NORTEL

Communication Server 2100

Interworking Services Guide

555-4001-026

Document status: Standard
Document version: 10.01
Document date: 20 October 2006

The information in this document is sourced in Canada, the United States of America, and the United Kingdom.

Contents

New in this release

There have been no updates to the document in this release.

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 the 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 is for the use of administrative, provisioning, and installation personnel.

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.

ATTENTION

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 *Communication Server 2100 Commercial Systems Master Index of Publications* (555-4031-001).

References in this document

lists related documents for the Communication Server 2100 and Communication Server 1000.

Related documents for the Communication Server 2100 and Communication Server 1000

Document number	Document title
555-8001-101	*Meridian SL-100 Basic Call Network Services*
555-8001-102	*Meridian SL-100 MCDN Integrated Services Access*
555-4001-106	*ISDN Primary Rate Interface (PRI) Specification (NTNA)*
553-3001-230	*Installing and Configuring Optivity Telephony Manager*
553-3001-330	*Using Optivity Telephony Manager*
553-3001-331	*Using Optivity Telephony Manager Telemanagement Applications*

Basic call service

Introduction

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

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 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.

ATTENTION

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. "Network elements of basic call service" (page 14) shows the network elements of basic call service.

Network elements of basic call service
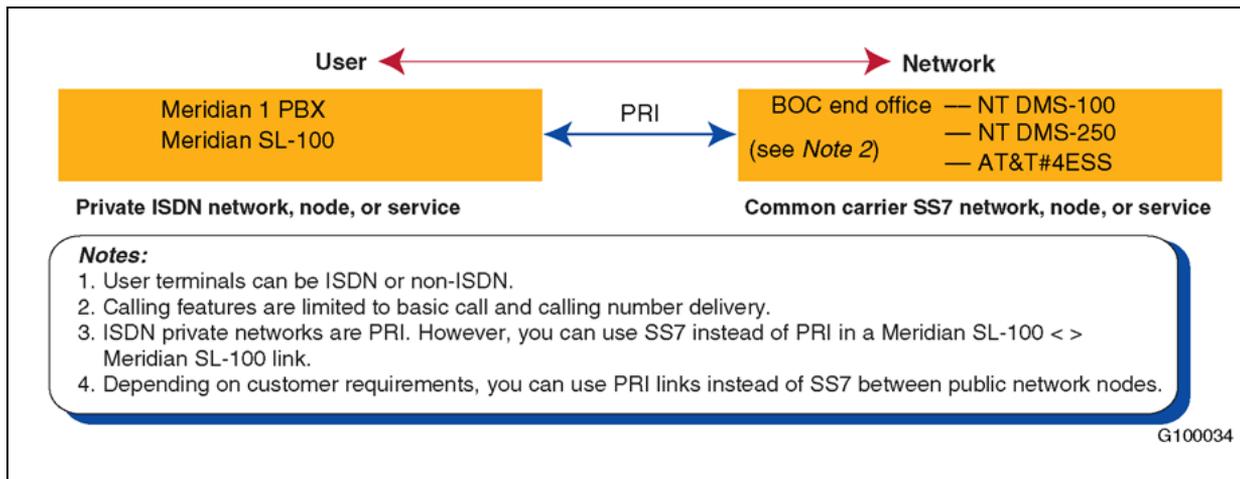
Basic call connections

An ISDN node can function as an originating or terminating endpoint, or as a direct access tandem in a private or public network. Table 2 shows compatible network connections for the Meridian 1 and Meridian SL-100.

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	N/A	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 (IE) within call control messages enable other ISDN services. "PRI IEs for network features" (page 15) 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.

PRI IEs for network features

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.

G100035
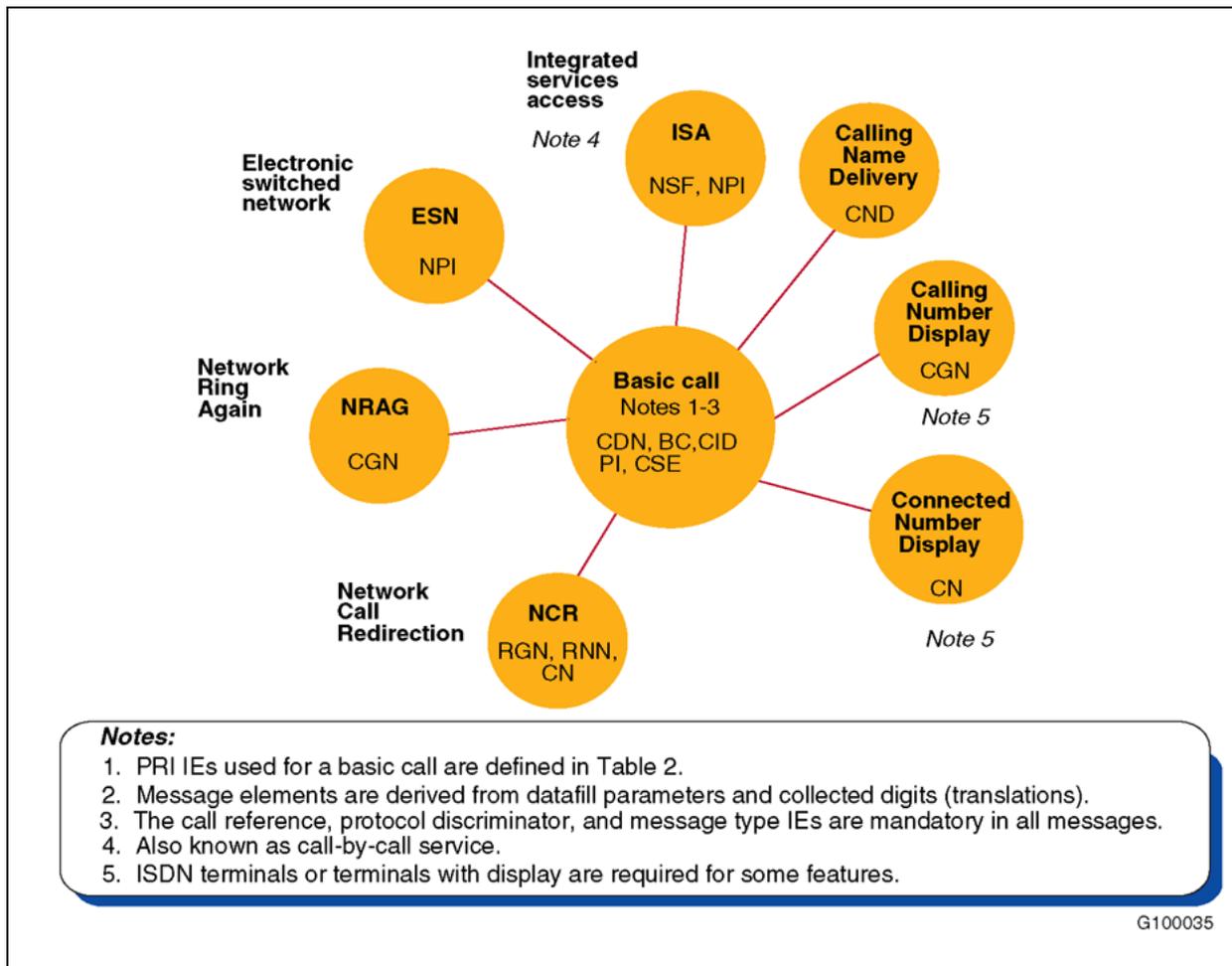
PRI information elements

"PRI message elements" (page 16) lists the PRI call control message elements. "PRI IEs for network features" (page 15) 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.

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.	N/A	Used for routing.
TON	Type of Number.	International, national, local, directory number (DN), unknown.	N/A
NPI	Numbering Plan Indicator.	Public (E.164) or private (ESN).	N/A
IA5 Digits	Dialed digits.	0 through 9, * and #.	N/A
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 in-band to originating PRI.
CSE	Cause.	See Cause tables in each switch section.	Identifies why a call cannot be completed or that there is an in-band treatment (such as busy).

Element	Definition	Options	Comments
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.
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 setup 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 time slot 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 kilobits per second (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 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.

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

B-channel allocation

The B-channel (DS-1 time slot) 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).

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

Network versus 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 in-band 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 in-band 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 (OM).

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 in-band 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 (BC) 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 Electronic Switched Network (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).

"PRI call types" (page 21) shows the supported call types for incoming PRI calls.

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	N/A	N/A	N/A
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.

"PRI routing for incoming calls (Meridian SL-100, DMS-100, DMS-250 switches)" (page 21) displays call processing and routing combinations for the Meridian SL-100, DMS-100, and DMS-250 systems.

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.	N/A	N/A

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 - "Outgoing call types" (page 22) lists the call types that the switch supports for outgoing calls.

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	N/A
FEX	FX	FX; not applicable	FX; INWATS
PVT (to DMS-250)	N/A	N/A	N/A
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.

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

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.
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.

Call Type	NPI	NSF(see Note 1)	XLARTE	Comments
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. ESN is one type of dialing plan that Nortel 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 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 regular calls over PRI (using standard PRI signaling) with a BC of 56 or 64 Kbps. The system assigns voice band 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.

describes the Meridian 1 network options for basic call service.

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.	N/A	**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 in-band ANI (also called digital in-band, 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. 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.

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.
Implementation	The DCHI card provides D-channel signaling. The PRI card provides the DS-1 link, which is synced 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 LD 17) requires a modem or ASIM. ISL SHA requires the HSDM. Channel IDs must match at the endpoints.	N/A
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 in-band 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).	N/A
Database configuration	Use LD 17 (USR prompt) to identify the D-channel mode. Associate the D-channel with the trunk group in LD 17 (PRI prompt).	Enable ISL trunks on a per-trunk group basis: • Identify the D-channel type in LD 17 (USR prompt) • Assign the ISL trunks a channel ID in LD 14 (CHID prompt) for the trunk group	N/A

Meridian 1 basic call service considerations

"Meridian 1 basic call service considerations" (page 29) shows the requirements, networking considerations, and sample datafill for basic call service on the Meridian 1.

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 LD 11. 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 rerouting 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

"Meridian 1 basic call service and ESN feature packages (Release 15 and later)" (page 29) shows the Meridian 1 software dependencies for basic call service. ESN requires no new options for ISDN networking.

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.
ISDN (Option 145 and 118)	N/A	Includes ISDN signaling, CLID, and CLID in CDR.

Basic call		
SW0301A	ISDN PRA.	Provides basic call on PRI and ESN signaling on PRI.
PRA (Option 146)	N/A	Requires base package and SW0300A.
SW0302A	ISDN signaling link.	Requires base package and SW0300A for dedicated mode.
ISL (Option 147)	N/A	Also requires SW0301A for shared mode.
SW0304A	Interexchange carrier.	Requires SW0301A.
IEC (Option 149)	N/A	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)	N/A	

Hardware requirements

shows the hardware architecture for Meridian 1 PRI links.

Meridian 1 PRI hardware configuration

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).
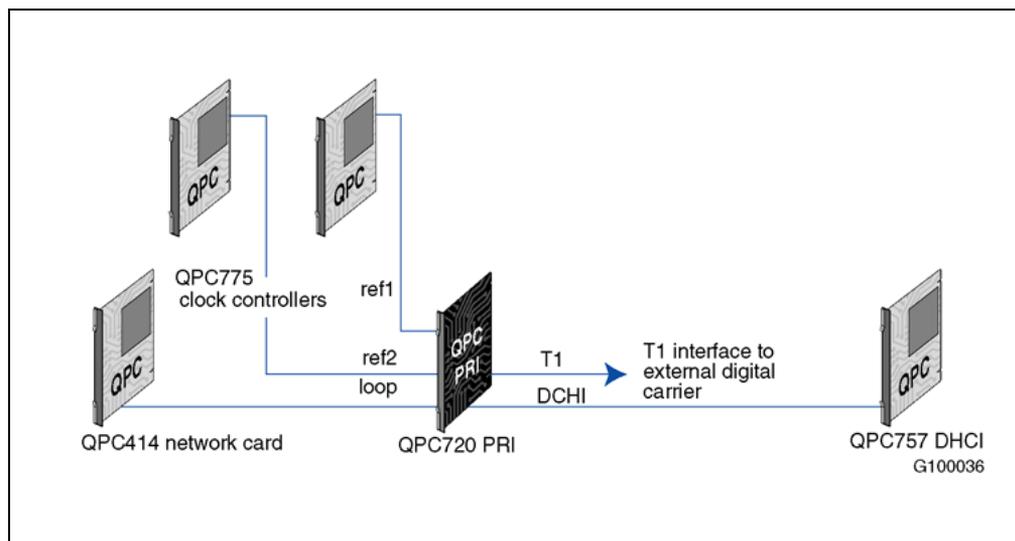
Meridian 1 PRI and ISL hardware description

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 LD 17.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 LD 17. 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

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.

"Meridian 1 PRI datafill sequence" (page 32) summarizes the datafill sequence for installing the PRI interface.

Meridian 1 PRI datafill sequence

Step no. and LD	Description	Initial install
1. LD 73 (DDB)	Set error detection thresholds and clock synchronization control.	✓
2. LD 15 (CDB)	Equip customers with PRI capability.	✓
3. LD 17 (CFN)	Configure all PRI loops (DS-1 spans) before associating the D-channel link.	✓
4. LD 17 (CFN)	Add the associated D-channel (DCHI card) and configure the D-channel link.	✓
5. LD 16 (RDB)	Configure PRI routes.	✓
6. LD 14	Configure PRI trunks (B-channels).	✓
7. LD 86 (DGT)	Add ESN dialing capability (skip this step if you do not require ESN).	Optional

The following tables provide examples of the steps in "Meridian 1 PRI datafill sequence" (page 32). 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.

Step 1: LD 73 (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.	N/A	N/A
SREF	0-159 or *<cr>*	Secondary clock or free run.	N/A	Appears if PREF = 0-159.
TRSH	0-15	Reference number.	Match TRSH in LD 17 on DLOP.	N/A
RALM	1-3-128	Yellow alarm 24-hour out-of-service limit.	Must be enabled in LD 60.	You must manually restore service.
BIPC	0-2-128	24-hour limit for times returned to service.	Uses BIPV out-of-service limit.	0 restores service automatically.

Prompt	Options	Description	Requirements	Comments
LFAC	0-3-128	24-hour 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 6.6s 2 => 10K in 66s 3 => 10K in 660s 4 => 10K in 6600s.	N/A
SRTK	1-5-24 1-30-360	Slip count (tracking) maintenance and out-of-service limits.	N/A	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 s, for 10 slips).	N/A	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).	N/A	If the condition clears for 15 s, the switch automatically restores service.

Step 2: LD15 (CDB) - Define PRI customer

Prompt	Options	Description	Requirements	Comments
CUST	0-31	N/A	N/A	N/A
... AWU	<cr>	N/A	N/A	N/A
ISDN	YES	Change ISDN parameters.	N/A	N/A
PNI	1-32700	Customer private network identifier.	Must be unique; must be the same throughout the network. Must match PNI in RDB (LD 16).	Prompted if ISDN = Y in LD 17 and there is at least one configured PRI link.
HNPA	100-999	Area code for customer's Meridian 1.	N/A	N/A

Prompt	Options	Description	Requirements	Comments
HNXX	100-999	CO prefix (exchange) for customer's Meridian 1.	N/A	N/A
HLOC	100-999	Home location code (NARS).	N/A	N/A
LSC	1-9999 or <cr>	1- to 4-digit local steering code in coordinate dialing plan (CDP); press <cr> to transmit CDP DN.	N/A	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.	N/A	Attendant consoles can have only an LDN.
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.	N/A	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.

Step 3: LD 17 (CFN) - Configure PRI network loops

Prompt	Options	Description	Requirements
PWD2	<cr>	N/A	N/A
ISDN	<cr>	N/A	N/A
PARM	<cr>	N/A	N/A
CEQU	YES	*Note:* You must configure all PRI network loops, before associating the D-channel for those loops. See step 4.	N/A
... XCT	N/A	N/A	N/A

Prompt	Options	Description	Requirements
DLOP	lll dd ff lll = 0-159 dd = 0 ff = D2-D3-D4-ESF	lll = network loop number. dd = number 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	N/A	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 LD 73.
DTIC	0-159	Starting network loop card slot for PRI.	The loop number must be even.

Step 4: LD 17 (CFN) - Add DCHI and configure D-channel link

Prompt	Options	Description	Requirements	Comments
PWD2	<cr>	N/A	N/A	N/A
ISDN	YES	*Note:* You must configure all PRI network loops, before associating the D-channel for those loops.	N/A	N/A
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-ISLD-SHA	D-channel signaling mode.	N/A	There is no default.

Prompt	Options	Description	Requirements	Comments
RCVP	NO or YES	Recovery to backup D (N) or primary D when primary reestablished (Y).	If this does not match the far end, both sides default to NO.	N/A
ISLM	1-382	Count of ISL trunks controlled by the D-channel.	N/A	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	Number of output request buffers.	N/A	N/A
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.
IFC	D100 ESS4 SL-1 S-100 D250	Near-end mode.	N/A	N/A

Prompt	Options	Description	Requirements	Comments
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.	N/A	N/A
T23	1-20-31	Interface guard timer (timeout for DCHI response to system).	Enter in 1/2 s. units (for example, 20 = 10 s).	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 number of octets in information field.	N/A	Appears if LAPD = Y.
N201	4-260	Maximum number of octets in information field.	N/A	Appears if LAPD = Y.

Prompt	Options	Description	Requirements	Comments
T203	2-10-40	Maximum time (s) allowed without frame exchange.	Release 15 requires a non-zero value.	Appears if LAPD = Y.
K	1-7-32	Maximum number of NAKS (unacknowle dged or outstanding frames).	N/A	Appears if LAPD = Y.

Step 5: LD16 (RDB) - Configure PRI routes

Prompt	Options	Description	Requirements	Comments
CUST	0-99	Customer number.	N/A	N/A
ROUT	0-127 or 0-511	Route number: 0-511 for options NT, RT, ST, XT, 21, 51, 61, and 71; 0-127 all others.	N/A	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 LD 17. Refer to the *MCDN Integrated Services Guide* (555-8001-102) for configuring ISA routes.
... RCLS	N/A	N/A	N/A	N/A
DTRK	NO or YES	Analog (N) or digital (Y) trunk.	N/A	N/A
DGTP	DTI or PRI	Digital trunk type.	Use DTI for ISLD only.	Prompted if DTRK = Y.
ISDN	YES	ISDN customer.	N/A	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 LD 17.	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 (LD 15).	Prompted if ISDN = Y in LD 17 and there is at least one configured PRI link.

Prompt	Options	Description	Requirements	Comments
IFC	D100 ESS4 SL-1 S100 D250	Near end node.	Same as IFC in LD 17.	N/A
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.	N/A	N/A
NCRD	No or Yes	Allow (Y) network call redirection message (including CLID) or disallow (N).	N/A	N/A
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 number (INTL); national number (NPA); subscriber number (NXX); location code (LOC); coordinated dialing plan (CDP); or special number other than international format (SPN).	N/A	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.	N/A	Prompted if TKTP = TIE. If INAC = Y, the system bypasses the digit insertion option (INST).

Prompt	Options	Description	Requirements	Comments
INAC	NO or YES	Insert access code to incoming ESN call from a private network.	N/A	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.	N/A	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.

Step 6: LD 14 - 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 lscul = 0-159 ch = 1-23 s = 0-1 c = 1-10 u = 0-7	Terminal number address: PRI loop number PRI channel number.	Must match DLOP lll in LD 17; use loop number and D-channel number for PRI links; use loop number shelf number, card number and unit number for ISL links.	Refer to the *MCDN Integrated Service Access Guide* (555-8001-102) for configuring ISA TNs.

Prompt	Options	Description	Requirements	Comments
... RTMB	N/A	N/A	N/A	N/A
CHID	1-382	Channel number for ISL trunk.	Must match the far end.	LD 17 (ISLM prompt) specifies the number of ISL trunks allowed for the D-channel.

Step 7: LD86 (DGT) - Add ESN dialing capability

Prompt	Options	Description	Requirements
CUST	0-99	Customer number.	N/A
FEAT	DGT	Digit manipulation data block.	Home location codes require digit manipulation tables. Assign home location codes in LD 90, prompt HLOC.
DMI	1-255	Digit manipulation index (number table) for NARS/BARS.	N/A
CTYP	NCHG INT NPA NXX LOC CDP SPN UKWN	Modifies the call type according to the DMI: no change (NCHG); special international number (INT); area code (NPA); local exchange (NXX); location code (LOC); coordinated dialing plan (CDP); special number (other than international); and unknown (UKWN).	The far end switch must recognize the call type.

PRI datafill dependencies

"Meridian 1 PRI datafill dependencies" (page 41) lists the datafill dependencies in the DS-1 span. Enter these parameters in LD17.

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

"Meridian 1 to Meridian 1 correlation table" (page 42) and "Meridian 1 to Meridian SL-100 correlation table" (page 43) 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.

Meridian 1 to Meridian 1 correlation table

G100037

Meridian 1 to Meridian SL-100 correlation table

Trunk and route (TFC002)

The switch reports traffic measurements on PRI trunk routes as 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:

*   LD 2

*   SOPS 9

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

*   LD 2

*   INVS 9

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

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):

*   The PLOG is printed automatically when a protocol counter overflows.

- PLOG counters clear after the PLOG is printed or the DCHI card is enabled.

- 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 representative.

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

- LD 96

- PLOG DCHI port number

Meridian 1 protocol log format

```
DCHI n I 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

"Meridian 1 alarms" (page 46) lists common PRI alarms that affect basic call service. The system provides automatic detection and recovery for most faults.

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-hour 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.	N/A
DTA008 Disabled	N/A	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:*LD60S TAT*loop#. 2. Check PRI counters:LD 60LCNT loop number. 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 number 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.

Message	Effects	Remedy
DTA013 24-hour 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 number*ENLL* loop number.
DTA014 Cleared	PRI is restored.	N/A
Frame slip: clock sync error (NEAR END FAULT)		
DTA015 Maint limit (tracking mode)	Switch increments counter.	Midnight routines print number 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 number 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 inLD60 with the TRCK PCK command.
DTA028 SRIM timer expired without improvement in slip rate; maintenance message count (SRMM in LD 73) is exceeded.	Switch keeps PRI out of service and restarts guard timer.	Same as DTA027.
DTA029 The number of allowable maintenance messages (SRMM in LD 73) is not exceeded.	Switch restores PRI.	Same as DTA027.

Message	Effects	Remedy
Frame alignment: out-of-frame error (NEAR END FAULT)		
DTA019 Maint limit	N/A	Check DS-1 connection to far end.
DTA020 Out-of-service limit	If LFAC = 0 in LD 73, 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.	N/A
DTA023 PRI loop is up	N/A	N/A
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.	N/A

lists common status messages that affect basic call service.

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.
B-channel	
PR100 loop number ch number 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.

Message	Remedy
PRI101 loop number ch number 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.

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

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	N/A	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#.

Manual tests		
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 setup 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 LD 60.

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. "Meridian SL-100 network options" (page 51) 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.

"Meridian SL-100 network options" (page 51) contains network options for the Meridian SL-100.

Meridian SL-100 network options

Trunk	PRI only	N/A	SS7
Mode	PRI only	ITA (PRI + T1 A/B) (see Note 1)	SS7
Restrictions	N/A	N/A	Not available for Meridian 1 to Meridian SL-100.
BCS software	BCS 29 minimum	N/A	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 in-band 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 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. "Meridian SL-100 PRI interface summary" (page 51) shows PRI interface requirements, networking considerations, and sample datafill for the Meridian SL-100.

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.

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

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

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.
Networking considerations	Set up route selection to select the PRI trunk first with overflow rerouting to the non-PRI trunks. Bearer capability allows restriction of trunk groups in order to carry data only, voice only, voice band 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 is completed. If the BCs are not compatible, the call is completed 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 so that stations within a customer group and NCOS can automatically access a particular network • datafilling the LOGNET option in table IBNXLA so that stations in a customer group to use dialed codes can 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. "Meridian SL-100 summary for ESN signaling" (page 53) describes the Meridian SL-100 requirements for implementing ESN signaling on PRI links.

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.
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

"Meridian SL-100 PRI basic call and ESN feature packages" (page 54) 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.

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.

"MSL software ordering" (page 54) shows MSL software ordering information.

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

"Meridian SL-100 PRI hardware configuration" (page 55) shows the basic hardware architecture for PRI links. Required equipment includes the following:

- **An ISDN DTCI** - the Digital Trunk Controller-ISDN (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.

Meridian SL-100 PRI hardware configuration
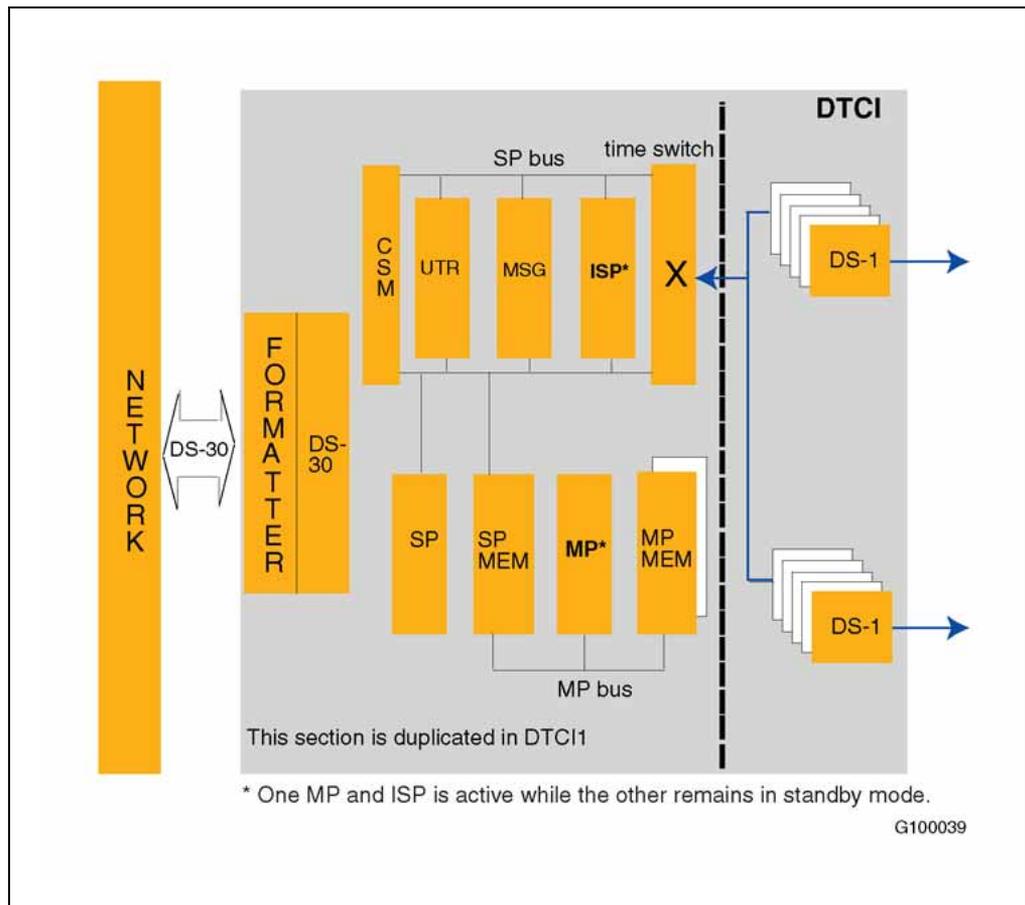
"Meridian SL-100 PRI hardware description" (page 55) shows the hardware requirements for PRI links.

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.

Card	Abbreviation	NT_PEC	Comments
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

shows rules and recommendations that apply to PRI installation.

MSL-100 PRI installation rules

Node
1   Install a maximum 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.
3   The following recommendations apply to configuring channels: • Each 6 by 50 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 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.

Node	
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 manual busy (MB) the DCH if installation busy (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 "Meridian 1 PRI datafill dependencies" (page 41). 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 installation busy (INB) state.

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

PRI datafill sequence

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.

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 number).	√			√
6. CARRMTC	Configure DS-1 carrier and set error rates and alarms. (Optional; switch provides a default tuple for 64K clear).	Optional			

Step	Description	Initial install	Add a trunk member	Add DS-1 span	Add a C-side link
7. LTCPSINV	Identify the DS-1 cards that are associated with a DTCI to the software (P-side port number) 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.	√			
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.

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 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.	N/A	N/A

Field	Entry	Description	Requirements	Comments
TRKGRSIZ	0-2047	The number 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 recommends that you use TRA FCLS, 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.

Step 2: PADDATA - Define the transmit and receive pad values (optional)

Field	Entry	Description	Requirements	Comments
PADKEY	N/A	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.	N/A	If you use a reserved pad group, the switch automatically sets this value.
PAD2TO1	0 to 14L	The network receive pad.	N/A	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 number of LTIDs = 1022.

Step 3: TRKGRP - Configure the trunk group

Field	Entry	Description	Requirements	Comments
GRPKEY	N/A	Equals subfield CLLI.	N/A	N/A
CLLI	alphanumeric (up to 12 characters)	CLLI name for the trunk group.	Same as trunk group name in CLLI table.	N/A
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.
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.	N/A
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.	N/A	N/A
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.

Field	Entry	Description	Requirements	Comments
NCOS	0-255	Network class of service defines the access privileges of a user.	N/A	Index to NCOS table.
BILLDN	N/A	Use CGN (N) or DN (Y) for billing for PRI interface.	N/A	N/A
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	N/A	Logical terminal group name.	This field is updated with the LTGRP entry in LTMAP.	Not prompted.
LTNUM	N/A	Logical terminal group number.	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

Step 4: OFCENG - Define the number of allowable simultaneous PRI/SS7 calls

Field	Entry	Description	Requirements
PARMNAME	NO_OF_HIS_CONTROL_BLKS	Parameter name.	N/A
PARMVAL	1	Parameter value.	Nortel recommends one HCB per trunk member.
PARMNAME	NO_OF_HIS_DATA_BLKS	Parameter name.	N/A
PARMVAL	1	Parameter value.	Nortel recommends one HDB per trunk member.

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

Step 5: LTCINV - Identify the DTCIs to the system software (C-side port number)

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

Field	Entry	Description	Requirements	Comments
CSLINKTAB	vector with 3-16 members	Equals subfields NMNO + NMPORT + CONTMARK.	N/A	N/A
NMNO	0-31	The network module number assigned to XPM.	Must correspond to C-side links 0-15 of the PM.	N/A
NMPORT	0-63	Network port number for NMNO.	N/A	N/A
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.	N/A
OPTATTR	$	Optional attributes.	Enter $	Applies only to DTC CCS7 ISUP trunks.
PEC6X40	6X40AA, 6X40AB, or 6X40AC	PEC for DS-30 interface card.	N/A	N/A
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 in this table. Data in this table must be consistent with the datafill in TRKSGRP.

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.	N/A	N/A

Field	Entry	Description	Requirements	Comments
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.	N/A	Enter 255 to disable this feature.
RTSOL	0-255	Out-of-service limit for the audit interval.	N/A	Enter 255 to disable this feature.
ATTR	N/A	Equals subfield SELECTOR.	N/A	N/A
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.	N/A	N/A
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.

Field	Entry	Description	Requirements	Comments
FF	SF or ESF	Frame format: superframe (SF) or extended superframe (ESF).	Must correspond with DS-1 card code.	N/A
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.	N/A
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).	N/A	N/A
LCGAST	1-250-9999	Local carrier alarm group set threshold in units of 10 ms.	N/A	N/A
LCGACL	1-1000-9999	Local carrier alarm clear threshold in units of 10 ms.	N/A	N/A
RCGAST	1-50-9999	Remote carrier alarm set threshold in units of 10 ms.	For problems bringing carrier into service, use 1000 (10 s).	N/A
RCGACL	1-50-9999	Remote carrier alarm clear threshold in units of 10 ms.	For problems bringing carriers into service, use 1000 (10 s.).	N/A
AISCL	1-1000-9999	Alarm indicator signal clear threshold in units of 10 ms.	N/A	N/A
BEROL	3-6	BER out-of-service limit.	N/A	3 => 10K in 6 s 4 => 10K in 66 s 5 => 10K in 660 s 6 => 10K in 6600 s

Field	Entry	Description	Requirements	Comments
BERML	4-6-7	BER maintenance limit.	N/A	4 => 10K in 66 s 5 => 10K in 660 s 6 => 10K in 6600 s 7 => 10K in 66000s
ES	0-864-9999	Error second threshold in units of 10 ms.	N/A	N/A
SES	0-100-9999	Severe error second threshold in units of 10 ms.	N/A	N/A
FRAMEML	0-17-9999	Maintenance limit for frame loss.	N/A	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.	N/A	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.

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

Field	Entry	Description	Requirements	Comments
LTCNAME	N/A	Equals subfields XPMTYPE + XPMNO.	N/A	N/A
XPMTYPE	DTCI	Peripheral module type.	N/A	N/A

Field	Entry	Description	Requirements	Comments
XPMNO	0-511	Peripheral module number.	N/A	N/A
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.
PSLINK	0-19	P-side port number.	N/A	N/A
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.	N/A	N/A
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.

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 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.	N/A
PRODUCT	For PRI: DMS, Meridian 1, OTHER	Adjacent switch type.	N/A	N/A
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.

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

Field	Entry	Description	Requirements	Comments
SGRPKEY	N/A	Equals CLLI + SGRP subfields.	N/A	To configure ITA on the DTCI, datafill the non-PRI trunk subgroups in table TRKSGRP along with the PRI trunk subgroups.
CLLI	N/A	CLLI trunk group name.	N/A	N/A

Field	Entry	Description	Requirements	Comments
SGRP	0	Subgroup number.	N/A	The switch allows only one subgroup (subgroup 0) per PRI interface.
CARDCODE	DS1SIG	Card code.	ISDN PRI requires DS1SIG.	N/A
SGRVAR	N/A	Equals subfields SIGDATA through DCHBCKUP below.	N/A	N/A
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.	N/A	Applies only to in-band DTMF digits.
PARTDIAL	2-30	The time, in seconds, that the trunk must wait to receive each digit after the first digit.	N/A	Applies only to in-band DTMF digits.
VERSION	87Q931	The D-channel protocol version.	This is the only supported value.	N/A
CRLENGTH	2	Call reference length (number of octets).	The only supported value is 2.	N/A
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).	N/A	When a call collision occurs, an entry of YIELD causes the switch to take the call and select another trunk.

Field	Entry	Description	Requirements	Comments
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.	N/A	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.	N/A
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.	N/A

Field	Entry	Description	Requirements	Comments
			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 ms. This is the time that the trunk waits after sending a DISCONNECT message and before putting the trunk into IDLE.	For PRI, Nortel 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.	N/A
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.	N/A

Field	Entry	Description	Requirements	Comments
DCHNL	N/A	The primary D-channel for this PRI interface; it includes subfields PMTYPE through HDLCTYPE below.	N/A	You cannot change or delete this field, unless the D-channel is in INB state.
PMTYPE	DTCI	PM type.	Use DTCI for BCS 30 and later.	N/A
DTCINO	0-511	DTCI PM number.	N/A	N/A
DTCICKTNO	0-19	DS-1 span on the DTCI for the D-channel.	N/A	N/A
DTCICKTTS	1-24	DS-1 time slot for the D-channel.	N/A	N/A
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	N/A	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.	N/A
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.

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

Field	Entry	Description	Requirements	Comments
CLLI	N/A	CLLI name for the trunk group.	Must match trunk group name in CLLI table.	N/A
EXTRKNM	0-9999	The external trunk number.	The first digit in the tuple must be the same as the channel number to ensure correct trunk selection.	N/A
SGRP	0	Trunk subgroup number.	Same as SGRP in table TRKSGRP.	Always 0 for PRI trunks.
MEMVAR	N/A	Equals subfields PMTYPE + DTCNO + DTCCKTNO + DTCCKTTS.	N/A	N/A
PMTYPE	DTCI	PM type.	N/A	N/A
DTCNO	0-511	DTCI number 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.	N/A
DTCCKTTS	1-24	DS-1 time slot for this trunk member.	N/A	N/A
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

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).	N/A
CLASSREF		Equals subfield LTCLASS.	N/A	N/A
LTCLASS	PRA	The LT class.	N/A	Defines the required fields and the allowed services.
NUMBCHNL	1-479	Number of B-channels in the trunk group.	N/A	N/A
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.	N/A
INCCALLS	0-479	The number of reserved incoming-only calls allowed on the LTID at one time.	N/A	Not used; enter any number.
OUTCALLS	0-479	The number of reserved outgoing-only calls allowed on the LTID at one time.	N/A	Not used; enter any number.

Field	Entry	Description	Requirements	Comments
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

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

Field	Entry	Description	Requirements	Comments
LTID	N/A	Equals subfields LTGRP + LTNUM.	N/A	N/A
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 number within the group.	N/A	N/A
DATATYPE	NIL, DN, or SERV	Data type for the services associated with this LTID.	N/A	N/A
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.

Field	Entry	Description	Requirements	Comments
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.	N/A	N/A
When DATATYPE = SERV, you require the following fields:				
AUDTRMT	N or Y	Audible treatments; specify whether the switch provides in-band tones and announcements instead of "disconnect with cause" for treatments from this LTID.	N/A	N/A
CGNREQD	N or Y	Specify whether the calling user switch must provide the CGN.	N/A	N/A
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).	N/A
CDNDELV	NEVER or ALWAYS	Specify whether the switch must deliver the CDN to the called interface.	N/A	N/A
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.	N/A	Up to two entries allowed.

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

LTCALLS table

Step 13: LTCALLS - Provides the initial translations associated with the call type

Field	Entry	Description	Requirements	Comments
LTID	N/A	The LTID from table LTDATA.	N/A	N/A
CALLTYPE	PUB, PVT, WATS, INWATS, FX, or TIE	Defines the call type allowed on this PRI interface.	N/A	If XLARTSEL = XLALEC, the following call types are not valid: PVT, INWATS, and TIE.
XLARTSEL		Equals subfield XLARTE.	N/A	N/A
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.	N/A	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.	N/A	Indexes table LINEATTR for public calls.

Field	Entry	Description	Requirements	Comments
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.	N/A	N/A
SUBGRP	0-7	Subgroup number for the CUSTGRP.	N/A	N/A
NCOS	0-255	The network class of service, which defines access privileges for the user.	N/A	N/A
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.	N/A	N/A
OPTIONS	$	N/A	Enter $	N/A
Example: *ISDN 555 PUB XLAIBN 52 $*				

LTMAP table

Step 14: LTMAP - Map the LTID to the CLLIs of the PRI trunk groups

Field	Entry	Description	Requirements	Comments
LTID	N/A	LTKEY from table LTDEF indexes this table.	N/A	Automatically updates LTID field in table TRKGRP.
MAPTYPE	CLLI	N/A	N/A	Always set to CLLI for PRI.
CLLI	N/A	The CLLI name for the trunk group.	Must match CLLI name in table TRKGRP.	N/A
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.

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 number.	Use 1 for Meridian SL-100.
DNREVXLA	$	DN reverse translators.	Use $ for Meridian SL-100.
OPTIONS	CLID or NTWKRAG	MCDN feature options.	N/A
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. is an example tuple for table OFRT that shows how to implement this.

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 incoming calls on DMS2MSLDAL the same way as incoming calls on DMS2MSLPRA.

PRI datafill dependencies

The datafill you enter for table CARRMTC must be consistent with the datafill in table TRKSGRP. "Meridian SL-100 PRI datafill dependencies" (page 81) shows the Meridian SL-100 PRI datafill dependencies.

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 time slot 2, or FLD2 for input from external interrupt. Currently, the system supports only NILDL.

Correlation tables

"Meridian SL-100 to Meridian 1 correlation table" (page 82) and "Meridian SL-100 to Meridian SL-100 correlation table" (page 83) show the parameters that you must coordinate between the near and far end. Note that there can be differences in datafill between product types.

Meridian SL-100 to Meridian 1 correlation table

Meridian SL-100 to Meridian SL-100 correlation table

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 switch uses a default BC.

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

Default BC summary

"Meridian SL-100 default Bearer Capability summary" (page 84) summarizes the default values associated with tables BCDEF, BCCOMPAT, and KSETFEAT. "Step 11: LTDEF - Define the logical terminal (LT) and access privileges" (page 75) describes the OPTIONS field in table LTDEF.

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
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

"Meridian SL-100 BC datafill sequence" (page 85) 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.

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 BCDEF default BC compatibility" (page 85). 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 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
PROTOTYP	N/A	N/A	N/A	DTU	N/A
PROTOCOL	N/A	N/A	N/A	NONE	N/A
SYNC	N/A	N/A	N/A	Y	N/A
DATARATE	N/A	N/A	N/A	56 Kbps	N/A
DISCRIM	N/A	N/A	N/A	N/A	N/A

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 BCDEF summary" (page 86) shows the fields you can datafill. You must define this table, before defining table BCCOMPAT.

Table BCDEF summary

Field	Entry	Description	Requirements	Comments
BCNAME	alphanumeric (up to 7 characters)	Bearer capability name.	N/A	Define a maximum of 59 BCs.
BCDATA	N/A	Equals subfields XFERCAP + XFERMODE + CODINGST.	N/A	N/A
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.	N/A	N/A
XFERMODE	CIRCUIT, NETWORK	The coding standard for BC: CCITT or a network-specific coding standard.	N/A	N/A
CODINGST	CCITT, NETWORK	The coding standard for BC: CCITT or a network-specific coding standard.	N/A	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.	N/A	N/A
When PROTOTYP = MODEM, you require the following fields:				
MODEMPRO	alphanumeric	Identify the modem protocol.	You must define the name used in table MODEMPRO.	N/A
MODEMSNC	Y or N	Synchronous (Y) or async (N) communications.	N/A	N/A

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

Field	Entry	Description	Requirements	Comments
DISCRIM	0-63	Identifies OTHER devices.	N/A	N/A
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 BCCOMPAT summary" (page 88) 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 BCCOMPAT summary

Field	Entry	Description	Requirements	Comments
KEY	N/A	= subfields CALLBC and TERMBC	N/A	Used to define compatible combinations. By default, any bearer capability is compatible with itself - no tuples need to be entered. For bidirectional compatibility, you must define two tuples.
CALLBC	N/A	BC name	Must define in BCDEF.	N/A
TERMBC	N/A	BC name	Must define in BCDEF.	N/A
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 KSETFEAT summary" (page 89) is an example of table KSETFEAT.

Table KSETFEAT summary

Field	Entry	Description	Comments
FEATKEY	Equals subfields LTGRP + LTNUM + KEY + FEAT.	N/A	N/A
LTGRP	N/A	Logical terminal group.	N/A
LTNUM	N/A	Logical terminal number.	N/A
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.	N/A
KVAR	N/A	Equals subfield FEAT + BCNAME.	N/A
FEATURE	BC	Enter BC feature.	N/A
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

"TCOS to NCOS mapping" (page 90) 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 to 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.

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 (OM)
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.

"DS-1 OM pegs" (page 90) shows the OM pegs that the switch accumulates for each DS-1 carrier for 24 hours and resets when DS1LOF and DS1SLP are reset.

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.
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.

Peg	Description
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.

"DCH OM pegs" (page 91) shows the PRADCHL2.

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.
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.

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

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.
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 miscellaneous (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 miscellaneous: 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

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

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

Report ID	Alarm info	Event type	Event ID	Equip type	Equip ID
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
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

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.

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 s of remote alarm. When the counter reaches 34, it no longer increments the counter and removes the trunk from service.	Check the far end.
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 s or more, the switch removes the trunk from service. The switch restores it automatically when it receives frame sync continuously for 15 s	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	N/A	Alter alarm settings by changing table CARRMTC.
SES Severe errored seconds	N/A	Alter alarm settings by changing table CARRMTC.

Message	Effects	Remedy
UAS unavailable seconds	N/A	N/A
State carrier state	Shows INSV, MANB, SYSB, UNEQ (trunks offline)	N/A

DTCI commands

"DTCI MAP commands" (page 96) 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*

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 offline (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 offline 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.

lists the Meridian SL-100 system PRADCH maintenance commands.

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 time slot)*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 can 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

"Meridian SL-100 DTCI states" (page 98) 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.

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 offline (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 offline.
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 offline.

DS-1 carrier states

"Meridian SL-100 DS-1 carrier states" (page 98) lists the possible states for the DS-1 carrier.

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.

State	Description
OFFL	The DS-1 is offline.
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 offline.

D-channel states

"Meridian SL-100 D-channel states" (page 99) lists the possible states for the D-channels.

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

"Meridian SL-100 B-channel states" (page 99) lists the possible states for the B-channels.

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.

State	Description
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

"Tests for verifying network operation" (page 100) 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.

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 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

"Troubleshooting procedures" (page 101) provides troubleshooting procedures for common problems.

Troubleshooting procedures

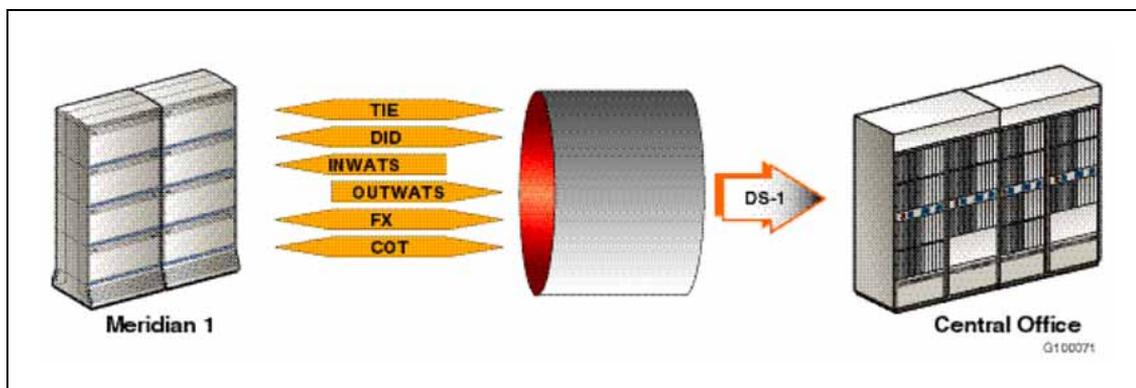| Symptom	Procedure
The DCH is locked out (LO).	Verify the data rate in table TRKSGRP matches that of the far end.
	Verify the IFCLASS in table TRKSGRP. If connected to another DMS-250, the endpoints of the local connection must have opposite values. Otherwise, the DMS-1 = 250 is always NETWORK.
	Verify 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

Introduction

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

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). ISA enables dynamic call-by-call service selection and provides the capability to match trunk requirements to peak call usage periods.
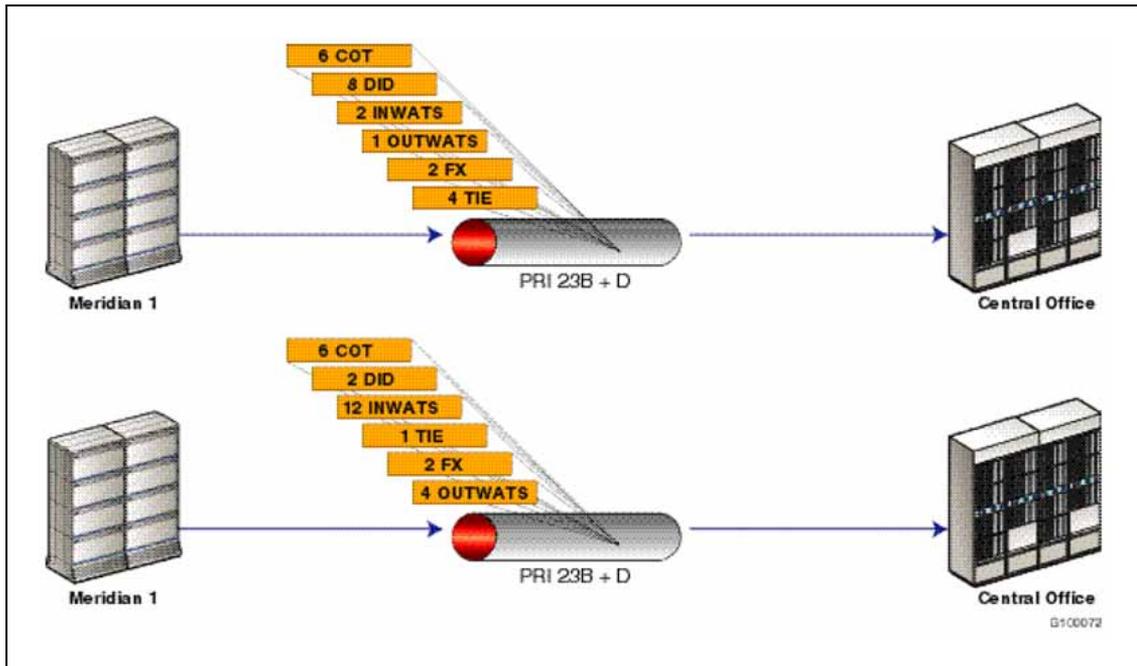
shows an example of ISA on PRI for the Meridian 1.

Meridian 1 Integrated Services Access on PRI

shows how PRI B-channels can be adjusted to allow a telemarketer more DID calls than Central Office Trunk (COT).

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 that 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 collocated, 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 .

Define PRI routes as ISA routes

Step	Action
1	Define an ISA route in LD 16.
2	Configure ISA trunks in LD 14.
3	Configure all the service routes (FX, TIE, INWATS, OUTWATS, COT, DID) in LD 16.

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.

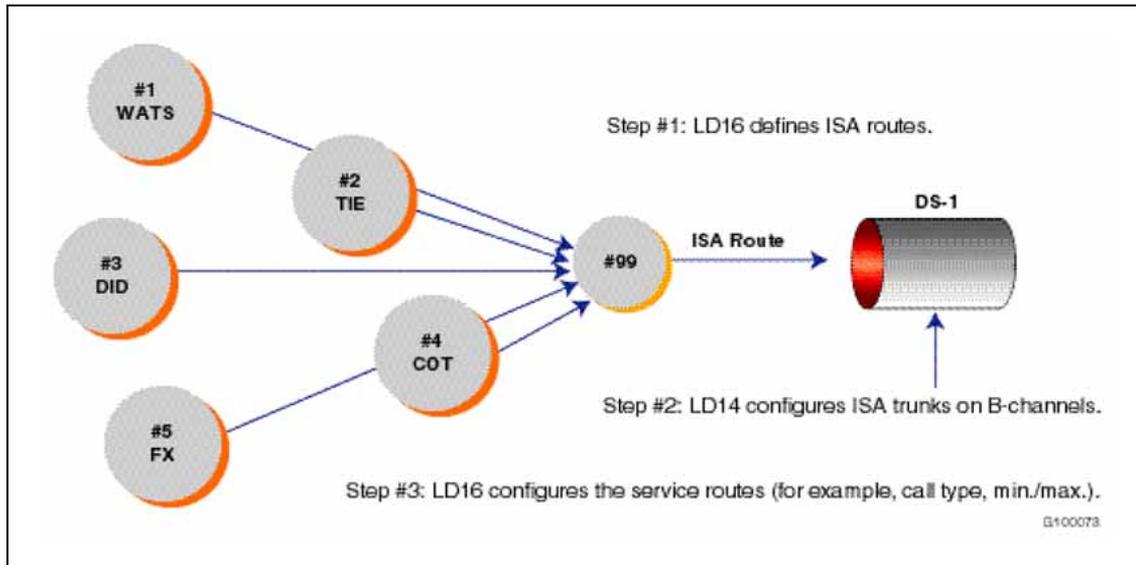*Note:* The IFC of a service route and its ISA route must match.

—End—

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.

Step 1: LD 16 - 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	N/A	N/A
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.
ICOG	IAO ICT OGT	Incoming and outgoing trunk. Incoming trunk. Outgoing trunk.

Prompt	Range	Description
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.		

Step 2: LD 14 - 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 LD 17. 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.

Step 3: LD 14 - 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.
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.

Prompt	Range	Description
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 LD 14. 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. "Trunk route traffic measurements" (page 109) shows traffic measurements for a trunk route.

Trunk route traffic measurements

System ID	TFC002
<Customer Number>	N/A
<Group Number>	COT
<Trunks Equipped>	<Trunks Working>

System ID	TFC002
<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>	N/A
<Outgoing ISA Peg Count>	<Incoming ISA Peg Count>

shows traffic measurements for an ISA route.

ISA route traffic measurements

System ID	TFC002
<Customer Number>	N/A
<Group Number>	ISA
<Trunks Equipped>	<Trunks Working>
<Incoming usage>	<Incoming PC>
<Outgoing usage>	<Outgoing PC>
<Outgoing Overflow>	<All Trunks Busy>
<Toll PC>	N/A
<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.

Test the Meridian 1 ISA PRI trunk setup

Step	Action
1	Select a PRI to test.
2	Access LD 60. 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 LD 80 to ensure a B-channel from the ISA pool is in use. Then:

    a. Place the call on hold.

    b. Make another call.

       You 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 receives an overflow signal (fast busy).

8   Disconnect both calls.

—End—

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 enables call-by-call service selection and provides the capability to match trunk requirements to peak periods of call usage.

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

Meridian SL-100 Integrated Services Access on PRI
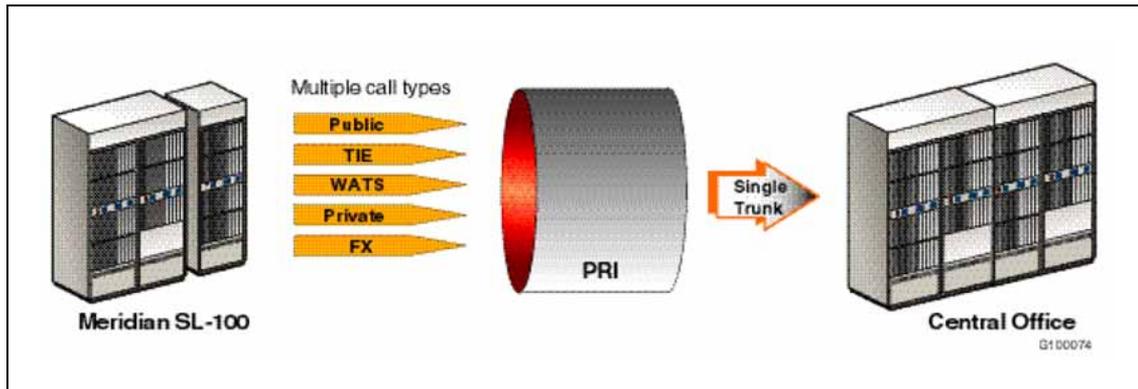
You can adjust PRI B-channels to allow a telemarketer more INWATS calls when needed, as shown in "Varying Meridian SL-100 B-channel allocation by call type" (page 112). The selection of call type occurs on a per-call basis that provides a service-based architecture. The switch sends a SETUP message with 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.

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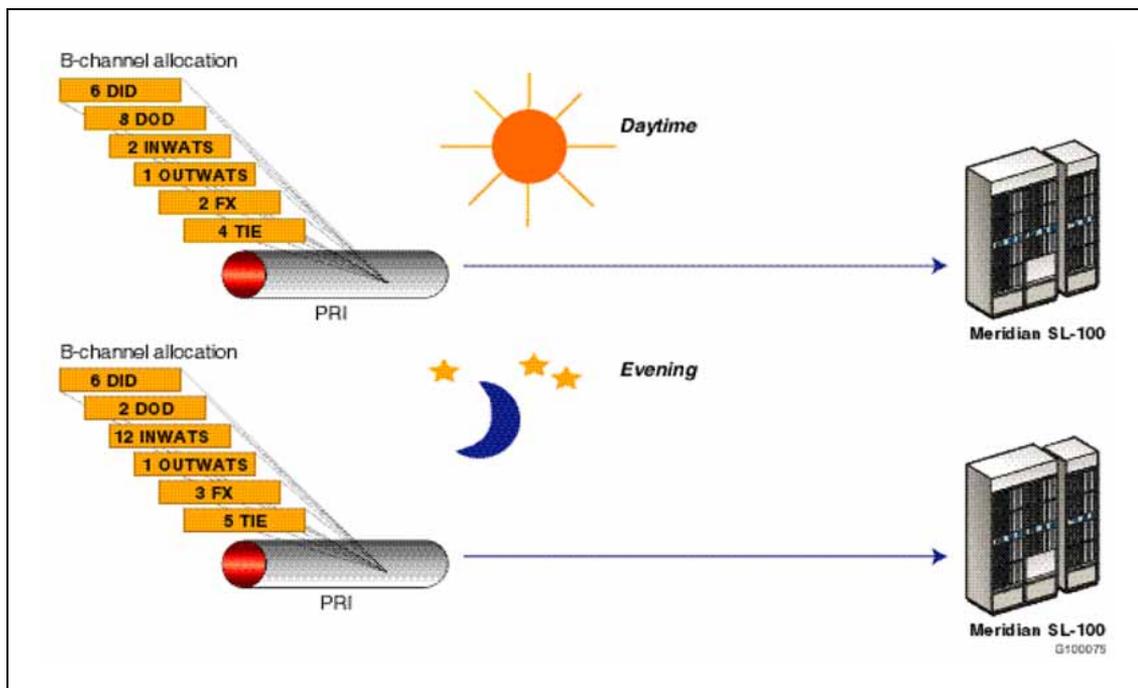
The Meridian SL-100 provides ISA over the PRI between the following:

*   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

ISA is a software feature, therefore 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 that specifies the actual facility used to route the call.

Originating ISA table flow

"Originating ISA table flow (Meridian SL-100)" (page 115) shows the tables the Meridian SL-100 uses when a PRI trunk member originates an ISA call.

Originating ISA table flow (Meridian SL-100)
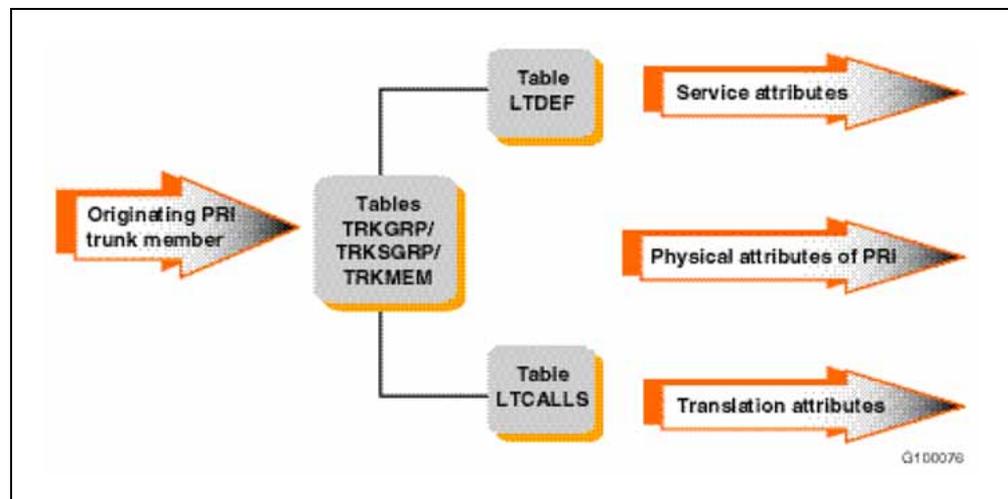
Terminating ISA table flow

"Terminating ISA table flow (Meridian SL-100)" (page 116) shows the tables the Meridian SL-100 uses when a PRI trunk member terminates an ISA call.

Terminating ISA table flow (Meridian SL-100)
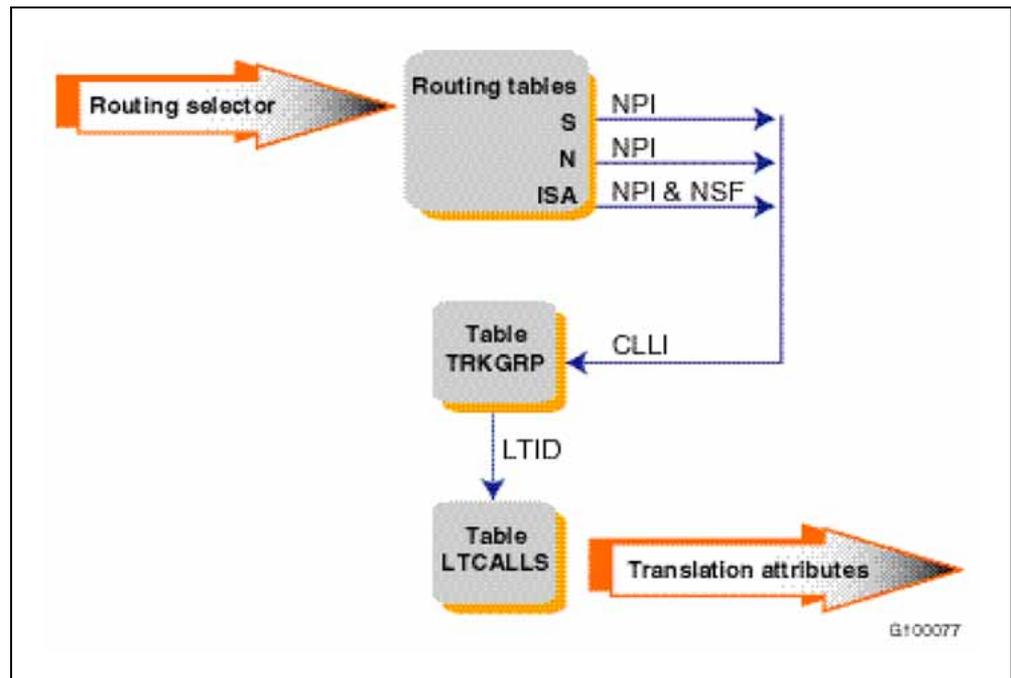

Logical terminal tables

The logical terminal tables provide the Meridian SL-100 with identification, service, and translation information about the terminals connected to a PRI. Nortel 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.

"Meridian SL-100 logical terminal tables" (page 117) 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 "Meridian SL-100 logical terminal tables" (page 117).

Meridian SL-100 logical terminal tables
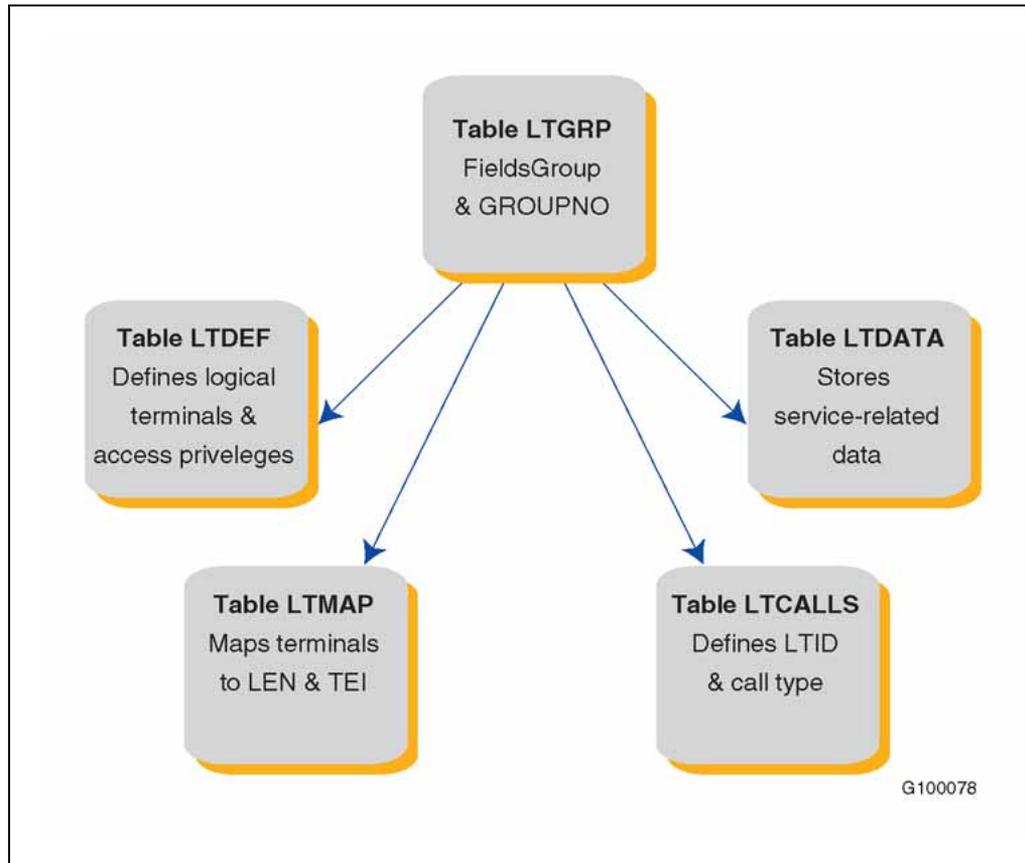
Table LTGRP

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.

"Meridian SL-100 table LTGRP parameters" (page 117) shows the fields
and values for table LTGRP.

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.

Field name	Range	Default value	Description
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.

shows an example of a tuple for table LTGRP.

Table LTGRP tuple

```
group     groupno    options

ISDN        0        SAPI16
```

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

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.

Field name	Range	Description
(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 "Meridian SL-100 table LTCLASS subfields" (page 119) appear.

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.
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 sign (+) when the data continues to next line. Enter $ to signify end of string.

"Table LTDEF tuple" (page 119) shows an example of a tuple for table LTDEF.

Table LTDEF tuple

```
ltgrp    ltnum    ltap    ltclass

                                   num     num     inc     out    options
                                   bchnl   calls   calls   calls

         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.
"Meridian SL-100 table LTDATA parameters" (page 120) shows the fields
and values for table LTDATA.

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.
(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.

"Table LTDATA tuple" (page 120) shows an example of a tuple for table
LTDATA.

Table LTDATA tuple

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.

shows the fields and values for table LTCALLS.

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.
(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:		

Field name	Range	Description
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.

shows an example of a tuple for table LTCALLS if the XLARTE selector is XLALEC.

Table LTCALLS tuple

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.

shows the fields and values for table LTMAP.

Meridian SL-100 table LTMAP parameters

Field name	Range	Description
LTKEY	alphanumeric	Logical terminal key consists of the subfields LTGRP and LTNUM.

Field name	Range	Description
(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.
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.

shows an example of a tuple for table LTMAP.

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 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, except 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

"Meridian SL-100 tables IBNRTE, OFRT, and RTEREF parameters" (page 124) shows the fields and values for tables IBNRTE, OFRT, and RTEREF.

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 callback 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.
DMI	0-32767	Modifies the CDN before transmission.

Field name	Range	Description
(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.		

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

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

Configure ISA INWATS routing to a Meridian 1

Step   Action

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.

—End—

---

show translations verifications (TRAVER) example datafill the system uses to route ISA INWATS calls to the Meridian 1.

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 +++
```

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.

Test the ISA configuration

Step	Action
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.
	Note: A successful TRAVER does not necessarily indicate that a call was completed. TRAVERs are part of a complete testing plan and not a guarantee.
3	Verify each call by actual completion.
	Note: A successful TRAVER does not necessarily indicate that a call completed. TRAVERs are part of a complete testing plan and not a guarantee.

—End—

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.

describes the call types and provides recommended actions.

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.

Call type	Action
	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 connects to a PRI trunk using a route defined in table RTEREF.
	Verify that a PUB ISA call connects to a PRI trunk using a route defined in table IBNRTE.
	Verify that a PUB ISA call connects to a PRI trunk using a route defined in table OFRT.
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 is completed 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 is completed using this route.
Private call type verification (terminating PRI)	Set the NPI to PVT. Verify that a PVT ISA call connects to a PRI trunk using a route defined in table IBNRTE.
	Set the NPI to PVT. Verify that a PVT ISA call connects to a PRI trunk using a route defined in table OFRT.
	Set the NPI to E164. Verify that a PVT ISA call connects 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 connects 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 connects 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 connects using this route.
OUTWATS call type verification (terminating PRI)	Verify that a PUB ISA call connects to a PRI trunk using a route defined in table RTEREF.
	Verify that a PUB ISA call connects to a PRI trunk using a route defined in table IBNRTE.
	Verify that a PUB ISA call connects to a PRI trunk using a route defined in table OFRT.

| Call type	Action
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 connects 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 connects 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 connects 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 connects using this route.
TIE call type verification (terminating PRI)	Verify that a PUB ISA call connects to a PRI trunk using a route defined in table IBNRTE.
	Verify that a PUB ISA call connects 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 connects to a PRI trunk using a route defined in table RTEREF.
	Verify that a PUB ISA call connects to a PRI trunk using a route defined in table IBNRTE.
	Verify that a PUB ISA call connects 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>.

"Sample Meridian SL-100 TRAVER command format" (page 132) shows an example of the command format for a Meridian SL-100 TRAVER.

Sample Meridian SL-100 TRAVER command format
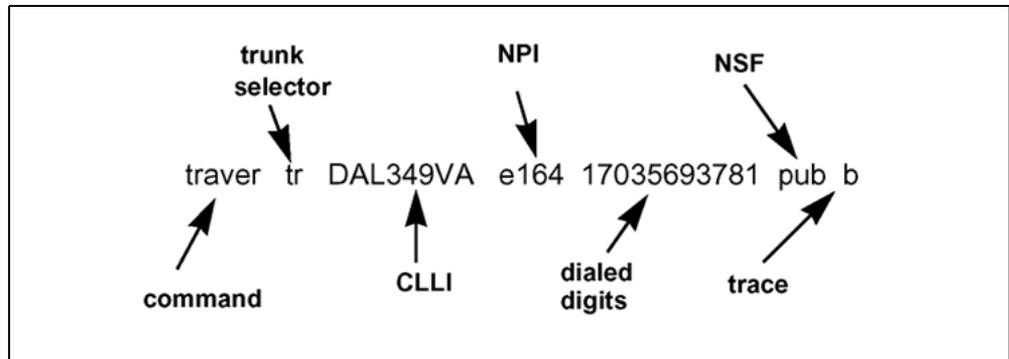
"Meridian SL-100 TRAVER parameters and values" (page 132) shows the range of values and descriptions of the parameters of a TRAVER.

Meridian SL-100 TRAVER parameters and values

Field name	Range	Description
ORIG	N/A	N/A
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	N/A	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

"Public ISA call using routing from table OFRT TRAVER" (page 133) through "FX ISA call TRAVER" (page 135) show TRAVERs for each ISA call type. They show a TRAVER for both terminating and originating ISA calls, where applicable.

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 +++
```

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 +++
```

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 +++
```

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 +++
```

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 +++
```

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 +++
```

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 LATA 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 +++
```

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 +++
```

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

shows the billing options for
ISA call types.

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

Introduction

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 switches.

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 special prefix (SPRE) code (for a Nortel 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 as usual.

shows an example of NRAG in this type of network.

NRAG within a Meridian 1/Meridian SL-100 network
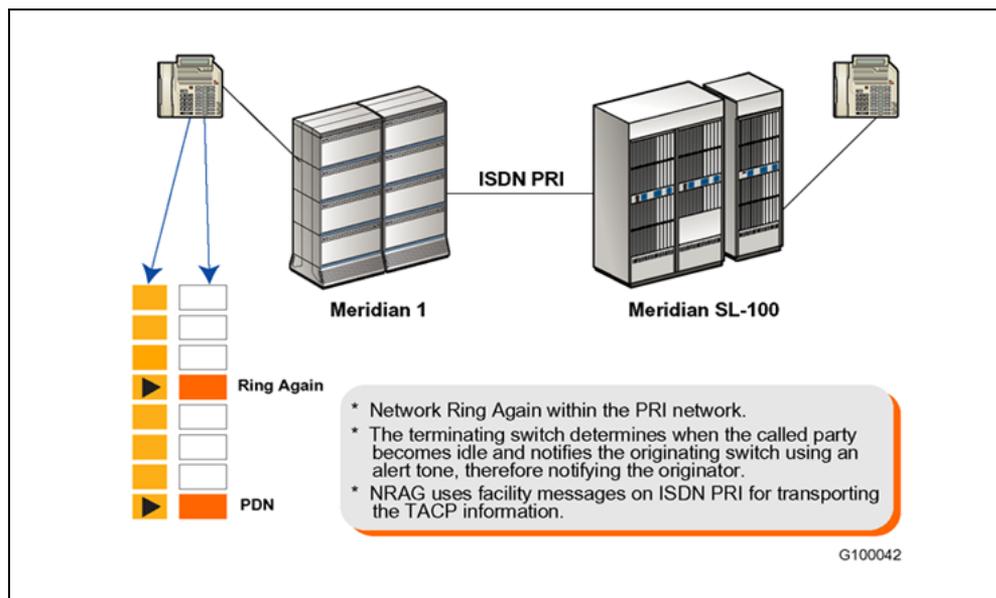
NRAG on the Meridian 1

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 message response timer, begins to count. When user A receives the confirmation tone, T5 stops and T6 begins. T6, the originating switch 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 setup, T2 stops.

   b. If user A's Nortel 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 (4 seconds) expires.

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

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

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

- 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 setup and finds that user B is 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 duration timer (T6) expires.

- The terminating switch 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 retry the NRAG call later.

- Provides interfaces for different sets.

Meridian 1 originating switch timers

The timers listed in "Meridian 1 originating switch timers" (page 141) 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.

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 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 enables the originating switch time to recall user A and then respond with a new call setup.

- Handles feature interactions; enables 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 "Meridian 1 Meridian 1 terminating switch timers" (page 142) 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.

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 phonesets. All other sets carry NRAG beginning with Release 12, except those sets that 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 switches must have the PRI and D-channel interface (DCHI) cards (for DCHI, at least firmware version 2.1).

NRAG Meridian 1 network configurations

"Meridian 1 to Meridian 1 network" (page 143) and "Meridian 1 to Meridian SL-100 network" (page 143) show the Meridian 1 and Meridian SL-100 network configurations supporting NRAG.

Meridian 1 to Meridian 1 network
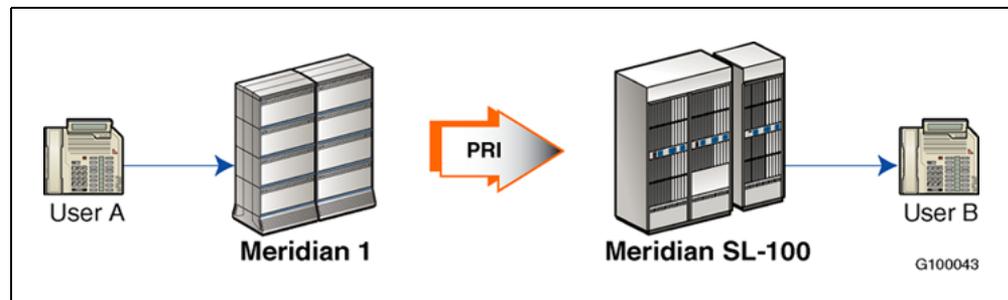
Meridian 1 to Meridian SL-100 network
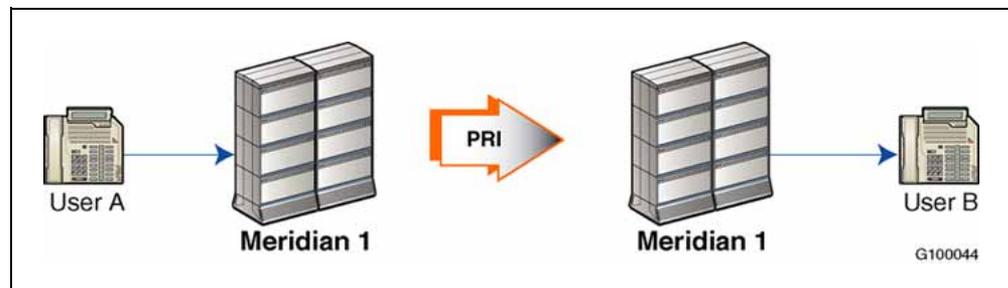
Software requirements

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.

LD 10 - 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.

**LD 11 - specify a key on multiline 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 enables the NRAG feature to work.

Note: Nortel 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.

"Same PNI value within a network" (page 145) shows an example of Meridian 1s and routes that have the same PNI value within a network. "Different PNI value within a network" (page 145) shows different PNI values within the same network.

Same PNI value within a network
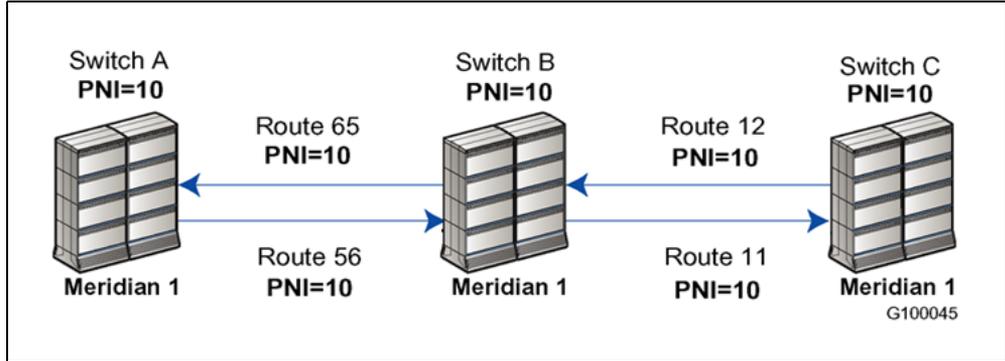
Different PNI value within a network
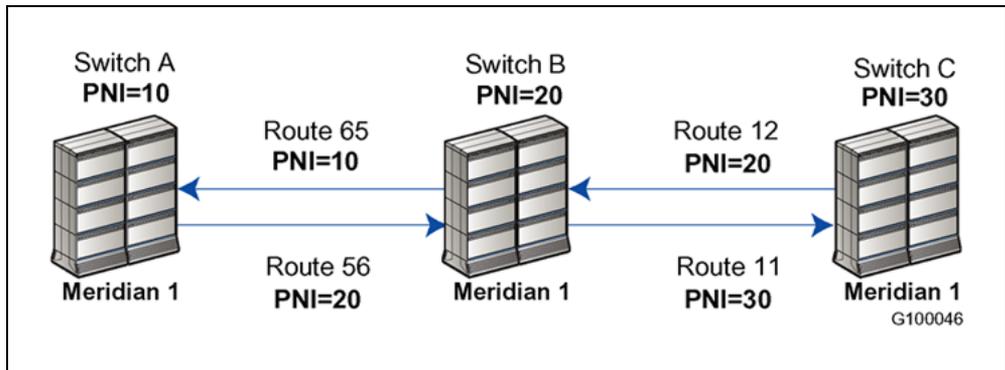
In "Different PNI value within a network" (page 145) the PNI value of each route is the same as the next Meridian 1 it encounters. Each customer group within the same Meridian 1 must have a unique PNI.

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 "LD 15 - customer data block NRAG entries" (page 145) shows.

LD 15 - 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.

LD 16 - 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 LD 17 (see). Set the software release ID of the far end.

LD 17 - 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.

Prompt	Range	Description
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 LD 15 for NRAG to work for NARS calls.

The following entries must be made for CDP calls:

- LD 15 - LSC

- LD 86 - ESN data block: CDP; maximum number of steering codes (MXSC); number of digits in CDP DN (NCDP)

- LD 87 - LSC: distant steering code (DSC)

Feature testing

To verify NRAG, perform the steps in .

Test the Meridian 1 NRAG configuration

Step	Action
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.

—End—

Feature interactions

describes the Meridian 1 feature interactions.

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. "Fields and values for table NETNAMES" (page 149) provides an example of the fields and values for table NETNAMES.

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.
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. "Sample datafill for table NETNAME" (page 149) provides sample datafill for table NETNAME.

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. "Fields and values for table CUSTNTWK" (page 150) shows the fields and values for table CUSTNTWK.

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. "Sample datafill for table CUSTNTWK" (page 150) provides sample datafill for table CUSTNTWK.

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. "Fields and values for table MSGRTE" (page 150) shows an example of the fields and values for table MSGRTE.

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.

Field	Range	Description
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.
(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. provides sample datafill for table MSGRTE.

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. "Fields and values for table DNGRPS" (page 152) shows the fields and values for table DNGRPS.

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. "Sample datafill for table DNGRPS" (page 152) provides sample datafill for table DNGRPS.

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:

```
    240  calls receiving busy tone           24
  x   10%  requesting NRAG            x    2
  ───────                            ───────
    = 24                              = 48   TCAPTRIDs required
```

"Fields and values for table TCAPTRID" (page 153) contains the fields and values for table TCAPTRID.

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. "Sample datafill for table TCAPTRID" (page 153) provides sample datafill for table TCAPTRID.

Sample datafill for table TCAPTRID

```
tcapappl         numtrids
NRAG               20
PVN                10
ACBAR              35
DNVAL              12
NMS                10
```
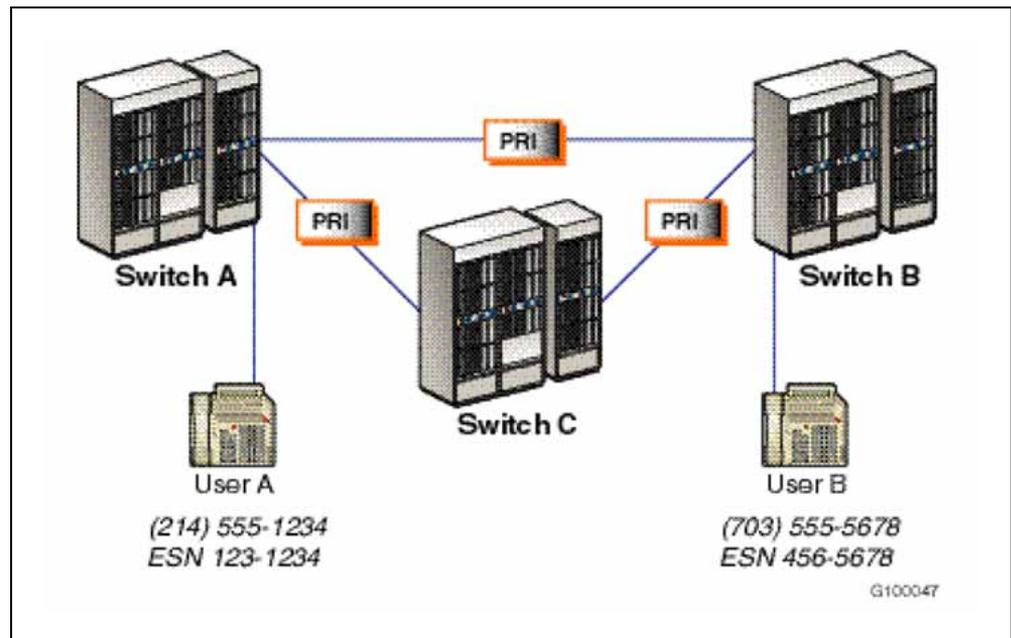
CAUTION
Cold restart required - Changes or additions to table TCAPTRID do not take effect until after a cold restart.

Sample Meridian SL-100 datafill for NRAG on PRI

"Meridian SL-100 NRAG on PRI network example" (page 154) and the following examples show the datafill necessary for implementing NRAG on PRI.

Meridian SL-100 NRAG on PRI network example

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

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 (outpulsed digits)	PRA PRAATOB 3 N $ PRA PRAATOC 3 N $
NETABC 123 123 (incoming digits)	LOCAL 3 214555
NETABC 456 456 (reply digits DNGRPS)	PRA PRAATOB 0 N $ PRA PRAATOC 0 N $
NETABC 555 555 (reply digits norm.)	PRA PRAATOB 3 456 $ 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).

Table DNGRPS (on switch B)

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

Switch B datafill

shows the datafill necessary to enable NRAG on switch B.

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).

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.

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 and the following examples for the datafill necessary for implementing NRAG on SS7.

Meridian SL-100 NRAG on SS7 network example
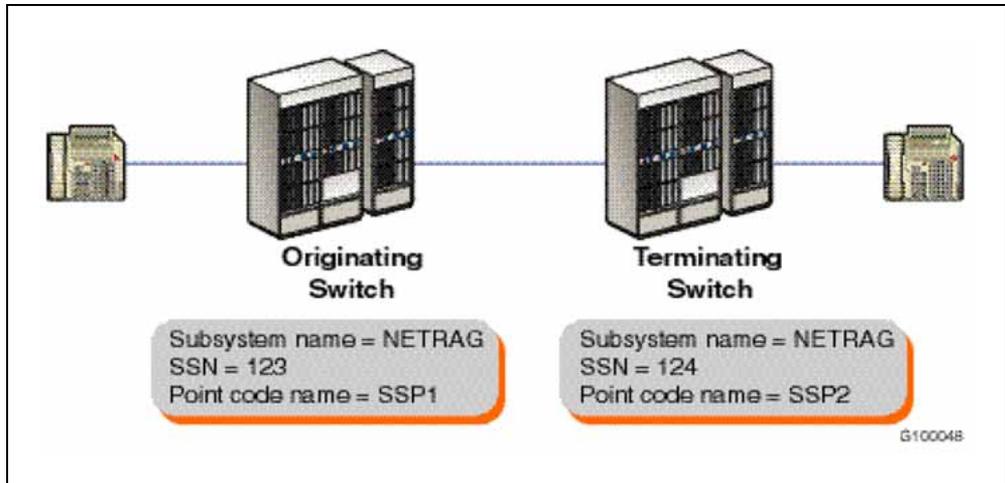
Datafill at originating switch

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

"Feature interaction summary for NRAG on Meridian SL-100" (page 158) describes the interactions between NRAG and the called party's features.

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.

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 (OM) 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.

"Meridian SL-100 OM registers for PRAFAC" (page 159) shows the individual registers in the PRAFAC group.

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).
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.

Register	Description
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.
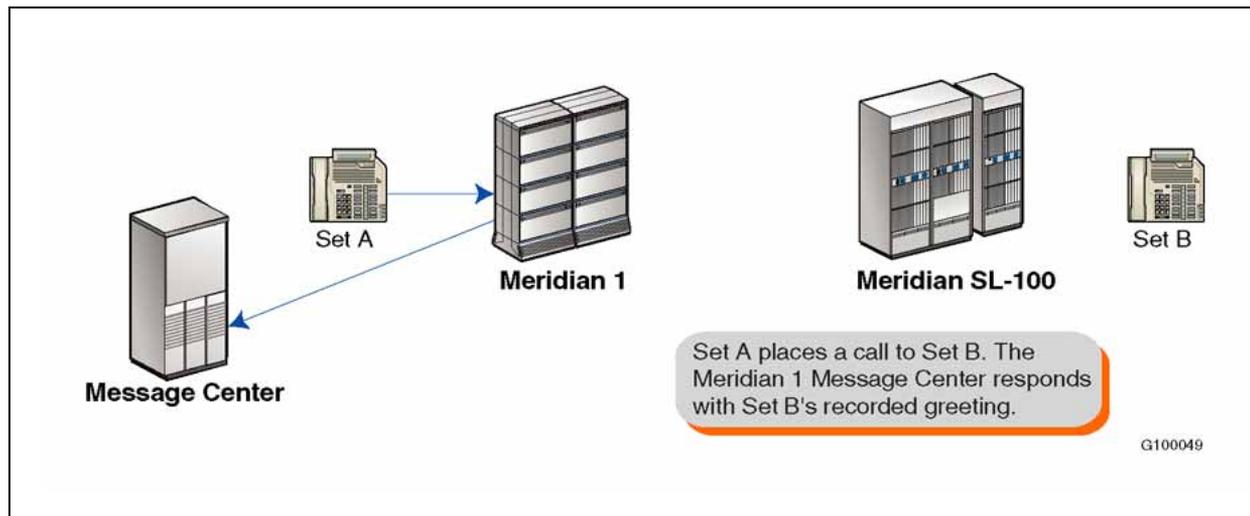
Network Message Waiting

Introduction

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.
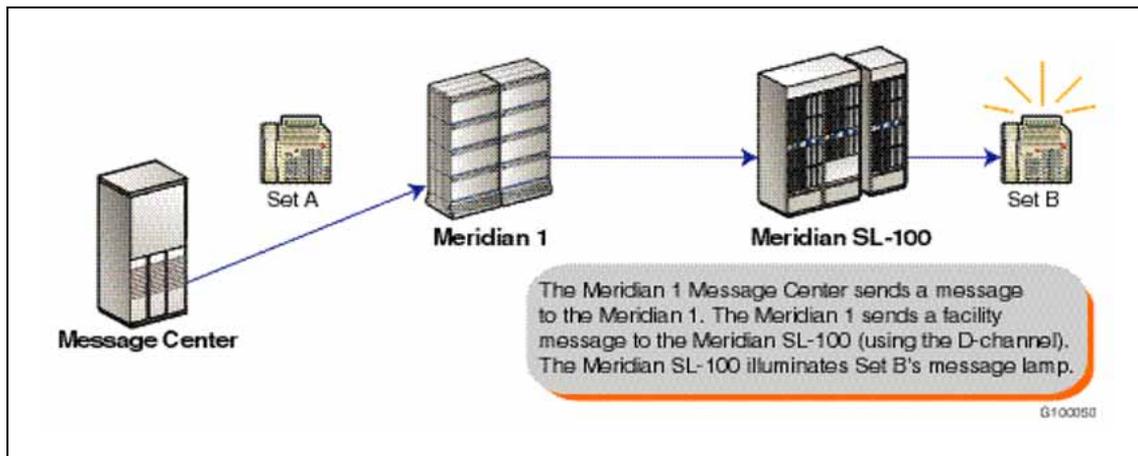
Feature description

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. "Meridian 1 host to Meridian SL-100 switch" (page 161) through "Meridian SL-100 host to Meridian 1 switch (part 2)" (page 162) show how NMW works, with the Meridian 1 host to the Meridian SL-100 and the Meridian SL-100 host to the Meridian 1.
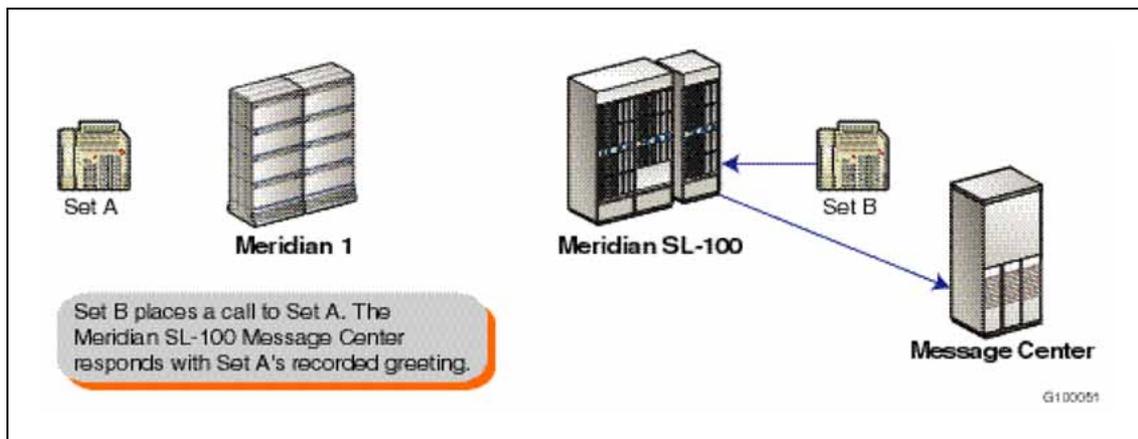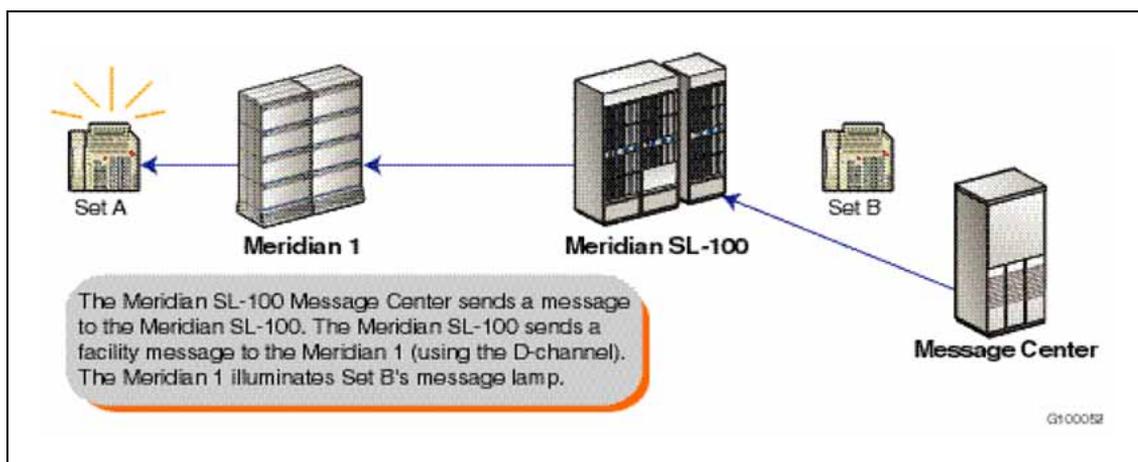
Meridian 1 host to Meridian SL-100 switch

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

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

Set A

Meridian 1

Meridian SL-100

Set B

Message Center

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

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.

G100051

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. "Meridian 1 message center host node packages" (page 163) shows the required packages for a Meridian 1 message center host node.

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. "Meridian 1 message center remote/tandem node packages" (page 163) shows the required software packages for Meridian 1 message center remote nodes.

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).

Package	Description
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. "Meridian SL-100 message center remote/tandem node packages" (page 164) shows the required packages for message center user and tandem nodes.

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. "Meridian SL-100 message center host node packages" (page 165) shows the required packages for Message center host nodes.

Meridian SL-100 message center host node packages

Package	Description
NTX732AA	Simplified Message Desk Interface (SMDI).
NTX000AA	Bilge.
NTX001AA	Common basic.
NTX100AA	IBN basic.
NTX101AA	Enhanced features IBN
NTX119AA	Message Service.
NTX730AA	Multilink ASCII device driver.
NTX901AA	Local features 1.
NTX791AA	PRI: NRAG.
NTX106AA	Electronic telephone sets (if using business sets).
NTX750AB	ISDN Basic Access.
NTX790AB	ISDN PRI.
NTX901AA	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 LD 17, which the VSID fields in LD 15 and LD 23 recognize. Datafill LD 17 before LD 15 and LD 23.

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
LD 17 - Configuration record
Use LD 17 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.

LD 17 - 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).

Prompt	Response	Description
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.

LD 15 - 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).

LD 15 - Customer data block

Prompt	Response	Description
REQ	CHG	Change the customer data block.
TYPE	CDB	Customer data block.
CUST	0-99	Customer number.
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 LD 17.
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.

Prompt	Response	Description
PNI	1-32700	Private network identifier; each customer group within the same Meridian 1 network must have a unique PNI. While Nortel 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 (LD 16) must match the customer PNI (LD 15) 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.

LD 23 - 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.

LD 23 - 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.

Prompt	Response	Description
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 login 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.

LD 11 - Multiline 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.

LD 11 - Multiline 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.

Prompt	Response	Description
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 LD 15: 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.
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	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).
	xx SCR yyyy, where: xx = key number yyyy = single-call ringing DN	For a voice mail subscriber: Specify a single-call ringing DN key.
	xx MWK yyyy, where: xx = key number yyyy = ACD DN or message center DN	Specify a message-waiting key.

LD 16 - Route data block
Modify the datafill for the trunk route that connects to a DMS or a Meridian 1.

LD 16 - 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.

LD 90 - ESN translation tables
Use LD 90 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 LD 90 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 LD 90 to terminate the facility message at the user's DN.

LD 90 - 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.

Prompt	Response	Description
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

"TERMDES field in table TERMDEV" (page 173) through "COMCLASS field in table TERMDEV" (page 175) provide information about the individual fields in the table TERMDEV sample tuple.

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.

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

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

NETOPTS field in table TERMDEV

MCSMDI 1 4 SMDI B1200 EIA 1X67FA EVEN N NONE ALL

NETOPTS field
Specify the terminal type.
Value: SMDI

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

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

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

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

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

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

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

through provide information about the individual fields in the table SLLNKDEV sample tuple.

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

DEVTYPE field in table SLLNKDEV

MCSMDI 1X67 NONE NONE INOUTLK SMDIDATA NMSPVT
10 NUMDIGS

DEVTYPE field

Specify the device type.

Value: 1X67

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

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

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

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

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

provide information about the individual fields in the table LNINV sample tuple.

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

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

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

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

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

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

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

UCDNAME field in table UCDGRP

ACD field in table UCDGRP

CUSTGRP field in table UCDGRP

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

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

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

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

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

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

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

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

OPTIONS field in table UCDGRP

TERMDES field in table UCDGRP

DSKNO field in table UCDGRP

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

provide information about the individual fields in the table IBNLINES sample tuple.

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

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 referenced.
> *Value:*   0

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

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

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

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

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

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

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

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

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 CNF3 0 0 3
0 MWT MWT4 0 0 4 0 EMW EMW MWL CLASSA

"LEN field in table IBNFEAT" (page 185) through "MAILBOX field in table
IBNFEAT" (page 188) provide information about the individual fields in the
table IBNFEAT sample tuple.

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

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

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

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

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

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

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

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

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

provide information about the individual fields in the table DNROUTE sample tuple.

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

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

STNCODE field in table DNROUTE

214 684 **5000** FEAT UCD USGROUP PRIM 0

STNCODE field

The DN of the voice service

Value: four digits

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

FEAT field in table DNROUTE

214 684 5000 FEAT **UCD** USGROUP PRIM 0

FEAT field

Specify a UCD group.

Value: UCD

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

DNTYPE field in table DNROUTE

214 684 5000 FEAT UCD USGROUP **PRIM** 0

DNTYPE field
Specify the primary group.
Value: PRIM

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

"KEY field in table NMSDATA" (page 190) through "NMSID field in table NMSDATA" (page 191) provide information about the individual fields in the table NMSDATA sample tuple.

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

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

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. 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

"LEN field in table KSETFEAT" (page 191) through "CRX field in table KSETFEAT" (page 192) provide information about the individual fields in the table KSETFEAT sample tuple.

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

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

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

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

CRRCFW field in table KSETFEAT

```
4 0 0 0    8    MWT    YES    ALL    NO
```

CRRCFW field
Allow call request retrieval to forward.
Value: ALL

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

With table NETNAMES, you can 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

NETNAME field in table NETNAMES

EXTNETID field in table NETNAMES

NETDIGS field in table NETNAMES

NETOPTS field in table NETNAMES

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 ?

"CUSTNAME field in table CUSTNTWK" (page 194) through "OPTION field in table CUSTNTWK" (page 195) provide information about the individual fields in the table CUSTNTWK sample tuple.

CUSTNAME field in table CUSTNTWK

NETNAME field in table CUSTNTWK

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

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 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.	N/A
PRODUCT	For PRI: DMS, , Meridian 1, OTHER	Adjacent switch type.	N/A	N/A
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.

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

Field	Entry	Description	Requirements	Comments
SGRPKEY	N/A	Equals CLLI + SGRP subfields.	N/A	To configure ITA on the DTCI, datafill the non-PRI trunk subgroups in table TRKSGRP along with the PRI trunk subgroups.
CLLI	N/A	CLLI trunk group name.	N/A	N/A

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

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.

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

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

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

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.

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

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

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 - "Meridian Mail: Unknown mailbox number" (page 200) shows what happens when Meridian Mail does not receive calling party information and cannot determine which mailbox to access.

Meridian Mail: Unknown mailbox number
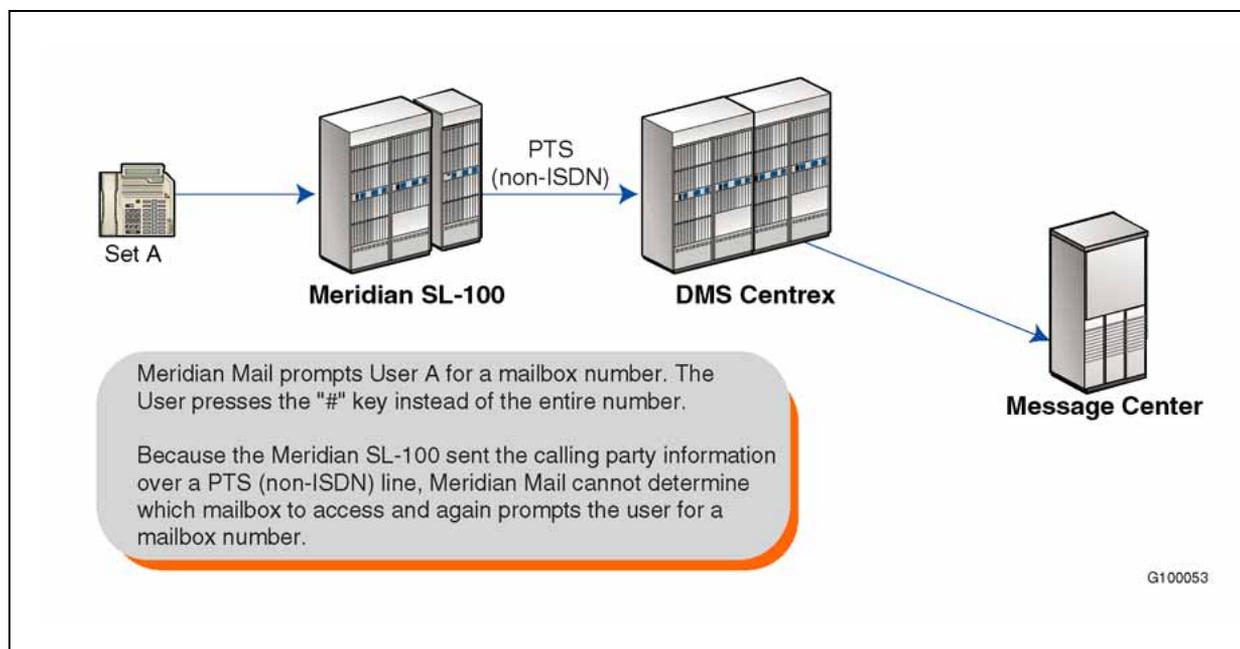
Operational measurements

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

"EXTNETID and PNI values on a Meridian 1/Meridian SL-100 network" (page 202) shows the Meridian SL-100 EXTNETID values and the Meridian 1 PNI values in a hypothetical, multi-customer network.

EXTNETID and PNI values on a Meridian 1/Meridian SL-100 network
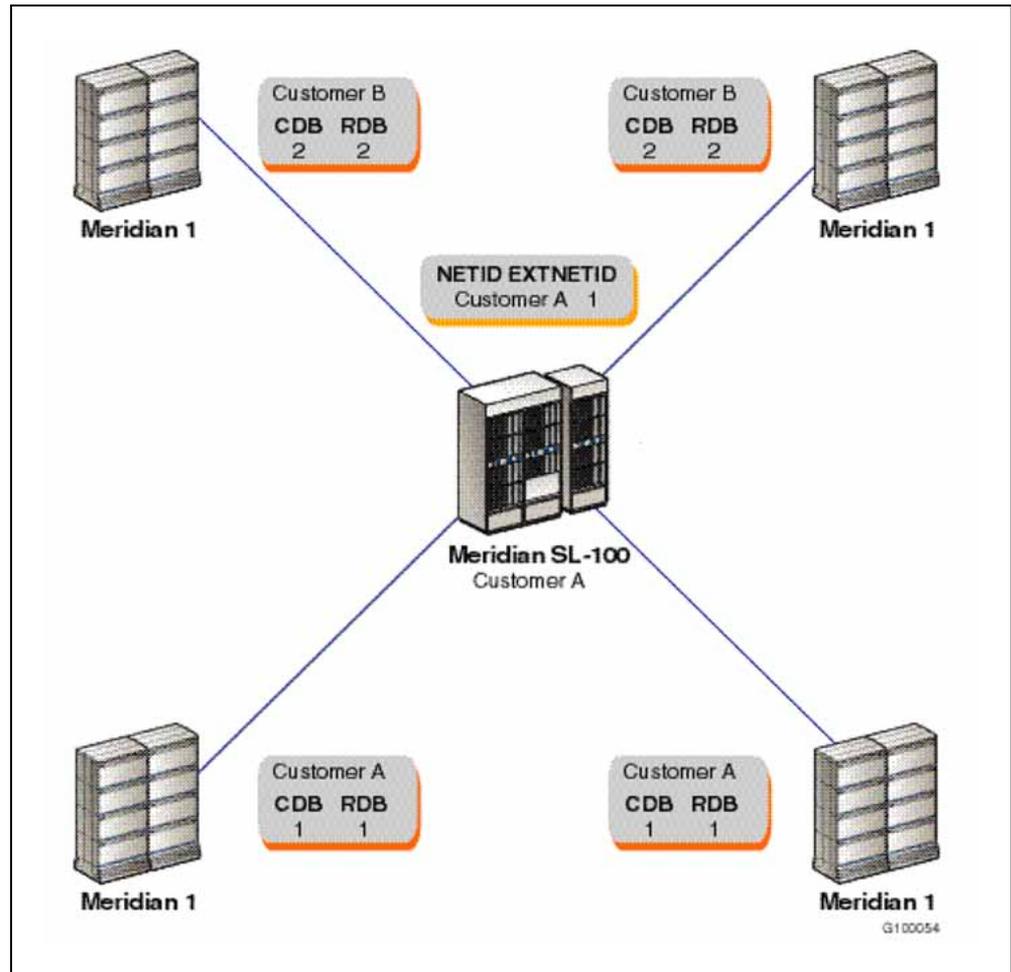
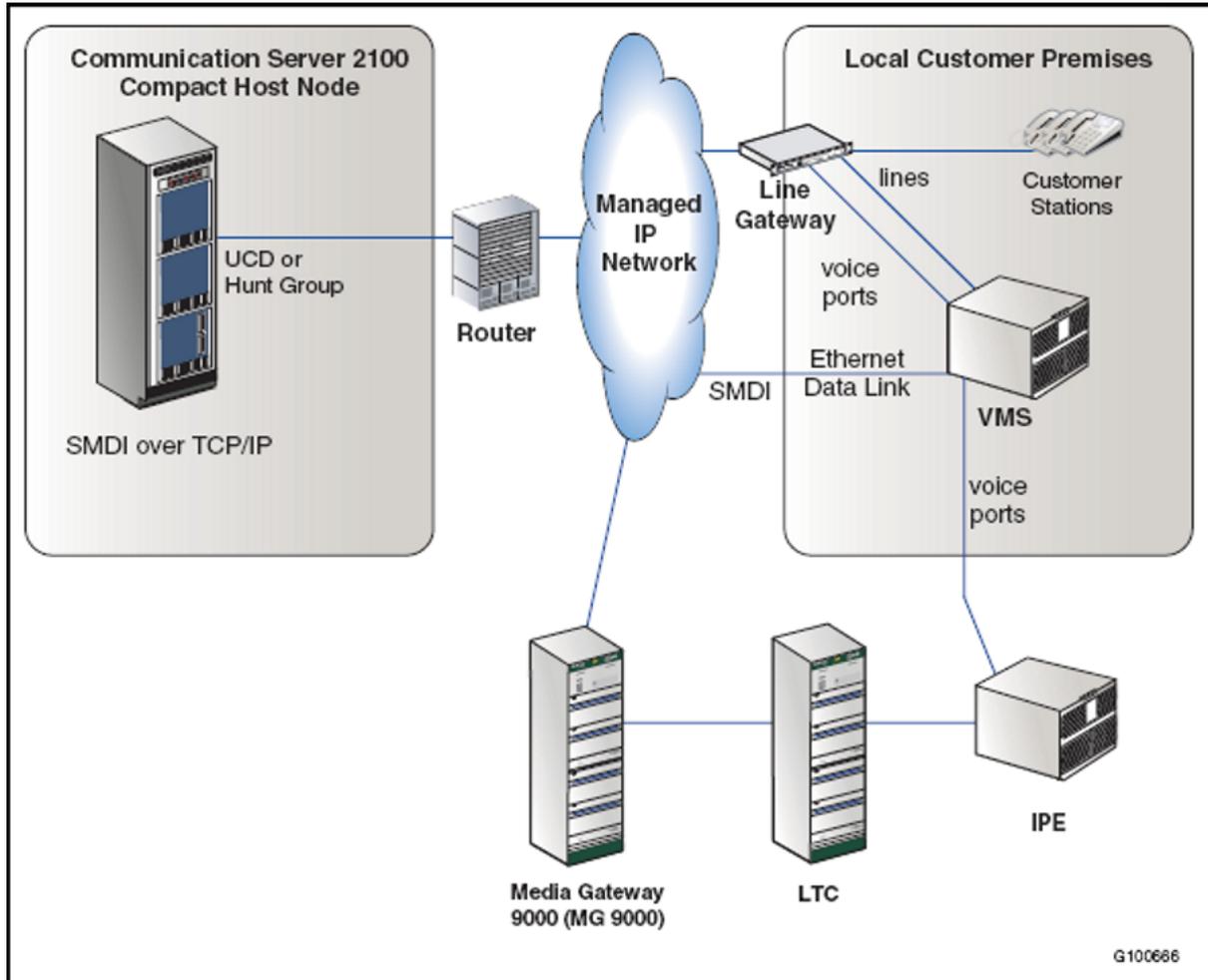# H.323 (CS 2100/CS 1000 Voice Mail interworking)

Introduction

This chapter describes the H.323 (CS2100/CS 1000) Voice Mail interworking feature, which provides Message Waiting service access on an H.323 network.

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 CallPilot that connects to 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 (PNI). 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.

depicts a centralized and H.323 Voice Mail system in interworking CS 2100s.

Centralized Voice Mail

The following figure shows H.323 CS 2100 to CS 1000 Voice Mail interworking

H.323 CS 2100 to CS 1000 Voice Mail interworking
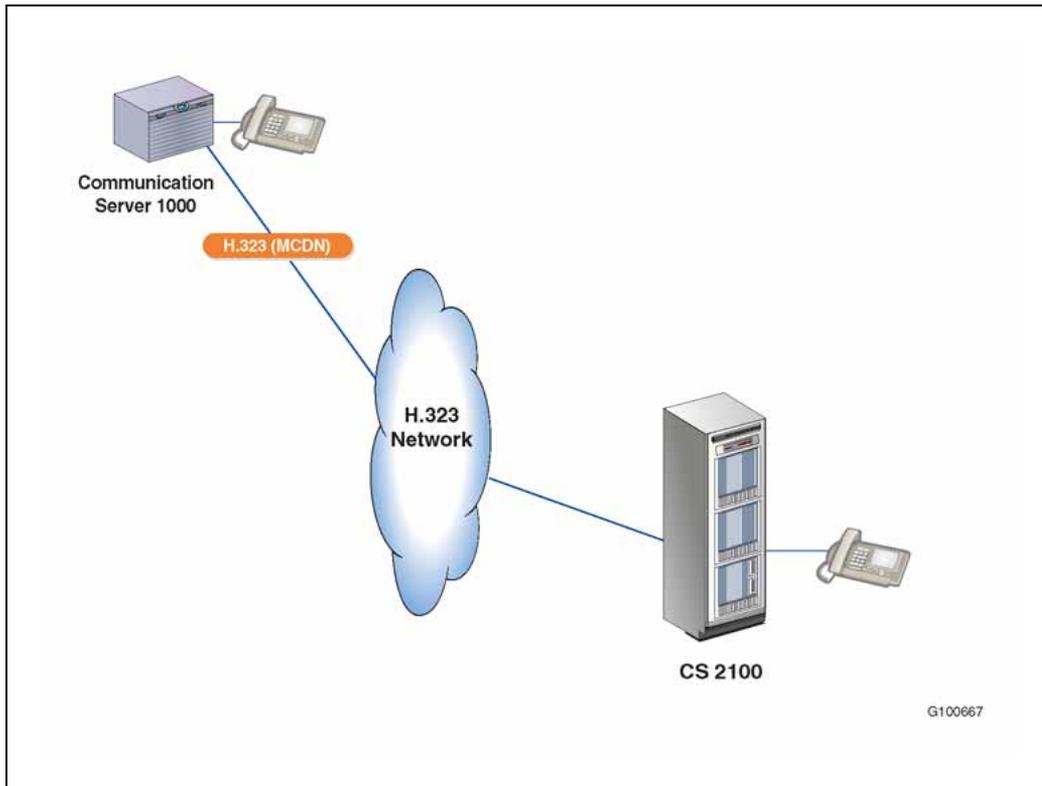
Network Message Waiting Service access using H.323 network

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 wad 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 simplified message desk interface (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

Message waiting service 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 are supported:

- Voice Mail or MsgSrv system configurations

  — Network Voice Mail communication using H.323 protocol – In this configuration, the VM is connected to an H.323 node such as a CS 1000 or CS 1000M that 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 setup 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 SE09 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 measure.

- 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, is 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 discards 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

- Only supports 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.

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.

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.

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.

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-Call IP 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-Call IP 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.

Log	Associated OM	Description
NMSH113	NMSFACRV	Log NMSH113 is generated when an error occurs while a non-Call IP 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-Call IP 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
"Related documents" (page 211) lists related documents.

Related documents

Document number	Document title
555-4001-806	*Communication Server 2100 Product Guide*
555-4001-124	*Voice Message Exchange Interface General Description*
555-4001-127	*Communication Server 2100 Simplified Message Desk Interface Description and Implementation*
555-7101-100	*CallPilot Networking Planning Guide*
555-7101-224	*CallPilot Installation and Configuration (Part 3 T1/SMDI and CallPilot Server Configuration)*

Anti-tromboning

Introduction

This chapter describes how to eliminate tromboning, and maximize trunk usage, between Meridian 1 and Meridian SL-100 switches.

Note: Refer to "H.323 Release Link Trunks" (page 225)for information and configuration details about that feature. The RLT over H.323 feature enables Communication Server 1000 customers to optimize calls over both RLT and TAT. That chapter also describes the interaction of Communication Server 1000 and Communication Server 2000/2100 systems in relation to these technologies in a network that includes CS 1000 and CS 2x00 systems.

Overview

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 loopback of the same call that is redirected from the called station back to a different set at the originating node. The loopback 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 loopback 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 eliminates the redundant trunks after the call is answered. TAT can communicate with 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.

Example of RLT/TAT
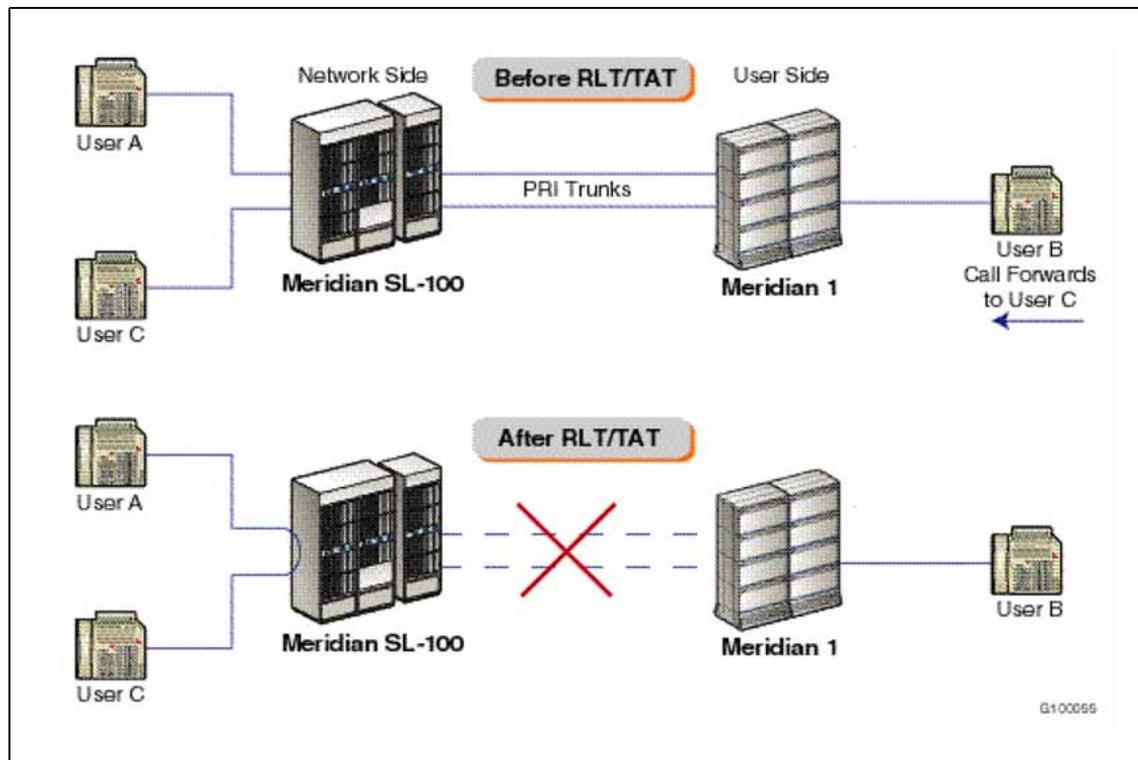
Meridian SL-100 configuration

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

"Table TRKGRP datafill" (page 215) shows table TRKGRP datafill needed for RLT.

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).

"Table TRKGRP datafill" (page 215) 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 Multipurpose 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 Multipurpose 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)

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 = Multipurpose Serial Data Link (for Options 51C, 61C, 81, and 81C) MSDL = Downloadable D-channel for Option 11.
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 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.

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 "RLT/TAT anti-tromboning for network call redirection (example 1)" (page 218), RLT/TAT is applied to a network call redirection scenario (using call forward) with two Meridian 1 systems interworking with a Meridian SL-100:

1. 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 "RLT/TAT anti-tromboning for network call redirection (example 1)" (page 218) as the first call.

2. 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 "RLT/TAT anti-tromboning for network call redirection (example 1)" (page 218) as the redirected call.

3. Station C answers.

4. Station A connects to Station C.

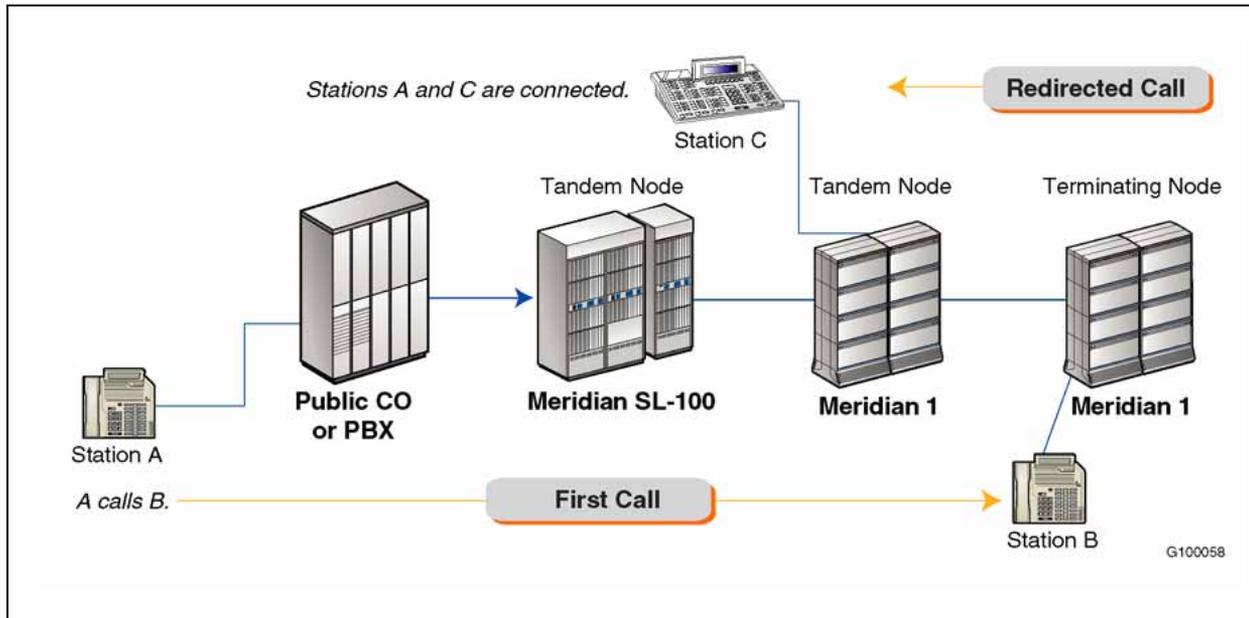**RLT/TAT anti-tromboning for network call redirection (example 1)**
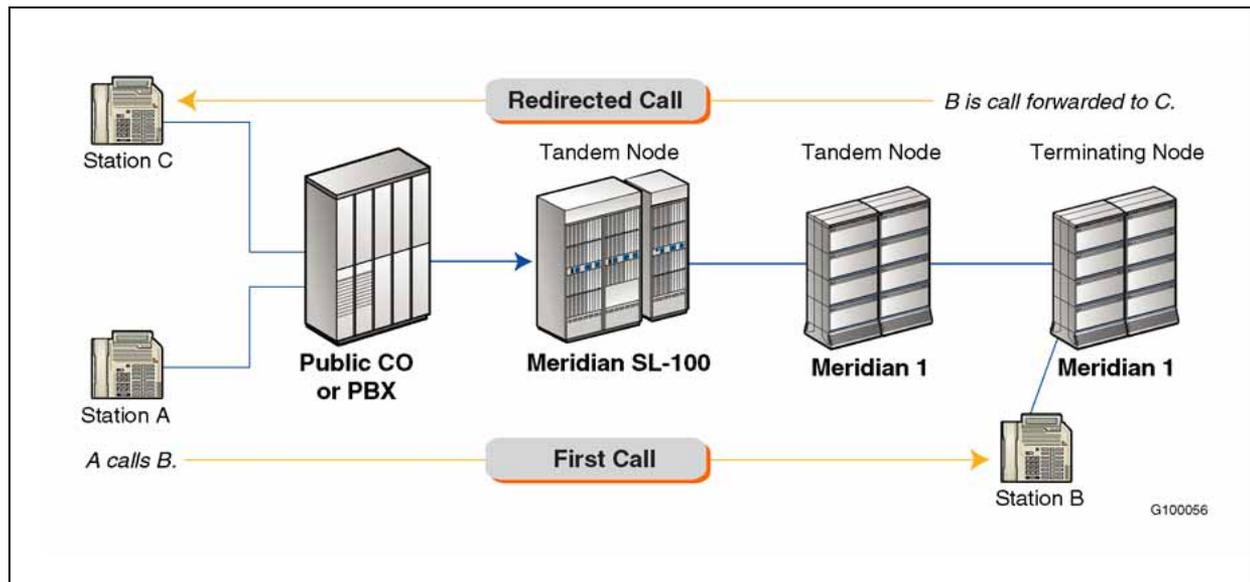
"Results of RLT/TAT anti-tromboning for network call redirection (example 1)" (page 219) shows the results of anti-tromboning after Station C answers the call.

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.

Results of RLT/TAT anti-tromboning for network call redirection (example 1)

Trunks released by RLT.

Trunks released by TAT.

Station C

Public CO or PBX

Tandem Node — Meridian SL-100

Tandem Node — Meridian 1

Terminating Node — Meridian 1

Station A

A calls B.

Stations A and C are bridged at the Meridian SL-100. The call is sustained by the Meridian SL-100.

Station B

G100057

RLT/TAT Anti-tromboning operation for network call redirection (example 2)

"RLT/TAT anti-tromboning for network call redirection (example 2)" (page 220) 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 "RLT/TAT anti-tromboning for network call redirection (example 2)" (page 220) 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 "RLT/TAT anti-tromboning for network call redirection (example 2)" (page 220) as the redirected call.

3. Station C answers.

4. Station A connects to Station C.

RLT/TAT anti-tromboning for network call redirection (example 2)

"Results of RLT/TAT anti-tromboning for network call redirection (example 2)" (page 220) 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.

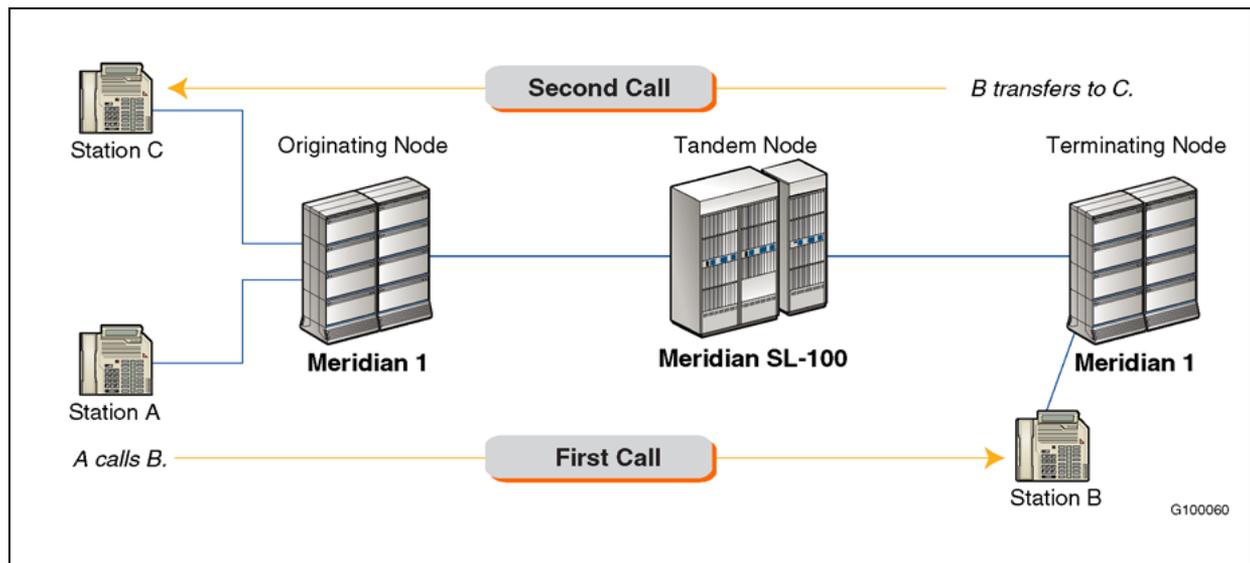**Results of RLT/TAT anti-tromboning for network call redirection (example 2)**
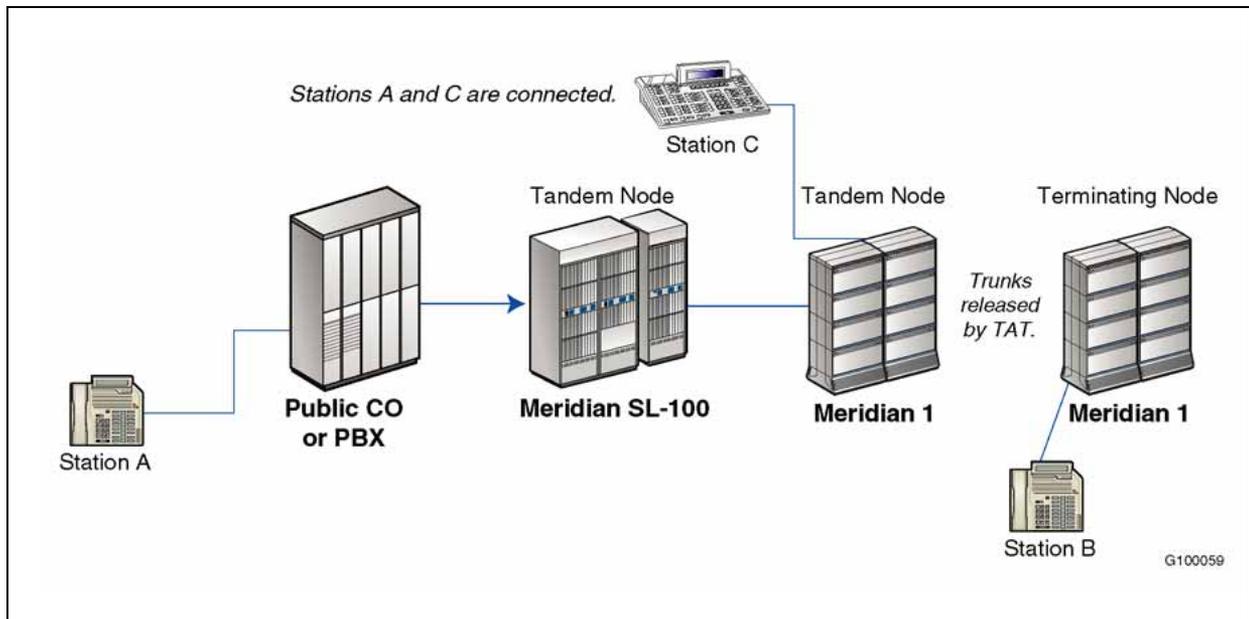
RLT/TAT Anti-tromboning operation for call modification

"RLT/TAT anti-tromboning for call modification" (page 221) shows RLT/TAT as applied to a call modification scenario with a 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 "RLT/TAT anti-tromboning for call modification" (page 221) 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 "RLT/TAT anti-tromboning for call modification" (page 221) as the second call.

3. Station C answers.

4. Station B completes the call transfer.

**RLT/TAT anti-tromboning for call modification**

"Results of RLT/TAT anti-tromboning for network call transfer" (page 222) 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.

Results of RLT/TAT anti-tromboning for network call transfer
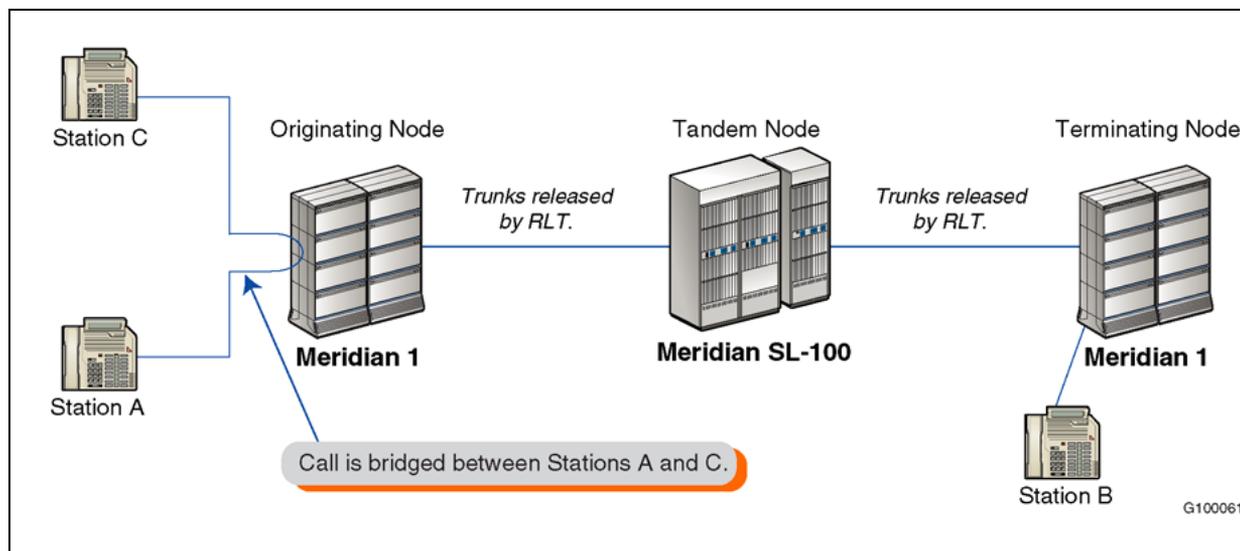
Operating parameters

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

"Anti-tromboning feature interactions" (page 223) shows the feature interactions.

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 cancels 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 cancels 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.

Feature	Interaction
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.
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

Introduction

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 2100 and Communication Server 1000 systems to optimize trunk usage and resources.

Note: In this document, the terms Communication Server 2100, IPCM, and SE08 also refer to Communication Server 2000, CICM, and SN08, respectively, 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 for how to provision the Communication Server 2100 for H.323 RLT, see "H.323 RLT configuration for Communication Server 2100" (page 232).

H.323 Release Link Trunks 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 endpoints that is not supported by RLT. In other words:

- any call that can successfully complete a PRI RLT will complete an H.323 RLT

- any call that cannot 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. "Phone call optimized by RLT feature (User side)" (page 228) shows a call optimized by RLT and "Optimization by both RLT and TAT (or RLT and RLT-CS 2100 and redirection)" (page 231) 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 so that 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. Trunk Anti-Tromboning (TAT) is a similar feature that 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" (page 232).

The two frames in "Phone call optimized by RLT feature (User side)" (page 228) 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.

Phone call optimized by RLT feature (User side)
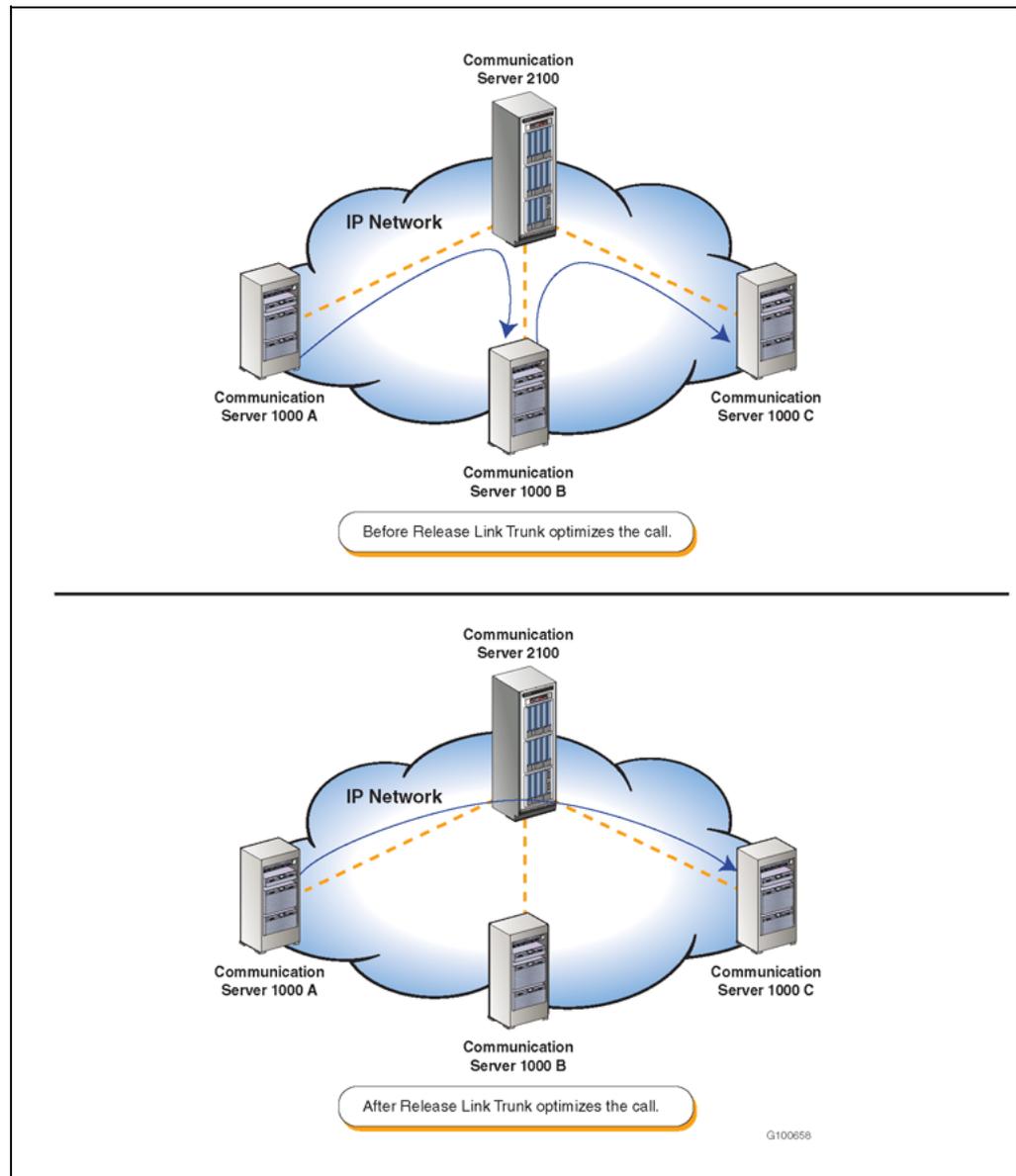
The illustration in "Phone call optimized by network side RLT (CS 2100 only)" (page 229) shows RLT behavior on the network side. Communication Server 1000 A is calling an H.323 gateway connected to the Communication Server 2100, which forwards the call back to Communication Server 1000 A. The Communication 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.

Phone call optimized by network side RLT (CS 2100 only)
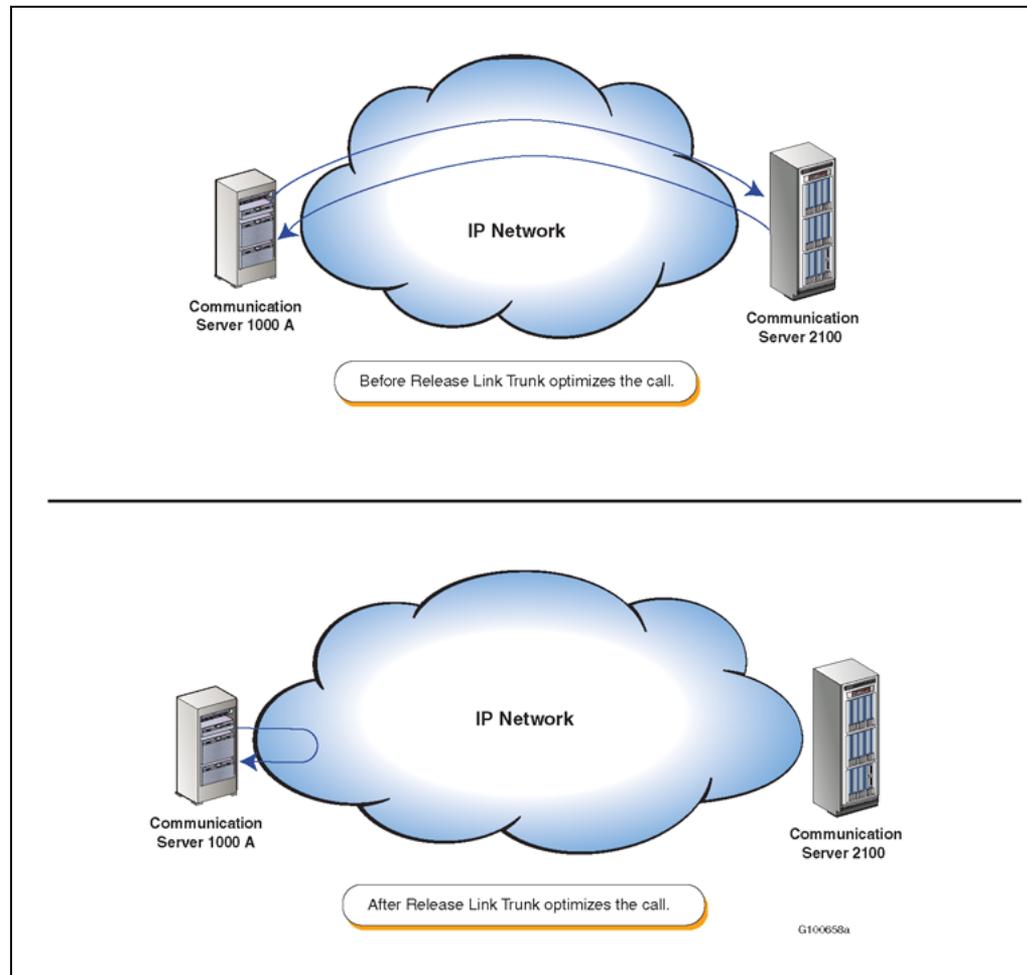
The same result can occur if the Communication Server 2100 had a call redirection during the prior parts of the call (see). That is, if the initial call from A to B was redirected in the Communication Server 2100 back to A before the call reached gateway B, and the resulting call was redirected to gateway C, call IDs may have been provided because RLT would be invoked. Node A would be unaware of the fact that it had a loopback at the CS 2100 due to the topology of the call.

Prior redirection resulting in RLT opportunities (CS 2100 only)
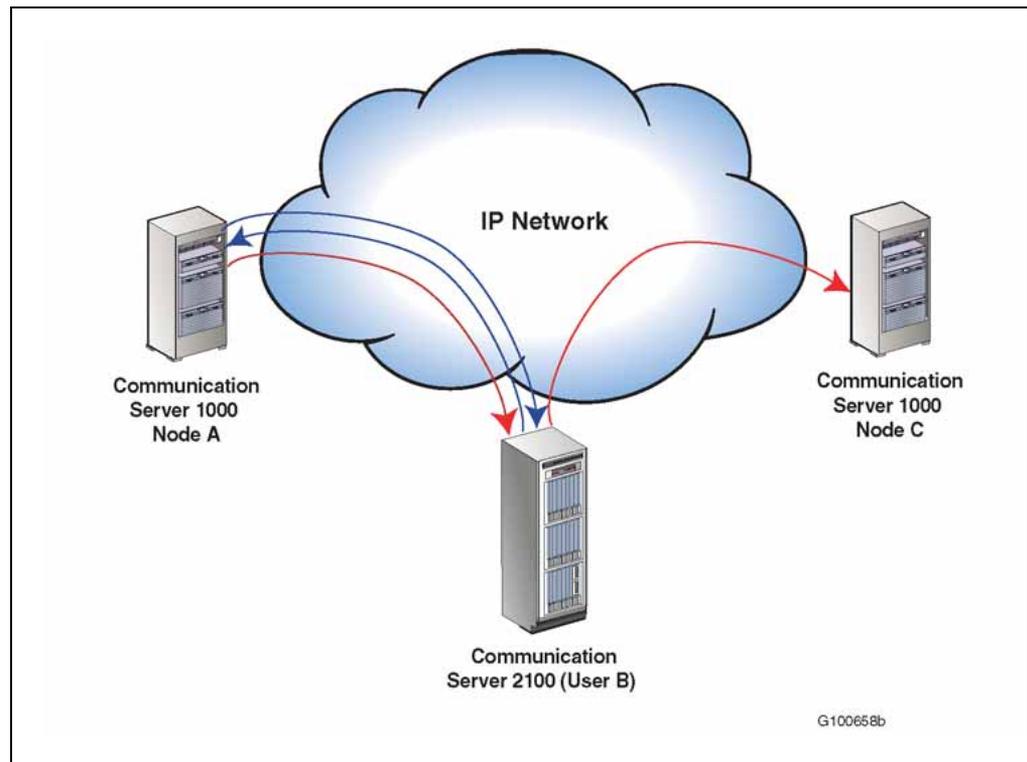
Using RLT alone will provide better service than TAT alone, because RLT implies a Communication Server 2100 in the middle. The Communication Server 2100, which uses gatekeeper routing, is a signaling tandem for all calls, so it knows the capabilities and destinations of all calls. Therefore the calls 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 "Phone call optimized by RLT feature (User side)" (page 228) shows the optimization by RLT, which collapses the call back into a simple tandem at the Communication Server 2100, "Optimization by both RLT and TAT (or RLT and RLT-CS 2100 and redirection)" (page 231) 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.

Optimization by both RLT and TAT (or RLT and RLT-CS 2100 and redirection)
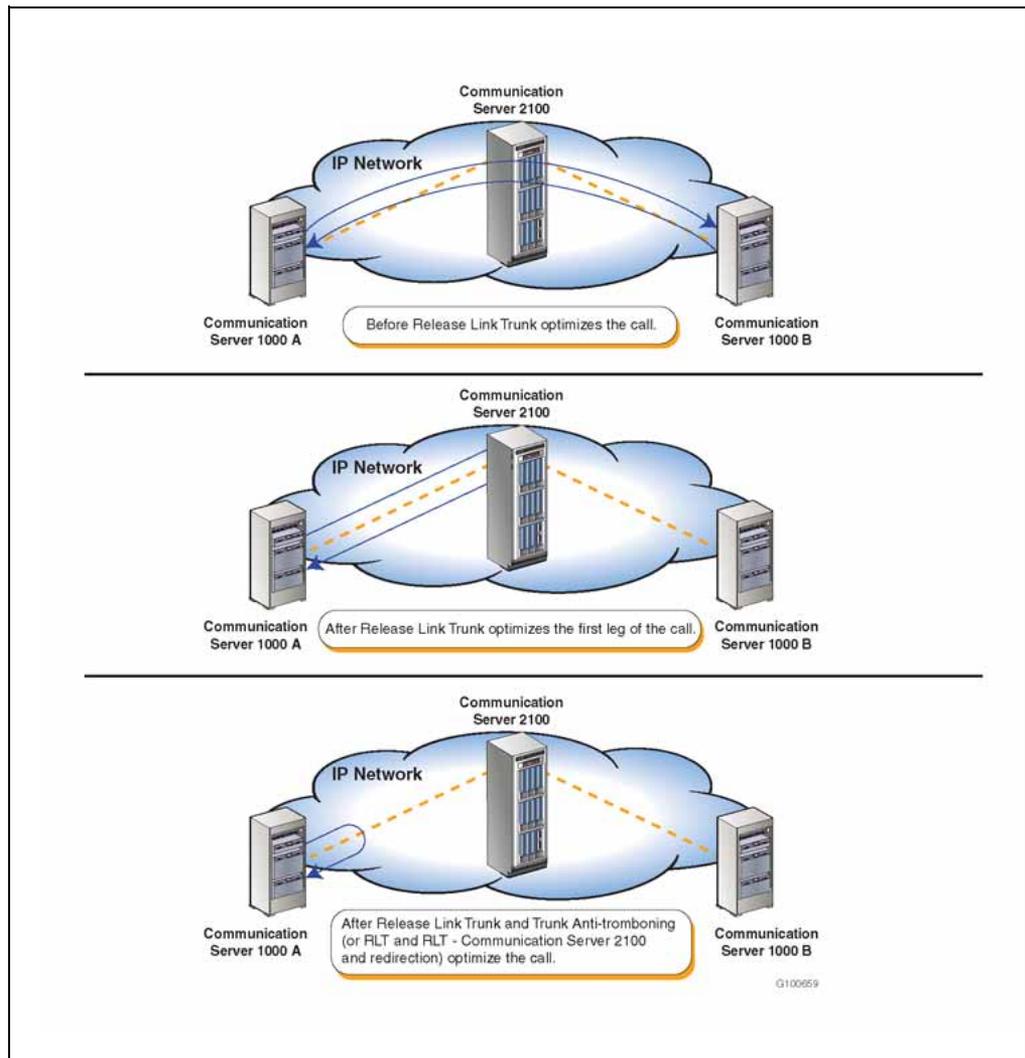
The following table lists the gateways capable of interoperating and interworking with RLT.

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

Supported function	Description	CS 2000 (SN09)	CS 2100	IP Trunk
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

lists related documents.

Related documents

Document number	Document title
NTP 555-4001-806	*Communication Server 2100 Product Guide*
NTP 555-4001-106	*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 "Define PRI routes as ISA routes" (page 106).

Set and verify SOC option

Step	Action

1   At >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

—End—

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 "Provision RLT Trunks (add MRLT to Table TRKGRP)" (page 233).

Provision RLT Trunks (add MRLT to Table TRKGRP)

Step	Action
1	At >table trkgrp; format pack; pos <h323-clli> ; change *(option set to MRLT)*
2	Assign <h323-clli> PRA 0 NPDGP NCRT ASEQ N (ISDN 100) $ (**MRLT**) $

—End—

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. Q.931 messaging 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 creates 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 contain the facility RLT.

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 contain the same facility RLT.

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 receives an RLT Facility in the SETUP message, CS 2100 ALERT response messages will the call-ID in the facility RLT.

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 contains an error indicating no RLT support.
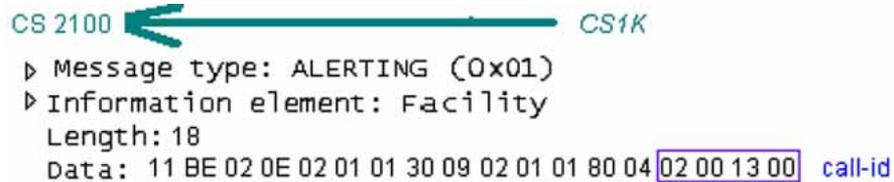
CS 2100 ALERT with error indicating no RLT support

CS1K ◄━━━━━━━━━━━━━━ CS2K
▷ Message type: ALERTING (0x01)
▷ Information element: Facility
  Length:10
  Data: 11BEA306O2O101020112 error
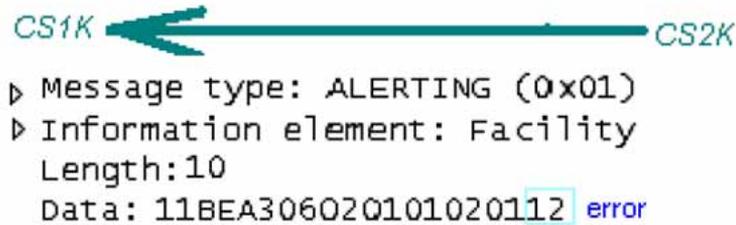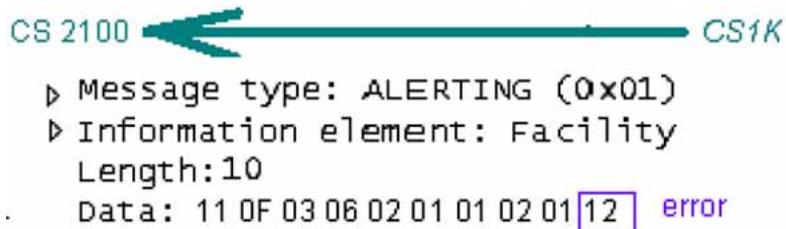
H.323 ALERT from CS 1000

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.

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.

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 release the signaling links. The FACILITY RLT message contains the data returned in the ALERT message. Therefore, a FACILITY RLT message is only 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.

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 sends the FACILITY RLT message with the information it receives from the CS 1000 ALERT message.

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 sends a response for the FACILITY RLT success or it will send an error indication.

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
```

CS 2100 sends an error (RLT failure)

CS1K ◄━━━━━━━━━━━━━━━ CS2K

▷ Message type: FACILITY (Ox62)
▷ 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 that of the CS 2100.

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

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 2100 and CS 1000 systems 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 elsewhere in Communication Server 1000 feature DE2302. Because RLT is requested by the H.323 Gateway, the GWC does 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" (page 232).

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

Introduction

This chapter describes how to create an ISDN/IP gateway between the Meridian SL-100 and the Meridian 1.

Overview

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 IP Phone 2004 (i2004) 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-100 systems.

With the Meridian SL-100/Meridian 1 IP trunking application, Meridian SL-100 customers can 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.
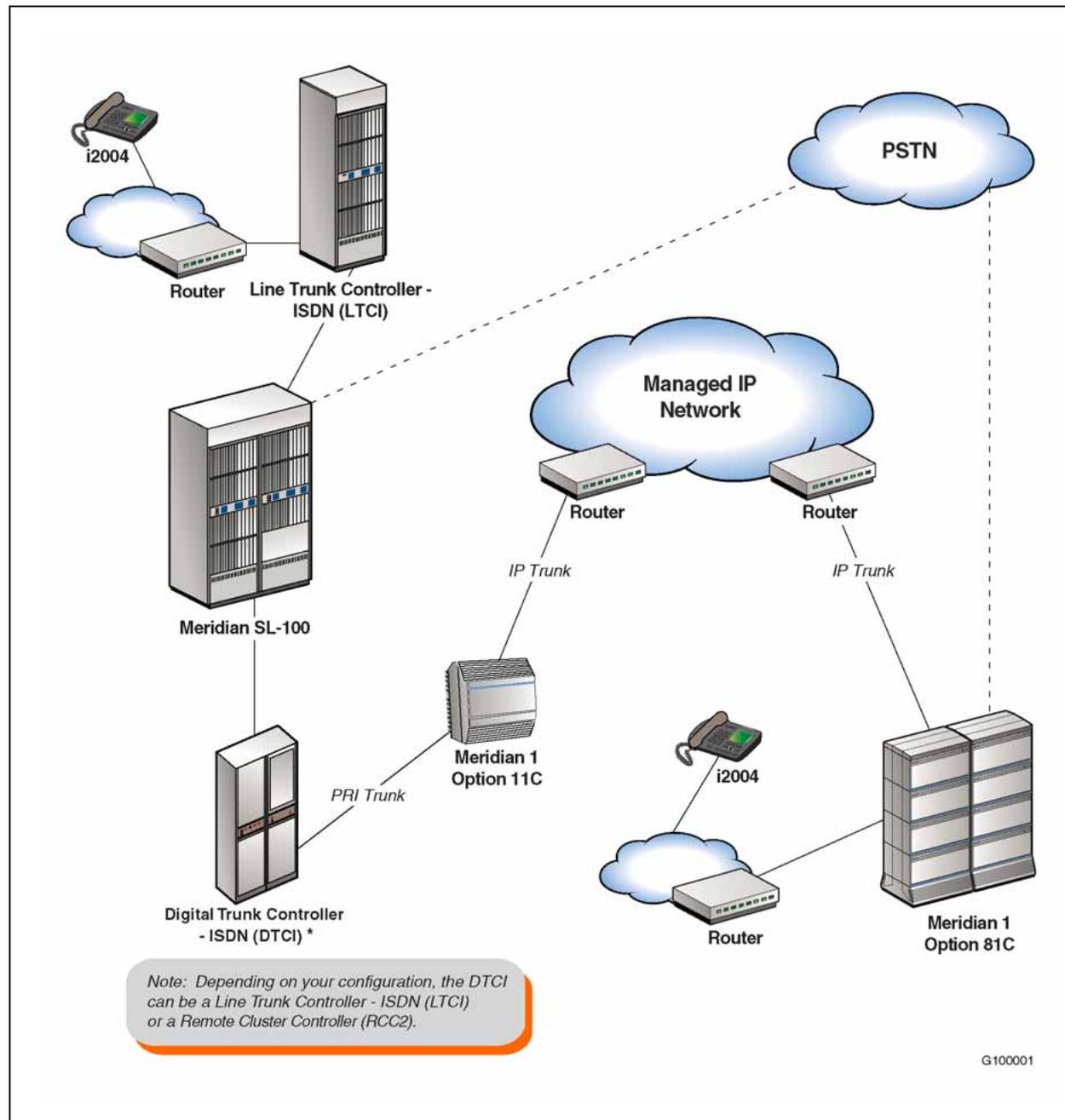
The solution supports the following codecs which you can download to the ITG card:

- G.711

- G.723

- G.729

Network configuration

shows ISDN/IP trunking between a Meridian SL-100 and a Meridian 1 Option 81C.

Meridian SL-100 to Meridian 1 Option 81C ISDN/IP trunking configuration

G100001

In "Meridian SL-100 to Meridian 1 Option 81C ISDN/IP trunking configuration" (page 241), 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.

"Meridian SL-100 to Meridian SL-100 ISDN/IP trunking configuration" (page 242) shows ISDN/IP trunking between a Meridian SL-100s.

Meridian SL-100 to Meridian SL-100 ISDN/IP trunking configuration
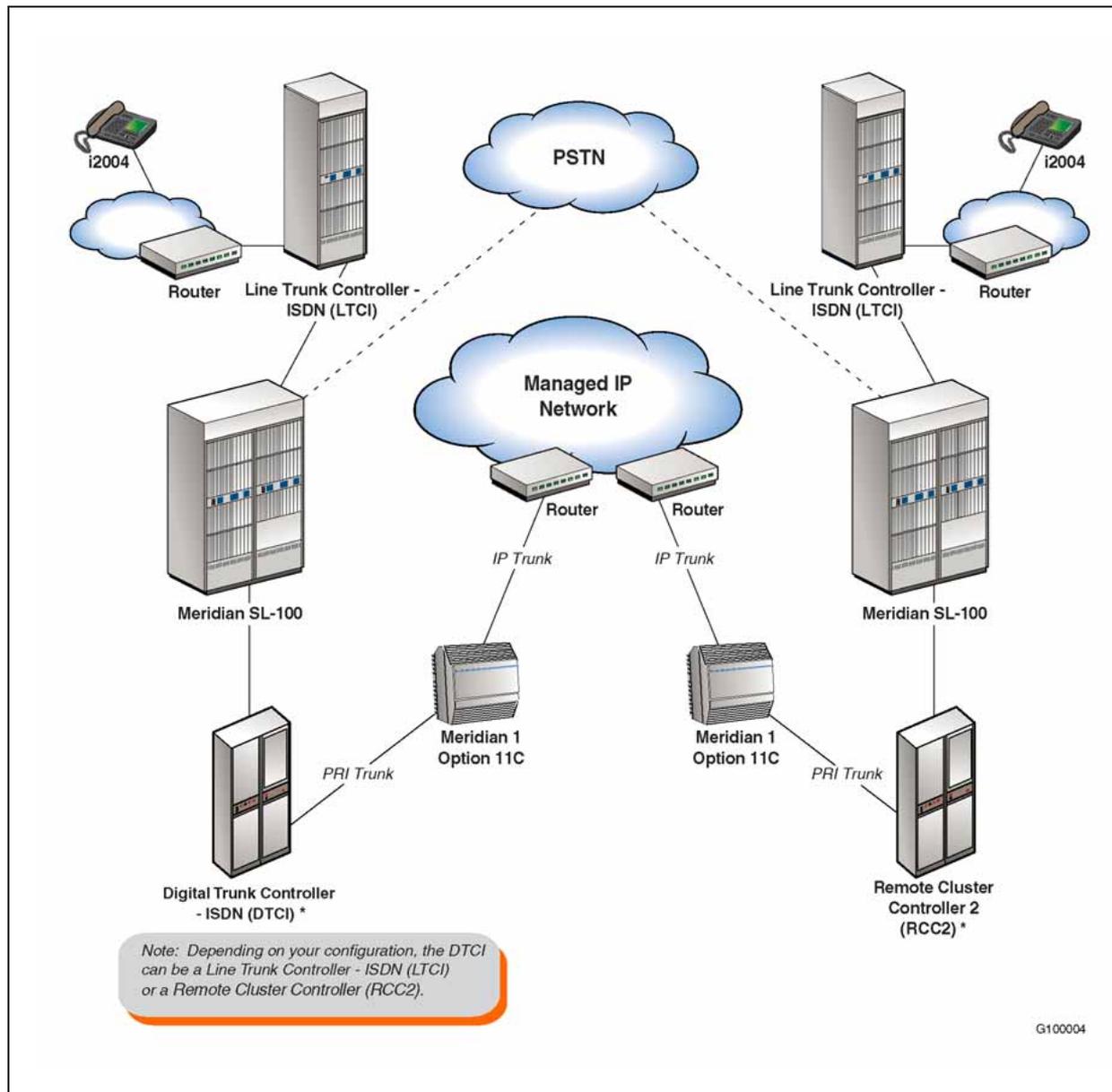
Quality of Service (QoS)

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 diminish the quality of voice signal that the user hears. Problems include:

- **Speech breakup** - Speech sounds distorted like the speech experienced on a digital cell phone when the signal is getting out of range.

- **Speech clipping** - Parts of words get cut off.

- **Pops and clicks** - This is caused when the network drops voice packets.

- **Echo** - This occurs 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 not travel 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 reassembles 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 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 predefined 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.

shows a Fallback to PSTN example.

Fallback to PSTN example
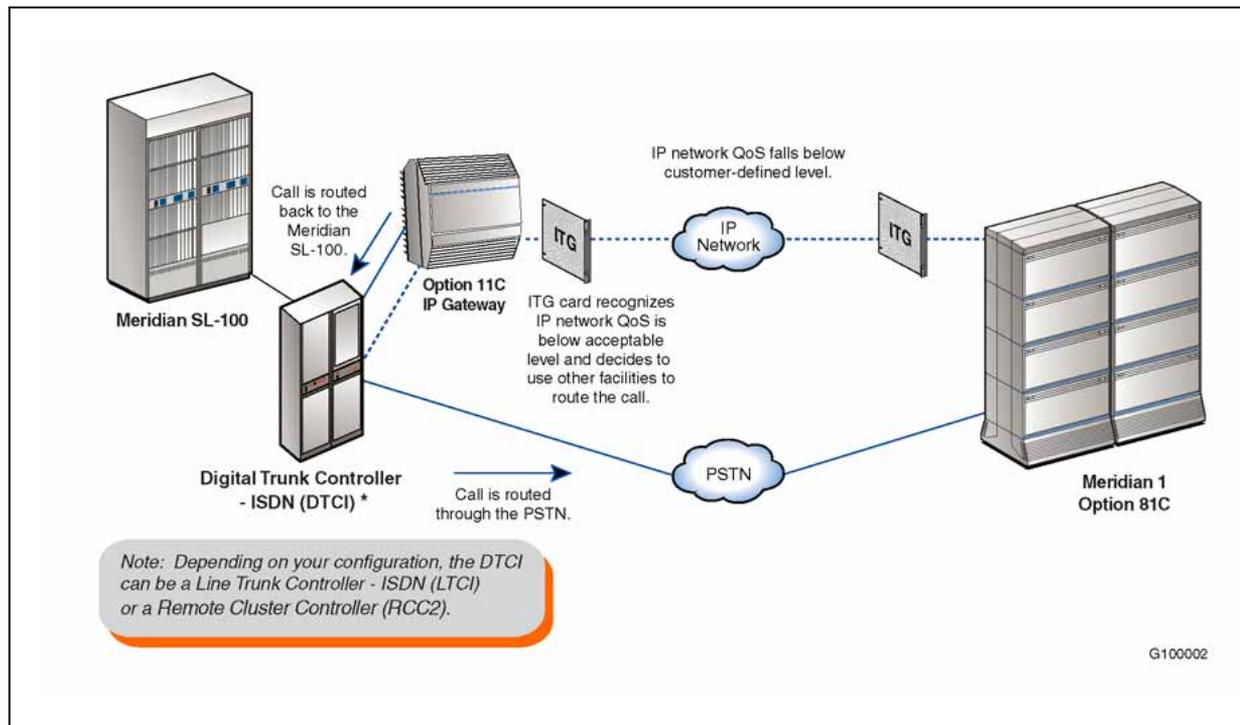
Option 11C IP Gateway system requirements
Hardware

"Option 11C Gateway minimum hardware requirements" (page 244) 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.

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)
7	1	NTSF8730	TMDI D-channels

Item	Quantity	NT Code	Description
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.			

shows a sample card layout in the Option 11C Gateway.

Option 11C Gateway card configuration
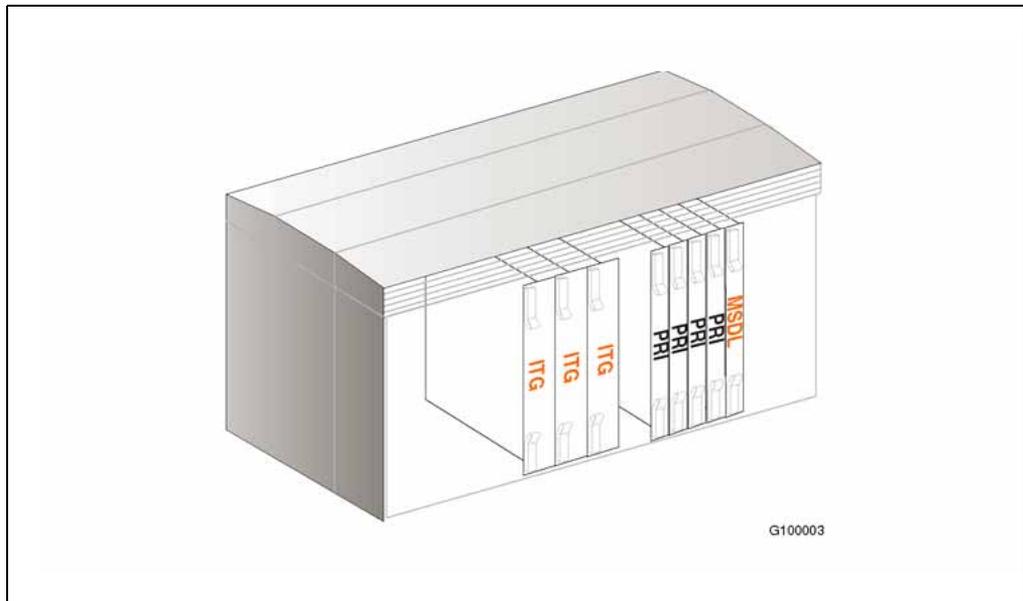
Software
The Option 11C Gateway requires ITG Trunkside Release 2.0 software.

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 information previous chapters in this guide to configure trunks and supported network features.

Meridian 1 setup

Follow the information in 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 possible. The Meridian SL-100 and the Meridian 1 products provide separate billing records. It is 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 that allows you to install more cards per shelf. The most trunks available on the Option 11C are 96 trunks (see).

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

Item	Quantity	NT Code	Description
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

Introduction

This chapter outlines the tools available for managing and maintaining the Meridian SL-100 and the Meridian 1.

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, Release 2.0 uses a multitier 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 communicates with the application unit interface (AUI). The application uses the Simple Network Manager Protocol (SNMP) that operates with the User Datagram Protocol/Internet Protocol (UDP/IP).

The system can be set up so that a user that has administrative logons and privileges can manage users on the system more efficiently, and with increased security, through user logon and password verification.

Optivity Telephony Manager Meridian SL-100, Release 2.0 provides several switch management features, including:

- retrieval of switch equipment information such as core nodes, c-side peripheral devices, 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 Enhanced Intelligent Peripheral Equipment (EIPE).

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 logons and privileges

- increased capacity for events and equipment inventory

- new log event browsing features with log event annotations

- new EIPE 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, Release 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, each must be a M3902, M3903, M3904, or M3905.

Integration of Optivity Telephony Manager for Meridian SL-100, Release 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:

- With integration, voice folder in the Optivity Network Management System InfoCenter turns red when a critical, major, or minor log is received from the Meridian SL-100.

- With the Optivity Telephony Manager Meridian 1 consolidated alarm browser, you can view alarms from Meridian 1, when the Optivity Telephony Manager Meridian 1 web browser is launched. Consolidated alarms for Meridian 1, Meridian SL-100, Meridian Mail, CallPilot, and Symposium Call Center Server are among those that you can view.

Optivity Telephony Manager for Meridian SL-100, Release 2.0 provides you with the ability to manage network elements from a Unified Network Management Platform.

Optivity Telephony Manager for the Meridian SL-100 configuration
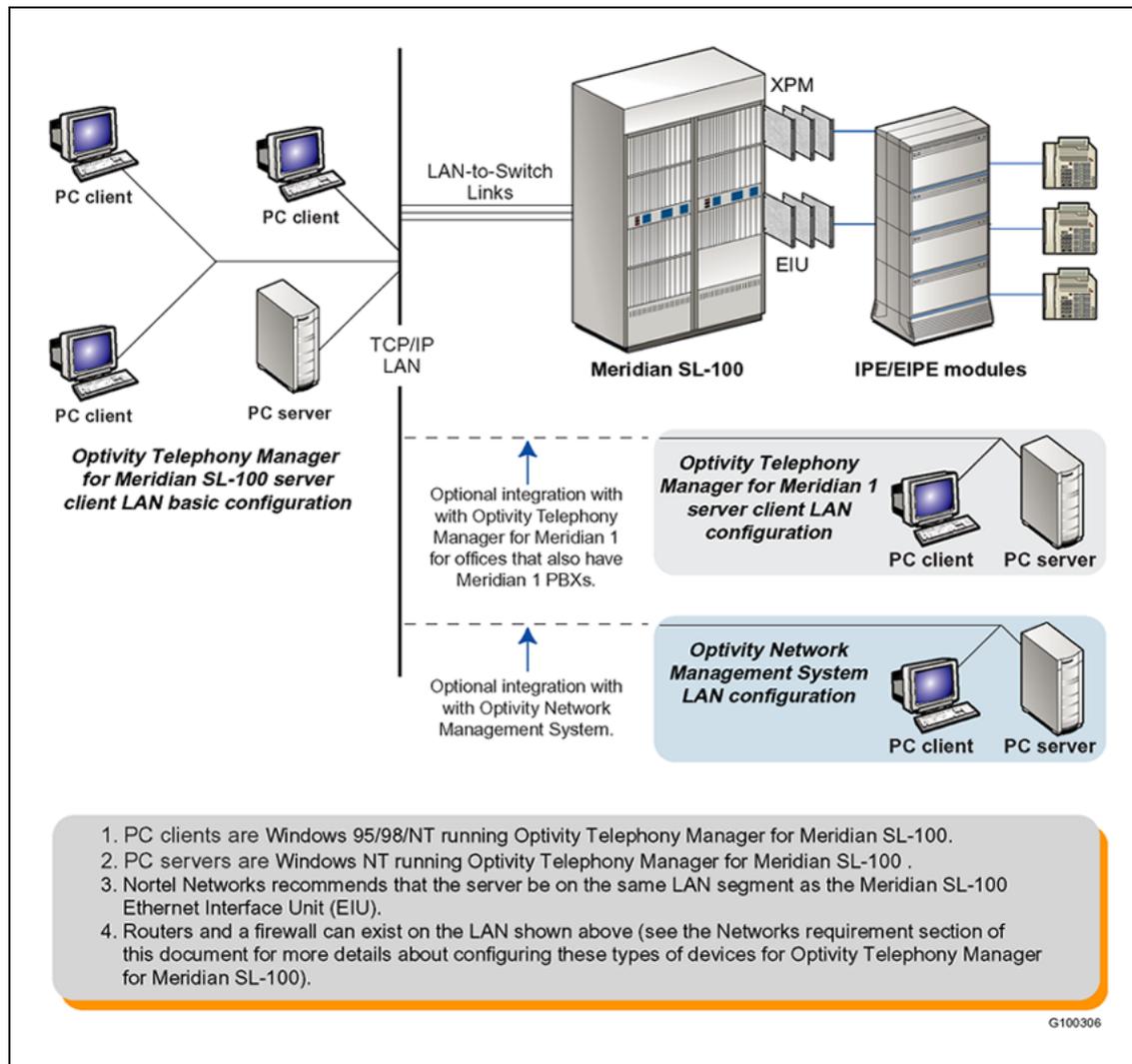
Meridian 1 Optivity Telephony Manager

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, CallPilot, 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 stand-alone 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

compares the maintenance and testing capabilities between the Meridian 1 and Meridian SL-100.

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. Online 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.
Automatic line testing	N/A	Individual or group.

Function	Meridian 1	Meridian SL-100
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

Introduction

This chapter describes how M3900 Meridian digital telephone features operate on the Meridian 1 and the Meridian SL-100.

M3900 Meridian digital telephone feature operation

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.

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.
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 the pound key (#).

Feature	Meridian 1	Meridian SL-100
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.
Call Transfer DN	Press the **Transfer** key. If there is no answer, return to the original **DN** key to continue conversation.	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.

Feature	Meridian 1	Meridian SL-100
	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.	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.
Customer Originated Trace	Not available.	Press the **CustOrigTr** key or dial the FAC for COT.

Feature	Meridian 1	Meridian SL-100
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 Wake-up FFC. Dial the wake-up time in 24 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/occ upied.	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 that of the Meridian SL-100.	Dial operation is the same as the Meridian 1. Uses the Automatic Line (AUL) feature.
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.

Feature	Meridian 1	Meridian SL-100
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.
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.

Feature	Meridian 1	Meridian SL-100
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

shows software and hardware requirements for M3900 Meridian digital telephones on the two systems.

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.

Item	Meridian 1	Meridian SL-100
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.	Included 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" (page 265) - provides a matrix that shows compatibility of features when a Meridian 1 is connected to the Meridian SL-100.

- "Applications comparison" (page 268) - provides illustrations that compare how various applications run on both systems.

Feature compatibility

The following tables show Meridian 1 feature compatibility when connected to the Meridian SL-100, including availability based on release and hardware vintage.

- "Meridian 1/Meridian SL-100 feature compatibility - Part 1" (page 265)

- "Meridian 1/Meridian SL-100 feature compatibility - Part 2" (page 266)

- "Meridian 1/Meridian SL-100 feature compatibility - Part 3" (page 267)

Meridian 1/Meridian SL-100 feature compatibility - Part 1

Feature	R16	R17	R18	R19	R20	R21	R22	R23	R24
Backup D-channel	N	Y	Y	Y	Y	Y	Y	Y	Y
nB+D	N	Y	Y	Y	Y	Y	Y	Y	Y
Basic Call Service	Y	Y	Y	Y	Y	Y	Y	Y	Y
Calling Line ID	Y	Y	Y	Y	Y	Y	Y	Y	Y
CLID in CDR	Y	Y	Y	Y	Y	Y	Y	Y	Y

Feature	R16	R17	R18	R19	R20	R21	R22	R23	R24
DPN access	Y	Y	Y	Y	Y	Y	Y	Y	Y
DTI, ESF, CRC	Y	Y	Y	Y	Y	Y	Y	Y	Y
DTI Compatible	Y	Y	Y	Y	Y	Y	Y	Y	Y
ESN over PRI	Y	Y	Y	Y	Y	Y	Y	Y	Y
ISA	N	Y	Y	Y	Y	Y	Y	Y	Y
NND	N	Y	Y	Y	Y	Y	Y	Y	Y
NCRD									
— NCFAC	Y	Y	Y	Y	Y	Y	Y	Y	Y
– NCFB	Y	Y	Y	Y	Y	Y	Y	Y	Y
— NCFNA	Y	Y	Y	Y	Y	Y	Y	Y	Y
— NHNT	Y	Y	Y	Y	Y	Y	Y	Y	Y
NRAG (TIE)	Y	Y	Y	Y	Y	Y	N	N	N

* 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.

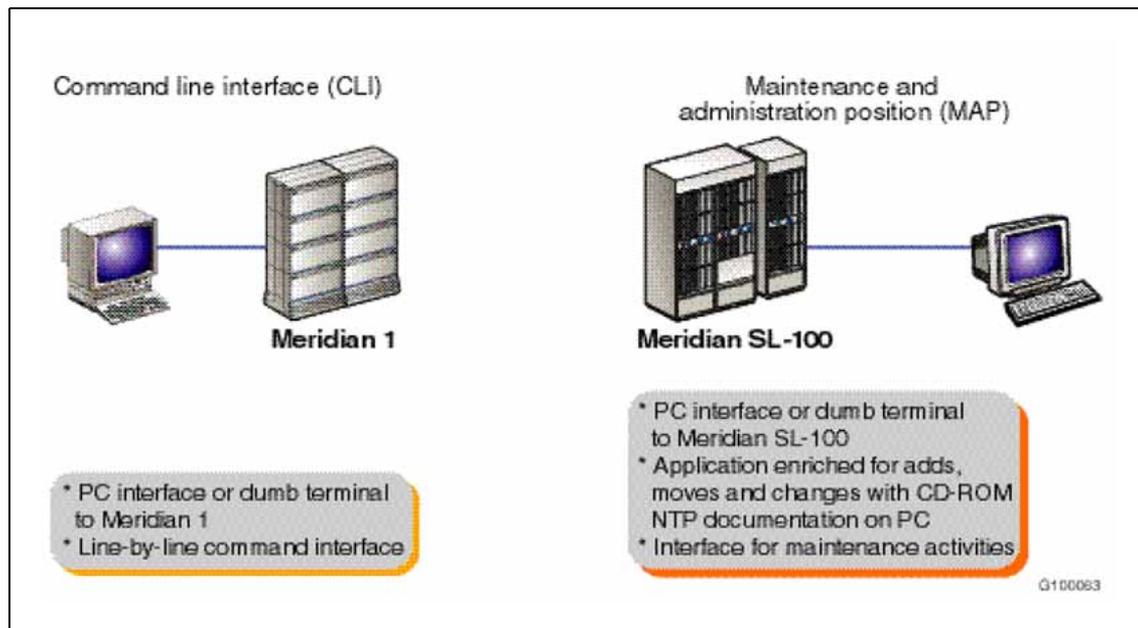**** Includes the NTBK51AA Downloadable D-channel daughterboard.

Meridian 1/Meridian SL-100 feature compatibility - Part 2

Feature	720A	720B	720C/E*	720F**	757A	757B
Backup D-channel	N	Y	Y	Y	N	N
nB+D	N	N	Y	Y	N	N
Basic Call Service	Y	Y	Y	Y	Y	Y
Calling Line ID	Y	Y	Y	Y	Y	Y
CLID in CDR	N	Y	Y	Y	Y	Y
DPN access	Y	N	Y	Y	N	Y
DTI, ESF, CRC	Y	Y	Y	Y	–	–
DTI Compatible	Y	Y	Y	Y	–	–
ESN over PRI	Y	Y	Y	Y	Y	Y
ISA	Y	Y	Y	Y	Y	Y
NND	Y	Y	Y	Y	N	N
NCRD						
— NCFAC	N	Y	Y	Y	N	Y
— NCFB	N	Y	Y	Y	N	N

Feature	720A	720B	720C/E*	720F**	757A	757B
— NCFNA	Y	Y	Y	Y	N	Y
— NHNT	N	Y	Y	Y	N	N
NRAG (TIE)	Y	Y	Y	Y	N	N

* 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.

Meridian 1/Meridian SL-100 feature compatibility - Part 3

Feature	757C	757D	757E	NT6D80AA ***	NT6D80AB ***	NT5D12DDP ****
Backup D-channel	N	Y	Y	Y	Y	Y
nB+D	N	N	Y	Y	Y	Y
Basic Call Service	Y	Y	Y	Y	Y	Y
Calling Line ID	Y	Y	Y	Y	Y	Y
CLID in CDR	Y	Y	Y	Y	Y	Y
DPN access	Y	Y	Y	Y	Y	Y
DTI, ESF, CRC	–	–	–	–	–	–
DTI Compatible	–	–	–	–	–	Y
ESN over PRI	Y	Y	Y	Y	Y	Y
ISA	Y	Y	Y	Y	Y	Y
NND	N	N	Y	Y	Y	Y
NCRD						
— NCFAC	Y	Y	Y	Y	Y	Y
— NCFB	Y	Y	Y	Y	Y	Y
— NCFNA	Y	Y	Y	Y	Y	Y
— NHNT	Y	Y	Y	Y	Y	Y
NRAG (TIE)	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 shown in this section represent differences in system management, call center, computer telephony integration (CTI), and open integrated voice recognition (IVR).
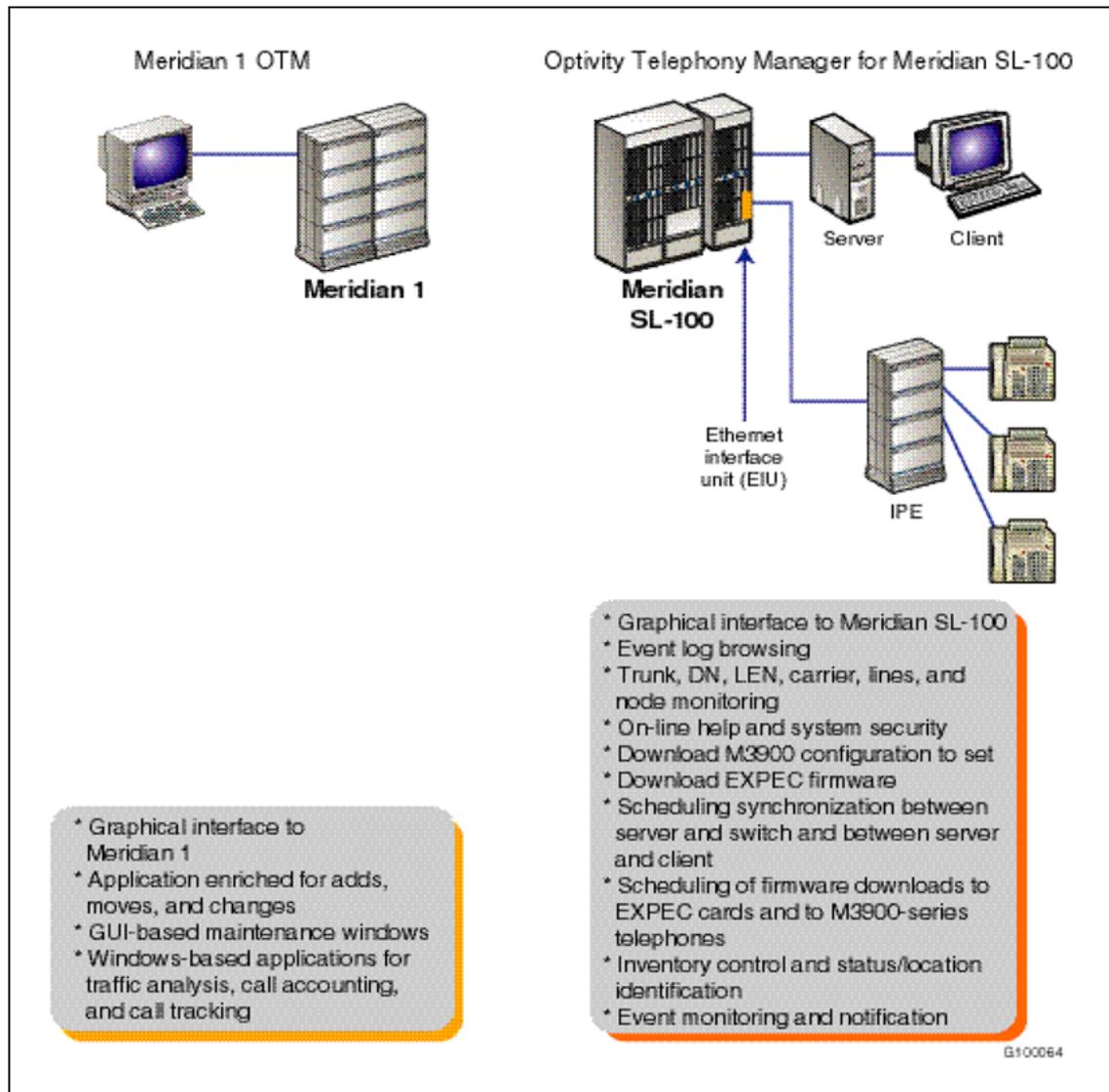
System management

compare system management options for the Meridian 1 and Meridian SL-100.

**System management (Meridian 1/Meridian SL-100) (example 1)**

**System management (Meridian 1/Meridian SL-100) (example 2)**

Meridian 1 OTM

Optivity Telephony Manager for Meridian SL-100

Meridian 1

Meridian SL-100

Server   Client

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

G100064

Call centers

compare Meridian 1 and Meridian SL-100 call center implementations.

Call centers with X.25 (Meridian 1/Meridian SL-100)

G100065
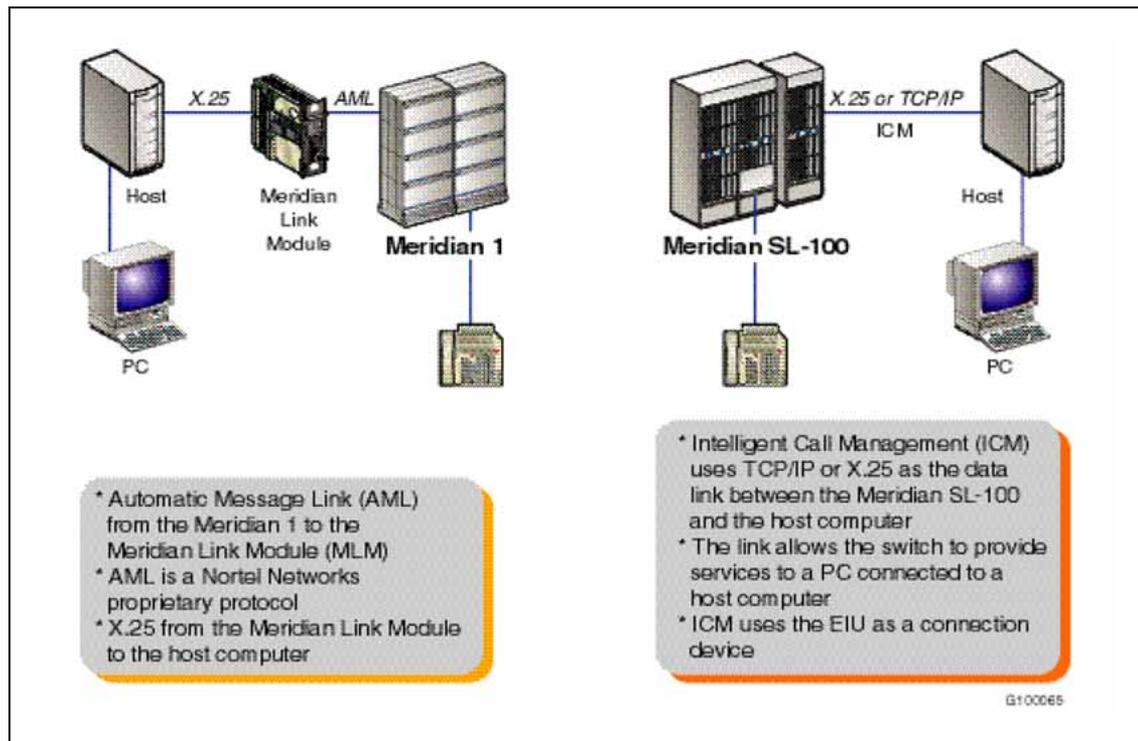
Call centers (Meridian 1/Meridian SL-100)

G100066
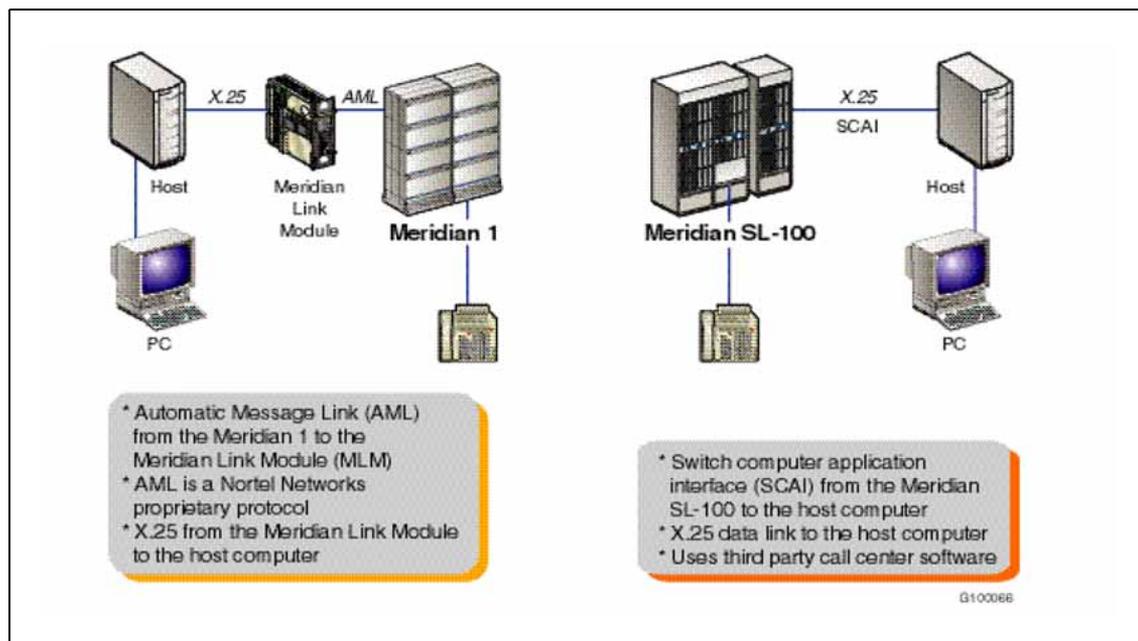
Call centers with CCMIS (Meridian 1/Meridian SL-100)
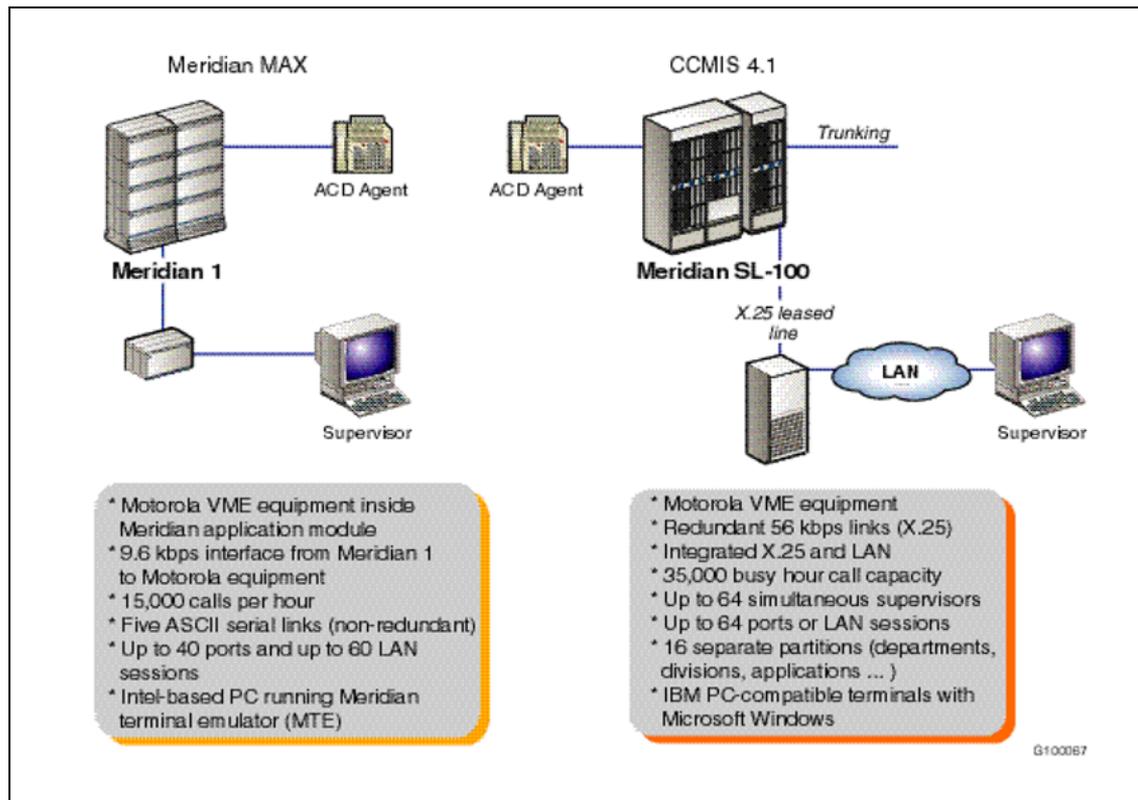
Call centers with TAPI (Meridian 1/Meridian SL-100)
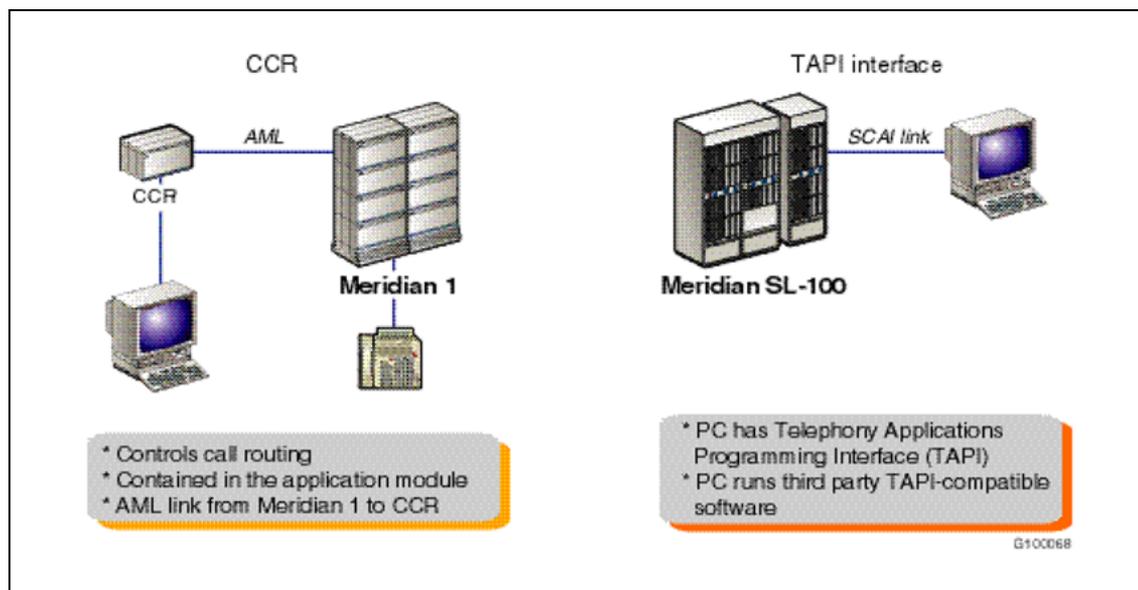
Computer telephony integration

"Computer telephony integration (Meridian 1/Meridian SL-100)" (page 272) compares Meridian 1 and Meridian SL-100 computer telephony integration.

Computer telephony integration (Meridian 1/Meridian SL-100)
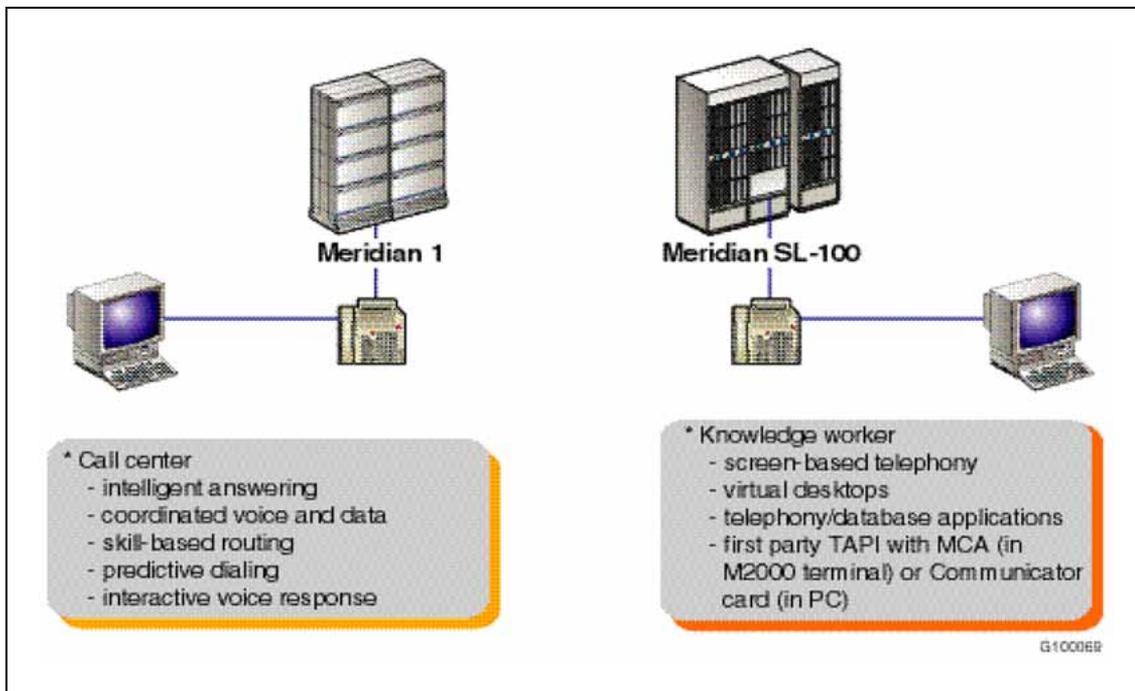
Open integrated voice recognition (IVR)

"Open integrated voice recognition (IVR) (Meridian 1/Meridian SL-100)" (page 273) compares Meridian 1 and Meridian SL-100 open IVR.

Open integrated voice recognition (IVR) (Meridian 1/Meridian SL-100)
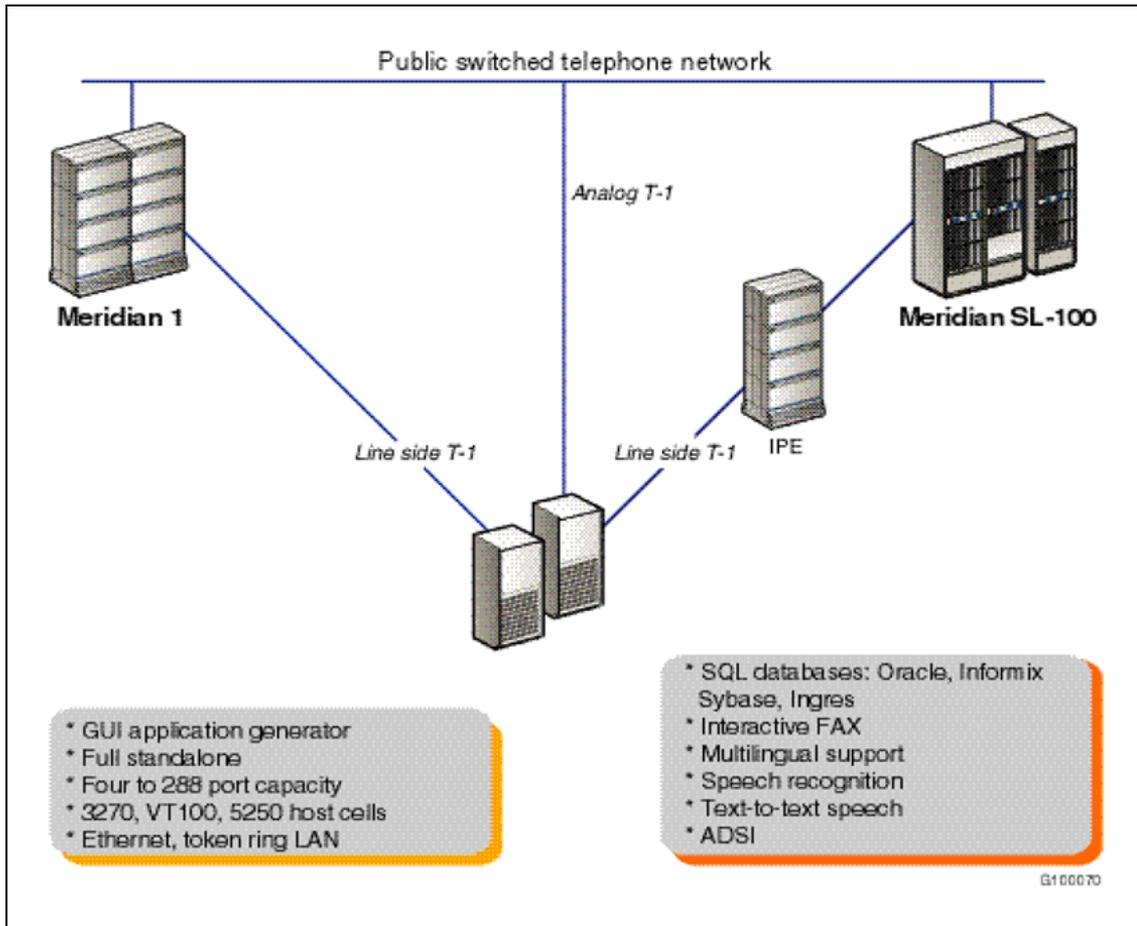
IP Telephone Survivability (S1-S2)

Introduction

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 subfeature 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 usually 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 90 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.

shows the Communication Server 1000 interworking with Communication Server 2100 IPCM to provide IP telephone survivability.

IP Telephone Survivability
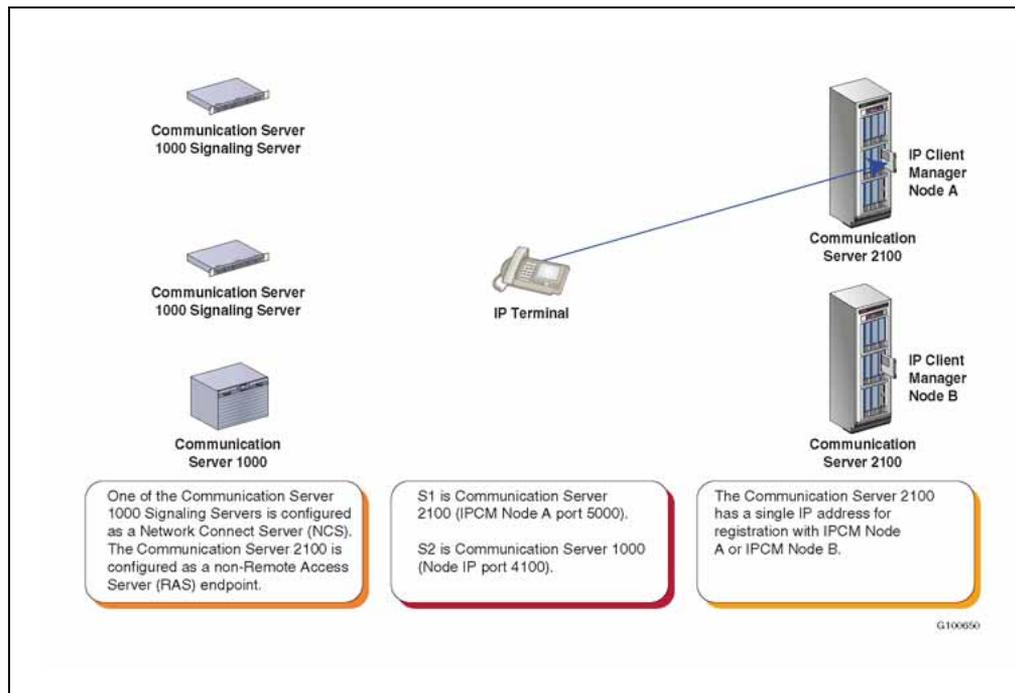
The Communication Server 2100 IPCM is comprised of two redundant nodes, Node A and Node B. On the Communication Server 1000, the IP set is normally registered with IP Client Manager (IPCM) A. If IPCM Node A is unreachable, the set is then registered with, and receives services from, IPCM Node B. If both 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 in large 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. "IP set - connection lost with IPCM Node A" (page 277) shows an example where a Communication Server 1000 IP set has lost connection with IPCM Node A and then registered with IPCM Node B.

IP set - connection lost with IPCM Node A

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).

IP set - connection lost with IPCM Node A and IPCM Node B
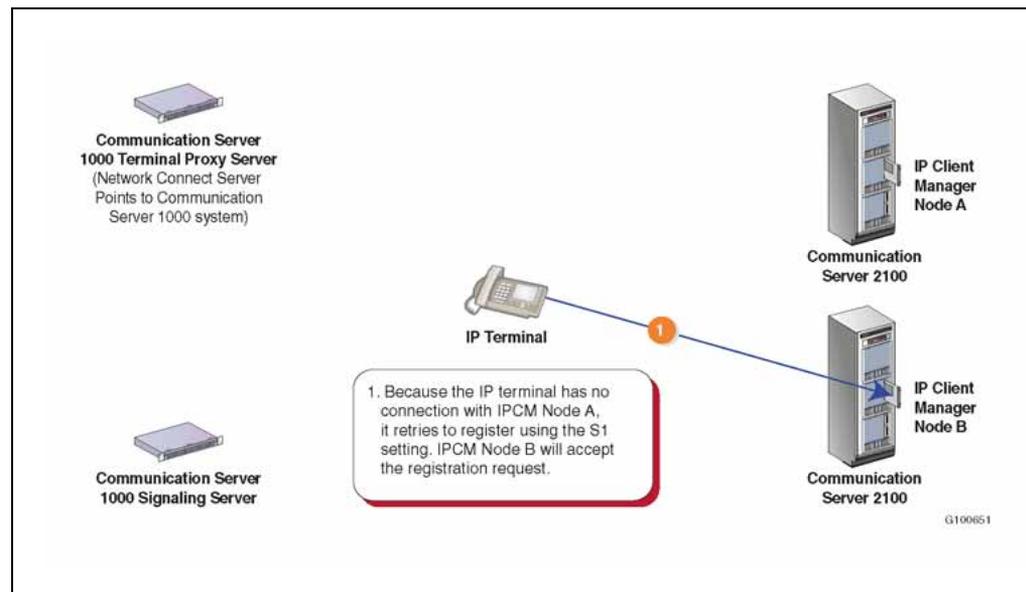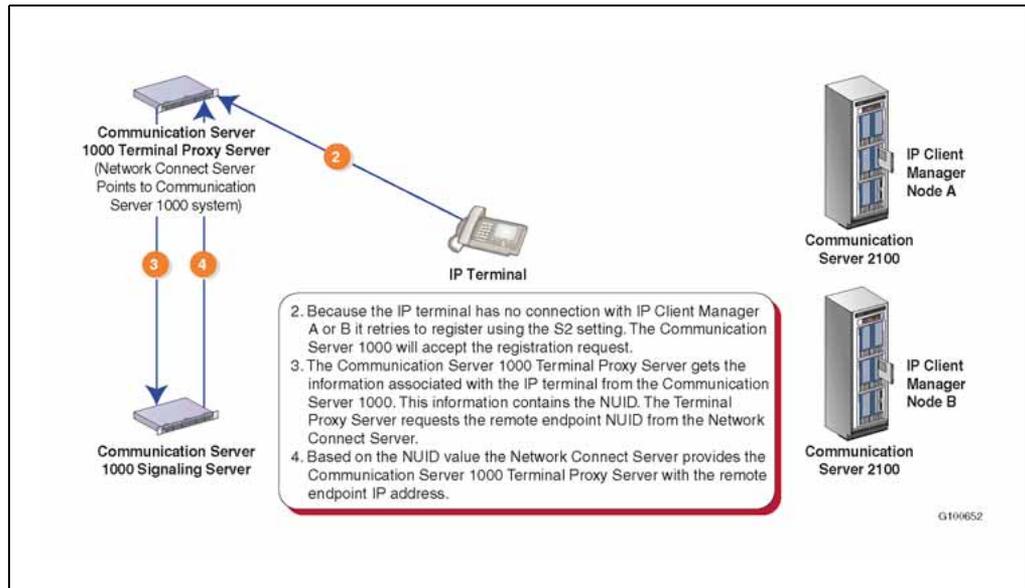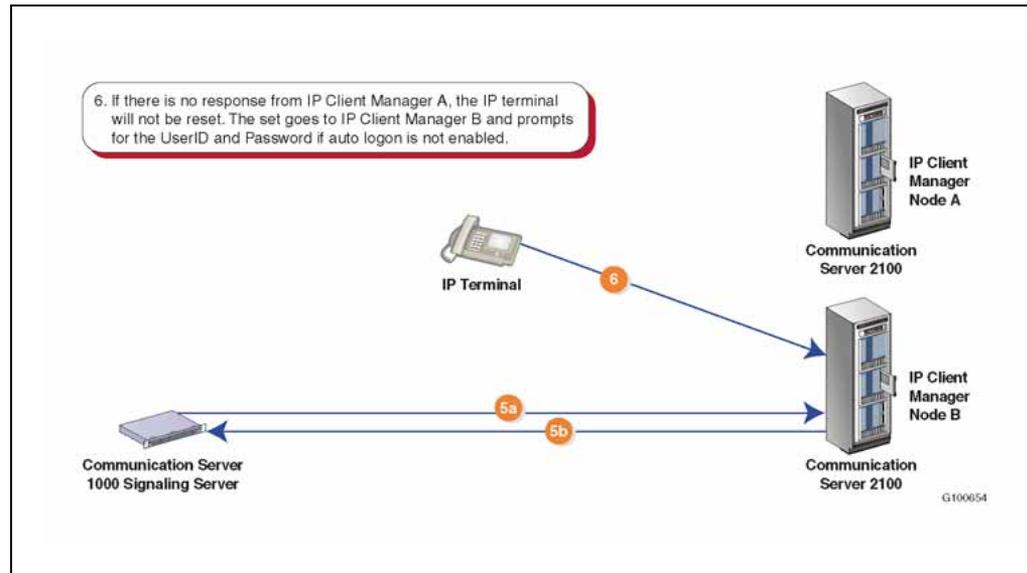

"New heartbeat procedure redirection to IPCM Node A" (page 278) shows an example of a new heartbeat procedure redirection to IPCM Node A (steps 5a and 5b).

**New heartbeat procedure redirection to IPCM Node A**
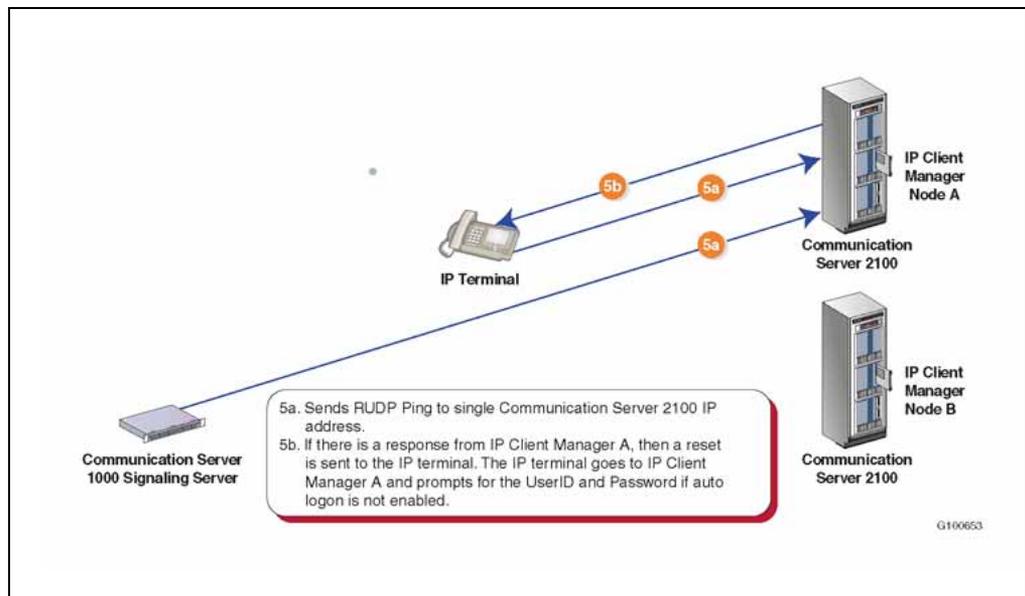
"IPCM Node A is unreachable" (page 279) shows an example of where IPCM Node A is unreachable (steps 5a, 5b, and 6).

IPCM Node A is unreachable

"Services from Communication Server 1000" (page 279) 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.

Services from Communication Server 1000
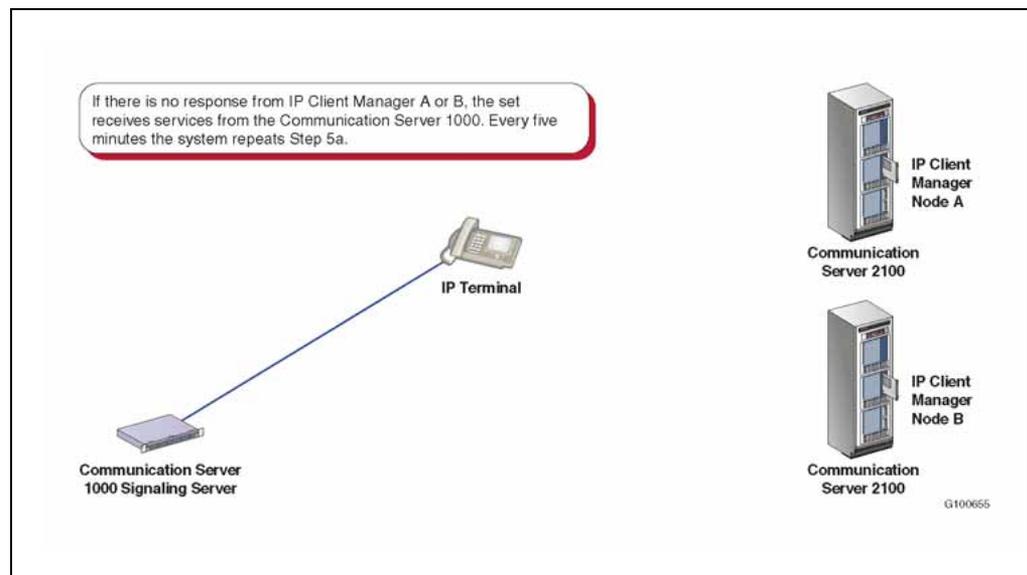
Firmware upgrade

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

Because both CS 2100 IPCM and CS 1000 accept the minimum or higher firmware version during registration, a firmware upgrade only takes place during initial system installation or when a minimum IP set firmware version is introduced in a software release. Usually, 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, you must initiate it 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 telephone survivability in CS 1000 and CS 2100 IPCM interworking" (page 283), 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.

"Related documents" (page 281) lists documents related to this feature, or referred to in this document.

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 "Limitations and restrictions" (page 281) 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" (page 283) - scenarios of IP phone survivability

  — in interworking CS 1000/CS 2100 IPCM ("IP phone survivability in interworking CS 1000/CS2100 scenario" (page 283)).

  — in interworking CS 1000/CS 2100 IPCM - where IPCM Node A is unreachable ("IP phone survivability in interworking CS 1000/CS2100 scenario - where IPCM Node A is unreachable" (page 284)).

  — in interworking CS 1000/CS 2100 IPCM - where both IPCM Node A and IPCM Node B are unreachable ("IP phone survivability in interworking CS 1000/CS2100 scenario - where both IPCM Node A and IPCM Nod" (page 285)).

  — in interworking CS 1000/CS 2100 IPCM - where CS 2100 IPCM is unreachable (different set firmware in CS 2100 IPCM and CS 1000) - ("IP phone survivability scenario in interworking CS 1000/CS 2100 IPCM - where the CS 2100 IPCM is unr" (page 285)).

- "IP telephone survivability in MG 1000B and CS 2100 IPCM interworking" (page 286).

    Note: See "Configuration" (page 288) 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 1000 and CS 2100 IPCM 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.

"IP phone survivability in interworking CS 1000/CS2100 scenario" (page 283) shows the scenario for IP phone survivability where Communication Server 1000 and Communication Server 2100 are interworking.

IP phone survivability in interworking CS 1000/CS2100 scenario

The following steps 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.

The following steps track the sequence of events in this scenario.	
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.
20	IP set registers with S1 destination.
21	IP set is registered with IPCM Node A, which provides telephony services.

"IP phone survivability in interworking CS 1000/CS2100 scenario - where IPCM Node A is unreachable" (page 284) shows IP telephone survivability in interworking. CS 2100 IPCM/CS 1000s in the scenario where IPCM Node A is unreachable.

IP phone survivability in interworking CS 1000/CS2100 scenario - where IPCM Node A is unreachable

The following steps 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.

"IP phone survivability in interworking CS 1000/CS2100 scenario - where both IPCM Node A and IPCM Nod" (page 285) 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.

IP phone survivability in interworking CS 1000/CS2100 scenario - where both IPCM Node A and IPCM Node B are unreachable

The following steps 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.
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.

"IP phone survivability scenario in interworking CS 1000/CS 2100 IPCM - where the CS 2100 IPCM is unr" (page 285) shows IP telephone survivability in interworking CS 2100 IPCM/CS 1000s in the scenario where the CS 2100 IPCM is unreachable. There is a different set firmware in CS 2100 IPCM and CS 1000.

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)

The following steps 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.

The following steps track the sequence of events in this scenario.	
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.
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.

shows a scenario of IP telephone survivability with interworking MG 1000B and CS 2100 IPCMs.

IP telephone survivability in MG 1000B and CS 2100 IPCM interworking

	The following steps 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.
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" (page 288)

- "Configuring CS 2100 IPCM IP phones with Survivability in MG 1000B" (page 289)

   Note: Refer to "Software requirements" (page 281) and "Limitations and restrictions" (page 281) 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" (page 288) 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 "Installing the IP phone with CS 2100" (page 288) for instructions on how to install the IP phone.

Installing the IP phone with CS 2100

Step	Action
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.

—End—

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.

LD 11 Configuration of NUID and NHTN

Command/Prompt	Command/User Responses	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 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 for instructions on how to install the IP phone.

Installing the IP phone with MG 1000B

Step	Action

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.

—End—

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.

LD 11 Configuration of BUID and MOTN

Command/Prompt	Command/User Responses	Description
CUST	x	Customer number

Command/Prompt	Command/User Responses	Description
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 Signaling 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
Multipurpose ISDN Signalling Processor

MOTN
Main Office Terminal Number

MWI
Message Waiting Indicator

NCS
Network Connect Server

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

RLT
Release Line Trunks

RUDP
Reliable User Datagram Protocol

TPS

Terminal Proxy Server

TAT

Trunk Anti-Tromboning

VGMC

Voice Gateway Media Card

VPNI

Virtual Private Network Identifier

Communication Server 2100

Interworking Services Guide

To provide feedback or report a problem in this document, go to www.nortel.com/documentfeedback .

The information in this document is sourced in Canada, the United States of America, and the United Kingdom.

NORTEL