer, the FACILITY RLT message is used to free up the signaling links. The FACILITY RLT message contains the data returned in the ALERT message. Therefore, a FACILITY RLT message will only be performed when the CS 2100 is properly provisioned for RLT on the particular trunk group.

The CS 1000 will send the FACILITY RLT message with the information it receives from the CS 2100 ALERT message.

Figure 176
CS 1000 FACILITY RLT with information received from CS 2100 ALERT message

CS1K ────────────────────► CS2K

▷ Message type: FACILITY (0x62)
▷ Information element: Facility
  Length: 17
  Data: 11BEA20D0201013008020101800302005C call-id
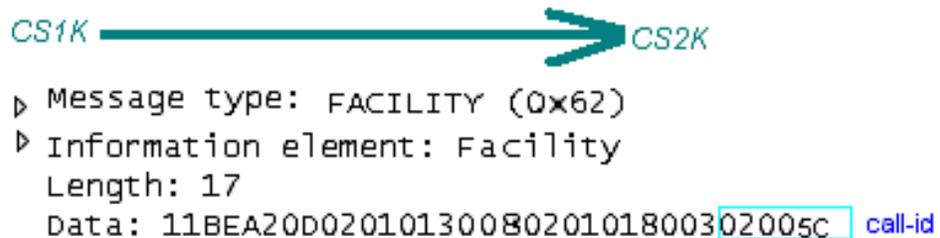
The CS 2100 will send the FACILITY RLT message with the information it receives from the CS 1000 ALERT message.

Figure 177
CS 2100 will send the FACILITY RLT message with information received from CS 1000 ALERT message

```
CS 2100  ◀━━━━━━━━━━━━━━━━  CS1K
  ▷ Message type: ALERTING (0x01)
  ▷ Information element: Facility
    Length: 18
    Data:  11 BE 02 0E 02 01 01 30 09 02 01 01 80 04 │02 00 13 00│  call-id
```

H.323 FACILITY RLT response

The CS 2100 will send a response for the FACILITY RLT success or it will send an error indication.

Figure 178
CS 2100 sends response for RLT success

```
CS1K  ◀━━━━━━━━━━━━━━━━  CS2K
  ▷ Message type: FACILITY (0x62)
  ▷ Information element: Facility
    Length: 7
    Data: 11 BE A2 03 02 01 02
```

Figure 179
CS 2100 sends an error (RLT failure)

```
CS1K  ◀━━━━━━━━━━━━━━━━  CS2K
  ▷ Message type: FACILITY (0x62)
  ▷ Information element: Facility
    Length:10
    Data: 11 BE A3 06 02 01 02 02 01 │12│  error
```

CS 1000 response for FACILITY RLT message (success and failure) is the same as the CS 2100.

Figure 180
CS 1000 sends response for RLT success

```
CS 2100 ◄──────────────────────── CS1K
   ▷ Message type: FACILITY (Ox62)
   ▷ Information element: Facility
     Length: 7
     Data: 11 BE A2 03 02 01 02
```

Figure 181
CS 1000 sends an error (RLT failure)

```
CS 2100 ◄──────────────────────── CS1K
   ▷ Message type: FACILITY (Ox62)
   ▷ Information element: Facility
     Length:10
     Data:  11 BE A3 06 02 01 02 02 01 12   error
```

Hardware requirements

The H.323 RLT capability is a software only component for GWC that works on a mixed network of CS 2100s and CS 1000s with sufficient hardware to place calls between the systems. A data network capable of supporting the H.323 IP telephony traffic is also required.

Software requirements

The H.323 RLT software requirements for the Communication Server 1000 are described outside the scope of this document in Communication Server 1000 feature DE2302. Since RLT is requested by the H.323 Gateway, the GWC will not perform any RLT action without a Nortel H.323 Gateway, such as the Communication Server 1000.

Limitations and restrictions

The Communication Server 2100 will provide the RLT functionality described in NTNA PRI Specification (NIS A211-1).

Interactions

The RLT functionality is independent of the MCDN tunneling component of the H.323.

Datafill

For provisioning instructions for this feature, see "H.323 RLT configuration for Communication Server 2100" on page 234.

Service Orders

This feature does not change Service Orders.

Operational Measurements

This feature does not affect Operational Measurements

Logs

This feature does not affect logs.

User interface

This feature does not change the user interface.

Billing

This Feature does not affect billing.

Meridian SL-100/Meridian 1 ISDN/IP trunking interworking

Purpose

This chapter describes how to create an ISDN/IP gateway between the Meridian SL-100 and the Meridian 1.

The chapter contains the following sections:

- **Introduction** – introduces the Meridian SL-100/Meridian 1 ISDN/IP gateway trunking solution and describes the Quality of Service requirements.

- **Option 11C IP Gateway system requirements** – describes the system requirements for the Meridian 1 Option 11C.

- **Configuration procedures** – provides configuration steps for the Meridian SL-100 and the Meridian 1.

- **Operating parameters** – defines the system prerequisites, feature interworkings, and billing options.

Introduction

The Meridian SL-100/Meridian 1 Integrated Services Digital Network (ISDN)/Internet Protocol (IP) trunking solution extends the IP reach of the Meridian SL-100. Meridian SL-100 callers can use the i2004 Internet Telephone to call Meridian 1 users who also have an i2004. This IP trunking configuration provides customers with an end-to-end IP connection from an Meridian SL-100 to Meridian 1 systems for voice calls. You can also use this solution to interconnect Meridian SL-100s.

With the proven feature richness and reliability of today's telephone networks, the Meridian SL-100/Meridian 1 IP trunking application enables Meridian SL-100 customers to access a wide range of features over a managed IP network.

Using IP network facilities provides Meridian SL-100 customers with cost savings that result from extending their IP voice calling ability as follows:

- voice traffic is routed at a lower marginal cost
- equipment costs are reduced due to combined voice and data infrastructures

In this configuration, the Meridian 1 Option 11C operates as an IP Gateway or protocol converter. The Option 11C uses T1 trunks to connect to the Digital Trunk Controller-ISDN (DTCI) and IP trunks to connect to the Meridian 1. The Option 11 converts the DTCI Primary Rate Interface (PRI) into an IP interface to the remote Meridian 1.

ISDN features that are currently offered on the Meridian Internet Telephony Gateway (ITG) 2.1 card are transparently available to Meridian SL-100 users. The ITG is an Intelligent Peripheral Equipment (IPE) card that provides a communications gateway between the IP data network and a circuit-switched Private Branch Exchange (PBX) environment. The ITG card integrates IP telephony applications into a circuit-switched enterprise environment PBX.

The solution supports the following codecs which you can download to the ITG card:

- G.711
- G.723
- G.729

Network configuration

shows ISDN/IP trunking between a Meridian SL-100 and a Meridian 1 Option 81C.

Figure 182
Meridian SL-100 to Meridian 1 Option 81C ISDN/IP trunking configuration
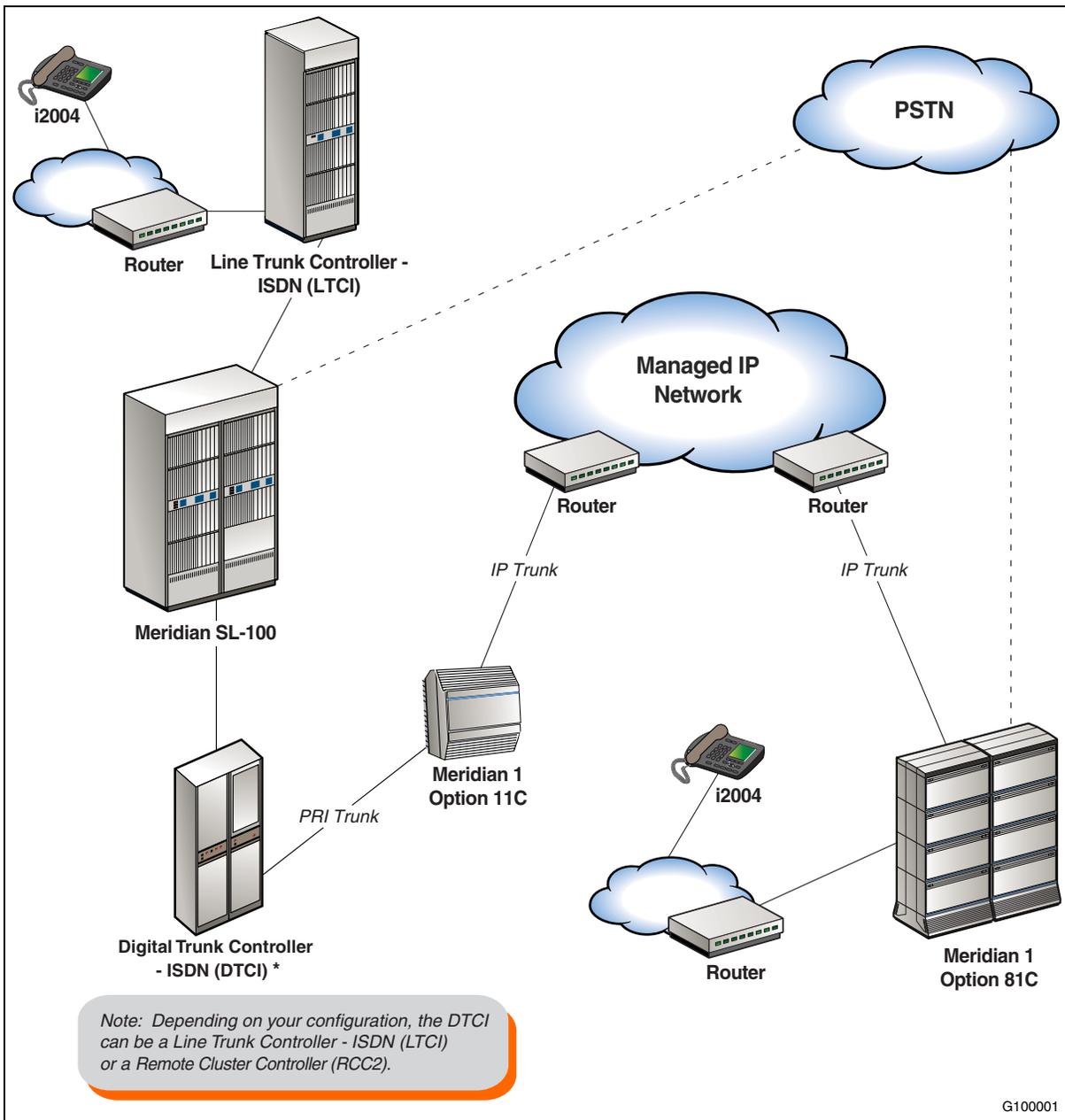
In Figure 182, the Option 11C gateway resides in the same equipment room as the Meridian SL-100. The Meridian 1 Option 81C resides in a remote location.

shows ISDN/IP trunking between a Meridian SL-100s.

Figure 183
Meridian SL-100 to Meridian SL-100 ISDN/IP trunking configuration
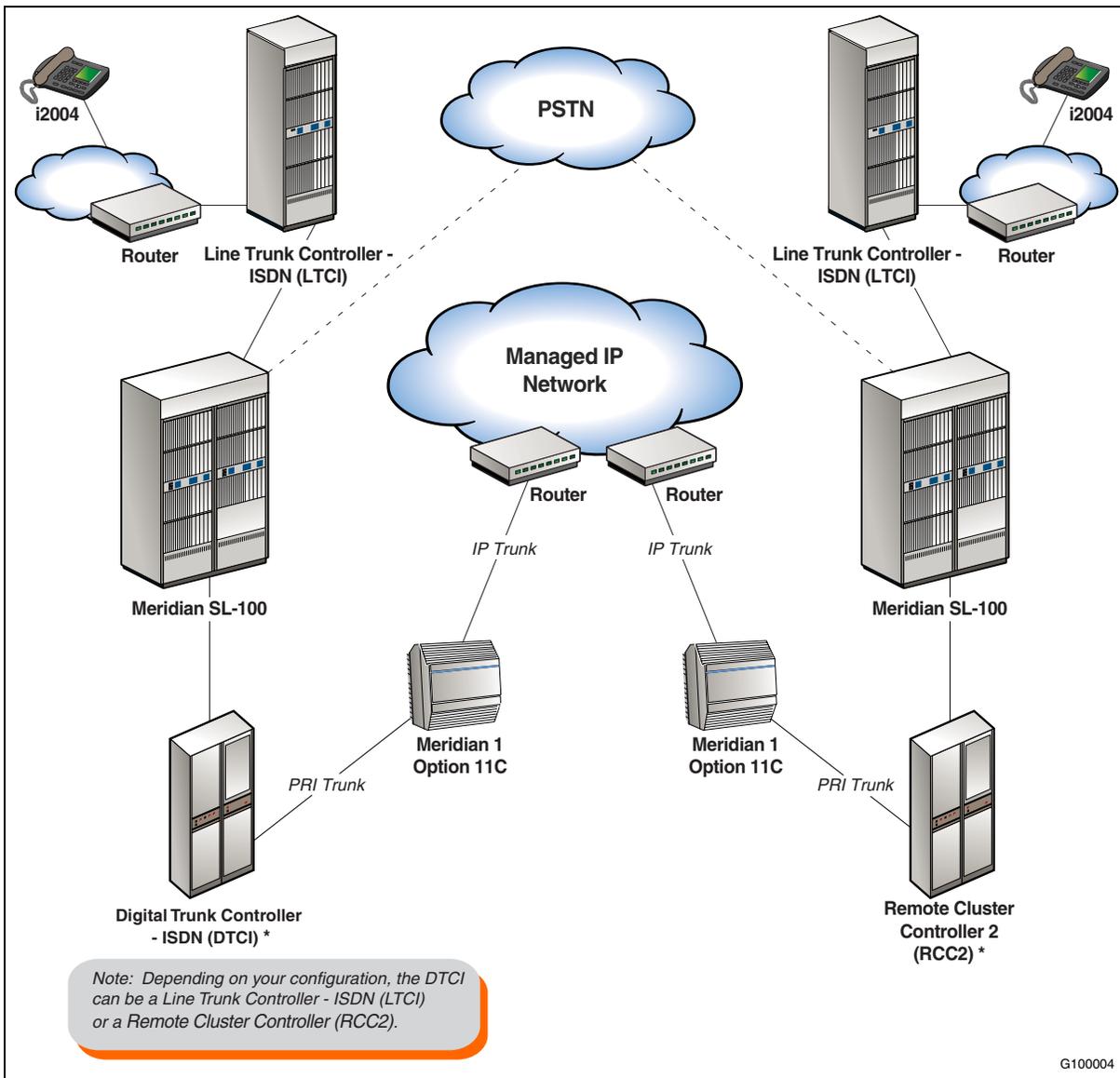
Quality of Service (QoS)

Quality of Service is the gauge of quality of the IP network between two callers. You configure ITG QoS parameters to make sure that voice transmission does not degrade below an acceptable level.

Most IP networks treat all traffic the same and are referred to as "best-effort" networks. Because of this, the traffic can experience different amounts of packet delay, loss or jitter at any given time. These types of traffic "impairments" result in the quality of voice signal that the user will hear such as:

- **Speech break-up** – This causes the speech to sound distorted like the speech experienced on a digital cell phone when the signal is getting out of range.

- **Speech clipping** – This causes parts of words to get cut off.

- **Pops and clicks** – This is caused when the network drops voice packets.

- **Echo** – This is caused when the remote end reflects your voice back to you.

In today's Time Division Multiplexing (TDM) based voice systems, the voice traffic experiences a fixed amount of delay and essentially no packet loss due to the structure of the circuit-switched network. Resulting voice quality is very high. For VoIP systems, a QoS system is needed, because VoIP networks do no transverse along fixed, dedicated circuits with a small, constant amount of delay and no packet loss as in circuit-switched telephone networks.

Behavioral characteristics of the IP network are dependent on such factors as Round Trip Time (RTT), latency, Queuing Delay in the intermediate nodes, Packet Loss, and available bandwidth. The Type of Service (ToS) bits in the IP packet header can also affect how efficiently data is routed through the network. Packet jitter related to latency influences the real-time IP transmissions. For good voice quality, the ITG card re-assembles the voice packets in an ordered continuous stream and plays them out at regular intervals despite varying packet arrival times.

You must consider many factors before installing a Voice over IP (VoIP) system on an existing, best-effort IP network infrastructure. Make sure your network is set up to provide the best solution for your VoIP connection. For more information, contact your Nortel Networks representative.

Fallback to PSTN
The Option 11C IP Gateway constantly monitors and analyzes QoS data. When the Option 11C IP Gateway detects network congestion, and the QoS falls below a customer pre-defined value, it rejects new calls destined for the remote Meridian 1. Instead the Meridian SL-100 Gateway routes them over non-IP facilities or back to the Meridian SL-100.

Figure 184 shows a Fallback to PSTN example.

Figure 184
Fallback to PSTN example
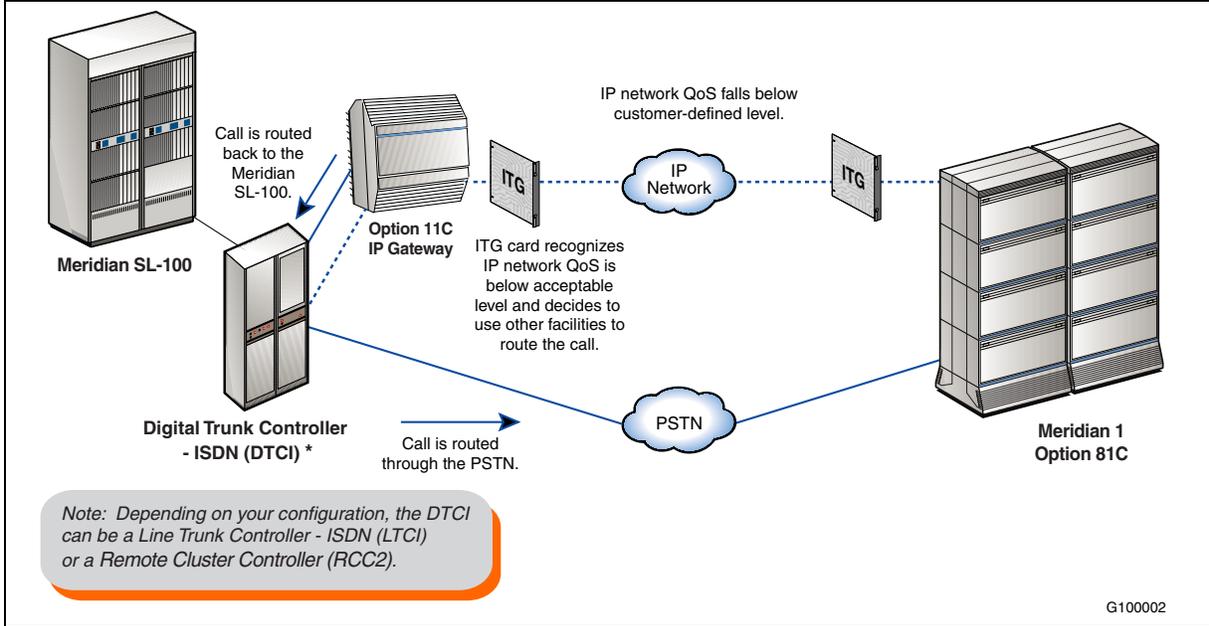
Option 11C IP Gateway system requirements

Hardware

Table 116 shows the hardware requirements for the Option 11C Gateway to provide non-blocking call traffic. This configuration provides 24 PRI trunks from the Meridian SL-100 and 24 IP trunks to the intranet.

Table 116
Option 11C gateway minimum hardware requirements

Item	Quantity	NT Code	Description
1	1	NTWB09CA	Option 11C Single Cabinet (DC)
Engineered additions:			
2	1	NTZC44BA	Meridian ITG 2.0 Trunk Small System
3	1	NTAK27AA	Option 11 Cabinet Pedestal
4	1	NTSF8021	Option 11C Enhanced Bus Software Package
5	1	AS1073	SDI/DCH Package
6	1	NTSF6800	TMDI Package (1.5MB DTI/PRI)

Table 116
Option 11C gateway minimum hardware requirements

Item	Quantity	NT Code	Description
7	1	NTSF8730	TMDI D-channels
8	1	NTAK20AD	Clock Controller Card
Note: Using the Option 11C DC-DC cabinet allows a connection to the Meridian SL-100 DC Power Plant for system back up during power outages.			

Figure 185 shows a sample card layout in the Option 11C Gateway.

Figure 185
Option 11C Gateway card configuration

G100003
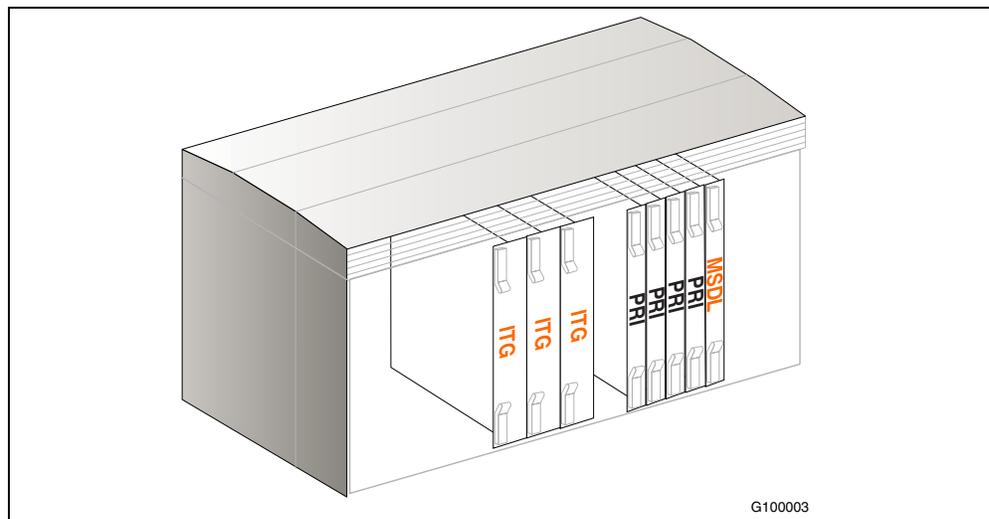
Software
The Option 11C Gateway requires ITG Trunkside Release 2.0 software.

Configuration procedures

IP trunk routing requires knowledge of network routing translations through the Meridian 1, ITG, and Meridian SL-100. You must understand the Meridian 1 overlays, ITG Routing tables, and Meridian SL-100 tables to configure the connection correctly.

Meridian SL-100 setup

The Meridian SL-100 requires a T1 PRI trunk connection to the Meridian 1 Option 11C. Refer to *Meridian Customer Defined Network Integrated Services Access*, 555-8001-102, for MCDN table information. Follow the previous chapters in this guide to configure trunks and supported network features.

Meridian 1 setup

Follow the previous chapters in this guide to configure trunks and related network features. For facility messages to work correctly over PRI from the Meridian SL-100 to the remote Meridian 1 or Meridian SL-100, you must configure location codes in the Meridian 1 and ITG to reach your destination. Use the Coordinated Dialing Plan, in conjunction with location codes, to establish your dialing plan. ITG Trunk 2.0 supports the ESN5 signaling protocol only, in addition to standard (that is, non-network) signaling. ITG 2.0 supports a mixed network consisting of ESN5 and standard network signaling nodes.

Refer to *Meridian Internet Telephony Gateway (ITG) Trunk 2.0/ISDN Signaling Link (ISL) Description, Installation and Operation*, 553-3001-202. Follow the procedures to connect the ITG trunk routes to the remote Meridian 1 ITG trunk. Verify that the Meridian 1 Option 11C at the Meridian SL-100 host location can tandem traffic from the ITG card through the PRI connection to the Meridian SL-100.

Important overlays to configure include the following:

- LD 90 – Location code, NPA, NXX must match the ITG route codes to reach the Meridian SL-100.

- LD 87 – Coordinated Dialing Plan.

- LD 15 – To turn on Message Waiting if you are using Voice Mail at a central location for all switches. Verify that Netdata is set up to define Calling Line ID.

ITG setup

Follow the procedures in *Meridian Internet Telephony Gateway (ITG) Trunk 2.0/ISDN Signaling Link (ISL) Description, Installation and Operation*. Configure the ITG card through Meridian Administration Tools (MAT) or Optivity Telephony Manager (OTM), depending on your management system.

> *Note:* Meridian SL-100 OTM does not support ITG card configuration. You must use the OTM management tool associated with the Meridian 1 Option 11C in which the ITG is installed.

Operating parameters

Meridian SL-100 prerequisites

The following prerequisites apply to the Meridian SL-100:

- Meridian SL-100 software Release 15 or later

- DTCI/LTCI/RCC with ISDN PRI

- NT6X50AB (two T1 spans per card)

Meridian 1 prerequisites

The following prerequisites apply to the Meridian 1:

- ITG 2.0 24 port card
- OTM 1.1 or higher
- SDI/DCH Package
- TMDI Package
- TMDI D-channel

Feature interworking

The following features have been tested and work transparently between the Meridian SL-100 and the Meridian 1:

- Calling Name Delivery
- Calling Number Delivery
- Call Forwarding
- Release Link Trunk (RLT) – Meridian SL-100/Trunk Anti-Tromboning (TAT) – Meridian 1
- Network Ring Again
- Network Call Redirection
- Network Message Waiting Indication

Billing

It is important to consolidate the billing of the trunk interface into one billing record if at all possible. The Meridian SL-100 and the Meridian 1 products provide separate billing records. It would be ideal not to have the Option 11C provide billing records and allow the Meridian SL-100 and option 81C to manage billing.

Recommendation

To provide the best overall trunk capacity it is best to use the ITG 2.1 32 port IP Trunk card. This provides a single slot ITG card which allows you to install more cards per shelf. The most trunks available on the Option 11C are 96 trunks (seeTable 117).

Table 117
Option 11C gateway recommended configuration

Item	Quantity	NT Code	Description
1	1	NTWB09CA	Option 11C Single Cabinet (DC)
Engineered additions:			
2	3	NTVQ81AA	Meridian ITG 2.1 Trunk Small and Large Systems
3	1	NTAK27AA	Option 11 Cabinet Pedestal
4	1	NTSF8022	Option 11C Enterprise Software Package
5	4	NTSF6800	TMDI Package (1.5MB DTI/PRI)
6	4	NTSF8730	TMDI D-channels
7	1	NTAK20AD	Clock Controller Card

Managing and maintaining the switch

Purpose

This chapter outlines the tools available for managing and maintaining the Meridian SL-100 and the Meridian 1.

The chapter contains the following sections:

- **Available tools** – introduces the management tools available for both switches.

- **Optivity Telephony Manager for Meridian SL-100** – describes how to use Optivity Telephony Manager for the Meridian SL-100 to monitor and administer the Meridian SL-100.

- **Meridian 1 Optivity Telephony Manager** – describes how to use Optivity Telephony Manager (OTM) to manage the Meridian 1 and CSE 1000 systems and outlines the other value-added OTM applications.

- **Maintenance and testing** – Describes testing and maintenance capabilities for the two switches.

Available tools

The Meridian 1 and Meridian SL-100 switches have tools for managing the maintenance and administration activities. Optivity Telephony Manager (OTM) is the system administration and management tool for use with a Meridian 1/CSE 1000. OTM replaced Meridian Administration Tools (MAT). Optivity Telephony Manager for the Meridian SL-100 (formerly Switch Manager) is the system administration tool for the Meridian SL-100.

Optivity Telephony Manager for Meridian SL-100

Optivity Telephony Manager for Meridian SL-100 is a client/server product that offers customers a unified network management platform from which to manage all of their Meridian SL-100 and Meridian 1 switches. Information on events, traps, inventory, switch status, firmware maintenance download status, and much more can be measured, observed, and managed from a single client (PC). Or if the customer wishes, this information can be viewed from several clients.

Optivity Telephony Manager Meridian SL-100, 2.0 uses a multi-tier client server architecture. It is comprised of the Java Windows client application, Java Windows/NT server framework, and the Meridian SL-100 switch with an installed ethernet interface unit (EIU) that interfaces to the application unit interface (AUI). The application uses the Simple Network Manager Protocol (SNMP) that operates on top of the User Datagram Protocol/Internet Protocol (UDP/IP).

User administration with log-ins and privileges can be set up so than an administrator can manage users on the system more efficiently, and with increased security, through user log-on and password verification.

Optivity Telephony Manager Meridian SL-100, 2.0 provides several switch management features including:

- retrieval of switch equipment information such as core nodes, c-side peripherals, carriers, trunks, links, LENs and DNs

- receipts of switch events (full text reports previously only available from switch logs accessible through "LOGUTIL"). A "Watcher" functionality is provided for event-triggered actions. Watcher sounds an audible alarm (if desired) and sends an E-mail notification when any designated log event is received.

- on-demand query of equipment status

- database queries of the switch equipment inventory and events

- increased capacity for events and equipment inventory

- new event browsing features provide event annotations

- in-service transfers of software loads to E-IPEs

Enhancements to system management

Optivity Telephony Manager for Meridian SL-100 incorporates the following enhancements to system management:

- EIU interface

- reduced SNMP messaging to the switch (server only)

- user administration with logins and privileges

- increased capacity for events and equipment inventory

- new log event browsing features with log event annotations

- new E-IPE (Enhanced Intelligent Peripheral Equipment) controller card loading while in-service

- integration with Optivity NMS (Network Management System) and Optivity Telephony Manager for Meridian 1 (if required)

- maintenance of firmware loads for M3900 series phone sets through E-IPEs

   Note: Because phones are rendered out-of-service during the downloads of new firmware loads, Optivity Telephony Manager Meridian SL-100, 2.0 allows downloads to be scheduled for a range of sets during non-service hours. All phones included in range designated for a scheduled download must be of the same type: for instance, all must be a M3902, M3903, M3904, or M3905.

Integration of Optivity Telephony Manager for Meridian SL-100, 2.0, with Optivity Network Management System (NMS) is available through Optivity Telephony Manager for Meridian 1.

Attributes of Optivity Network Management System (NMS) integration
Attributes include the following:

- Integration enables the voice folder in the Optivity Network Management System InfoCenter to turn red when a critical, major or minor log is received from the Meridian SL-100.

- Optivity Telephony Manager Meridian 1's consolidated alarm browser enables viewing alarms from Meridian 1, once Optivity Telephony Manager Meridian 1's web browser is launched. Consolidated alarms for Meridian 1, Meridian SL-100, Meridian Mail, CallPilot, and Symposium Call Center Server are among those that can be viewed.

Optivity Telephony Manager for Meridian SL-100, 2.0 provides the user with the ability to manage network elements from a Unified Network Management Platform.

Figure 186
Optivity Telephony Manager for the Meridian SL-100 configuration

1. PC clients are Windows 95/98/NT running Optivity Telephony Manager for Meridian SL-100.
2. PC servers are Windows NT running Optivity Telephony Manager for Meridian SL-100 .
3. Nortel Networks recommends that the server be on the same LAN segment as the Meridian SL-100 Ethernet Interface Unit (EIU).
4. Routers and a firewall can exist on the LAN shown above (see the Networks requirement section of this document for more details about configuring these types of devices for Optivity Telephony Manager for Meridian SL-100).

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Meridian 1 Optivity Telephony Manager

Optivity Telephony Manager (OTM) contains all of the Meridian Administration Tools (MAT) applications and provides value-added web applications and integration with Optivity NMS. OTM operates as a management server. It collects and processes alarms from multiple devices (for example, the Meridian 1, Succession CSE 100, Call Pilot, and IP Telephony Gateway – ITG). OTM also collects call accounting and traffic data and acts as a terminal server for multiple devices.

You can install OTM in a standalone configuration, without client support or web applications, on a PC running Windows 95/98, WIndows NT version 4.0, or Windows 2000. System access is provided through the OTM Windows System Terminal; security management is provided through the OTM User Administration.

OTM applications

OTM provides the following Windows-based applications:

- Enhanced Station Administration/Call Party Name Display (CPND)
- Directory Service with Lightweight Directory Access Protocol (LDAP) support
- Telecom Billing System (TBS), which replaced MAT Call Accounting
- Data Buffering and Access (DBA)

OTM Windows-based applications can operate in either server or standalone mode on a PC running Windows NT version 4.0 Server or Windows 200 Server.

OTM can also operate in client mode on a PC running Windows 95/98, Windows NT 4.0 Server or Workstation, or Windows 2000 Server.

The following MAT 6.6 applications are supported by OTM:

- List Manager
- Electronic Switched Network (ESN)
- Traffic Analysis module
- Call Tracking application
- Corporate Directory
- ITG applications
- Inventory
- Maintenance Windows
- Alarm Notification

OTM Provides the following web-based (http) applications:

- OTM Web Navigator
- Virtual Terminal Service (command line interface from the web)
- Web System Terminal
- Web Station Administration
- Web Alarm Browser

- Maintenance Pages

- Customizable Web Help

- Web User Access and Session Monitor pages

- Desktop Services that provide web pages to display directory and telephone configuration. You can permit end users to modify the configuration of their telephones using Desktop Services.

Technical documentation

The OTM documentation suite consists of the following:

- *Installing and Configuring Optivity Telephony Manager*

- *Using Optivity Telephony Manager*

- *Using Optivity Telephony Manager Telemanagement Applications*

Maintenance and testing

Table 118 compares the maintenance and testing capabilities between the Meridian 1 and Meridian SL-100.

Table 118
Meridian 1 and Meridian SL-100 maintenance and testing comparison

Function	Meridian 1	Meridian SL-100
Interface	Maintenance and administration: terminal/printer. Meridian Manager option. OTM.	Maintenance and Administration Position (MAP). Optivity Telephony Manager.
Hardware fault detection capabilities	Automatically detected by internal facilities. Maintenance and error messages generated and used with fault clearing procedures.	Automatically detected by internal facilities. Log report generated.
Diagnostic programs	Automatically identify and isolate faulty hardware units. Maintenance and error messages generated and used with fault clearing procedures.	Automatically identify and isolate faulty hardware units and status on MAP. Error messages generated. Identify faulty circuit on line.
Real-time activity indicator	System services peg count and usage. CPU occupancy. Trunks and network traffic by way of holding register dump.	System services peg count and usage. CPU occupancy. Trunks and network traffic by way of holding register dump. On-line status by way of MAP.
System software integrity	Sanity test is in active CPU against software and firmware. Loop errors and CC audits.	Sanity tests in both CPUs against software and firmware. Loop errors, CC, and PE audits.

Table 118
Meridian 1 and Meridian SL-100 maintenance and testing comparison

Function	Meridian 1	Meridian SL-100
Automatic line testing	N/A	Individual or group.
Automatic trunk testing	Trunk seizure and hold thresholds. Integrity testing (digital).	Trunk seizure and hold thresholds with killer trunk. Integrity testing (digital). Bit error rate testing (BERT).
Alarms	Audible and visual indicators. Remote alarms using TSB AT-1.	Audible and visual indicators. Remote alarms using TSB AT-1. Optional remote alarm circuit. Scan and signal points I/F.
Transmission testing	Test trunks for noise and loss.	Test trunks and lines for 100 series.
ROTL	Provision for Heidemian System access.	Interfaces for CAROT and Heidemian.
Trunk test position	Manual testing in-board, automatic testing out-board.	Manual and automatic testing in-board.
Metallic test access	Using external test sets and patch panels.	Uses MAP and test sets.
Remote maintenance testing	Uses remote terminal/printer and modem.	Uses remote MAP and modem.
Voice station testing	Electronic hybrid and digital hybrid.	Electronic hybrid, digital hybrid, and digital ISDN.
Data station testing	Digital hybrid data units.	Digital hybrid data units, digital ISDN data units, and Bit Error Rate Testing (BERT).
Network diagnostics	Network circuit (DS-30). Network path-junctors, PE.	Network circuit (DS-30). Network path-specific. Network fabric-automatic testing. All paths, both planes.

Using M3900 Meridian digital telephones on the two systems

Purpose

This chapter describes how M3900 Meridian digital telephone features operate on the Meridian 1 and the Meridian SL-100.

The chapter contains the following sections:

- **M3900 Meridian digital telephone feature comparison** – shows the differences in M3900 set feature operation between the two systems.

- **Requirements** – describes hardware and software requirements for M3900 sets on each system.

M3900 Meridian digital telephone feature operation

Table 119 shows how to operate M3900 Meridian digital telephone features on the Meridian 1 and Meridian SL-100. The table highlights the differences in feature operation between the two systems.

Table 119
M3900 Meridian digital telephone feature comparison

Feature	Meridian 1	Meridian SL-100
Answering a call	Key 0 is referred to as the Primary Directory Number (PDN).	Key 1 is referred to as the PDN.
Attendant Recall	Press the **Att Recall** key during a call. Stay on the line until the attendant answers. Replace the handset and switch connects the caller to the attendant.	Use the Transfer feature to transfer a call to the attendant.
AutoDial	To display the AutoDial number, press the **Display** key.	To display the AutoDial number, press the **AutoDial** key.

Table 119
M3900 Meridian digital telephone feature comparison

Feature	Meridian 1	Meridian SL-100
AutoDial Transfer DN	Press the **Trunk Switchhook Flash** key and then press the **AutoDial** key. Hang up or press the **Release** key.	Press the **Transfer** key, then press the **AutoDial** key. Press the **Release** key.
Automatic Dial	To erase a number stored against an **Autodial** key, dial the autodial deactivate Flexible Feature Code (FFC).	To erase a number stored against an **Autodial** key, press (#).
Automatic Hold	Same as the Meridian SL-100 when the Auto Hold feature is assigned	To answer another line (**DN** key) on a telephone set with multiple DNs, press the flashing DN and your current call is automatically put on hold.
Call Forward	Operation same as the Meridian SL-100.	Same as the Meridian 1.
Call Join	During conversation, press the **Conference** key, press the flashing **DN** key that is on hold, and then press the **Conference** key to activate Call Join.	Same as the Meridian 1.
Call Park	Use the **Park** key, **Transfer** key, or **Conference** key to park a call. To park a call, press the **Park** key once. Press the **Conference** or **Transfer** key, enter the Special Prefix (SPRE) + 71 or the FFC; press the **Conference** or **Transfer** key again.	Use the **Call Park** key or **Directed Call Park** key to park a call. To park a call, press the **Call Park** key, or **Directed Call Park** key (and then dial a DN or use the system defined DN).
Call Pickup	Operation is the same for both switches.	Operation is the same for both switches.
– Group (your group)	For DN pickup without a key, dial the SPRE + 94 + the DN. With a key, operation is the same.	For DN pickup without a key, dial the Call Pickup feature access code + the DN. With a key, operation is the same.
– Directed Phone Pickup	For group pickup without a key, dial the SPRE + 95 + the group number. With a key, operation is the same.	For group pickup without a key, dial the DCPU feature access code + the DN. With a key, operation is the same.
– Group (another Call Pickup Group	Press the **Group Pickup** key and dial the Group Pickup number of ringing phone.	Not available.

Table 119
M3900 Meridian digital telephone feature comparison

Feature	Meridian 1	Meridian SL-100
Call Transfer DN	Press the **Transfer** key. If there is no answer, return to the original **DN** key to continue conversation. If the party answers, press the **Transfer** key again, talk to the party privately, then hang up; or press transfer when you hear the ringing. Hang up. The system transfers the call.	Press the **Transfer** key. If there is no answer, press the **Release** key then return to the original key. Uses the three-way conference feature. If the party answers, press the **Transfer** key again; all three parties are connected. Press the **Release** key. Hang up. The system transfers the call. Or, when you hear the ring tone, hang up and the system transfers the call.
Call Unpark	To unpark a call, press the **Park** key or the SPRE + 71 or the FFC. Dial the extension where call is parked.	To unpark a call, press the feature access code and then the DN.
Call Waiting	To answer an incoming call during a telephone call, you must press the **Hold** key before the **Call Waiting** key. To return to first telephone call, press the **Hold** key and then the DN.	To answer an incoming call during a telephone call, press the **Call Waiting** key. The other party is automatically held. To return to the first call, press the DN. The other party is automatically held.
Calling Name/ Number Delivery Blocking	Not available.	Dial the Feature Activation Code (FAC).
Calling Number	To create a charge account record, press the **Calling Number** key, dial the account number, and press the Calling Number again.	To create a charge account record, flash the switchhook, enter the feature code, and then enter the account number.
Centrex/ Exchange Line Switchhook Flash	Allows a user to signal the central office (CO) during a call to use a Centrex service such as call transfer or three-way calling.	Not available; the Meridian SL-100 provides the same features as most COs.
Charge/ Forced Charge	Charge allows a user to charge to a specific account. Force Charge allows a user to charge long distance calls from a restricted set.	Account Code allows a user to enter a billing number. Account code can be prompted because of called number, NCOS, station's attributes, or authcode.
Conference	During conversation, press the **Conference** key and call the next number. If there is no answer, return to the original **DN** key and continue conversation. If the call is answered, press the **Conference** key.	During conversation, press the **Conference** key and call the next number. If there is no answer, press the **Release** key and then return to the original **DN** key for conversation. If the call is answered, press the **Conference** key.

Table 119
M3900 Meridian digital telephone feature comparison

Feature	Meridian 1	Meridian SL-100
Customer Originated Trace	Not available.	Press the **CustOrigTr** key or dial the FAC for COT.
Displaying key information	Uses the **Display** key.	Uses the **Inspect** key, or the set automatically displays the information.
Electronic Lock	Meridian Digital Telephones can be locked with a password and a flexible feature code.	This feature is not available on the Meridian SL-100.
Forced Camp-on	Dial the telephone number and hear a busy signal. Press the **Override** key or enter the FFC on a multiline set.	Station Camp-on allows a set to camp on to a busy station.
Group Call	Press the **Group Call** key or enter the FFC on a multiline set.	Use the Preset Conference feature. Dial the DN for Preset Conference.
Hospitality Features:		
Anonymous Caller Rejection	Not available.	Dial the FAC for ACRJ.
Automatic Callback	Not available.	Dial the FAC for ACB.
Automatic Recall	Not available.	Dial the FAC for AR.
Automatic Wake-up	Dial the Automatic Wakeup FFC. Dial the wake-up time in twenty-four hour format.	Dial the Wake-up Request FAC; when you receive the second dial tone, enter four consecutive digits to specify the hour and minute.
Maid Identification	Maid enters room information.	Not available.
Message Registration	Read and change meters that log calls.	Not available.
Room Status	Read status of room-vacant/occupied.	Not available.
Hotline	Press the **Hot Line** key on a multiline set.	Press the **Automatic Line** key.
Hotline/ Automatic	Dial operation is the same as the Meridian SL-100.	Dial operation is the same as the Meridian 1. Uses the Automatic Line (AUL) feature.

Table 119
M3900 Meridian digital telephone feature comparison

Feature	Meridian 1	Meridian SL-100
Last Number Redial	Press the **DN** key twice or press the **DN** key and the **Last Number Redial** key. The system redials the last number dialed from that phone.	Press the **DN** key and dial the access code or press the **DN** key and dial ##. The system redials the last number dialed from that DN.
Malicious Call Hold	Called Malicious Call Trace. Press the **Trace** key, enter the SPRE code + 83 or the Trace FFC. Keep the caller on the line. The switch does not put the call on hold. Trace is sent to maintenance TTY.	Press the **Malicious Call Hold** key; the call is put on hold. Press the **DN** key to return to the call. You can also activate this feature by entering a feature access code and pressing the **Transfer** key.
Message	There is a flashing icon beside the **Message** key and the Message Waiting Light lit.	Same as the Meridian 1.
Multiple Message Waiting Indication	Same as the Meridian SL-100.	Allows a secondary telephone set to provide an indication that messages are waiting on the primary telephone set. Supports multiline and single line analog and business IBN sets (which support CLASS messaging).
Override	Press the **Override** key or dial the Override FFC.	Press the **Busy Override** key or dial the feature access code.
Enhanced Override	Allows you to override a call after attempting a Forced Camp-on.	Not available.
Priority Override	Allows you to override call and join a call in progress.	Busy Override provides this capability.
Radio Paging	Some Meridian 1 systems are equipped with an on-site Radio Paging System. Use the Radio Paging FFC to alert the pager.	Meridian SL-100s can be equipped with a Paging System; however, special radio paging features are not available.
Remote Call Forward	From outside the system, dial the Direct System Inward Access (DISA) number and enter the Remote Call Forward FFC. Enter the Electronic Lock password. Dial the extension number and the number to forward calls. Press #.	From outside the system, dial a remote access number. The system prompts you to enter a DN and then the Call Forward Remote authorization code. You can then activate, deactivate, or change the Call Forward feature.
Ring Again – Busy Line	Operation is the same for both switches.	Operation is the same for both switches.
Ring Again – No Answer	Redial number that did not answer.	Not available.
Selective Call Forward	Not available.	Dial the FAC.

Table 119
M3900 Meridian digital telephone feature comparison

Feature	Meridian 1	Meridian SL-100
Special prefix (SPRE) or flexible feature codes	To use a feature on a telephone set, you may need to enter a SPRE or flexible feature code.	To use a feature, you may need to enter a feature access code if there is no assigned a feature key.
Speed Call – Store	Operation is the same for both switches.	Operation is the same for both switches.
Speed Call – Change	Operation is the same for both switches.	Operation is the same for both switches.
Speed Call – Erase	Press *.	Press #.
Speed Call – Make Call	Operation is the same for both switches.	Operation is the same for both switches.
Speed Call –Private Lines	Press the **Private Line** key.	Not available.
Speed Call – System	System.	Network Speed Call.
Stored Number	Press the **Stored Number** key or dial the FFC.	Press the **Automatic Dial (AUD)** key; feature code activation is not available.
Timed Reminder Recall	Timed Reminder Recall rings to remind you of a transferred call that has not been answered.	Blind Transfer Recall rings to remind you of a transferred call that has not been answered.
Virtual Office Worker (VOW)	Available on M3903 and M3904 sets. Dial the Virtual Office Terminal Log In (VTLN) FFC. Enter your password using the dial pad.	Available on M2000, M5000 and M3900 series sets. Dial the Virtual Office Worker In (VOWIN) FAC. Enter the VOW authorization code, if required. Enter your personal authorization code.
Voice Call	Calls a DN that is automatically answered.	Individual page from the Group Intercom (GIC) feature is similar. Dial the GIC number. After the first ring, press the **GIC** key. The switch establishes a one-way connection; then talk over the speaker.

Requirements

Table 120 shows software and hardware requirements for M3900 Meridian digital telephones on the two systems.

Table 120
M3900 system requirements

Item	Meridian 1	Meridian SL-100
Corporate directory	X11 Release 25 (controlled release) uses MAT version 6.6 and above.	Available post MSL12 and above; server application.
Downloading	System software X11 Release 25 and above.	Uses Optivity Telephony Manager (OTM) release 2 MSL11 and above.
Icon-based Display Indication	Not available.	MSL12 and above.
IPE Controller	XPEC (NT8D01).	Enhanced XPEC (NT7D07BA) or later.
M3905 Release 2	Not available.	MSL11 and above with XPM 13 and above.
Release 1 M3900 Series	X11 Release 24.	Not available.
Release 2 M3900 Series, M3901, M3902, M3903 and M3904; Release 1 M3905	X11 Release 25.	MSL11 and above with XPM 13 and above.
Release 3 M3900 Series, M3903, M3904, and M3905	X11 Release 26.	MSL15 and above with XMP15.
Set to set messaging	X11 Release 25.	Not available.
Software bundling	Release 24 and up.	Inclusive with system.

Feature compatibility and application comparisons

Purpose

This chapter summarizes feature compatibility between the Meridian 1 and Meridian SL-100. It also compares how value-added applications are implemented on the two switches.

The chapter contains the following sections

- **Feature compatibility** – provides a matrix that shows compatibility of features when a Meridian 1 is connected to the Meridian SL-100.

- **Applications comparison** – provides illustrations that compare how various applications run on both systems.

Feature compatibility

shows Meridian 1 feature compatibility when connected to the Meridian SL-100. The table shows availability based on release and hardware vintage.

Table 121
Meridian 1/Meridian SL-100 feature compatibility

Feature	R16	R17	R18	R19	R20	R21	R22	R23	R24	720A	720B	720C/E*	720F**	757A	757B	757C	757D	757E	NT6D80AA***	NT6D80AB***	NT5D12DDP****
Backup D-channel	N	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	N	N	N	Y	Y	Y	Y	Y
nB+D	N	Y	Y	Y	Y	Y	Y	Y	Y	N	N	Y	Y	N	N	N	N	Y	Y	Y	Y
Basic Call Service	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Calling Line ID	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
CLID in CDR	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
DPN access	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y
DTI, ESF, CRC	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	–	–	–	–	–	–	–	–
DTI Compatible	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	–	–	–	–	–	–	–	Y
ESN over PRI	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
ISA	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
NND	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N	N	N	Y	Y	Y	Y
NCRD																					
— NCFAC	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y
— NCFB	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	N	N	Y	Y	Y	Y	Y	Y
— NCFNA	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y
— NHNT	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	N	N	Y	Y	Y	Y	Y	Y
NRAG (TIE)	Y	Y	Y	Y	Y	Y	N	N	N	Y	Y	Y	Y	N	N	Y	Y	Y	Y	Y	Y

* The QPC720D was not introduced in North America (it is only used in Hong Kong).
** The QPC720F was introduced to handle NI-2, and R22 and higher software features.
*** The NT6D80AA MSDL supports R18-R20 inclusive. The NT6D80AB supports R21 and higher.
**** Includes the NTBK51AA Downloadable D-channel daughterboard.

Applications comparison

The figures in this section represent differences in system management, call center, computer telephony integration (CTI), and open integrated voice recognition (IVR).

System management

Figure 187 and Figure 188 on page 272 compare system management options for the Meridian 1 and Meridian SL-100.

Figure 187
System management (Meridian 1/Meridian SL-100) Example 1

Command line interface (CLI)

Maintenance and administration position (MAP)

Meridian 1

Meridian SL-100

* PC interface or dumb terminal to Meridian SL-100
* Application enriched for adds, moves and changes with CD-ROM NTP documentation on PC
* Interface for maintenance activities

* PC interface or dumb terminal to Meridian 1
* Line-by-line command interface

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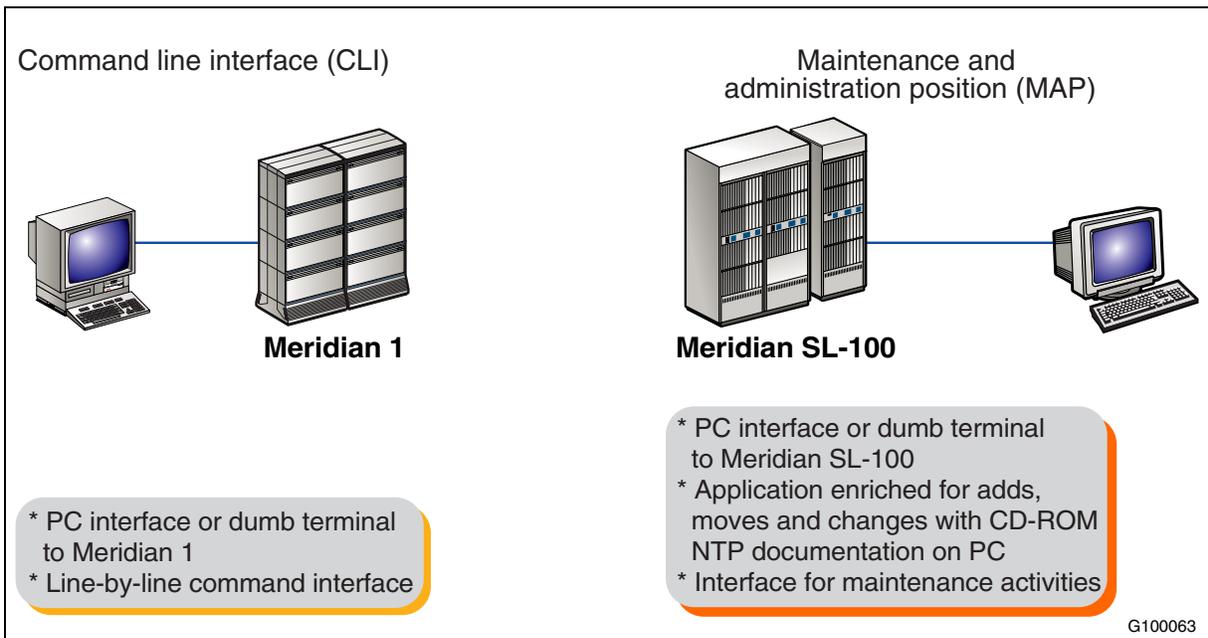
Figure 188
System management (Meridian 1/Meridian SL-100) Example 2

Meridian 1 OTM

Optivity Telephony Manager for Meridian SL-100

Meridian 1

Server   Client

Meridian SL-100

Ethernet interface unit (EIU)

IPE

* Graphical interface to Meridian SL-100
* Event log browsing
* Trunk, DN, LEN, carrier, lines, and node monitoring
* On-line help and system security
* Download M3900 configuration to set
* Download EXPEC firmware
* Scheduling synchronization between server and switch and between server and client
* Scheduling of firmware downloads to EXPEC cards and to M3900-series telephones
* Inventory control and status/location identification
* Event monitoring and notification

* Graphical interface to Meridian 1
* Application enriched for adds, moves, and changes
* GUI-based maintenance windows
* Windows-based applications for traffic analysis, call accounting, and call tracking

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Call centers

compare Meridian 1 and Meridian SL-100 call center implementations.

Figure 189
Call centers with X.25 (Meridian 1/Meridian SL-100)

* Automatic Message Link (AML)
  from the Meridian 1 to the
  Meridian Link Module (MLM)
* AML is a Nortel Networks
  proprietary protocol
* X.25 from the Meridian Link Module
  to the host computer
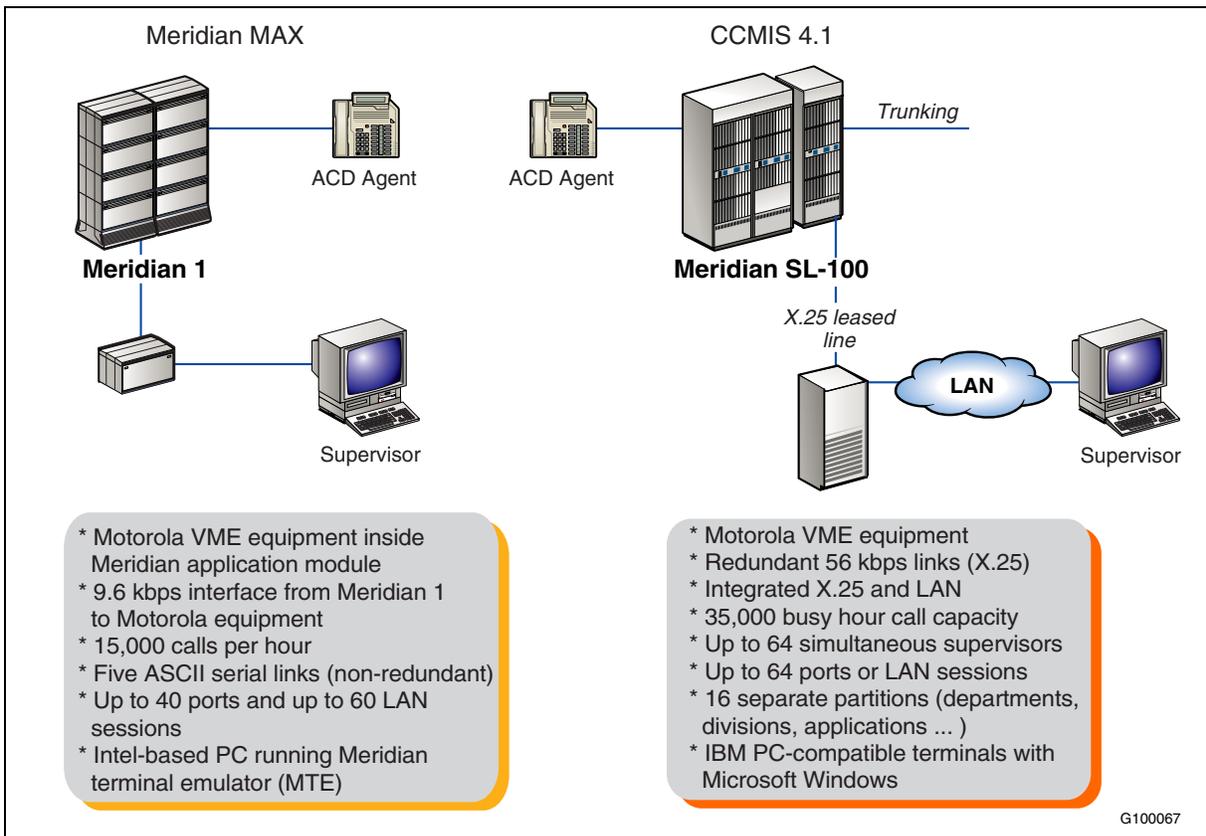
* Intelligent Call Management (ICM)
  uses TCP/IP or X.25 as the data
  link between the Meridian SL-100
  and the host computer
* The link allows the switch to provide
  services to a PC connected to a
  host computer
* ICM uses the EIU as a connection
  device

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Figure 190
Call centers (Meridian 1/Meridian SL-100)

* Automatic Message Link (AML)
  from the Meridian 1 to the
  Meridian Link Module (MLM)
* AML is a Nortel Networks
  proprietary protocol
* X.25 from the Meridian Link Module
  to the host computer

* Switch computer application
  interface (SCAI) from the Meridian
  SL-100 to the host computer
* X.25 data link to the host computer
* Uses third party call center software

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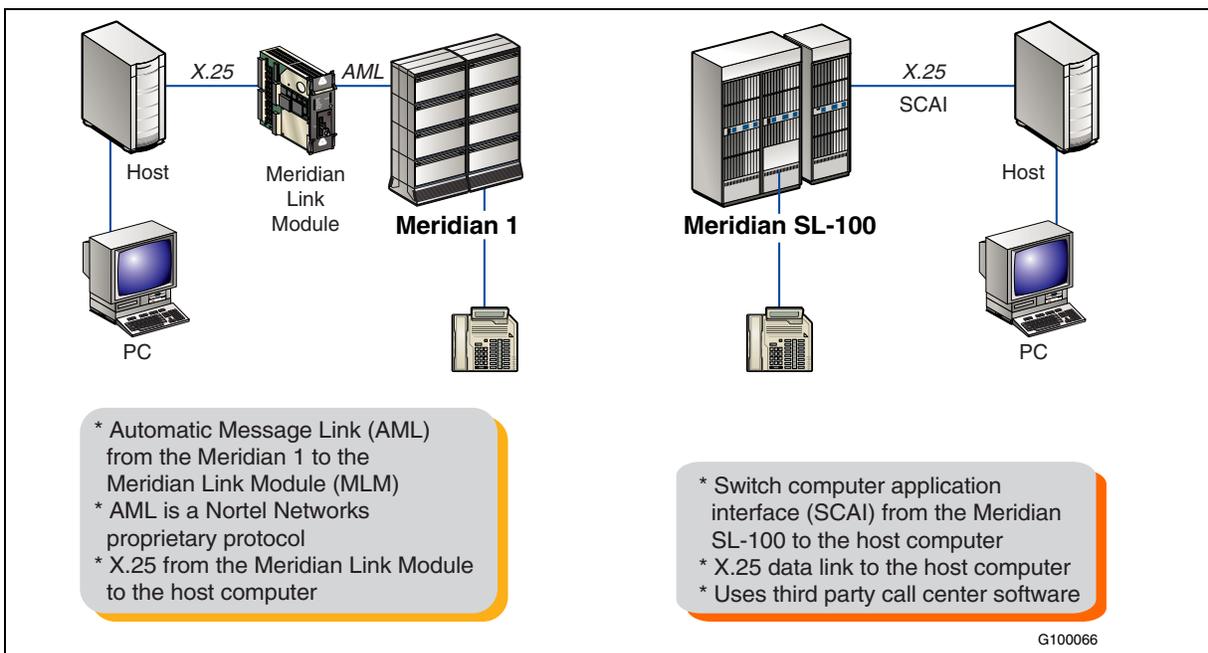
Figure 191
Call centers with CCMIS (Meridian 1/Meridian SL-100)

Meridian MAX   CCMIS 4.1

ACD Agent   ACD Agent   Trunking

Meridian 1   **Meridian SL-100**

                                        X.25 leased
                                        line

                                        LAN

Supervisor   Supervisor

* Motorola VME equipment inside
  Meridian application module
* 9.6 kbps interface from Meridian 1
  to Motorola equipment
* 15,000 calls per hour
* Five ASCII serial links (non-redundant)
* Up to 40 ports and up to 60 LAN
  sessions
* Intel-based PC running Meridian
  terminal emulator (MTE)

* Motorola VME equipment
* Redundant 56 kbps links (X.25)
* Integrated X.25 and LAN
* 35,000 busy hour call capacity
* Up to 64 simultaneous supervisors
* Up to 64 ports or LAN sessions
* 16 separate partitions (departments,
  divisions, applications ...)
* IBM PC-compatible terminals with
  Microsoft Windows

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Figure 192
Call centers with TAPI (Meridian 1/Meridian SL-100)

CCR   TAPI interface

              AML   SCAI link

CCR

Meridian 1   **Meridian SL-100**

* Controls call routing
* Contained in the application module
* AML link from Meridian 1 to CCR

* PC has Telephony Applications
  Programming Interface (TAPI)
* PC runs third party TAPI-compatible
  software

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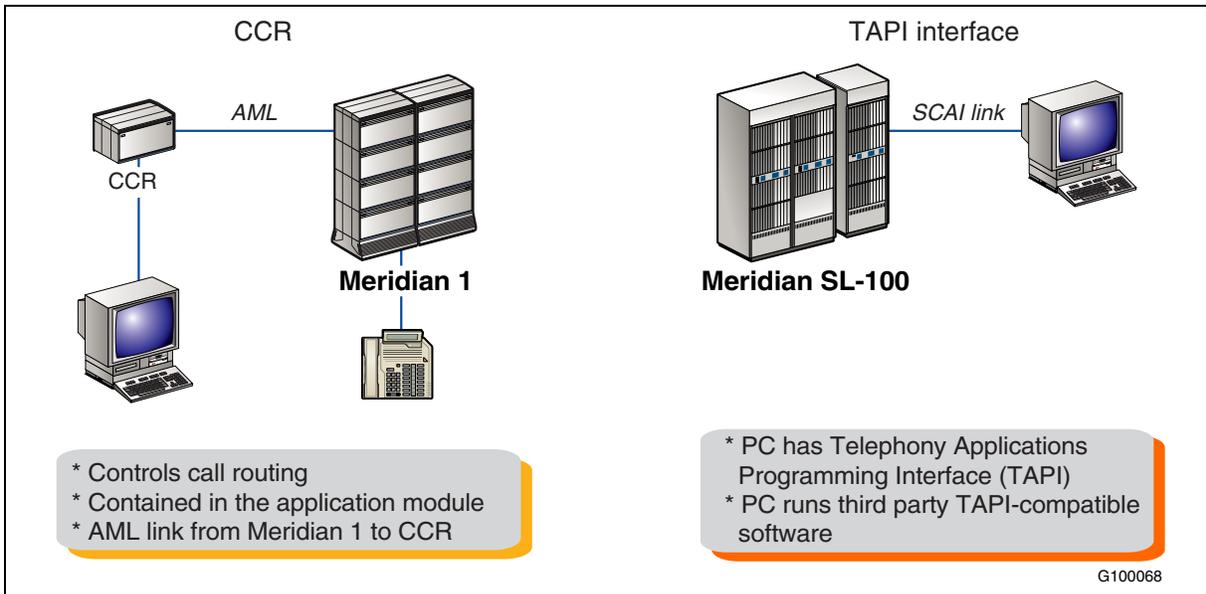
Computer telephony integration

Figure 193 compares Meridian 1 and Meridian SL-100 computer telephony integration.

Figure 193
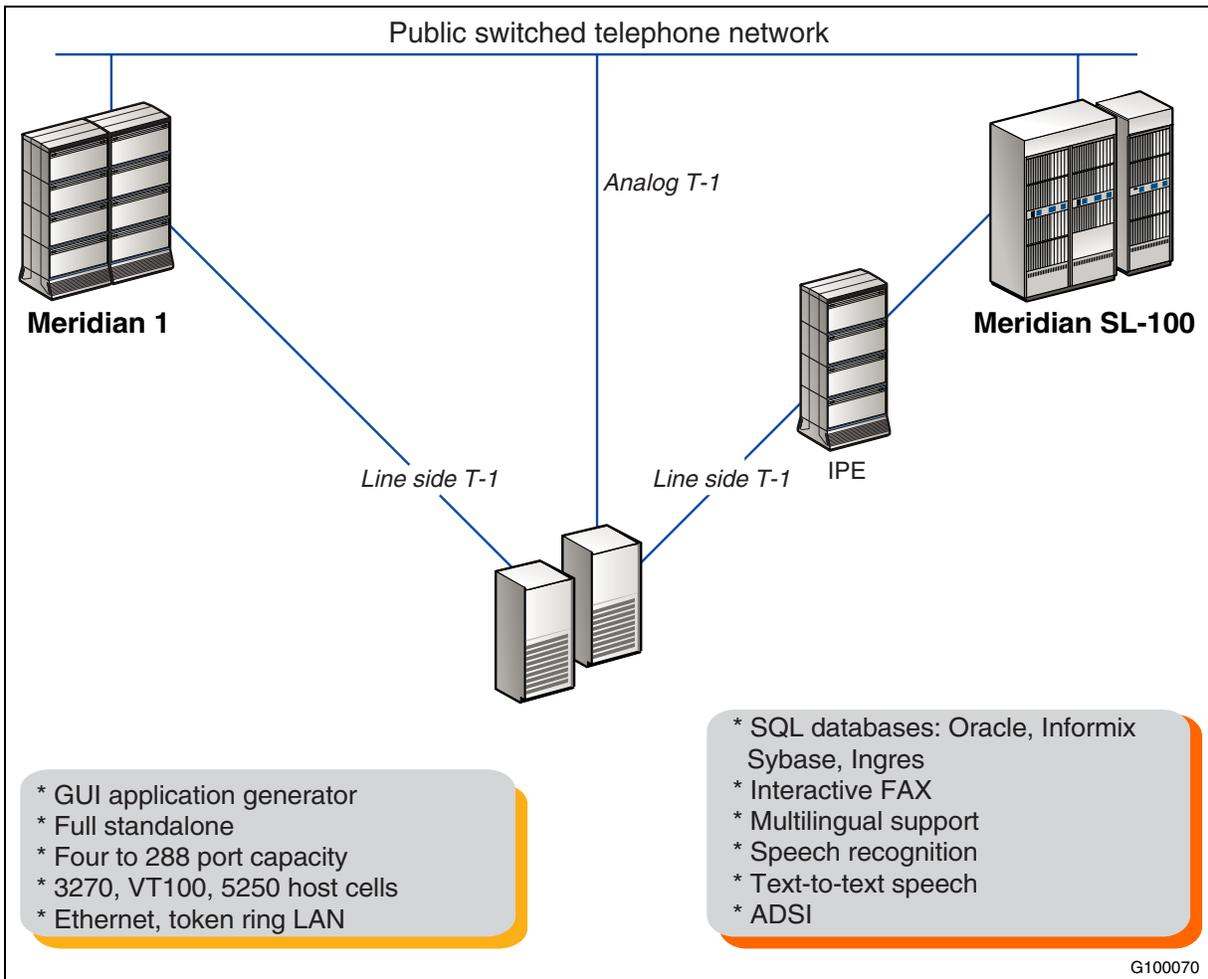**Computer telephony integration (Meridian 1/Meridian SL-100)**
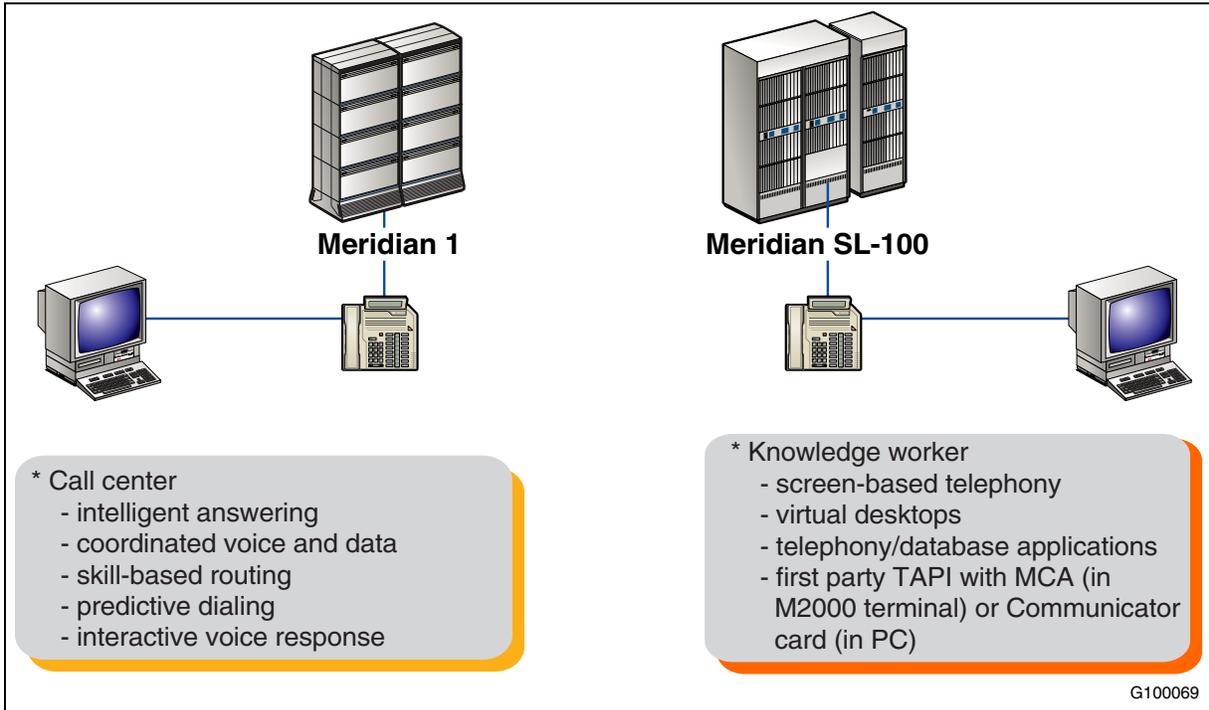
Meridian 1

Meridian SL-100

* Call center
  - intelligent answering
  - coordinated voice and data
  - skill-based routing
  - predictive dialing
  - interactive voice response

* Knowledge worker
  - screen-based telephony
  - virtual desktops
  - telephony/database applications
  - first party TAPI with MCA (in
    M2000 terminal) or Communicator
    card (in PC)

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Open integrated voice recognition (IVR)

Figure 194 compares Meridian 1 and Meridian SL-100 open IVR.

Figure 194
Open integrated voice recognition (IVR) (Meridian 1/Meridian SL-100)

Public switched telephone network

Analog T-1

Meridian 1

Meridian SL-100

Line side T-1   *Line side T-1*   IPE

* GUI application generator
* Full standalone
* Four to 288 port capacity
* 3270, VT100, 5250 host cells
* Ethernet, token ring LAN

* SQL databases: Oracle, Informix
  Sybase, Ingres
* Interactive FAX
* Multilingual support
* Speech recognition
* Text-to-text speech
* ADSI

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IP Telephone Survivability (S1-S2)

Purpose

This chapter describes the IP Telephone Survivability feature on the Communication Server 1000 and the interworking required between the Communication Server 1000 (CS 1000) and Communication Server 2100 IP Client Manager (CS 2100 IPCM) to facilitate this operation.

Feature description

This feature extends the Communication Server 1000 Network Wide Redundancy sub-feature of the Geographic Redundancy to small systems in the Communication Server 1000 to provide survivability of IP telephones registered with the Communication Server 2100 IPCM. The feature allows some IP sets to register with the Communication Server 1000 as the primary Call Server. The other sets are normally registered to a remote CS 2100 IPCM and receive telephony services from the CS 2100 IPCM. In case the link to the CS 2100 IPCM is lost or the CS 2100 IPCM itself fails, the IP telephones obtain survivability by registering with the local Communication Server 1000 which then provides the telephony services, until service to the CS 2100 IPCM is restored. The IP set display will now display "Local Mode" to indicate that the IP set is now in survival mode. A license period of ninety days will be allowed under the survival mode. If the CS 2100 IPCM is still unreachable after 90 days, the set will begin to display "Beyond Licensed Period". Other Geographic Redundancy functionality information will also be displayed, until the link to the CS 2100 is restored.

When the link to, and service from the Communication Server 2100 IPCM is restored, the telephones on the Communication Server 1000 are automatically registered back to the Communication Server 2100 IPCM, and consequently receive telephony services from there.

Figure 195 on page 278 shows the Communication Server 1000 inter-working with Communication Server 2100 IPCM to provide IP telephone survivability.

Figure 195
IP Telephone Survivability
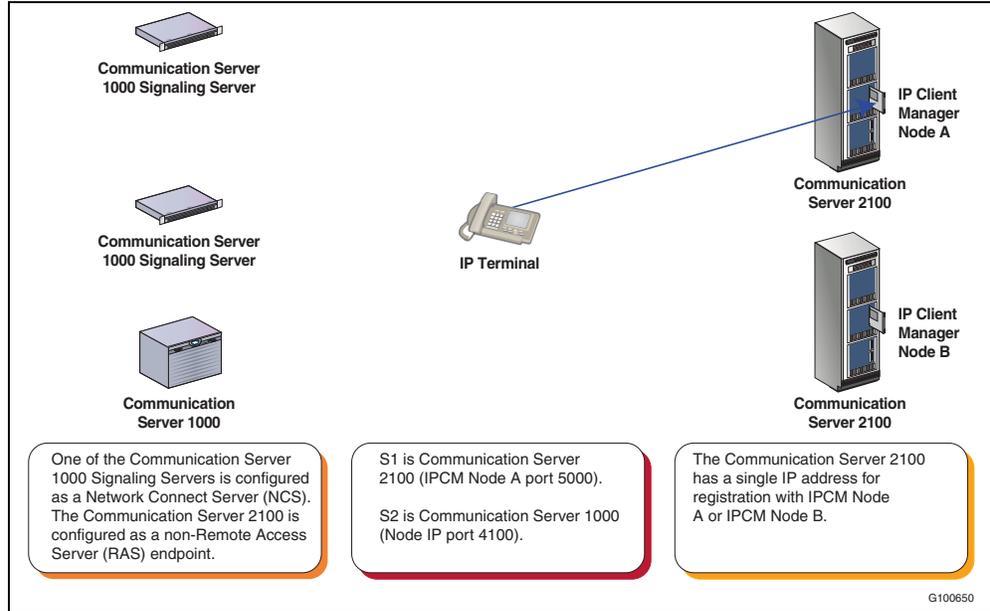
The Communication Server 2100 IPCM is comprised of two redundant nodes, Node A and Node B. On the Communication Server 1000, the IP set is normally registered with IP Client Manager (IPCM) A. If IPCM Node A is unreachable, the set is then registered with, and receives services from, IPCM Node B. If both IPCMs are unreachable, the IP set is registered with, and receives services from, the Communication Server 1000. In other words, the Communication Server 1000 provides survivability for the IP sets on the Communication Server 1000 when the Communication Server 2100 IPCMs are unreachable. This feature interworks with the SE08 software that supports a single IP address for registration with IPCM Node A and IPCM Node B and the Reliable User Datagram Protocol (RUDP) Ping protocol from the Communication Server 1000.

This feature is integrated in Communication Server 1000 release 4.5, but is disabled by default. A release 4.5 PI patch is required to enable configuration of this feature. The PI patch makes the Network User Identification (NUID) and Network Home Terminal Number (NHTN) prompts available in small systems. (NUID and NHTN are available inlarge systems with CP-PII CPU and the Branch User IP (BUID) and Main Office Terminal Number (MOTN) prompts are available to the MG 1000B.)

Note: MG 1000B is the office name for Communication Server 1000 Branch Office.

With the PI patch installed, Terminal Number 252 1 15 31 is reserved to indicate the Network Home or Main Office is a Communication Server 2100 (CS 2100 IPCM) when it is entered as the response to NHTN or MOTN. This TN must not be entered if the Network Home or Main Office is not a CS 2100 IPCM (this restriction does not apply if the PI patch is not installed).

Note: Consult Communication Server 1000 documentation for patches and software required and configurations supported by this feature.

The following four figures show the steps that occur when an IP set on a Communication Server 1000, interworking with the CS 2100 IPCM, survives the loss of connection with first one, and then both IPCMs on the CS 2100 IPCM. Figure 196 shows an example where a Communication Server 1000 IP set has lost connection with IPCM Node A and then registered with IPCM Node B.

Figure 196
IP set – connection lost with IPCM Node A
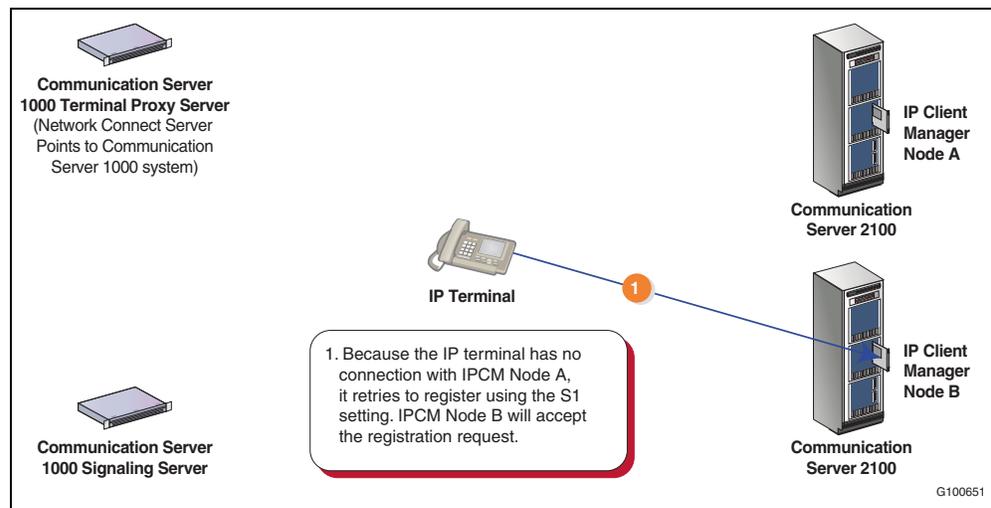
Figure 197 on page 280 shows an example where a Communication Server 1000 IP set has lost connection with IPCM Node A and IPCM Node B (steps 2, 3, and 4).

Figure 197
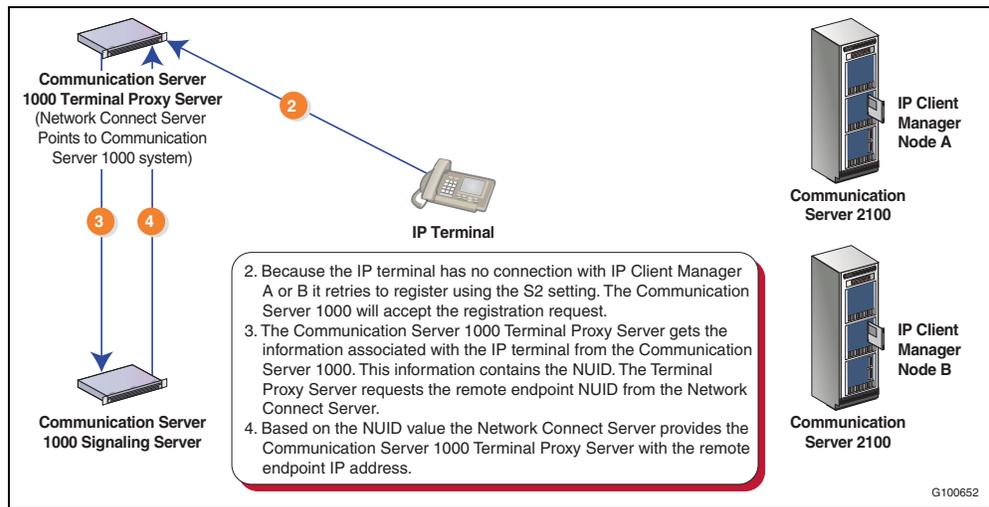**IP set – connection lost with IPCM Node A and IPCM Node B**

Communication Server 1000 Terminal Proxy Server
(Network Connect Server Points to Communication Server 1000 system)

IP Terminal

Communication Server 1000 Signaling Server

IP Client Manager Node A

Communication Server 2100

IP Client Manager Node B

Communication Server 2100

2. Because the IP terminal has no connection with IP Client Manager A or B it retries to register using the S2 setting. The Communication Server 1000 will accept the registration request.
3. The Communication Server 1000 Terminal Proxy Server gets the information associated with the IP terminal from the Communication Server 1000. This information contains the NUID. The Terminal Proxy Server requests the remote endpoint NUID from the Network Connect Server.
4. Based on the NUID value the Network Connect Server provides the Communication Server 1000 Terminal Proxy Server with the remote endpoint IP address.

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Figure 198 shows an example of a new heartbeat procedure redirection to IPCM Node A (steps 5a and 5b).

Figure 198
New heartbeat procedure redirection to IPCM Node A

IP Terminal

IP Client Manager Node A

Communication Server 2100

IP Client Manager Node B

Communication Server 2100

Communication Server 1000 Signaling Server

5a. Sends RUDP Ping to single Communication Server 2100 IP address.
5b. If there is a response from IP Client Manager A, then a reset is sent to the IP terminal. The IP terminal goes to IP Client Manager A and prompts for the UserID and Password if auto logon is not enabled.

G100653
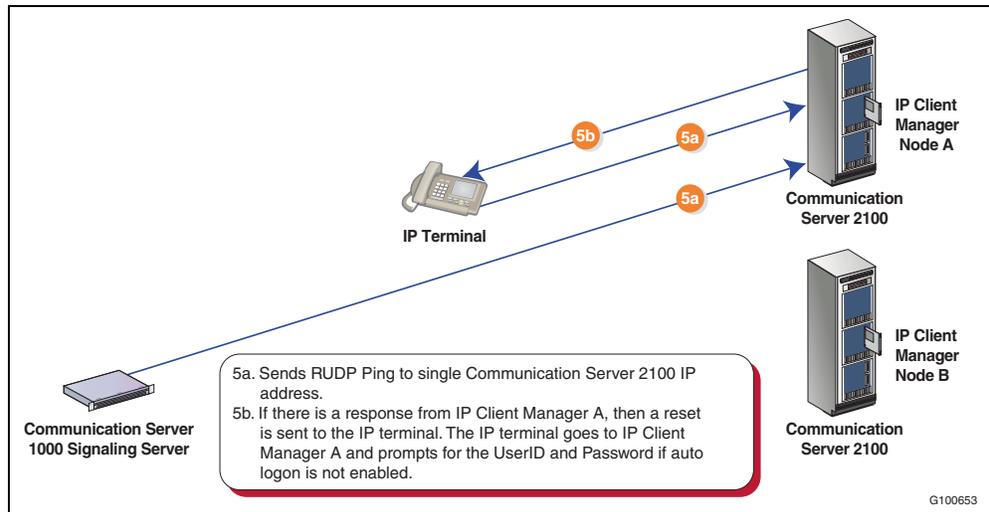
shows an example of where IPCM Node A is unreachable (steps 5a, 5b, and 6).

Figure 199
IPCM Node A is unreachable

6. If there is no response from IP Client Manager A, the IP terminal will not be reset. The set goes to IP Client Manager B and prompts for the UserID and Password if auto logon is not enabled.
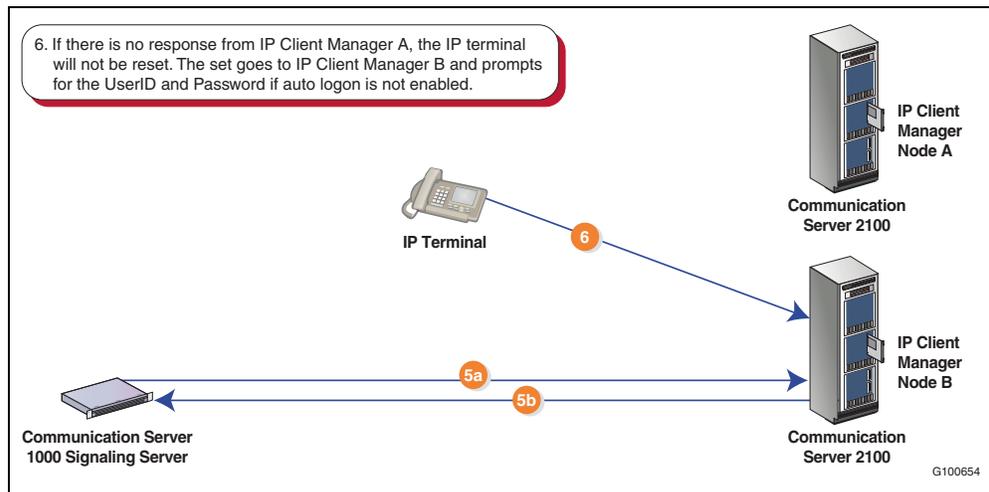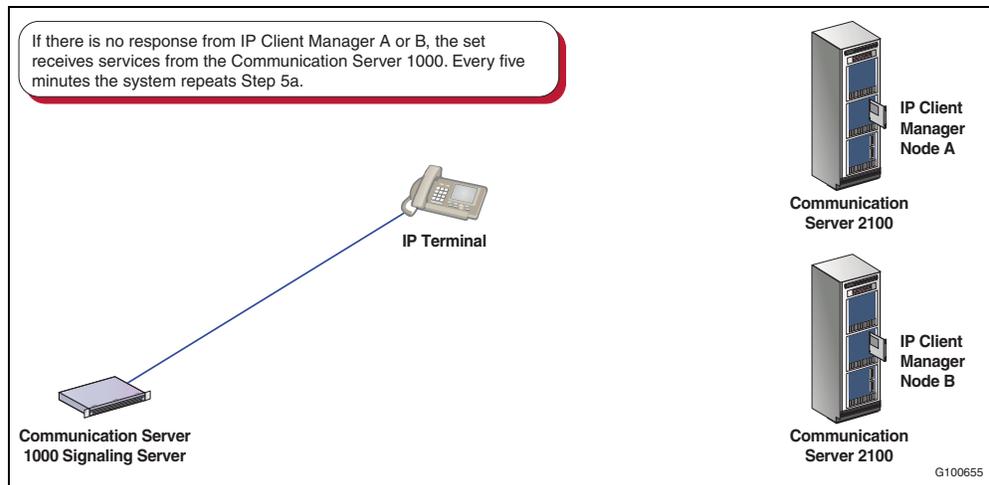
Figure 200 shows how, when there is no connection to IPCM Node A or IPCM Node B, the IP set will get telephony services from the Communication Server 1000.

Figure 200
Services from Communication Server 1000

If there is no response from IP Client Manager A or B, the set receives services from the Communication Server 1000. Every five minutes the system repeats Step 5a.

Firmware upgrade

The Communication Server 2100 IPCM and Communication Server 1000 may have different policy combinations and the different upgrade scenarios are described in the following sections.

Both CS 2100 IPCM and CS 1000 accept minimum and higher firmware version
Since both CS 2100 IPCM and CS 1000 accept the minimum or higher firmware version during registration, a firmware upgrade will only take place during initial system installation or when a minimum IP set firmware version is introduced in a software release. Normally, no firmware upgrade occurs when the CS 2100 becomes unreachable and the IP telephone registers with the CS 1000 or when the IP telephone registers with the CS 2100 IPCM after the CS 2100 IPCM becomes reachable again. However, if IP set firmware upgrade is desirable, it must be initiated manually.

CS 2100 IPCM accepts minimum or higher firmware version
In this case, the CS 2100 IPCM accepts the minimum or higher firmware version, but the CS 1000 always upgrades or downgrades the IP set firmware version if it is not the same version as the one that associates with the CS 1000 software release. IP set firmware upgrade only occurs after the software in the CS 1000 has been upgraded to a new version that introduces a new IP set firmware version. Then the firmware is upgraded the first time the IP telephone registers with the CS 1000 after this software upgrade. If the CS 2100 IPCM software is upgraded to a new version that contains the new version of IP set firmware and IP set firmware upgrade is desirable, the IP set firmware upgrade must be initiated manually.

CS 1000 accepts minimum or higher firmware version
The CS 2100 IPCM is set up to always upgrade or downgrade the IP set firmware version if it does not match the version associated with the CS 2100 IPCM software. The CS 1000 accepts the minimum or higher firmware version. As in the section , IP set firmware upgrade happens once, the first time the IP telephone registers with the CS 2100 IPCM after the CS 2100 IPCM software has been upgraded to the software version that introduces a new IP set firmware version. The IP set firmware upgrade does not happen when the IP telephone registers with the CS 1000 when the CS 2100 IPCM cannot be reached. Since firmware upgrade occurs automatically when the IP telephone registers with the CS 2100 IPCM, no manually-initiated IP set firmware upgrade is required.

Both CS 2100 IPCM and CS 1000 always upgrade unmatched firmware version

If the software of the CS 2100 IPCM and the software of the CS 1000 contain the same version of IP set firmware, the firmware of the IP telephones are upgraded to the new firmware version when they first register with either the CS 2100 IPCM or CS 1000 that contains the new firmware version. No firmware upgrade happens during subsequent registration. IP set firmware upgrade occurs automatically.

If the software of the CS 2100 IPCM and the software of the CS 1000 contain different versions of IP set firmware, firmware upgrade or downgrade occurs every time an IP telephone registers with the CS 1000 when losing connection to the CS 2100 IPCM. After the connection is restored, IP set firmware downgrade or upgrade also happens when the set registers back to the CS 2100 IPCM. The IP set firmware upgrade or downgrade introduces a three to five minute delay when the IP telephone goes to survival mode in the CS 1000 or goes back to normal mode in the CS 2100 IPCM. If the system administrator chooses this configuration, the administrator must accept the extra delay during the mode switching of the IP telephones.

Table 122 lists documents related to this feature, or referred to in this document.

Table 122
Related documents

Document number	Document title
NTP 555-4001-806	*Communication Server 2100 Product Guide*
NTP 553-3001-332	*Element Manager: System Administration*
NTP 553-3001-214	*Branch Office: Installation and Configuration*
NTP 553-3001-307	*Communication Server 1000: System Redundancy*

Hardware requirements

There are no Hardware requirements for the Communication Server 2100 IPCM.

Note: See for Communication Server 1000 systems that are not supported with this feature.

Software requirements

SE08 software is required for the Communication Server 2100, while the Communication Server 1000 must be running Release 4.5 software.

Limitations and restrictions

The following limitations or restrictions apply for this feature:

- Two points of failure: If the IP telephone is registered to IPCM x, it loses connection to IPCM x, and the IP telephone cannot reach the CS 1000 that S2 directs the set to, then the IP telephone is out-of-service, until either the IPCM x or the CS 1000 comes back in service.

- The Communication Server 2100 Selective IPCM Login is not supported when IP telephone survivability is provided on the CS 1000.

- The IP telephone will have one primary DN when registered to the CS 2100 IPCM and another when registered to the CS 1000.

- IP Soft Clients are not supported between the CS 2100 IPCM and the CS 1000. The CS 1000 cannot provide survival call service to the m6350. The CS 1000 i2050 cannot be redirected to the CS 2100 IPCM, as this client is not supported on the CS 2100 IPCM.

- UNIStim security is not available on the CS 1000.

- If the individual terminals do not have Auto Login "Enabled", the user name and password is prompted for prior to the set being registered with the CS 2100 IPCM.

- TN 252 1 15 31 is reserved to indicate the Network Home is a CS 2100 IPCM when it is used as a response to the NHTN prompt. It must not be used as a response to NHTN or MOTN if the Network Home of the Main Office is a CS 1000. This limitation does not affect the usage of TN 252 1 15 31 in a terminal configuration (that is, a local IP set could be configured with TN 252 1 15 31).

- IP Telephone Survivability is not supported on the following Communication Server 1000 systems with CP3/CP4 processors:

  — Communication Server 1000M Half Group (HG)

  — Communication Server 1000M Single Group (SG)

  — Communication Server 1000M Multi Group (MG)

Interactions

Refer to the following interworking scenarios for examples of interactions between interworking Communication Servers:

- "IP telephone survivability in CS 1000 and CS 2100 IPCM interworking" on page 285 – scenarios of IP phone survivability

  — in interworking CS 1000/CS 2100 IPCM (Table 123 on page 286).

  — in interworking CS 1000/CS 2100 IPCM – where IPCM Node A is unreachable (Table 124 on page 287).

  — in interworking CS 1000/CS 2100 IPCM – where both IPCM Node A and IPCM Node B are unreachable (Table 125 on page 287).

  — in interworking CS 1000/CS 2100 IPCM – where CS 2100 IPCM is unreachable (different set firmware in CS 2100 IPCM and CS 1000) - (Table 126 on page 288).

- "IP telephone survivability in MG 1000B and CS 2100 IPCM interworking" on page 289.

  Note: See "Configuration" on page 291 for information on how to configure the CS 2100 IPCM IP telephones with survivability in the CS 1000 or MG 1000B.

Interworking scenarios

The following scenarios show ways in which telephone survivability occurs in interworking of CS 1000s and CS 2100 IPCMs and interworking of CS 2100 IPCM and MG 1000B.

IP telephone survivability in CS 1000 and CS 2100 IPCM interworking
Assumptions for this scenario
In this scenario, the CS 1000 provides survivability to the IP phones in the CS 2100 IPCM.

- The IP set has S1 pointing to the CS 2100 IPCM (port 5000) and S2 pointing to a CS 1000 (port 4100).

- The IP set has NUID configured and NHTN is configured as 252 1 15 31 in the CS 1000.

- The Network Connect Server (NCS) has CS 2100 IPCM and CS 1000 IP node configured as non-Remote Access Server (RAS) endpoints.

- CS 2100 IPCM and CS 1000 software use the same version of IP set software.

Table 123 shows the scenario for IP phone survivability where Communication Server 1000 and Communication Server 2100 are interworking.

Table 123
IP phone survivability in interworking CS 1000/CS2100 scenario (Sheet 1 of 2)

	The steps below track the sequence of events in this scenario.
1	IP set, with Auto Login enabled, resets and registers with S1 destination.
2	IP set is registered with IPCM Node A, which provides telephony services.
3	IP set loses connection with IPCM Node A.
4	IP set resets and registers with S1 destination.
5	IP set is registered with IPCM Node B, which provides telephony services.
6	IP set loses connection with IPCM Node B.
7	IP set resets and registers with S1 destination.
8	After six attempts to contact S1 destination fail, IP set registers with S2 destination (CS 1000).
9	IP set is registered with CS 1000 Terminal Proxy Server (TPS), and requests registration with Call Server.
10	Call Server redirects IP set according to NUID configuration.
11	Query Network Connect Server (NCS) for NUID endpoint.
12	NUID endpoint is received from NCS – contact endpoint using Reliable User Data Protocol (RUDP) Ping.
13	No response is received from endpoint – set up endpoint access recovery monitor to query endpoint once every five minutes.
14	IP set is registered to CS 1000, which provides telephony services – "**Local Mode**" is displayed on IP set.
15	Endpoint access monitor receives NACK from endpoint – Link Recovery message is sent to Call Server.
16	Call Server redirects IP set according to NUID configuration.
17	Query NCS for NUID endpoint.
18	NUID endpoint is received from NCS – contact endpoint using RUDP Ping.
19	NACK is received from endpoint – Server Switch IP set to S1.

Table 123
IP phone survivability in interworking CS 1000/CS2100 scenario
(Sheet 2 of 2)

The steps below track the sequence of events in this scenario.	
20	IP set registers with S1 destination.
21	IP set is registered with IPCM Node A, which provides telephony services.

Table 124 shows IP telephone survivability in interworking. CS 2100
IPCM/CS 1000s in the scenario where IPCM Node A is unreachable.

Table 124
IP phone survivability in interworking CS 1000/CS2100 scenario –
where IPCM Node A is unreachable

The steps below track the sequence of events in this scenario.	
1	IP set, with Auto Login disabled, resets and registers with S1 destination.
2	IPCM Node B prompts for user name and password.
3	User enters valid user name and password.
4	IP set is registered with IPCM Node B, which provides telephony services.

Table 125 shows IP telephone survivability in interworking CS 2100
IPCM/CS 1000s in the scenario where both IPCM Node A and IPCM
Node B are unreachable.

Table 125
IP phone survivability in interworking CS 1000/CS2100 scenario –
where both IPCM Node A and IPCM Node B are unreachable
(Sheet 1 of 2)

The steps below track the sequence of events in this scenario.	
1	IP set, with Auto Login enabled, resets and registers with S1 destination.
2	After six attempts to contact S1 destination fail, IP set registers with S2 (CS 1000).
3	IP set is registered with CS 1000 TPS and requests registration with Call Server.
4	Call Server redirects IP set according to NUID configuration.
5	Query NCS for NUID endpoint.

Table 125
IP phone survivability in interworking CS 1000/CS2100 scenario –
where both IPCM Node A and IPCM Node B are unreachable
(Sheet 2 of 2)

The steps below track the sequence of events in this scenario.	
6	No response is received from CS 2100 IPCM endpoint – monitoring is set up to detect Link Recovery.
7	IP set is registered to CS 1000, which provides telephony services.

Table 126 shows IP telephone survivability in interworking CS 2100
IPCM/CS 1000s in the scenario where the CS 2100 IPCM is
unreachable. (different set firmware in CS 2100 IPCM and CS 1000).

Table 126
IP phone survivability scenario in interworking CS 1000/CS 2100
IPCM – where the CS 2100 IPCM is unreachable (different set
firmware in CS 2100 IPCM and CS 1000) (Sheet 1 of 2)

The steps below track the sequence of events in this scenario.	
1	IP set, with Auto Login enabled, resets and registers with S1 destination.
2	After six attempts to contact S1 destination fail, IP set registers with S2 destination (CS 1000).
3	CS 1000 TPS detects that set firmware is not the required version – firmware download is requested.
4	Firmware download is completed and reset is initiated.
5	After six attempts to contact S1 destination fail, IP set registers with S2 (CS 1000).
6	IP set is registered to CS 1000 TPS, and requests registration with Call Server.
7	CS 1000 Call Server sends redirect message with NUID configuration to TPS.
8	TPS queries NCS for NUID endpoint.
9	NCS returns CS 2100 IPCM endpoint IP address.
10	TPS sends RUDP ping to CS 2100 IPCM.
11	No response is received from CS 2100 endpoint – monitoring is set up to detect Link Recovery.
12	IP set is registered to CS 1000, which provides telephony services.

Table 126
IP phone survivability scenario in interworking CS 1000/CS 2100 IPCM – where the CS 2100 IPCM is unreachable (different set firmware in CS 2100 IPCM and CS 1000) (Sheet 2 of 2)

The steps below track the sequence of events in this scenario.	
13	Network Home monitor receives response from Network Home – Link Recovery message is sent to CS 1000 Call Server.
14	CS 1000 Call Server verifies that set is idle – Call Server ends redirect message with NUID configuration to TPS.
15	CS 1000 TPS Queries NCS for NUID endpoint.
16	NCS returns CS 2100 endpoint IP address.
17	TPS sends RUDP ping to CS 2100.
18	CS 2100 returns RUDP NACK.
19	IP set is reset to contact S1 destination.
20	CS 2100 detects that set firmware is not the required version – firmware download is initiated.
21	Firmware download is completed.
22	IP set is reset to contact S1 destination.
23	IP set is registered with CS 2100.

IP telephone survivability in MG 1000B and CS 2100 IPCM interworking
Assumptions for this scenario
The following assumptions are made for this scenario, where the MG 1000B provides survivability to the IP phones in the CS 1000:

- The IP set has S1 pointing to IPCM (port 5000), and S2 pointing to a MG 1000B (port 4100).

- The IP set has BUID configured, and MOTN configured as 252 1 15 31 in the MG 1000B.

- NCS has CS 2100 IPCM and CS 1000 IP node configured as non-RAS endpoints.

- The CS 2100 IPCM and MG 1000 software use the same version of IP set software.

Table 127 shows a scenario of IP telephone survivability with interworking MG 1000B and CS 2100 IPCMs.

Table 127
IP telephone survivability in MG 1000B and CS 2100 IPCM interworking (Sheet 1 of 2)

The steps below track the sequence of events in this scenario.

1	IP set, with Auto Login enabled, resets, and registers with S1 destination.
2	IP set is registered with IPCM Node A, which provides telephony services.
3	IP set loses connection with IPCM Node A.
4	IP set resets and registers with S1 destination.
5	IP set is registered with IPCM Node B, which provides telephony services.
6	IP set loses connection with IPCM Node B.
7	IP set resets and registers with S1 destination.
8	After six attempts to contact S1 destination fail, IP set registers with S2 destination (MG 1000B).
9	IP set is registered with MG 1000B TPS, and requests registration with MG 1000B Controller.
10	MG 1000B Controller redirects IP set according to BUID configuration.
11	Query NCS for BUID endpoint.
12	BUID endpoint is received from NCS – contact endpoint using RUDP Ping.
13	No response is received from endpoint – set up endpoint access recovery monitor to query endpoint once every five minutes.
14	IP set is registered to MG1000B, which provides telephony services – "**Local Mode**" is displayed on IP set.
15	Endpoint access monitor receives NACK from endpoint – Link Recovery message is sent to MG 1000B.
16	MG 1000B redirects IP set according to BUID configuration.
17	Query NCS for NUID endpoint.
18	BUID endpoint is received from NCS – contact endpoint using RUDP Ping.
19	NACK is received from endpoint – server switches IP set to S1.

Table 127
IP telephone survivability in MG 1000B and CS 2100 IPCM
interworking (Sheet 2 of 2)

The steps below track the sequence of events in this scenario.
20   IP set registers with S1 destination.
21   IP set is registered with IPCM Node A, which provides telephony services.

Datafill

There are no datafill requirements for this feature.

Configuration

Configuration description for this feature is provided by way of the following two scenarios:

- "Configuring CS 2100 IPCM IP phones with Survivability in CS 1000" on page 291

- "Configuring CS 2100 IPCM IP phones with Survivability in MG 1000B" on page 292

   Note: Refer to "Software requirements" on page 284 and "Limitations and restrictions" on page 284 for requirements and dependencies.

Configuring CS 2100 IPCM IP phones with Survivability in CS 1000
Assumptions

The following assumptions are made, and preconditions should exist for this configuration scenario (see "Installing the IP phone" on page 292 for instructions on how to install the phone in this scenario):

- The CS 2100 IPCM is using SE08 software.

- The CS 1000 is using Release 4.5 software.

- One of the CS 1000 Signaling Servers is configured to the Primary NCS (PNCS) and another to be the Alternate NCS.

- The single IP address for the CS 2100 IPCM Node A/IPCM Node B registration and all CS 1000 IP nodes are configured as a non-RAS endpoints in the Primary NCS and Alternate NCS.

- Route entries are configured for the CS 2100 IPCM and all the CS 1000 in the Primary NCS and the Alternate NCS.

- The IP sets in the CS 1000 are configured to include the NUID and NHTN in the set data.

Installing the IP phone

Follow Procedure 8 for instructions on how to install the IP phone.

Procedure 8
Installation of IP phone with CS 2100

1   Program the IP address of the IP phone.

2   Program S1 and S2 of the IP set to point to the node IP address of the CS 1000 with port 4100.

3   Program the node identity and the CS 1000 TN on the IP phone.

4   The IP phone registers with the CS 1000 and is redirected to the CS 2100 IPCM.

> *Note:* S1 is overwritten to point to the single IP address of the CS 2100 IPCM with port 5000 after the first redirection of the CS 2100 IPCM.

This procedure is now complete

The following table shows the command definitions for the configuration of the NUID and NHTN for CS 2100 IP phones with Survivability in the CS 1000.

Table 128
LD 11 Configuration of NUID and NHTN

Command/Prompt	Command/User Response(s)	Description
CUST	x	Customer number
NUID	xxxxx	Network Dialable DN
NHTN	252 1 15 31 SCH1600 message is printed to inform users that TN 252 1 15 31 is reserved for CS 2100 IPCM Network Home if TN 252 1 15 31 is entered as response to the NHTN prompt.	Network Home TN 252 1 15 31 is a reserved TN to indicate the Network Home is a CS 2100 IPCM. It must not be used if the Network Home is a CS 1000.

Configuring CS 2100 IPCM IP phones with Survivability in MG 1000B
Assumptions

The following assumptions are made, and preconditions should exist for this configuration scenario (see "Installing the IP phone" on page 293 for instructions on how to install the phone in this scenario).

•   The CS 2100 IPCM is using SE08 software.

•   The CS 1000 is using Release 4.5 software.

•   One of the CS 1000 Signaling Servers (this could be the MG 1000B) is configured to be the PNCS and another to be the Alternate NCS.

- The single IP address for the CS 2100 IPCM Node A/IPCM Node B registration, the MG 1000 B nodes, and all CS 1000 nodes in the network supporting the Virtual Office feature are configured as non-RAS endpoints in the Primary NCS and the Alternate NCS.

- Route entries are configured for the CS 2100 IPCM, the MG 1000B, and CS 1000s for IP telephone redirection in the Primary NCS and the Alternate NCS.

- The IP sets in the MG 1000B are configured to include the BUID and MOTN in the set data.

Installing the IP phone
Follow Procedure 9 for instructions on how to install the IP phone.

Procedure 9
Installation of IP phone with MG 1000B

1   Program the IP address of the IP telephone.

2   Program the S1 and S2 of the IP telephone to point to the node IP address of the MG1000B with port 4100.

3   Program the node identity and the MG 1000B TN on the IP telephone.

4   The IP telephone registers with the MG 1000B and is redirected to the CS 2100 IPCM.

> *Note:* S1 is overwritten to point to the single IP address of the CS 2100 IPCM with port 5000 after the first redirection of the CS 2100 IPCM.

This procedure is now complete

The following table shows the command definitions for the configuration of BUID and MOTN for CS 2100 IP phones with Survivability in the MG 1000B.

Table 129
LD 11 Configuration of BUID and MOTN

Command/Prompt	Command/User Response(s)	Description
CUST	x	Customer number
BUID	xxxxx	Network Dialable DN
MOTN	252 1 15 31 SCH1600 message is printed to inform users that TN 252 1 15 31 is reserved for CS 2100 IPCM Main Office if TN 252 1 15 31 is entered as response to the MOTN prompt.	Main Office TN 252 1 15 31 is a reserved TN to indicate the Main Office is a CS 2100 IPCM. It must not be used if the Main Office is a CS 1000.

Service Orders

This feature does not change Service Orders.

Operational Measurements

This feature does not affect Operational Measurements

Logs

This feature does not affect logs.

User interface

This feature does not change the user interface.

Billing

This Feature does not affect Billing.

List of terms

ACD

Automatic Call Distribution

ANCS

Alternate Network Connect Server

ATDN

AUTO Terminate TN

ATS

 Activity Tracking System

AUX

Auxiliary

BRSC

Basic Rate Signalling Concentrator

BUID

Brand User Identifier

CAST

Customer Assurance & Serviceability Test

CCR

Customer Controlled Routing

CDR

Call Detail Record

COT

Central Office Trunks

CFU

Call Forward Universal

CFW

      Call Forward

CI

      Command Interpreter

CIF

      Controlled Interflow

CLI

      Calling Line Identify

COT

      Customer Originated Trace

CS 2x00

      Communication Server 2000 or 2100

DN

      Directory Number

DNIS

      Dialed Number Identification Services

EMS

      Enterprise Multimedia Systems

EPROM

      Erasable Programmable Read Only Memory

FOPT

      Flexible Orbiting Preventing Timer

GNTS

      Global Network Technical Support

IPCM

      IP Client Manager

MCDN

      Meridian Customer Defined Networking

MCDN P-P

      Meridian Customer Defined Networking Peer-to-Peer ISDN interface

MCDN UNI

Meridian Customer Defined Networking User-Network ISDN interface

MISP

Multi-purpose ISDN Signalling Processor

MOTN

Main Office Terminal Number

MWI

Message Waiting Indicator

NCS

Network Connect Server

NGSS

Next Generation Session Server

NMS

Network Message Service

NMUS

Network Music Service

NHID

Network Home Identifier

NHTN

Network Home Terminal Number

NUID

Network User Identification

OTM

Optivity Telephony Manager

PNCS

Primary Network Connect Server

PNI

Primary Network Identifier

PSTN

Public Switched Telephone Network

RLT

Release Line Trunks

RUDP

Reliable User Datagram Protocol

SMDI

Simplified Message Desk Interface

TPS

Terminal Proxy Server

TAT

Trunk Anti-Tromboning

TDM

Time Division Multiplexing

VGMC

Voice Gateway Media Card

VPNI

Virtual Private Network Identifier

Communication Server 2100

Communcation Server 1000 Interworking

Services Guide

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