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Meridian SuperNode

Meridian SL-100

Product Guide

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NORTEL NETWORKS™

Meridian SuperNode

Meridian SL-100

Product Guide

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To comply with Nortel Networks Technical Documentation Standards, the Publication history will contain updates for the current release and two prior releases.

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Version 17.01, Standard, MSL15. This version presents the standard release of this document and provides information on Optivity Telephony Manager for Meridian SL-100, 2.0.

November 2000

Version 16.01, Standard, MSL14. This version provides additional information on SPM feature, an update to CLASS over PRI and Terminals section of this document.

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Version 15.01, Standard, MSL12. This version provides information on the following.

- Updates Meridian Digital Telephone M3900 Series information
- Adds Voice Over IP (VoIP) information
- Adds Call Pilot information
- Updates Switch Manager information for the Meridian SL-100

Contents

About this document

When to use this document

This document describes the hardware components, operation, software, and optional features of the Meridian SuperNode (Meridian SL-100) system. It is part of the documentation package that supports Nortel Networks Meridian SuperNode products. This document applies to all Meridian SL-100 offices.

How to check the version and issue of this document

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

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

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

To determine which version of this document applies to the software in your office and how documentation for your product is organized, check the release information in the *Master Index of Publications*.

How this document is organized

This document is divided into the following sections:

Section 1, “Introduction," briefly describes the cabinetized Meridian SuperNode system by describing the SuperNode and SuperNode Space Enhanced (SE) switches. This section addresses the cabinet concept and its advantages.

Section 2, “General functions," describes the general functionality of the core, bus, and link of the SuperNode and SuperNode SE switches and the maintenance and administration area.

Section 3, “Cabinet modular hardware," gives a physical overview of the Meridian SL-100 cabinets, describes the site level power and grounding, and describes the individual cabinet modules.

Section 4, “System configuration," describes the system groups, standard group configurations, and the non-standard configurations with merged lineups. Primary and secondary group lineups are illustrated.

Section 5, “System performance," describes the power consumption, floor loading, environmental requirements, and standard features.

Section 6, “System software," describes the operating system, call processing, administration, database management, and the modular software structure.

Section 7, “Maintenance and administration system," describes the maintenance and administration system and its subsystems. This includes Meridian SuperNode system access, line maintenance, trunk maintenance, administration subsystems, access control system, electronic documentation access, and the method used by system maintenance personnel to get emergency assistance from Nortel Networks.

Section 8, “Voice messaging/processing," provides an overview of voice processing/messaging. The MSM, Modular Option, and OPEN IVR features are also described in detail.

Section 9, “Call management," provides an overview of the automatic call distribution and call center management information systems.

Section 10, “Subscriber services," provides an overview of subscriber services such as CLASS, CCS7, ISDN, dialable wideband service, SMDI, DataSPAN frame relay, 64K MCA, ACD, CompuCALL, 1 Meg Modem service, and the SSLP/FLIS.

Section 11, “Computer-telephony integration (CTI)," provides an overview of the SYMPOSIUM products as well as the Nortel Networks Communicator card.

Section 12, “Meridian Integrated Conference Bridge," briefly describes the MICB, its functional characteristics, system compatibility features, conference features, and chairperson features.

Section 13, “Remote access," provides an overview of the remote products such as the MCRM-S, AccessNode, and MCRU.

Section 14, “Enterprise solutions," briefly describes the product lines in the Nortel Networks Enterprise Solutions division such as switching, multimedia applications, terminals, and wireless systems.

Section 15, “Wireless," briefly describes the COMPANION family of products available on the Meridian SL-100 system.

Section 16, “Terminals," provides an overview of the telephone sets available on the Meridian SL-100 system.

Section 17, “List of terms" lists and defines acronyms and abbreviations used in this document.

References in this document

This document includes references to documents containing additional information on specific subjects where appropriate. The following list provides the names of all outside references mentioned in this document.

- Meridian SL-100 manuals
  - *Meridian SL-100 Translations Guide*
  - *Meridian SL-100 Dialable Wideband Services (DWS) Guide*
  - *Meridian SL-100 General Description*
  - *Meridian SL-100 Feature Description Manual*
  - *Meridian SL-100 Hardware Description Manual*
  - *Meridian SL-100 Enhanced MAP Workstation Product Guide*
  - *M2000 Digital Telephones Reference Manual*
  - *M3000 Touchphone Reference Manual*
  - *Meridian SL-100 Remote Peripherals General Description*
  - *Meridian SL-100 Simplified Message Desk Interface Description and Implementation*
  - *Meridian SL-100 Network Management for SPECTRUM Service Guide*
  - *Meridian SL-100 Operational Measurements Reference Manual*
  - *Meridian SL-100 Log Report Manual*
  - *Meridian SL-100 Maintenance Guide*
  - *Intelligent Peripheral Equipment (IPE) Reference Manual*
  - *Meridian Communications Adapter Reference Manual*
  - *Meridian Modular Telephone Reference Manual*
  - *M3900 Series Meridian Digital Telephone Reference Manual*
  - *Meridian SL-100 ISDN PRI Reference Manual*
  - *Meridian SL-100 Meridian Integrated Conference Bridge Reference Manual*

- DMS-100 manuals
  - *DMS-100 Family Provisioning Manual*, PLN-8991-104.
  - *DMS-100 Family Peripheral Modules*, 297-1001-103
  - *DMS SuperNode Technical Specification*, PLN-5001-001
  - *DMS SuperNode DataSPAN Frame Relay Service Maintenance Guide*, 297-5111-501
  - *RSC Maintenance Manual*, 297-8221-550
  - *MDC Simplified Message Desk Interface Setup and Operation*, 297-2051-104,
  - *Small Carrier Module-100 Urban Maintenance Manual*, 297-8241-550
  - *Simplified Message Desk Interface Setup & Operation*, 297-2051-104
  - *Basic Translations Tools Guide*, 297-1001-360
  - *Non-Menu Commands Reference Manual*, 297-1001-820
  - *Menu Commands Reference Manual*, 297-1001-821
  - *Common Channel Signaling 7 Maintenance Reference Guide*, 297-1001-531
  - *Common Channel Signaling 7 Services Guide*, 297-5151-020
  - *Input/Output System Reference Manual*, 297-1001-129
  - *DMS-100 Family Hardware Description Manual*, 297-8991-805
- Meridian Mail manuals
  - *Meridian Mail MSM Product Guide*, 557-7001-010
  - *Meridian Mail MSM Planning and Engineering Guide*, 557-7001-100
  - *Meridian Mail Networking Services Administration Guide*, 555-7001-335
  - *Meridian Mail General Description*, 555-7001-101
  - *Modular Option GP Site and Installation Planning Guide*, 555-7051-200
  - *Meridian Mail MSM System Administration Guide*, 557-7001-300
  - *Meridian Mail System Administration Guide*, 555-7001-307
  - *Meridian Mail System Administration Tools Guide*, 555-7001-305
  - *Merdian Mail MSM Routine Maintenance Procedures*, 557-7001-501
  - *Meridian Mail System Installation and Modification Guide*, 555-7001-215

- CC MIS manuals
  - — *Digital Switching System CC MIS Supervisor's Guide,* 297-2671-050
  - — *CC MIS General Description*, 297-2671-150
- Miscellaneous manuals
  - — *Passport General Description*, 241-7001-110
  - — *Network Description*, 241-1001-100
  - — *S/DMS Access Node Configuration and Equipment Description*, 323-3001-100
  - — *M5212 ACD Set General Description*, 297-2041-900

For further information, a complete list of related documents can be found in the *Master Index of Publications.*

What precautionary messages mean

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

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

Examples of the precautionary messages follow.

ATTENTION Information needed to perform a task

ATTENTION

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

DANGER Possibility of personal injury

DANGER

Risk of electrocution

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

WARNING Possibility of equipment damage

DANGER

Damage to the backplane connector pins

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

CAUTION Possibility of service interruption or degradation

CAUTION

Possible loss of service

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

How commands, parameters, and responses are represented

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

Input prompt (>)

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

```
>BSY
```

Commands and fixed parameters

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

```
>BSY CTRL
```

Variables

Variables are shown in lowercase letters:

```
>BSY  CTRL  ctrl_no
```

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

Responses

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

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

FP 3 Busy CTRL 0: Command passed.
```

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

Procedure 1

At your location

1 Manually busy the CTRL on the inactive plane by typing

`>BSY CTRL ctrl_no`

and pressing the Enter key.

where

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

Example of a MAP response:

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

FP 3 Busy CTRL 0: Command passed.

1 Introduction

The Meridian SuperNode system provides fully integrated voice and data communications and management. It serves as either a switching or networking manager for corporate, military, and institutional purposes. This large-scale, software-controlled private switching system handles up to 60,000 digital voice or data connections, or a combination of both, to a wide variety of other voice or data systems.

There are two types of Meridian SuperNode systems, and they are differentiated by the core processor. The first type is the SuperNode core with enhanced call processing and handling capabilities. The second type is a scaled-down version of the SuperNode core, called the SuperNode SE (SNSE) core, designed to serve smaller offices with a maximum of 36,000 lines.

> ***Note:*** The number of lines supported is dependent on the switch configuration, the feature implementation, the amount of ISDN line penetration, and the centi-call seconds (CCS) per line.

The SuperNode system is known as Meridian 1 Option 211. The more compact SuperNode SE system is known as Meridian 1 Option 201.

This section gives an overview of the SuperNode and SuperNode SE systems, describes the cabinet concept, details the advantages of a cabinetized system, and presents the input and output devices used for maintenance and administration purposes.

SuperNode generations

The SuperNode generation of switches, which includes the SuperNode and SuperNode SE systems, is based on evolutionary technology, yielding the following improvements over the NT40 generation of switches:

- increased processing and call-handling capability
- reduced size
- improved reliability

SuperNode switches consists of three components:

- core—the control component
- bus—the messaging component; hereafter called the message switch (MS) bus or MS bus in this document to differentiate it from other types of buses
- link—the software infrastructure that implements public networking standards including common channel signaling and ISDN public standards and protocols

SuperNode switches have a distributed architecture and increased processing capabilities, which provide an infrastructure for the development of new features and services. The SuperNode system also provides an interface with fiber transmission systems.

Duplication for reliability

For reliability, Meridian SuperNode systems have duplicate control component elements that operate in synchronism and duplicated message component elements that operate in load-sharing mode.

Duplication offers hardware fault protection as well as the ability to carry out office extensions and software updates without disrupting service.

Note: For clarity, duplication is omitted from the illustrations in this document.

Overview of functional elements

All Meridian SuperNode systems consist of the same functional elements: the control component, the messaging component, the switching network, the peripheral modules, and the input/output controller.

An overview of these components is given in subsequent paragraphs. For details on the functionality of these components and illustrations, see section 2 of this document.

Control component

The duplicated control component coordinates call processing, including the actions of the switching network and of the peripheral modules.

The SuperNode control component is called the “core." The core's major elements are a computing module (CM) and system load module (SLM).

Note: The SuperNode messaging component is not contained in the control component, but is separate and called the message switch bus.

Messaging component

The messaging component routes messages within the Meridian SuperNode system.

The SuperNode messaging component is the MS bus. The MS bus consists of duplicated message switches. The message switch is based on the SuperNode CPU; thus, it uses some of the same software as the computing module and the central control complex CPU.

Switching network

The switching network is a digital switching matrix that interconnects the peripheral modules, using time division multiplexing (TDM).

The switching network has duplicate network planes for reliability. It is made up of microprocessor controlled digital switching network modules (NM) and is connected to the SuperNode MS bus.

Peripheral modules

The peripheral modules (PM) provide an interface between the switching network and telephony terminals such as lines and trunks. They also provide an interface between the Meridian SuperNode system and remote digital terminals (RDT), access nodes (S/DMS Access Node), and other vendors' switching equipment.

Input/output controller

The input/output controller (IOC) provides an interface between the messaging component (the SuperNode MS bus) and input/output devices such as magnetic tape drives, disk drives, data links, video display units, and printers.

A video display unit connected to the IOC is used as a component of a MAP workstation. The MAP workstation provides a user interface to the Meridian SuperNode system.

Cabinet concept

The Meridian SuperNode system cabinet structure consists of basic hardware switching modules mounted in 6-ft (1.8-m) gray or brown cabinets.

Modular design

Modular design techniques are used in the development of both the software and hardware. Modularity can be thought of as the implementation of a complex system through a set of functional units or modules connected by well-defined interfaces. As a result of proper module and interface design, the various units can be connected, disconnected, modified, or improved without affecting either the operation of the other modules in the system or the system as a whole.

This modularity gives the system flexibility in physical layout and function, in providing special features, and in system expansion. The cabinetized Meridian SuperNode system can be adapted to specific customer line, trunk, and service circuit requirements through additional engineering.

Advantages of the cabinet

The cabinetized Meridian SuperNode system offers these benefits:

- provides pre-cabled, factory-assembled, and tested cabinets; thus, reducing on-site installation or commissioning intervals
- provides a modular system that easily expands and accommodates variations in system size and feature choices and allows integration of future system enhancements
- eliminates the need for additional external earthquake bracing by using prebraced steel cabinets
- presents a modern, computer-style appearance, ideally suited for computer rooms having raised flooring and low, suspended ceilings
- shortens delivery time
- simplifies system expansions

For details of the general functionality of the Meridian SuperNode system, see section 2.

SuperNode SE system

Although the SuperNode SE system is based on SuperNode technology having the same three components (core, bus, and link), there are important hardware differences:

- The SuperNode SE system is a “compact" SuperNode system. The two MS shelves are combined into a single shelf, and the CM and SLM shelves are also combined into a single shelf. The cabinet containing these modules is known as the SuperNode combined core (SCC) cabinet. This scaled-down version of the SuperNode system provides all the existing applications of the SuperNode and supports all SuperNode software features at a reduced call processing capacity.
- The SuperNode SE system is equipped with a network shelf housing two enhanced network (ENET) planes.
- The SuperNode SE system can be equipped with up to 14 built-in application specific units (ASUs) for common channel signaling no. 7 (CCS7) and DMS packet handler capabilities.

2 General functions

The Meridian SuperNode system consists of the functional areas illustrated and described in this section, including the following:

- SuperNode and SuperNode SE system functionality
- network modules
- peripheral modules
- maintenance and administration area

The main functional areas of the Meridian SuperNode system are connected by links carrying speech samples and control messages in the form of serial digital data. Each link provides a 2-way (4-wire) transmission path for 32 channels of time division multiplexed (TDM) data.

The speech links have 30 channels for transmission of Pulse Code Modulation (PCM) speech samples and two channels for control messages. The message links have all 32 channels assigned exclusively to control messages.

SuperNode and SuperNode SE system functionality

Both the full-sized SuperNode and the SuperNode SE systems consist of two hardware elements (core and bus) and one software element (link), as illustrated in Figure "Functional areas of the Meridian SuperNode system (one of duplicated planes)" on page 2-3 and Figure "Functional areas of the Meridian SuperNode SE system with internal 16K ENET and optional LIUs (one of duplicated planes)" on page 2-4, and described in the following paragraphs.

The SuperNode and SuperNode SE components are duplicated for reliability and operate as synchronized pairs. One plane is in-service (active) and performs call processing and other operations. The other plane (standby) performs the same operations, but checks for variations between itself and the active plane. Any difference between the two planes results in a maintenance interruption and a recovery action.

Duplication is omitted in the illustrations for clarity.

Core functions

Each plane of the core consists of the following:

- computing module (CM)
- system memory
- system load module (SLM)

- call management processor
- message switch (MS) interfaces

The core performs the call processing function, system management, system sanity checking, maintenance, and loading and downloading of programs.

The core interacts with other components of the Meridian SuperNode system through the MS bus, which supports multiple application modules.

Bus functions

The MS bus supplies system messaging, allowing system peripherals and processors connected to the MS bus ports to communicate freely with one another.

The MS bus consists of the following:

- processor bus
- transaction bus
- control processor with supporting memory
- mapper
- processor transaction bus interface
- system clock
- port interface units

Link functions

The link (not shown in Figure "Functional areas of the Meridian SuperNode system (one of duplicated planes)" on page 2-3) is the software and protocol structure used on signaling links for SuperNode and SuperNode SE applications that interface with the telecommunications network. The link enables the networking of SuperNode systems, SuperNode SE systems, and interfaces for customer programming applications.

The link delivers a range of network signaling services based on the public standards.

Figure 2-1 Functional areas of the Meridian SuperNode system (one of duplicated planes)

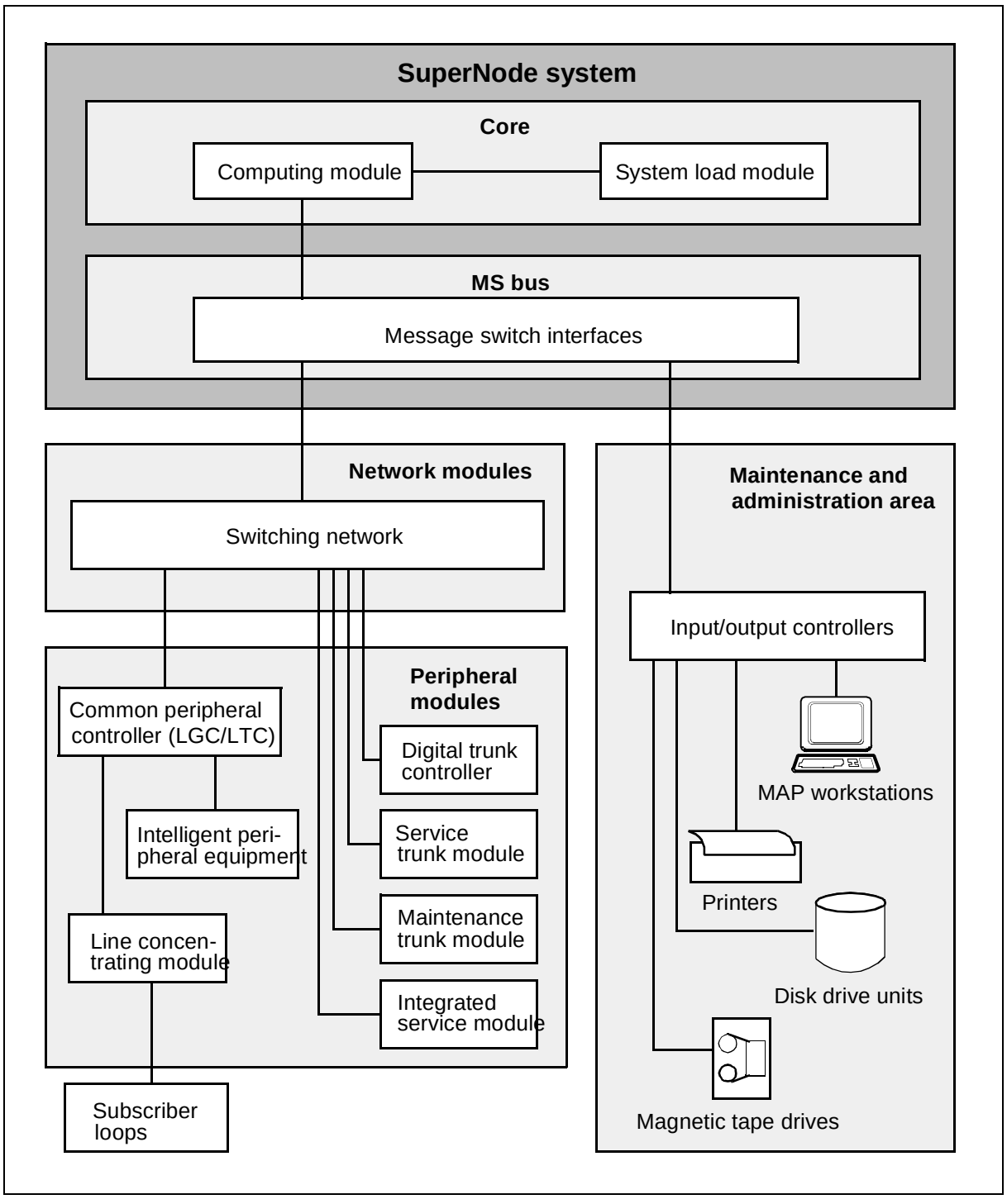
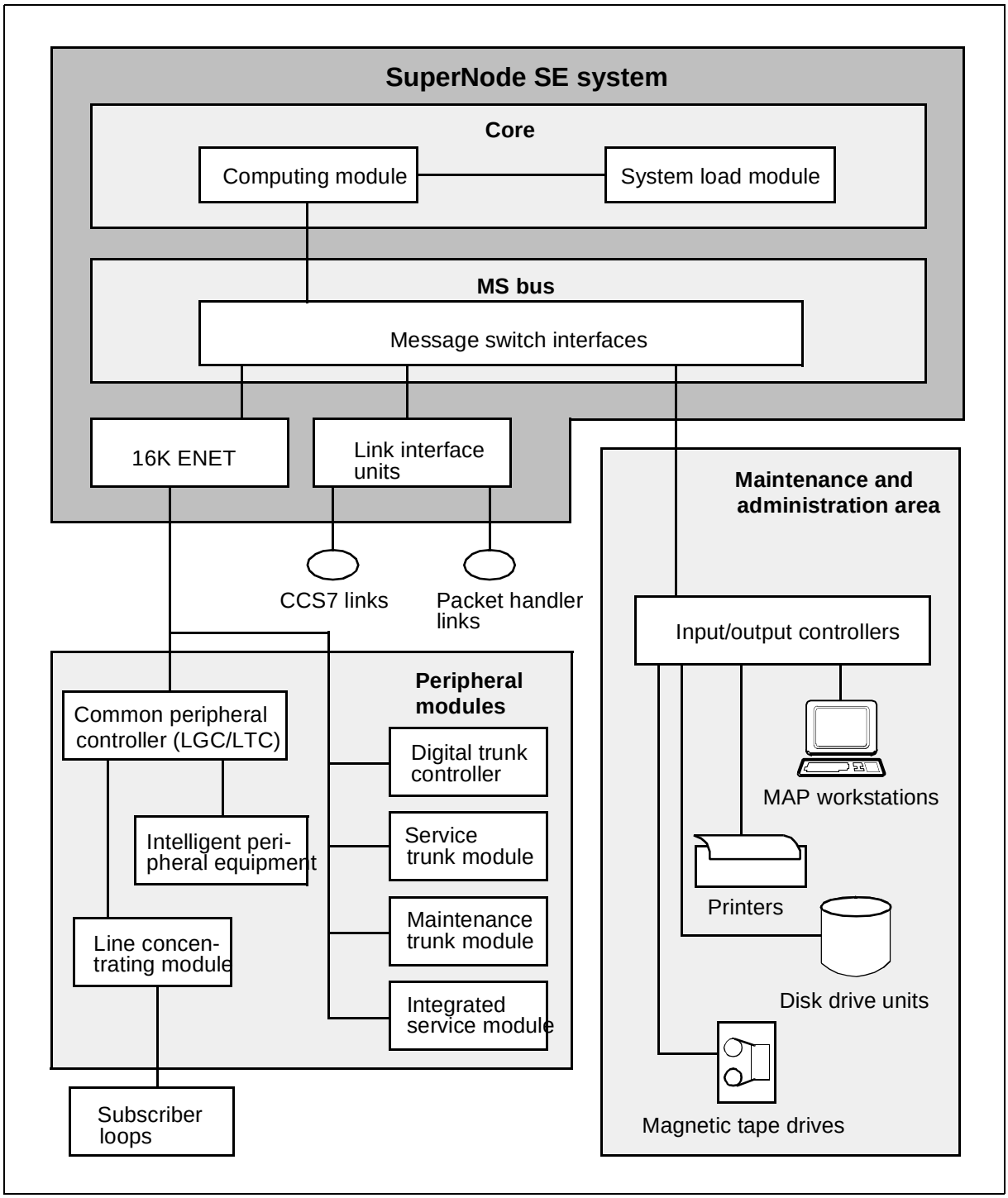


Figure 2-2 Functional areas of the Meridian SuperNode SE system with internal 16K ENET and optional LIUs (one of duplicated planes)



Protocol sets within the link include the CCS7 set for the following:

- transaction and trunk signaling
- ISDN access
- network operations protocols
- X.25 packet communications

The link also supports DMS packet handler, which provides national ISDN-1 compliant packet service. DMS packet handler signaling includes the following:

- X.25 and X.75/X.75' protocols for packet processing
- ISDN Basic Rate Interface (BRI) access

Network modules

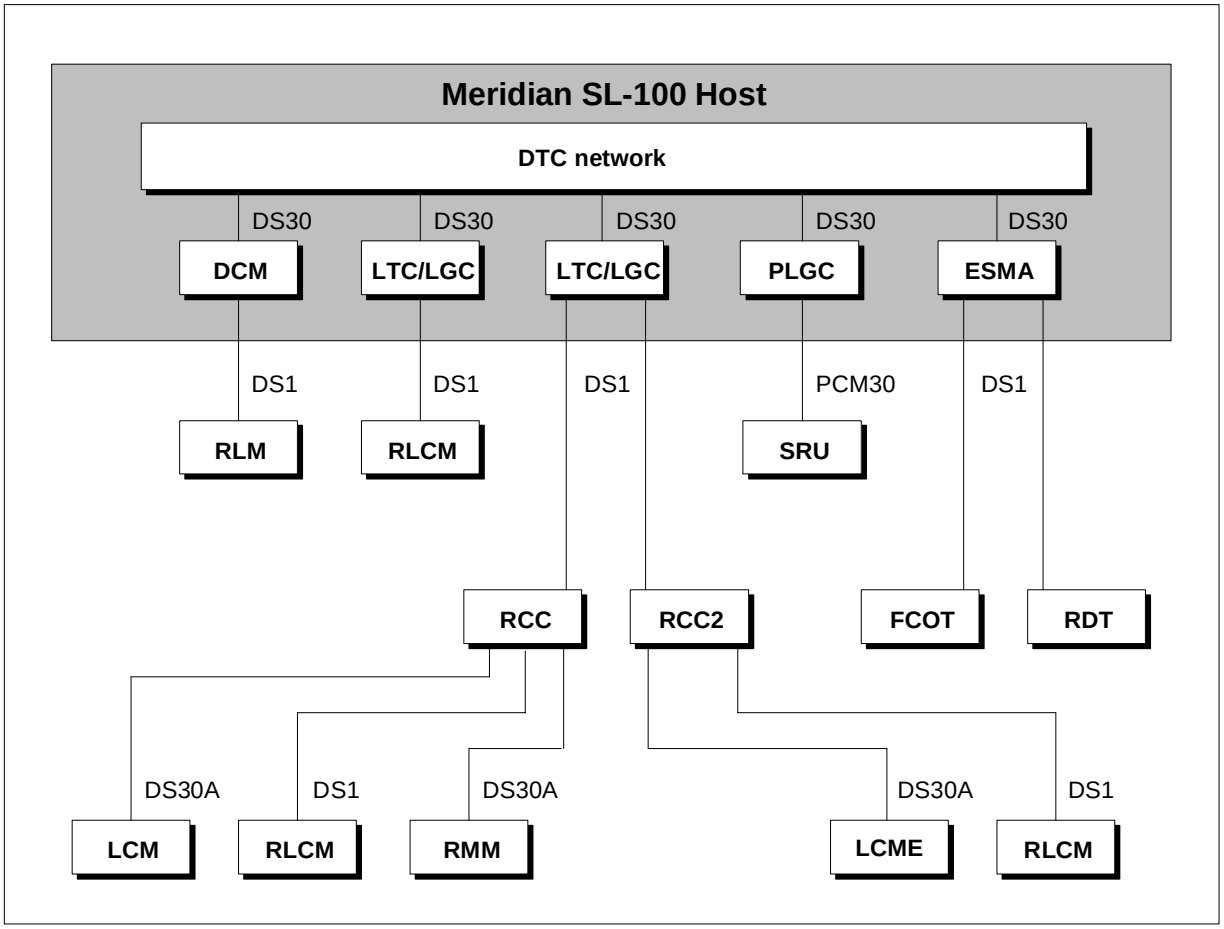
The network module (NM) is one of the main functional components of the Meridian SuperNode system that connects to the MS bus. Figure "Functional areas of the Meridian SL-100 network module" on page 2-6 is an illustration of the NM and Figure "Functional areas of the Meridian SL-100 network module (ENET)" on page 2-7 is an illustration of the NM using the enhanced network (ENET).

The NMs are duplicated as two parallel sets (plane 0 and plane 1) of the two-way transmission paths for each connected channel between the peripheral modules (PMs). The duplicated parallel paths ensure that if one channel in a transmission path fails, the alternate channel is immediately available. Meanwhile, recovery action is taken to restore the failed channel.

Two types of networks are supported: junctored network (JNET) and enhanced network.

- JNET is a multi-stage time switching network with junctors connecting the receiving and transmitting sides of the PMs. JNET hardware is housed in the Meridian Cabinet Network Module (MCNM).
- ENET is a non-blocking, junctorless, single-stage time switch that is compatible with all Meridian SL-100 PMs. ENET is a replacement for JNET, therefore, the two networks cannot coexist in the same system. ENET hardware is either housed in an external ENET cabinet (for SuperNode systems) or a single ENET shelf located in the SuperNode SE cabinet. ENET is provisioned with new SuperNode systems and all SuperNode SE systems.

Figure 2-3 Functional areas of the Meridian SL-100 network module



Junctored network

Multi-stage time switching

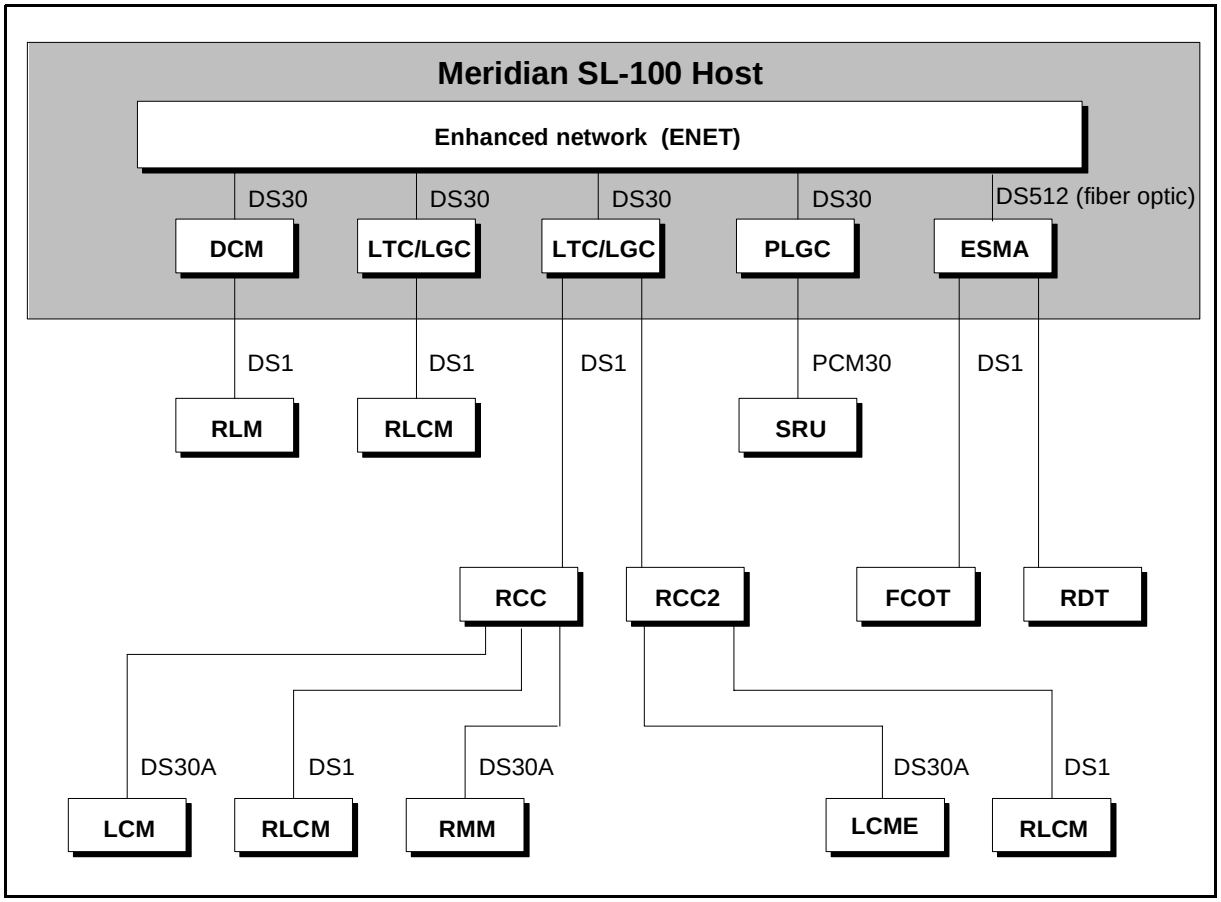
The junctored network employs four stages of time switching for each voice connection between the originating PM and the terminating PM. The paths for each connection through the network are controlled by the central processing unit (CPU). The network also distributes the control messages to and from the PM and the CPU.

Each NM has two sides:

- receive side A (incoming paths from the PM)
- transmit side B (outgoing paths to the PM)

The separate receive and transmit paths give the network a 4-wire characteristic.

Figure 2-4 Functional areas of the Meridian SL-100 network module (ENET)



Each of the two sides of an NM is involved in two stages of time switching:

- stage 1—incoming crosspoint time switch
- stage 2—outgoing crosspoint time switch

Each time switch (TS) has 16 ports (0 to 15). Each port handles 32 channels (30 voice and 2 message) between the NM and PM. Each side of an NM contains four first-stage time switches and four second-stage time switches. The full capability of an NM is 1920 (30×64) voice channels and 128 (2×64) message channels and is determined as follows:

- number of channels per port equals 32 (30 voice and 2 message)
- number of ports per time switch equals 16
- number of time switches per side equals 8 (4 in stage 1, and 4 in stage 2)
- total number of ports per side equals 64 incoming and outgoing (4 16)
- total number of channels per time switch equals 512 (16 32)
- total number of channels per side equals 2048 ([32 64] or [512 4])

Because each side of an NM performs two stages of time switching, the four stages of switching through the network are accomplished by connecting the outgoing ports of the second stage time switch in the receiving side of an NM to the incoming port of the first stage time switch in the transmitting side of the same or another NM. The connections between the receiving and transmitting sides are called “junctors."

Network message controllers

Each network module contains a network message controller (NMC) that exchanges messages with the CM and the peripheral module through the MS bus.

Inputs to the NMC from the SuperNode CM can be in the form of commands to locate appropriate paths through the network, to establish or release network connections, or to send a maintenance code.

Path selection is done by software in the SuperNode CM based on a network map kept in the data store. If the network map in the data store is lost, the map can be reconstructed from information stored in the NMC.

Enhanced network

The enhanced network is the new generation of switching networks that replaces the junctored network modules. It is a non-blocking, junctorless, single-stage time switch that can expand its capacity from 4k to 128k unidirectional channels. ENET is compatible with all Meridian SL-100 PMs, including the fiberized Series II PMs.

ENET is available in a 64 kbyte single-cabinet or 128 kbyte dual-cabinet configuration with four shelves per cabinet. The ENET cabinet uses the same hardware, power, electromagnetic interference, and cooling design as the DMS SuperNode cabinet.

Each ENET shelf is composed of the following functional systems, which are described in subsequent paragraphs:

- processor and memory
- clock and messaging
- crosspoint
- transmission and interface
- power

Processor and memory system

The processor and memory system provides operational and diagnostic control for the ENET shelf. The CPU card includes 4MByte of RAM, which holds the

operating software of the ENET. It also contains 128 kbytes of ROM firmware for bootloading and initialization procedures.

Clock and messaging system

The clock and messaging system consists of the clock and message card, which provides input/output control and the clock source for the ENET shelf. It also contains a DS512 fiber interface paddle board, which provides channelized fiber links to the DMS-bus for messaging. One of the links provides the clock source for synchronization with the DMS-bus.

Crosspoint system

The crosspoint system consists of cards that form the switching matrix. The cards are connected to the other cards on the same shelf as well as cards on other shelves in the ENET cabinet.

Transmission and interface system

The transmission and interface system consists of the transmit and receive interfaces between the PMs and the crosspoint cards of the ENET. The interfaces supported are fiber (DS512) and copper (DS30) speech links. Series I PMs connect to the ENET through existing copper links, and Series II PMs connect to the ENET using DS512 fiber links.

Power system

The power is provided by two +5V-, 80-A power converters and two -5V-, 20-A power converters. One of each type is located at each end of an ENET shelf and provides power for one half of the shelf.

Peripheral modules

Peripheral modules (PMs) are microprocessor-controlled units that connect to the network modules. Each peripheral module has a peripheral processor (PP) function that performs local processing and controls the flow of messages between itself and the CM. This independent action by the peripheral processor relieves the CM of routine local processing, which enables the CM to concentrate on higher-level activities. Figure "Meridian SuperNode peripheral and network module functional areas" on page 2-11 illustrates the DMS SuperNode peripheral modules as they relate to system network modules.

PMs are responsible for the following functions:

- scanning the lines in the modules for changes of circuit state
- performing timing functions for call processing
- collecting and storing digits
- generating digital tones

- sending and receiving signaling and control information to and from the CM
- checking the integrity of established voice or data paths through the network
- digital recorded announcement machine (DRAM) or enhanced DRAM (EDRAM)
- conference circuits

Peripheral modules are categorized as Series I, Series II, or Series III peripherals. The following paragraphs define and list the three types of Meridian SuperNode system peripheral modules.

Series I peripherals

Series I peripherals are also called trunk module-type (TM-type) PMs. Series I peripherals have only one processor.

The following is a list of Series I peripherals.

- maintenance trunk module (MTM)
- service trunk module (STM)
- intelligent peripheral equipment (IPE)

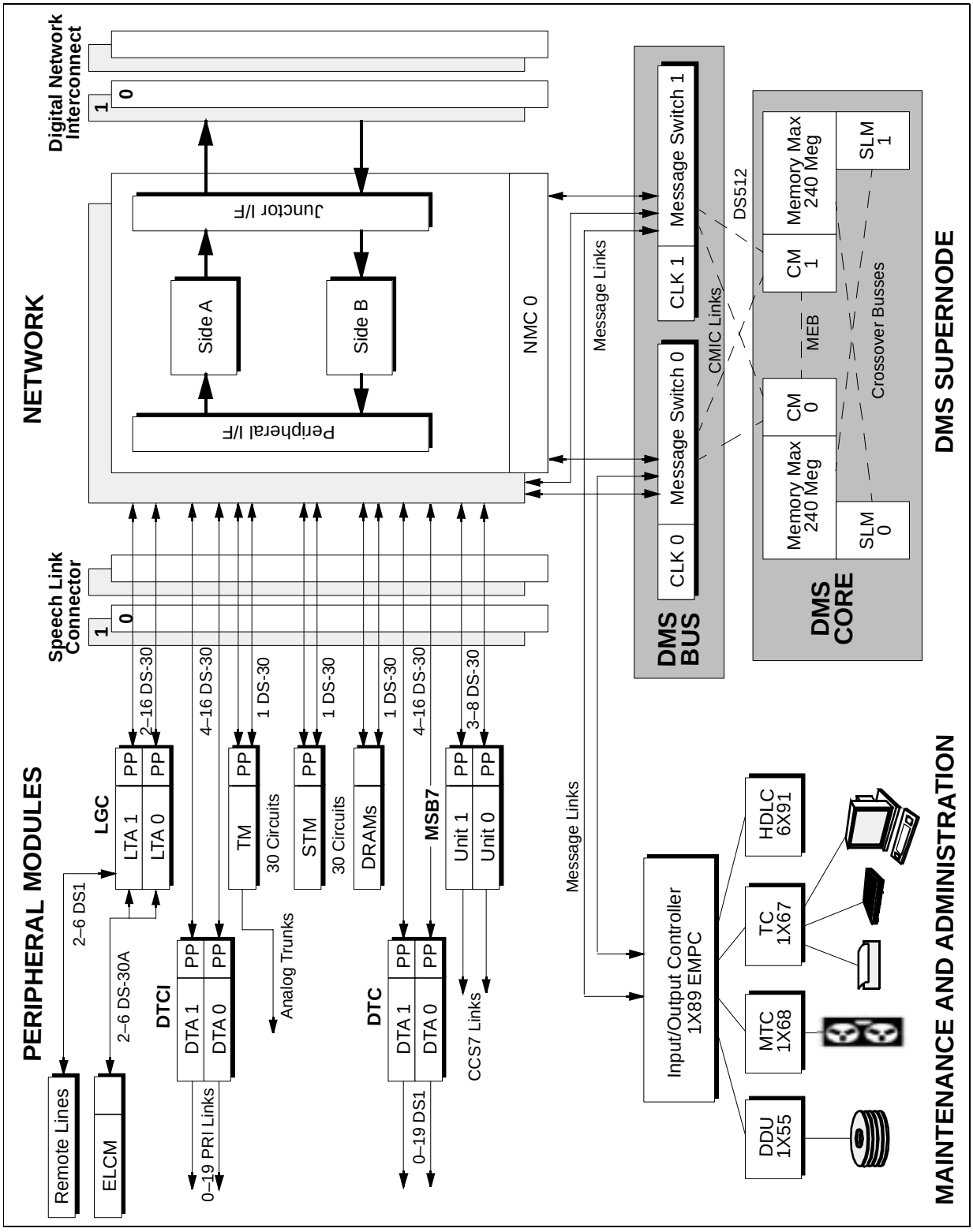
Series II peripherals

Series II peripherals ars also called XMS-based PMs (XPMs). Series II peripherals have two processors and two separate operating units.

The following is a list of Series II peripherals.

- digital trunk controller (DTC, DTC-I)
- enhanced line concentrating module (ELCM, LCM-E)
- digital line module (DLM)
- line group controller (LGC1)
- line trunk controller (LTC1)
- remote cluster controller (RCC, RCC2)
- subscriber carrier module-100 access (SMA, ESMA)

Figure 5 Meridian SuperNode peripheral and network module functional areas



Series III peripherals

Series III peripherals are known as link peripheral processor-based (LPP-based) peripherals. Series III peripherals include modules for the link peripheral processor (LPP) and the SuperNode combined core (SCC).

The following is a list of Series III peripherals.

- channel frame processor (CFP)
- Ethernet interface unit (EIU)
- frame relay interface unit (FRIU)
- link interface module (LIM)
- link interface unit for SS7 (LIU7)
- network interface unit (NIU)
- X.25-X.75 line interface unit (XLIU)

Maintenance and administration

The maintenance and administration area is one of the main functional components of the Meridian SuperNode system that connects to the MS bus. This area contains the input/output controllers (IOCs) that provide the interfaces with MAP workstations, printers, disk drives, and tape drives.

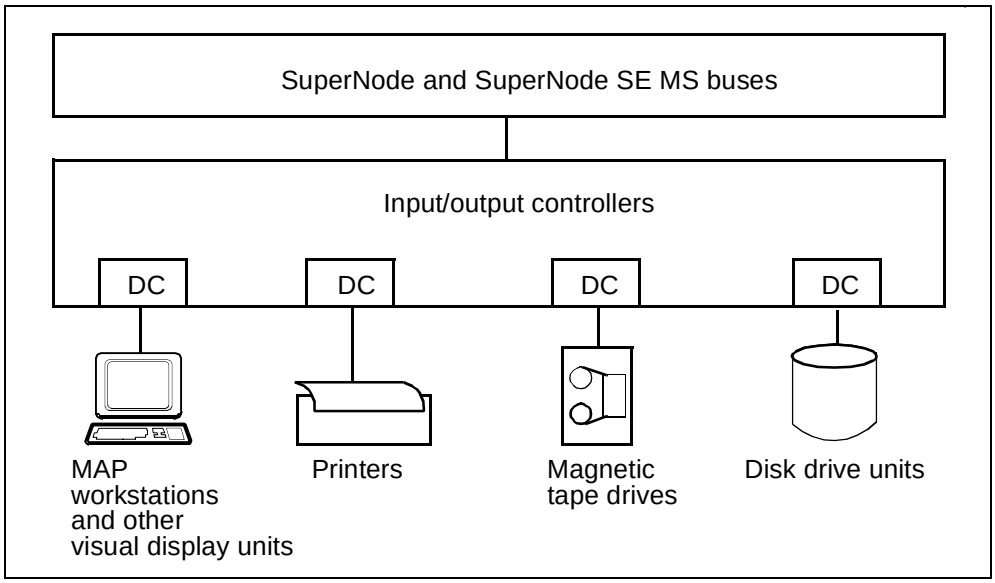
Input/output controllers

The IOCs provide an interface between the various input/output devices used for maintenance and administration purposes and the messaging component (the SuperNode and SuperNode SE MS buses). The IOCs contain device controllers (DC) to communicate with the input/output devices.

The following maintenance and administration input/output devices are common to most Meridian Supernode systems. These devices are shown in Figure "Maintenance and administration area" on page 2-13.

- MAP workstations, including the enhanced MAP (EMAP) workstation and other visual display units
- printers
- magnetic tape drives
- disk drive units
- enhanced multiprotocol controller (NT1X89BB)

Figure 2-6 Maintenance and administration area



Input/output devices subsystem

Access to the Meridian SuperNode system for maintenance and administration is provided by the input/output devices (IOD) subsystem. The IOD subsystem monitors the IOCs.

The IOD subsystem consists of hardware and software packages as follows:

- The IOD hardware includes the input and display devices. Using these, the maintenance personnel can communicate with the Meridian SuperNode system.
- The IOD software implements the commands given to the input device and provides responses to the user through the display device.

The following information describes typical input/output devices.

MAP workstation

The standard input/output terminal device is the MAP workstation. The MAP workstation consists of a visual display unit with a keyboard, a telephone set, and a jack field.

Recording devices

Also controlled by the IOD subsystem are recording devices, such as disk drives and magnetic tape drives. Data is directed to or retrieved from the recording devices automatically through software control or manually in response to commands from the input devices.

Other standard test equipment

Other standard test equipment consists of a printer, an incoming 101 test trunk or line, an outgoing communication trunk, and at least one headset circuit for monitoring and recording purposes.

Note: Section 7 provides details on Meridian SuperNode maintenance, line maintenance, trunk maintenance, administration subsystems, the access control system, and emergency assistance.

3 Cabinet modular hardware

Cabinet update

Many of the Meridian cabinets are manufacture discontinued (MD) to streamline the product line. There are also a couple of Meridian cabinets that have reached the end of life. All of the cabinets that are manufacture discontinued, or have reached the end of life, have replacements. There are cabinets being introduced for the Meridian SL-100 in the release MSL10 timeframe.

The table that follows provides a list of the MD and end of life cabinets and their replacements, and the cabinets being introduced in releases MSL10 and MSL11.

Table 3-1 Meridian cabinets update (Sheet 1 of 3)

Cabinet name	Manufacture discontinued	End of life	New	Replacement
Meridian Cabinet CCS7 Module (MC7M)		X (as of release MSL07)		Fiber Link Interface Shelf (FLIS) or Link Peripheral Processor (LLP)
Meridian Cabinet Digital Remote (MCDR)		X (as of release MSL09)		Meridian Cabinet Remote Unit (MCRU)
Meridian Cabinet Digital Module (MCDM)	X			Intelligent Peripheral Equipment Column (IPEC)
Meridian Cabinet Network Manager (MCNM)	X			Enhanced Network (ENET)
Meridian Power Distribution Cabinet (MPDC)	X			Cabinetized Power Distribution Center (CPDC)
Meridian Cabinet Peripheral Maintenance (MCPM)	X			Meridian Cabinet Auxiliary Module phase 3 (MCAM3)

Note: Manufacture discontinued means the product is no longer being manufactured or sold. It is, however, supported by technical assistance service (TAS) and repair and return. End of life means it is no longer manufactured, sold, or supported.

Table 3-1 Meridian cabinets update (Sheet 2 of 3)

Cabinet name	Manufacture discontinued	End of life	New	Replacement
Meridian Cabinet Services Module (MCSM)	X			Meridian Cabinet Auxiliary Module phase 3 (MCAM3) or Cabinetized Integrated Services Module (CISM)
Meridian Cabinet General Module (MCGM)	X			Meridian Cabinet Auxiliary Module phase 3 (MCAM3) or Cabinetized Integrated Services Module (CISM)
Meridian Cabinet Spares Storage (MCSS)	X			Cabinetized Miscellaneous Spares Storage (CMSS)
Meridian Cabinet Remote Module (MCRM)	X			Meridian Cabinet Remote Unit (MCRU)
Cabinetized International Peripheral Equipment (CIPE)			X (as of MSL10)	
Cabinetized Integrated Services Module (CISM)			X (as of MSL10)	
Spectrum Peripheral Module (SPM)			X (as of MSL10)	
Cabinetized Power Distribution Center (CPDC)			X (as of MSL10)	
Cabinetized Miscellaneous Spares Storage (CMSS)			X (as of MSL10)	

Note: Manufacture discontinued means the product is no longer being manufactured or sold. It is, however, supported by technical assistance service (TAS) and repair and return. End of life means it is no longer manufactured, sold, or supported.

Table 3-1 Meridian cabinets update (Sheet 3 of 3)

Cabinet name	Manufacture discontinued	End of life	New	Replacement
Fiber Link Interface Shelf (FLIS)			X (as of MSL10)	
Meridian Cabinet Network Interface (MCNI)			X (as of MSL11)	

Note: Manufacture discontinued means the product is no longer being manufactured or sold. It is, however, supported by technical assistance service (TAS) and repair and return. End of life means it is no longer manufactured, sold, or supported.

The first part of this section describes Meridian SuperNode system cabinets. The cabinet descriptions include the following information:

- cabinet hardware dimensions
- exterior and interior design
- cabling
- earthquake resistance
- thermal efficiency

The next part of this section describes site-level power and grounding. The power and grounding descriptions include the following information:

- system grounding requirements
- power plant configuration diagram
- personal hazard diagram
- system grounding with signal ground (logic ground) diagram
- grounding communication links

The last part of this section provides overviews of all Meridian SuperNode system cabinet modules. The overviews include the following cabinets:

- SuperNode cabinet module (DPCC)
- SuperNode SE cabinet module (SCC)
- network cabinet module (MCNM)
- enhanced network cabinet module (ENET)
- trunk cabinet modules (MCTM-I, CIPE, SPM)
- network interface module (MCNI)

- line cabinet modules (MCLM, MCLM-E, MCDM, IPEC)
- peripheral modules (LPP, FLIS)
- cabinetized multi-vendor interface (CMVI)
- maintenance and administration cabinet modules (MCPM, MCAM3, MCGM, MCSS, CMSS, MPDC, CPDC, CISM)

The remainder of this section includes descriptions and illustrations of each cabinet module component.

Note: For detailed information on IPECs, refer to the *Intelligent Peripheral Equipment (IPE) Reference Manual*.

Cabinet descriptions

Unified steel cabinets replace the open-rack frame for housing switching equipment. The cabinets are designed to be compatible with future technology and capable of upgrading with system enhancements, such as the SuperNode and SuperNode SE products.

Cabinet dimensions

The exterior dimensions and maximum weights of Meridian SuperNode cabinets and IPE columns are shown in the following table.

Table 3-2 Cabinet and column dimensions (Sheet 1 of 3)

Cabinet or column	Height	Width	Depth	Weight
CIPE	72 in	28.5 in	28 in	350 lb
	180 cm	72.4 cm	71.1 cm	158.8 kg
CISM	72 in	28.5 in	28 in	643 lb
	180 cm	72.4 cm	71.1 cm	291.7 kg
CMSS	72 in	28.5 in	28 in	514 lb
	180 cm	72.4 cm	71.1 cm	233.1 kg
CMVI	72 in	28.5 in	28 in	370 lb
	180 cm	72.4cm	71.1 cm	168.2 kg
CPDC	72 in	28.5 in	28 in	350 lb
	180 cm	72.4 cm	71.1 cm	158.8 kg
ENET	72 in	42 in	28 in	1600 lb
	180 cm	106.7 cm	71.1 cm	725.7 kg

Table 3-2 Cabinet and column dimensions (Sheet 2 of 3)

Cabinet or column	Height	Width	Depth	Weight
FLIS	72 in	42 in	28 in	1600 lb
	180 cm	106.7 cm	71.1 cm	727 kg
IPEC (with four IPE modules)	82 in	31.5 in	25.5 in	838 lb
	208.3 cm	80 cm	64.7 cm	380.1 kg
LPP	72 in	42 in	28 in	1600 lb
	180 cm	106.7 cm	71.1 cm	727 kg
MCAM3	72 in	28.5 in	28 in	643 lb
	180 cm	72.4 cm	71.1 cm	291.7 kg
MCDM	72 in	28.5 in	28 in	530 lb
	180 cm	72.4 cm	71.1 cm	240.4 kg
MCGM	72 in	28.5 in	28 in	400 lb
	180 cm	72.4 cm	71.1 cm	181.4 kg
MCLM	72 in	28.5 in	28 in	920 lb
	180 cm	72.4 cm	71.1 cm	417.3 kg
MCLM-E	72 in	28.5 in	28 in	920 lb
	180 cm	72.4 cm	71.1 cm	417.3 kg
MCNI	72 in	42 in	28 in	1800 lb
	180 cm	106.7 cm	71.1 cm	818 kg
MCNM	72 in	28.5 in	28 in	678 lb
	180 cm	72.4 cm	71.1 cm	307.5 kg
MCPM	72 in	28.5 in	28 in	646 lb
	180 cm	72.4 cm	71.1 cm	293 kg
MCSM	72 in	28.5 in	28 in	606 lb
	180 cm	72.4 cm	71.1 cm	274.9 kg
MCSS	72 in	28.5 in	28 in	514 lb

Table 3-2 Cabinet and column dimensions (Sheet 3 of 3)

Cabinet or column	Height	Width	Depth	Weight
	180 cm	72.4 cm	71.1 cm	233.1 kg
MCTM-I	72 in	28.5 in	28 in	710 lb
	180 cm	72.4 cm	71.1 cm	322 kg
MPDC	72 in	28.5 in	28 in	350 lb
	180 cm	72.4 cm	71.1 cm	158.8 kg
SPM	72 in	27 in	18 in	858 lb
	180 cm	67.5 cm	45 cm	386 kg
SuperNode DPCC	72 in	42 in	28 in	1600 lb
	180 cm	106.7 cm	71.1 cm	725.7 kg
SuperNode SE SCC	72 in	42 in	28 in	1600 lb
	180 cm	106.7 cm	71.1 cm	725.7 kg

Cabinet exterior design

The cabinet has two center-open doors on both front and rear. The doors are easily installed, removed for servicing, and replaced. A lock and catch assembly is located in the top cap of each door.

The doors and end covers of the cabinet are Meridian product light gray. The cabinet frame is dark gray.

To accommodate raised computer flooring, the base of the cabinet depth fits standard North American and European raised floor tiles. A recessed area in the front at the base of the cabinet serves as an air intake for the cooling unit. Another air inlet is located at the rear of the cabinet, but is not recessed.

It is not necessary to bolt the cabinets to the floor, except in earthquake risk areas.

Cabinet interior design

Four standard 24-in. (61cm) width equipment shelves can be mounted inside the standard 28-in. cabinet.

Four equipment shelves can be mounted inside the standard 42-in. SuperNode DPCC and SuperNode SE SCC cabinets. The 42-in. cabinet is also used for ENET and LPP modules.

A frame supervisory panel (FSP) or modular supervisory panel (MSP) is located at the top of the cabinet.

In some cabinets, integral cooling fan units are located in the cabinet base. These units do not interfere with equipment mounting space.

Cabinet cabling

The cabinet packaging for Meridian SuperNode products permits either overhead or underfloor cabling. The figures on page 10 through page 12 in this section show examples of cabinet cabling schemes.

Where raised flooring is used, external cables are routed under the flooring, through an opening in the base of the cabinet below the rear bulkhead. Where raised flooring is not used, external cables are routed through the rear bulkhead opening at the top of the cabinet to cable racks (which are also used for routing between cabinet lineups).

Power and alarm cables run horizontally within cabinets in the same lineup. (Refer to Section 4 for details on lineup configurations.) Thus, the electromagnetic interference (EMI) shield is not broken, and the cables need not be routed through a shielded duct.

All cabinets meet the requirements of the Federal Communications Commission (FCC) Part 15 EMI compliance.

Earthquake resistance

Each steel cabinet is constructed of two single-piece side members joined to a specially reinforced base that provides resistance to earthquake vibration damage. Bolting two or more reinforced cabinets together improves earthquake resistance.

Among other things, the New Equipment Building Specifications (NEBS), Applied Technology Council (ATC), and Uniform Building Codes (UBC) establish seismic (earthquake) zoning.

Earthquake risk zones are considered to be ATC Zone 6 and 7, UBC Zone 4, and NEBS Zone 4. In these zones, a minimum of 3000 psi concrete strength at 5.5 in. of concrete thickness is required to meet the specifications of the cabinet floor anchors.

Assuming the building that houses the cabinets is not destroyed, damage resistance is provided against forces up to 150 percent of (NEBS) Zone 4 and ATC 3-06 specifications.

The cabinet also exceeds the NEBS tipping specification, therefore, the cabinet requires four bolts and anchors for fastening to a solid floor in earthquake risk

areas. In earthquake risk areas where raised flooring is used, a consulting engineer should supervise the installation of a suitable base structure.

Site level power and grounding

Meridian SuperNode systems are powered by an external, customer provided power plant. All Meridian SuperNode system installations require a -48 V power source. Meridian SuperNode systems use an isolated bonding network (IBN) but can share power plant facilities with common bonding network (CBN) equipment. Equipment lineups are individually grounded through the frame ground equalizer to a single point ground.

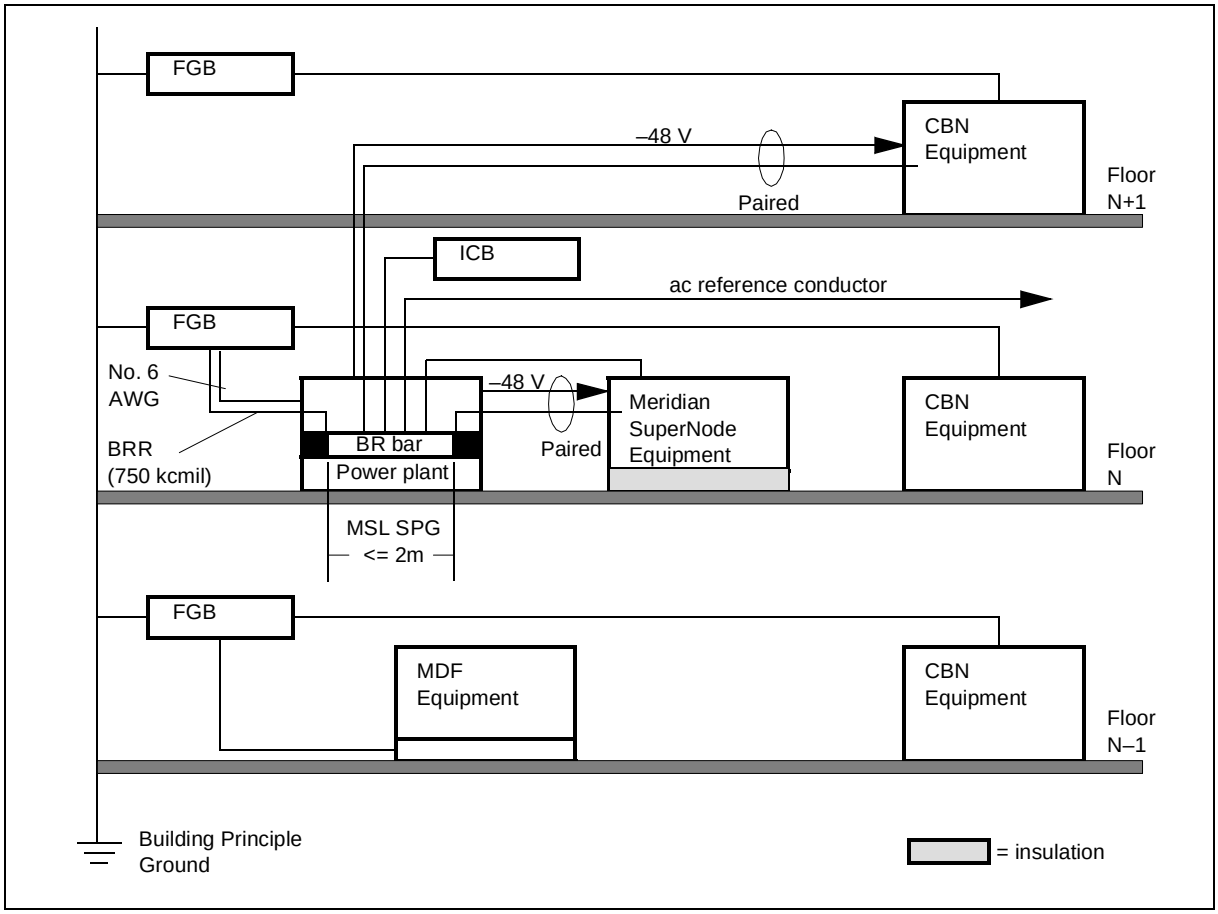
Power plant configuration

The operating range for Meridian SuperNode systems is -43.75 V to -55.8 V measured at the input terminals of Meridian Power Distribution Cabinets (MPDC) or Meridian Cabinet Auxiliary Modules (MCAM).

Power is usually supplied by a centralized power plant, which is shared with other systems or is dedicated. Terminal equipment, such as display terminals and printers, is considered to be an integral part of the Meridian SuperNode system and are powered by AC power.

The figure that follows shows the recommended method for positioning the power plant when equipment cannot be located on a single floor. The power plant, located on the middle floor, can accommodate equipment on up to three floors. This configuration is capable of supporting both IBN and CBN equipment and allows the power plant battery return to serve as the single point ground (SPG).

Figure 3-1 Power plant topology



System grounding and bonding

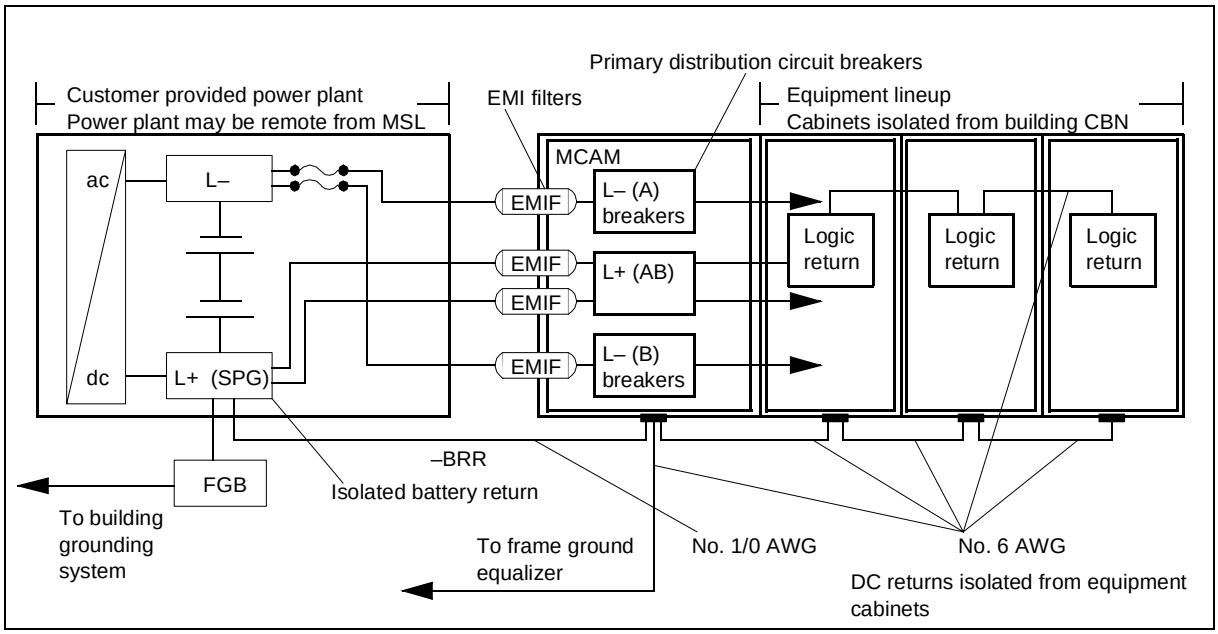
The figure that follows shows a typical configuration, grounding the system with all cabinets bonded together and connected to the building principle ground (BPG). This illustration shows the system connected to a single, building principle ground. The grounding design for the cabinets fully isolates all powered circuitry from the steel walls and shelves as well as from the floor and building structure.

The system, when configured as shown in the next figure, provides the following:

- All systems and subsystems maintain separate and isolated logic returns (LRs), battery returns (BRs), and frame grounds (FGs).
- All external I/O is shielded from external interference by EMI filters.
- All cabinets are connected at their frame ground studs.
- All LRs are daisy chained and referenced to the BR plate of the MPDC or MCAM3 in the lineup.

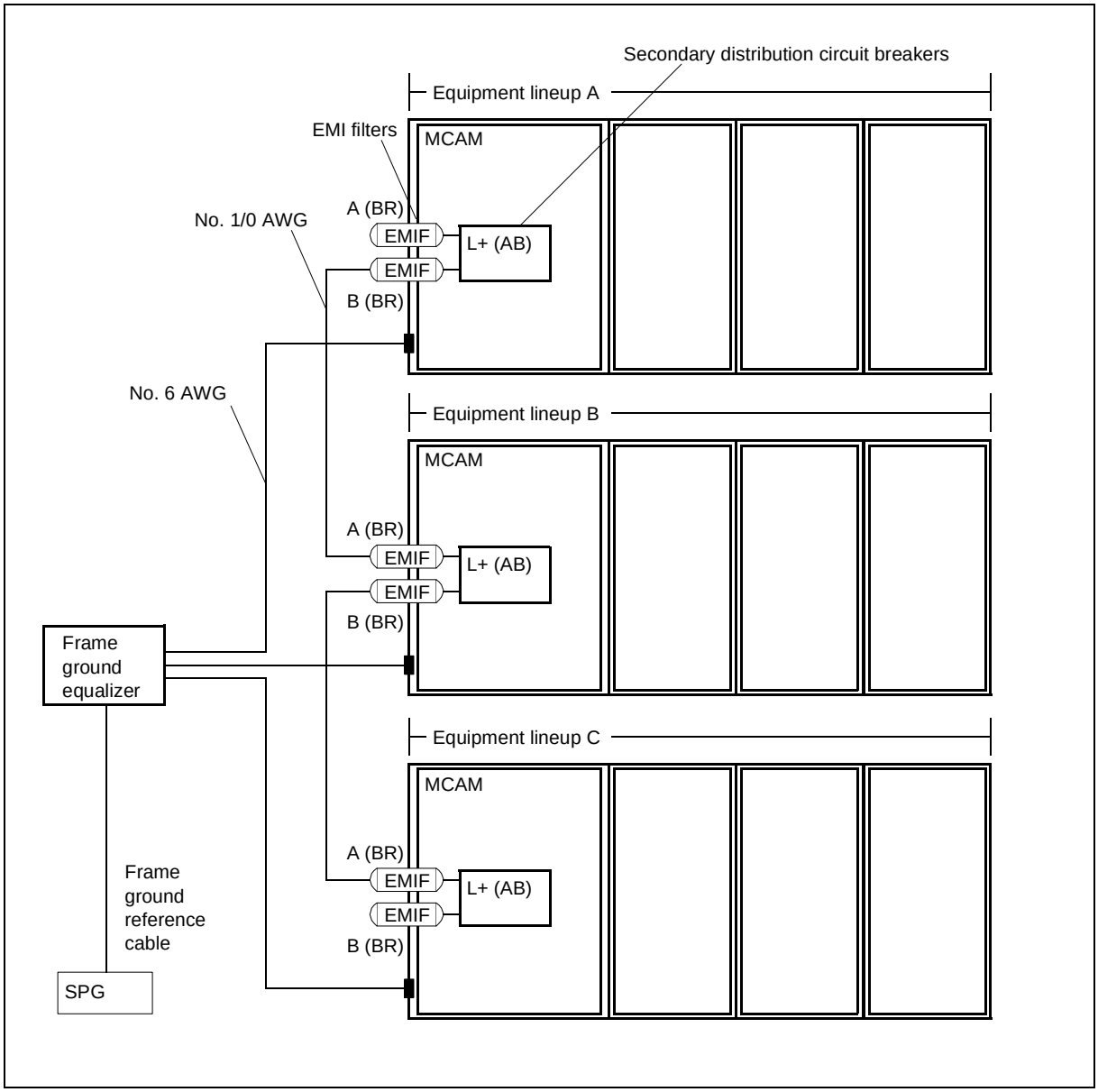
- Intra- and inter-system communication is dc-isolated.
- The lineups are physically isolated from the building using adequate insulation.

Figure 3-2 System grounding and bonding



The following figure shows the frame ground and battery return connections between lineups. The frame ground connections connect the frames of each lineup to the frame grounding reference, a single point ground. The battery return connections connect the A-feed battery return to the B-feed battery return in alternate lineups to ensure battery return equalization among lineups.

Figure 3-3 Frame ground and battery return connections

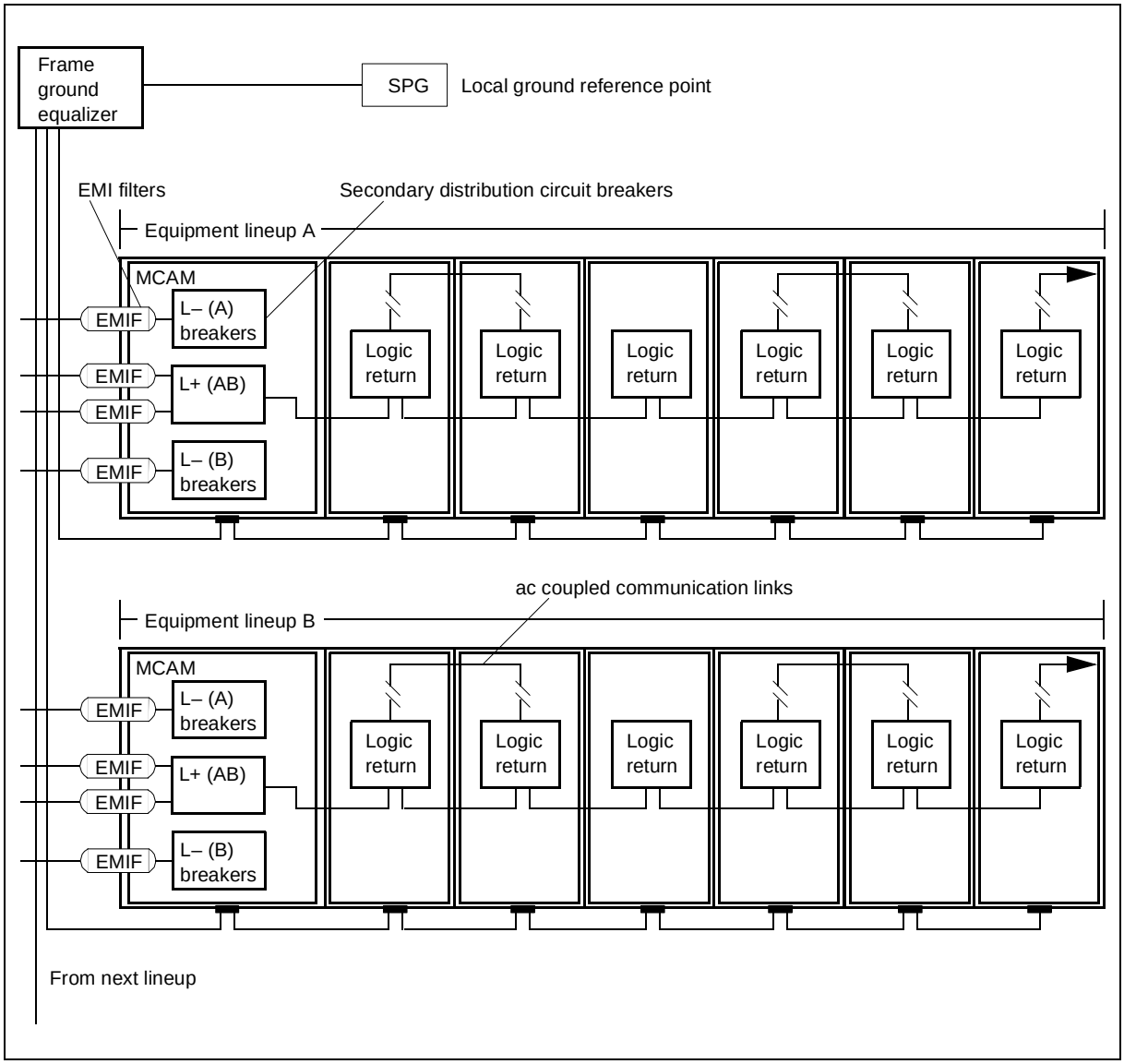


The figure that follows shows the grounding plan that provides each frame with an individual connection to the frame ground equalizer (FGE). The FGE is connected to the SPG with a single connection. In this grounding system, an individual ground cable is run from the SPG to the frame ground stud on the MCAM or MPDC in each lineup. Within the individual lineups, the ground cable is daisy chained from the MCAM or MPDC to each cabinet in the lineup.

The logic returns shown in the following figure are daisy chained together and connected to a single ground point in the MCAM or MPDC, which prevents ground loops and ensures proper reference levels between functionally

connected modules. Logic returns are isolated from frame grounds and from battery returns within individual cabinets. This grounding scheme virtually eliminates all system faults resulting from logic reference differentials (such as cut-offs, network integrity failures, and memory transients) by removing the effects of ground noise from the circuitry.

Figure 3-4 Star-IBN frame grounding configuration



Communication link grounding

The isolated bonding network must be protected from grounds associated with external communications links. The communications links must be isolated to address both operational concerns and safety concerns. Operational and safety concerns include signals that are referenced to different ground potentials,

which can cause signal errors and circuit damage, and metallic connections that allow contact between different ground potentials.

The four types of external communications links used with the Meridian SuperNode system are fiber optic links, EIA-232 links, shielded twisted pair links, and coaxial links. The Meridian SuperNode system supports all four types of links with the following constraints:

- Fiber optic links must have metallic components, such as metallic strengthening members, connected at both ends.
- EIA-232 must be isolated using back-to-back modems, opto-isolators, or an equivalent approved isolation device (except when it interfaces with an input/output module). EIA-232 cables should not extend beyond the immediate IBN area. Both synchronous and asynchronous EIA-232 links can be isolated using fiber optic modems.
- Shielded twisted pair signals must be transformer-coupled. EMI compliant links must bond the cable shield to the frame ground on the Meridian SuperNode system, to the transmission bonding bar (TBB) if extending beyond the IBN area, and at the end of the link. EMI noncompliant links (such as an Ethernet link) must bond the cable shield to the frame ground at the sending end of the link and must be open at the receiving end of the link.
- External coaxial links must be ac-coupled with the high voltage protection of the center conductor. (Transformer coupling is recommended.) The cable shield must be bonded to the IBN ground reference with a TBB and to the frame ground of the Meridian SuperNode system. The shield of internal coaxial links must not be referenced to the system logic return.

Workstation, printer, and modem power and grounding

External devices such as MAP workstations, printers, modems, and digital carrier trunk interfaces must be isolated from external grounding systems.

Workstations and printers, and modems located with a workstation or printer, must not be powered from an internal power source (embedded inverter). Workstations, printers, and colocated modems can be powered by a CBN source such as commercial ac, uninterruptible power source (UPS), external inverter derived ac, or another acceptable ac source.

MAP workstations and RITF terminals must not use dc-coupled communications links.

Overview of cabinet modules

Each cabinet contains a specific module providing special services. The Meridian SuperNode system can be configured to adapt to various customer

needs by designing a system lineup that combines the required cabinet modules.

Core modules

The network modules are

- SuperNode—Dual Plane Combined Core (DPCC)
- SuperNode SE—SuperNode Combined Core (SCC)

Network modules

The network modules are

- Meridian Cabinet Network Module (MCNM)
- Enhanced Network (ENET)
- Meridian Cabinet Network Interface (MCNI)

Peripheral modules

The peripheral modules are

- Trunk cabinets:
  - Meridian Cabinet Trunk Module-ISDN (MCTM-I)
  - Meridian Cabinet Service Module (MCSM)
  - Cabinetized Integrated Services Module (CISM)
- Line cabinets:
  - Meridian Cabinet Line Module (MCLM)
  - Meridian Cabinet Line Module-Enhanced (MCLM-E)
  - Meridian Cabinet Digital Module (MCDM)
  - Intelligent Peripheral Equipment Column (IPEC)
- Link Peripheral Processor (LPP)
- Spectrum Peripheral Module (SPM)
- Cabinetized International Peripheral Equipment (CIPE)
- Cabinetized Multi-Vendor Interface (CMVI)
- Meridian Cabinet Auxiliary Module phase 3 (MCAM3)
- Meridian Cabinet General Module (MCGM)

Note: The MCAM3 and MCGM are multipurpose cabinets that house both peripheral modules and maintenance and administration modules.

Maintenance and administration modules

The maintenance and administration modules are

- Meridian Cabinet Power Module (MCPM)
- Meridian Cabinet Auxiliary Module phase 3 (MCAM3)
- Meridian Cabinet General Module (MCGM)
- Meridian Cabinet Spares Storage (MCSS)
- Cabinetized Miscellaneous Spares Storage (CMSS)
- Meridian Power Distribution Center (MPDC)
- Cabinetized Power Distribution Center (CPDC)

Note: The MCAM3 and MCGM are multipurpose cabinets that house both peripheral modules and maintenance and administration modules.

Remote peripheral modules

The remote peripheral modules are

- Meridian Cabinet Remote Module (MCRM)

  Note: The MCRM is manufacture discontinued and replaced by the MCRU or the MCRM-S.

- Meridian Cabinet Remote Unit (MCRU)
- Meridian Power Remote Module-SONET (MCRM-S)

For a graphic overview of all cabinet modules, grouped as previously listed, see the tables on page 16 through page 21. For more illustrations and detailed information on IPECs, refer to the *Intelligent Peripheral Equipment (IPE) Reference Manual.*

Module descriptions follow the tables on page 16 through page 21 and are given in the order previously listed, rather than in the system lineup configuration order. (For system lineup details, see Section 4, “System configuration.")

Figure 3-5 Core and memory expansion cabinets

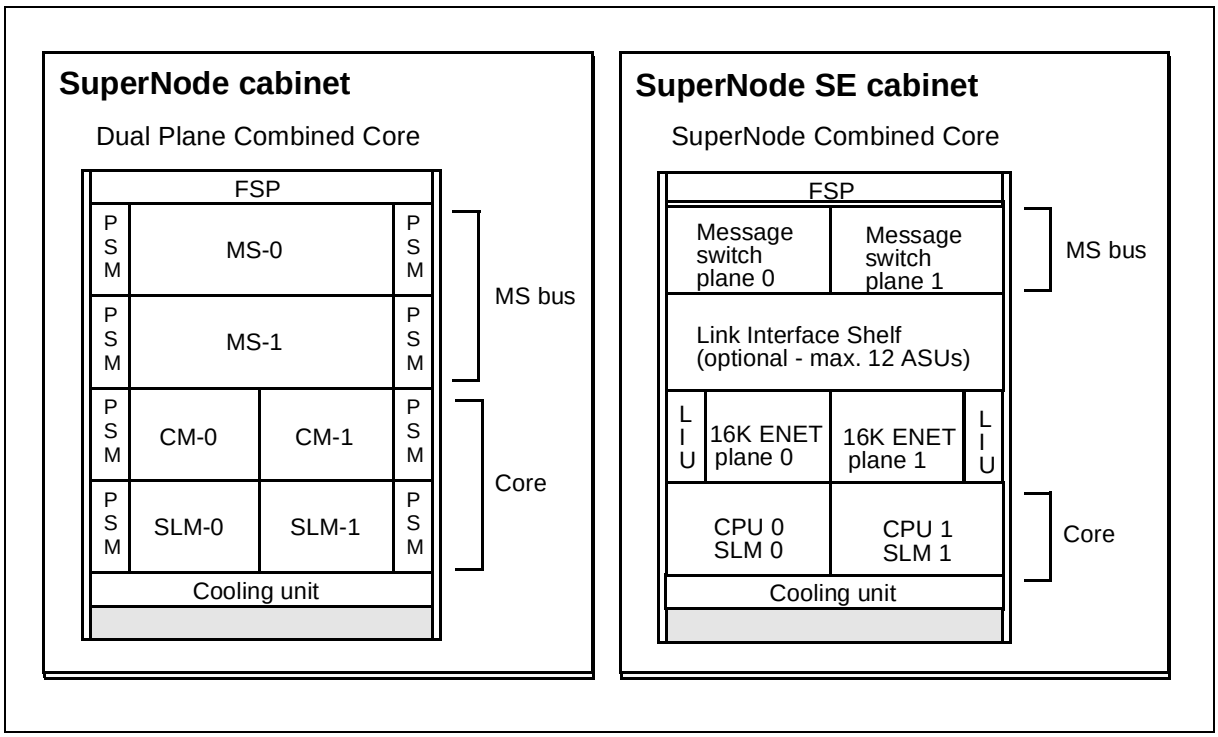


Figure 3-6 Peripheral cabinets

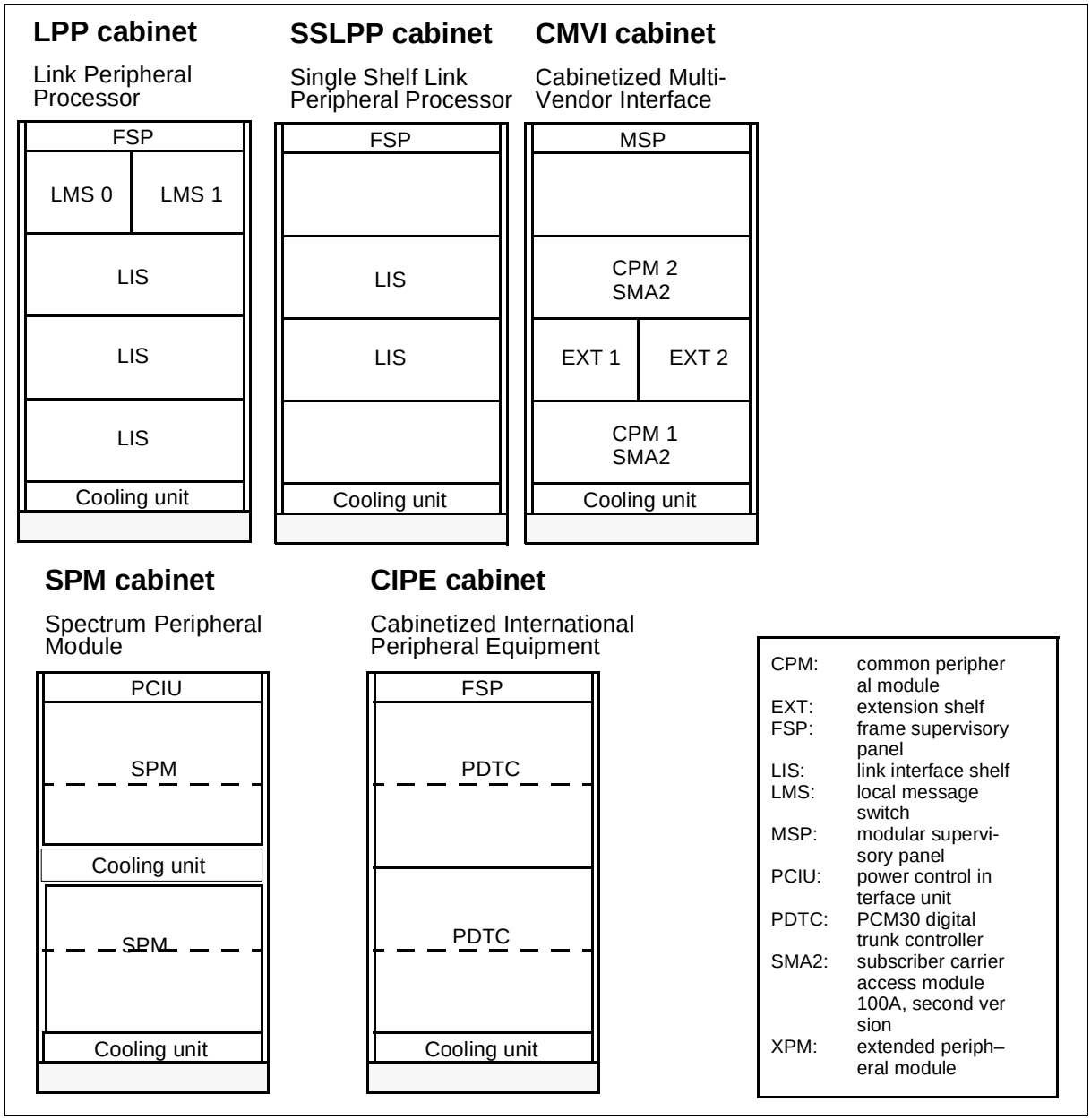


Figure 3-7 Trunk cabinets

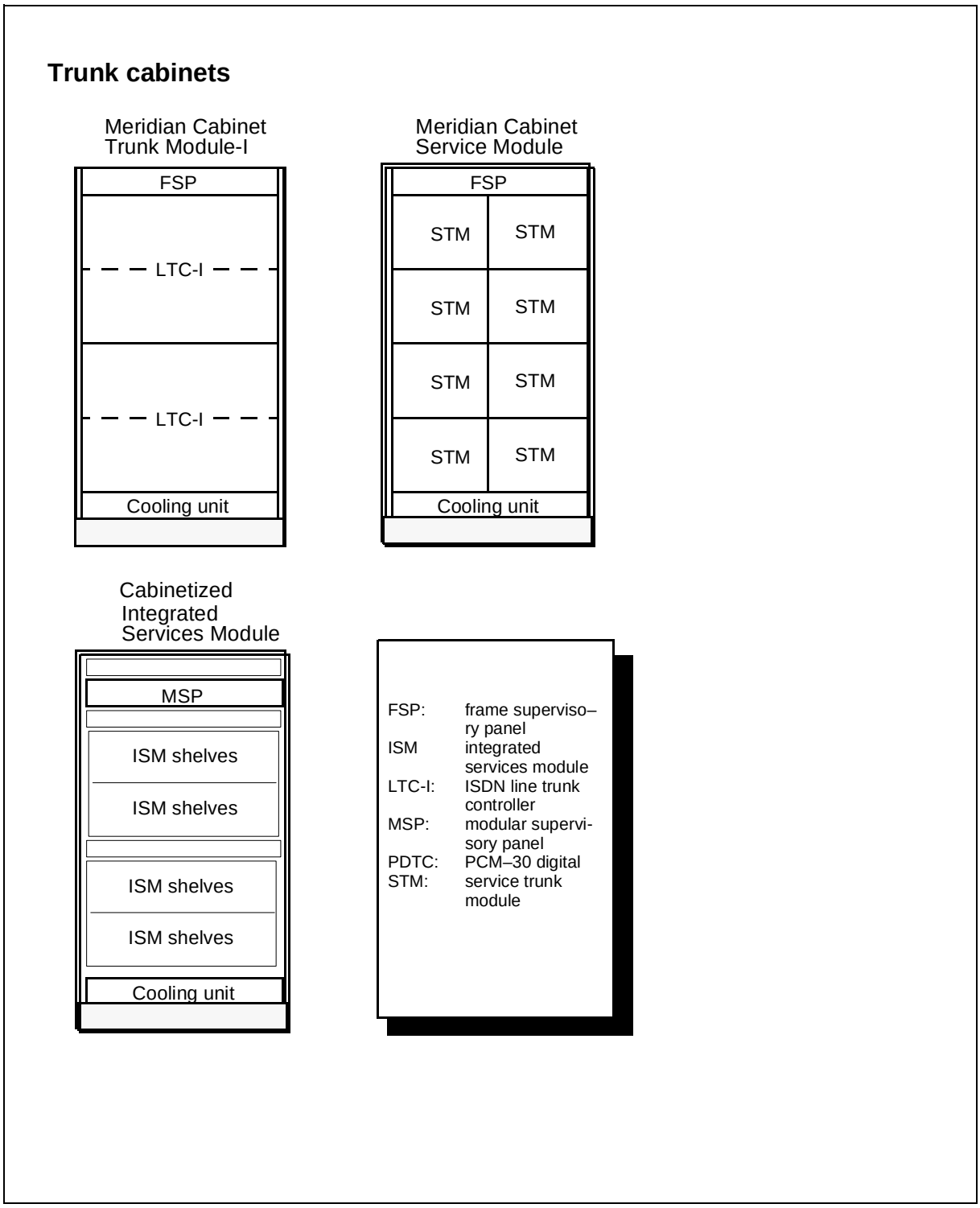


Figure 3-8 Line cabinets

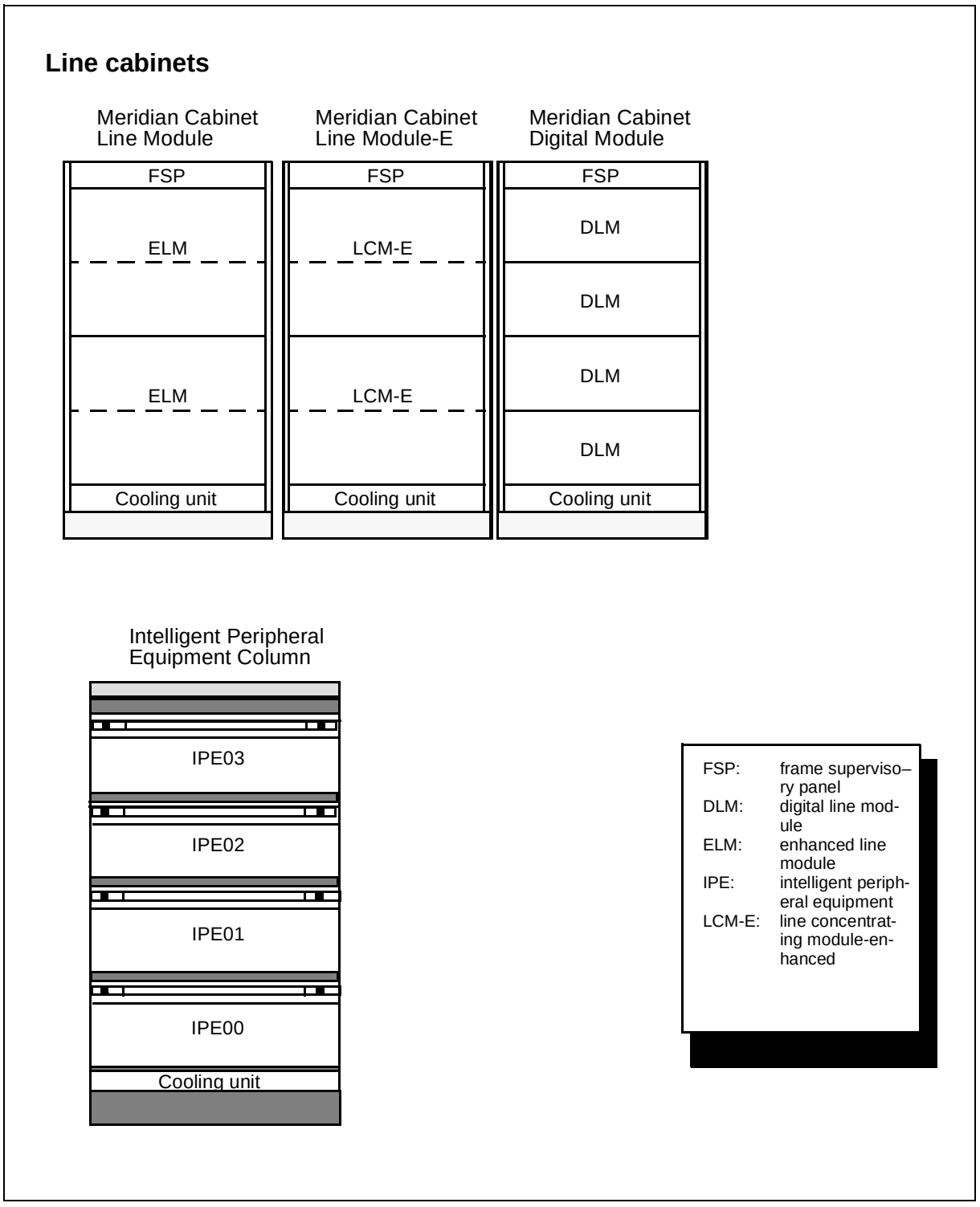


Figure 3-9 Network cabinets

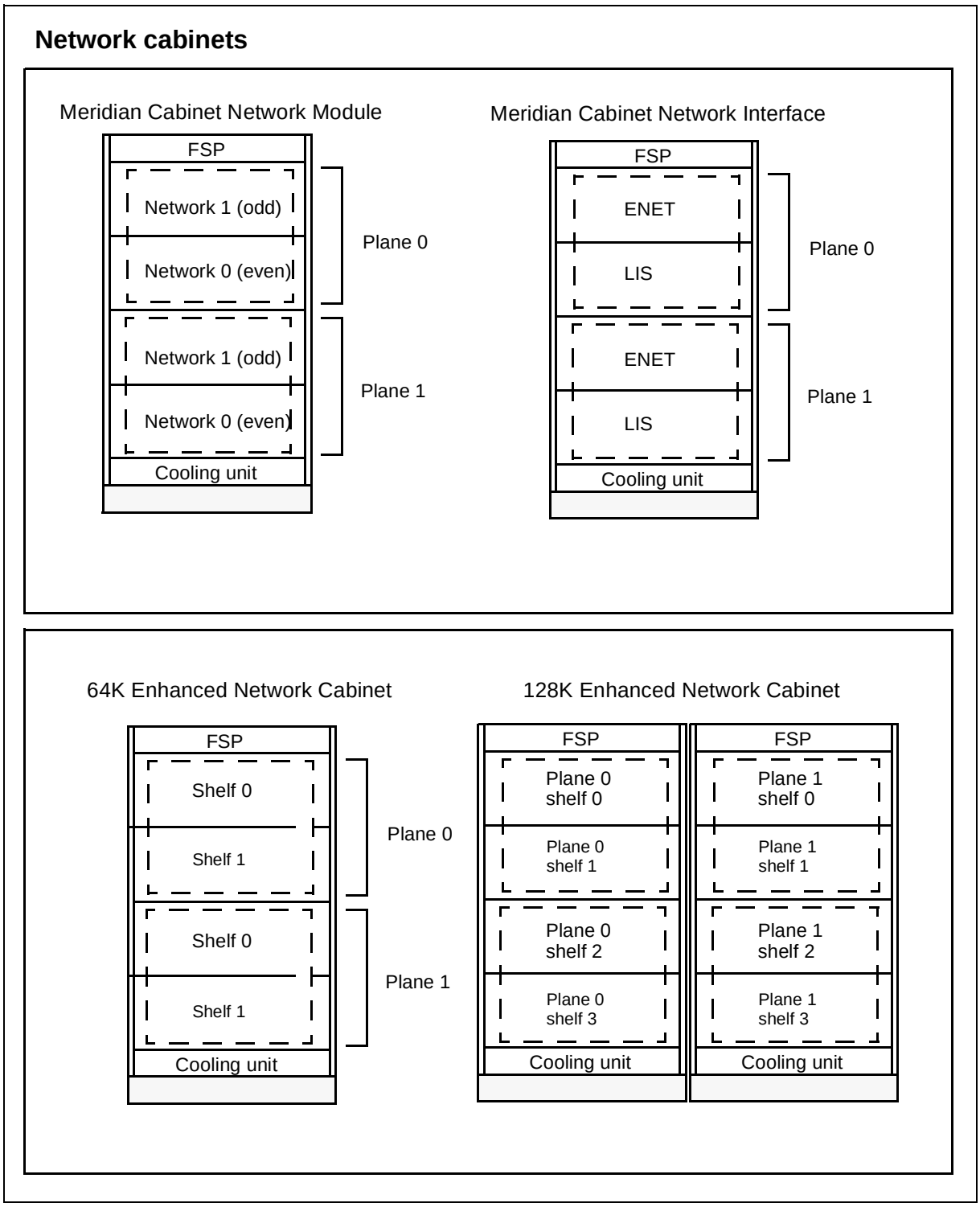


Figure 3-10 Maintenance and administration cabinets

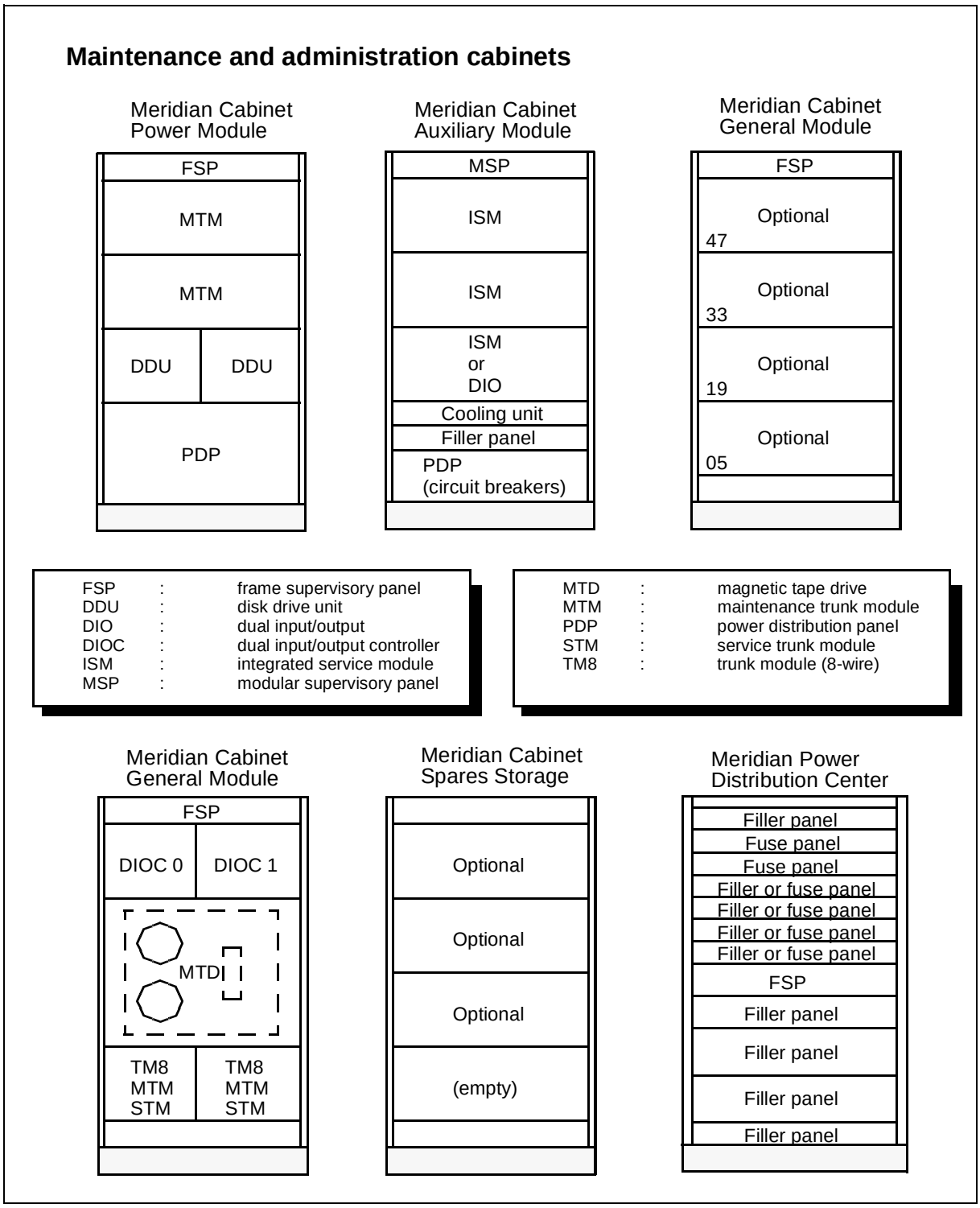
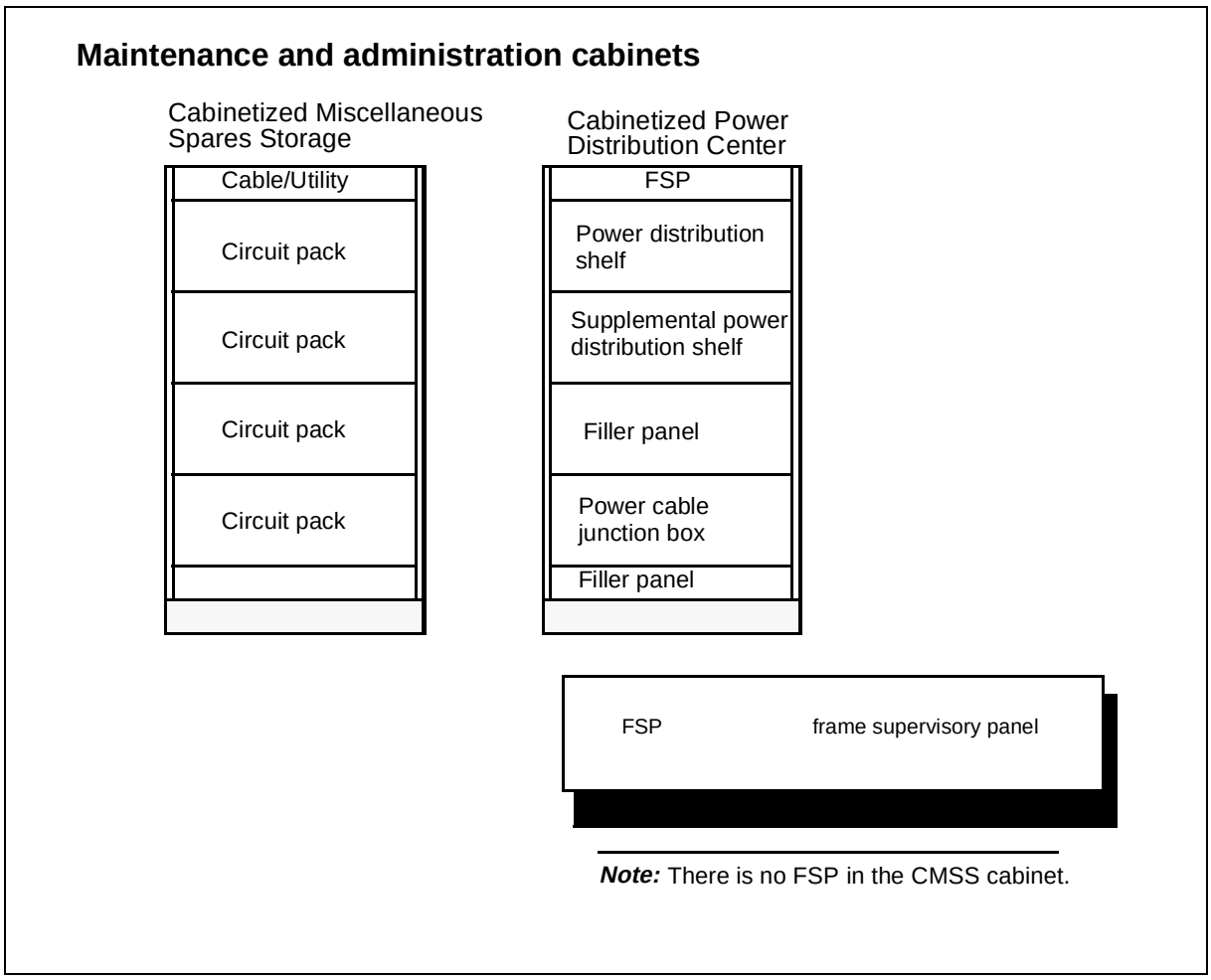


Figure 3-11 Maintenance and administration cabinets



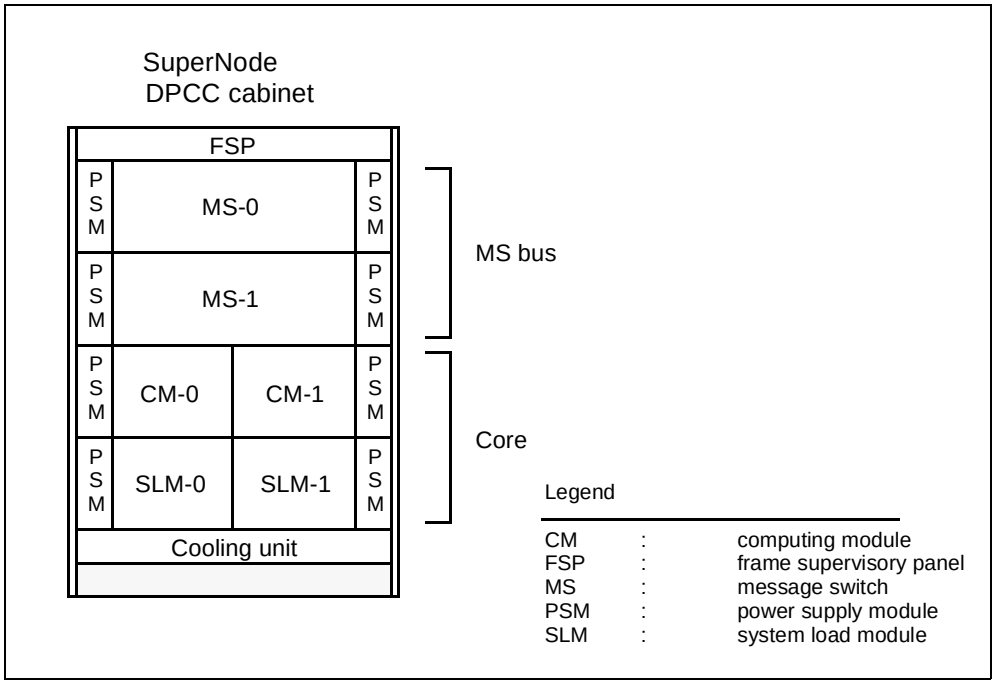
SuperNode cabinet module

The SuperNode Dual Plane Combined Core (DPCC) consists of four shelves, as shown in Figure "SuperNode DPCC components" on page 3-23. The components housed in the DPCC are described in subsequent paragraphs.

The DPCC cabinet packages the following:

- a dual-plane message switch that supersedes the central message controller in the current Meridian SuperNode system
- a computing module that supersedes the current central processing unit, program store, and data store
- a system load module that provides a mass storage system

Figure 3-12 SuperNode DPCC components



Cooling unit

The high-capacity cooling unit consists of four, high-speed DC-powered fan blowers. Two of these four fans are operated with a separate power feed for reliability.

System load module

The system load module (SLM) is the mass storage system used for storing office images and for booting new loads or stored images into the computing module. The SLM is designed for loads in excess of 250 megabytes.

The SLM shelf contains two SLMs that interface directly to the computing module through a computing module port. Each SLM is packaged into a single replaceable unit consisting of a disk drive, a streaming cartridge tape drive, and a controller circuit pack.

Computing module

The computing module (CM) shelf is part of the core that performs the call processing function.

The CM shelf contains two CM planes. Each CM plane has the following:

- processor used for call management
- message switch interfaces

- reset terminal interface
- memory circuit packs

The message switch interfaces allow the CM to communicate with the rest of the Meridian SuperNode system through the message switch. Reset terminals control, diagnose, and report the status of the CPUs.

Message switch

The top half of the SuperNode cabinet contains the dual-shelf message switch control complex and MS port interfaces. The fully duplicated message switch performs the system message function and is the messaging hub of the SuperNode system.

The MS contains the following:

- 128-Mbytes per second message bus system
- message switch control complex
- provisionable message port interfaces, used for the connection to the CM, NMs, and IOC
- central system clock, used for the synchronization of the Meridian SuperNode system. Currently, this clock provides stratum 3 synchronization internally. (Stratum 2 synchronization requires an added shelf in an MCGM cabinet.)

Power supply module

Each shelf consists of two power supply modules (PSM) at each end. Each PSM consists of one +5 V/80 A and one -5 V/20 A power converter circuit pack.

The fan unit is supplied with -48 V for the four dc fan blowers. The power drain for each shelf is 20 A at -48 V dc, and the power drain for the fan is 8 A at -48 V dc.

Total current required per bay is 80 A.

Frame supervisory panel

The frame supervisory panel (FSP) controls alarms in the cabinet.

Power requirement

The SuperNode DPCC cabinet is powered by an external -48 V dc source provided by the Meridian Power Distribution Center (MPDC) or the Meridian Cabinet Auxiliary Module (MCAM). These cabinets are described in the Maintenance and Administration part of this section.

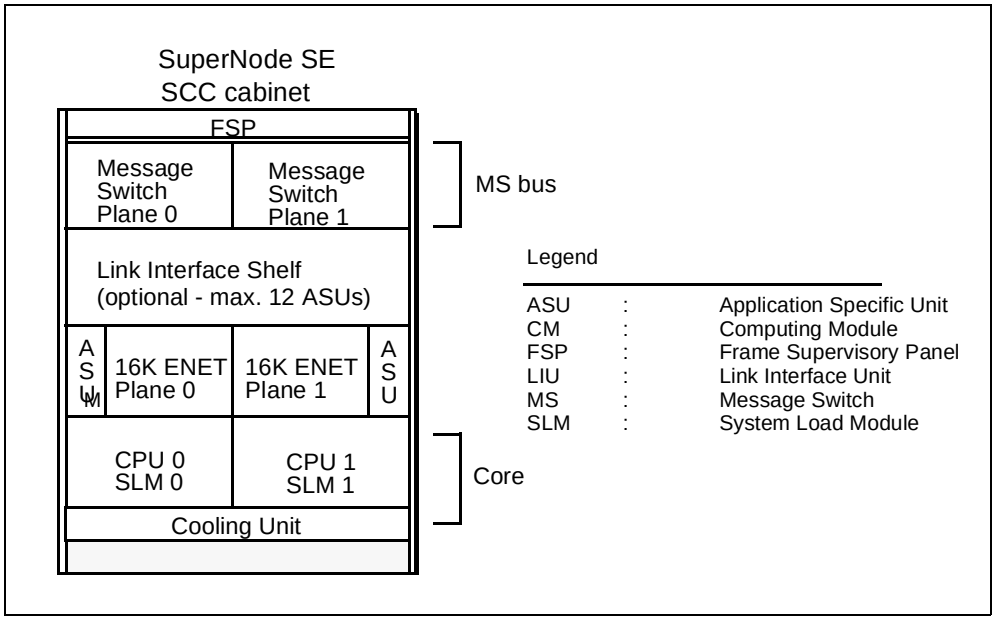
SuperNode SE cabinet

The SuperNode SE (SNSE) cabinet is also known as the SuperNode Combined Core (SCC). This cabinet consists of four shelves as shown in the figure that follows. The core and the bus occupy just one shelf each, unlike the full-size SuperNode cabinet, which requires two shelves each for the same components. One of the remaining shelves houses an ENET, and the other shelf can be provisioned with the optional link interface shelf.

Single-shelf core

The compact core consists of two synchronized CM planes that manage high-level call processing functions. The planes are connected by the mate exchange bus, which allows the processor on each plane to compare computations and, thus, ensures the system's integrity between active and inactive planes. The CM also loads and downloads programs.

Figure 3-13 SuperNode SE SCC components



System load module

The two SLMs (which occupy the bottom shelf with the two CM planes) are used for software loads, office images, and PM loads. Each SLM consists of one cartridge tape drive and a disk drive unit (DDU).

Single-shelf bus

The message switch is a hub for the communication between the switch's components. The MS occupies the upper shelf of the SCC and is equipped with cards on the front and corresponding paddle boards on the rear. The cards share a common bus with the paddle boards.

Cooling unit

The cooling unit provides forced-air ventilation for the equipment housed in the SCC.

Link interface

The link interface shelf (LIS) is a single-shelf link peripheral processor (LPP) capable of supporting 12 application specific units (ASU). An example of an ASU is the link interface unit (LIU) for CCS7 applications. The 12 ASUs supported by the LIS are in addition to the 2 LIUs that can be provisioned with the ENET shelf for CCS7 applications.

If additional ASUs are needed, external LPP cabinets may be added. The SuperNode SE system supports external LPPs up to the full physical capability of the SuperNode SE message switch.

Enhanced network

The enhanced network (ENET) shelf provides up to 16K ENET channels on two planes, provisionable in 4K increments. The shelf can also be provisioned with two LIUs, which can be used for CCS7 links.

Frame supervisory panel

The FSP controls alarms in the cabinet.

Power requirement

The SuperNode SE cabinet is powered by either the MPDC or Meridian Cabinet Auxiliary Module phase 3 (MCAM3). Both supply -48 V dc power to the SuperNode SE cabinet. The power supply option selected is based on the lineup configuration chosen by the user. For details on SuperNode SE configurations, refer to Section 4.

SNSE cabinet

The SNSE cabinet includes the following:

- message switch (MS)
- link interface shelf (LIS)
- enhanced network (ENET)
- computing module (CM)
- frame supervisory panel (FSP)
- cooling unit

The SNSE offers the following functions:

- BRISC 70EM
- ENET

- 12 ports for CCS7
- Ethernet interface (EIU)
- packet handler

For more information about the SNSE, refer to the previous information on the SuperNode SE in this chapter.

Network cabinets

The network cabinets consist of the Meridian Cabinet Network Module (MCNM), the ENET cabinet, and the Meridian Cabinet Network Interface (MCNI). Each cabinet is described and illustrated in subsequent pages.

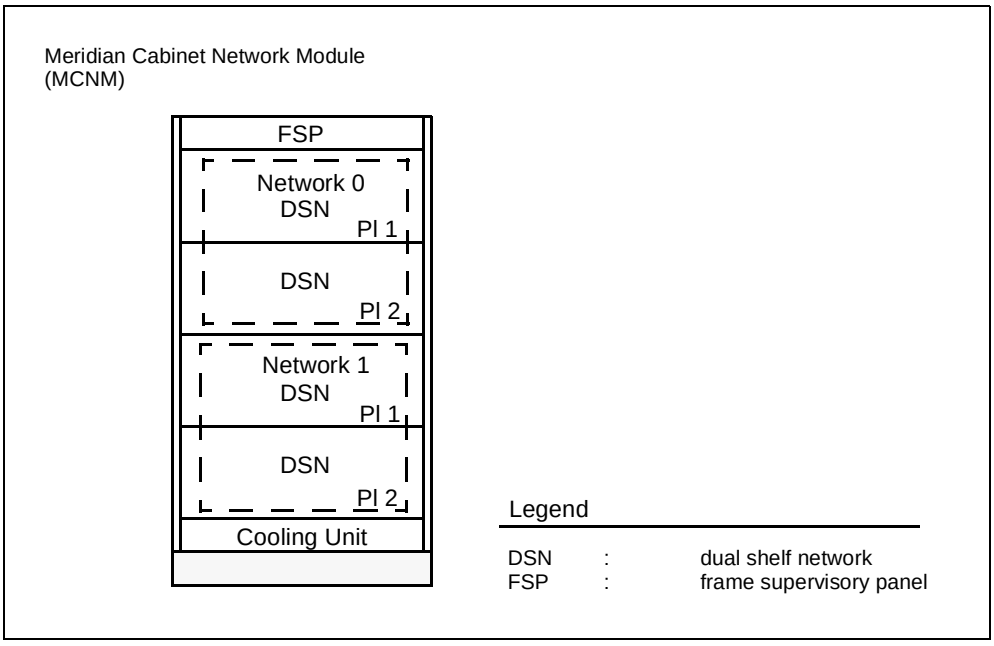
Meridian cabinet network module

Note: The Meridian Cabinet Network Module (MCNM) is manufacture discontinued and is replaced by the ENET. Refer to the ENET section.

The MCNM contains two fully duplicated dual shelf network (DSN) modules.

The following figure shows the MCNM components. The components of this cabinet module are described in subsequent paragraphs.

Figure 3-14 MCNM components



Cooling unit

The cooling unit provides forced air cooling with two-speed fans. The fans normally run at low speed. If a condition of thermal stress occurs, the fans switch to high speed.

Dual shelf network modules

The first network contains DSN modules 2, 4, 6, or 8, depending on the configuration; the second network contains DSN modules 3, 5, 7, or 9. Each duplicated DSN module provides 64 network ports.

The message switch ports of a network plane are hard-wired to a single connector on the rear bulkhead. Each plane has its own connector. The connector labeled PL00 connects to MS0 and distributes ports to each shelf. Each shelf requires one port to the MS. All junctors are also hard-wired to a connector array on the rear bulkhead.

Frame supervisory panel

The FSP distributes and controls power and alarms in the cabinet.

Enhanced network

The ENET cabinet is the standard SuperNode cabinet and, in this application, is provisioned with four ENET shelves. The ENET cabinet is available in either a 64k single-cabinet configuration consisting of two planes with two shelves per plane (see Figure "64K single-cabinet ENET components" below) or a 128k ENET dual-cabinet consisting of one cabinet serving as plane 0 and a second cabinet serving as plane 1 (see figure "128K dual-cabinet ENET components" below). All cabinets are provisioned with four ENET shelves, an FSP, and a cooling unit. ENET cards are installed in the shelves as needed.

Figure 3-15 64K single-cabinet ENET components

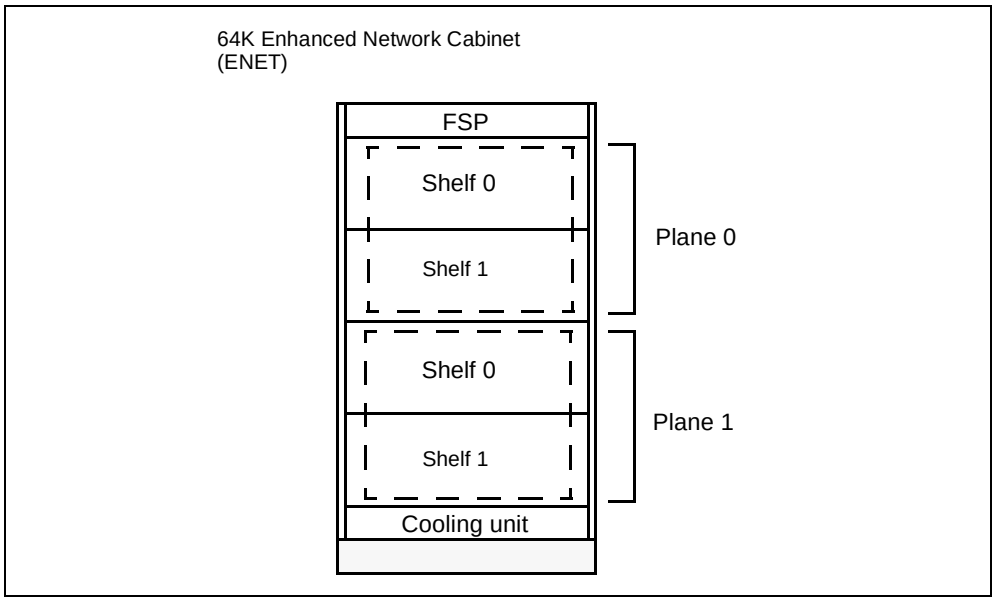
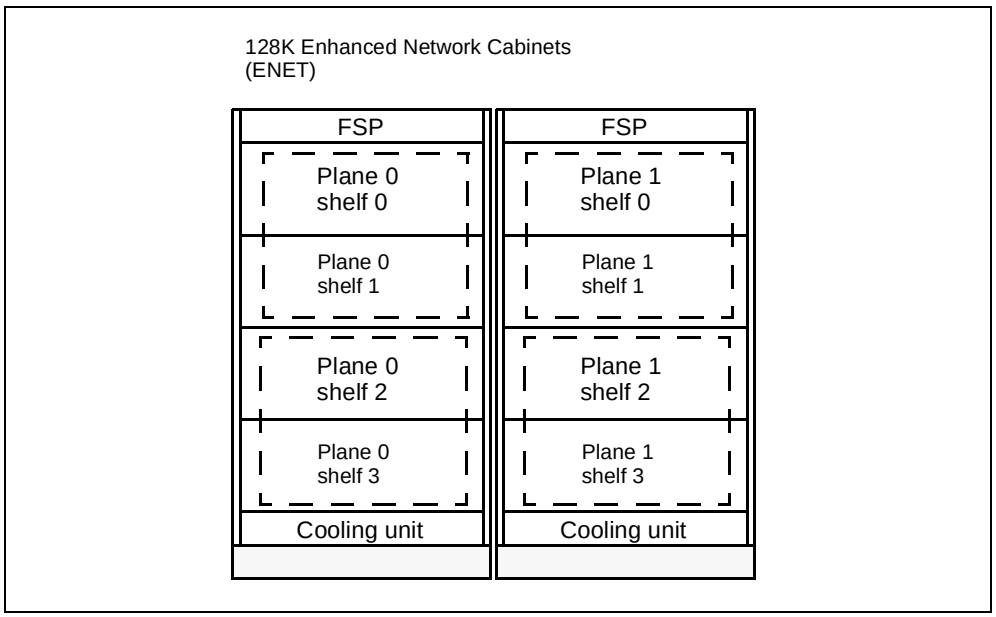


Figure 3-16 128K dual-cabinet ENET components



Frame supervisory panel

The FSP distributes and controls power and alarms in the cabinet.

Cooling unit

The high-capacity cooling unit consists of four, high-speed dc-powered fan blowers. Two of these four fans are operated with a separate power feed for reliability.

Power converters

Each ENET shelf includes one +5 V/80 A and one -5 V/20 A power converter circuit packs. The power converters are located at each end of the shelf with each power converter providing power for one half of the shelf.

Power requirement

The ENET cabinet is powered by either the MPDC or Meridian Cabinet Auxiliary Module phase 3 (MCAM3). Both supply -48 V dc power to the ENET cabinet. The power supply option selected is based on the lineup configuration chosen by the user. The ENET cabinet is powered by an external -48 V dc source called the Meridian Power Distribution Center (MPDC). These cabinets are described in the Maintenance and Administration part of this section.

Note: For detailed information on ENET, refer to the *DMS SuperNode Product Guide*, 297-5001-010, and *Peripheral Modules*, 297-1001-103.

Meridian Cabinet Network Interface (MCNI)

The MCNI addresses user requirements by providing networking capabilities in a singular, inexpensive package. This product addresses two types of users.

- users who have a 32K enhanced network (ENET) cabinet and wish to add the capability of a fiberized link interface shelf (FLIS), and the variety of features it makes possible. This is provided by NTYA05UK.
- users who wish to replace their junctured network (JNET) systems with a 32K ENET and acquire FLIS capability in one cabinet may do so by purchasing a factory-built MCNI cabinet (NTYA05AA)

The MCNI

- combines 32K ENET capability and FLIS capability plus options
- offers a non-blocking network matrix supporting up to 32,000 cross-points
- accommodates up to 24 application specific units (ASU) with two link interface shelves (LIS), or up to 12 ASUs with one LIS. The limitations and restrictions, which apply to the FLIS cabinet, also apply to the MCNI

cabinet. These are listed in engineering change memorandums (ECM) 612, 620, 626, and 632. The LIS supports the following:

— link interface unit (LIU7) for CCS7

— ethernet interface unit (EIU) to support 10-baseT interface

— network interface unit (NIU) to provide channelized access delivery of CCS7 services

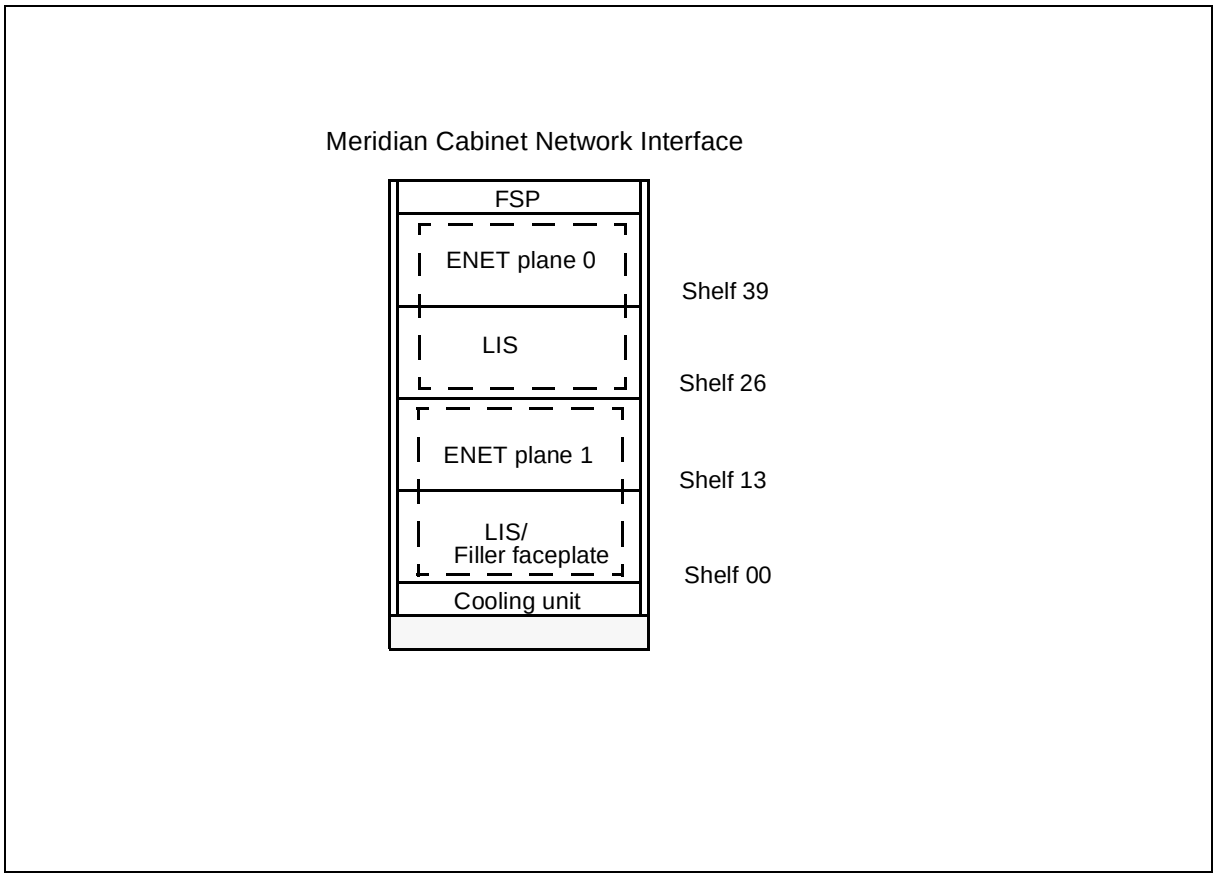
— frame relay interface unit (FRIU) to support frame relay services

— enhanced link interface unit (XLIU) to provide X.25 packet handler services

— applications supported in the enhanced multi-purpose cabinet (EMC)

For more information on ENET and FLIS, refer to the preceding section, “Enhanced network," and the section, “Link peripheral processor," respectively. The following figure illustrates the MCNI components.

Figure 3-17 Meridian Cabinet Network Interface components



Trunk cabinet modules

The series of trunk cabinet modules have the same hierarchical system function in the switch architecture. This series includes the following cabinets:

- Meridian Cabinet Trunk Module-ISDN with the following controllers:
  - — Line Trunk Controller with ISDN (LTC-I)
  - — Line Group Controller with ISDN (LGC-I)
  - — Digital Trunk Controller with ISDN (DTC-I)
  - — Subscriber Carrier Module-100A second version (SMA2)
- Meridian Cabinet Service Module (MCSM)
- Cabinetized Integrated Services Module (CISM)

Meridian cabinet trunk module-ISDN

The Meridian Cabinet Trunk Module-ISDN (MCTM-I) contains up to two duplicated Common Peripheral Controllers that can be configured as LTC-Is, LGC-Is, DTC-Is, LTGs, LGCs, or DTCs.

Note: The common peripheral controllers CPCs are wired as LTC-Is to eliminate custom engineering, but can be configured as LGC-Is or DTC-Is with the appropriate circuit packs. The LTC-I is used in Figure "MCTM-I components" on page 3-33, which shows the MCTM-I components. The components of this cabinet module are described in subsequent paragraphs.

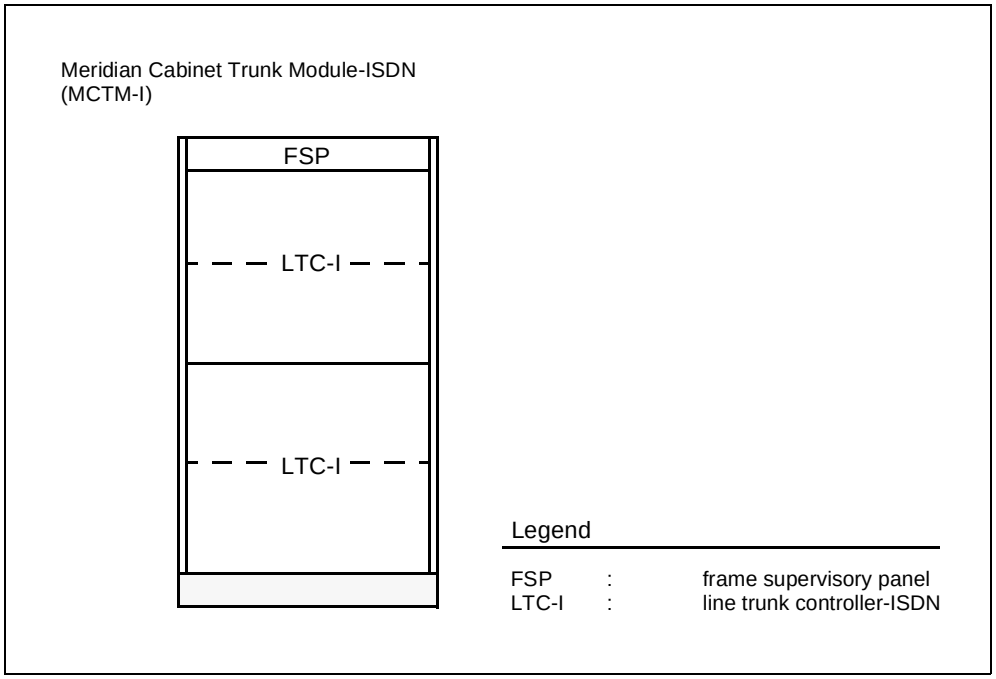
Line trunk controller-ISDN

The LTC-I is a peripheral module that is a combination of the LGC and the DTC and provides all the services offered by both. The LTC-I is wired for any combination of LTC-I, DTC-I, or LGC-I supporting up to eight line concentrating modules (LCM) or digital line modules (DLM) requiring up to 20 DS-30A trunk ports and 16 DS30 line ports.

The LTC-I and DTC-I can support DS-1 ports. The DS-1 ports for each LTC-I are fully wired to filtered connectors in the rear bulkhead for use as digital trunks, to connect remote modules, or both.

Up to eight LCMs or DLMs can be configured for each LTC-I. Each LCM or DLM has a dedicated connector on the rear bulkhead, which is prewired for six DS-30A links, simplifying the external cabling to the MCLM or MCDM. Inside the cabinet, the wiring permits on-site configuration for two to six links for each LCM or DLM. Cables providing 16 network DS30 links to each LTC-I are connected to the LTC-I as needed, on site.

Figure 3-18 MCTM-I components



LTC-Is are provisioned with universal tone receivers (UTR) containing 30 circuits. An additional 30 circuits may be provisioned with an additional pair of circuit packs.

Line group controller-ISDN

The LGC-I is a peripheral module that connects DS30 links from the network to the LCM. The LGC is essentially the same as the LTC, however, the LGC adds line support.

Digital trunk controller-ISDN

The DTC-I is a peripheral module that connects DS30 links from the network to the digital trunks. The MCTM-I has two fully duplicated DTC-Is. Each controller can support up to 20 DS-1 trunk ports. The lower shelves contain DTC-I 0; the upper two shelves contain DTC-I 1. The DTC-I supports ISDN packfill.

The DS-1 ports for each DTC-I are fully wired to filtered connectors in the rear bulkhead for use as digital trunks, to connect remote modules, or both. The DS-1 ports are fully connectorized, using the band pass RF filters for improved EMI performance. Additionally, the cabling and connectors allow the rear bulkhead to interface to the ISDN packet handler.

The DTC-Is are always provisioned with UTRs containing 30 circuits and 30 provisionable circuits.

A pair of special tone receivers (STR) provide the capability for call reorigination on each DTC-I for which the STRs are provisioned.

Meridian cabinet service module

Note: The Meridian Cabinet Service Module (MCSM) is manufacture discontinued and replaced by the Meridian Cabinet Auxiliary Module phase 3 (MCAM3) or the Cabinetized Integrated Services Module (CISM). Refer to the descriptions of the MCAM3 and CISM.

The MCSM contains eight service trunk modules (STM) having digital service circuits such as digital recorded announcement modules (DRAM) and conference bridges. These service circuits have no external connections, so the only MCSM system connections are to the network ports and power within its own lineup.

Figure "MCSM components" on page 3-35 shows the MCSM components. The components of this cabinet module are described in subsequent paragraphs.

Cooling unit

The cooling unit provides forced-air cooling with two-speed fans. The fans normally run at low speed. If a condition of thermal stress occurs, the fans switch to high speed.

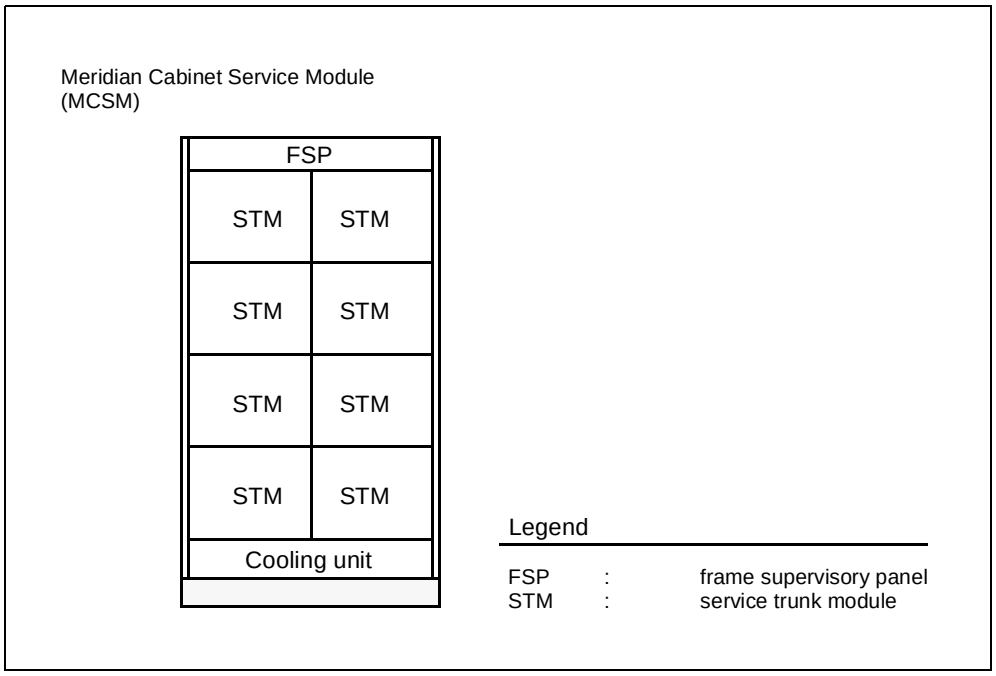
Service trunk modules

Each STM shelf contains two independent STM units. The odd-numbered STM unit in the bottom STM shelf is hard-wired for DRAM; a second DRAM is optional. The other STM can be provisioned for conference bridges and other digital service circuits, if the appropriate wiring is selected.

Frame supervisory panel

The FSP distributes and controls power and alarms in the cabinet. There is a power on and off control for each STM shelf.

Figure 3-19 MCSM components



Cabinetized integrated services module

The CISM cabinet houses shelves for integrated services modules (ISM) in addition to performing the functions of the trunk module (TM) and the maintenance trunk module (MTM).

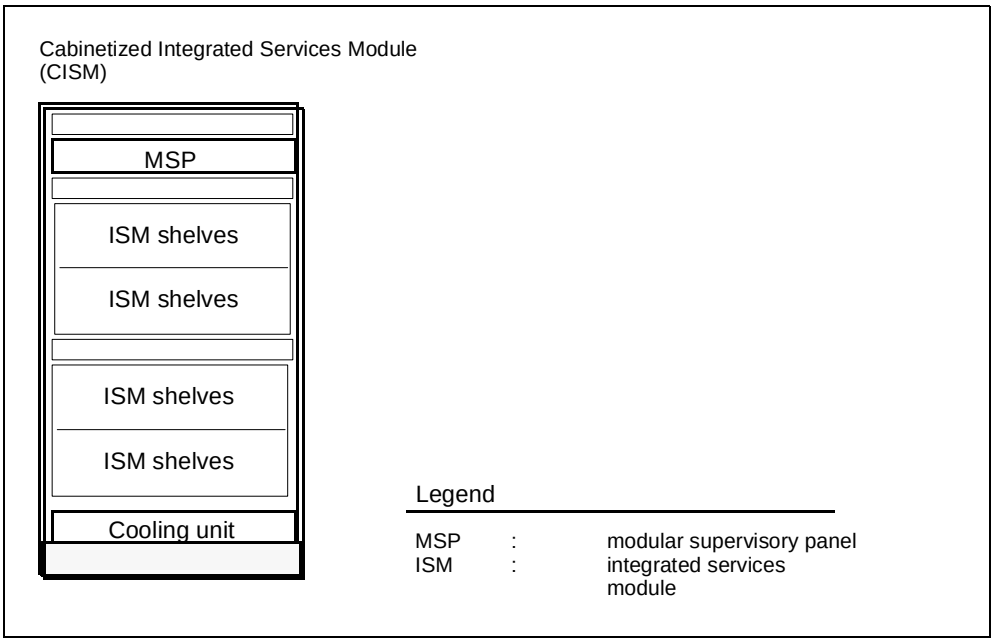
Modular supervisory panel

The MSP distributes and controls power, provides monitoring, and controls alarms in the CISM cabinet. It also provides a maintenance block that includes connections for telephone and data, and test jacks for alarm battery supply (ABS).

Integrated service module

The integrated service module (ISM) provides the same functionality as the trunk module (TM) and the maintenance trunk module (MTM), as well as functionality similar to the service trunk moduel (STM) by using conference bridges and digital service cirsuits, such as the conference trunk module (CTM) and the enhanced digital recorded announcement maching (EDRAM), respectively.

Figure 3-20 CISM components



Line cabinet modules

The series of line cabinet modules have the same hierarchical system function in the switch architecture.

The following are cabinets in the LM series, where MCLM stands for Meridian Cabinet Line Module.

- MCLM with enhanced line module (ELM)
- MCLM-E with ISDN line concentrating module-enhanced (LCM-E)
- Meridian Cabinetized Digital Module (MCDM) with digital line module (DLM)

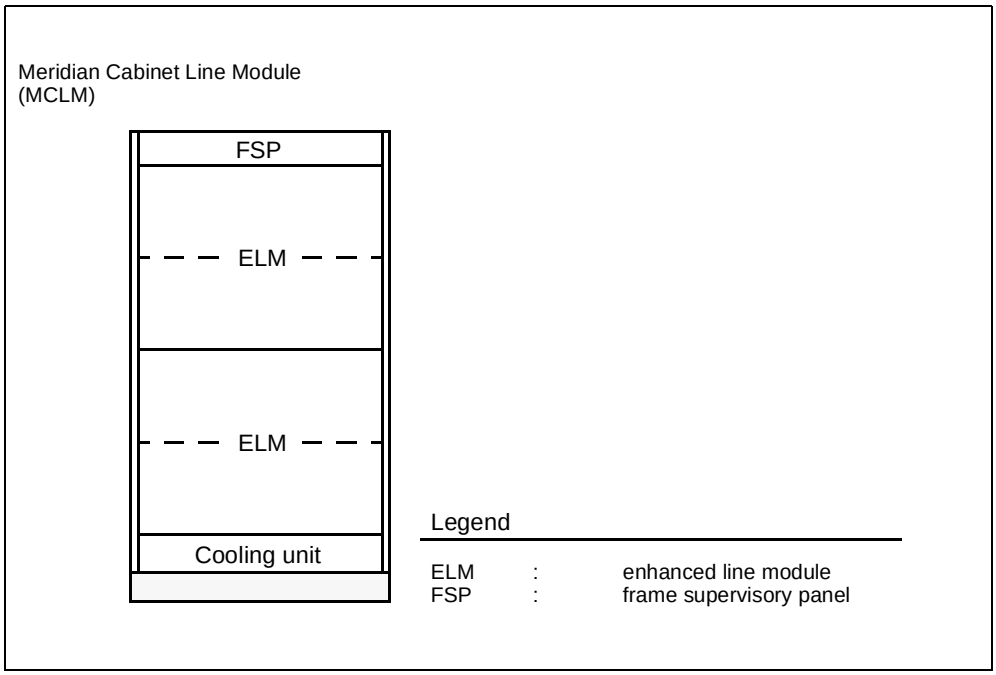
These are described and illustrated on the following pages.

Meridian cabinet line module

The MCLM contains two duplicated ELMs. Each ELM has 8 line drawers, which house 512 line cards. The MCLM cabinet provides 1024 single line card slots.

The following figure shows the MCLM components. The components of this cabinet module are described in subsequent paragraphs.

Figure 3-21 MCLM components



Cooling unit

Top and bottom units provide forced-air cooling with two-speed fans. The fans normally run at low speed to minimize noise. If a condition of thermal stress occurs, the fans switch to high speed.

Enhanced line module

The ELM uses a common backplane for the duplicated controller, ringing generator, and drawer fusing. All four line drawers on each shelf are located on the left side. The control equipment (such as ringing generators, fuse panels, power converters, and LCM processors) is located on the right side. This arrangement allows easier removal of line cards from the drawers.

The six DS-30A links for an ELM are hard-wired to a single connector on the rear bulkhead. The metallic test access (MTA) cable is hard-wired to the back panel and also connects to the MCAM3 (described later in this section).

All tip and ring cables from the line drawers are hard-wired to EMI-filtered, 50-pin connectors on the rear bulkhead, which eliminates on-site installation of the main distribution frame (MDF) cables to the line drawers.

Over voltage protection

Line cards NT6X17BA, NT6X18BA, NT6X19AA, and NT6X21AD are used only with telephone wiring protected by a Northern Telecom Protector Cat. No. 303M-12AIKE in combination with a 26AWG copper wire with

thermoplastic insulation. This is the maximum fusing wire to be used in series with the protector and is mandatory for over voltage protection.

Refer to the *DMS-100 Family Hardware Description Manual*, 297-8991-805, and the *Installation Safety Manual (ISM)* for more safety information.

Frame supervisory panel

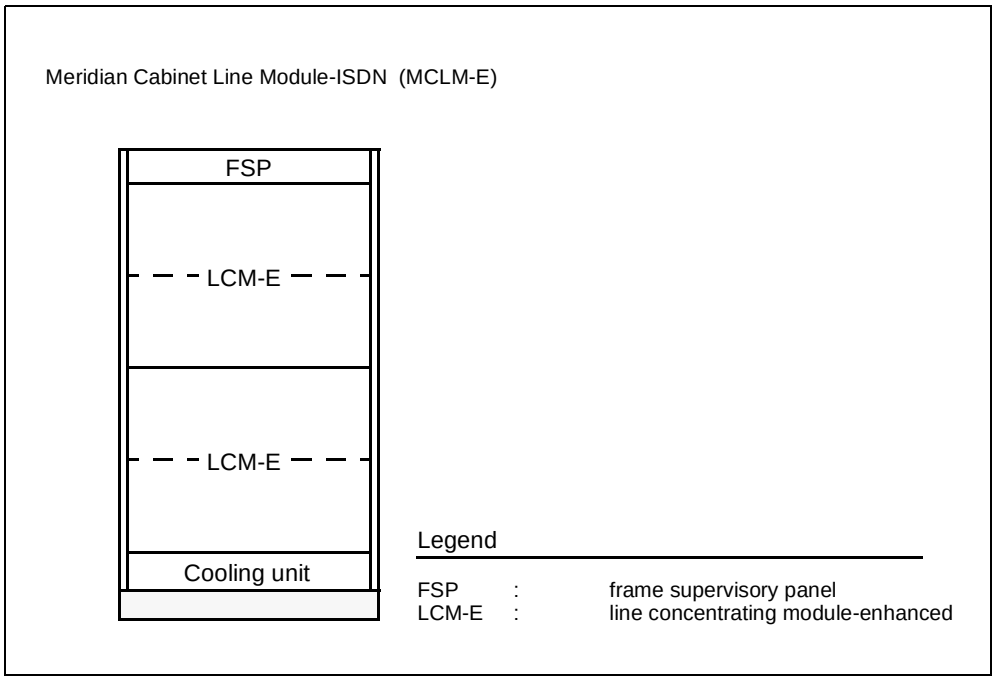
The FSP distributes and controls power and alarms in the cabinet.

Meridian cabinet line module-enhanced

The MCLM-E contains two duplicated ISDN LCM-Es. The LCM-Es provide ISDN basic rate interface (BRI) and standard line capability. The LCM-Es provide 480 ISDN U lines or 240 ISDN T lines.

The following figure shows the MCLM-E components. The components of this cabinet module are described in subsequent paragraphs.

Figure 3-22 MCLM-E components



Cooling unit

The cooling unit provides forced air cooling with two-speed fans. The fans normally run at low speed. If a condition of thermal stress occurs, the fans switch to high speed.

ISDN line concentrating module-enhanced

The LCM-E is a dual unit peripheral module that terminates ISDN lines, electronic business set (EBS) lines, and datapath lines. The LCM-E occupies

two shelves and supports a total of eight physical line drawers. The two units operate in a load sharing mode; either unit is capable of taking over the activity of the other. Each shelf of the LCM-E contains four physical line drawers and common equipment consisting of two power converters, a processor card, and two digroup control cards.

Where the LCM-E supports a mixture of line types, the total number of lines supported varies depending on the mix of lines installed. Each of the 8 line drawers can be provisioned with 20 ISDN line cards (U-line cards), 24 datapath line cards, or 48 EBS line cards. An LCM-E configured with a single type of line card supports 160 ISDN lines, 192 Datapath lines, or 384 EBS lines.

Over voltage protection

Line cards NTEX17AA, NT6X17BA, NT6X18BA, NT6X19AA, and NT6X21AD are used only with telephone wiring protected by a Northern Telecom Protector Cat. No. 303M-12AIKE in combination with a 26 AWG copper wire with thermoplastic insulation. This is the maximum fusing wire to be used in series with the protector and is mandatory for over voltage protection.

Refer to the *DMS-100 Family Hardware Description Manual*, 297-8991-805, and the *Installation Safety Manual (ISM)* for more safety information.

Frame supervisory panel

The FSP distributes and controls power and alarms in the cabinet. Duplicated ring generators and a four-fan cooling unit are also integrated into the FSP.

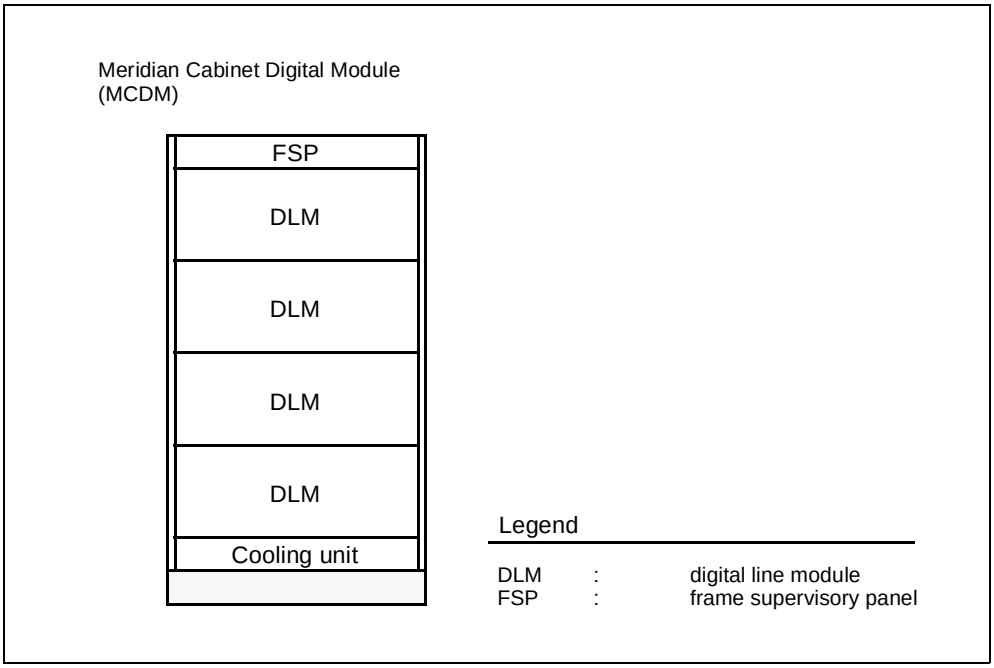
Meridian cabinet digital module

Note: The Meridian Cabinet Digital Module (MCDM) is manufacture discontinued and replaced by the Intelligent Peripheral Equipment Column (IPEC). Refer to the description on the IPEC.

The MCDM contains four DLMs that service a total of 640 M2000 and M3000 Meridian digital sets, data terminals, or both.

The figure that follows shows the MCDM components. The components of this cabinet module are described in subsequent paragraphs.

Figure 3-23 MCDM components



Cooling unit

The cooling unit provides forced-air cooling with two-speed fans. The fans normally run at low speed. If a condition of thermal stress occurs, the fans switch to high speed.

Digital line modules

Each of the four DLMs is a single shelf, standalone unit providing 160 digital time compression multiplexing (TCM) ports. Each TCM port supports one digital set and one data terminal. The entire MCDM cabinet can support a total of 1280 voice and data channels using a total of 640 integrated voice and data (IVD) ports.

The six DS-30A links for each DLM are hard-wired to a single connector on the rear bulkhead. All 640 ports are also hard-wired to EMI-filtered, 50-pin telephony connectors on the rear bulkhead to simplify connection to the MDF. All metallic test access circuits are built into each DLM, which eliminates the need for external connections.

Note: For detailed information on Digital Line Modules, refer to the *Digital Line Module (DLM) Reference Manual*.

Frame supervisory panel

The FSP distributes and controls power and alarms in the cabinet.

Intelligent peripheral equipment column

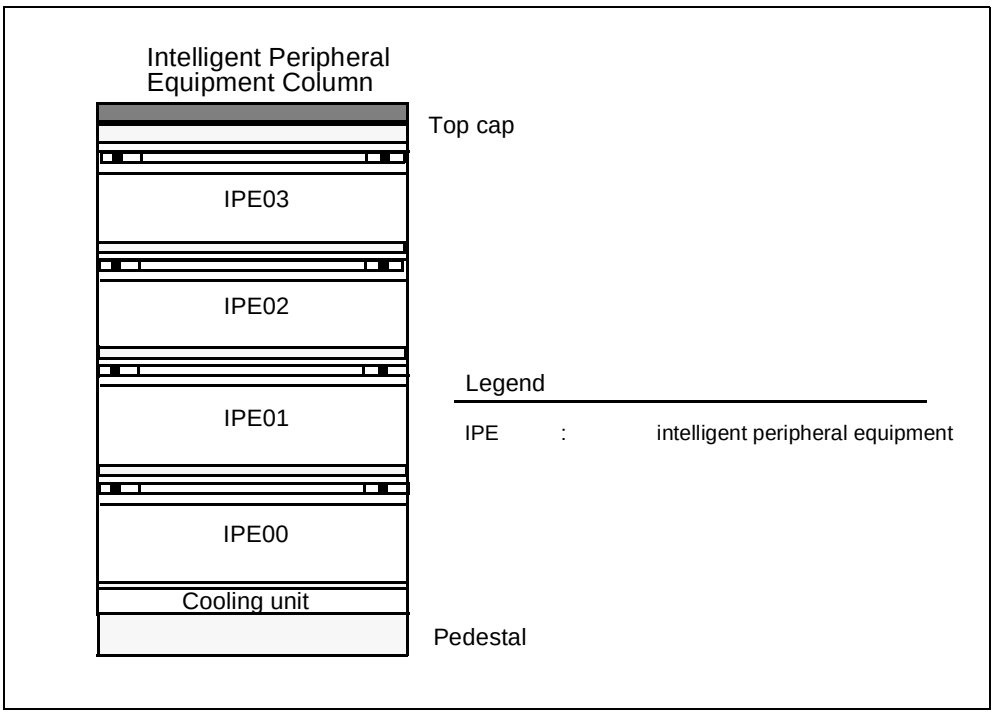
The IPEC contains up to four universal equipment modules (UEM) to house the intelligent peripheral equipment (IPE) modules. One UEM provides the framework for housing one IPE module.

Each IPEC requires one extended system monitor (XSM) card that can be configured either as a master or a slave. One master XSM is capable of supporting up to 64 columns (IPEC) and up to 63 slave XSMs located in other columns, using a daisy chain of serial communication links. Only the master XSM reports status (of the master XSM and the slaves connected to it) to the system CPU or responds to system status inquiry messages.

Note: For detailed information on the XSM card and other elements of Intelligent Peripheral Equipment, refer to the *Intelligent Peripheral Equipment (IPE) Reference Manual*.

The figure that follows shows the IPEC components. The components of this cabinet module are described in the subsequent paragraphs.

Figure 3-24 IPEC components



Cooling unit

The cooling unit provides forced-air cooling with two-speed fans. The fans normally run at low speed. If a condition of thermal stress occurs, the fans automatically switch to high speed. Under normal conditions, both fans

operate. If one of the two fans fails, or the temperature reaches 65 degrees Celsius, a fault is reported.

Intelligent peripheral equipment module

Up to four IPE modules can be housed in one IPEC. The IPE modules are numbered from 0 to 3 (bottom to top) in the IPEC.

Each IPE consists of the following:

- one controller card, provisioned in card slots 07 and 08
- up to 16 line cards (analog, digital, or both); any mix of digital line cards (DLCs), analog line cards (ALCs), line-side T-1 interface (LTI) cards, or analog message-waiting line cards (MLCs) may be provisioned in slots 00 through 15
- one dc (direct current) ringing generator (required when one or more MLCs are provisioned)
- one dc-version peripheral equipment power supply (PEPS), which provides power to the IPE shelf and regulates all the voltages required by the cards on the shelf

The enhanced IPE controller (EXPEC) card is an enhanced version of the IPE controller (XPEC) card. Each of these cards provide functionality to the IPE. For more information, refer to the IPE Reference Manual.

Top cap

The top cap is mounted on the highest IPE module of the IPEC. The top cap consists of thermal sensors, a fan speed sensor, a front and rear exhaust grill, and a column alarm indicator.

The sensors and alarm indicator interface with the XSM card located in the pedestal.

Power requirement

The IPE cabinet is powered by an external -48 V dc source provided by the MPDC. IPEs require the MPDC as a power source and cannot be powered by an MCAM unit. The MPDC cabinet is described in the Maintenance and administration part of this section.

Peripheral cabinet modules

The following cabinets house the peripheral modules and the peripheral interface for the Meridian SuperNode system.

- Link Peripheral Processor (LPP)
- Intelligent Peripheral Equipment Column (IPEC)
- Cabinetized Multi-Vendor Interface (CMVI)

- Spectrum Peripheral Module (SPM)
- Cabinetized International Peripheral Equipment (CIPE)

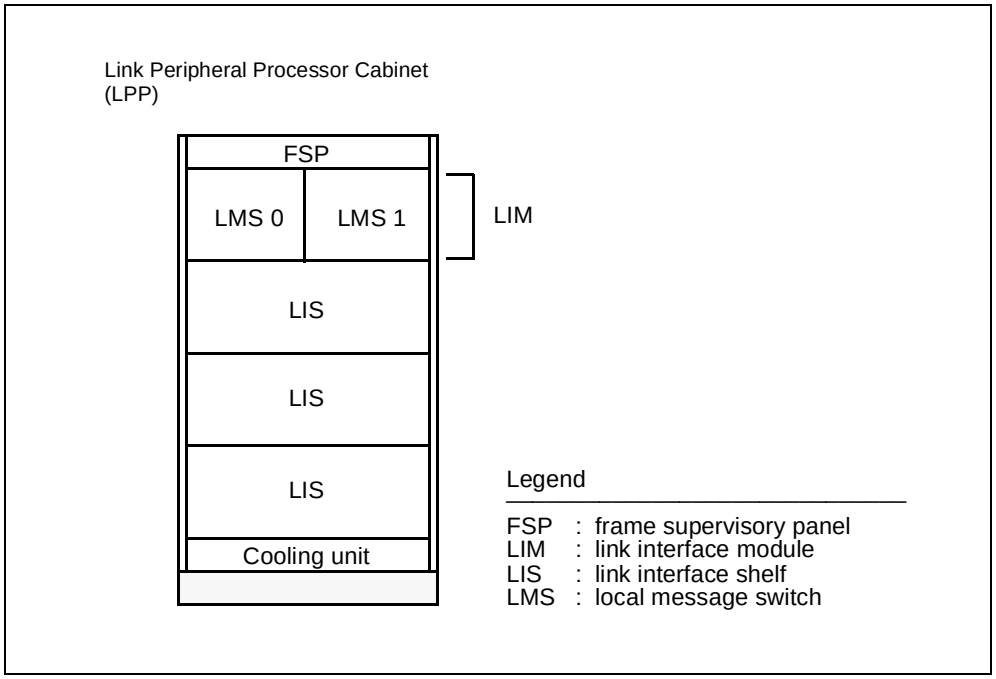
These cabinets are described and illustrated on the following pages.

Link peripheral processor

The LPP is a peripheral based on the SuperNode system cabinet architecture. The LPP allows network providers to add special applications such as CCS7 and DMS packet handler.

The following figure shows the LPP components.

Figure 3-25 LPP components



LPP cabinet component descriptions

The LPP cabinet contains two types of components: the link interface module (LIM) and link interface shelf (LIS).

- Link interface shelf

  The LIS houses modular, add-in cards and paddleboards known as application specific units (ASU). Examples of ASUs are the link interface unit (LIU) for CCS7 applications and the X.25/X.75/X.75' link interface unit (XLIU) for DMS packet handler applications. A maximum of three LISs can be provisioned in each cabinet and each shelf can house up to 12

ASUs for a total of 36 ASU slots. Frame transport buses (F-buses) are used to transfer messages between the ASUs and the link interface module.

- Link interface module

  The LIM controls the messaging between the ASUs in an LPP and also between the LPP and DMS MS-bus. The LIM consists of two local message switches (LMS) and two F-buses. Each LMS uses a dedicated F-bus to communicate with the ASUs in an LPP. The LMSs and F-buses operate in a load sharing mode, and a single LMS and F-bus can handle the entire messaging of an LPP. This configuration ensures LIM reliability in the event of an LMS failure. DS30 links are used to communicate between the LMSs and the DMS MS-bus.

LPP network interfaces

Messaging between the LPP and a customer's network is done using either an ASU paddleboard or channelized access as described in the following paragraphs.

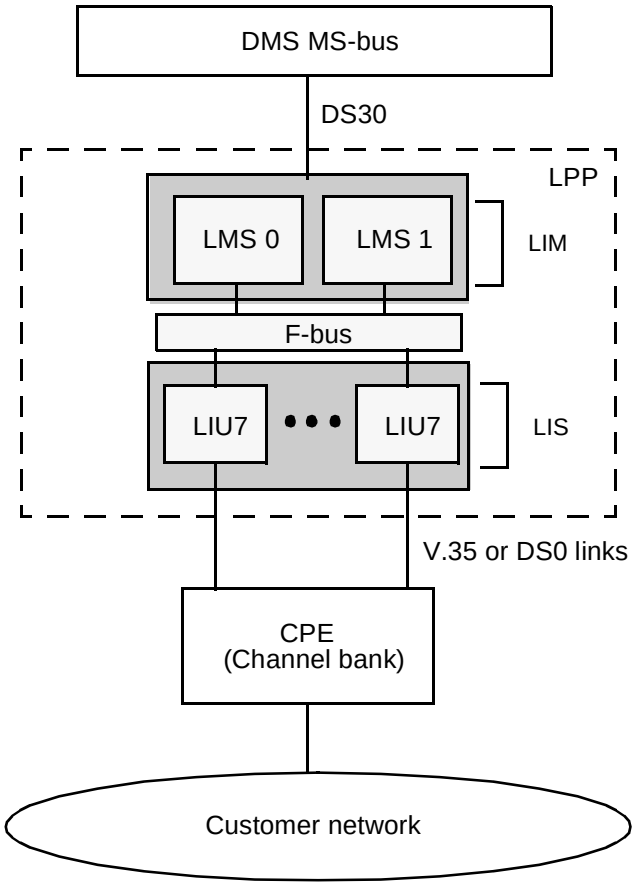
- ASU paddleboard

  The ASU paddleboard provides a direct V.35 or DS0 connection between the ASU and customer premise equipment (such as a channel bank). Refer to Figure "ASU paddleboard configuration" on page 3-45 for an illustration of this configuration.

- Channelized access

  Channelized access allows direct messaging between the LPP and the DMS network (ENET or JNET) using a network interface unit (NIU). The NIU is a type of application specific unit that uses DS30 links to communicate with the DMS network, and uses a channel bus (C-bus) to communicate with the ASUs located on the same shelf as the NIU. Refer to "Channelized access configuration" on page 3-46 for an illustration of this configuration.

Figure 3-26 ASU paddleboard configuration



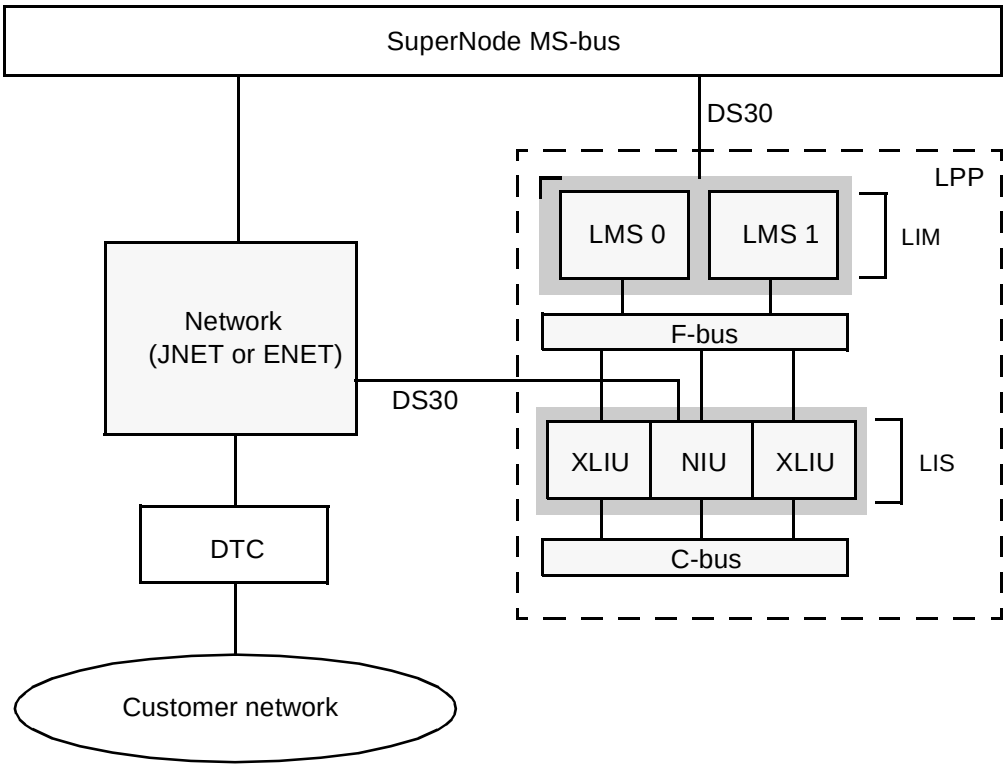
LPP components

LIU7 link interface unit that supports CCS7 applications (LIU7 is a type of ASU)

LMS local message switch that controls messaging between the ASUs in an LPP and between the LPP and DMS MS-bus

F-bus transports messaging between the ASUs and the LMSs

Figure 3-27 Channelized access configuration



LPP components

LMS	local message switch that controls messaging between the ASUs in an LPP and between the LPP and DMS MS-bus
F-bus	transports messages between the ASUs and LMSs
XLIU	provides X.25 and X.75 layer 2 and 3 services for packet handler applications (XLIU is a type of ASU)
NIU	network interface unit that transports data between the DMS network and ASUs
C-bus	provides communication between the ASUs and NIUs on a given shelf

Single-shelf LPP (SSLPP)

The SSLPP cabinet may also be configured as a single-shelf LPP, which is an option for Meridian SuperNode offices that do not require a large number of ASUs. The single-shelf LPP configuration differs from the LPP in that it does not have an LMS controlling the messaging between the LPP and DMS MS-bus. Instead, the ASUs communicate directly with the DMS MS-bus over fiber-optic cables. The single-shelf LPP may be configured with one or two shelves supporting up to 24 ASUs (12 ASUs for each shelf).

Frame supervisory panel

The FSP distributes and controls power and alarms in the cabinet.

Cooling unit

The high-capacity cooling unit consists of four, high-speed DC-powered fan blowers. Two of these four fans are operated with a separate power feed for reliability.

Power requirement

The LPP cabinet is powered by an external -48 V dc source provided by an MPDC. LPPs require the MPDC as a power source and cannot be powered by an MCAM unit. The MPDC cabinet is described in the Maintenance and administration part of this section.

Note: For detailed information on the LPP, refer to the *Peripheral Modules*, 297-1001-103.

Cabinetized multi-vendor interface

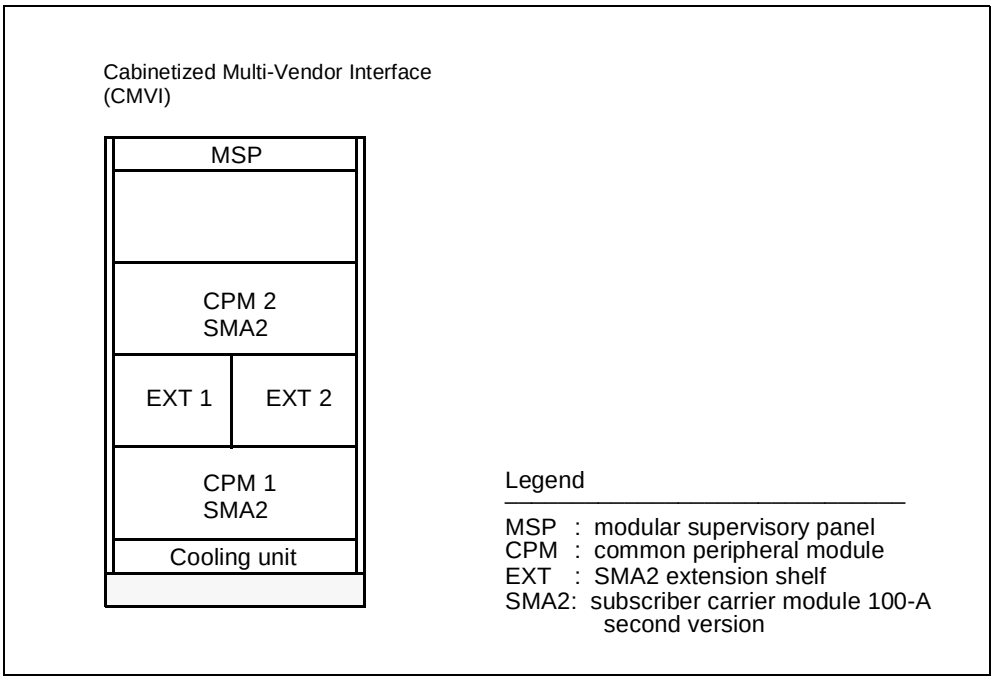
The CMVI provides the multi-vendor interface between the Meridian SuperNode system and the S/DMS AccessNode and other remote digital terminals (RDT). The Subscriber Carrier Module-100 Access, second version (SMA2), which resides in the CMVI cabinet, allows the Meridian SuperNode system to connect to the fiber central office terminal (FCOT) in the S/DMS AccessNode or any T1-based access platform from any supplier that conforms to the Bellcore standard TR-TSY-000303 (TR-303).

Note: The SMA2 is also known as the enhanced SMA (ESMA).

The CMVI comprises two main SMA2 shelves and one SMA2 extension shelf (a double shelf that services both of the main shelves). Each SMA2 provides up to 28 peripheral side (P-side) DS-1 ports per RDT, with up to 48 P-side DS-1 links total. The DS-1 links carry both traffic and messaging for up to eight RDTs or up to five RDTs if the RDTs require ISDN.

The following figure shows the CMVI components. The components of this cabinet module are described in subsequent paragraphs.

Figure 3-28 CMVI components



Subscriber carrier module-100A second version (SMA2)

The SMA2 main shelves are dual unit shelves. Each unit on the main SMA2 shelf contain its own set of control complexes, including a universal processor (UP), an enhanced ISDN signaling preprocessor (EISP), and associated memory. The control complex in either unit on a main shelf can control all call processing in the SMA2.

The main SMA2 shelf supports up to 24 P-side DS-1 ports. (The additional 24 ports for each SMA2 are provided by the extension shelf.) The SMA2 interfaces with the switching network using either one DS512 or up to 16 DS30 control side (C-side) links.

The SMA2 contains resources dedicated to subtending RDTs. These resources act as logical entities known as integrated digital terminals (IDTs). One SMA2 supports up to eight IDTs, with each IDT being dedicated to a corresponding RDT. Depending on traffic requirements, a number of FCOT and RDT configurations are possible.

The SMA2 provides an ISDN interface through enhanced D-channel packet handler (EDCH) circuit cards. The EDCH cards and the DS-1 cards share the same locations in the SMA2 module. For every DS-1 card that is replaced with an EDCH card, the number of DS-1 ports is reduced by eight.

Extension shelf

The extension shelf provides space for additional DS-1 or EDCH cards. The extension shelf comprises two half-width shelves with the left half being dedicated to SMA2 0 and the right half being dedicated to SMA2 1. If the extension shelf is populated with DS-1 cards, each side provides up to 24 additional DS-1 links for the SMA2 main shelves.

Both sides of the extension shelf requires two combination shelf power supply and DS60 interface cards (two DS60 cards on each side). Each DS60 card provides 14 DS60 links to one of the dual units on the SMA2 main shelf.

Modular supervisory panel

The modular supervisory panel (MSP) distributes and controls power and alarms in the cabinet. Interlocks for each LTC-I prevent power loss on the duplicated units at the same time.

Cooling unit

The high-capacity cooling unit consists of four, high-speed DC-powered fan blowers. Two of these four fans are operated with a separate power feed for reliability.

Power requirement

The CMVI cabinet is powered by an external -48 V dc source provided by either an MPDC or an MCAM unit. These cabinets are described in the Maintenance and administration part of this section.

Note: For more information on the S/DMS AccessNode, refer to the Fiber World product library, which is delivered separately with S/DMS AccessNode equipment. Refer to the 323-3001 series of S/DMS AccessNode NTPs for detailed information.

Spectrum peripheral module

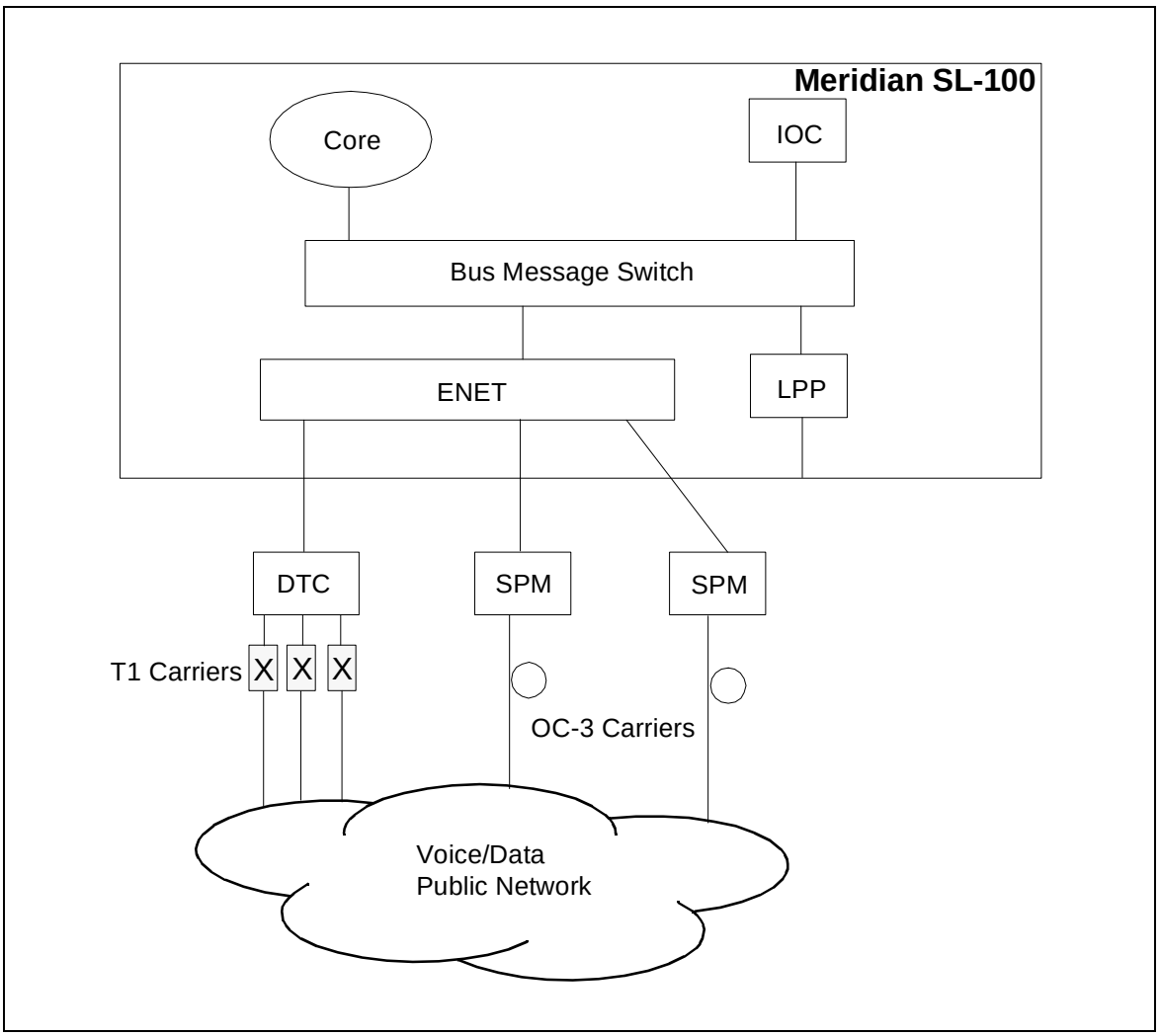
The Spectrum Peripheral Module (SPM) delivers a high-speed synchronous optical network (SONET) interface to the Meridian SL-100 switch. Per trunk signaling (PTS) and ISDN user part (ISUP) signaling are used over the SONET trunks to provide call processing capability. The SPM offers 1+1 redundant OC-3 trunking interface with integrated echo cancellation. It is a fully integrated peripheral module that is operated, administered, maintained, and provisioned like other Meridian SL-100 peripheral modules.

Note: The SPM is supported by both SuperNode and SuperNode SE.

The SPM directly terminates an OC-3 SONET carrier and feeds the individual traffic from the carrier into the Meridian SL-100 switch. The SPM does not need external cross connects or multiplexers to bring the carrier down to the T1 level because this is handled internally. The SPM terminates a single OC-3

fiber trunk which represents more than four times as many trunks as a single DTC. Refer to the following figure.

Figure 3-29 SPM within the Meridian SL-100 switch



Cabinetized international peripheral equipment

The CIPE is used primarily in the European market to support the E1 standard. It is the international version of the Cabinetized Control Peripheral Equipment (CCPE). The CIPE contains two dual shelf extended peripheral modules (XPM) configured as either line group controllers (LGC) or digital trunk controllers (DTC). Each shelf contains two LGC/DTC processor boards.

The CIPE connects to the network through either DS30 trunks (twisted pair) or DS512 trunks (fiber optic cables). This cabinet connects LCMs with DS30A trunks (also twisted pair). All connections to the network, line card

modules or PCM-30 trunks pass through the bulkhead for electromagnetic interface (EMI) compliance.

Frame supervisory panel

The FSP is located at the top of the cabinet and distributes -48V dc of power to shelves and contains cabinet alarms.

Cooling units

The cooling unit is located at the bottom of the cabinet and is forced air cooled with a fan unit integrated into the base of the cabinet.

Common peripheral controller shelf assembly (offshore)

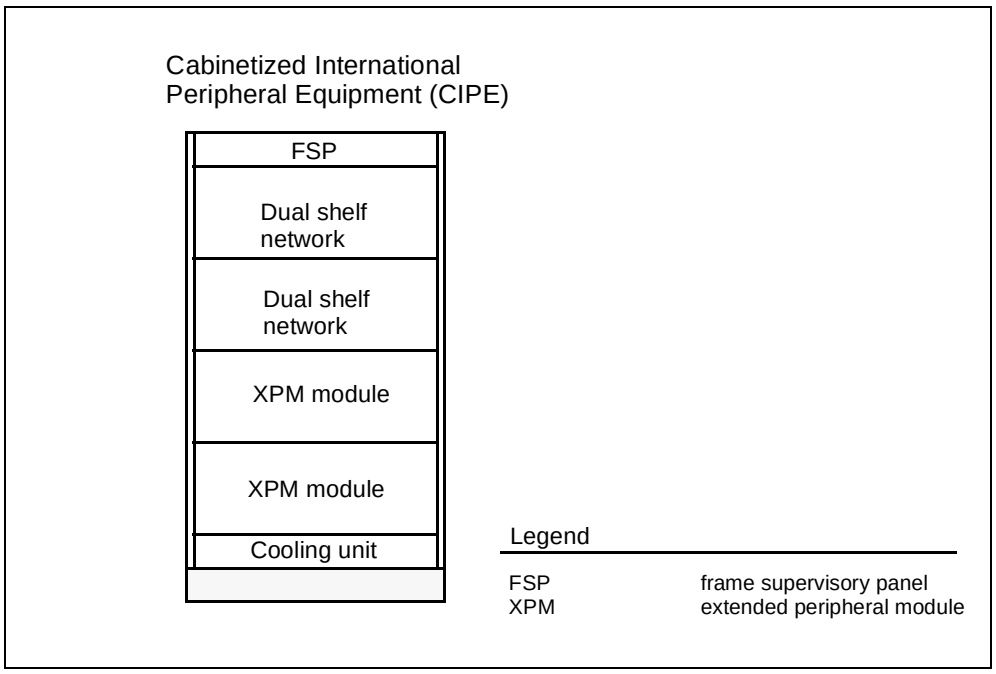
Each module (cabinetized line group equipment [CLGE] and cabinetized digital trunk equipment [CDTE]) is housed in two adjacent shelves. One pair of shelves in positions 47 and 33 and a pair of shelves in positions 19 and 05.

The CLGE defines the CIPEs intended function when the cabinet is configured specifically to house the LGC and ISDN LGC.

The CDTE defines the CIPEs intended function when the cabinet is configured specifically to house the DTC and ISDN DTC.

The following figure shows the CIPE components.

Figure 3-30 xxCIPE components



Meridian cabinet auxiliary module phase 3

The MCAM3 is a multipurpose cabinet that houses both peripheral modules and maintenance and administration modules. The MCAM3 is described in the next part with maintenance and administration cabinet modules.

Meridian cabinet general module

Note: The Meridian Cabinet General Module (MCGM) is manufacture discontinued and replaced by the MCAM3 or the CISM. Refer to the descriptions on the MCAM3 and CISM.

The MCGM is a multipurpose cabinet that houses both peripheral modules and maintenance and administration modules. The MCGM is described in the next part with maintenance and administration cabinet modules.

Maintenance and administration cabinet modules

The maintenance and administration cabinets include the following modules:

- Meridian Cabinet Power Module (MCPM)
- Meridian Cabinet Auxiliary Module phase 3 (MCAM3)
- Meridian Cabinet General Module (MCGM)
- Meridian Cabinet Spares Storage (MCSS)
- Cabinetized Miscellaneous Spares Storage (CMSS)
- Meridian Power Distribution Center (MPDC)
- Cabinetized Power Distribution Center (CPDC)

These are described and illustrated on the following pages.

Note: The MCPM, MCGM, MCSS, and MPDC are manufacture discontinued and replaced by the MCAM3, CISM, CMSS, and CPDC cabinets, respectively.

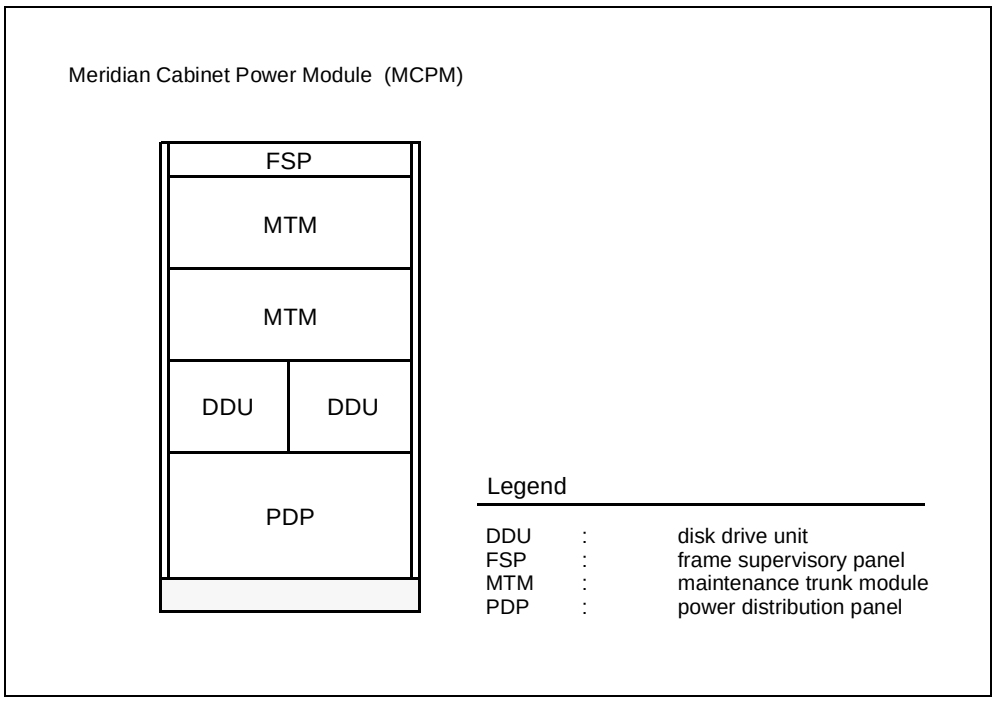
Meridian cabinet power module

Note: The MCPM is manufacture discontinued and replaced by the MCAM3. Refer to the description of the MCAM3.

The MCPM provides power to the first lineup of the system. This cabinet does not contain forced-air cooling because the total power dissipation is low enough for convection cooling.

The following figure shows the MCPM components. The components of this cabinet module are described in subsequent paragraphs.

Figure 3-31 MCPM components



Frame supervisory panel

The FSP distributes and controls power and alarms in the cabinet. Power interlock is provided to the DDU to prevent power loss or removal of the DDUs on both planes at the same time.

Maintenance trunk module

Maintenance trunk modules MTM0 and MTM1 contain system alarm circuitry, trunk and transmission test circuits, and miscellaneous analog trunk and digital service circuits. External connectors from these circuits to the MDF are provided through filtered connectors in the rear bulkhead.

Disk drive unit

The disk drive unit (DDU) consists of two 8-inch or 5 1/4-inch Nortel disk units providing 220 to 440 megabytes of formatted storage for the MCPM. Cables connect the DDU to the MCPM. Power on and off controls for the disk drive unit are interlocked with those of the IOC in the core module to prevent shutdown of redundant units.

Power distribution panel

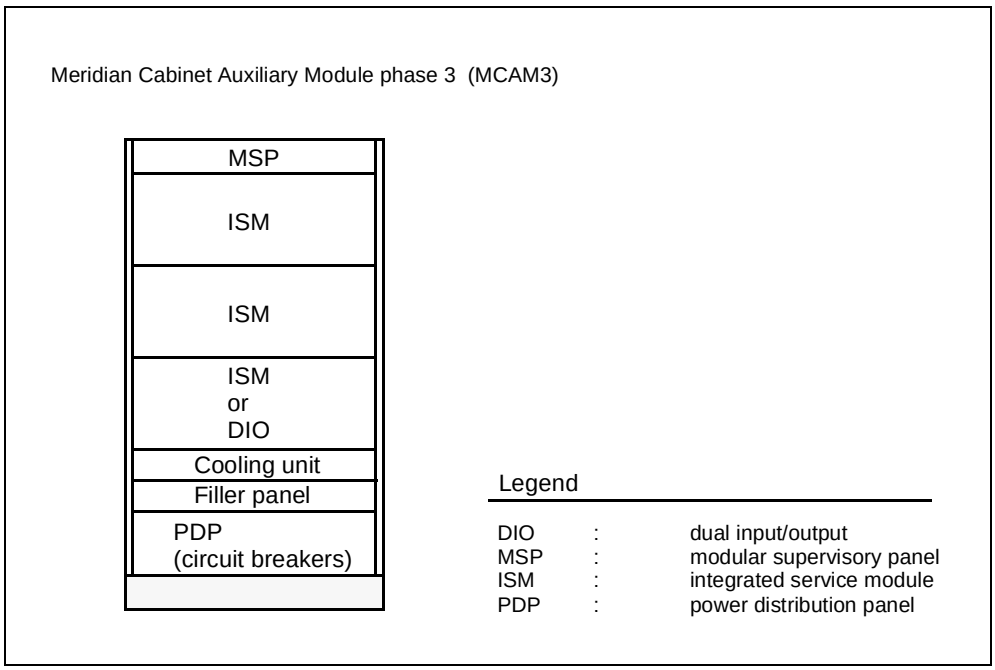
The power distribution panel (PDP) supplies power to a maximum of 11 cabinets in the lineup, including the MCPM.

Meridian cabinet auxiliary module phase 3

The MCAM3 cabinet houses shelves for integrated service modules (ISM) and a power distribution panel (PDP). The MCAM3 cabinet is typically configured with three ISMs. In addition to performing the functions of the trunk module (TM) and maintenance trunk module (MTM), the MCAM3 provides power to the lineup.

The figure that follows shows the MCAM3 components. The components of this cabinet module are described in subsequent paragraphs.

Figure 3-32 MCAM3 components



Modular supervisory panel

The MSP distributes and controls power, provides monitoring, and controls alarms in the MCAM3 cabinet. It also provides a maintenance block that includes connections for telephone and data, and test jacks for alarm battery supply (ABS).

Integrated service module

The integrated service module (ISM) provides the same functionality as the trunk module (TM) and the maintenance trunk module (MTM), as well as functionality similar to the service trunk module (STM) by using conference bridges and digital service circuits, such as the conference trunk module (CTM) and the enhanced digital recorded announcement machine (EDRAM), respectively.

Dual input/output module

The dual input/output (DIO) module provides the interface between the Meridian SuperNode system and the maintenance and billing subsystem. The DIO interface provides interfaces to printers, video display units, magnetic tape drives, modems, and dedicated billing processors.

Cooling unit

The cooling unit contains three 48V fans that provide a uniform airflow to the cabinet through a 10-inch by 23-inch exhaust area. An air filter placed directly above the fans provides the required particulate filtration. The fans normally run at low speed to minimize noise levels; however, if a condition of thermal stress occurs, the fans switch to high speed.

Power distribution panel

The PDP provides power for up to 11 cabinets (including the MCAM3), depending on the configuration. The circuit breaker module comprises two rows of 20 center trip circuit breakers, of which, half are connected to the A-feed and half to the B-feed. Each row has 16 30-amp circuit breakers and 4 10-amp circuit breakers. An LED assembly is provided to indicate if any breakers fail.

External power supply

The MCAM3 cabinet requires one -48V A-feed, one -48V B-feed, one 48V ABS feed, and one ground feed from the power plant. The external battery supply is connected through filtered connections to the PDP.

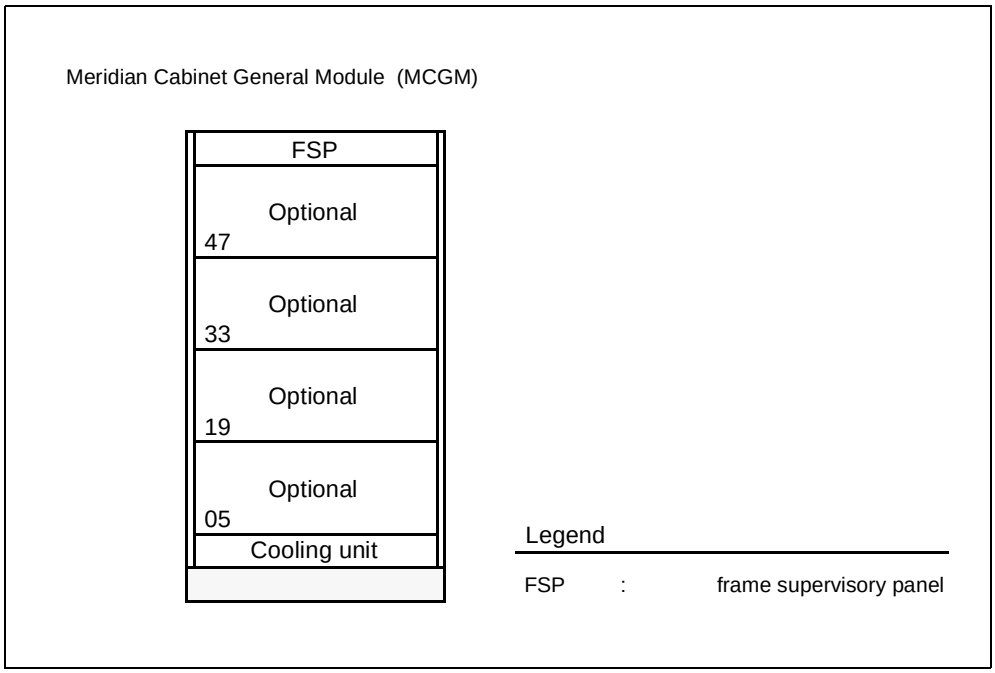
Meridian cabinet general module

Note: The MCGM is manufacture discontinued and is replaced by the MCAM3 or the CISM. Refer to the descriptions of the MCAM3 and CISM.

The MCGM allows the customer to choose custom features and hardware and locate all customized features into one cabinet. This controls the amount of special engineering required for the system and keeps the other cabinets standardized. A single cable connects this cabinet to the MCCM or MCNM, as required.

The following figure shows the MCGM components. The components of this cabinet module are described in subsequent paragraphs.

Figure 3-33 MCGM components



Customer-provisionable shelves

The four customer-provisionable shelves can contain combinations of the units as shown in alphabetic order in Table "Customer-provisionable shelf combinations" on page 3-56.

A stratum 2 or stratum 2.5 clock can also be provisioned.

Some unit combinations require more than one MCGM to locate all the equipment physically. Devices such as MTDs and DDUs can be located in an adjacent MCGM.

Table 3-3 Customer-provisionable shelf combinations (Sheet 1 of 2)

Unit	Shelf positions
disk drive unit (DDU)	05, 19, 33
input/output controller (IOC)	47 only
modem	05, 19, 33, 47
magnetic tape drive (MTD)	05, 19
maintenance trunk module (MTM)	05, 19, 33
ROS	33

Table 3-3 Customer-provisionable shelf combinations (Sheet 2 of 2)

Unit	Shelf positions
service trunk module (STM)	05, 19, 33, 47
trunk module 8-wire (TM8)	05, 19, 33

The MCGM cabinet components are described in subsequent paragraphs.

Disk drive unit

The DDU consists of two 8-inch or 5 1/4-inch Nortel disk units, providing 220 to 440 megabytes of formatted storage. Cables connect the DDU to the MCGM. Power on and off controls for the DDU are interlocked with those of the IOC in the core module to prevent shutdown of the redundant units.

Dual input/output controller

The DIOC is wired for 30 MS ports and 6 IOC positions. MS ports are wired to the EMI filtered bulkhead—four to a connector for each plane.

Magnetic tape drive

The Cook 9-track MTD connects to the IOC by cables from the core module.

Maintenance trunk module

The MTM contains system alarm circuitry, trunk and transmission test circuits, and miscellaneous analog trunk and digital service circuits. External connectors from these circuits to the MDF are provided through filtered connectors in the rear bulkhead.

Service trunk module

The STM provides conference bridges and digital service circuits, such as the EDRAM.

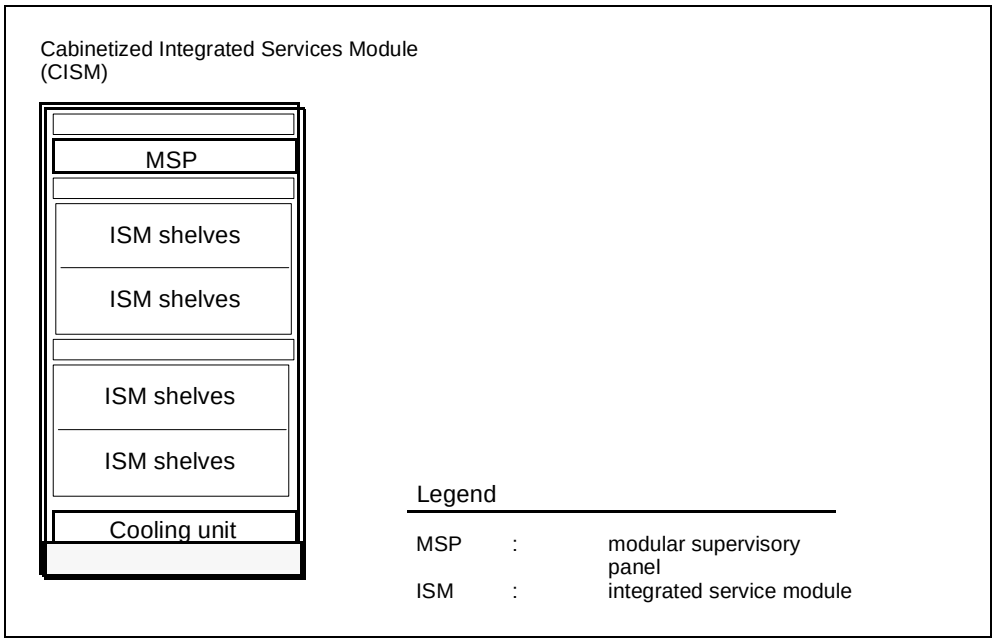
Frame supervisory panel

The FSP distributes and controls power and alarms in the cabinet. Power interlock is provided to the data store to prevent power loss or removal on both planes at the same time.

Cabinetized integrated services module

The CISM cabinet houses shelves for integrated services modules (ISM) in addition to performing the functions of the trunk module (TM) and the maintenance trunk module (MTM).

Figure 3-34 CISM components



Modular supervisory panel

The MSP distributes and controls power, provides monitoring, and controls alarms in the CISM cabinet. It also provides a maintenance block that includes connections for telephone and data, and test jacks for alarm battery supply (ABS).

Integrated service module

The integrated service module (ISM) provides the same functionality as the trunk module (TM) and the maintenance trunk module (MTM), as well as functionality similar to the service trunk module (STM) by using conference bridges and digital service circuits, such as the conference trunk module (CTM) and the enhanced digital recorded announcement machine (EDRAM), respectively.

Cooling unit

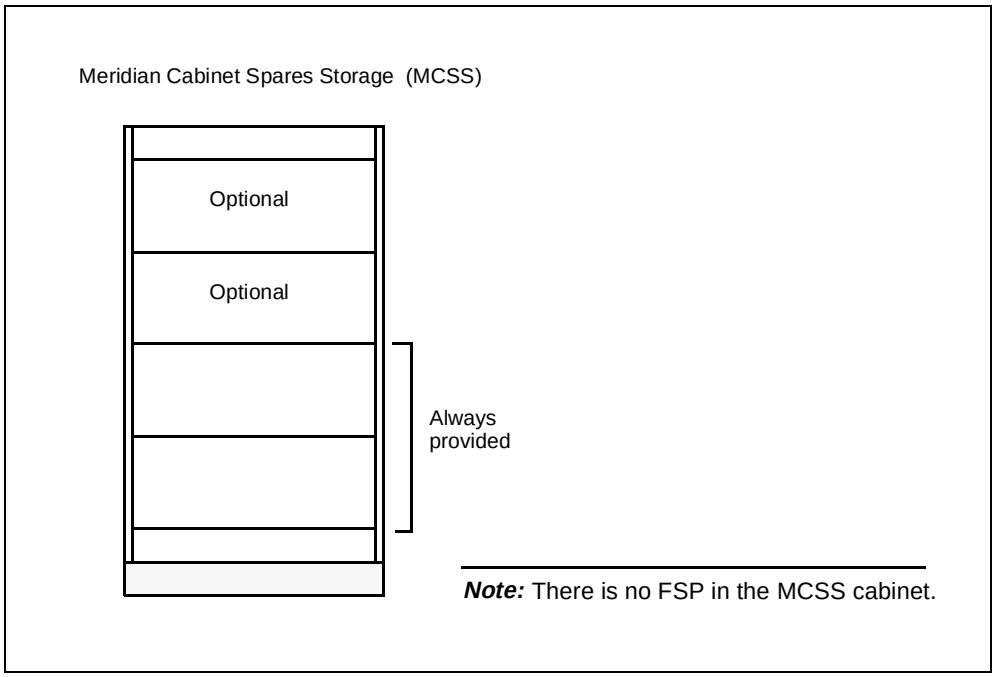
The cooling unit contains three 48V fans that provide a uniform airflow to the cabinet through a 10-inch by 23-inch exhaust area. An air filter placed directly above the fans provides the required particulate filtration. The fans normally run at low speed to minimize noise levels; however, if a condition of thermal stress occurs, the fans switch to high speed.

Meridian cabinet spares storage

Note: The MCSS is manufactured discontinued and is replaced by the Cabinetized Miscellaneous Spares Storage (CMSS). Refer to the description of the CMSS.

The MCSS cabinet comprises eight standard shelves where spare circuit packs can be stored. Four shelves can be mounted in the front of the cabinet, and four shelves can be mounted in the rear of the cabinet. The figure below illustrates the MCSS cabinet components.

Figure 3-35 MCSS components



Cabinetized miscellaneous spares storage

The CMSS can be configured with shelves and shelf inserts to provide storage for circuit packs plus a utility tray for technician tools. The CMSS provides framework, hardware, and ground braid assembly.

Storage shelf assembly

The storage shelf assembly is located in positions 03, 17, 31, and 45, but is always configured from the bottom up. The assembly provides a card cage plus sliders in the front and the rear for mounting spare circuit packs. The shelf accommodates a maximum of 54 circuit packs (22.2 mm [.875 in.] wide) or 42 circuit packs (28.5 mm [1.124 in.] wide). One shelf may be configured for each mounting position.

SuperNode spares circuit pack shelf assembly

The assembly provides a card cage plus sliders for storing up to two power converters and 20 SuperNode-size cards on the front side and a maximum of 26 paddle boards on the rear side.

The spare circuit pack shelf assembly is located in positions 04, 18, 32, and 46. Always configure the shelf assembly from the bottom up, and when mixing the storage shelf assembly with the SuperNode spares circuit pack shelf assembly, always configure the storage shelf assemblies first.

The SuperNode spares shelf assembly is configured in position 46 only when the storage shelf assembly is configured in position 31.

Storage shelf assembly insert

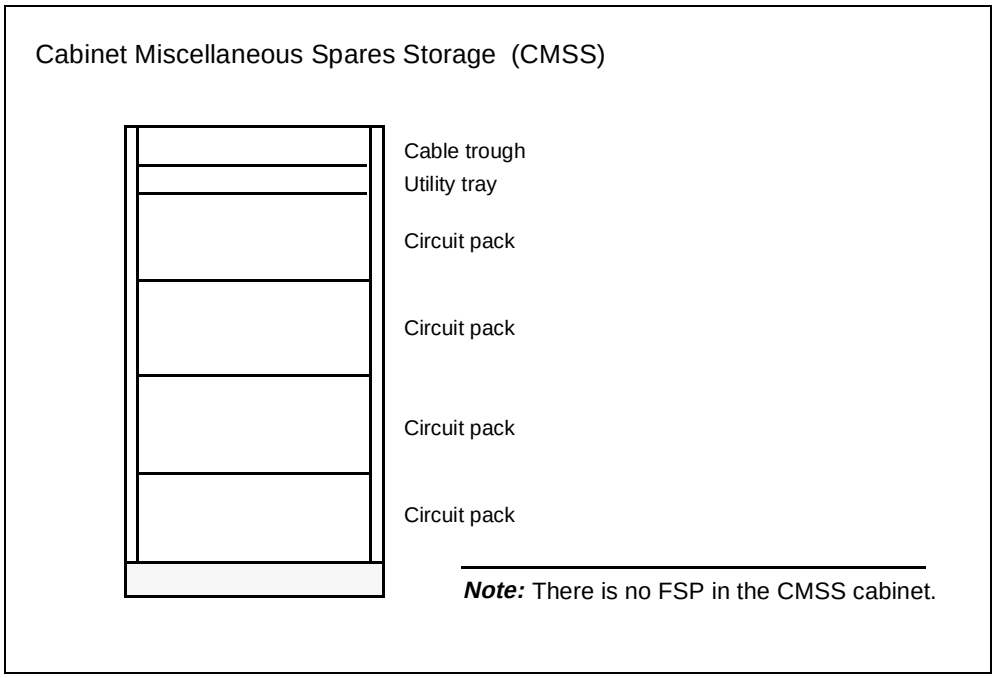
The storage shelf assembly insert provides storage for odd size circuit packs. The shelf insert stores a maximum of 22 circuit packs. Two shelf insert assemblies can be installed into the bottom storage shelf assembly at location 03. One storage shelf assembly insert is placed in the left side of the storage shelf assembly from the front and the second storage shelf assembly insert in the left side of the storage shelf assembly from the rear of the cabinet.

Line card storage chassis

A line card storage chassis is provided when line cards are configured. If the system requires line cards and three or more networks, two line card storage chassis should be provided.

Refer to the following figure for CMSS components.

Figure 3-36 CMSS components



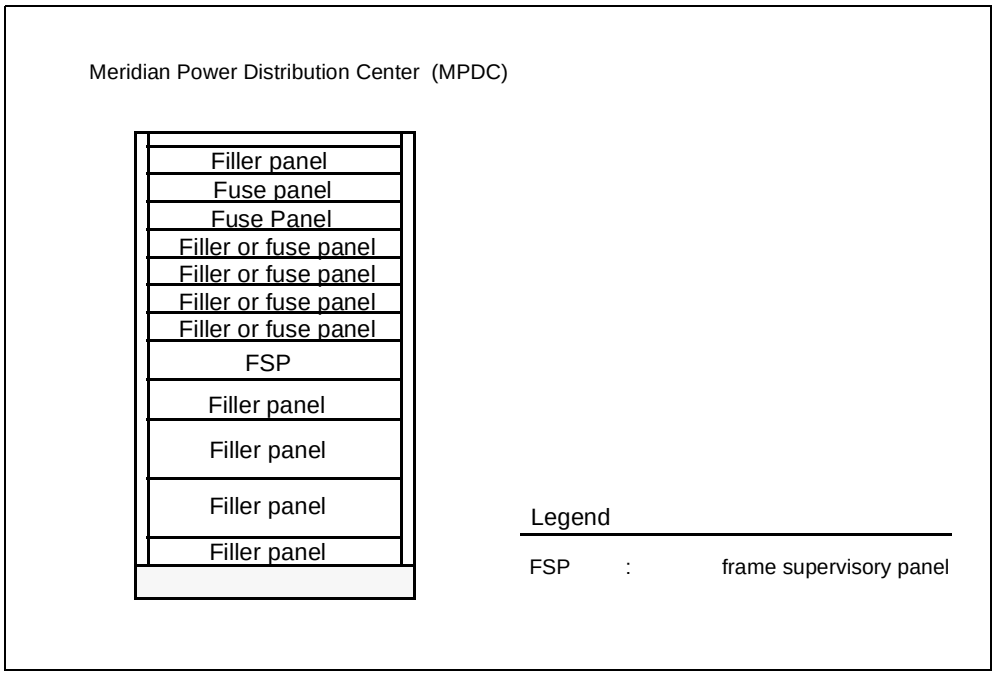
Meridian power distribution center

Note: The MPDC is manufacture discontinued and is replaced by the Cabinetized Power Distribution Center (CPDC). Refer to the description of the CPDC.

The LPP and IPEC units require the MPDC as the external common power source. The MPDC accepts -48 V dc from the power board and distributes this power to the cabinets assigned. The following figure illustrates the MPDC cabinet components.

Note: The LPP and IPEC units cannot be powered by the MCAM3 or MCPM.

Figure 3-37 MPDC components (bottom feed)



MPDC features

The MPDC provides the following features:

- two A-side and two B-side cable connection points (maximum cable size 750)
- four return feed connection points (one for each individual battery feed)
- maximum of 88 individual fuse-protected feeds available
- alarm signal to indicate blown fuses within the cabinet
- expandable fuse panels (from two to six fuse panels)
- configurable for either top or bottom cable entry

Cabinetized power distribution center

The CPDC is a single cabinet used to distribute power to the cabinets in the corresponding lineup. It provides dc power distribution and protection and optional inverted ac power for endguard outlets. The CPDC is the first cabinet in a linup of up to 11 cabinets.

The office alarm unit (OAU) provides alarm control and the CPDC services as the interface between equipment lineups and the OAU. The OAU is located in the first Cabinetized Trunk Module Equipment (CTME).

The CPDC provides a common product for numerous applications in both hosts and remotes. It also provides a compact configuration for small

applications with the option for seamless growth. The CPDC provides electromagnetic interference (EMI) compliance at the system level for all power distribution and at the cabinet level for all input power cabling.

Cabling

The dc power plant for the office supplies power to the CPDC at a nominal voltage of -48 V through separate battery feeders, A and B. (The power is returned from each CPDC to the power plant through battery return conductors, which are the same size as the battery feeders.)

The power is then distributed from the fuse/breaker panels in the CPDC to the frame supervisory panels (FSP) in the various equipment frames in the lineup through secondary battery feeders. It is returned to the CPDC through return feeders of the same size.

Required dc voltages other than -48 V are obtained from dc-dc converters, which are powered from -48 V and located within each equipment frame.

The CPDC accepts external cabling with either top or bottom entry. Internal cabling for all loads except for those in an NT9X01 or NT9X95AA style cabinet, exit and enter through the side of the cabinet. The NT9X95AA style cabinet accepts horizontal cabling. Feeds for the NT9X01 cabinet exit by way of feedthrough filter capacitors located on the NTRX31AA EMI bulkhead and route externally to these cabinets. Conversion to the NT9X95AA style eliminates the NT9X01 external power filters.

Frame supervisory panel

The FSP includes a frame fail light mounted at the top of the front of the cabinet and an electrostatic discharge wrist strap, located in the front.

Power distribution shelf

The power distribution shelf (PDS) provides wiring and circuit breaker protection to distribute power to the Meridian SL-100 system. The CPDC distributes up to a maximum of 200 A of 48 V dc power on each of its separate A and B buses.

A recommended 250A power board fuse provides overload protection. Distribution of the bulk dc power to equipment loads is by way of 30 A circuit breakers.

One or two PDSs can be configured, except for a lineup with a SuperNode-based cabinet, in which case one PDS is configured at shelf position 30. Configuration of PDS shelves varies according to the types of Meridian SL-100 frames to which the CPDC provides power.

A dc breaker panel is available and contains a total of 42 circuit breakers (21 on each of the A and B buses). Capacitive filtering of each bus is provided on

the breaker panel and one breaker on each bus is dedicated to this function, leaving 20 breakers for each bus for secondary distribution.

Supplementary power distribution shelf (optional)

A supplementary power distribution shelf can be configured. See the section, “Power distribution shelf."

Power cable junction box

The power cable junction box provides connection for supplementary shelves and is standard equipment on the CPDC.

500W inverter (optional)

The 500W inverter is an optional component that serves convenience outlets located in the equipment lineup endguards. The inverter kit contains the A0367433 LaMarch inverter, which converts the -48 V (nominal) dc from the office battery to 110 V ac.

Bulkhead filler panel

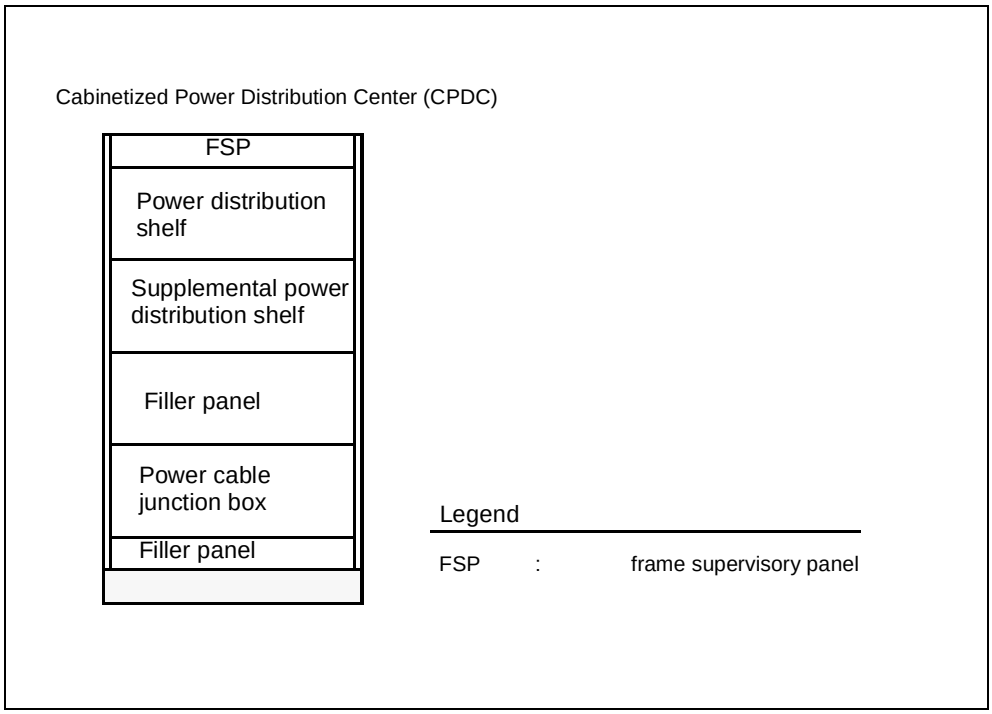
Two bulkhead filler panels are used when the CPDC is in a lineup without a SuperNode, link peripheral processor (LPP), or ENET mounted in a cabinet.

16-inch filler panel

One 16-in. (0.41 m) filler panel comes standard with the CPDC and is mounted at shelf position 14. One or two other panels should be used to fill unused PDS shelf spaces at positions 30 and 46.

Refer to the following figure for CPDC components.

Figure 3-38 CPDC components



Remote peripheral cabinet modules

Remote peripherals are specially equipped units located at a maximum distance of 150 miles (240 km) from the host Meridian SuperNode system, but operate as peripheral modules of the Meridian SuperNode system through DS-1 links. The Meridian SuperNode host office can accommodate up to 64 remote sites, depending on the configuration.

The remote peripheral cabinets include the following modules:

- Meridian Cabinet Remote Module (MCRM)
- Meridian Cabinet Remote Unit (MCRU)
- Meridian Power Remote Module-SONET (MCRM-S)

The remote peripheral cabinets are described briefly in the following section. For more information on remote peripherals, refer to the *Remote Peripherals General Description*.

Meridian cabinet remote module

Note: The MCRM is manufacture discontinued and replaced by the MCRM-S. Refer to the description of the MCRM-S in Section 12.

Meridian cabinet remote unit

The MCRU can interface up to 640 remote subscribers to a Meridian SuperNode host. The MCRU interfaces to the host through two to six DS-1 links. The remote provides an intra-calling capability, allowing calls between subscribers on the same MCRU to be locally switched. At the Meridian SuperNode host, DS-1 links from the MCRU interface to the system through an LTC or LGC. For increased reliability, the primary DS-1 links should terminate on different DS-1 line cards at the host LTC or LGC.

In the event of a complete outage of all DS-1 links between the remotes and the host office, the emergency standalone (ESA) feature provides the capability to maintain basic service for remote subscribers. Additional hardware is required for this optional service.

Meridian cabinetized remote module-SONET

The MCRM-S is a replacement for the MCRM-I that performs all the functions of the ISDN cabinet on a new platform that provides an interface for future fiber optics. The MCRM-S supports all services for POTS, IVD, and ISDN lines.

4 System configuration

Cabinet update

Many of the Meridian cabinets are manufacture discontinued (MD) to streamline the product line. There are also a couple of Meridian cabinets that have reached the end of life. All of the cabinets that are manufacture discontinued, or have reached the end of life, have replacements. Table “Meridian cabinets update” on page 1-1 of chapter Cabinet modular hardware provides a list of the MD and end of life cabinets and their replacements, plus the cabinets introduced in release Meridian SL10.

System configuration overview

The Meridian SuperNode system cabinetized configuration is based on five system groups of modules (groups 0 to 4).

- The first group, called the primary group or group 0, contains the central control functions shown in the following list.
  - — the dual plane combined core (DPCC) cabinet for the SuperNode system
  - — the SuperNode combined core (SCC) cabinet for the SuperNode SE system
  - — other system elements to support up to 9000 lines
- The other four groups, called secondary groups or groups 1 to 4, contain elements that are added as required to increase the system size.

Cabling between modules is minimized, being self-contained within a lineup. The only external connections are the lines, trunks, and network connections to the core module and other group networks.

This section describes the typical standard group configurations and the non-standard configurations with merged lineups.

Standard group configurations

Every SuperNode system requires a 3-lineup configuration for the primary group (group 0) for the first 9000 lines, plus two lineups of a secondary group for each 9000-line increment.

Every SuperNode SE system may be configured with a 2- or 3-lineup configuration for the primary group (group 0) for the first 9000 lines, plus two lineups of a secondary group for each 9000-line increment.

Primary group lineups

SuperNode system

For a one-group SuperNode system serving up to 9000 lines (8 ccs per line) or for the primary group (group 0) of a larger system, the first lineup consists of the Meridian Power Distribution Center (MPDC); DPCC; optional cabinets such as enhanced network (ENET), Link Peripheral Processor (LPP), and Intelligent Peripheral Equipment (IPE); plus room for future cabinets.

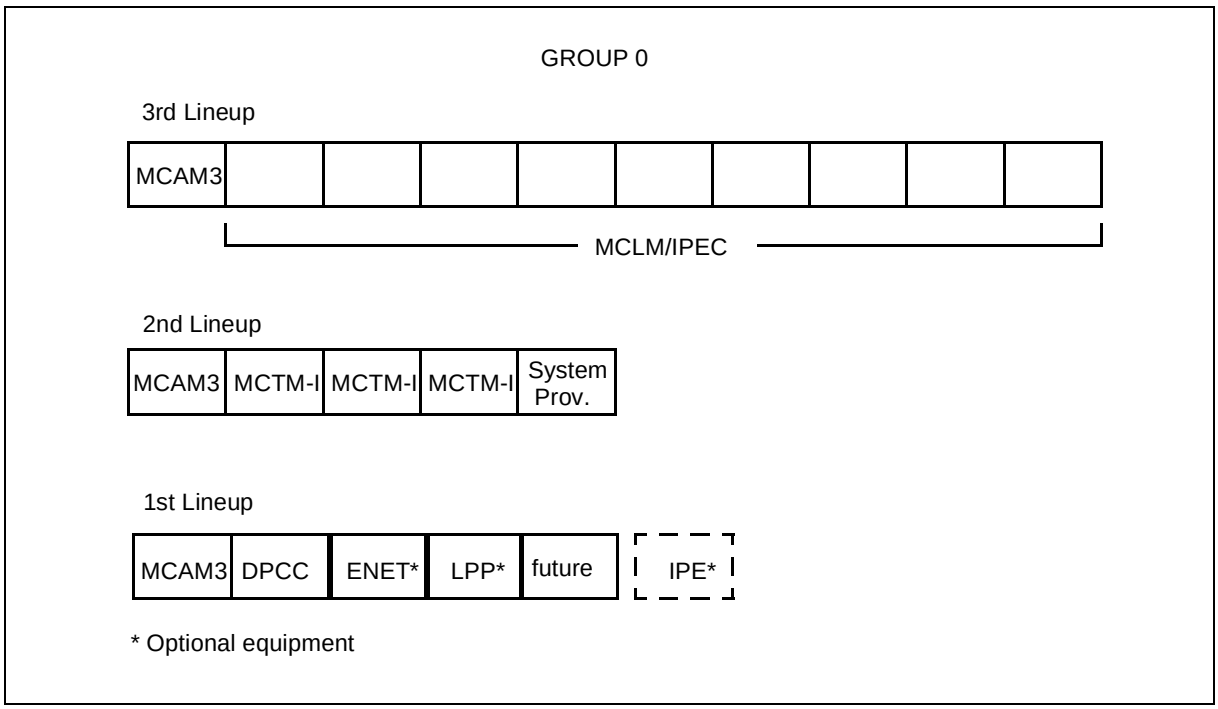
Note 1: The ENET cabinet is optional for SuperNode systems. The SuperNode can interface with existing junctored networks (JNET), which are housed in the Meridian Cabinet Network Module (MCNM).

Note 2: For SuperNode systems after release MSL03, ENET is always provisioned.

Note 3: The MPDC is manufacture discontinued and is replaced by the Cabinetized Power Distribution Center (CPDC). Refer to Chapter 3.

Every initial SuperNode system requires the first lineup as shown in the following figure.

Figure 4-1 Primary group—SuperNode system lineup



The second lineup of the primary group for a full-size SuperNode system consists of the Meridian Cabinet Auxiliary Module phase 3 (MCAM3), followed by three Meridian Cabinet Trunk Module-ISDN (MCTM-I) cabinets

and a system provisionable cabinet (Figure "Primary group—SuperNode system lineup" on page 4-2).

The third lineup of the primary group consists of the MCAM3, plus up to eight Meridian Cabinet Line Modules (MCLMs) or up to ten Intelligent Peripheral Equipment Cabinets (IPEC), or a combination of MCLMs and IPECs, as needed (Figure "Primary group—SuperNode system lineup" on page 4-2).

All MCLM and IPEC cabinets of the third lineup are directly connected to their respective MCTM-I in the second lineup by a single standard cable for each enhanced line module (ELM) that connects between the rear bulkheads. All other cabling is self-contained within the lineups.

SuperNode SE system

The power source (MPDC, CPDC, or MCAM3) determines the primary group lineup configuration for a one-group SuperNode SE system serving up to 9000 lines (8 ccs per line) or a primary group (group 0) of a larger system.

SuperNode SE systems powered by an MPDC or CPDC require three lineups in the primary group (Figure "Primary group—SuperNode SE powered by MPDC" on page 4-4), and systems powered by an MCAM3 require two lineups (Figure "Primary group—SuperNode SE powered by MCAM" on page 4-4).

SuperNode SE system powered by an MPDC or CPDC

For SuperNode SE systems powered by an MPDC or CPDC, the first lineup of cabinets consists of an MPDC or CPDC, SCC, optional cabinets such as the LPP and IPE, plus room for future cabinets (Figure "Primary group—SuperNode SE powered by MPDC" on page 4-4).

The SuperNode SE system's second lineup of cabinets consists of the MCAM3, followed by three MCTM-Is and a system provisionable cabinet (Figure "Primary group—SuperNode SE powered by MPDC" on page 4-4). The SuperNode SE cabinet (SCC) contains an ENET shelf, therefore, MCNMs are not provisioned with the system.

The SuperNode SE system's third lineup consists of the MCAM3, plus up to eight MCLMs (Figure "Primary group—SuperNode SE powered by MPDC" on page 4-4).

All MCLM cabinets of the third lineup are directly connected to their respective MCTM-I in the second lineup by a single standard cable for each ELM that connects between the rear bulkheads. All other cabling is self-contained within the lineups.

Figure 4-2 Primary group—SuperNode SE powered by MPDC

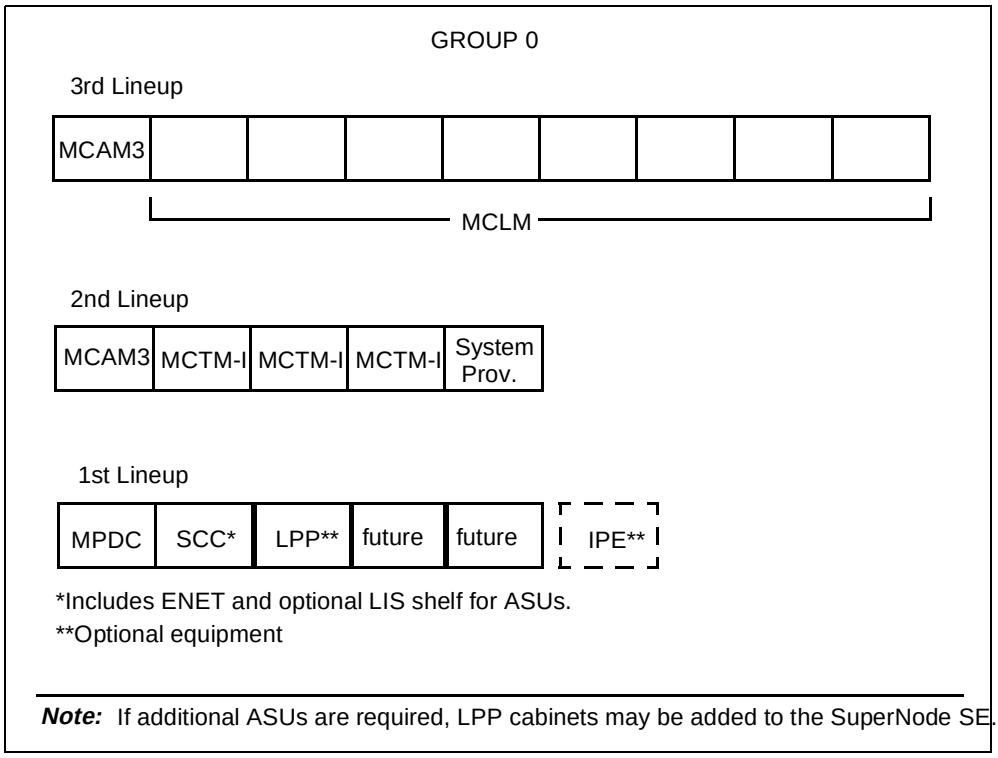
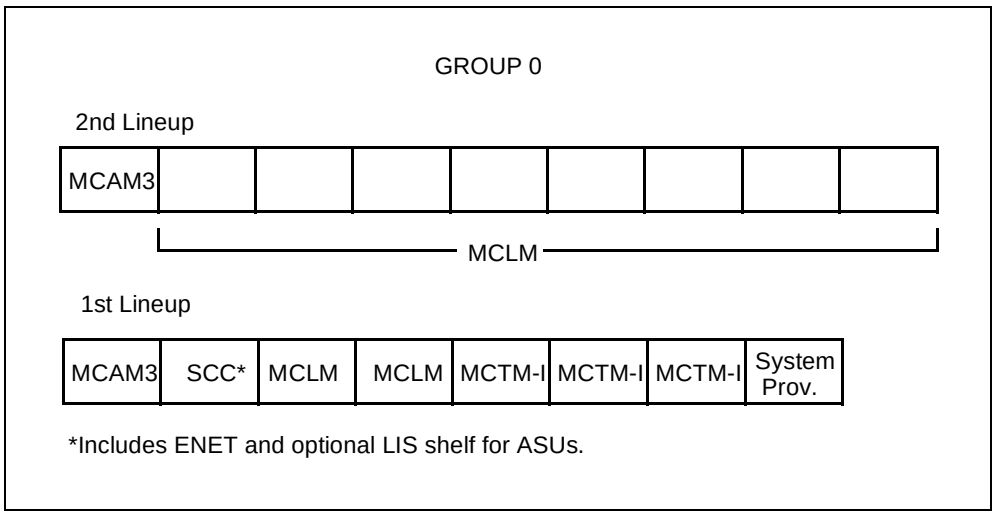


Figure 4-3 Primary group—SuperNode SE powered by MCAM



SuperNode SE system powered by an MCAM3

For SuperNode SE systems powered by an MCAM3, the first lineup consists of the MCAM3 followed by the SCC, three MCTM-Is, and a system provisionable cabinet (see Figure "Primary group—SuperNode SE powered by MCAM" on page 4-4). The SuperNode SE cabinet (SCC) contains an ENET shelf, therefore, MCNMs are not provisioned with the system.

The second lineup consists of the MCAM3, plus up to eight MCLMs or up to ten IPECs, or a combination of MCLMs and IPECs, as needed (Figure "Primary group—SuperNode SE powered by MCAM" on page 4-4).

If an IPE, LPP, or both are added to the system, a third lineup must be provisioned containing these cabinets, plus an MPDC or CPDC to supply power to the lineup.

Secondary group lineups

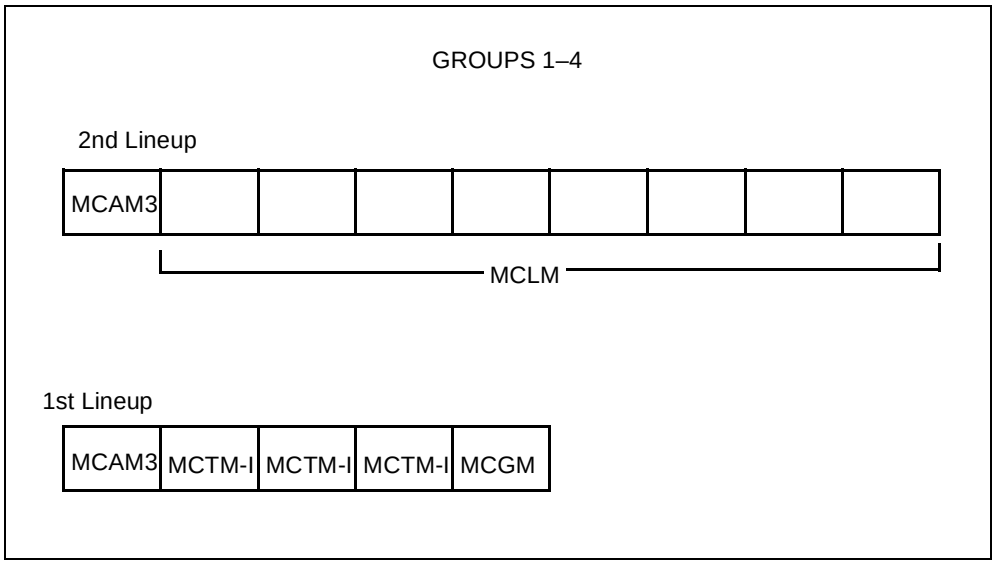
The other four secondary groups (Groups 1 to 4) are alike and use a similar two-lineup configuration for the SuperNode and SuperNode SE systems.

> ***Note:*** This document presents examples of typical configurations. Your configuration may vary slightly. For SuperNode and SuperNode SE systems with ENET, the MCNM cabinet shown in Figure "Cabinet lineups for secondary groups" on page 4-5 would not be provisioned.

The first lineup of a secondary group in a typical configuration contains the MCAM3 followed by MCTM-Is (Figure "Cabinet lineups for secondary groups" on page 4-5).

The second lineup of a secondary group consists of the MCAM3 plus MCLMs. It supports up to ten cabinets for each lineup (Figure "Cabinet lineups for secondary groups" on page 4-5).

Figure 4-4 Cabinet lineups for secondary groups



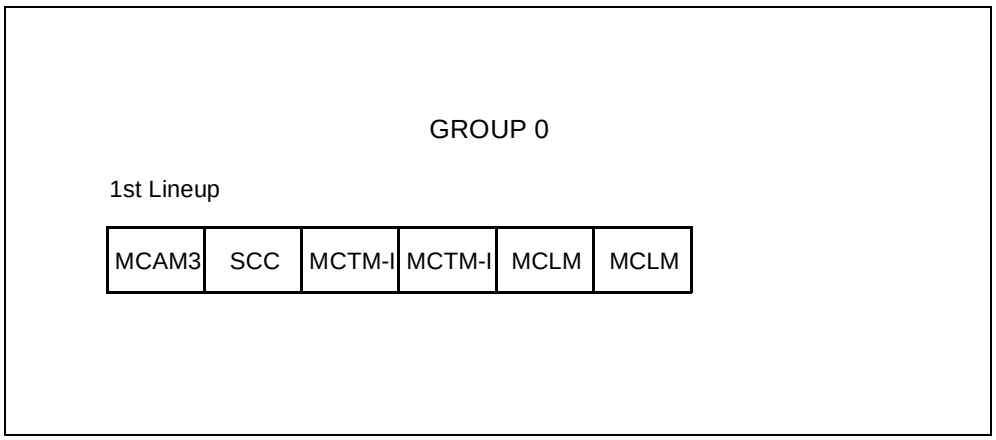
Merged lineups or non-standard configurations

A standard floor plan is not appropriate under the following conditions:

- when configuring a small switch of 2000 lines or less
- when lineups can be merged to make efficient use of floor space and cabling

For example, initial SuperNode SE systems of 2000 lines or less can have the lineups within a primary group merged into a single lineup as shown in Figure "SuperNode SE Group 0 merged into a single lineup" on page 4-6.

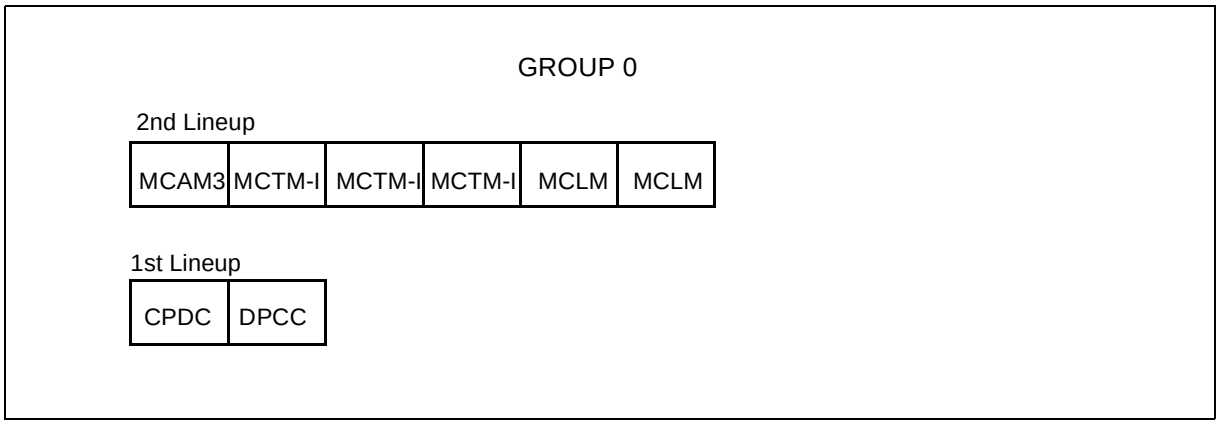
Figure 4-5 SuperNode SE Group 0 merged into a single lineup



A single lineup can be engineered only if the MCAM3 is used as the power source. If an MPDC or CPDC is used to power the SCC, a second lineup is required. Additionally, if an IPE, LPP, or both are added, a second lineup must be provisioned consisting of these cabinets, plus an MPDC or CPDC to supply power.

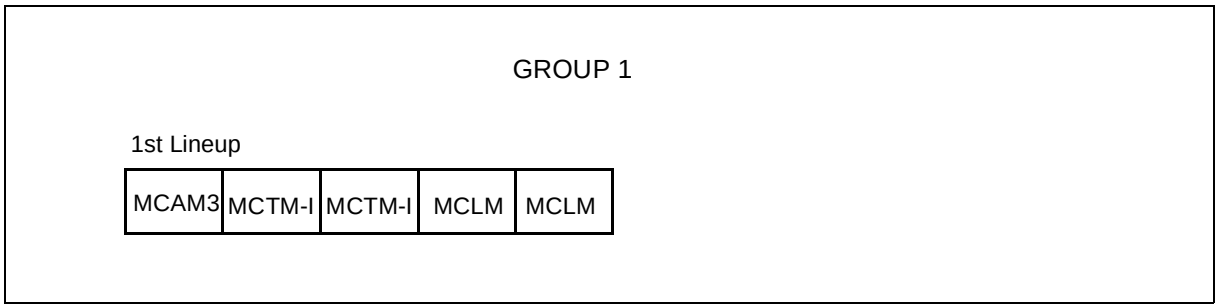
For initial SuperNode systems, the primary group can be merged into two lineups to minimize the amount of floor space used (Figure "SuperNode Group 0 merged into two lineups" on page 4-7).

Figure 4-6 SuperNode Group 0 merged into two lineups



Secondary group lineups can also be merged for floor space efficiencies. Lineups 1 and 2 of a secondary group consisting of an MCAM3, MCTM-I, and MCLM can be merged into a single lineup as shown in Figure "Secondary group merged into a single lineup" on page 4-7.

Figure 4-7 Secondary group merged into a single lineup



5 System performance

This section describes the requirements for the following system performance factors:

- power consumption
- floor loading
- temperature and humidity environment

This section also describes the features that require special provisioning and the features that require minimal customizing.

Power consumption

The Meridian SuperNode cabinets operate in the voltage range, 42 to 56 V dc. Table "Typical power requirements for cabinets" on page 5-1 shows the typical power requirements for the cabinet modules.

Table 5-1 Typical power requirements for cabinets (Sheet 1 of 3)

Module	Current at -48 V dc
SuperNode cabinet:	
Dual Plane Combined Core (DPCC)	46 A
SuperNode SE cabinet:	
SuperNode Combined Core (SCC)	48 A
Trunk cabinets:	
Meridian Cabinet Trunk Module-ISDN (MCTM-I)	30 A
Cabinetized Integrated Services Module (CISM) (see note)	0 A

Note: The MCDM is manufacture discontinued (MD) and is replaced by the IPEC. The MCPM is MD and is replaced by the MCAM3. The MCGM is MD and is replaced by the MCAM3 and the CISM. The MCSS is MD and is replaced by the CMSS.

Table 5-1 Typical power requirements for cabinets (Sheet 2 of 3)

Module	Current at -48 V dc
Line cabinets:	
Meridian Cabinet Line Module (MCLM)	30 A
Meridian Cabinet Line Module-ISDN (MCLM-E)	30 A
Meridian Cabinet Digital Module (MCDM) (see note)	30 A
Intelligent Peripheral Equipment Column (IPEC) (see note)	27 A
Link peripheral processor cabinet:	
Link Peripheral Processor (LPP)	64 A
Cabinetized Multi-Vendor Interface:	
Cabinetized Multi-Vendor Interface (CMVI)	30A
Network cabinets:	
Meridian Cabinet Network Module (MCNM)	20 A
Enhanced Network (ENET)	95 A
Meridian Cabinet Network Interface (MCNI)	100 A
Spectrum peripheral module cabinet:	
Spectrum Peripheral Module (SPM)	64 A

Note: The MCDM is manufacture discontinued (MD) and is replaced by the IPEC. The MCPM is MD and is replaced by the MCAM3. The MCGM is MD and is replaced by the MCAM3 and the CISM. The MCSS is MD and is replaced by the CMSS.

Table 5-1 Typical power requirements for cabinets (Sheet 3 of 3)

Module	Current at -48 V dc
International peripheral equipment cabinet:	
Cabinetized International Peripheral Equipment (CIPE)	64 A
Maintenance and administration cabinets:	
Meridian Cabinet Power Module (MCPM) (see note)	16 A
Meridian Cabinet Service Module (MCSM)	16 A
Meridian Cabinet Auxiliary Module phase 3 (MCAM3)	11 A
Meridian Cabinet General Module (MCGM) (see note)	15 A
Meridian Cabinet Spares Storage (MCSS) (see note)	0 A
Cabinetized Miscellaneous Spares Storage (CMSS) (see note)	0 A
Note: The MCDM is manufacture discontinued (MD) and is replaced by the IPEC. The MCPM is MD and is replaced by the MCAM3. The MCGM is MD and is replaced by the MCAM3 and the CISM. The MCSS is MD and is replaced by the CMSS.	

Typical lineup current drains can be calculated.

For details on the SuperNode DPCC and SuperNode SE SCC power requirements, refer to Section 3.

Floor loading

The increased area of the cabinet base reduces spot floor loading by 25 percent in comparison to equivalent standard equipment frames. For a cabinet weighing 1200 lb, floor loading is 240 lb/sq ft, if resting on the base instead of the leveling feet.

Environmental requirements

The temperatures and relative humidity conditions listed in Tables "Temperature and humidity specifications (Meridian SuperNode cabinets)" on page 5-4 and "Temperature and humidity specifications (IPEC)" on page 5-4 are based on a maximum duration of 72 continuous hours and a total duration of 15 days per year.

The maximum rate of temperature excursion should not exceed 1 degree Celsius per minute.

Table 5-2 Temperature and humidity specifications (Meridian SuperNode cabinets)

Temperature range	Relative humidity
Minimum: 41° F (5° C)	*Minimum:* 20% (noncondensing)
Maximum: 120° F (48° C)	*Maximum:* 80% (noncondensing)
Recommended: 50° to 86° F (10° to 30° C)	*Recommended:* 20% to 50% (noncondensing)

Table 5-3 Temperature and humidity specifications (IPEC)

Temperature range	Relative humidity
Minimum: 40° F (4° C)	*Minimum:* 20% (noncondensing)
Maximum: 113° F (45° C)	*Maximum:* 80% (noncondensing)
Recommended: 59° to 86° F (15° to 30° C)	*Recommended:* 20% to 50% (noncondensing)

Standard features

All Meridian SuperNode system features and capabilities are available for the cabinet model. Most can be ordered through a supercode. However, special customer requirements are arranged on an as-needed basis.

The following features do not require special provisioning:

- all features other than hardware-dependent features
- any terminal-dependent features
- single digital recorded announcement machines (DRAM)
- music on hold
- paging, radio paging
- multiline test unit (MTU)
- transmission test unit (TTU)
- transmission test trunk (TTT)
- 101, 103 test lines

The following features require minimal customizing:

- additional magnetic tape drive (MTD)
- analog trunk interface

The following are some of the features that can be provided with the Meridian SuperNode system:

- remote office test line (ROTL)
- automatic number announcer (ANA)
- Meridian mail

For more information on general features available for the Meridian SuperNode system, refer to the *Feature Description Manual*.

6 System software

The Meridian SuperNode system is a large, multi-port process control system. The software is made up of individual processes that perform the functions necessary for operation. These processes communicate with each other, or with processes in peripheral devices, by a message passing facility.

Messages are generated by processes and are placed in message buffer queues. The queues are examined by the operating system in a certain sequence, according to priority. The operating system determines the destination process for each message and activates the process that uses the message information in its execution.

As a call progresses through various states, processes involved with the call move from state to state. State transition occurs when one process receives a message from another process, indicating the occurrence of an event. The operating system controls all the processes and controls allocation of machine resources.

The Meridian SuperNode system combines the concepts of process, state, and event, along with techniques of language, database, and operating system design to ensure a flexible and efficient software structure.

The Meridian SuperNode software consists of the following functional areas:

- operating system
- call processing
- administration
- database management

These areas are described in subsequent pages, with each functional area beginning at the top of a new page.

At the end of this chapter, after the database management description, the modular software structure of the Meridian SuperNode software is described.

Operating system

The control functions associated with the Meridian SuperNode system are handled by the operating system.

The operating system is a real-time system, capable of simultaneously handling a number of different tasks, such as calls in different stages of completion, and routine maintenance functions.

The functions performed by the operating system include the following:

- storage allocation
- pool allocation
- process scheduling and timing
- sharing system resources
- queueing
- message passing
- logging events
- input/output control
- file control and support
- command interpreting
- program loading

These functions are described in the following paragraphs.

Storage allocation

The storage allocation system allocates and deallocates blocks of storage in both program store and data store and maintains free storage area.

Pool allocation

The pool allocation system groups items of the same size and type into pools within specific blocks of storage, to be allocated and deallocated as required.

Process scheduling and timing

The process scheduling and timing system schedules processes based on priority queues. After reaching the top of the queue and being allowed to run, processes are limited to a certain amount of time for execution.

Sharing system resources

The sharing system resources system controls simultaneous access to blocks of data through semaphores and flags. Semaphores allow many processes to read data, but allow only one process to write data at a time. Flags control allocation and deallocation of resources.

Queueing

The queueing system provides for adding and deleting items from different types of queues.

Message passing

The message passing system controls direct and indirect communication between processes through data transferal.

Logging events

The log system provides output reports giving information about events occurring inside the Meridian SuperNode system. Log reports are stored in buffers and sent to various output devices.

Input/output control

The input/output control system controls communication between the CPU and the peripheral modules.

File control and support

The file system controls system files and supports various output device types, such as terminals, line printers, tapes, and disks.

Command interpreter

The command interpreter (CI) system allows user interface with the system for maintenance and administrative functions entered through the MAP workstation.

Program loading

The program loader system loads application software into program store and data store.

Call processing

Call processing (CP) software provides the code for the call processing functions associated with different types of telephony agents such as lines, trunks, and attendant consoles in the Meridian SuperNode system.

Call processing procedures are executed when one action triggers the appropriate series of programmed instructions.

The functions performed by the call processing system include the following:

- call sequence control
- digit reception and translation
- billing data collection

These functions are described in subsequent paragraphs.

Call sequence control

The call sequence control system provides control of the telephone call state transitions from the beginning to the end of each call.

Digit reception and translation

The digit reception and translation system provides the analysis of signaling data and the determination of the appropriate call routing.

Billing data collection

The billing data collection system collects data to support call charging functions.

Administration

The administrative functions of the Meridian SuperNode system include getting the system started, supporting primary system functions, and planning for long term growth and operation.

Four modules contain procedures for performing system administration functions:

- system loading and initialization
- service charge
- system malfunction analysis
- traffic data collection

These modules are described in the following paragraphs.

System loading and initialization

The system loading and initialization module establishes the system on site as a working unit.

Service charge

The service change module supports day-to-day equipment change such as translation data changes.

System malfunction analysis

The system malfunction analysis module provides a centralized collection and analysis point for invalid conditions detected primarily by audits and hardware or software defensive checks throughout the system.

Traffic data collection

The traffic data collection module administers counters and other indicators for registering equipment traffic.

Database management

The database management software supplies a means of directing queries and changes to the system. The database is accessible from the MAP workstation.

The facilities described in the following paragraphs enable a user to define, access, or modify system data at various levels.

Table control

Table control provides facilities for maintaining tables of data in a controlled manner. Table control provides procedures for accessing and modifying system data, used by the table editor and service order facilities.

Table editor

The table editor provides a user interface to system data, enabling the user to modify information in Meridian SuperNode system data tables.

Service order system

The service order system provides a user interface to line data. This uses standard telephone industry command format.

Pending order system

The pending order system provides facilities for storing data modification orders (DMO) and for retrieving them at a specified time for execution.

Journal file

The journal file preserves DMOs from the table editor and service order system on a recording device. This allows data tables to be re-executed if the Meridian SuperNode system must be reloaded from a backup of the data.

Software evolution

An important aspect of software evolution is the simplification of the product structure. Improvements now give Nortel Networks the ability to bring new services to market more quickly and enable a new generation of advanced services.

Software layering

Software layering allows partitioning the switch software into relatively independent components with well-defined interfaces to other components and provides Nortel Networks the ability to develop and deliver new services faster.

Layers are relatively independent software modules with well-defined links to other modules, allowing the software to take advantage of object-oriented programming and other efficiencies for faster service development.

Software layers, however, should not be considered when ordering Meridian SuperNode software. Each new product computing module load (PCL) automatically includes the latest available features in each software layer—Base, Telecom, Product, and Market—as well as XPM software.

Technically, a PCL combines three major software components, each of which is developed on an independent schedule:

- *Communications Services Platform (CSP)*: The CSP forms a software base common to all SuperNode applications, regardless of switch type. The base and telecom layers make up the CSP. A PCL does not actually contain XPM software, rather XPM software is delivered with the PCL.
- *DMS-100 Common (CCM)*: This layer is the product layer, which contains all features shared by all DMS family applications (including Meridian SuperNode systems).
- *North American DMS-100 (CNA)*: This layer is the custom layer, which contains custom features shared by all North American DMS family applications (including Meridian SuperNode systems).
- *Meridian SL-100 (MSL)*: This layer is the market layer, which contains all features that make the Meridian SuperNode system a unique product (such as integrated voice and data or defense switched network software).

The preceding terms occasionally occur in technical descriptions, but they are not relevant to provisioning and ordering a switch. These terms simply represent partitioned modules in the switch that are developed separately.

Simplified switch options

In BCS36 and below, Nortel Network's SuperNode software was divided into hundreds of NTX packages. When provisioning a switch, the customer chooses from among these packages and deals with software dependencies. In the new software structure, many hundreds of NTX packages are reduced to fewer software options for easier provisioning.

Product CM Loads (PCLs)

Under the BCS development stream, many customers ordered custom loads to meet their individual needs. While this type of provisioning allowed flexibility in service selection, it had many disadvantages. If the customer chose to deploy a service resident in an NTX package not present in the switch, the customer completely re-loaded the BCS to obtain the new package. Also, custom software loads resulted in thousands of different software configurations in the field, which greatly complicated verification and support.

After BCS36, Nortel Networks began delivering PCLs instead of BCS releases or universal software loads (USL). Each PCL contains all the generally available software for a particular switch application in a particular market. There is no need to re-load software to deploy a generally available feature because all features are already present in the switch.

Previously, Nortel Networks tested BCS releases in their entirety and then delivered subsets of the BCS as custom loads. With PCLs, the customer receives software in the exact configuration in which it is developed. The

customer chooses which services are to be deployed either by choosing one of the PCLs applicable to their market or purchasing one of the software options in the PCL.

Software options

Effective with software release MSL03, all generally available Meridian SuperNode system features reside in the software load. On purchasing MSL03 or above software, whether as part of a new system or as an upgrade to an existing system, the customer has the right to use all features resident in the load. Exceptions will be the following software options that must be purchased from Nortel Networks before use in the customer's switch:

- automatic call distribution (ACD)
- Common Channel Signaling Number 7 (CCS7)
- Custom Local Area Signaling Services (CLASS)
- DataSPAN Frame Relay
- dialable wideband services
- ISDN Primary Rate Interface (ISDN PRI)
- ISDN Basic Rate Interface (ISDN BRI)
- packet handler
- Simplified Message Desk Interface (SMDI)
- Switch-Computer Application Interface (Meridian SCAI)

The right to use software features associated with these applications must be purchased separately. Software optionality control (SOC) allows Nortel Networks to enable optional software or applications, on a site-by-site basis, on receipt of an appropriate purchase order.

MSL development stream

Features for all Meridian SuperNode system PCLs, stand-alone and combined applications, are developed in the MSL development stream. The MSL development stream is updated approximately twice a year, and each new product release is given a sequential number (for example, MSL06, MSL07, MSL08). The availability of a new MSL version allows new PCLs to be assembled from the MSL development stream.

A PCL is a software load consisting of features selected from an MSL product release and intended for a particular SuperNode application in a particular market. Every PCL with the same name is the same in terms of software content: *fully tested and verified in the exact configuration released to the customer*.

Nortel Networks advertises availability for Meridian SuperNode system features by giving the MSL product release in which the feature is available. For example, a feature may become available in MSL07. That means that PCLs built from MSL07 and later will contain the feature. Note that the PCL represents the ordered part of the software load. The MSL product release cannot be ordered, but represents the vintage of software from which the PCL is built.

PCL ordering codes

Each PCL is given a PCL name and corresponding ordering code that describes the PCL product type, market application, and the MSL product release from which the PCL is built. Any addition or changes to PCLs in subsequent MSL product releases may apply to that release only. *Please verify any future PCLs and ordering codes through the appropriate marketing literature and customer documentation.*

Table "PCL commercial systems ordering codes" on page 6-8 shows the PCL code, the PCL ordering code, and the customer documentation ordering number that describes what is in that release.

Table 6-1 PCL commercial systems ordering codes

Release	PCL code	Ordering code	Customer documentation ordering number
MSL03	MSLI0003	00033396	P0809271
MSL04	MSLI0004	00034868	P0810839
MSL05	MSLI0005	00035482	P0810320
MSL06	MSLI0006	00037107	P0854588
MSL07	MSLI0007	00038143	P0854589
MSL08	MSLI0008	00040088	P0854590
MSL09	MSLI0009	00039994	P0884902
MSL10	MSLI0010	00042141	P0884904
MSL11	MSLIV0011	MSLI0011	P0884906

7 Maintenance and administration system

Overview

The MAP workstation provides an interface between telecommunications personnel and the Meridian SuperNode system. This section provides an overview of the following MAP workstation function tasks:

- general maintenance
- line maintenance
- trunk maintenance
- administration

For more information on MAP workstation functions and procedures, refer to the *Input/Output System Reference Manual*, 297-1001-129, the *Non-Menu Commands Reference Manual*, 297-1001-820, and the *Menu Commands Reference Manual*, 297-1001-821.

This section also provides the following additional information related to the maintenance and administration system:

- MAP workstation access control
- emergency assistance
- Helmsman software (electronic documentation)
- Optivity Telephony Manager (formerly Switch Manager)

General maintenance

The Meridian SuperNode maintenance system provides complete maintenance of the hardware and software by monitoring key functional areas and by detecting, analyzing, correcting, and reporting errors occurring in these areas.

User-machine interface

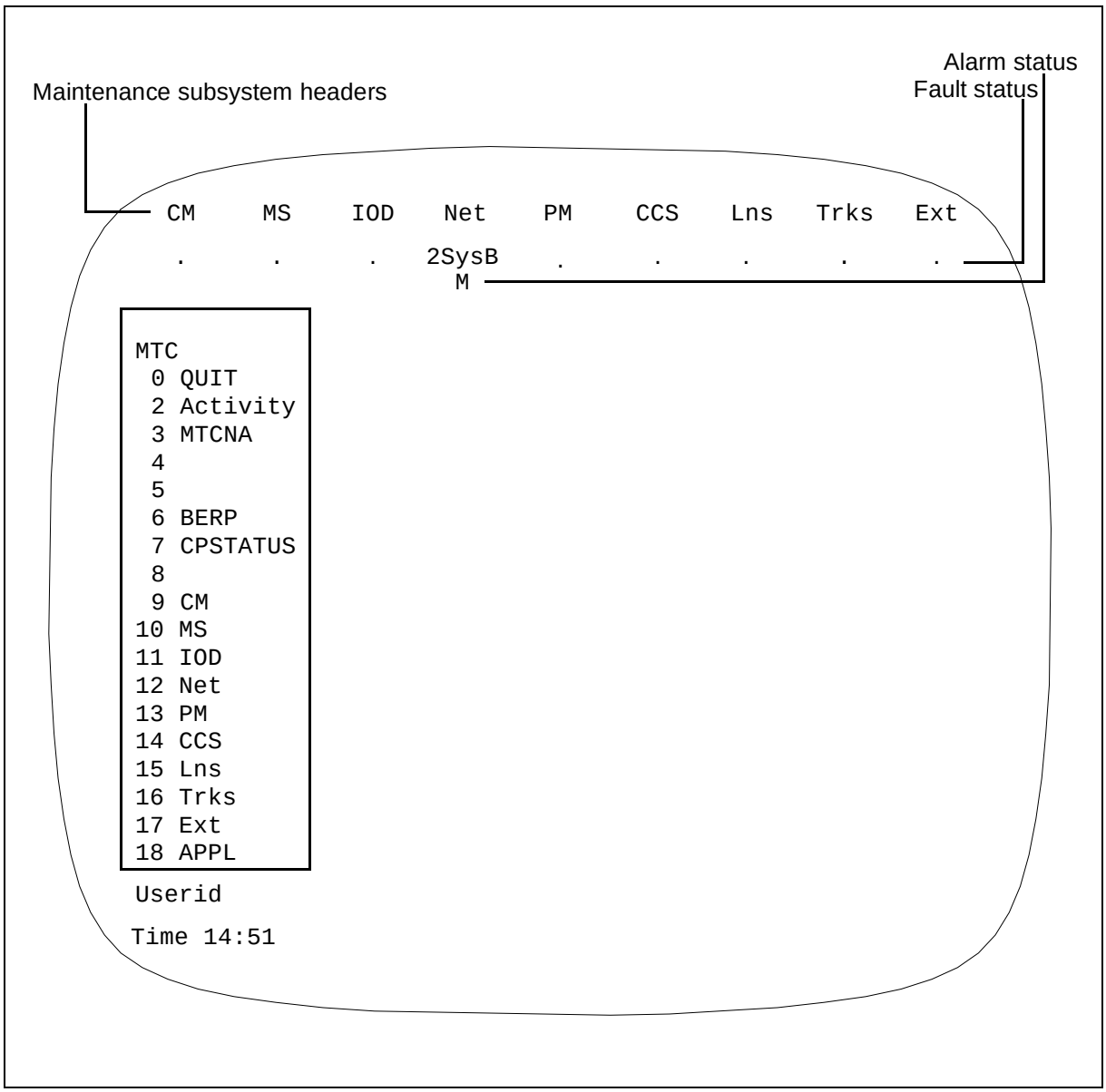
To perform the various maintenance tasks, a sequence of commands is entered on the MAP workstation keyboard. The user is prompted by responses displayed on the video display unit.

The maintenance system uses menu hierarchies to examine the operation of the Meridian SuperNode system. A hierarchy of menus presented on the MAP workstation permits details to be obtained about system status or trouble. Displays start at the maintenance subsystem (top) level and descend to lower levels until the fault is eventually traced to a replaceable component or system malfunction.

The figure below shows a sample MAP workstation display screen at the first maintenance level on the Meridian SuperNode system with SuperNode core.

Note: Maintenance headings shown in the figure are for documentation example purposes only. The headings on another MAP workstation display screen may be different.

Figure 7-1 MAP maintenance (MTC) system status display



A dot beneath a header indicates that the status of the subsystem is satisfactory. Any other code indicates that an out-of-service or alarm condition exists.

In the example above, the code shown under the “Net" heading indicates that two network modules are out-of-service (busy) because of faults that originated in the Meridian SuperNode system (2SysB) and that a major alarm (M) condition exists.

To examine the problem in the Net subsystem, enter the Net maintenance level by selecting Option 12 on the input position at the bottom of the screen. Using the appropriate user interface and command menus, proceed from menu level to menu level until the reference, location, and status of the defective network element are displayed. (Problems occurring in any of the other maintenance subsystems are handled similarly.)

Maintenance subsystems

The areas of responsibility covered by the various maintenance subsystems are briefly described in the table below. See the Maintenance and administration part in Section 3 for details.

Table 7-1 Descriptions of maintenance subsystems (Sheet 1 of 2)

Subsystem header	Description of maintenance subsystem
CM	The computing module (CM) is the part of the core that performs the call processing function.
MS	The message switch (MS) subsystem monitors the message controller (MC) and the message links to the network module and input/output controller (IOC).
IOD	The input/output device (IOD) subsystem monitors the IOC, including the device controller, the input/output devices, and the recording devices.
Net	The network (Net) subsystem monitors the network module and the speech links to the peripheral modules.
PM	The peripheral module (PM) subsystem monitors all types of peripheral modules up to, but not including, the line or trunk voice circuits.
CCS	The common channel signaling (CCS) subsystem monitors the independent signaling network for transmitting telephony messages related to groups of speech circuits.
Lns	The lines (Lns) subsystem monitors the line concentrating module (LCM) line circuits and the transmission facilities (lines) to the station sets.

Table 7-1 Descriptions of maintenance subsystems (Sheet 2 of 2)

Subsystem header	Description of maintenance subsystem
Trks	The trunks (Trks) subsystem monitors the digital trunk controller (DTC) DS-1 circuits and the transmission facilities over the DS-1 carrier equipment and monitors service circuits for receivers, senders, and modems.
Ext	The external (Ext) subsystem monitors the alarm circuits of all outside equipment connected to the Meridian SuperNode system. This subsystem sends alarm indications to the visual display unit and to the alarm hardware.

Alarm system

The alarm system consists of hardware and software elements that monitor key points in the system and audible or visual indicating devices. The indicating devices respond to alarm inputs detected by the monitoring elements.

Detected trouble conditions are classified in decreasing order of severity, such as critical, major, and minor. Indications of current alarm classes existing in the various maintenance subsystems are displayed on the MAP workstation. Usually only critical and major alarm classes activate visual or audible alarm devices.

The alarm class is also printed on any log message concerning maintenance occurrences. If no alarm is associated with the log, the information only classification is printed.

The alarm system can also be affected by commands given as input at the MAP workstation. For example, the SIL command can be input to silence an audible alarm while troubleshooting is in progress.

Log system

The log system records and prints messages concerning maintenance-related events. As output reports are generated, they are stored in the Meridian SuperNode log system in log buffers. Each subsystem has a log buffer dedicated to it. Logs stored in these buffers can be displayed on the MAP workstation or printed.

For more information on logs, refer to the *Meridian SL-100 Log Report Manual*.

Line maintenance

The MAP workstation can also be used to perform line testing. These tests are performed by entering the line test position (LTP) menu. There is a short and

a long diagnostic for line concentrating module (LCM) line circuits. The short diagnostic performs a transmission test that is designed to detect 85 percent of the failures, and the long diagnostic detects virtually 100 percent of the failures.

The tests that can be performed are in the following categories.

Line test position

The LTP provides the tools and functions required to locate and verify faults and checks that corrective action is successful.

The LTP consists of four MAP workstation levels:

- LTP—line circuit oriented
- LTPLTA—facility tests
- LTPDATA—line transmission test tools for ISDN BRI lines
- LTPMAN—line transmission test tools

Automatic line test

The automatic line test (ALT) provides a simple method for testing large numbers of lines. There are four tests currently available:

- trans hybrid loss test
- line card diagnostic
- line insulation test
- on-hook balance network

These tests may be run immediately or scheduled for daily operation over a specified range of lines identified by a line equipment number (LEN). No operator-active MAP workstation is required during scheduled operation.

For more information on line maintenance, refer to the *Meridian SL-100 Maintenance Guide* and the *Menu Commands Reference Manual*, 297-1001-821.

Trunk maintenance

Trunk maintenance has two main areas: diagnostics and test lines. Diagnostics are procedures that do the following:

- check whether diagnostics exist for the circuit in question
- check to see if test equipment is required
- format the information into a message that is sent to one of the diagnostic processes
- wait for the resulting message

When the test line process is invoked by the trunk test position (TTP) or automatic trunk test (ATT) module, a call is made to run a test line. The modules called to perform specific functions are described in the following paragraphs.

Trunk test position

The TTP handles four levels of testing:

- diagnostic test, performed by the diagnostic test process
- monitor level test, which allows all trunks to be monitored in both talk path directions
- test line tests, performed by the test line process
- manual test connections, performed by the TTP process

Automatic trunk test

The ATT is the prime method for detecting operational failures during light or no-traffic periods when per-call failure detection is inactive.

The objective of automatic trunk testing is to generate sufficient test calls during low traffic periods so that failures can be detected in the voice or data path modules, such as peripheral modules, network modules, facility routes (cable and carrier), and the distant switching system.

For more information on trunk maintenance, refer to the *Meridian SL-100 Maintenance Guide* and the *Menu Commands Reference Manual*, 297-1001-821.

Administration subsystems

The MAP workstation can also be used in administration modes to perform Meridian SuperNode system management through the following subsystems:

- automatic message accounting (AMA)
- station message detail recording (SMDR)
- network management (NWM)
- operational measurements (OMs)

The data from these sources are filed on magnetic recording devices. Data from automatic message accounting, station message detail recording, and operational measurements subsystems is routed to an appropriate device (disk or tape) by a software module called device independent recording package (DIRP).

Automatic message accounting

The AMA subsystem collects the necessary call data and automatically records it on a data storage device. Periodically this stored data is extracted from the data files for retrieval of the information necessary for accounting purposes, call analysis, or both.

Station message detail recording

SMDR records details of billable and non-billable calls for each business group.

SMDR is similar to AMA, but operates independently using its own recording format. If a Meridian SuperNode system is equipped with AMA and SMDR, two records are generated: one in AMA format and one in SMDR format.

Network management

NWM provides controls that can be applied through the MAP workstation to maintain optimum transmission capacity and to offset the effects of traffic variations or component failures. Network management controls are either expansive or protective.

Expansive controls manipulate routing patterns to use alternate capacities not normally selected as the shortest route pattern in a switch hierarchy.

Protective controls restrict certain kinds of traffic to prevent system degradation (NET delays) resulting from overload.

Note: Matching loss is defined as the average probability of a call not being completed due to congestion in the NET or in the line concentration.

Operational measurements

System performance is constantly and automatically recorded by the operational measurement (OM) system.

The measurements are stored in OM registers, either individually every time an event occurs (a peg count) or on the basis of a scan that is conducted at regular intervals, regardless of the time of occurrence of the event (a usage measurement).

Using a computer system, the recorded OM data can be manipulated in various ways to generate statistics on aspects of Meridian SuperNode system performance, such as the following:

- office maintenance
- provisioning new equipment
- analysis of traffic through trends on marginal conditions

- balancing of traffic load through operable equipment
- determining fluctuating service capacities
- testing line and trunk performance and transmission

For more information on operational measurements, refer to the *Meridian SL-100 Operational Measurements Reference Manual*.

Access control system

Access to the Meridian SuperNode system data through the MAP workstation is controlled, for security purposes, through logon procedures and access rights according to user class.

Logon

Each authorized user is assigned a user name and password. No user interface activity can be performed until the proper identification has been entered and acknowledged by the MAP workstation.

User names and passwords can only be changed by the proper level of authorized user.

Command and terminal access

Authorized users are divided into user classes, depending on the functions that these users are required to perform. For example, one user may do trunk maintenance and another may do network management. Each user can only access the menus of commands associated with that user's particular function and can only use those terminals associated with that user's user class.

Emergency assistance

Emergency Technical Assistance Service (ETAS) provides assistance to system maintenance personnel if a problem arises that cannot be corrected by normal procedures. ETAS on-line support is available to Nortel Networks customers using a TURBOLINK modem.

Helmsman software

The Helmsman software is an electronic documentation product that provides the latest Nortel Networks technical publications (NTPs) on CD-ROM. Extensive search functions allow the user to quickly search virtually every word of every document. One CD-ROM stores approximately 200,000 pages of text and graphics. Documentation appearance does not change, regardless of whether it's viewed or printed. Helmsman Release 2.7 supports Macintosh, Windows, Solaris, and HP (Unix). Helmsman Release 4.0 supports Windows 95 and Windows NT. Helmsman 4.1 supports Windows 95 or Windows NT, however, Unix and Macintosh are not supported.

Enhanced MAP workstation

The enhanced MAP (EMAP) workstation combines the functionality of the MAP video display unit and a CD-ROM drive into one workstation. This workstation provides the Meridian SuperNode technicians with the ability to perform tasks on the MAP window and access the Helmsman software simultaneously.

For more information on EMAP workstation functions and installation, refer to the *Enhanced MAP Workstation Product Guide*.

Optivity Telephony Manager

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, from several clients.

Optivity Telephony Manager - Meridian SL-100, 2.0 uses a multi-tier client server architecture. It is comprised of the Java Windows client application, Java Windows/NT server framework, and the Meridian SL-100 switch with an installed Ethernet Interface Unit (EIU) that interfaces to the Application Unit Interface (AUI). The application uses the Simple Network Manager Protocol (SNMP) that operates on top of the User Datagram Protocol/Internet Protocol (UDP/IP).

User administration with log-ins and privileges can be set up so than an administrator can manager users on the system more efficiently, and with increased security, through user log-on and password verification.

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

- retrieval of switch equipment information such as core nodes, c-side peripherals, carriers, trunks, links, LENs and DNs
- receipts of switch events (full text reports previously only available from switch logs accessible through “LOGUTIL”. A “Watcher” functionality is provided for event-triggered actions. Watcher sounds an audible alarm (if desired) and sends an E-mail notification when any designated log event is received.
- on-demand query of equipment status
- database queries of the switch equipment inventory and events
- increased capacity for events and equipment inventory

- new event browsing features provide event annotations
- in-service transfers of software loads to E-IPEs

Enhancements to system management

Optivity Telephony Manager for Meridian SL-100 incorporates the following enhancements to system management:

- EIU interface
- reduced SNMP (Simple Network Management Protocol) messaging to the switch (server only)
- user administration with logins and privileges
- increased capacity for events and equipment inventory
- new log event browsing features with log event annotations
- new E-IPE (Enhanced Intelligent Peripheral Equipment) controller card loading while in-service
- Meridian 3900-series phone set firmware maintenance through E-IPE
- integration with Optivity NMS (Network Management System) and Optivity Telephony Manager for Meridian 1 (if required)
- maintenance of firmware loads for M3900 series phone sets through E-IPEs

  Note: Because phones are rendered out-of-service during the downloads of new firmware loads, Optivity Telephony Manager -- Meridian SL-100, 2.0 allows downloads to be scheduled for a range of sets during non-service hours. All phones included in range designated for a scheduled download must be of the same type: for instance, all must be a M3902, M3903, M3904 or M3905.

Integration of Optivity Telephony Manager for Meridian SL-100, 2.0, with Optivity Network management System (NMS) is available through Optivity Telephony Manager for meridian 1 (Optivity Telephony Manager).

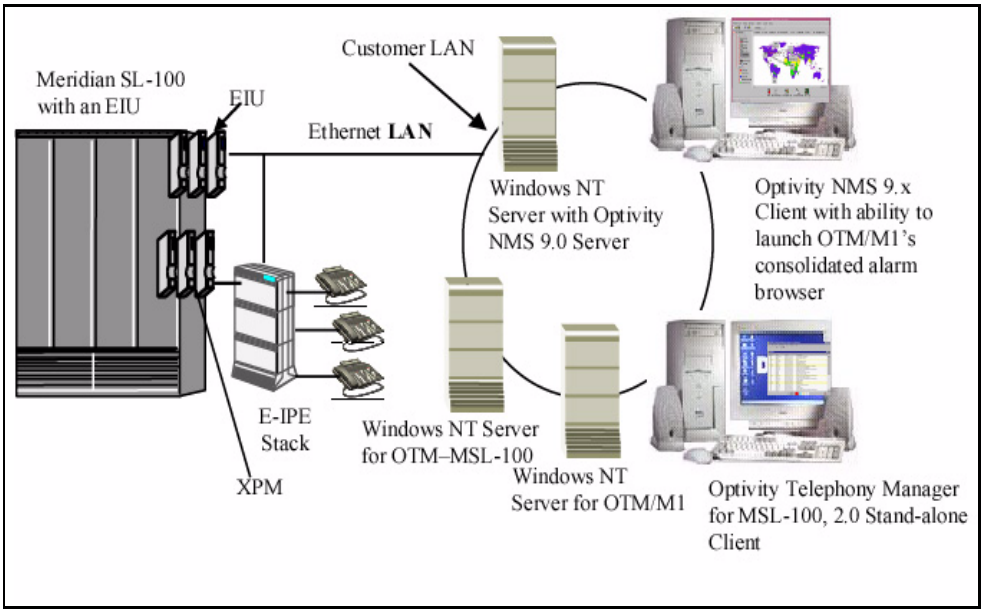
Attributes of Optivity Network Management System (NMS) integration

- Integration enables the voice folder in the Optivity Network Management System InfoCenter to turn red when a critical, major or minor log is received from the Meridian SL-100.
- Optivity Telephony Manager - Meridian 1’s consolidated alarm browser enables viewing alarms from Meridian 1, once Optivity Telephony manager - Meridian 1’s web browser is launched. Consolidated alarms for

Meridian 1, Meridian SL-100, Meridian Mail, CallPilot, and Symposium Call Center Server are among those that can be viewed.

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

Figure 7-2 Optivity Telephony Manager and Optivity NMS Integration



For more information on the Optivity Telephony Manager for Meridian SL-100, 2.0, refer to 555-4001-026, *Internetworking Services Guide*.

8 Voice messaging/processing

This section describes the benefits, capacities, and features of the Meridian SuperNode voice messaging and processing capability. Refer to the *Meridian IVR General Description*, 555-9001-010, the *Meridian Mail General Description*, 555-7001-101, the *IVR MRS/AP Product Guide*, and the *Meridian Mail System Administration Guide*, 555-7001-307 for detailed information on the Meridian SL-100 voice messaging and processing systems.

Desktop applications associated with voice messaging and processing, such as SYMPOSIUM Call Manager, are discussed in the *Computer-telephony integration (CTI)* section of this manual.

Introduction to voice processing/messaging

Voice messaging and processing functionality for the Meridian SL-100 switch consists of three hardware platforms: the Message services module (MSM), the Modular Option General Purpose (GP), and the OPEN interactive voice response (IVR).

The MSM and the Modular Option (GP) systems are standalone hardware messaging platforms. The IVR system is a standalone system (as an OPEN IVR system) to meet the needs of non-Meridan SL-100 customers. The MSM is for large capacity voice processing and the Modular Option (GP) system is for small to medium-sized networks.

MSM

The MSM is a Nortel Networks-manufactured, central office-compliant, large capacity, multi-applications voice processing system. The MSM is equipped to handle up to 43,000 users, 2,000 customer groups, and 1,600 hours of fully duplicated subscriber storage (depending on call traffic). It is an effective, highly reliable solution for large-sized voice processing applications. The MSM can also handle up to 4,000 voice menus and 16,000 call attempts for busy hour. Up to 16 simplified message desk interface (SMDI) links can connect the MSM to a network of Meridian SuperNode and non-DMS central office switches.

For more detailed information about the MSM, refer to the *Meridian Mail General Description*, the *Meridian Mail MSM Product Guide*, the *Meridian Mail MSM Planning and Engineering Guide*, the *Meridian Mail MSM System Administration Guide*, the *Meridian Mail Networking Services Administration Guide*, and the *Meridian Mail MSM Routine Maintenance Procedures*.

MSM benefits

Nortel Networks voice messaging systems offer the following benefits:

- Both the MSM and the Modular Option (GP) system offer high reliability and full redundancy of the critical disk storage units.
- The MSM has full redundancy of all subsystems, meeting stringent network provider requirements and ensuring high service availability.
- Both platforms share base software which is a blending of the best end products of Nortel Networks' expertise in voice messaging development.
- Multi-vendor compatibility; both the MSM and Modular Option (GP) system support the Meridian SL-100 system over SMDI.
- System support for both residential and business messaging applications on the same platform over a wide service area.
- System support for large geographic areas from one central location eliminating the need for a service provider to equip each end office with a separate mail system.
- Compatibility with custom calling features (CCF) and custom local area signaling services (CLASS).
- Cost-effective, around-the-clock access to information is one of the greatest benefits to using Meridian Mail.
- Both systems support industry standards, such as VMUIF for voice messaging, AMIS for networking, and SMDI for connectivity. Like the Meridian SL-100 switch, the MSM supports NEBS for network performance.

MSM and Modular Option (GP) system common software and features

There are a number of software packages and system features that are common to both the Modular Option (GP) system and the MSM. These common software packages and features include base software and Meridian Mail.

Base software

Base software is common for the MSM and the Modular Option (GP) system. Base software includes dual language greeting support, subscriber interfaces (such as the Meridian Mail user interface (MMUI) and VMUIF), multi-lingual support, mailbox class of service, multi-administration support, outdialing, single SMDI support, and voice menus. The following is an overview of the base software:

- dual language greeting support

  This feature is intended for multilingual systems. It allows certain system prompts to be played first in one language and then in a second language.

This is especially useful in areas where there is more than one official language.

- MMUI

  MMUI is the Nortel Networks full-featured proprietary voice mail interface for dual tone multi-frequency (DTMF) sets available on Meridian and other-vendor switches. The MMUI interface is a command-driven voice mail interface primarily designed for business users.

  VMUIF is a self-contained, menu-driven call answering and voice messaging interface. It is the Industry Information Association's (IIA) recommended user interface for public network call answering. VMUIF can be set up to receive and send composed messages, provide the user with simple call answering capabilities or full voice messaging functionality. VMUIF allows a user's mailbox to function much like an answering machine. Callers are able to leave messages for users who are away from the phone or on another line. VMUIF can provide message notification using a message waiting indicator. Users can retrieve and listen to messages.

  VMUIF does not support Nortel Networks' proprietary Networking feature, and therefore, cannot support private networking, with the exception of AMIS Networking.

- mailbox class of service

  A class of service (COS) is a template that contains information about the capabilities subscribers have with their mailboxes and the values that are assigned to specific parameters for these capabilities. Each user can be assigned either to a personal class of service or to 1 of 15 system COSs to which the user's customer group belongs.

- Meridian Mail Reporter

  A Windows-compatible enhanced reporting package for Meridian Mail.

- multi-administration

  Support is available for multiple administrator positions including the system administration terminal and the user administration terminals (UAT).

- multi-lingual support

  Meridian Mail currently supports more than 20 languages to meet the needs of international markets. The MSM and Modular Option (GP) systems support four languages for systems shipped in North America. Each subscriber mailbox is configured to be monolingual or bilingual, depending on customer preference.

- outdialing
  - — remote notification (RN)-RN monitors the subscriber's mailbox and notifies the subscriber of mail messages using a remote device such as a pager/paging service or another telephone. The Remote Notification feature (also referred to as out-dialing) allows subscribers to be notified using a pager that a message is waiting in their mailbox. This feature supports a variety of pagers, including tone, voice, and display types. With remote notification capability, subscribers can also request that messages be delivered to non-subscriber telephones, including cellular phones.
  - — delivery to non-users-This feature allows a user to create and send messages to someone who has no mailbox (usually someone within the organization or at a remote location).
- Single SMDI support

  The simplified message desk interface (SMDI) is a standardized protocol used to connect a voice mail system to a switch. The MSM base configuration includes a single SMDI link through a single internal modem or a redundant internal modem pair. Multiple SMDI connection options are available at additional cost.
- Voice menus

  Voice menus are call processing applications created by the administrator allowing callers to listen to recorded information, leave messages for specific users, or place calls.

MSM hardware

The MSM cabinet contains one pair of multi-server processor (MSP) nodes, two or more pairs of signal processing nodes (SPN), and one or two pairs of telephony interface nodes (TIFN). A Meridian Mail bus transports signals between the nodes. The MSM cabinet also contains a storage module for each MSM and SPN, a tape drive (connected to the primary MSP), transition modules, and redundant power supplies.

The Figure "Fully configured (192-port) message services module" on page 8-6 illustrates the layout for a fully configured MSM. Housed in an S/DMS cabinet, the MSM can be configured from 48 to 192 ports in 24-port increments, and from 150 to 1200 hours of duplicated subscriber storage in 150-hour or 300-hour increments. The MSM is delivered fully wired to support 192 ports and is expandable by adding circuit packs.

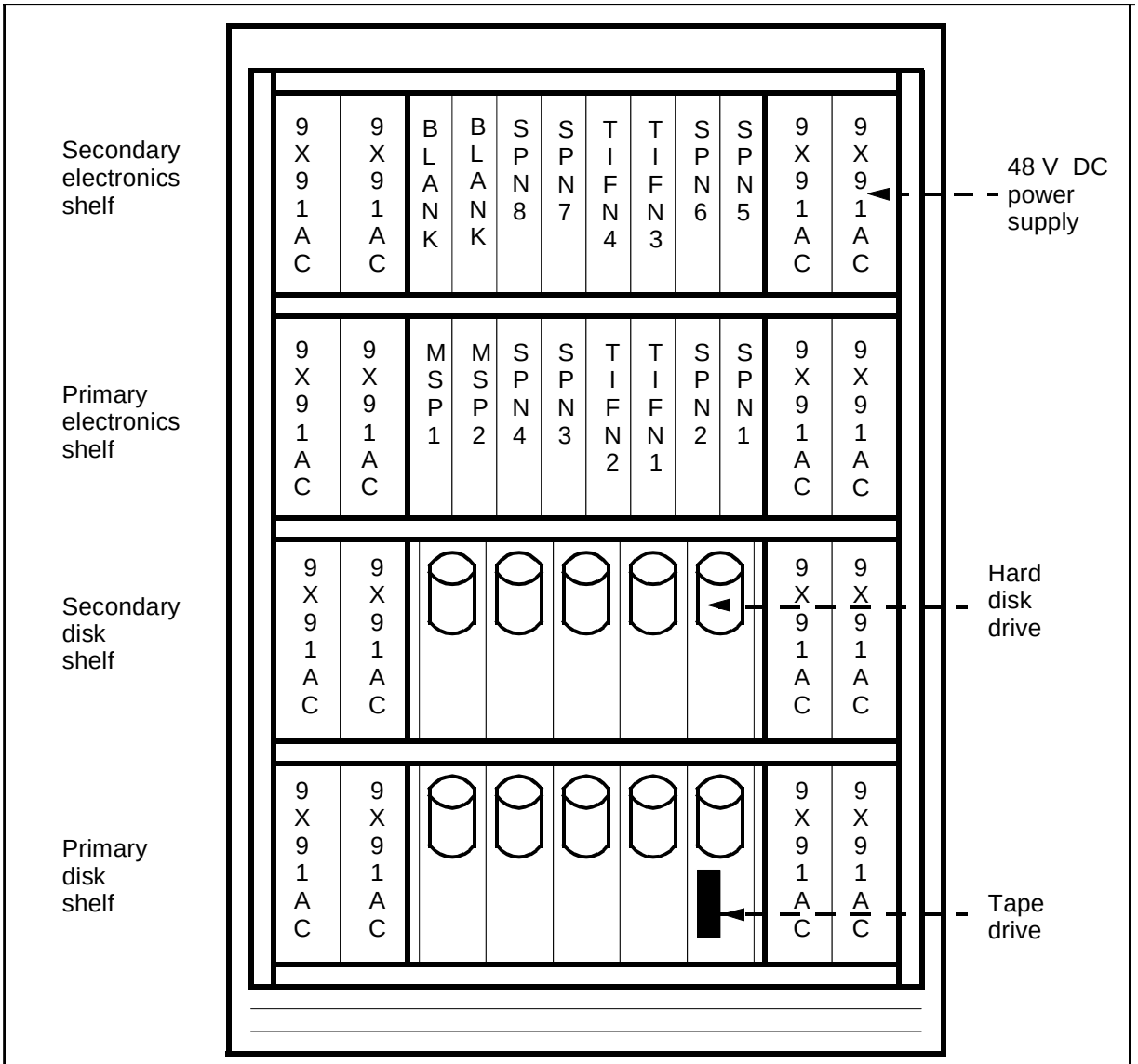
For more detailed information about MSM hardware, refer to the *Meridian Mail MSM Product Guide*.

Flexible disk drives

These new disk drives mean that the system can support a mixture of single and dual disk drives to allow more dynamic storage capacities that can change with the system's storage needs.

These drives can have a single storage capacity of either 150 or 200 hours for single drives, and 300 or 400 hours for dual drives. Paired nodes must have two drives of the same capacity although there may be a combination of storage capacities within the system as a whole.

Figure 8-1 Fully configured (192-port) message services module



Note: The disk storage packs connected to the SPNs can be provisioned as single disk packs (NTGX15AB) providing 150 or 200 hours of storage, or as dual disk packs) (NTGX15BB) providing 300 or 400 hours of storage.

Port types

Communication services are provided to users through ports on the MSM. A port is the point at which a speech or message link is connected to the MSM system. Ports can be one of two types, voice or multimedia, and can supply one

of two levels of service, basic service or full service. These types and capabilities can be combined to create three distinct kinds of ports:

- basic service voice
- full service voice
- full service multimedia

A voice port is capable of supporting all voice-related activities such as compression, recording, decompression, playback, and tone detection. Multimedia ports can support both fax and voice activities. However, to do so, multimedia ports require additional digital signal processing capabilities.

Basic service voice ports can be used to run IVR applications (created using Meridian ACCESS) and voice menus. Full service voice ports are required to run applications such as Voice Messaging, Networking services, Outcalling, or callback Fax (that is, a fax application in which the actual transmission of a fax is done after the application is terminated). A full-service voice port can handle all services that require basic voice or full-service voice capabilities. “Same call" and “caller choice" fax applications require the extra processing power of full-service multimedia ports. The MSM may have a combination of basic-service voice ports, full-service voice ports, and full-service multimedia ports depending on customer requirements.

Data links

Data links are used to establish a communication channel or link the Meridian SL-100 switch and other central office switches. Data links include SMDI links, ACCESS links, and Meridian Mail Reporter links.

- SMDI links

  The SMDI links to the Meridian SL-100 and central office switches are called SMDI links. The SMDI link is a 1200 or 2400 bps asynchronous RS-232 connection. Voice mail is interfaced to the I/O card on the switch SMDI ports. Multiple switches can be connected to a single Meridian Mail system or a single switch can support a number of Meridian Mail systems.

- ACCESS links

  The ACCESS link is the communication channel for Meridian ACCESS. It is an asynchronous link between Meridian Mail and a host running a Meridian ACCESS application such as IVR or VISIT Messenger.

- Meridian Mail Reporter links

  The Meridian Mail Reporter link is a 9600 bps asynchronous RS-232 connection to Meridian Mail Reporter by one of the two ports on the MMP40 card or one of the four ports on the node 1 RSM card.

MSM Capacities

The maximum number of mailboxes on an MSM system is calculated by the total available hours of storage, divided by the average time taken by each user's messages and greetings. The average time for mailbox depends on the mailbox size limits and message deletion policy, both of which are set by the administrator. The MSM is provisioned by selecting appropriate numbers of ports and hours of storage. The following table outlines the MSM and Modular Option (GP) system mail capabilities.

For more detailed information about MSM capacities, refer to the *Meridian Mail MSM Planning and Engineering Guide*.

Table 8-1 Meridian Mail capabilities/capacities (Sheet 1 of 2)

Capability	Modular Option	MSM
Administration terminals	4	4
Call attempts for busy hour	5300	16,000
Classes of service	127	127
Customer groups	64	2000
Disk shadowing	Standard	Standard
Duration of saved messages	31 days	31 days
Entries for distribution list	99	99
Languages	27	27
Mailboxes	21,192	42,328
Messages for mailbox	999	999
Message length (maximum)	99 minutes	99 minutes
Minutes for mailbox (maximum)	360	360
Permission/restriction lists	30	30
Personal distribution lists for user	9	9
Sites (number of)	150	150

Table 8-1 Meridian Mail capabilities/capacities (Sheet 2 of 2)

Capability	Modular Option	MSM
Simultaneous languages supported	4	4
SMDI links	12	16
Storage hours	800	1600
Voice forms	100	100
Voice menus	1000	4000
Voice ports	4 to 64	48 to 192

On the MSM platform, single-density and double-density disks can be mixed within the same system.

On the Modular Option (GP) system platform, a 2 Gigabyte disk drive is optional on systems upgrading to MM11 provided the system already is equipped with a 300 MB disk drive.

MSM peripheral modules

Peripheral devices for MSM Meridian Mail include the following:

- administration terminal and printers (required)
- A/B switchbox and local modem for remote administration and maintenance (optional)
- terminal and remote modem for remote administration (optional)
- networking modem (optional)
- guest administration terminals for the hospitality feature (optional)
- RSM card and cabling installation to provide four RS-232 ports and alarm capabilities (optional)

For more detailed information about MSM peripherals, refer the *Meridian Mail MSM Product Guide*.

MSM optional network interfaces

Meridian networking allows a business customer group to exchange messages with other related closed user groups who have Meridian Networking. The other user groups may be at a different location and served by another switch. Meridian Networking can only be enabled for one customer group within a multi-customer system.

Network message service (NMS)

The network message service (NMS) is an optional network interface for Meridian Mail host offices. NMS encourages centralized voice processing service provisioning by allowing message service to be provided to an entire city or local access and transport area (LATA) from a centralized Meridian Mail messaging node. NMS provides the means for incoming CCS7 signaling trunks to be terminated on the SMDI link handler (thereby enabling the pass-through of called and calling directory number (DN) information). Each Meridian Mail messaging node serving subscriber mailbox lines also requires NMS to deliver message waiting using CCS7.

When several offices are supported by a single Meridian Mail system, the offices can be linked to Meridian Mail by

- multiple SMDI links, or
- a single SMDI link to a host office and NMS links between the host office and other offices to be supported with Meridian Mail.

For more detailed information about MSM networking, refer to the *System Installation and Modification Guide*.

MSM connectivity

The MSM is a large-capacity voice processing system. The MSM can operate in connection with several different switches including

- Meridian SL-100
- carrier switches
  - — DMS-100
  - — AT&T #1AESS and #5ESS
- Other switches using Meridian connections
  - — AT&T
  - — ROLM

The MSM connections are illustrated in the figures that follow.

Figure 8-2 MSM and the Meridian SL-100 PBX

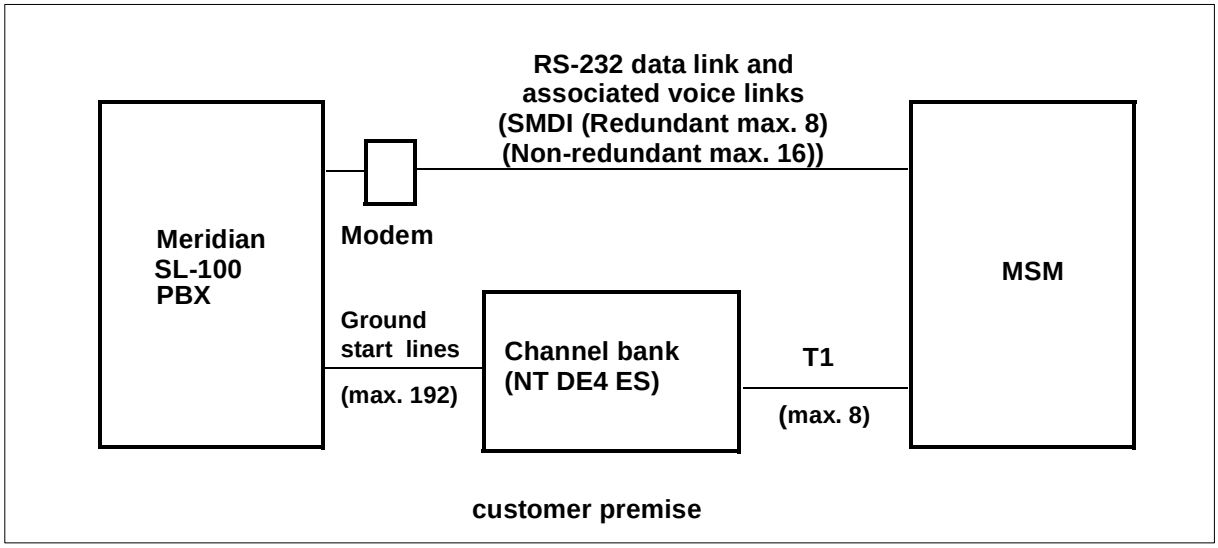
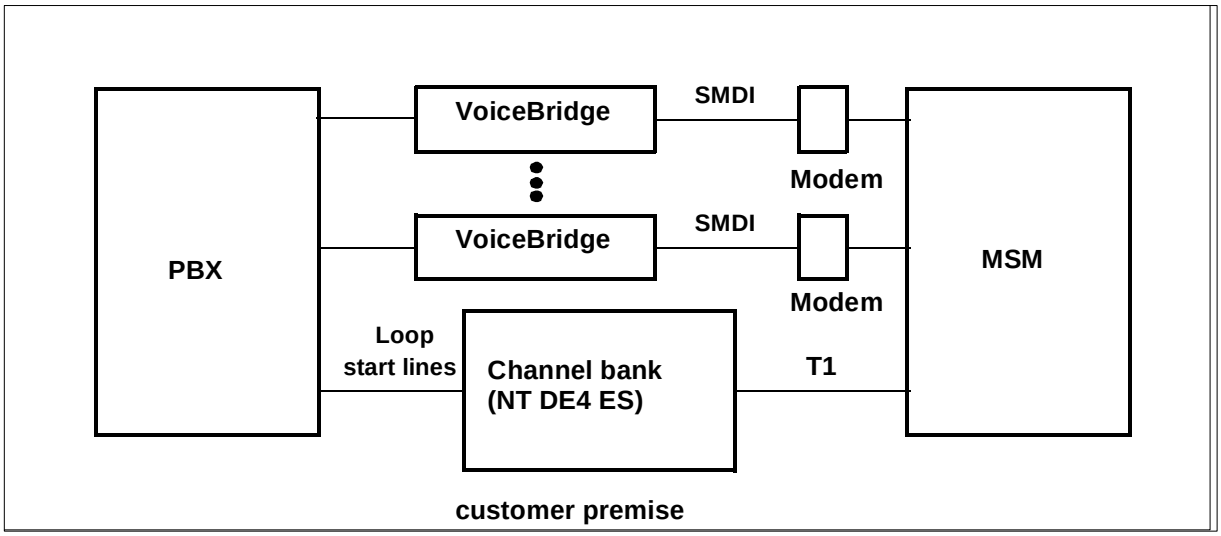


Figure 8-3 Meridian Mail connected to a non-Nortel Networks PBX



Modular Option (GP)

The Modular Option (GP) system is a Nortel Networks-manufactured, central office-compliant, multi-applications voice processing system for smaller markets. The Modular Option (GP) system is offered in specially packaged voice port sizes, from 8 ports with 100 hours of storage to 64 ports with 800 hours of storage. With the ability to grow in four-port increments, the Modular Option (GP) system can expand from a single-node (eight voice ports) to a five-node (64 voice ports) configuration. Larger configurations are achieved by adding more nodes, each node supporting up to 16 voice ports, depending on the configuration.

The Modular Option (GP) system is equipped to handle up 12,300 subscribers and supports from 8 ports (single node) to 64 ports (5 node):

- Single-node configuration-This option can be configured for either 8 or 12 ports, with 200 hours of storage.
- Two-node configuration-When additional voice ports are required for greater capacity, the two-node platform can accommodate 16, 20, or 24 ports, with 400 hours of storage. In this configuration, two nodes are stacked together, interconnected by a high-availability bus controller (HABC). Each node is powered separately for added reliability.
- Four-node configuration-The four-node configuration can accommodate 36, 40, 44, or 48 ports, with 600 hours of storage.
- Five-node configuration-The five-node configuration can be designed for 52, 56, 60, or 64 ports, with 800 hours of storage. The configuration consists of two stacks of GP nodes, with one stack containing three nodes, the other two nodes.

For more detailed information about the Modular Option (GP) system, refer to the *Meridian SL-100 General Description*, the *Meridian Mail General Description*, and the *Modular Option GP Site and Installation Planning Guide*.

Modular Option (GP) system benefits

Nortel voice messaging systems offer the following benefits:

- Both the MSM and the Modular Option (GP) systems offer high reliability and full redundancy of the critical disk storage units.
- The MSM has full redundancy of all subsystems, meeting stringent network provider requirements and ensuring high service availability.
- Both MSM and the Modular Option (GP) platforms share base software which is a blending of the best end products of Nortel's expertise in voice messaging development.
- The system offers multi-vendor compatibility because both the MSM and Modular Option (GP) system support the Meridian SL-100 system over SMDI.
- The system offers support for both residential and business messaging applications on the same platform over a wide service area.
- The system offers support for large geographic areas from one central location eliminating the need for a service provider to equip each end office with a separate mail system.
- The system offers compatibility with custom calling features (CCF) and custom local area signaling services (CLASS).

- The system offers cost-effective, around-the-clock access to information and is one of the greatest benefits to using Meridian Mail.
- Both MSM and the Modular Option (GP) systems support industry standards, such as VMUIF for voice messaging, AMIS for networking, and SMDI for connectivity. Like the Meridian SL-100 switch, the MSM supports NEBS for network performance.
- Both the MSM and the Modular Option (GP) system offer high reliability and full redundancy of the critical disk storage units.

Modular Option (GP) hardware

The Modular Option (GP) hardware packaging is assembled from printed circuit pack (PCP) cards housed in a card cage. Each card cage holds up to eight cards.

Along with one or two hard disks, each card cage constitutes a Meridian Mail node and is equipped with the following cards:

- Meridian Mail Processor 40 (MMP40) board with 16 Mbyte of RAM
- high availability bus controller (HABC), if in a multi-node configuration
- one or more voice processor cards
- RS-232 service module (RSM) card (optional)

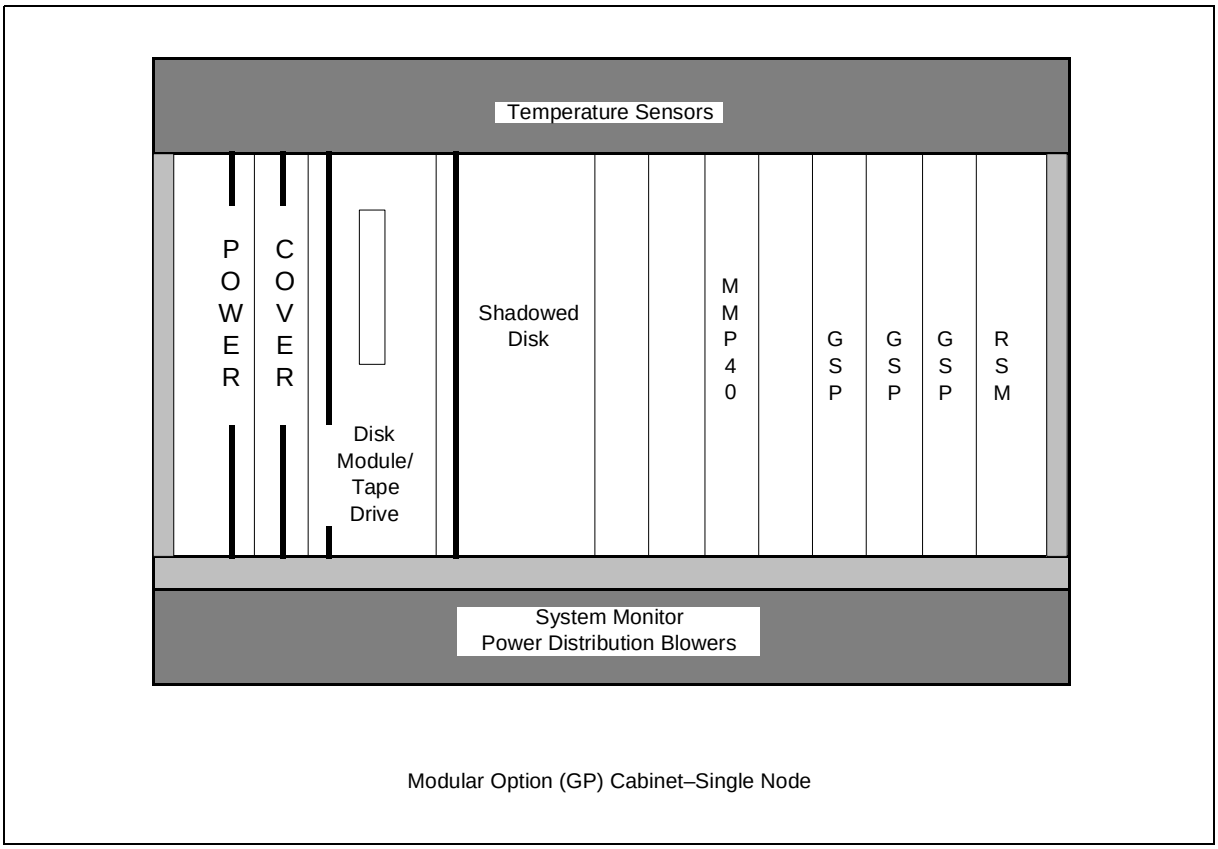
For more detailed information about Modular Option (GP) hardware, refer to the *Modular Option GP Site and Installation Planning Guide.*

Cabinet

The single-node Modular Option (GP) system cabinet contains the following circuit packs:

- The MMP40 board has a 24-Mhz 68040 processor, 16 Mbyte of RAM (expandable to 64 Mbyte), a SCSI interface processor, and two RS-232 serial ports. The MMP40 board handles all voice-related functions and the data link to the Meridian SL-100 system.
- RSM-RS-232 service module with 4 SDI ports and two dry contacts for alarms
- GSP-General signaling processor with four voice ports for card
- DISK-One standard 5-inch Windchester disk with tape drive
- ODM-Optional second disk for shadowing

Figure 8-4 Single-node Modular Option (GP) module



The single node can be configured for either 8 or 12 ports, with 100 hours of storage. The single node has the ability to grow in four-port increments expanding from a single node (eight voice ports) to a five-node (64 voice ports). The previous figure illustrates a single-node Modular Option (GP) module.

High availability bus controller (HABC)

The HABC card provides 2 Mbyte of random access memory (RAM) storage for programs and data and contains circuitry that allows interconnection of nodes in multi-node configurations through an external bus (DVS bus).

General-purpose signal processor (GSP) card

The voice processor card is a 32K GSP card. Each GSP card provides four voice channels. Each card has two digital signal processors (DSP) that provide voice compression and digital tone receiver (DTR)/automatic gain control (AGC) functions. The voice channel interfaces to the Meridian SL-100 system through analog loop pairs.

RS-232 service module (RSM)

The RSM card provides four RS-232 serial ports, a battery-backup clock, and two alarm relays. The ports connect to networking and remote administration modems, terminals, and printers.

Tape drive

The tape drive assembly is a Tandberg TDC4220 unit that uses tapes capable of storing up to 2.5 Gbytes of information.

Flexible disk drives

New disk drives allow the system to support a mixture of single and dual disk drives to allow more dynamic storage capacities that can change with the system's storage needs.

Storage is increased in level changes. All levels are supported in single disk configurations of 2 gigabytes. Disk shadowing is used for redundant backup.

Port types

Communication services are provided to users through ports on the Modular Option GP. A port is the point at which a speech or message link is connected to the Modular Option GP system. Ports can be one of two types, voice or multimedia, and can supply one of two levels of service, basic service or full service. These types and capabilities can be combined to create three distinct kinds of ports:

- basic service voice
- full service voice
- full service multimedia

A voice port is capable of supporting all voice-related activities such as compression, recording, decompression, playback, and tone detection. Multimedia ports can support both fax and voice activities. However, to do so, multimedia ports require additional digital signal processing capabilities.

Basic service voice ports can be used to run IVR applications (created using Meridian ACCESS) and voice menus. Full service voice ports are required to run applications such as Voice Messaging, Networking Services, Outcalling, or Callback Fax (that is, a fax application in which the actual transmission of a fax is done after the application is terminated). A full-service voice port can handle all services that require basic voice or full-service voice capabilities. “Same call" and “caller choice" fax applications require the extra processing power of full-service multimedia ports. The Modular Option GP may have a combination of basic-service voice ports, full-service voice ports, and full-service multimedia ports depending on customer requirements.

Modular Option (GP) capacities

The following table outlines the MSM and Modular Option (GP) system mail capacities.

For more detailed information about MSM capacities, refer to the *Modular Option GP Site and Installation Planning Guide*.

Table 8-2 Meridian Mail capabilities/capacities (Sheet 1 of 2)

Capability	Modular Option	MSM
Administration terminals	4	4
Call attempts for busy hour	5300	16,000
Classes of service	127	127
Customer groups	64	2000
Disk shadowing	Standard	Standard
Duration of saved messages	31 days	31 days
Entries for distribution list	99	99
Languages	27	27
Mailboxes	21,192	42,328
Messages for mailbox	999	999
Message length (maximum)	99 minutes	99 minutes
Minutes for mailbox (maximum)	360	360
Permission/restriction lists	30	30
Personal distribution lists for user	9	9
Sites (number of)	150	150
Simultaneous languages supported	4	4
SMDI links	12	16
Storage hours	800	1600

Table 8-2 Meridian Mail capabilities/capacities (Sheet 2 of 2)

Capability	Modular Option	MSM
Voice forms	100	100
Voice menus	1000	4000
Voice ports	4 to 64	48 to 192

On the MSM platform, single-density and double-density disks can be mixed within the same system.

On the Modular Option (GP) system platform, a 2 Gigabyte disk drive is optional on systems upgrading to MM11 provided the system already is equipped with a 300 MB disk drive.

Modular Option (GP) peripheral modules

Peripheral devices for the Modular Option (GP) Meridian Mail include the following

- administration terminal and printers (required)
- A/B switchbox and local modem for remote administration and maintenance (optional)
- terminal and remote modem for remote administration (optional)
- networking modem (optional)
- guest administration terminals for the hospitality feature (optional)
- RSM card and cabling installation to provide four RS-232 ports and alarm capabilities (optional)

For more detailed information about Modular Option (GP) peripherals, refer to Chapter 6 of the *System Installation and Modification Guide*.

Modular Option (GP) optional network interface

Meridian networking allows a business customer group to exchange messages with other related closed user groups who have Meridian Networking. The other user groups may be at a different location and served by another switch. Meridian Networking can only be enabled for one customer group within a multi-customer system.

Network message service (NMS)

NMS, an optional network interface for Meridian Mail host offices. NMS encourages centralized voice processing service provisioning by allowing message service to be provided to an entire city or local access and transport area (LATA) from a centralized Meridian Mail messaging node. NMS provides the means for incoming CCS7 signaling trunks to be terminated on

the SMDI link handler (thereby enabling the pass-through of called and calling directory number (DN) information). Each Meridian Mail messaging node serving subscriber mailbox lines also requires NMS to deliver message waiting using CCS7.

When several offices are supported by a single Meridian Mail system, the offices can be linked to Meridian Mail by

- multiple SMDI links, or
- a single SMDI link to a host office and NMS links between the host office and other offices to be supported with Meridian Mail.

For more detailed information about Modular Option (GP) networking, refer to the *System Installation and Modification Guide*.

Modular Option (GP) connectivity

The MSM is a large-capacity voice processing system. The MSM can operate in connection with several different switches including

- Meridian SL-100
- Carrier switches
  - — DMS-100
  - — AT&T #1AESS and #5ESS
- Other switches using Meridian connections
  - — AT&T
  - — ROLM

The Modular Option GP connections are illustrated in the following figures.

Figure 8-5 Meridian Mail and the Meridian SL-100 PBX

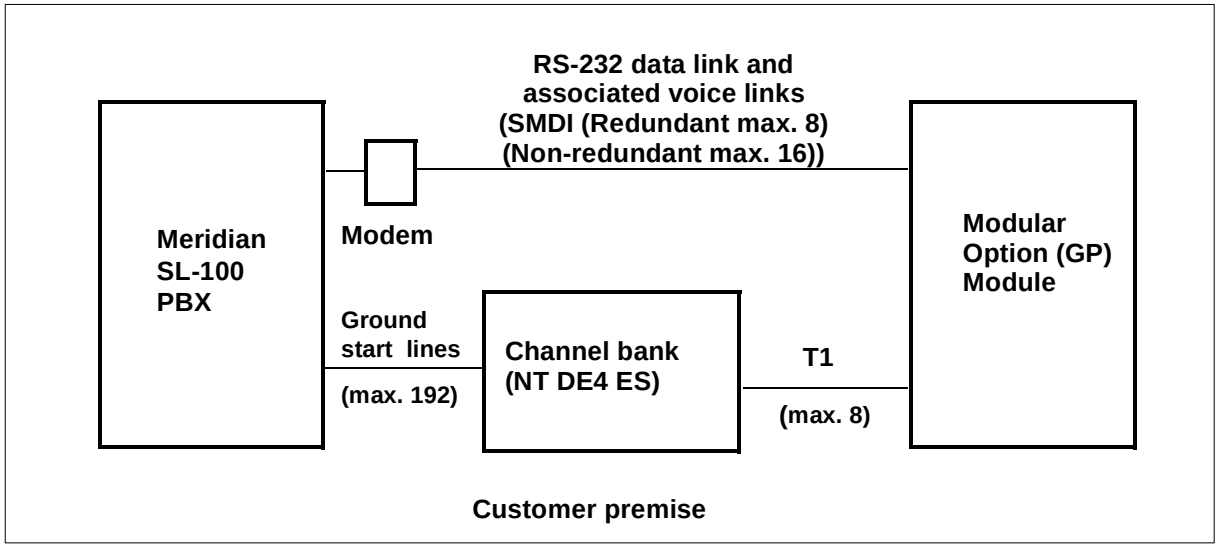
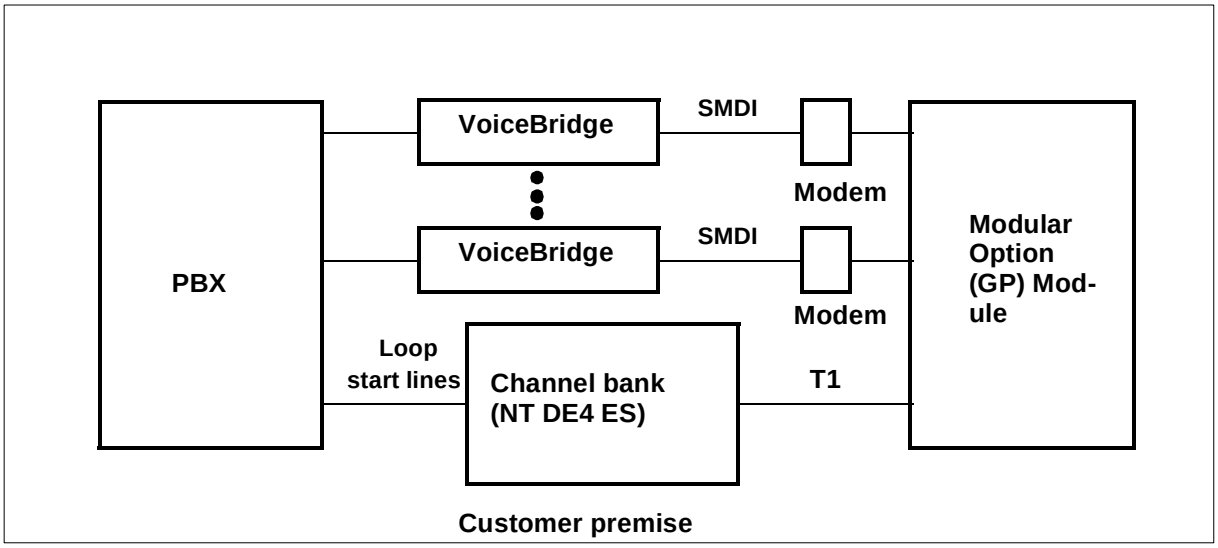


Figure 8-6 Meridian Mail connected to a non-Nortel Networks PBX



OPEN IVR

OPEN IVR is one of the two interactive voice response (IVR) products. Its open architecture provides flexibility for increased functionality and the capability of working with both Meridian and non-Meridian switches and auxiliary hardware. Open IVR is a stand-alone product that provides a number of network interfaces and independent voice ports that allow for connection to a wide variety of switches.

The open architecture includes the Intel 486 or Pentium processor running SCO UNIX. The open architecture provides flexibility for increased

functionality and the capability of working with both Meridian and non-Meridian switches.

OPEN IVR allows callers to enter, retrieve, and update host computer data using spoken words for output and tones and speech recognition for input.

Open IVR uses the IVR Applications Generator 2.0/S for IVR application development environment. The OPEN IVR system consists of an application processor and a terminal resource server used to connect to a local area network (LAN) using ethernet or token ring.

With OPEN IVR, you can choose from a variety of state-of-the-art technology including automated speech recognition, analog display services interface (ADSI), interactive fax, text-to-speech conversion, outbound dialing, mainframe communications, external database communications. Applications utilizing these features are easily and efficiently developed using our GUI application generator.

The section describes IVR benefits, capacities and features. Refer to the *IVR MRS/AP Product Guide*, for detailed information on the OPEN IVR system.

OPEN IVR benefits

Using OPEN IVR, traditional call center functions can now be performed automatically. These functions include answering calls, collecting caller information and requests, retrieving requested information from databases and providing it to the caller in voice, fax, ADSI screenphone or text-to-speech format. All these functions can be achieved in conjunction with call center agents or without any human intervention. OPEN IVR benefits include

- flexible client-server architecture
- graphical user interface
- scalable capacity-up to 288 ports
- feature-rich functionality
- automated speech recognition

Open IVR software and features

The MRS/AP hardware is driven and managed by the SCO UNIX operating system. All application development and processing coordinated by IVR Generator 2.0/S.

Analog display services interface (ADSI) support

ADSI technology allows display-based telephones to support an IVR application, providing the caller with the simplicity of a visual display and the ability to press soft keys on the set to select menu options for sophisticated applications.

Application processor (AP)

The application processor (AP) provides the computing environment in which IVR Applications Generator 2.0/S resides and provides management and control of IVR applications. The AP is a PC-class machine that interfaces with the terminal resource server (TRS) using a command link on Ethernet. The AP supports both the IVR Applications Generator 2.0/S development and run-time environment allowing applications to be created and managed across multiple voice response units.

Application development software

The application development software consists of the following five modules which are application management, data management, prompt management, reports and statistics management, and system management.

- application management (Application management is application development software enabling creation and editing of custom applications.)
- data management (Data management is an application development software allowing creation and maintenance of flat-file databases.)
- prompt management (Prompt management is application development software allowing creation, review, edit, installation, and deletion of voice prompts.)

  an optional graphical voice prompt editor is also available for editing ease.
- Report and statistics management (Statistic management is application development software providing a complete portfolio of standard reports on call detail, cell and trunk usage, subscriber information, and transaction logs.)
- System management (System management is application development software enabling management of the entire OPEN IVR system.)

Automated speech recognition

Automated speech recognition gives your customers the convenience of spoken responses rather than manual input using the telephone keypad. Discrete and continuous speech recognition are supported. Both options provide speaker-independent voice recognition of digits 0 to 9, and the words `yes,' `no,' and `oh' in multiple languages.

Interactive fax, fax-on-demand, and fax broadcasting

Interactive fax provides the caller with a faxed confirmation or record of the IVR transaction. Customers can fax themselves product brochures, receive confirmation of an order placed, order status or change.

IVR Generator 2.0/S

The GUI application generator is application development software providing a state-of-the-art GUI environment for rapid application development.

Multilingual support

Multilingual capability allows the creation of applications that support multiple languages. In addition, the GUI application generator can be in the language of choice.

Multimedia resource server (MRS)

OPEN IVR multimedia resource server provides the information processing (for example, voice, fax, voice recognition) and the interface to the telephony network. MRS offers full voice processing capabilities plus advanced technologies such as speech recognition, ADSI and text-to-speech. MRS uses state of the art DSP-based technology and industry standard circuit boards.

Outbound telemarketing

Outbound telemarketing allows the capability to send only the answered outbound calls to soliciting agents.

SCO UNIX operating system

The SCO UNIX operating system provides all standard computing resources required for effective communication among IVR Generator 2.0/S, the MRS/AP system voice processing resources, and the telephony network.

Service console interface (SCI)

The service console interface (SCI) provides the system administration and maintenance interface (remotely or locally).

Text-to-speech conversion

Text-to-speech conversion is the ability to convert a text file into speech. Text-to-speech facilitates the development of applications which support large vocabularies and multiple languages. It also expedites the port of screen-based applications to the IVR platform.

Voice runtime daemon

The voice runtime daemon (VRTD) starts the MRS software, monitors process integrity, records messages in the event log, and manages all TCP/IP socket connections between MRS processes.

Open IVR power

The OPEN IVR system supports connection to an AC power source. The optional non-interruptible power source (UPS) ensures continuous AC power to the system during utility power failures and proper system shut-down when the UPS internal batteries near depletion.

Open IVR hardware and peripheral devices

The MRS/AP system components include

- central processing unit (CPU) module
- voice processing module

- SCSI disk drive providing 15 hours of voice storage

  (expandable to 7 additional drives)
- floppy disk drive
- tape drive for back up, external data storage, and loading software
- power supply
- SVGA monitor
- keyboard
- mouse
- fax module (optional)
- speech recognition module (optional)
- text-to-speech module (optional)
- 5250, 3270, or VT100 Gateway module (optional)

For detailed information about MRS/AP hardware refer to the *MRS/AP Product Guide*.

Open IVR capacities

OPEN IVR has a fully scalable, modular client/server architecture offering seamless growth from 8 to 96 ports, controlled from a single application processor. Multiple application processors can be combined to provide even higher capacity systems. OPEN IVR can support up to 108 hours of voice storage.

The OPEN IVR architecture supports a wide range of options to ensure maximum system uptime including:

- disk mirroring
- remote service console interface
- non-interruptible power supplies (UPS)

Open IVR configuration

There are three models of OPEN IVR available: MRS/AP, MRS/Tower, and MRS/Rackmount. The functionality of each is dependent on the configuration. Generally, the MRS and AP systems are separate in the other two models to provide superior scalability. The combined MRS/AP model bundles the MRS and AP into one unit, providing complete IVR functionality and a low-cost entry into IVR technology. The MRS/tower is designed to meet the port capacity and functional needs of most business customers. The MRS/Rackmount model is designed to support very large port capabilities and central-office environments.

Three models of OPEN IVR are available:

MRS/AP combined

Combined MRS/AP bundles the MRS and AP into one unit, providing complete IVR functionality (voice fax, and speech recognition).

MRS/AP separately deployed

The MRS and AP systems deployed separately (referred to as MRS/AP) provide superior scalability for future growth. MRS/AP is on controlled release and is available only in the MRS/tower and the MRS/rackmount. Text-to-speech recognition is not available in the MRS/AP configuration.

MRS/tower

The MRS/tower is an MRS/AP system which connects to the high performance Intel/UNIX applications processor over an ethernet or token ring LAN.

MRS/rackmount

The MRS/rackmount is an MRS/AP system which is designed to support very large port capabilities and central-office environments.

The MRS/AP design allows easy capability expansion by installing the optional modules in the system and loading the accompanying software. The optional modules consist of physical hardware installed on the pulse code modulation (PCM) expansion bus (PEB) cable. Hardware installed on the PEB is shared across all available channels.

Available option packages include

- non-interruptible power supply
- fax
- Gateway (3270, 5250, or VT100)
- speech recognition
- SQL
- audio interface unit (AIU)
- text-to-speech (TTS)
- ADSI

Open IVR connectivity

The OPEN IVR systems include either an Ethernet or token ring interface for connecting a TCP/IP LAN. Host computer links include:

- 3270
- 5250

- VT-100
- Ethernet
- token ring
- SQL database: Ingres, Informix, Oracle, and Sybase
- other emulations using standard TCP/IP applications

Network interfaces include loopstart, T1, and E1 interfaces.

CallPilot Desktop Messaging

CallPilot is Nortel Networks' Microsoft Windows NT based unified messaging system. It incorporates Meridian Mail feature functionality as well as significant new capabilities. New capabilities include an integrated voice and fax mailbox and a new telset user interface that relies on state-of-the-art speech recognition technology to retrieve voice and fax messages using only spoken commands.

CallPilot Desktop Messaging stores all of your voice and fax messages in one personal mailbox. The following lists some of the features used to send and receive messages:

- forward and reply to messages
- compose, edit, and send messages
- create personalized distribution lists for sending messages
- add message options such as urgent, private, and timed delivery
- dial and address by name or by number
- receive remote notification of incoming messages
- receive, print, and send fax messages

CallPilot components

A CallPilot system consists of three key components: switch, server, and administrative PC.

- The switch is the Meridian SL-100 with release MSL11 software.
- The server is a 702t, 1001rp, or a 200i series server and is connected to an embedded LAN (ELAN) for Nortel Networks equipment.
- The administrative PC maintains the server, switch, and CallPilot software.

9 Call management

This section describes the basic feature sets, management functions including automatic call distribution (ACD), management information system (MIS), and call center management information system (CCMIS), and phone sets associated with the Meridian SuperNode call management capability. Refer to the *ACD Product Guide*, 297-2041-010, the *Translations Guide*, the *ACD Server Product Guide*, 297-2041-011, and the *M5212 ACD Set General Description*, 297-2041-900 for detailed information about the Meridian ACD function.

Introduction to call management

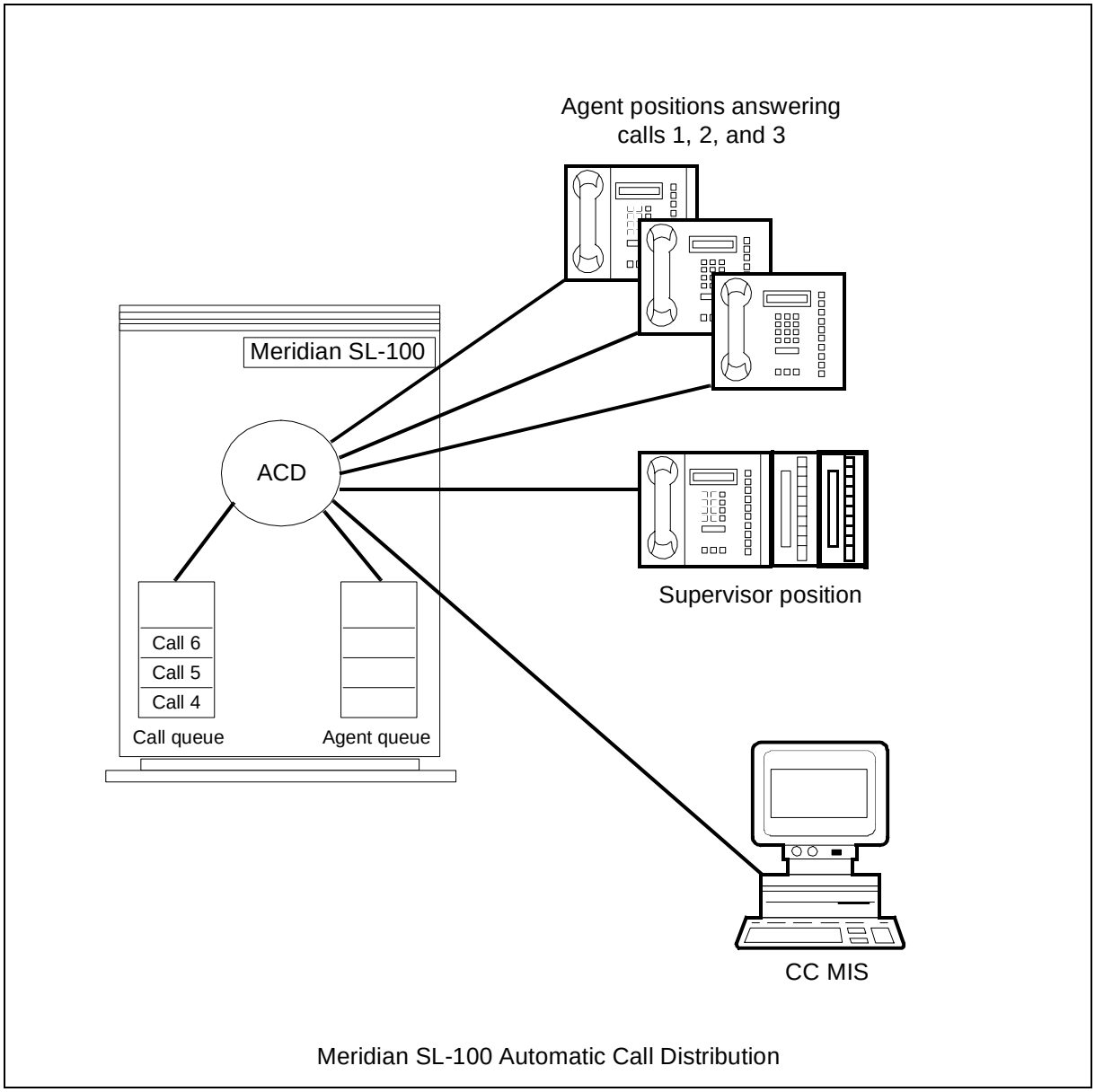
Meridian SuperNode call management capability is referred to as the ACD service. ACD enables the Meridian SuperNode to offer ACD capabilities from a private branch exchange (PBX) eliminating the need for costly hardware and software to reside on the customer's premises.

The Meridian SuperNode capability includes the following features and options

- ACD basic service
- ACD supervisory functions (ACD MIS)
- ACD network capability
- CC MIS tool
- extended call management (ECM)
- CompuCALL

The figure that follows depicts various components of the Meridian SuperNode ACD function.

Figure 9-1 Meridian SL-100 Automatic Call Distribution



ACD basic service

The ACD system is flexible enough to respond to the needs of the smallest customer group and robust enough to handle the complexities of the largest ACD operations. Meridian SuperNode ACD associates directory numbers to a group of answering positions rather than with lines. The answering positions are queued so that the agent who has been idle the longest is presented with the first incoming call. When all agents are busy, calls are queued and answered in order of arrival. ACD provides efficient call handling by equally distributing a large volume of incoming calls to a designated group of

answering positions. Meridian SuperNode ACD is a highly effective business tool for mail order companies, service centers, telemarketing firms, and other enterprises that rely on the telephone for their revenues and services.

ACD MIS

Meridian SuperNode ACD also provides a full set of supervisory features (referred to as ACD management information systems [MIS]) to manage groups of agents effectively.

Prerequisites for ACD MIS software include the hardware for the communications and associated software plus a 9600 bps synchronous modem or a Meridian data unit.

Network ACD

Meridian SuperNode ACD networking capability allows the customer to tap into the service provider's network. ACD network options can manage ACD groups at widely dispersed sites as if they were at a single location. Public networking saves the customer from purchasing, installing, and maintaining ACD nodes at each call center location and thereby avoids the high cost of private trunks to carry the phone traffic between them.

The Meridian ACD network option offers optional functionality that extends the range of ACD base and enhances an optional software to a very large multinode call center. Network ACD options include ACD SuperGroup and multinode networking.

ACD SuperGroup

ACD SuperGroup provides complete Meridian ACD network option capability within a single DMS Meridian ACD node. It enables multiple ACD groups (situated either in single or multiple locations and serviced by the same Meridian ACD node) to distribute calls dynamically among the separate groups based on the resources available at the time.

Multinode networking

SuperGroup function includes the features that are required to work with the software packages required for Meridian ACD network option multinodal network capability: ACD networking on CCS7 and on primary rate interface (PRI).

Terminal sets

Several terminal sets and options are available with Meridian SuperNode ACD. Terminal options include the 2500 type sets with distinctive ringing feature, the M5216 sets and compatible add-ons, the M5212 set, and the M2216 ACD sets.

M2216 ACD set

The M2216 ACD telephone answers the specialized needs of call center environments with an all-digital telephone designed specifically for customer service agents and supervisors. The M2216 ACD telephone operates in a variety of call center configurations, allowing agents and supervisors to tap into the powerful ACD packages available on the Meridian SuperNode.

The M2216 ACD telephone is equipped with a built-in 2-line x 24-character alphanumeric display that provides vital information on arriving calls to prepare agents and allow customized greetings. Dual headset jacks help supervisors coach agent performance. With optional Key Expansion modules, a variety of configurations are available for up to 60 line/feature keys. Large indicators associated with each key show line and feature status at a glance, and an light emitting diode (LED) indicator shows when a message is waiting.

M5216 ACD Meridian business set

The M5216 is part of the MBS II portfolio and is designed to maximize the use of features and offer powerful call coverage and call handling capabilities. With liquid crystal display (LCD) and dual headset compatibility, the M5216 is recommended when you need a central answering position or ACD support. Combined with the M522 Meridian Mate Expansion module, the M5216 is also recommended as a mini-console.

M5212 ACD Meridian Business set

The M5212 ACD Meridian business set is an advanced ACD terminal. It is a full featured display set for use by both supervisors and agents. It features a 2-line by 24 character adjustable angle display and 11 programmable line feature buttons. This set is designed for use with a variety of headset designs and supports simultaneous use of two headsets plus the handset. It is fully compatible with both the 18-button (M518) and 36-button (M536) expansion units.

2500 sets

Agents with 2500 sets can log into the ACD group and use ACD features by dialing access and feature activation codes. Distinctive ringing allows the agents to distinguish between ACD and non-ACD calls. Supervisors can administer and monitor 2500 sets in the same way they do the fully featured ACD Meridian business sets. ACD sets lack the feature keys and displays and therefore cannot use access key or display dependent features.

Call center management information system (CC MIS)

The CC MIS is a powerful, flexible, and user-friendly call center management tool for the Meridian SuperNode ACD call center. It is designed for call centers comprising either traditional Meridian ACD groups or larger supergroup configurations served by a single Meridian SuperNode.

While the service provider is responsible for ACD system installation, maintenance, and upgrades, the subscriber retains all the management information and control traditionally associated with standalone systems through the CC MIS tool. CC MIS also enables call center managers to optimize available resources by changing load management parameters. They can, for example, reconfigure inbound agent positions to outbound telemarketing stations. Idle agents can be redeployed quickly and easily based on the amount of traffic in the network.

Figure "CC MIS system overview" on page 9-6 illustrates a potential system overview for a service bureau configuration for the CC MIS. Refer to the *Digital Switching Systems CC MIS Supervisor's Guide*, 297-2671-050 and the *CC MIS General Description*, 297-2671-150 for detailed information about the CC MIS.

CC MIS benefits

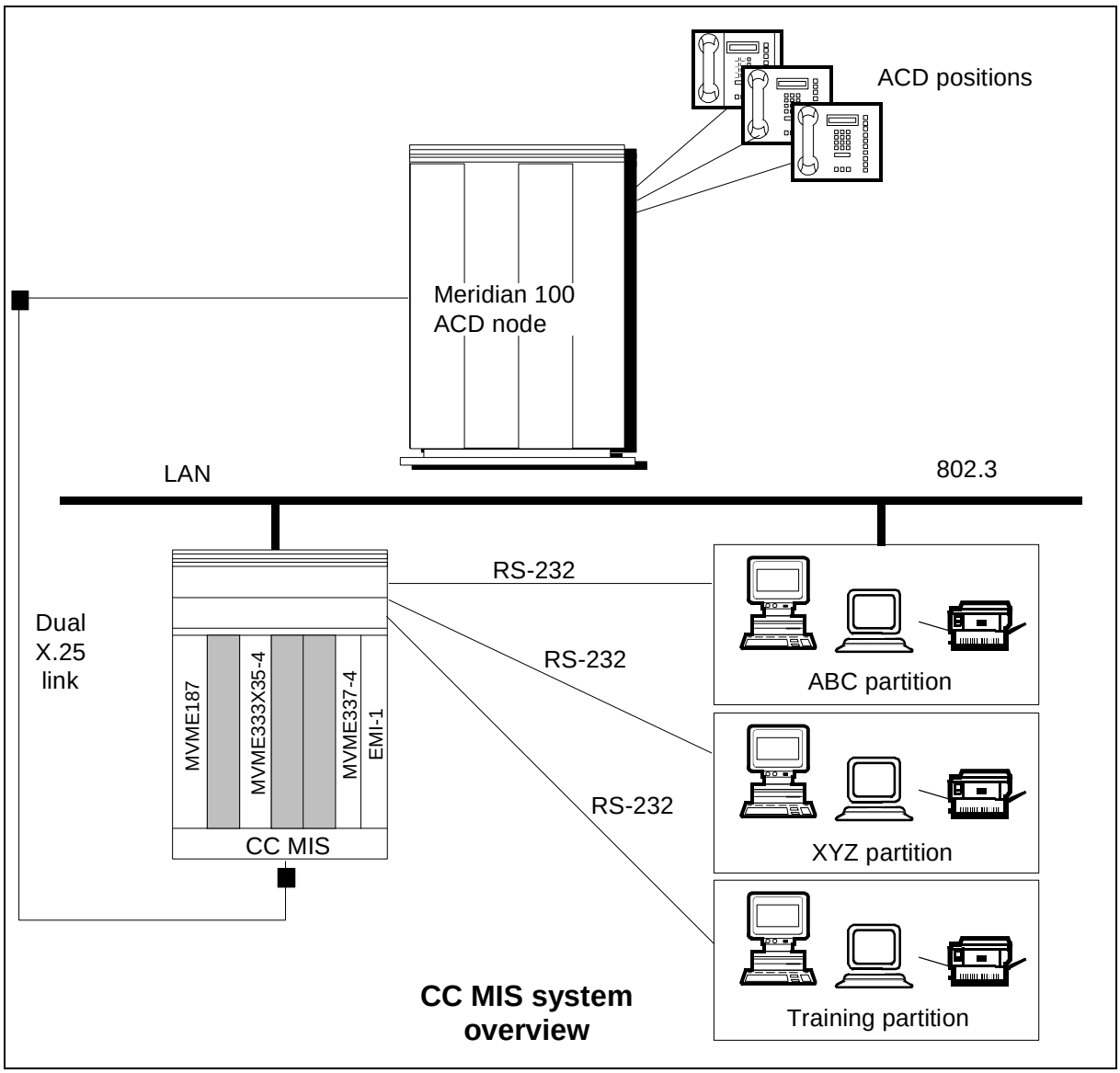
The CC MIS benefits include

- partitioning enhancements
- individually configurable real-time queue statistics
- agent elapsed time enhancements
- dual link support with redundancy
- increased remote terminal support
- enhanced Windows interface
- simultaneous training and live product mode
- wallboard for displaying information on a call center wall

CC MIS components

The CC MIS host is a Motorola XR Power PC 3-slot base unit, or 12-slot base unit, using the Motorola UNIX operating system. It contains the central processing unit (CPU), operating system, tape drives, and hard disk. The host computer interfaces with the Meridian SL-100 switch and the serial and parallel devices used in the product.

Figure 9-2 CC MIS system overview



The host computer dimensions are

- height: 22.5 in (57.8 cm)
- width: 8.0 in (20.8 cm)
- depth: 19.0 in (48.8 cm)

Uninterruptible power supply (UPS)

Uninterruptible power supply can be purchased as an option to prevent power failure to the host. The UPS provides about 20 minutes of power to the host

after the normal power supply fails. CC MIS monitors the amount of time it has been powered by the UPS and gracefully terminates its processes if power is not returned to the system before the UPS fails. The UPS lessens the possibility of database problems due to power failure.

CC MIS capacities

The CC MIS has a modular architecture allowing the system to expand and accommodate virtually any organizational enterprise and support additional agents and enhancements as a call center grows. The CC MIS host computer is available in different configurations from eight ports to 48 ports. The configuration depends on the number of devices connected serially to the host.

Depending upon hardware, software release levels, incoming call profiles, and system configuration, the CC MIS supports:

- 35,000 calls per hour
- 2,000 active agent positions
- 4,095 ACD agent personal identification number (PIN)
- 256 ACD groups
- 256 supervisors
- 64 supervisory terminals
- 72 printers
- 10 wall displays

CC MIS connectivity

The CC MIS provides local area network (LAN) connectivity and a link between the CC MIS and the Meridan SL-100 switch.

LAN connection

The CC MIS provides LAN connectivity so you can share equipment, data files and application software. The ability to share these resources greatly enhances agent management capability.

Link to the Meridian SL-100 switch

The link between the CC MIS and the Meridian SL-100 switch is an X.25 link. Clocking may range from 9600 Bps and 56 KBps and may use an RS-232 or V.35 interface. The type of interface used is transparent to the CC MIS. The enhanced multiprocessor controller (EMPC) is used on the switch end of the interface.

The redundant link option provides two links between the Meridian SL-100 switch and the CC MIS. Only one data link is active at a time.

Extended call management (ECM)

Switch-to-computer application interface (SCAI) is a protocol standard set by the ANSI T1S1 committee. Meridian SCAI (also referred to as CompuCALL) is Nortel Networks' implementation of this emerging standard. Meridian CompuCALL provides a SCAI signaling channel between the Meridian SuperNode and a customer site host computer. This signaling channel exchanges information between the customer's host computer and the Meridian SuperNode to enhance call processing.

Meridian CompuCALL provides the switch to host communications, ACD capability, and coordinated voice and data capability. Meridian CompuCALL allows the Meridian SuperNode to send call information to the customer's host computer before an agent (answering position) is connected to the call. This is done so the customer's host computer can process the database query and show the appropriate information to the answering agent when the agent answers the call. The Meridian CompuCALL base functional group consists of CompuCALL for ACD and the Centrex coordinated voice and data.

Figure "Meridian CompuCALL system overview" on page 9-9 depicts the Meridian CompuCALL with the coordinated voice/data delivery using the Meridian CompuCALL link.

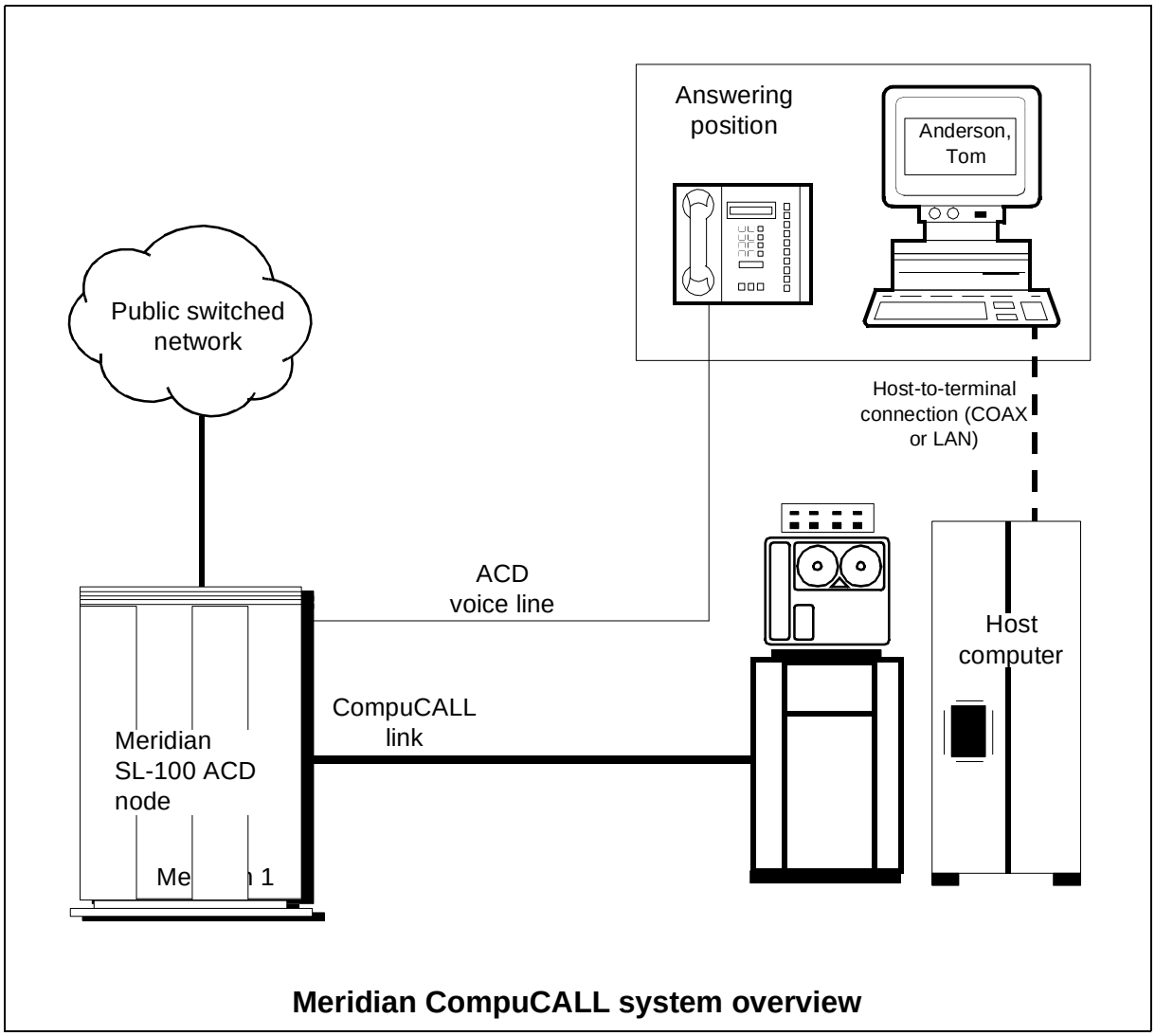
Refer to the *Translations Guide* for detailed information about Meridian CompuCALL.

Meridian CompuCALL

Meridian CompuCALL options offer additional capabilities to the base Meridian CompuCALL functionality enabling a call center to simultaneously present a voice call and visual data about the call to the ACD agent. Meridian CompuCALL options include coordinated voice and data, third-party call control, voice processing integration, and third-party agent control.

Meridian CompuCALL consists of both the software on a Meridian SL-100 switch and an intelligent link to a subscriber's business computer.

Figure 9-3 Meridian CompuCALL system overview



Meridian CompuCALL benefits

Meridian CompuCALL options give call centers several capabilities including coordinated voice and data (CVD), third-party control, call redirection and more. Meridian CompuCALL benefits also include

- the call redirection option allows the call center to program the business computer to redirect calls to appropriate agents.
- the coordinated voice and data option provides an agent with a screen of information about a caller at the same time the call is being received. The agent is able to speak on the telephone while examining call-related information on the desktop terminal.

- the third-party call control gives the call center agent the ability to use the desktop terminal keyboard to perform such functions as placing an outgoing call, and transferring, dropping, adding parties, and call conferencing for incoming calls. This option permits a customer's computer to interact with CVD if desired to place outgoing calls and provide telephony control from a call center computer.
- Voice processing integration - This option allows a host application, working with an interactive voice response (IVR) system to obtain additional information about callers, or provide information to the caller in order to more efficiently handle the call.
- Third-party agent control - This option enables an external host computer to log ACD agents in and out, and make the agents ready or not ready to receive calls through the CompuCALL signaling.

Meridian CompuCALL components

The components needed to provide the CompuCALL service from the Meridian SL-100 switch are

- enhanced multi protocol controller (EMPC) card
- data units or synchronous modems
- X.25 transport, using R232-C or V.35 connections on each end of the link

Meridian CompuCALL capacities

Meridian CompuCALL hardware can accommodate up to 15 EMPC cards on one IOC shelf and up to 150 EMPC cards can be installed. Other hardware provisioning can limit this number. The EMPC subsystem limits the number of simultaneous conversations to 256. Meridian CompuCALL supports modem speeds of up to 56 Kbps.

Meridian CompuCALL PBX and LAN connectivity

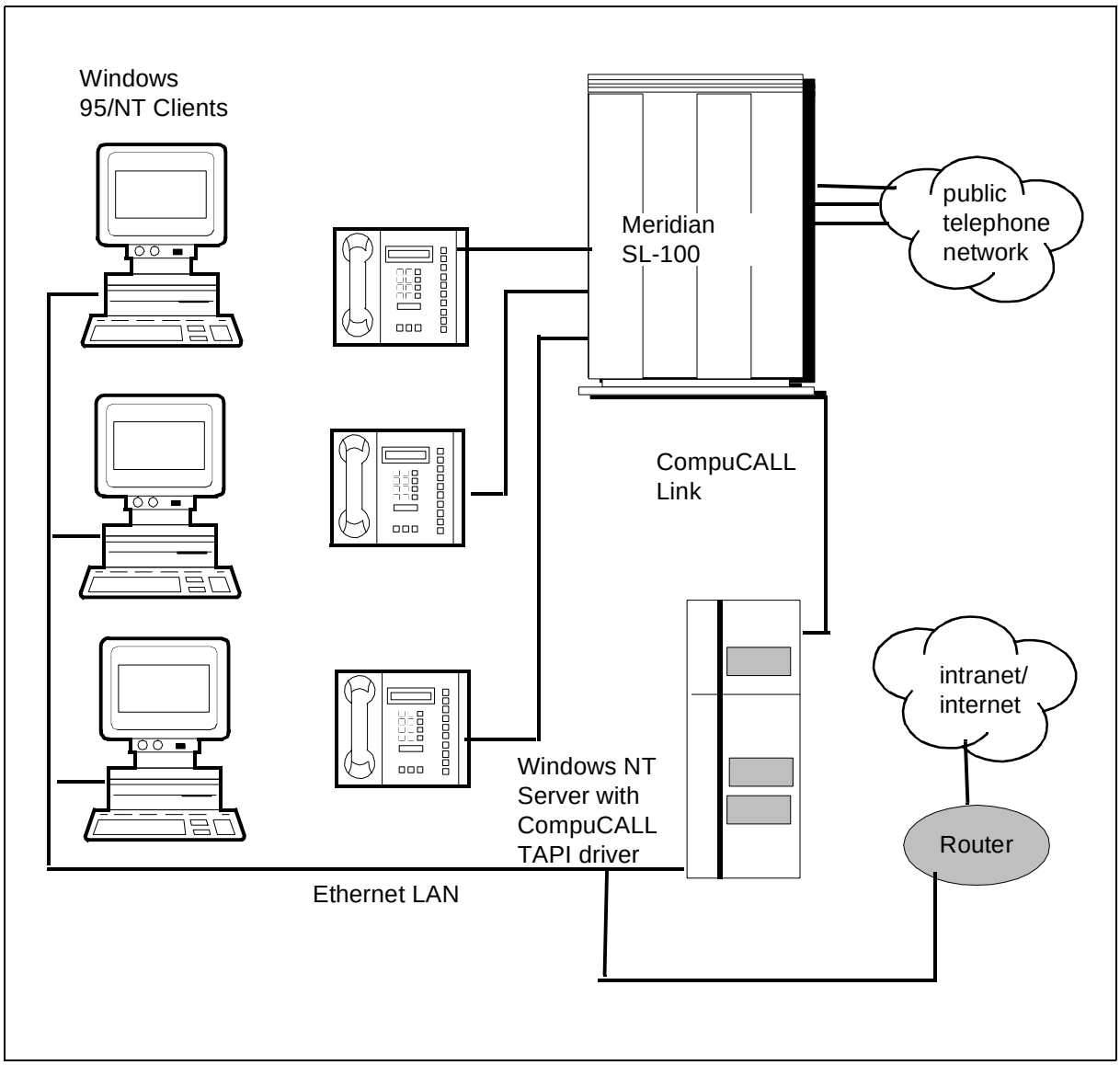
CompuCALL provides LAN connectivity so you can share equipment, data files and application software. The ability to share these resources greatly enhances agent management capability.

Symposium CompuCALL TAPI driver

The Symposium CompuCALL telephony application programming interface (TAPI) driver provides a powerful, cost-effective interface that enables CTI applications running on a Windows NT Server or Windows NT/95 client to monitor and intelligently control incoming and outgoing calls within the Meridian SL-100 system. The Symposium CompuCALL TAPI driver translates between the message set generated by a TAPI 2.1 compliant application and the CompuCALL message set understood by the Meridian SL-100 system. With Symposium CompuCALL TAPI driver, Meridian SL-100 users are able to take advantage of readily available, off-the-shelf CTI solutions.

Microsoft's TAPI 2.1 is an industry standard, third-party call control enabler for the Windows NT and Windows 95 operating systems. TAPI 2.1 is designed to simplify the development of client/server CTI applications.

Windows Telephony requires both an application programming interface (API) and a service provider interface (SPI). TAPI 2.1 serves as the front end API that specifies how the application program accesses the telephony features of Windows. The SPI defines how Windows accesses telephony hardware and telephony services. The Symposium CompuCALL TAPI driver is technically a TAPI SPI that translates between the message set generated by a TAPI 2.1 compliant application and the CompuCALL message set understood by the Meridian SL-100 system. In this way, the Symposium CompuCALL TAPI driver isolates the application from having to know the details of the Meridian SL-100 hardware and software. CompuCALL link allows the TAPI application to receive messages from the switch and to send commands to the switch enabling native TAPI applications to drive call processing on the Meridian SL-100 system.


Windows
95/NT Clients
Meridian
SL-100
public
telephone
network
CompuCALL
Link
intranet/
internet
Router
Windows NT
Server with
CompuCALL
TAPI driver
Ethernet LAN

10 Subscriber services

Refer to the *Translations Guide*, the *Meridian SL-100 ISDN PRI Reference Manual*, the *Common Channel Signaling 7 Maintenance Reference Guide*, 297-1001-531, the *Common Channel Signaling 7 Services Guide*, 297-5151-020, the *DMS SuperNode Technical Specification*, PLN-5001-001, the *Dialable Wideband Services (DWS) Guide*, the *MSL-100 Simplified Message Desk Interface Description and Implementation*, the *Simplified Message Desk Interface Setup and Operation*, 297-2051-104, the *DMS SuperNode DataSPAN Frame Relay Service Maintenance Guide*, 297-5111-501, the *Internet Thruway 1000 Hardware Description Manual*, 297-8991-805, the *Fiberized Link Interface Shelf Hardware Description Manual*, 297-1771-100, the *DMS-100 Family Provisioning Manual*, PLN-8991-104, the *Spectrum Reference Manual*, 297-1771-100, the *Spectrum User Guide*, 297-1771-305, and the *Meridian Communications Adapter Reference Manual* for more detailed information about the Meridian SuperNode subscriber services.

Introduction to subscriber services

Meridian SuperNode subscriber services are also referred to as applications. Subscriber services in the Meridian SL-100 network are divided into two groups: nodal (inter) services and network services.

Nodal subscriber features

Nodal subscriber features are offered in a nodal or intraswitch environment. Nodal services function independently of the switching network that comprises multiple nodes across a telephone service area. Network-derived signaling protocols are not required. Individual subscribers receive full feature functionality without special signaling through the network.

Network subscriber features

Network subscriber services features are designed to work within a custom local area signaling service (CLASS)-compliant (network or interswitch) environment. Network services provide the most sophisticated capabilities offered in today's residential environment. The key attribute of network CLASS features is that the central office switch delivers information about the calling party to the called party during call set-up. To extend network CLASS features across a network of multiple switching nodes, each central office requires software and hardware that supports common channel signaling no. 7 (CCS7), the Bellcore-defined signaling protocol for these features.

Subscriber services applications

Meridian SuperNode subscriber services include

- CLASS
- integrated services digital network (ISDN) basic rate interface (BRI)
- integrated services digital network (ISDN) primary rate interface (PRI)
- simplified message desk interface (SMDI)
- automatic call distribution (ACD)
- packet handler (PH)
- DataSPAN frame relay
- dialable wideband service (DWS)
- CCS7
- Meridian CompuCALL
- 64K Meridian communications adapter (MCA)

CLASS (custom local area signaling services)

CLASS, sometimes referred to as call management service (CMS) in Canada, is a set of advanced calling capabilities which offer convenience and control beyond custom calling features. Service providers can offer CLASS features as subscription services to their established customer base. CLASS services are designed to provide end users with productivity-enhancing products and features using Meridian business sets, CLASS analog telephone sets, and 2500-type telephones with an adjunct display. CLASS features are available in both nodal and network environments.

Refer to the *Translations Guide* for more detailed information about CLASS.

Benefits

Aimed at small to medium PBX markets, this software competitively expands a network provider's portfolio of services to include CLASS features. These Bellcore-conforming features can help open markets previously inaccessible without expensive equipment and create a foundation upon which the network provider can implement new advanced services as they become available.

Capabilities

CLASS feature capabilities that are available include the following:

- automatic callback (ACB), anonymous caller rejection (ACRJ), and automatic recall (AR) on IVD sets
- automatic callback (ACB)
- anonymous caller rejection (ACRJ)

- automatic recall (AR)
- call management system automatic recall blocking to private numbers (CABOP)
- calling name and number delivery (CNND)
- calling name delivery (CNAMD)
- calling number delivery (CND)
- calling number delivery blocking (CNDB)
- calling number delivery blocking override (CNDBO)
- calling number/name delivery blocking (CNNB)
- CALLOG
- CLASS features on IPE
- CLASS message waiting indication (CMWI)
- CLASS per use SMDR billing
- COT and SCF on IVD sets
- customer originated trace (COT)
- customer originated trace feature key access
- deluxe spontaneous call waiting identification (DSCWID)
- diable number delivery (DDN)
- distinctive ringing/call waiting tone (DRCW)
- QCUST command enhancements
- RES SLE/ACBAR TCAP query disable
- selective call acceptance (SCA)
- selective call forward (SCF)
- selective call rejection (SCRJ)
- single USOC for SCWID and CFDA
- spontaneous call waiting display (SCWID)
- visual screening list editing (VSLE)
- RES CNAMD interwork (TCAPNM) local lookup

CLASS over PRI

The Meridian SL-100 system offers most CLASS features over ISDN primary rate interface (PRI) trunks. The following paragraphs describe CLASS features that are currently available over PRI trunks using either the NTNA variant to a DMS-100 central office or the NI-2 variant to a DMS-100 and/or

5ESS central office, along with special hardware requirements and feature restrictions, limitations, and interactions.

Anonymous Caller Rejection (ACRJ)

This feature allows subscribers with or without CLASS Calling Number Display or Calling Name Display to reject calls for which the calling name or number display information has been intentionally blocked. Only calls for which the information has been blocked are rejected. This feature is only available with the NI-2 variant; it is not supported with the NTNA variant.

Hardware Requirements

This feature requires a digital recorded announcement machine (DRAM) with a digital recorded announcement controller card (1X75BA). An EEPROM card (1X79AA) or a RAM card (1X77AA) is also required to record the rejection and confirmation announcements.

Restrictions and limitations

Subscriber usage sensitive pricing (SUSP) is not provided for this feature. When the subscriber activates a name-blocking feature for a network call, the name appears to be unavailable at the terminating office. An OUT OF AREA indicator is delivered to the terminator's customer premises equipment. For a call to be anonymous, it must be blocked in both name and number.

This feature is incompatible with the following features:

- Denied Termination
- Automatic Call Distribution
- Common Control Software Arrangement
- Group Intercom
- E911 PSAP Table Control
- Uniform Call Distribution

Feature interactions

This feature interacts with the following features:

- Distinctive Ringing/Call Waiting
- Selective Call Acceptance
- Selective Call Forwarding
- Selective Call Rejection
- Multiple Access Directory Numbers
- Multiline Hunt Groups

- Distributed Line Hunt Groups
- Directory Number Hunt Groups

Automatic Recall (AR)

This feature allows subscribers to enter a feature code that automatically sets up a call to the last directory number that was dialed regardless of whether the call was answered, unanswered, or busy.

Restrictions and limitations

This feature can be assigned only to lines with the following line class codes:

- 1FR
- 1MR
- RES
- IBN

AR operates with a maximum of 18 dialable digits. A maximum of 21 digits are returned as a result of reverse translations such as dialable directory number.

AR Automatic Recall are the only features that deliver calling party information on recall ringing.

This feature provides long-term denial to valid directory numbers that have octothorpes or asterisks as part of the address.

AR will not monitor the set state or continue to try to place a call to the last incoming DN. In order for AR to work over PRI, the SLE/ACBAR NOTCAP SOC option must be enabled in the Meridian SL-100 (set to “ON”.) Also, in Table RESOFC, the TCAP Query Enable, must be set to “N(o).”

A user can automatically reoriginate a call to the last incoming DN by entering the activation code. If the two-level feature activation is provided, the user hears an automatic recording announcing the DN of the last incoming call. However, with a CCS7 network, if the DN is busy, the user is notified and instructed by an announcement, and automatic processing of the call continues until both DNs are idle. With a PRI network, automatic processing of the call is not supported.

To enable AR over PRI, the TCAP_Query_Enabled field must be enabled with the appropriate SOC, and the TCAP Query Disable field in table RESOFC must be set to N.

Feature interactions

AR does not work when the called directory number has any of the following features activated:

- Call Back Queuing
- Call Forward Fixed
- Call Forward Intragroup
- Call Forward Universal
- Denied Incoming
- Ring Again

AR works when any of the following features are active on the called directory number but the call does not follow the call forward path:

- Call Forward Busy
- Call Forward Busy Internal Deny
- Call Forward Don't Answer
- Call Forward Don't Answer Internal Deny
- Call Forward Don't Answer External Deny
- Call Forward Don't Answer Unrestricted
- Call Forward Don't Answer Variable Timer
- Call Forward Group Don't Answer
- Internal/External Call Forward Don't Answer

AR works when any of the following features are active on the called directory number:

- Automatic Call Distribution
- Call Waiting Deny
- Call Waiting Originating
- Call Park
- Expensive Route Warning Tone
- Off Hook Queueing
- Uniform Call Distribution

The controlling station on a flexible station controlled conference (CNF) call cannot activate AR to add a conferee to the call. If AR is used on a call to a directory number with message waiting (MWT), the message waiting indication is not cancelled.

If AR is used on a call to a directory number that requires an authorization code, the caller is prompted for the AUTH code on recall ringing. If AR is used on a call to a directory number that is part of a preset conference, the caller gets long-term denial.

If a call is forwarded by any of the following features, the calling number is displayed on the set to which the call has been forwarded:

- Call Forward Busy
- Call Forward Busy Internal Deny
- Call Forward Don't Answer
- Call Forward Don't Answer External Deny
- Call Forward Don't Answer Internal Deny
- Call Forward Don't Answer Unrestricted
- Call Forward Don't Answer Variable Timer
- Call Forward Fixed
- Call Forward Intragroup
- Call Forward Universal
- Internal/External Call Forward Busy

If a call is forwarded by Call Forward Group Don't Answer (CFGD), the directory number of the station that forwarded the call is displayed on the set to which the call was forwarded.

Calling Name Delivery (CNAMD)

This feature enables delivery of the calling party's name to the customer premises equipment (CPE) of the subscriber.

In addition, the following enhancements are provided:

- Subscription usage sensitive pricing (SUSP) is provided for CLASS display features.
- CNAMD is made available to the IBN environment.
- The existing NAME line option may be provided to other line class codes.

Hardware requirements

This feature requires an NT6X78 CLASS modem resource (CMR) card, an NT1X75 controller card for DRMUSER announcements, and at least one set on the subscriber loop capable of demodulating the dialable directory number (DDN) calling information.

Restrictions and limitations

The following limitations and restrictions apply to CNAMD:

- All CLASS display features share the same customer originated trace (CO activation and deactivation codes.
- Calling information cannot be delivered to off-key sets.
- CNAMD information is delivered to the CPE in multiple data message format only.
- calling name/number delivery (CNND) delivers name and number on an individual call basis.

For NTNA, CNAMD, CND, and CNND; table NETNAMES must be datafilled as follows: PUBLIC 010 (NMDSP SETUP) $in order for all calling name and number delivery and blocking features to function correctly.

The DMS-100 CO that provides the Meridian SL-100 PRI trunks should have table ISDNPARM and table TRKSGRP datafilled. The following is an example:

```
TABLE: ISDNPARM

-------------------

ECORE SETUP BOTH MAP (DIE MAP)$

ECORE NOTIFY BOTH MAP (DIEMAP)$

TABLE:TRKSGRP

    PRIES 0 DS1SIG

 ISDN 8 12 67Q931 2 N STAND NETWORK PT_PT USER N UNEQ

160 N ECORE LTC 3 1 24 64K HDLC

(  LTC 3 3 24 64K HDLC)$

                  $
```

If the CO has CCS7 and uses TCAP, then the name cannot be delivered to the MSL100 via NTNA. MSL cannot initiate a query to the DMS with NTNA. For features that are dependent upon name display, the feature will not display the name.

For NI-2, CNAMD, CNND, and CND, the following datafill is required.

```
TAB LTDATA-entry required for both USER and NETWORK side trunk

ISDN <LTID> SERV SERV Y Y ALWAYS ALWAYS TCAP_CNAM N $
```

```
TAB CUSTNTWK

<cust_grp_for_network> PUBLIC 2 $ CLID OFFNET TCAPNM LOCAL$

<cust_grp_for_user> PUBLIC 2 $ CLID OFFNET TCAPNM LOCAL$

TAB NETNAMES

PUBLIC 0 0 NMDSP SETUP $

TAB ISDNPARM - This entry maps to the PARMNAME fieled in table
TRKSGRP for NI2 trunk.

TEST SETUP BOTH MAP DIE MAP $
```

The DMS-100 CO that provides the Meridian SL-100 PRI trunks must have certain parameters and options set up for the NI-2 PRI name to be sent to the Meridian SL-100

Procedure 10-1 Setting parameters to send NI-2 PRI name to the Meridian SL-100

1 Determine the name of the NI-2 trunk group on the DMS-100 that is hook to the Meridian SL-100.

2 Go to table LTMAP and find the LTERM_INDEX (LTKEY) associated with the desired NI-2 PRI trunk group.

3 Go to table LTDATA an d position on that same LTKEY with SERV as the third part of the key. Ensure that the TCAP_CNAM option is specified and that

N is chosen for the CNAM_SUSP portion of the option.

4 GO to table OFCENG and position on the IAM_USE_NAME_CHARS. Ensure this is set to Y.

5 Go to table TRKSGRP and position on the trunk subgroup associated with this NI-2PRI trunk. Located the PARMNAME field of that tuple - it is the last field before the PM type is specified.

6 Using information from PARMNAME, go to table ISDNPARM. Locate a tuple with the key <parmname> SETUP, <both, in, out>. Enuser that DFLTACT is set to MAP.

This is an example of the above steps:

Name of trunk is RTPTORCHNI2

Table LTMAP: tuple that contains RTPTORCHNI2 name: ISDN14 CLLI RTPTORCHNI2 TEI 0 $

Table LTDATA: pos on ISDN 14 SERV and ensure that TCAP_CNAM is datafilled:

ISDN 14 SERV SERV Y Y ALWAYS ALWAYS TCAP_CNMA N $

Table OFCENG - ensure the following

IAM_USE_NAME_CHARS Y

Table TRKSGRP: pos RTPTORCCHNI2 0 and get the PARNAME:

```
RTPTORCHNI2 0 DS1SIG ISDN 15 15 87Q931 2 N YIELD USER +
PT_PT USER N UNEQ 16 N TEST DTCI 3 3 24 64K HDLC $$

Table ISDNPARM: pos on parmname TEST SETUP BOTH and ensure
that MAP is specifed:

TEST SETUP BOTH MAP (DIE MAP)$
```

Feature interactions

The feature is not compatible with AR, ACB, Denied Termination (DTM), or Multiple Appearance Directory Number (MADN) features.

Calling Number Delivery (CND)

CND identifies the 10-digit DN of the calling party so that the subscriber can choose whether or not to answer the call.

The calling number displays after the first ringing cycle, on a telephone set or adjunct capable of displaying the incoming DN. Number recognition allows the subscriber to answer the call with a personalized greeting.

The date and time of the incoming call are also displayed. This information is useful in conjunction with voice messaging and sets that provide call logging because it allows the subscriber to know exactly when, and in what order, the calls are received.

Hardware requirements

This feature requires an NT6X78 CLASS modem resource (CMR) card, an NT1X75 controller card for DRMUSER announcements, and at least one set on the subscriber loop capable of demodulating the DDN calling information.

Restrictions and limitations

When reverse translations cannot be invoked, the standard 10-digit directory number is sent to the subscriber. Refer to CNAMD for more details on restrictions and limitations.

Feature interactions

This feature is not compatible with DTM or MADN features.

Calling Number Delivery Blocking (CNDB)

This feature allows the calling party to control the display of the calling DN to the called party on a per call basis. If the calling number is usually displayed, the caller can choose not to display it. If the calling number is usually not displayed, the caller can choose to display it.

CNDB provides DN suppression control for a single call.

Restrictions and limitations

CNDB is available only for RES lines. The following RES line options cannot be used with CNDB:

- Denied Origination
- Automatic Line
- Multiple Appearance DN

The privacy indication requested by CLASS over PRI CNDB must be correctly mapped into the outgoing PRI SETUP message.

Feature interactions

CNDB has the following feature interactions:

- A calling party can activate both CNDB and ACB for the same call. CNDB must be activated first, then ACB.
- A calling party can activate AR in the same call as CNDB. CNDB must be activated first, then AR.
- A calling party can use CNDB to control DN display to the third party of a third-party call. The calling party activates CNDB, then dials the third party's number.
- A calling party can use CNDB to control the display of his DN when transferring a call to a third party. The calling party activates CNDB first, then dials the third party's number.
- All other originating line features normally available to RES lines can be used on calls with CNDB activated.
- CNDB can work with Call Forward Don't Answer (CFD). If the CNDB access code is not dialed before the call, the calling party's default suppression status is used at the remote station. If CNDB is activated before the call, the opposite of the calling party's default suppression status is used at the remote station.
- CNDB and any of the other call forwarding features can be assigned to the same RES line.

Calling Name, Number Delivery Blocking (CNNB)

This feature enables Meridian Digital Centrex (MDC) subscribers to control, on a per-call basis, whether their names, directory numbers, or both are displayed at the called party's set. CNNB suppresses the display of the subscriber's name, directory number, or both for the duration of the call.

Restrictions and limitations

The following limitations and restrictions apply to CNNB:

- CNNB cannot be used by attendant consoles.
- CNNB is assigned to a customer group.
- CNNB has no effect on subsequent calls.
- For inter-office calls, the directory number is always transmitted to the terminating office with the correct suppression value. The message Private Number may be displayed, depending on trunk type and telephone set.
- When the name is suppressed for an inter-office call, it is not transmitted to the terminating office. The message Unknown Name is displayed on the telephone set.

For NTNA, UNKNOWN NAME may be displayed instead of Private Name. The message Private Number may be displayed, depending upon the set and trunk type. Although the privacy flag is only sent across the network for the number, the name is not displayed to the terminating party. The originating switch blocked the name from being sent.

Feature interactions

This feature can be activated by MADN members.

Calling Name, Number Delivery (CNND)

CNND is an option of the CNAB feature that may be used to deliver the user's name and number on an individual call basis. If the user's line or customer group is configured to suppress the calling name and number, then dialing the access code will send the calling party's name and number.

Hardware requirements

This feature requires an NT6X78 CLASS modem resource (CMR) card, an NT1X75 controller card for DRMUSER announcements, and at least one set on the subscriber loop capable of demodulating the dialable directory number (DDN) calling information.

Restrictions and limitations

When reverse translations cannot be invoked, the standard 10-digit directory number is sent to the subscriber. Refer to CNAMD for more details on restrictions and limitations.

With NTNA, the privacy indication requested by the CLASS CNBD service must be correctly mapped into the outgoing PRI SETUP message.

If the CO has CCS7 and uses TCAP, then the name cannot be delivered to the MSL100 via NTNA. MSL cannot initiate a query to the DMS with NTNA.

Feature interactions

This feature is not compatible with ACB, INT calls, DTM, or MADN features.

Call Logging (CALLOG)

CALLOG provides switch-based incoming caller list (ICL) on up to 31 incoming calls to customer premises equipment (CPE.) Access CALLOG by dialing an appropriate activation code. The function of the feature are then implemented using softkeys on a Analog Display Services Interface (ADSI) set. The feature provides the subscriber with the following information: DN, or name of the calling party, time and date of the call, number of times the party called, and status (unanswered, busy, or forwarded.) If any part of this information is blocked by the calling party (such as name or DN), the display indicates that status as well.

Hardware requirements

The CALLOG feature requires an NT6X78 (CLASS modem resource) card for transmission of soft key and display information. This feature also requires receivers to collect the dual-tone multifrequency (DTMF) digits the CPE sends as encoded operations on the ICL.

Restrictions and limitations

The following restrictions and limitations apply to CALLOG.

- The maximum number of entries in the ICL is 31.
- Call Logging cannot be activated on the addon leg of any call.
- Call Logging cannot be assigned to MADN groups.
- Call Logging cannot be assigned to ACD agents.
- Call Logging cannot be assigned to UCD agents.
- CALLOG is incompatible with AAK, ACD, AEMK, AGT, ASL, AUL, AVT, CAG, CCSA, CCV, DIN, DOR, DTM, EMW, FIG, LDTPSAP, MDN, MDNAME, MEMDISP, MLAMP, MREL, MRF, MWT, OBS, and UCD.
- An ADSI compliant telephone or display device is required.
- For calls that come over the network and are logged in the subscriber's ICL, both public and private TCAP translators must be provided for reverse translations. Reverse translations provides the dialable directory number (DN) of the calling party in command CLOG and in a Call Logging session. For more information on the datafill required for reverse translations for Network Call Logging, refer to the network EMW document.
- CALLOG entries appear in a session in order of the most recent calls first to the least recent calls last. Over the dump and restore process (one night process), the order is guaranteed to the minute, not the second. Calls that

were logged in the ICL during the same minute are not guaranteed to be in the order they came in to the subscriber after a dump and restore.

- For calls that come over the network by ISUP using the query method to a CALLOG subscriber whose line is currently busy, the call is logged but the name is not delivered. This CALLOG entry appears in the ICL as Unknown Name, because if the caller gets busy treatment and hangs up, the trunk is released and the name is not sent using the query method. In addition, if busy treatment is applied locally, the trunk is immediately released and again the name is not sent using the query method. For these reasons, the setup method is strongly recommended.

  Note: If a call is made over ISUP Query to a busy line, an entry is logged with Unknown Name. If this call is a repeat call and is returned to the Call Logging subscriber, but this time the line is either unanswered or forwarded, a separate entry is logged (from the busy call) since the names of the first and second calls do not match.

- For calls that come over the network by ISUP using the query method to a CALLOG subscriber whose line is forwarded by CFW/CFU or CFBL/CFB, the call is logged but the name is not delivered. When these options are on the line, the call never actually terminates to the CALLOG subscriber's line so the query is not sent. Even if the query is sent, the returning pass-along message (PAM) with the name information is returned to the forwarded party (terminator), not the CALLOG subscriber.

Feature interactions

CALLOG has the following feature interactions:

- Automatic Recall (AR): CALLOG does not initiate AR calls.
- Call Pickup (CPU, DCPU): If a station picks up a call that terminates on a station with CALLOG, the call is considered an answered call and is not logged on the CALLOG station. If the station that picked up the call has CALLOG, its ICL is not updated, as it is an answered call.
- Group Intercom (GIC): When a group intercom call is received by a station with CALLOG, the originator's real DN, not the GIC member number, is stored in the ICL.
- Do Not Disturb, Make Set Busy (DND, MSB, MSBI): If an incoming call is routed to busy line treatment, it is logged in the subscriber's ICL.
- Screening Features (ACRJ, SCRJ, SCA): If an incoming call does not terminate due to an active screening feature, the incoming call is not logged.
- Secondary DN (SDN): Calls terminating on SDNs are logged against the primary DN (PDN). Call Logging can be assigned only to the PDN.

- Enhanced Secondary DN (ESDN): Only calls that terminate on the PDN of a line with enhanced secondary DNs are logged in the ICL. CALLOG may not be assigned to enhanced secondary DNs.
- Secondary Language (SL): CALLOG is only supported for English.
- Call Forward (all types): Calls log as FWD whenever forwarding is attempted.
- Selective Call Forwarding (SCF): Calls that terminate on a line with this feature activated are forwarded only if the telephone number of the originating station matches one of the numbers on the SCF list.
- Hunt (MLH/DLH): When an MLH or DLH member calls a station with CALLOG, that member is queued as the pilot of the hunt group unless the member has a unique DN, in which case the unique DN and its associated name are logged. CALLOG is assigned only to the pilot of an MLH or DLH group. A single ICL is created for the group and calls to any member that require logging are placed in the group ICL. If a group member calls the pilot DN of the same group, the call is not logged unless the member has a unique DN. In this case, the call is returned directly and the call is logged if necessary.
- Hunt (DNH): When a DNH member calls a station with CALLOG, that member is queued. CALLOG can be assigned to any member of a DNH hunt group. Each member with CALLOG has a separate ICL. Calls to any member that require logging are placed in that member's ICL. If a DNH member is busy and a call hunts past that member to the next available member, the call is logged at the available member instead of the busy number. If all the members of the DNH hunt group are busy, the call is logged as BSY in the called member's ICL.
- Multiple Appearance Directory Number (MADN): When a secondary MADN member calls a station with CALLOG, the MADN member is queued as the primary member of the MADN group.
- Three Way Calling (3WC): When a CALLOG station is the add-on party of a 3WC and the add-on leg is abandoned, the call is not logged. If the non-controlling party exits before the controlling party, the call is considered a two party call and the controller is logged against the add-on party. If a call is transferred to a CALLOG station, the transferred party is logged in the add-on party's ICL.
- Call Waiting (CWT): When a CALLOG subscriber receives a call waiting call but does not answer and the waiting party abandons, the call is not logged. When the waiting party re-rings the CALLOG subscriber, the call is logged if it is busy, unanswered, or forwarded. However, if the CWT/CALLOG subscriber answers the waiting call, goes on-hook, and the held call re-rings the CWT subscriber, the call is not logged. Since the CWT subscriber has already talked to the held party, the call is considered answered.

- Multi-party Lines: Nodal calls from multi-party lines are not logged in the ICL. Network calls from multi-party lines are logged if the calling party information is delivered.
- Direct Inward System Access (DISA): Calls from a DISA number log as if they were made from the originating station rather than the DISA number.
- Series Completion (SCMP): CALLOG logs calls that series complete to and terminate on a CALLOG subscriber. If a CALLOG subscriber is called but the line is busy and series completes to another line (SCMP is on the subscriber's line as well as CALLOG), the call is not logged at the busy station with CALLOG.
- Automatic Call Back (ACB): If a caller with the ACB feature calls a CALLOG subscriber and receives busy treatment and flashes to dial the ACB activation code, the call is not logged at the CALLOG subscriber's station. If, however, the subscriber with the ACB feature goes on-hook instead of flashing, the call is logged at the CALLOG subscriber's station.

CLASS on IPE

This feature provides support within the intelligent peripheral equipment (IPE) for the following CLASS features:

- Anonymous Caller Rejection
- Automatic Recall
- Automatic Recall Blocking of Private Calls
- Calling Name Delivery
- Calling Number Delivery
- Call Logging
- Class Message Waiting Indication
- Calling Name/Number Delivery Blocking
- Calling Number Delivery Blocking
- Customer Originated Trace
- Dialable Directory Number
- Selective Call Acceptance
- Selective Call Forwarding
- Selective Call Rejection
- Spontaneous Call Waiting Identification
- Spontaneous Call Waiting Identification with Disposition

Hardware requirements

The following hardware is required for this feature:

- Extended Peripheral Module (XPM)
- IPE
- NT8D09 or NT8D03 line cards
- CMR card

The following telephone sets are supported by CLASS on IPE:

- M9417, M9516, 9316CW, 9417CW
- Maestro sets: 1500, 2500, 3500, 4525, 4625, 6200CW, 6300CW
- PowerTouch sets: 225, 250,300, 350, 360, 450, 452
- 2500 sets with adjunct displays, M8001, M8003, M8009, M8314, M8417

Restrictions and limitations

The following are restrictions and limitations for CLASS on IPE:

- Distinctive Ringing Call Waiting (DRCW) is not supported in the IPE environment.
- If a phone misses its immediate ringing resource during the first ringing cycle, the CLASS information is not sent by the CMR card within the XPM. This is because the CMR is not able to detect the ringing on the line within the given time period allotted to it.
- If a ringing generator overload is detected within the IPE during the first ringing cycle, the CLASS information is not sent.
- If the telephone user goes off hook on the telephone between the first and second ringing cycle, the CLASS information is not sent.
- CND and CNAMD do not support immediate ringing or revertive ringing.
- CND and CNAMD do not support secondary MADN members nor secondary HUNT group members. These features use a revertive ringing pattern which is treated with the same urgency as immediate ringing. CND and CNAMD will not be supported for any feature or option whose secondary members require either immediate or revertive ringing patterns.
- CND and CNAMD do not support the M9316 and the M9216 telephone sets.
- The IPE does not support other ringing patterns regarding CND or CNAMD.

Feature interactions

The following interactions are supported for CLASS on IPE.

- The ringing schema is affected within the IPE because the CMR card is used during the first and second ringing cycle.
- The immediate ring bool within table OFCENG must be set to N in order for the CMR information to send successfully.
- It is possible for an ERROR message to be displayed on an adjunct display if the display does not have time to refresh. This could be due to a change in line state. For example, if a set is in the process of receiving confirmation tone, but the line state changes to display incoming CND or CNAMD information, the adjunct display may not have enough time to recover from the previous line state and the word ERROR appears.
- A subscriber can experience an extremely short burst of noise (about 0.75 seconds). This is because loss pad data was replaced with an idle code that the CMR card recognizes. To hear this noise, the subscriber must answer the set within the 0.75 seconds range directly following the first ring.

CLASS per use SMDR billing

This feature gives Meridian SL-100 system CLASS service providers the ability to offer billing on a use by use basis rather than a flat monthly rate.

The following CLASS features are supported using CLASS over PRI:

- Automatic Recall
- Calling Number Delivery
- Calling Name Delivery
- Dialable Directory Number
- Calling Number Delivery Blocking
- Customer Originated Trace
- Distinctive Ringing/Call Waiting
- Selective Call Acceptance
- Selective Call Forwarding
- Selective Call Rejection
- Deluxe Spontaneous Call Waiting Display
- Bulk Calling Line Identification

Restrictions and limitations

CLASS per use SMDR billing has the following restrictions and limitations:

- All translations must be appropriately datafilled for the CLASS features that the DF09 call extension record supports.
- The PERUSE option must be added to the appropriate customer groups in table CUSTSMDR for the DF09 record.
- The SUSP option must be turned on in table AMAOPTS for the DF09 record.
- The billing type must be set to AMA when adding CLASS features through SERVORD.
- An audit interval must be set using tuple CIDSUSPAUD in table AMAOPTS for the CLASS display features CND, DDN, and CNAMD.
- The DF09 record is generated using a periodic audit of every phone that has option CND, DDN, CNAMD, DSCWID, and BCLID.
- The DF09 record is generated using activation/deactivation and through editing of the screening list for the SLE features SCA, SCF, SCRJ, and DRCW.
- The DF09 record is not generated when incoming calls are processed by SLE features SCA, SCF, SCRJ, and DRCW.
- The DF09 record is generated through feature activation or operation, or both, for every other supported feature.
- Some logs and records are not generated because of restrictions or limitations inherent in specific features. For example, CLASS feature code 0066 AR timeout is not applicable for CLASS over PRI. Since AR over PRI does not monitor the telephone set and continue to attempt call connection, this record is not generated.

Feature interactions

This feature uses the existing SMDR facilities for generating extension records.

CLASS Message Waiting Indicator (CMWI)

This feature provides a visual indication that messages are waiting for subscribers who forward their telephones to a Voice Message Service (VMS) provider. The subscriber can also receive an audible notification (ringing, stuttered dial tone, or both).

Hardware requirements

CMWI requires customer premises equipment with display capability in order to receive and display the message waiting information. This feature also requires a CLASS modem resource (CMR) circuit pack (NT6X78) and a combined messaging and tone generator circuit pack (NT6X69).

Restrictions and limitations

This feature applies only to 500/2500-type sets, capable of receiving and understanding CLASS modem transmissions.

> ***Note:*** Retransmissions are necessary if the CMR cannot handle a transmission request, or when the subscriber goes off hook during the CMR transmission causing the transmission to be aborted. If the maximum number of attempts to retransmit is reached, the CMWI request is discarded and the user does not receive the information necessary to update his message waiting indicator until lamp audits are executed for that line.

This feature is not supported in feature groups and is not available to enhanced message-waiting subscribers.

The voice mail system must be located on the same Meridian SL-100 system as the called party. Network message waiting cannot be used with PRI variant NI-2 to display message waiting notification (light the message waiting lamp.)

Feature interactions

This feature is available to message-waiting subscribers with integrated business network (IBN) or residential enhanced service (RES) line class codes.

Notification requests to a non-idle set must be delayed until the set returns to the idle state. Delayed requests for CMWI interact with other features, such as RAG, ACB, and AR, which are also activated when a set returns to idle.

CMS Automatic Recall Blocking of Private Calls (CABOP)

This feature allows the operating company to block calls that automatic recall activates to private directory numbers.

Restrictions and limitations

CABOP only blocks AR-activated calls to private numbers that the system routes through equal access carriers that are not approved. The CABOP feature is available from dual-tone multifrequency (DTMF) and dial pulse (DP) sets. This feature is available to residential users and business end users.

CABOP requires one of the following line class codes:

- RES
- 1FR
- 1MR
- IBN
- PSET
- M5008

- M5009
- M5112
- M5208
- M5209
- M5212
- M5216
- M5312
- M5316

Feature interactions

CABOP interacts with the following features:

- Automatic Call Back
- Advanced Intelligent Network
- Carrier Toll Denied
- Equal Access
- Last Number Redial
- Subscriber Activated Call Blocking
- Three-Way Calling
- Toll Denied
- Virtual Facility Group

Customer Originated Trace (COT)

COT allows subscribers who have been receiving harassing or prank calls to activate an immediate trace of the last incoming call, without requiring prior approval and costly manual intervention by telephone company personnel.

After a harassing or prank call is terminated, a subscriber who wishes to trace the call goes off-hook, receives dial tone, and then dials the COT activation code. When the trace has been completed, the subscriber receives a COT success tone or announcement, such as, “You have successfully traced your last incoming call.”

Hardware requirements

Two-level activation of the COT feature requires additional universal tone receiver (NT6X92) and digitone receiver (NT2X48) cards.

Restrictions and limitations

The announcements used in two-level activation increases the use of digitone receivers and universal tone receivers.

When the calling number is blocked, the number is sent over the PRI trunk (NTNA variant) with a flag indicating that the number should not be displayed to the calling party. If the calling party initiates COT, the number can be traced. However, some telephone companies may not send the calling number to a PBX when the calling party blocks it.

Feature interactions

COT cannot be used to trace the originator of a call that receives Directed Call Pick Up Barge In (DCBI) or Executive Business Override (EBO).

COT and SCF on IVD sets

This feature allows M2000 and M3900 phone set users to activate the SCF and COT features.

Note: M2000 phone sets include M2616, M2008, M2008HF, M2006, M2216 ACD, and M2317 phone sets. M3900 phone sets include M3901, M3902, M3903, M3904, and M3905 phone sets.

Restrictions and limitations

SCF is incompatible with the following features and options:

- Bridged Night Number
- Customer Data Change
- Denied Origination
- Denied Termination

COT is incompatible with the following features and options:

- Automatic Line
- Denied Origination
- Denied Termination
- Multiple Appearance DNs

Feature interactions

The interactions for this feature are the same as those specified by the SCF and COT features on M5000, M8000, and M9000 series sets.

Dialable Directory Number (DDN)

This feature displays the calling party's directory number on the subscriber's CPE in a form that is dialable by the subscriber.

Hardware requirements

This feature requires an NT6X78 CLASS modem resource (CMR) card, an NT1X75 controller card for DRMUSER announcements, and at least one set on the subscriber loop capable of demodulating the DDN calling information.

Restrictions and limitations

The following limitations and restrictions apply to DDN:

- DDN may exist along with request suspended (RSUS) service, but DDN SUSP may not be activated while RSUS is active.
- DDN delivers information to the customer premises equipment in multiple data message format only.
- When reverse translations cannot be invoked, the standard 10-digit directory number is sent to the subscriber.

Feature interactions

This feature is not compatible with ACB, intercom (INT) calls, DTM, or MADN features.

To work with denied originating (DOR) or automatic line (AUL) features, DDN must have the NOAMA billing option.

DDN and calling number delivery cannot be added to the same line.

For teen service lines, DDN charges for calls to the secondary line is billed to the primary directory number.

Distinctive Ringing Call Waiting (DRCW)

DRCW is a call management feature which enables a subscriber to select a group of directory numbers from which incoming calls are identified at the called station by a distinctive ring or tone. The DRCW screening list can be modified by the operating company through service orders or by the subscriber using access- and modification-codes. The subscriber can query feature status, activate and deactivate the feature, review the directory number list, and add or delete entries from the list.

Hardware requirements

This feature requires the NT3X68 trunk card to provide distinctive call waiting tone. DRAMS with announcements for appropriate treatment are recommended.

Restrictions and limitations

DRCW cannot be assigned to electronic business sets (EBS), denied termination (DTM) lines, MADN lines, or MADN extension bridging (MADN EXB) lines.

DRCW does not check the DN entered in the DRCW list to ensure it is a valid number.

To enable DRCW over PRI, the TCAP_Query_Enabled field must be enabled with the appropriate SOC, and the TCAP Query Disable field in table RESOFC must be set to N.

With CLASS over PRI NI-2 variant, the datafill in Table LTDATA (same as that required for CNND) is required to support incoming calls where the DN and name are blocked.

Feature interactions

DRCW has the following feature interactions:

- DRCW takes precedence over Three-Way Calling (3WC) and Call Forwarding Busy Line (CFBL).
- Selective Call Rejection (SCRJ), Call Forwarding (CF), Selective Call Forwarding (SCF), and Make Set Busy (MSB) take precedence over DRCW.
- DRCW alerting treatment can be applied to lines with teen service only when the called station is the primary directory number of the teen service line; it cannot be applied to secondary directory numbers.

RES SLE/ACBAR TCAP Query Disable

This feature provides the option to disable TCAP query functions used by the following features. A disabled TCAP query for these features allows networks without full TCAP connectivity to provide limited versions of these features. Each feature can disable the TCAP query.

- Automatic Recall
- Screening List Editing

The following features use SLE:

- Selective Call Rejection
- Selective Call Acceptance
- Selective Call Forwarding
- Distinctive Ringing/Call Waiting

Restrictions and limitations

The following restrictions and limitations apply to this feature:

- To enable RES SLE/ACBAR TCAP Query Disable over PRI, the TCAP_Query_Enabled field must be enabled with the appropriate SOC, and the TCAP Query Disable field in table RESOFC must be set to N.
- For ACBAR, the delayed processing functionality of these features is non-operational. The system does not perform delayed attempt for call completion because the busy/idle state checking is not possible. These

checks cannot occur without TCAP messaging. If the called DN is busy, the system provides busy treatment to the calling (ACBAR) station.

- For SLE programming, the system does not perform DN validation with TCAP messaging.
- With CLASS over PRI NI-2 variant, the datafill in Table LTDATA (same as that required for CNND) is required to support incoming calls where the DN and name are blocked.

Selective Call Acceptance (SCA)

This feature screens incoming calls against a list of subscriber-specified directory numbers (DN) and accepts any calls from those DNs. Calls from any other DN are denied access to the subscriber's line and routed to SCA treatment (announcement or tone). Announcements are recommended to provide appropriate treatment.

The selective call acceptance (SCA) feature can be used to ensure that a subscriber is not interrupted by unwanted calls but can still receive important calls. This feature can also be used to control access to computer lines for security reasons because it restricts the DNs that can terminate on a computer line.

The SCA screening list can be modified by the operating company or the subscriber. The operating company modifies the list through service orders. The subscriber dials an SCA access code to modify the list. After dialing the access code, the subscriber can query the feature status, activate or deactivate SCA, review the list, and add or delete DNs from the list.

Restrictions and limitations

The following limitations and restrictions apply to SCA:

- The SCA line option can only be added through the service order system.
- SCA cannot be assigned to groups of lines, electronic business sets, multiple access directory number (MADN) lines, or MADN extension bridging.
- SCA can only be denied by removing it from the line or by disabling the feature for the entire office in table RESOFC.
- SCA cannot be used with denied termination (DTM).
- SCA does not check the DN entered in the SCA list to ensure it is a valid number.

- To enable SCA over PRI, the TCAP_Query_Enabled field must be enabled with the appropriate SOC, and the TCAP Query Disable field in table RESOFC must be set to N.
- With CLASS over PRI NI-2 variant, the datafill in Table LTDATA (same as that required for CNND) is required to support incoming calls where the DN and name are blocked.

Selective Call Forwarding (SCF)

This feature screens incoming calls against a list of subscriber-specified directory numbers (DN) and forwards those calls to a designated DN. SCF also allows a subscriber to give special treatment to important calls.

The status of the feature (activated or deactivated), forwarded directory number, and a screening list can be established by either the operating company or the subscriber. The operating company defines features information through service orders. The subscriber activates and deactivates the feature by dialing a selective call forwarding access code. Automatic announcements tell the subscriber whether the feature is activated or deactivated, what directory numbers are in the screening list, and the forwarded-to DN. Subscribers can modify this information by responding to prompts from the Meridian SL-100 system.

Subscriber usage sensitive pricing is available for this feature.

Restrictions and limitations

SCF cannot be used with the following features:

- Automatic Call Distribution
- Automatic Message Accounting Test
- AUTOVON Termination
- Bridged Night Number
- Call Forward Busy Intragroup
- Call Forwarding Busy Unrestricted
- Call Forward Don't Answer Exclude Intragroup
- Call Forward Don't Answer External
- Call Forward Don't Answer Unrestricted
- Call Forward Don't Answer Variable Timer
- Call Forward Fixed
- Call Forward for Secondary MADN Number
- Call Forward Intragroup
- Call Forward Simultaneous Screening

- Call Forwarding Group Don't Answer
- Call Park
- Call Preemption
- Call Transfer Warning
- Call Waiting - Dial
- Call Waiting Exempt
- Call Waiting - Originating
- Circuit Switched Digital Data Service
- Common Control Switching Arrangement
- Customer Data Change
- Denied Call Forwarding
- Denied Incoming Calls
- Denied Termination
- Directed Call Park
- Directed Call Pickup
- Directed Call Pickup Barge In
- Directed Call Pickup Barge In Exempt
- Directed Call Pickup Exempt
- Do Not Disturb
- Executive Busy Override Exempt
- Executive Busy Override Originator
- Free Number Terminating
- Hotel, Motel
- Internal External Call Forward Busy
- Internal External Call Forward Don't Answer
- Last Number Redial
- Line Appearance On Digital Trunk Public Safety Announcement
- MADN Member display
- MADN Member Name Display
- Make Set Busy Intragroup
- Message Waiting
- Multiple Access Directory Number

- Multiport Conferencing
- Operator Number Identification
- Permanent Hold
- Plug Up
- Precedence Call Waiting
- Privacy Release
- Ring Again
- Security Code
- Simplified Message Desk Interface
- Station Specific Auth Codes
- Terminator Billing Option
- Three-Way Calling - Public Announcement
- UCD Signal Distributor
- Uniform Call Distribution

The maximum number of lines with call forwarding is 50,000. SCF customers with dial tone denial features (RSUS, DOR, AUL) must have their lists built by the operating company.

SCF does not check the DN entered in the SCF list to ensure it is a valid number.

To enable SCF over PRI, the TCAP_Query_Enabled field must be enabled with the appropriate SOC, and the TCAP Query Disable field in table RESOFC must be set to N.

With CLASS over PRI NI-2 variant, the datafill in Table LTDATA (same as that required for CNND) is required to support incoming calls where the DN and name are blocked.

Selective Call Rejection (SCRJ)

This feature enables a subscriber to reject calls arriving from a limited set of directory numbers. Numbers to be rejected are built into a list through the screening list editing (SLE) facility.

The Selective Call Rejection (SCRJ) screening list can be modified either by the operating company through service orders or by the subscriber using access and modification codes. The subscriber can query feature status, activate and deactivate the feature, review the directory number list, and add or delete entries from the list. When a call is rejected, it is routed to treatment

(announcement or tone). Announcements are recommended for appropriate treatment.

Restrictions and limitations

The following limitations and restrictions apply to SCRJ:

- This feature cannot be assigned to electronic business sets (EBS), denied termination (DTM) lines, multiple access directory number (MADN) lines, or MADN extension bridging (MADN EXB) lines.
- SCRJ subscribers with other features that deny dial tone must have their list built by the operating company.
- SCRJ does not check the DN entered in the SCRJ list to ensure it is a valid number.
- To enable SCRJ over PRI, the TCAP_Query_Enabled field must be enabled with the appropriate SOC, and the TCAP Query Disable field in table RESOFC must be set to N.
- With CLASS over PRI NI-2 variant, the datafill in Table LTDATA (same as that required for CNND) is required to support incoming calls where the DN and name are blocked.

Feature interactions

The following feature interactions apply to SCRJ:

- This feature takes precedence over all forms of selective call forwarding (SCF, CFX, CFW, CFDA, CFBL) and distinctive ringing/call waiting (DRCW).
- Selective Call Acceptance takes precedence over SCRJ.
- Any call to a line with the SCRJ feature that is in a directory number hunt (DNH) group is screened, and treatment is applied if appropriate. Any call which hunts to that line is also screened, however, and if screening determines that the call should be rejected, the call continues to hunt rather than being given treatment.
- SCRJ may be assigned to both pilots and members of multiline hunt (MLH) and distributed line hunt (DLH) groups. When assigned to a pilot, SCRJ takes precedence over hunting. When SCRJ is assigned to members and an incoming call to a member is rejected, the call continues to hunt rather than being given treatment.
- If an SCRJ subscriber has calling number delivery (CND), no calling information is given about rejected calls.
- SCRJ is not invoked during Three-Way Calling (3WC).
- An SCRJ subscriber does not receive Call Waiting (CWT) tones for rejected calls.

Spontaneous Call Waiting Identification with Disposition (DSCWID)

This feature, also known as call waiting deluxe, allows a subscriber to display calling party information about a waiting call and select one of the following options:

- forward the waiting call
- place the waiting call on hold
- send the waiting call to treatment (such as announcement or voice mail)
- answer the waiting call, and place the existing call on hold
- answer the waiting call, and terminate the existing call
- conference the new call with the existing call

Hardware requirements

This feature requires an NT6X78 card (CLASS modem resource).

Restrictions and limitations

DSCWID requires universal tone receivers (UTR) to receive information, such as acknowledgement tone and soft key usage, from the customer premise equipment (CPE).

DSCWID can be assigned only to lines subtending from peripherals that support both UTRs and the CMR card. These peripherals include a line group controller (LGC), line trunk controller (LTC), and remote cluster controller (RCC).

An ADSI compliant telephone or display is required.

If the originating or terminating party in a call has the DSCWID feature active, RCC intraswitched and interswitched, and remote line concentrating module (RLCM) intraswitched calls are not established.

Under high peripheral traffic, soft key usage can alter the display of call information, although the call itself is not switched.

For CLASS over PRI-NTNA and/or NI-2, when tie trunks are used, the call waiting intragroup option should be assigned. Currently, name display is not supported with this feature using PRI.

Feature interactions

DSCWID interacts with the following features:

- Call Number/Call Name Blocking
- Dialable Directory Number
- Distinctive Call Waiting Tones

- Distinctive Ringing/Call Waiting
- Long Distance Indicator
- Multiple Appearance Directory Numbers
- Call Waiting
- Dial Call Waiting
- Call Waiting Originating
- Cancel Call Waiting
- Calling Name Delivery
- Calling Number Delivery
- Selective Call Forwarding
- Selective Call Rejection
- Teen Service

Spontaneous Call Waiting Identification (SCWID)

This feature displays calling party information to CLASS display residential subscribers that have call waiting. Subscribers can have either the number display, the name display or both displays assigned. If the subscriber has SCWID and CND assigned, the number of the waiting caller is displayed. If the subscriber has SCWID and CNAMD assigned, the name of the waiting caller is displayed. These displays occur in addition to the call waiting tone.

This feature also provides Cancel SCWID (CSCWID) capability. CSCWID allows the subscriber to cancel the display of call waiting information for an individual call.

Hardware requirements

The CLASS modem resource (CMR) card, NT6X78, is required in the line trunk controller, line group controller, remote cluster controller, subscriber module DMS-1 urban, and subscriber module SLC-96. The CMR card must be placed in one of the optional card slots in the peripheral, with one card for each unit.

Restrictions and limitations

The following limitations and restrictions apply to DDN:

- Currently, name display is not supported with this feature using PRI.
- SCWID data is delivered once during the call waiting sequence.
- If field ACK_TONE in table RESOFC is datafilled with Y, universal tone receivers are required in order to provide SCWID.

- CLASS display data is displayed upon call waiting re-ring only if the party re-ringing the CLASS customer premises equipment originally terminated on the CLASS customer premises equipment.
- When Cancel Call Waiting is activated, SCWID operational measurements (OM) do not increment.
- For CLASS over PRI-NTNA and/or NI-2, when tie trunks are used, the call waiting intragroup option should be assigned.

Feature interactions

SCWID interacts with the following features:

- Call Number/Call Name Blocking
- Dialable Directory Number
- Distinctive Call Waiting Tones
- Distinctive Ringing/Call Waiting
- Long Distance Indicator
- Multiple Appearance Directory Numbers
- Call Waiting
- Dial Call Waiting
- Call Waiting Originating
- Cancel Call Waiting
- Calling Name Delivery
- Calling Number Delivery
- Selective Call Forwarding
- Selective Call Rejection
- Teen Service

Visual Screen List Editing (VSLE)

The analogue services interface (ADSI) protocol allows soft key data to be downloaded to an ADSI set that displays feature-specific status, prompting and list information, With ADSI, the subscriber can perform the VSLE functions.

Screening list editing (SLE) allows the subscriber to screen specific incoming calls for special treatment. Calls selected for this special treatment are identified by the DN of the party originating the call The following list describes the four SLE features.

- distinctive ringing/call waiting (DRCW)
- selective call acceptance (SCA)

- selective call forwarding (SCF)
- selective call rejection (SCRJ)

Hardware requirements

This feature requires the NT6X78AA (CLASS modem resource (CMR) card), the dual-tone multifrequency (DTMF) receiver card, and the universal tone receiver (UTR) card.

DRAMS with announcements are recommended to provide appropriate treatment.

Restrictions and limitations

With the following SLE features, there are restrictions and limitations with the NTNA and NI-2 variant.

- DRCW
- SCA
- SCF
- SRFJ

With NTNA, the following restrictions/limitations apply.

Procedure 10-2

1 If no SS7 links were available to perform TCAP query of DNs off another switch, then the TCAP_QUERY_ENABLED field for each of the following SLE features in table RESOFC must be set to N. The RES00073 SLE/ACBAR TCAP ON SOC options can be ON or IDLE.

2 Without a TCAP query, a check cannot be done to insure that the DN entered in the list is a valid number.

With NI-2, the following restrictions/limitations apply.

Procedure 10-3

1 If no SS7 links were available to perform TCAP query of DNs of another switch, then the TCAP_QUERY_ENABLED field for each of the following SLE features in table RESOFC must be set to N. The RES00073 SLE/ACBAR TCAP ON SOC option ca be ON or IDLE.

2 The datafill in table LTDATA (the same as that required for CNND), is required to support incoming calls where the DN and name are blocked.

3 Without a TCAP query, a check cannot be done to insure that the DN entered in the list is a valid number.

CCS7

In a telephone network, voice communication is controlled by signaling performed by telephone switches. Prior to CCS7 protocol, telephone switches used per-trunk signaling (PTS), which transmits the signaling component of a call on the same facility as the voice component of a call. Therefore, each voice trunk needed dedicated signaling equipment.

CCS7 uses two paths for transmitting telephone calls. CCS7 partitions the components so the signaling component travels on signaling links and the voice and data component follows voice trunks. Thus, a signaling link can be used for a large number of voice trunks without becoming overloaded. CCS7 performs call setup and dialing and provides supervisory signals for call progression and billing.

CCS7 is a Bellcore-defined signaling protocol for CLASS features. To extend CLASS features across a network of multiple switching nodes, each central office requires software and hardware that supports CCS7 connectivity. The revenue generating portion of CCS7 services is called 800 service.

Refer to the *Translations Guide*, the *Common Channel Signaling 7 Maintenance Guide*, 297-1001-531, the *Common Channel Signaling 7 Services Guide,* 297-5151-020 for more detailed information about CCS7.

800 service

800 service uses service switching points (SSP) and a service control point (SCP) in a CCS7 network to provide toll-reversed calling, in which the calling party pays long distance charges. Businesses and other organizations subscribing to 800 service can provide customers and callers with convenient, cost-free access to telephone services.

The service profile gives the 800 service subscriber the ability to customize the 800 service functions to meet specific needs. The service profile contains information that defines service parameters.

CCS7 network

CCS7-based network features include calling number display, automatic call setup, and screening list editing features. This is achieved by adding a central office data processor (CODP), an outboard adjunct processor which provides CCS7 network interface capabilities to the analog SPC. Nortel Networks was the first in the industry to make it possible for offices with analog SPCs to offer these CLASS-type services.

A CCS7 network is composed of the following components:

- signaling point (SP)
- service switching point (SSP)

- signaling transfer point (STP)
- service control point (SCP)

CCS7 trunk signaling

For the network providers, CCS7 increases both efficiency of interoffice trunking facilities and the opportunities for network-wide services. With CCS7 trunk signaling, premium services such as ISDN and CLASS can be easily and efficiently extended across the network. CCS7 trunk capabilities interwork fully with both existing multifrequency (MF) trunks and CCS7 networks. The Meridian SuperNode can provide direct associated signaling between switches.

Types of CCS7 signaling

CCS7 signaling is divided into two types: connection-oriented signaling and connectionless signaling.

Connection-oriented signaling

Connection-oriented signaling, also referred to as trunk signaling, corresponds to the signaling process in which a fixed end-to-end path is established for the call. The signaling protocol establishes a fixed path although the signaling itself can travel by way of different paths for the duration of he call. All the information associated with the call follows a fixed path even though the signaling itself is not connection-oriented.

Connectionless signaling

Connectionless signaling, also referred to as transaction services, has no fixed end-to-end connection and is associated with the call. The route followed by the information and signaling between the originating and terminating subscribers is not fixed and can change from one message to the next. For example, signaling used to access a database for 800 number translations and maintenance signaling messages between signaling points are considered to be connectionless signaling.

Benefits

CCS7 benefits include enabling providers to maximize the control, reliability, and capacity for their networks. CCS7 software offers diagnostics that are integrated with the MSL-100 system to reduce operations, administration, and maintenance costs. Optional CCS7 functions reduce the time and effort required to isolate and identify the source of improper datafill or hardware problems that are affecting CCS7 messaging over designated links. Other optional functions minimize link downtime by reducing the time and effort required to isolate and identify faulty CCS7 signaling link transmission path segments.

Capabilities

Base CCS7 capabilities include the following:

- message transfer part (MTP)
- signaling connection control part (SCCP)
- transaction capabilities application part (TCAP)
- ISDN user part (ISUP)
- CCS7 link interface unit (LIU7)
- LIU7 enhanced maintenance
- error recovery for CCS7 signaling data links (SDL)
- CCS7 protocol monitor tool
- CCS7 external routing

Availability

The following CCS7 packages are available:

- CCS7 Base
- CCS7 channelized access
- CCS7 integrated link protocol tester
- CS7 interworking with LEAS office
- CCS7 ISDN user part InterLATA connection for Access Tandem
- CCS7 ISDN user part InterLATA connection for equal access end office
- CCS7 link fault locator
- intertoll ISDN user part and CCS7
- network ACD on CCS7

ISDN

Integrated Services Digital Network (ISDN) is a set of standards for end-to-end digital voice/data transmission over the public switched network. These standards are modified for North America in accordance with recommendations of Bell Communications Research (Bellcore). ISDN specifies physical interfaces, electrical characteristics, protocols for encoding information in the network and standards for the operation and processing of calling features such as call waiting and call forward.

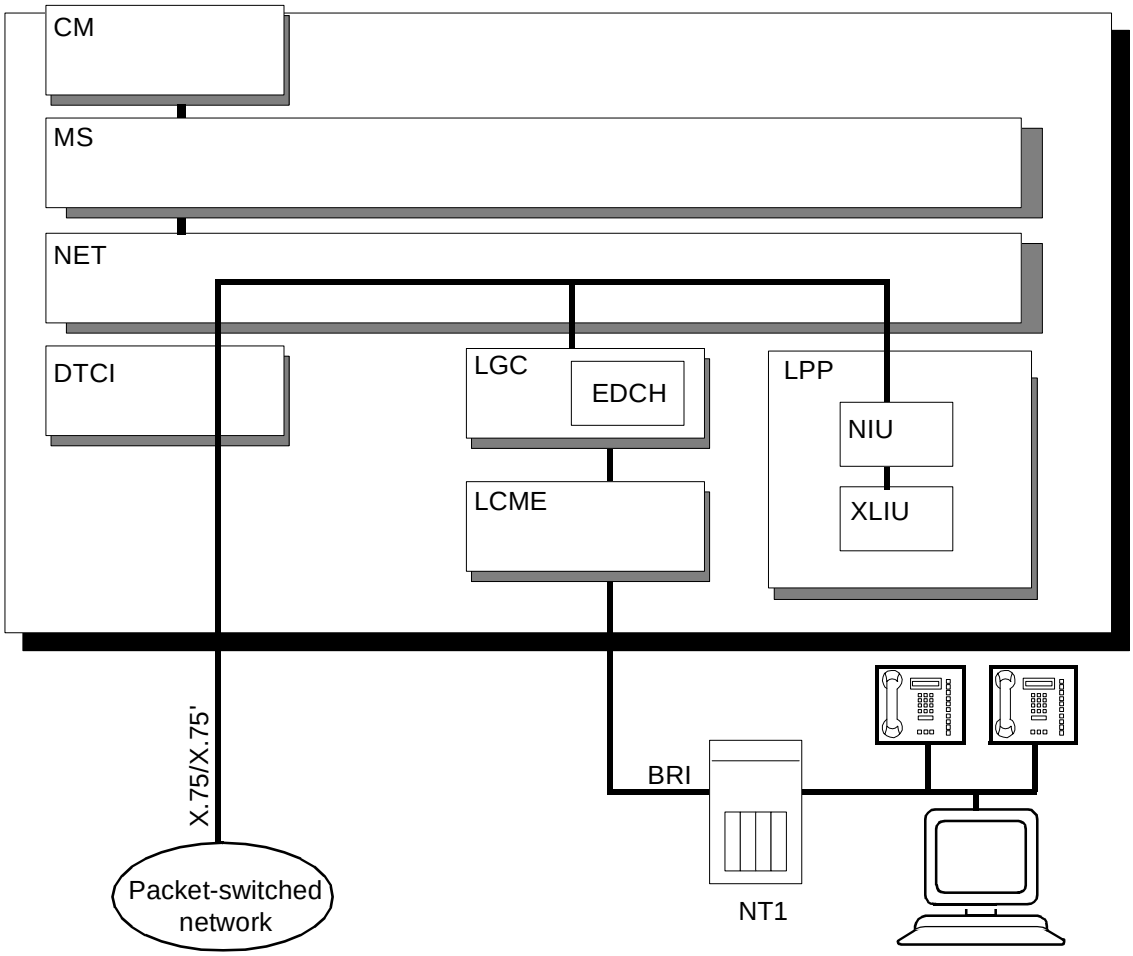
An MSL-100 ISDN node provides circuit switch and packet switch capabilities. The packet handler component performs packet switching data operations and is a gateway to the packed-switched network.

ISDN services can be extended between switches by CCS7 or PRI trunks, permitting more efficient use of network resources and allowing the delivery of advanced network services such as calling line ID (CLID).

An ISDN switch offers subscribers two methods of accessing the voice and data networks: basic rate interface (BRI) for line service, and primary rate interface (PRI) for trunk service.

The following figure illustrates the key components of a DMS-100 ISDN using a DMS packet handler.

Figure 10-1 Key components of an MSL-100 ISDN using a DMS packet handler



MSL-100 ISDN components

Legend:

CM	computing module	LPP	link peripheral processor
DTCI	ISDN digital trunk controller	MS	message switch
EDCH	enhanced D-channel handler	NET	network
LCME	line concentrating module enhanced	NIU	network interface unit
		NT1	network termination 1
LGC	ISDN line group controller	XLIU	X.25/X.75/X.75' link interface unit

Refer to the *Translations Guide*, the *Meridian SL-100 ISDN PRI Reference Manual*, and the *DMS SuperNode Technical Specification*, PLN-5001-001, for more detailed information about ISDN.

DMS packet handler (DMS PH)

A packet is a group of binary digits, including data and call control signals, that is switched as a composite whole. Data, call control signals, and possible error control information are arranged in a specified format for transmission through the network.

Packet switching is the most cost-effective transmission technology for lower-speed data applications. Packet switching offers a superior level of data connectivity with end-to-end checking and correction.

The MSL-100 ISDN node supports two types of packet handlers: the data packet network packet handler (DPN PH) and the DMS packet handler (DMS PH). The DPN packet handler is phased out beginning in BCS34 and replaced by the DMS packet handler (DMS PH). The DMS packet handler application supports the MSL-100 system packet-call processing functionality.

The DMS PH is a packet handler for the DMS-100 product family that provides a full featured X.25 packet services for ISDN B and D channels. The DMS PH is an integral component of the Nortel ISDN switch. The DMS PH provides the protocol engines (X.25/X.75/X.75') required for packet switching. It relies on the common DMS operations, maintenance and provisioning systems to provide all OA&M functions.

The DMS PH became generally available on the DMS SuperNode system's link peripheral processor (LPP) in BCS35. The NI-1 packet services software supports the packet call processing and architecture for the National ISDN-1 compliant release of the DMS packet handler, including numbering plans, digit analysis, packet translations and routing, ISDN/public packet-switched network (PPSN) interworking, and packet-call screening.

The DMS packet handler is an integrated peripheral of the MSL-100 system and fully supports the following packet services:

- X.75/X.75' networking among multivendor packet networks
- DataSPAN frame relay access over the ISDN B-channel
- D-channel packet data
- B-channel packet data

Customer wiring is simplified because access to both packet data service and circuit switched data service is over one standard twisted pair loop.

Benefits

DMS PH benefits include

- National ISDN-1 compliance
- conservation of DMS-core resources
- optimal use of line facilities and existing hardware
- shared network management functions
- multivendor compatibility
- fast effective data transmissions
- minimal line requirements

Capabilities

DMS PH capabilities include

- D-channel packet data from 1.2 kbps to 9.6 kbps using X.25 link access procedure on the D-channel (LAPD)
- B-channel packet data up to 64 kbps to 9.6 kbps using X.25 LAPD.
- X.75/X.75' networking among multivendor packet networks.

Availability

The following DMS PH packages are available

- DMS packet handler operational measurements
- DMS packet handler base
- DMS packet handler SERVOD

ISDN BRI

ISDN BRI is a revenue-generating ISDN offering. BRI is the basic subscriber loop, delivering two 64-kbps B-channels and one 16-kbps D-channel over a standard twisted pair loop. PRI delivers 64 kbps clear channels and standardized out-of-band signaling.

Refer to the *Translations Guide* and the *DMS SuperNode Technical Specification*, PLN-5001-001 for more detailed information about ISDN BRI.

Benefits

ISDN makes sophisticated data services available to businesses and organizations that would not normally be able to afford high speed private lines for data networking. Aside from significant cost savings, subscribers can increase productivity through the many ISDN capabilities.

ISDN benefits include

- full featured and integrated voice and data service
- out-of-band signaling
- lower customer premise equipment (CPE) cost and wider choices of CPE
- terminal portability
- standardized operations, administration, and maintenance (OAM)
- on-site network management
- complete interworking with all other DMS-based data services
- a central office based data network.

Capabilities

An ISDN BRI loop supports multiple subscriber terminals. BRI allows a variety of computers, data terminals, and telephone sets to access advanced circuit-switched and packet-switched features and services through a single modular connector at the subscriber premises. BRI also provides access to third-party vendors, known as enhanced service providers (ESP), who provide services such as weather report, ticket office, and stock market services.

Functional signaling

Functional signaling is based on a peer-to-peer exchange of information between an intelligent terminal and the network. This signaling method allows users to access new network features and services, and makes ISDN standardization easier.

Stimulus signaling (Meridian feature transparency)

Stimulus signaling provides a master/slave relationship between the network and the user terminal. The terminal reports feature key activation to the network, and the network interprets the report and returns prompts (such as audible tones and indicator lamp states) to the user terminal.

BRI channels

An ISDN BRI loop from a customer's premises has two B-channels at 64 Kbps each, plus one D-channel at 16 Kbps totaling 144 Kbps. This gives the user the capability of using three channels (commonly called 2B+D).

BRI provides access to:

- circuit-switched voice and data services on the 64-kbit/s B-channels
- high speed packet data services on a provisioned B-channel connection
- low speed packet data services on the 16 Kbps D-channel

Availability

The following ISDN BRI packages are available

- flex call interworking with E911
- ISDN electronic key telephone system (EKTS)
- ISDN supplementary services compliance
- ISDN display services
- ISDN/ISDN user part interworking
- CLASS on ISDN
- ISDN routing
- INFO+ enhanced number delivery
- multipoint embedded operations channel
- NI 2/3 BRI service

ISDN PRI

ISDN PRI is a revenue-generating ISDN offering. It is a practical, cost-effective option that can deliver significant cost savings and service improvements, supporting access to DWS, network-wide calling features, integrated services access, and enhanced equal access.

Refer to the *Translations Guide*, the *Meridian SL-100 ISDN PRI Reference Manual*, and the *DMS SuperNode Technical Specification*, PLN-5001-001 for more detailed information about ISDN PRI.

Benefits

PRI can be a server to CPE or a host computer, or it can function as a trunk interface between central offices. PRI delivers 64 kbps clear channels and standardized out-of-band signaling.

ISDN PRI benefits include

- subscriber access to DWS
- integrated services access (ISA)
- calling feature delivery across the CCS7 public network
- network-wide calling features such as Calling Line Identification
- enhanced equal access
- offering competitive hybrid network services

Capabilities

ISDN PRI offers the following capabilities to increase call handling productivity:

- calling line identification
- redirected number delivery
- call forward reason display
- connectivity to Meridian 1, SL-1, MSL-100, DMS-250, and other vendor private branch exchange (PBX).

There are two feature-set options for ISDN users: National ISDN (NI-1), including Meridian feature transparency (MFT) also referred to as stimulus signaling, and National ISDN 2.

National ISDN

National ISDN is a Bellcore-defined standard that allows local exchange carriers to offer a consistent set of feature-rich services to all customers, regardless of the serving switch.

Meridian feature transparency (stimulus signaling)

Stimulus signaling provides a master/slave relationship between the network and the user terminal. The terminal reports feature key activation to the network, and the network interprets the report and returns prompts (such as audible tones and indicator lamp states) to the user terminal.

National ISDN 2

National ISDN 2 (NI-2) builds on the foundation laid by NI-1, further standardizing the interface and expanding the functionality to support many of the features offered by Nortel as proprietary enhancements to NI-1. These capabilities include standardized versions of integrated service access (call by call) and dialable wideband (Nx64).

Availability

The following ISDN PRI packages are available:

- PRI base
- PRI integrated services access
- PRI CCS7 interworking
- PRI enhanced number delivery
- back-up D-Channel
- PRI digital test access
- 4ESS and 5ESS interworking (NTNA PRI variant only)
- PRI networking

- PRI network display
- PRI message waiting indicator
- NI-2 PRI base services
- NI-2 DWS
- NI-2 Call by call

Meridian SL-100 IP-enabled

The Meridian SL-100 IP-enabled product is an Internet Protocol (IP) telephony service that serves small and large businesses, and the mobile work force. With the increase in data network usage, small and large businesses require high-performance data access technology for all their communications needs. The Meridian SL-100 IP-enabled product integrates seamlessly with existing corporate networks to unify the delivery of voice and data over IP connections. It allows voice and data traffic to travel over a variety of carrier grade, cost-efficient packet networks. With the Meridian SL-100 IP-enabled product, a PBX switch has feature capabilities of voice over an IP network. Business travelers and telecommuters access the same business services they have in the office by using a dial-up connection.

The Meridian SL-100 IP-enabled product uses two of Nortel Networks' most successful telecommunications services, Integrated Services Digital Network (ISDN) Basic Rate Interface (BRI) and Meridian Digital Centrex (MDC). MDC is a robust, full-featured telecommunications service serving the telecommunications needs of corporate enterprises. The Meridian SL-100 IP-enabled product uses the ISDN BRI call processing platform to deliver the voice features to the IP terminals.

Meridian SL-100 IP-enabled benefits to users

The Meridian SL-100 IP-enabled product coexists with circuit-switched voice users and shares dialing plans, line features, group features, and network access. Additional benefits to users are listed as follows:

- Extends the Meridian SL-100 voice features onto the growing IP market
- Allows smooth migration of Meridian SL-100 customers to managed IP networks
- Provides seamless integration with existing IP networks, eliminates network duplication
- Provides migration strategy to next generation data services

The Meridian SL-100 IP-enabled product provides the following benefits to end users:

- Provides same features and benefits as Meridian SL-100 voice services
- Offers scalability in level of adopting new services

- Allows one network for voice and data, reducing network administration and expense
- Provides the platform for advanced services deployment while utilizing existing infrastructure
- Extends business communication services to the mobile work force

Packet switching versus circuit switching

The Meridian SL-100 IP-enabled product uses packet switching to deliver voice over an IP network. In a packet-switched network, messages are divided into chunks of information called packets. Each packet contains a destination address that is used to route the packet. IP networks are considered *connectionless* because there is no established connection between the endpoints that are communicating. The individual packets for a given message may take different routes over the network. IP networks depend on the Transmission Control Protocol (TCP) to keep track of the packet sequence of a message. TCP is a connection protocol that puts the packets back in the proper order.

Some IP-based applications use User Datagram Protocol (UDP) instead of TCP. UDP uses IP to route packets, also called datagrams, across the network. UDP does not provide packet sequencing, but attempts to ensure that the packets arrive in the right order. Applications that exchange relatively small units of data use UDP to save processing time.

Circuit-switched networks differ from packet-switched networks in that a physical path is obtained and dedicated for the duration of a connection between endpoints. The dedicated connection makes resources unavailable to other users. The following table compares the features of a packet-switched network with those of a circuit-switched network.

Table 10-1 Network comparison

Packet-switched network	Circuit-switched network
Virtual line card	NTBX27 line card
Ethernet connection or coaxial cable	Copper twisted pair
Shared bandwidth	Dedicated bandwidth
No distance limitation	Maximum distance of 18k ft per loop
Q.931 and H.225 call control signaling	Q.931 call control signaling
Converts voice to IP packets	Converts voice to 64 kbit/s time division multiplex (TDM)

H.323 standard

The Meridian SL-100 IP-enabled product system components are based on a proprietary version of the International Telecommunications Union (ITU) Recommendation H.323. This recommendation provides standards for protocols used in packet-based multimedia communications systems. Compliance to the H.323 standard ensures multimedia products and applications from different vendors are compatible with each other. This section introduces some of the concepts and terms associated with the H.323 standard.

The H.323 standard defines four major components for a communications network:

- gatekeepers
- gateways
- terminals
- multipoint control units (MCU)

The functions of the H.323 components are defined in the following sections.

H.323 gatekeeper

A gatekeeper performs call control functions and zone management. The collection of H.323 components that are managed by a single gatekeeper is referred to as the H.323 zone. The required functions that the gatekeeper performs for the terminals and gateways that have registered within its zone are as follows:

- address translation
- admissions control
- bandwidth control
- zone management

In addition, a gatekeeper can have the following optional functions:

- call control signaling
- call authorization
- bandwidth management
- call management

H.323 gateway

A gateway functions as an interface between two networks. If there is only one network, a gateway is not required. The gateways and terminals on the network are called endpoints in an H.323 system. An endpoint is a device that can initiate and receive calls. Two endpoints (terminals) can communicate directly

with each other if they are on the same local area network (LAN). The gateway allows a terminal on a LAN to connect with a terminal on another LAN.

In addition, a gateway performs translations between the H.245 and Q.931 protocols used by the terminals. This allows the terminals on an Ethernet LAN and the terminals on the PSTN to talk to each other. The actual number of H.323 terminals that can communicate through a gateway is not defined in the H.323 standard. This, and other gateway functions, can be designed by the manufacturer.

H.323 terminal

A terminal is a device that allows real-time, two-way voice communication over a LAN. Terminals usually consist of PC-based telephony software or stand-alone IP-based phones. The H.323 standard specifies the requirements for audio, video, and data to operate on H.323 terminals. Video and data functionality is optional, but audio conferencing is required. All H.323 terminals must support H.245, which is a protocol used to negotiate channel usage. In addition, H.323 terminals must support the following protocols:

- Q.931 for call signaling and call setup
- H.225 protocol to communicate with the Gatekeeper
- real-time protocol/real-time control protocol (RTP/RTCP) for audio and video signal management

Multipoint control unit

The MCU is a device that allows three or more endpoints to have an audio or video conference.

> ***Note:*** The Meridian SL-100 IP-enabled product does not contain MCUs.

Codecs

A codec is a type of voice compression protocol. The H.323 standard uses several codecs, which use different voice compression algorithms. All H.323 endpoints must support the G.711 codec for voice compression. The other codecs are optional. The G.711 codec delivers toll quality speech at 56 or 64 kbit/s. This is the best codec for speech quality; however, it also requires the largest bandwidth. The G.711 codec was designed originally for continuous bit-rate networks. The G.723.1 and G.729A codecs operate at lower bit rates and are also predominant audio codecs in H.323-based systems.

Meridian SL-100 IP-enabled components

The Meridian SL-100 IP-enabled system has the following basic components:

- the IP-ready ISDN line trunk controller (LTCI)
- the integrated IP Gateway card in the LTCI
- a Gatekeeper that resides in the central office
- the Packet Telephony Manager (PTM)
- the dynamic host configuration protocol (DHCP), file transfer protocol (FTP), and trivial file transfer protocol (TFTP) load server
- an Ethernet-based LAN
- the i2004 internet telephone on the LAN
- the terminal proxy server (TPS)

The Meridian SL-100 IP-enabled product components are described in the sections that follow.

IP-ready LTCI

The IP-ready LTCI (NT6X01AF) is an XMS-based peripheral module (XPM) enhanced to integrate the IP Gateway card as an IP interface. In addition to a new shelf and backplane, 16 pins are added to the backplane for each slot that accommodates the Gateway card. A backplane-to-bulkhead cable assembly and bulkhead personality plate accommodate the additional cables that connect the LTCI to the edge device on the LAN. The IP-ready LTCI supports the following DMS services:

- voice features
- directory number (DN) provisioning and billing
- static data download
- operations, administration, and maintenance (OAM)

Gateway card

The IP Gateway card is an XPM circuit pack that resides in the P-side interface slots of an IP-ready LTCI. The Gateway card provides the primary interface between the PSTN and the IP terminals on the Ethernet LAN. The Gateway card also converts the voice data from the IP terminals to TDM voice data for the PSTN.

Gatekeeper

The Gatekeeper is the central call processing server of the Meridian SL-100 IP-enabled network. It is a dual configuration PC and application that runs on a Windows NT platform. The Gatekeeper provides registration and admission control to the H.323-based terminals.

The Gatekeeper provides the following services:

- address translation—translates a DN to its transport address (IP and TCP port number)
- admissions control—allows or denies a terminal request to access the packet telephony network
- zone management—provides address translation and admission control for terminals and Gateways that have registered with the Gatekeeper
- call signaling—sends the calling party number in the setup message to the Gateway; forwards the rest of the call signaling messages to the terminals
- authentication—blocks calls from unauthorized users

Packet Telephony Manager

The Packet Telephony Manager is a web-based subnetwork management system that allows you to remotely manage the Meridian SL-100 IP-enabled product components. The PTM manages the Gatekeeper, the Gateway, and the TPS. The PTM also provides information on terminals assigned to the Gatekeepers.

DHCP and FTP load server

The DHCP server runs on the Gatekeeper and provides configuration information to the Gateway cards. The FTP server runs on the same machine as the DHCP server and supplies the software load to the Gateway card.

LAN and LAN edge device

The LAN contains an Ethernet layer two switch device that connects the Gateway cards in the LTCI to the LAN edge device. The LAN can provide an Ethernet connection to the Gatekeeper.

The LAN edge device provides a WAN connection from the LAN through the access network to the enterprise network. The LAN edge device can be a layer three router or data switch.

The LAN and the LAN edge device reside at the customer enterprise. However, standard restrictions on Ethernet reach apply to all connections.

i2004 Internet Telephone

The i2004 Internet Telephone is Nortel Networks' first offering in a family of IP-based telephone sets. This product family focuses on the integration of voice and data at the desktop in the local and wide area network environments. The i2004 internet telephone has embedded voice coding algorithms, called vocoders, for digitizing and compressing speech signals and provides excellent voice quality.

The i2004 internet telephone requires network intelligence to provide telephony and features to the end user. The i2004 internet telephone uses the Unified Network IP Stimulus (UNISTIM) protocol to communicate with the TPS. The TPS translates the stimulus messages and transmits them to the Gatekeeper and the Gateway for call processing.

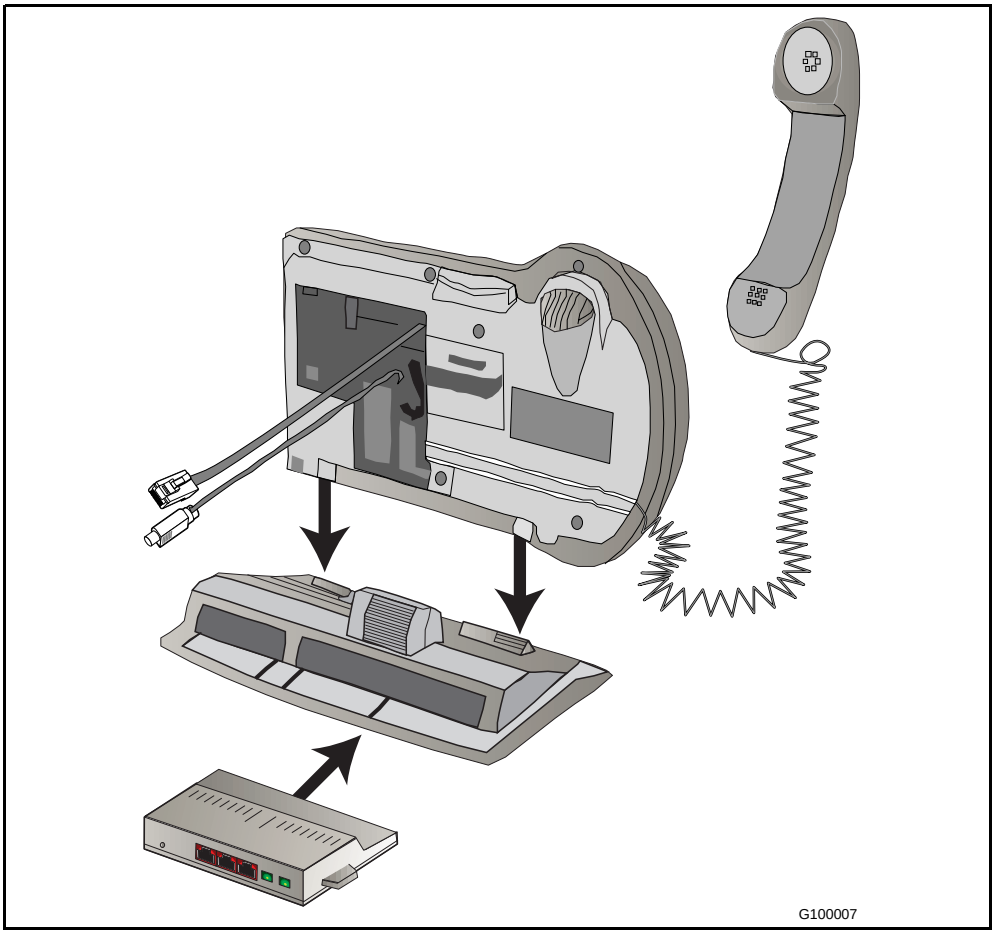
The i2004 internet telephone has a familiar telephony dialpad plus a liquid crystal display (LCD) user interface for text and icon information. The i2004 internet telephone user interface documentation is supplied with the phone.

The following sections describe accessories that can be used in support of the i2004.

Internet Telephone Switch Module

The Internet Telephone Switch Module allows the i2004 phone and a desktop PC in an office to operate over the same Ethernet connection. By splitting one LAN drop into separate feeds for the i2004 and PC, customers can realize cost savings by reducing the RJ-45 cabling necessary to provide LAN connection for their office equipment.

Figure 10-2 i2004 phone, accessory bay, and Internet Telephone Switch Module



The key features and characteristics of the Internet Telephone Switch Module are as follows:

- It is a fully functional, unmanaged, 10BASE-T/100BASE-TX Layer 2 data switch.
- It contains a hardware based fixed priority scheme (ensuring that the i2004 always gets the bandwidth it requires).
- It docks into the accessory bay of the i2004 Internet Telephone foot stand (refer to Figure 10-2).
- It can be powered by either the Inline LAN Power Panel or by a 48V DC power supply (drawing power form an AC wall outlet through an AC power adaptor).

Inline LAN Power Panel

The Inline LAN Power Panel adds power to the standard Category 5 LAN drops which carry the data communications. The LAN line can then power

data terminal equipment such as the i2004 Internet Telephone. Customers eliminate the need to connect each telephone to an AC outlet and realize cost savings by reducing the number of AC outlets necessary to provide power for their office equipment. This arrangement makes it possible to introduce a redundant power source for all the i2004.

The key features and characteristics of the Inline LAN Power Panel are as follows:

- It is patched in between an Ethernet switch and the individual data drops.
- It can power up to 24 ports.
- It may be rack mounted or stacked in a wiring closet.
- It employs automatic load sensing to avoid accidently powering a passive load such as a NIC card or accidently powering unused drops. Automatic load sensing is also employed to remove power in the case of a fault condition.
- It is powered by commercial AC power (any voltage from 90 to 240 V AC at 50 or 60 Hz).
- It can be operated from any commercially available UPS.

Terminal proxy server

The TPS is a mandatory component in the network whenever the i2004 internet telephone is present. The TPS software resides on the Gatekeeper. Its function is to perform call control services for the i2004 internet telephone. The TPS processes the stimulus messages received when the user presses a hard key or selects a softkey from the display. It then converts the stimulus messages to the appropriate signaling to access network services from the Gatekeeper. The TPS processes some of the stimulus messages locally to provide a set of specific i2004 services, such as the softkey options.

The TPS database stores the configuration data of the i2004 internet telephone, such as the DNs assigned to the phones, the key assignments for voice features, and the IP address of the Gatekeeper. The TPS performs the following functions for the i2004 internet telephone:

- makes call setup requests to the Gatekeeper
- processes and transmits Gatekeeper messages to the i2004 IP phone
- performs admission signaling for the i2004 IP phone
- performs call control signaling for the i2004 IP phone
- maintains the call state and the user interface

System limitations and restrictions

The following restrictions apply to the Meridian SL-100 IP-enabled product:

- The system is limited to 2000 users for each Gatekeeper.
- The LTCIs supporting the Gateway cards must have the NTSX05AA processor card.
- Each Gateway card supports up to 512 terminal identifiers (TID) for offices with release MSL12 software.
- Silence suppression is not implemented for G.711 encoding.
- No voice service prioritization for the enterprise is implemented. The required quality of service is achieved through end-to-end bandwidth management.

DWS (dialable wideband service)

Dialable wideband service is Nortel Networks' multirate ISDN switched service aimed at satisfying end-user needs for flexible, wideband connectivity. It provides a simple way to extend existing ISDN services to match the higher bandwidth requirements emerging for videoconferencing, multimedia, imaging, and other high-speed applications. DWS bridges the gap between narrowband services (< 64 kbps) and broadband services(> 1.536 Mbps). DWS offers a flexible, dialable, real-time network connection with rates from 128 Kbps to 1.536 Mbps in 64-Kbps increments.

DWS is based on an extension of the current ISDN PRI standard. The PRI is the subscriber access to DWS which allows subscribers to indicate the desired bandwidth and allows dialing a single standard directory number to make a connection to any multirate ISDN subscriber. The call bandwidth is determined by the originating end user at the time of call setup.

The main difference between a PRI call and DWS is the subscriber, using CPE, signals the MSL-100 to indicate the required bandwidth. All information for a PRI call with DWS is included in the setup message.

Refer to the *MSL-100 Dialable Wideband Services (DWS) Guide* for more detailed information about DWS.

Benefits

Dialable wideband key benefits include

- DWS addresses the needs of both current and future wideband subscribers.
- on-demand, dial-up bandwidth
- standards based
- constant delay performance
- flexible access to public switched wideband services

- savings on carrier services
- call setup performance
- call recording
- video transmission
- distance learning
- on-demand LAN/WAN interconnectivity
- imaging (medical, engineering or scientific imaging applications)
- video to the desktop

Capabilities

Dialable wideband services allows easy integration of several sophisticated applications into the enterprise network. Prime examples of DWS applications include

- request bandwidth on a per-call basis.
- dial a single standard directory number instead of multiple DNs demanded by narrowband systems.
- make a wideband connection to any DWS subscriber in the public network.
- receive a bill that reflects automatic message accounting-compliant records of wideband calls.
- video to the desktop

Availability

The following DWS packages are available:

- dialable wideband services flexible PRI access
- enhanced time switch
- dialable wideband services base software
- dialable wideband service PRI base
- dialable wideband service PRI test tool
- dialable wideband service PRI access
- dialable wideband (Nx64) on the NI-2 variant

Intertoll ISDN user part and CCS7

This optional software provides the CCS7 wideband trunking capability, call control, and messaging required for intra/inter-local access and transport area (LATA) DWS applications. It permits the service provider to offer subscribers the advantages of CCS7 connectivity such as speed, robustness, and distance.

Dialable wideband service flexible access

This feature provides flexible channel selection on the DWS PRI access loop to accommodate a wide variety of customer premises equipment. It allows service providers to offer DWS that supports a wide range of customer premises equipment through three different access subscription options: fixed channel selection, floating channel selection, and flexible channel selection.

Dialable wideband service carrier access

This software provides the CCS7 equal access wideband trunking capability and feature group D support to allow local providers to send dialable wideband service calls to destinations that cross LATA boundaries. It extends DWS network connectivity to include interexchange carriers (IEC). This optional software permits the local service provider to offer subscribers wideband connectivity outside the serving area and can also be used in an access tandem to coordinate traffic going to an IEC.

SMDI (simplified message desk interface)

SMDI functionality, available since software release BCS23, allows an MSL-100 switch to communicate with a message desk. SMDI provides the directory number of the called station, the calling station number (if available), and the reason the call was forwarded to a message desk. In addition SMDI allows the message desk to activate or deactivate the message waiting indication (MWI) for any station that is able to forward calls to the desk.

SMDI provides an interface using a data link and the MSL-100 switch to either of two types of message desks: a voice messaging system (VMS) or a text messaging system (TMS). SMDI allows the end user to monitor and retrieve incoming messages, interpreting these messages to appropriately alter the MWI state.

Figure "Voice messaging system" on page 10-56 illustrates a VMS configuration.

Refer to the *Simplified Message Desk Interface Description and Implementation* and the *Simplified Message Desk Interface Setup and Operation*, 297-2051-104 for more detailed information about SMDI.

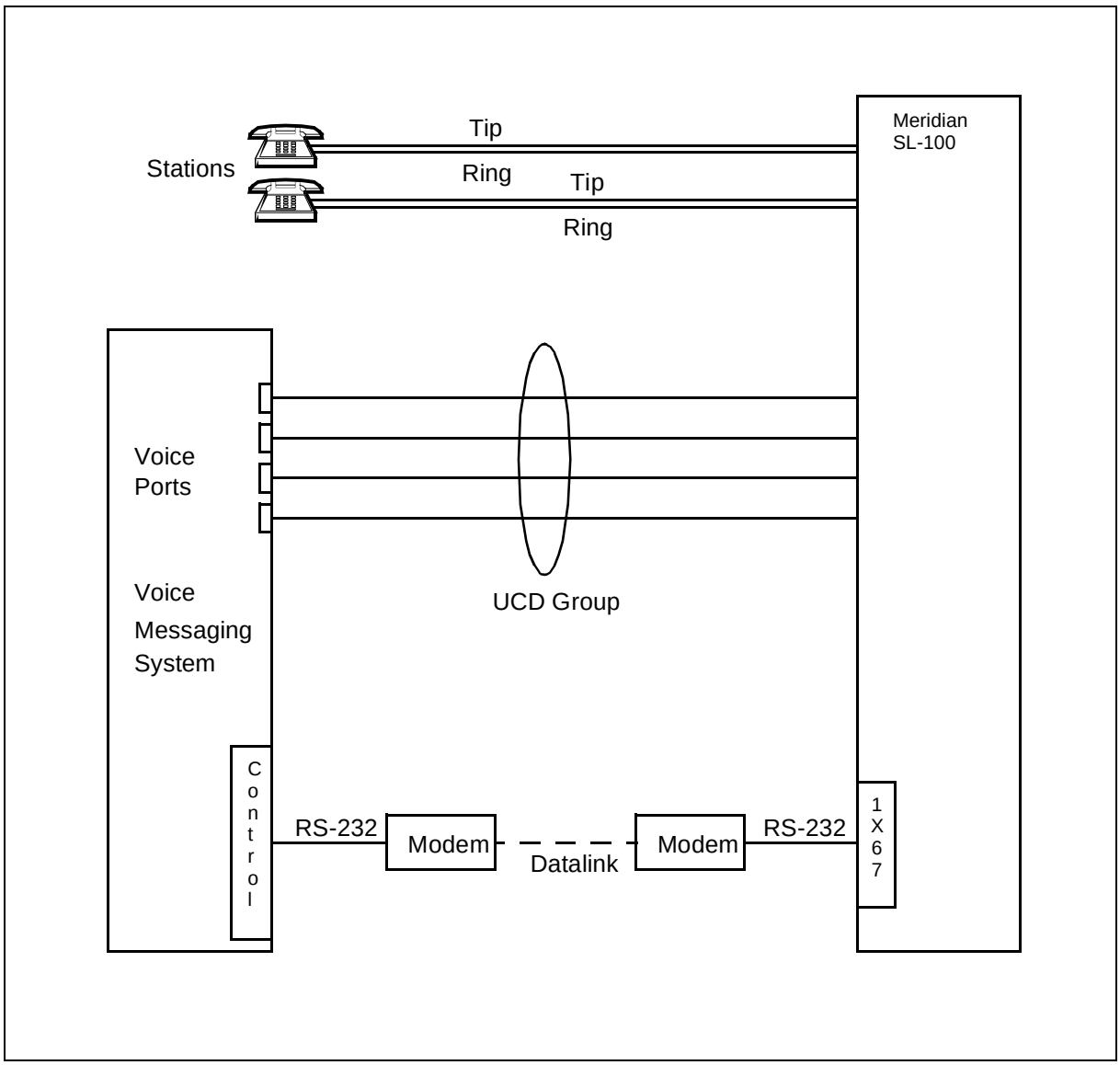
Message desk

A message desk is a central answering service which takes calls for users not available to answer their phones. Users access this service by call forwarding their phones to the message desk directory number. A message desk can be either a voice or text messaging system. Both systems use a datalink connection to a telephone switch to receive incoming call information and to issue two types of notification: message waiting notification and cancel message waiting notification.

The Message Desk is identified with a uniform call distribution (UCD) directory number (DN). The agents within a UCD group must have the UCD line option on their lines and the SMDI option to indicate that their UCD lines have the SMDI feature.

The Message Desk can be a TMS or a VMS. Either system answers forwarded calls and records messages.

Figure 10-3 Voice messaging system



VMS (voice messaging system)

A VMS is an automated recording device which can answer calls and play a recorded announced, record a message, and retrieve and play that message to the appropriate user.

The VMS automatically stores and plays back the requestor's actual voice message. The message transmits as it is delivered, thus eliminating the need for an attendant Message Desk.

TMS (text messaging system)

The TMS electronically automates the recording, filing, and retrieval of messages. The TMS uses a visual display unit with a keyboard to provide a message desk agent with an information display for incoming calls, a text entry facility to record messages, and a text retrieval facility to display all the messages for a user.

Benefits

SMDI integrates the functions of the message desk into the MSL-100 switch so that the SMDI appears to the end user as a single communications system. SMDI benefits include

- called and calling party identification numbers to the message desk by the MSL-100 switch so that the caller connects with the proper mailbox
- message desk activation and deactivation of the message waiting indication through the MSL-100 switch
- Message waiting for SMDI
- SMDI data link interface (to activate or deactivate MWI)
- call forwarding for SMDI

Capabilities

SMDI offers the following capabilities:

- One datalink can serve a maximum of 63 desk numbers in a Message Desk. When there are multiple desk numbers on one datalink, one desk number (desk 63) must be dedicated to handling call retrievals. This allows the Message Desk to store and deliver messages more effectively.
- SMDI supports a maximum of 59 datalinks for transferring messages between the Meridian SL-100 and the Message Desk.

Availability

The following SMDI packages are available:

- Message Service-Network message waiting indicator
- RES SMDI CLID suppression

- Message waiting indicator-MWI
- Flexible line delivery on SMDI
- RES high speed SMDI
- calling line identification display suppression

DataSPAN frame relay

A frame is one complete cycle of events in time-division multiplexing. The frame usually includes a sequence of time slots for the various channels and extra bits, which are used, for example, for control or framing.

DataSPAN frame relay is a wideband service providing users with a virtual private line network for high speed LAN and host computer interconnection. DataSPAN provides bandwidth on demand and reduces CPE costs by providing multiple virtual circuits for each physical access port.

DataSPAN is based on frame relay standards recommended by the International Telecommunications Union (ITU) and the American National Standards Institute (ANSI). Operating from the LPP platform of the Meridian SuperNode, DataSPAN allows service providers to increase revenues while offering customers improved high speed LAN interconnection.

Refer to the *DMS SuperNode DataSPAN Frame Relay Service Maintenance Guide*, 297-5111-501 for more detailed information about Frame Relay Service (FRS).

FRS (frame relay service)

An FRS subscriber is connected to a frame relay switch using an access channel on which multiple permanent virtual circuits (PVC) may exist. Each PVC operates independently of other logical links on the access channel. Each subscriber is assigned an agent, which corresponds to an access channel. The agent is the physical transport medium. The data link connection identifier (DLCI) logically identifies the subscriber's data.

Frame relay data can enter the network in two ways: a T1 trunk connection connecting one LPP to another, and an ISDN switched access connection connecting the CPE to the frame relay switch.

Network access

Network access to the FRS is available in the following ways:

ISDN switched access—provides both BRI and PRI access to the FRS network.

Circuit switched B-channel—provides temporary B-channel connection through the network.

ISDN 56 kbps access—allowing the user to use both A/B signaling and local management interface (LMI) to monitor the connectivity of the ISDN access.

Benefits

Users gain the following significant benefits from DataSPAN frame relay including:

- ISDN and Datapath switched 56 kbps access
- full integration with MSL-100 operations, processes, and procedures
- inexpensive add-on to existing LPPs and single shelf LPPs
- flexibility that allows easy expansion
- improved reliability
- simplified network management

Capabilities

DataSPAN allows the network provider to offer frame relay switching services from a DMS SuperNode central office. With this software and frame relay interface units (FRIU) in a DMS LPP, the provider can cost effectively offer frame relay network services or switched 56 kbps access services as an overlay to an existing frame relay network.

Frame relay capabilities include

- frame relay forum user network interface (UNI)
- ANSI T1.617 Annex D LMI
- access speeds at DS-0 (56 or 64 kbps), fractional DS-1 (384 kbps), and full DS-1 (1.544 Mbps)
- ISDN BRI and PRI switched 56 kbps access and BRI nailed-up 64 kbps access

Availability

The following frame relay packages are available:

- frame relay basic
- frame relay base billing
- frame relay local exchange carrier billing
- fractional T1

64K MCA

The Meridian communications adapter (MCA) is part of the Meridian SuperNode data communications equipment (DCE) and is an integrated data module consisting of a printed circuit board mounted within the Meridian modular telephone. The MCA allows synchronous/asynchronous ASCII

terminals, personal computers (PC), Macintosh computers, and printers to be connected to the telephone set through an RS-232-C interface. It passes asynchronous and synchronous data through Nortel Networks' private branch exchanges for asynchronous or synchronous data applications.

The 64K synchronous data support MCA was introduced in the MSL05 release to enable simultaneous voice, data, and video communications. The 64K MCA has new circuitry to accept a +5V wall transformer now available from Nortel Networks.

A Meridian modular telephone equipped with the MCA can execute data calls using keyboard dialing from an attached terminal. It can carry on voice and data communications simultaneously without causing any mutual interference. Figure "MCA Adapter phone set and PC connection (back view)" on page 10-61 illustrates the MCA connected to the back of a telephone set and a PC. Refer to the *Meridian Communications Adapter Reference Manual* for more detailed information about the MCA.

Benefits

The 64K MCA benefits include:

- PCs or a dumb terminal can be attached to the MCA to talk directly to the MCA.
- The MCA can operate with most automatic voice and data equipment such as a fax.
- Serial printers can be connected to the MCA.
- Data communications can be performed through the PBX to a far end service such as a mainframe, modem pool, other PCs, or printers.
- The MCA uses nonvolatile read and write memory for permanent settings and configuration parameter storage.
- The MCA stores auto dial and speed call numbers.

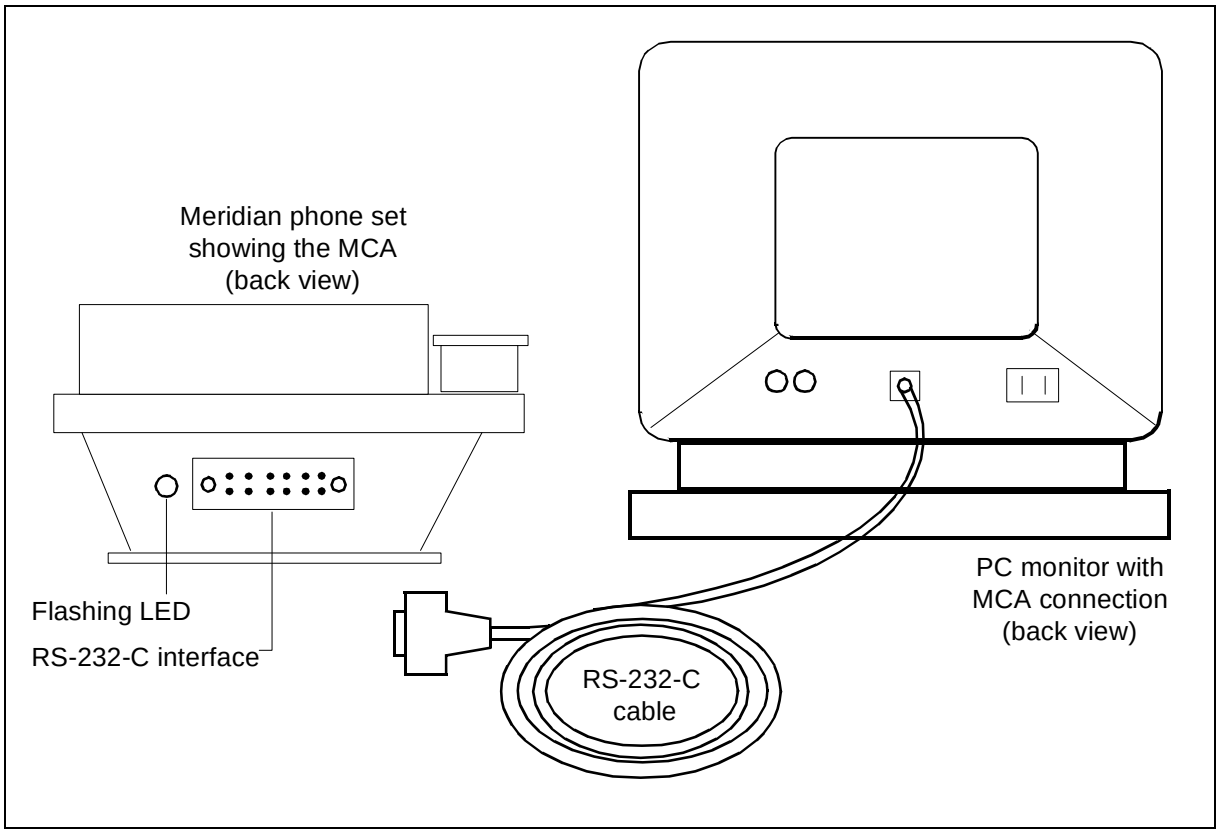
Capabilities

The 64K MCA offers the following capabilities:

- simultaneous voice, data, and video
- T-link support (enables MCA to talk to DMS and SuperNode data units at the desktop as well as to ISDN BRI terminal equipment that supports T-link)
- protocol adaptation and selection (enables the MCA to automatically select from various protocols and attempt a connection or complete the protocol exchange)
- V.25 bis protocol support

- high-level data-link control (HDLC) data format
- assert ready to send (RTS)

Figure 10-4 MCA Adapter phone set and PC connection (back view)



Availability

The MCA replaces the Meridian programmable data adapter (MPDA) for synchronous/asynchronous data applications.

The following 64K MCA synchronous data support is available on the following Meridian modular telephone sets:

- M2006
- M2008/M2008HF
- M2016-S
- M2616
- M2216ACD

ACD

See the *Call management* section of this publication.

Meridian CompuCALL

See the *Call management* section of this publication.

Single shelf link peripheral processor (SSLP)/fiberized link interface shelf (FLIS)

The link peripheral processor (LPP) is a high capacity vehicle for services such as frame relay, packet switching, CCS7 call control, and ethernet interface. The LPP is required to support the ethernet interface unit (EIU). Users of smaller MSL-100 systems that do not require such high capacity as the LPP, require a more economical method of accessing EIU/LPP services. The SSLPP/FLIS is an alternative to a full link peripheral processor where:

- The number of link interface unit (LUI7) application specific units (ASU) desired does not make the full LPP a cost effective option.
- Offices lacking floor space near the core processor makes it impossible to install an LPP cabinet.

For more information about the FLIS, refer to the *Fiberized Link Interface Shelf Hardware Description Manual*, 297-1771-100 and the *DMS-100 Family Provisioning Manual*, PLN-8991-104.

Hardware components

Hardware components of the FLIS include

- link interface shelf (LIS)
- LIS F-bus controller (LFC)
- LIS fiber interface (LFI)

The controlling entity for the LIS is composed of the LFC and the LFI. The LFC contains the firmware required to initialize the board and it receives the downloaded software required to maintain its messaging paths.

Figure "SSLP/FLIS configuration" on page 10-63 illustrates two FLIS shelves within the enhanced multipurpose cabinet (EMC). The integral FLIS hardware components are indicated in this diagram. A single shelf configuration can also be provisioned.

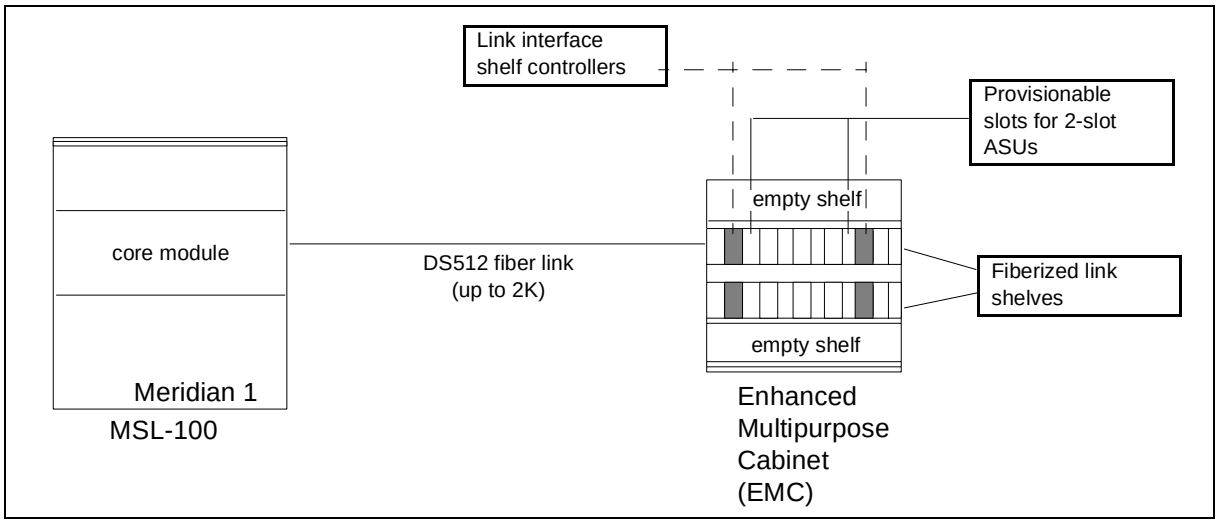
Hardware requirements are:

- DTC7 card on the XPM
- LIU7 (on the peripheral module)
- EIU (on the peripheral module)

Software

The FLIS software consists of central software, MS-bus software, and LFC software.

Figure 10-5 SSLP/FLIS configuration



Connectivity

The FLIS is installed in an EMC and connected to the core using DS512 fiber links. These fiber links allow the EMC cabinet to be located up to two kilometers from the core processor.

11 Computer-telephony integration (CTI)

Computer-telephony integration (CTI)

CTI is the convergence of computer and telephony technology. The introduction of the Microsoft telephony application programming interface (TAPI) is the basis of the development of CTI. CTI brings call management capability and other telephony functionalities to the computing desktop in a point and click environment. Nortel Networks developed a TAPI provider for the Meridian SuperNode (Meridian SL-100) to interpret the TAPI commands.

Nortel Networks spearheaded CTI application development with SYMPOSIUM FastCall, which is the first call center software application designed to operate on top of the Microsoft Windows TAPI software platform. Nortel Networks' SYMPOSIUM portfolio (formerly called the VISIT portfolio) offers a full range of TAPI applications. A key advantage of Nortel Networks' desktop CTI portfolio is its ability to work over existing 64 kbps voiceband channels. This capability enables enterprises to deploy desktop CTI technology today without the need to reconfigure legacy network infrastructures.

CTI applications include SYMPOSIUM Multimedia Conferencing, SYMPOSIUM FastCall, SYMPOSIUM Call Manager (formerly VISIT Voice), and SYMPOSIUM Messenger. SYMPOSIUM Communicator is a hardware interface device that integrates all your voice, fax, internet and data calls from your personal computer (PC).

H.320 video conferencing standard

H.320 is a top-level international standard for narrowband visual telephone systems and terminal equipment. It defines a minimum feature set that allows H.320-compatible products to communicate using this standard feature set. H.320 allows any H.320-compatible products (such as desktop units, room-conferencing systems, and multipoint conferencing units) to communicate at the level of the least advanced product. This allows H.320-compliant products to be interoperable with other vendors' video products that support this widely used standard. The major feature is real time video conferencing with in-band synchronized audio.

T.120 data conferencing standard

T.120 is a top-level international standard for data conferencing with subparts describing component standards. Major features are interactive sharing of a white board and PC applications, and high speed file transfer. The T.120 standard is supported by most new video conferencing systems and multipoint

conferencing units (MCU or video bridges). The units enable conferencing systems that use T.120 data applications to participate in multipoint T.120 activities.

Nortel's Communicator

Nortel Networks' SYMPOSIUM Communicator is a PC card that provides cost effective integration of business telephones and personal computers. Communicator allows data traffic to be transmitted over the existing cabling between the PBX IPE shelf and the desktop, optimizing the investment in a Meridian SL-100 system. Communicator enables desktop solutions such as fax, videoconferencing, data modem, call management, TAPI, productivity tools, and Internet access. With Nortel Networks' Communicator, you get an affordable, high-speed communication link that doesn't require additional analog or ISDN lines.

Communicator features

Communicator offers the following features:

- TAPI connectivity—run your PC application for personal call management, for call center agent productivity tools, or for other TAPI compliant applications. Communicator supports Microsoft's TAPI V1.4. This provides a standard Windows programming interface for applications to use telephony features from the Meridian switch. Compatible with digital lines from both Meridian 1 and Meridian SL-100 switches.
- fax modem connectivity—run your PC fax software. Communicator's digital signal processor (DSP) enables fax modem emulation. Communicator's fax modem works with Microsoft Exchange Fax services or other fax software, such as WinFax, that normally communicates with standard fax modems.
- data modem connectivity—run your internet service provider software or other direct dial modem software. With Communicator 2.0 you can communicate with other modem users or services at speeds up to 33.6 kbps using your exisiting digital lines.
- video conferencing connectivity—use with SYMPOSIUM Multimedia Conferencing for business quality video and file sharing/application tools. Get 128K ISDN comparable video bandwidth over your existing digital lines and 256K bandwidth in some cases. Communicator is compatible with SYMPOSIUM Multimedia Conferencing and works when paired with the SYMPOSIUM product to give you top-of-the-line desktop video and data conferencing.

- “soft" phone—use with a headset and your TAPI compliant application instead of a phone to save desktop space. Soft phone and fax/modem features are mutually exclusive.
- plug-and-play installation—installation couldn't be simpler. There is no more determining interrupts and I/O addresses. You just install the hardware into the PC, then run Communicator's setup software. The next time your computer is restarted, Window's configures Communicator automatically.

The following table lists the PC requirements for Communicator.

Table 11-1 PC requirements

Processor	486/66 MHz or faster
Memory	16 Mbyte or higher
Operating System	Windows 95
Space requirements for Communicator only	15 Mbyte
Space requirements with Call Manager	45 Mbyte
Space requirements with Multimedia Conferencing	65 Mbyte
Slots	one ISA slot
IRQs (Interrupts)	one for DSP and one for modem serial port
I/O (Input/Output) Addresses	one for DSP and one for modem serial port
DMA (Direct Memory Access) Address	one for DSP tasks
Access to a CD-ROM reader	for loading software

Basic configurations

The Communicator card can be configured in conjunction with the Meridian SL-100 switch to work several ways. These different configuration options depend on your plans for using your Communicator card and on the options that your switch software supports.

Currently Meridian SL-100 intelligent peripheral equipment (IPE) systems use the NT8D02 digital port for the Meridian digital terminal. The Meridian sets use the even logical equipment number (LEN) for voice communication and the odd LEN for data communication.

With this information the switch administrator uses the following table to configure the LENs.

Flexible LENs

The Flex LEN feature in Meridian SL-100 release MSL09 provides extended usage of the digital port.

Table 11-2 Flexible LEN

Desired Use of Communicator 2.0	MSL09 LEN Configurations			
TAPI application	**Fax/modem application**	**Symposium Multimedia Conferencing**	**one digital line**	**second digital line**
yes OR	yes		Even/voice	N/A
yes AND	yes		Even and odd both voice	N/A
		yes - 128K	Even and odd both DTMK	N/A
yes OR	yes OR	yes - 128K	Even and odd both DTMK	N/A
yes AND	yes AND	yes - 128K	Even voice and odd DTMK	Even voice and odd DTMK
		yes - 256K (to some locations)	Even and odd both DTMK	Even and odd both DTMK

Capabilities and restrictions

IPE LENs in Meridian SL-100 release MSL09 will have an option added in service orders, SERVORD, called FLXA. This feature allows a secondary DN to be added to the even port to allow data calls and voice calls on the odd LEN of the IPE. The Flexible LEN feature supports M2006, M2008, M2008HF, M2616, M2616CT, M2216, Meridian communication adapter (MCA), SYMPOSIUM Communicator, Meridian programmable data adapter (MPDA), and the analog terminal adapter (ATA).

Basics of how Flex LEN works

IPE digital ports have two channels in them. One channel corresponds to the even LEN, and the other corresponds to the odd LEN. Normally, the Meridian digital telephones only have access to the even LEN and the data accessories and the ATA access to the odd LENs.

However, once the Flex LEN FLXA option is assigned to the LEN, the Meridian digital terminals supported can be assigned to the odd LEN, and the MCA, MPDA, and ATA can be assigned to the even LEN.

In SERVORD, when a Meridian digital set is added to the even or odd LEN, an option called DTMK is used to provide data applications. When two phone sets are added to the even and odd LENs of one IPE port the user has full advantage of voice calls from his phone set, fax/modem capability from the odd port and 128k video from the secondary data keys (DTMK option). Pressing the DTM key on the set does nothing. The Communicator card will handle placing any data calls. The user can still place calls on any other primary directory number (PDN) or secondary directory number (SDN).

Industry standard videoconferencing

SYMPOSIUM Communicator allows industry standard H.320 desktop videoconferencing (128k), using one or two twisted pair to the PC and SYMPOSIUM's Multimedia Conferencing package. With this combination, you can take advantage of full screen, color videoconferencing, high speed file transfer, whiteboarding, and true application sharing without an additional ISDN line.

Desktop call management

SYMPOSIUM Communicator includes SYMPOSIUM Call Manager desktop call management software. Desktop speed dial and dial-by-name directories improve response times and productivity, and directory information can be imported from a wide variety of popular database programs. Call Manager also adds integrated call logging capabilities to your Meridian system, allowing users to continuously monitor and track call activity. Call Manager is simple to use and adds valuable call management features to your desktop.

SYMPOSIUM Multimedia Conferencing

SYMPOSIUM Multimedia Conferencing enables users to conduct video conferences and T.120 data conferencing in real time from the desktop. SYMPOSIUM Multimedia Conferencing is Nortel's implementation of the H.320 and T.120 international standards for video interfaces. SYMPOSIUM Multimedia Conferencing is a richly featured desktop CTI system that enables users to engage in full-color, real-time video conferencing and share image files. A compact video camera mounted on top of the PC monitor transmits video images in real time over standard twisted-pair facilities to other H.320 video conferencing systems.

SYMPOSIUM Multimedia Conferencing is Nortel Networks' third generation video conferencing product. It is an H.320-based video conferencing product designed for the PC's Windows 95 platform. It also includes T.120 data applications plus application sharing. Calls can be point-to-point, or transmitted through the VideoServer multipoint bridge. Figure

"SYMPOSIUM Multimedia Conferencing overview" on page 11-7 illustrates one configuration of SYMPOSIUM Multimedia Conferencing suite software.

Benefits and features

Key benefits and features of SYMPOSIUM Multimedia Conferencing include

- T.120 data conferencing
- H.320 video conferencing
- ISDN BRI is built into the codec video card or it can be used with the SYMPOSIUM Communicator card which provides data connectivity over the Meridian SL-100 IVD lines
- SYMPOSIUM Call Manager applications that can be used to dial video calls if the Call Manager connectivity device is present (see the following section on SYMPOSIUM Call Manager)
- video image capture that can be pasted into documents for printing or display
- remote presentation features
- speeds of 128k or 384k depending on Communicator, ISDN, or triple ISDN connectivity

Components

SYMPOSIUM Multimedia Conferencing Basic Kit components include

- PCI video codec board video signal
- high quality headset
- color digital camera with microphone
- related cabling
- software on CD-ROM
- on-line documentation and printed installation guide

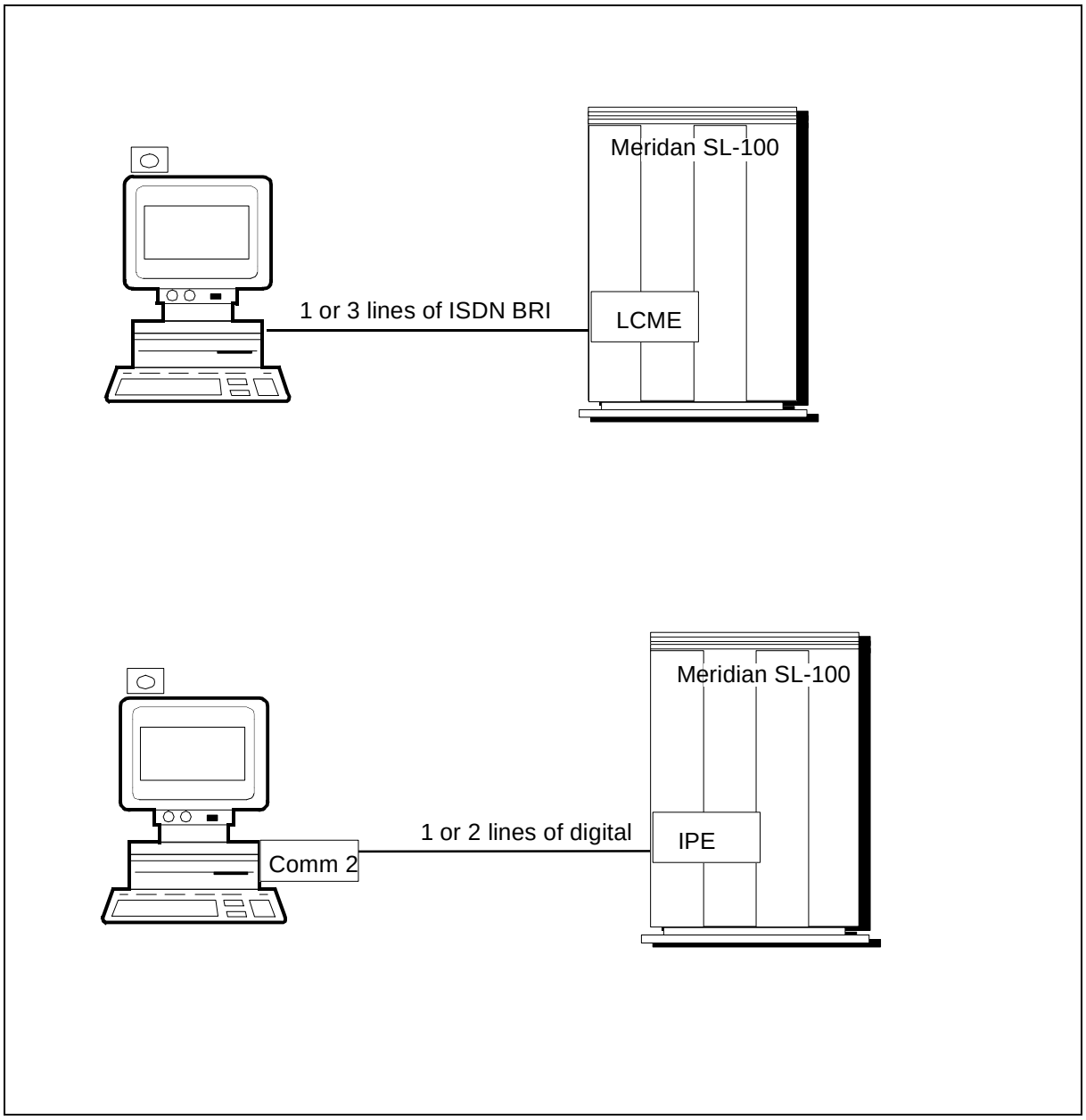
PC Requirements

SYMPOSIUM Multimedia Conferencing PC requirements are

- Microsoft Windows 95
- 16 MB RAM (minimum)
- 486, 66MHz speed (minimum)
- 65 MB available hard drive storage
- 16-bit color monitor
- PCI slot with IRQ and I/O address for the video codec

- ISA slot with IRQ and I/O address for any connectivity option other than 128K ISDN BRI
- access to a CD-ROM drive for software installation

Figure 11-1 SYMPOSIUM Multimedia Conferencing overview



Optional components

The following components are optional for SYMPOSIUM Multimedia Conferencing.

- Communicator card
- NT-1 for ISDN for U-loop connection
- high power PC speakers
- advanced remote control, zoom, swivel and tilt color camera
- electronic whiteboard display
- 384k ISDN connection kit
- multipoint bridge from 4 to 48 ports with multiple conferencing modes

Applications

The SYMPOSIUM Multimedia Conferencing portfolio of applications includes:

- business quality video conferencing at 128k or 384k (optional)
- voice capability to allow call logging, dialing plans, and point and click dialing
- whiteboarding capability including:
  - — window sharing for viewing and editing
  - — drawing tools
  - — typing tools
  - — graphic import and display for interactive editing or remote presentations
- file transfer capability to allow high-speed digital transfer of PC files
- application sharing capability to allow file editing by multiple parties
- ability to join multiparty video conferences through a bridge
- Communicator option to provide easy connectivity for SYMPOSIUM Multimedia Conferencing using the Meridian SL-100 private branch exchange (PBX)
- easy addition of peripherals to make SYMPOSIUM Multimedia Conferencing fit just about any video conferencing need from private desktop to university classroom

Capacities

SYMPOSIUM Multimedia Conferencing can run at 128K over standard ISDN BRI connections or triple ISDN BRI connections for 384K connections. It also runs over Nortel Network's SYMPOSIUM Communicator card that supports 256K video over two Meridian 1 or Meridian SL-100 digital lines.

Connectivity for telephone

Multimedia conferencing comes with the TAPI SP for Meridian SL-100 and telephony software. This telephone connection, should you choose to take advantage of it, is independent of video if you use an ISDN BRI video connection. In this case, Meridian business sets (MBS) require the VISIT interface unit (VIU) to act as interface between the telephone and computer. MBS2 sets can also connect this way but with a TAPI workaround of selecting in the PC the older MBS set that most closely matches the newer model. Meridian modular sets (MMS) require the Meridian Communication Adapter (MCA) to act as an interface between the telephone and computer.

In the case of selecting SYMPOSIUM Communicator as the video connection, it also serves as the telephone interface for MMS phones.

SYMPOSIUM FastCall

SYMPOSIUM FastCall is the first call center software application designed to operate on top of the Microsoft Windows TAPI software platform. SYMPOSIUM FastCall is one of Nortel Networks' computer telephony integration call management systems uniquely designed to maximize the productivity of call centers and help desk operators, and increase customer service for all callers.

SYMPOSIUM FastCall is designed for small call centers that use TAPI for connectivity. With SYMPOSIUM FastCall, subscribers can implement robust call center solutions for a fraction of the cost of traditional solutions requiring custom development.

SYMPOSIUM FastCall features include

- screen pops for incoming calls-Incoming calls automatically open the customer record based on data from automatic number identification (ANI) and calling line identification (CLID). Agents can reduce the amount of time needed for each call.
- application based preview dialing-Agents previewing a customer record on the screen can dial the customer at the touch of a button on their keyboard.
- rules-based call routing-End users can define rules by which their incoming calls are handled, based on calling number, called number, or time of day. Each call can be automatically transferred to unique destinations.
- screen-based telephone features-Telephone functions such as hold, transfer, conference, speed dial and redial can be performed by simply pressing a function key on the computer keyboard. The agent can focus on

the application on the screen, and still perform all of the necessary telephone set functions.

- call logs-A log of inbound and outbound calls is maintained for call tracking purposes. These files can be printed.

Benefits

Key benefits of SYMPOSIUM FastCall include

- no programming skills or custom development needed
- supports popular Microsoft Windows applications
- multiple Windows applications can be used by the employee and launched by SYMPOSIUM FastCall
- quick to install on each Windows PC
- keystroke or mouse compatible
- does not interrupt current computer environment
- no complex implementation or administration requirements
- no expensive third-party development
- works in any business that receives or places calls

Capacities

SYMPOSIUM FastCall capacities include

- support for popular client/server applications that allow the Microsoft Windows client PC to access data from a central file server
- available for the Meridian SuperNode family of switches
- available for Centrex switches
- runs on Novell's TSAPI-based software applications
- designed to operate on a PC-compatible personal computer loaded with SYMPOSIUM Voice and Windows 3.1 or higher

Connectivity

Meridian business sets (P-phone) require the stand-alone VISIT interface unit (VIU) to act as the interface between the telephone and computer.

Meridian modular sets (Aries) require the Meridian Communications Adapter or the Meridian programmable data adapter (MPDA) inside the set to act as the interface between the telephone and the computer. See the figures illustrating the SYMPOSIUM Call Manager connection options.

SYMPOSIUM Call Manager (formerly VISIT Voice)

SYMPOSIUM Call Manager is one of Nortel Networks' computer telephony integration call management systems designed for anyone who uses a personal computer and a telephone. SYMPOSIUM Call Manager is a visual interface to your telephone.

SYMPOSIUM Call Manager provides a flexible and cost effective way to control your phone from your computer. You can dial numbers from directories just by clicking your mouse. Stored notes can pop up on your computer screen based on incoming calls. Directory dialing, conference calling, and voice mail commands can all be accessed visually without using telephone keypad codes.

SYMPOSIUM Call Manager features include

- personal information manager (PIM) is a format directory in which multiple phone and data numbers, address, company, title, and a memo for details can all be stored for easy retrieval
- access to a remote corporate director
- dial with a click on any number in the directory
- call management to make and receive calls, hold, conference, or transfer calls and more using computer mouse or keyboard commands
- a call log to access a visual display of all calls made and received
- voice mail management to access and use your voice mail system with point-and-click simplicity
- directory import/export capability
- dialing plans to easily adapt for dialing from office, home, hotel, or other company locations without having to modify the directory numbers
- auto memo popup to manage contacts using an automatic memo popup on incoming calls

Benefits

Key benefits of SYMPOSIUM Call Manager include:

- convenience and time savings with directory lookup and dialing
- knowledge of telephone activity from the call log
- graphical user interface for voice mail integration on the Windows platform
- overall better functionality and improved operation

Capacities

SYMPOSIUM Call Manager supports single or multiple directory numbers.

Connectivity

SYMPOSIUM Call Manager application and Service Provider supports Microsoft Windows 95 for the VISIT Interface Unit, Meridian Communication Adapter or SYMPOSIUM Communicator connection options, or the CompuCall link option (see the following figures).

SYMPOSIUM Call Manager will also support Microsoft Windows NT with the CompuCALL link option.

Meridian business sets require the VISIT interface unit (VIU) to act as interface between the telephone and computer. MBS2 sets can also connect this way but with a TAPI workaround of selecting in the PC the older MBS set that most closely matches the newer model. Meridian modular sets require the Meridian Communication Adapter or the SYMPOSIUM Communicator to act as an interface between the telephone and computer.

Figure 11-2 SYMPOSIUM Call Manager connection options - Centrex

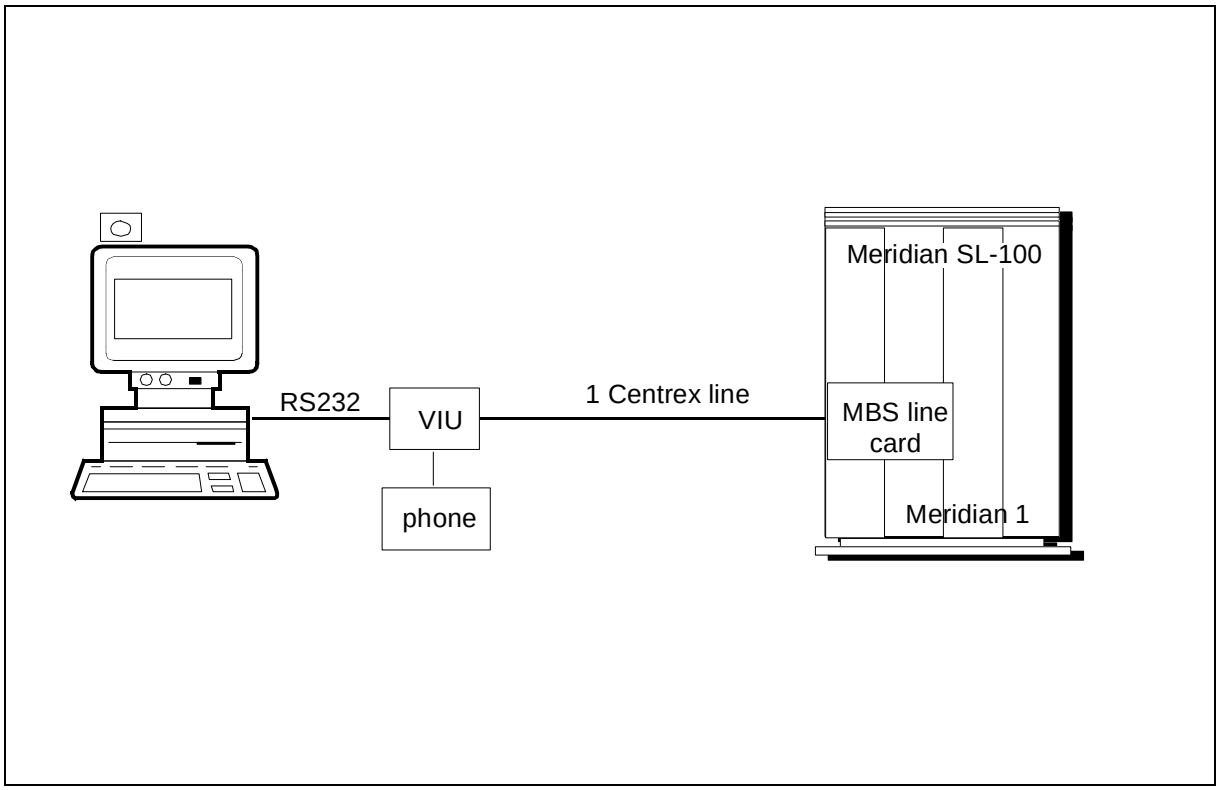


Figure 11-3 SYMPOSIUM Call Manager connection options - digital lines

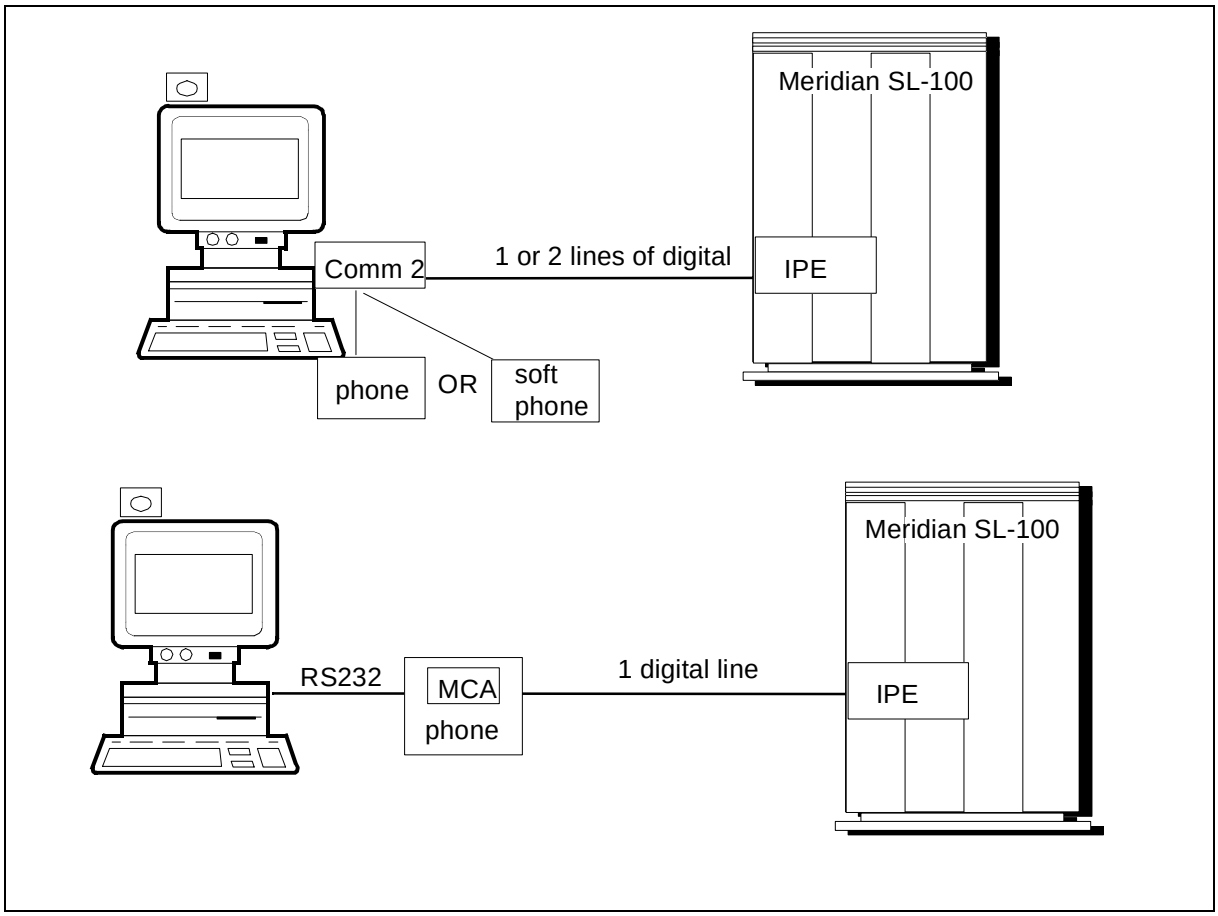
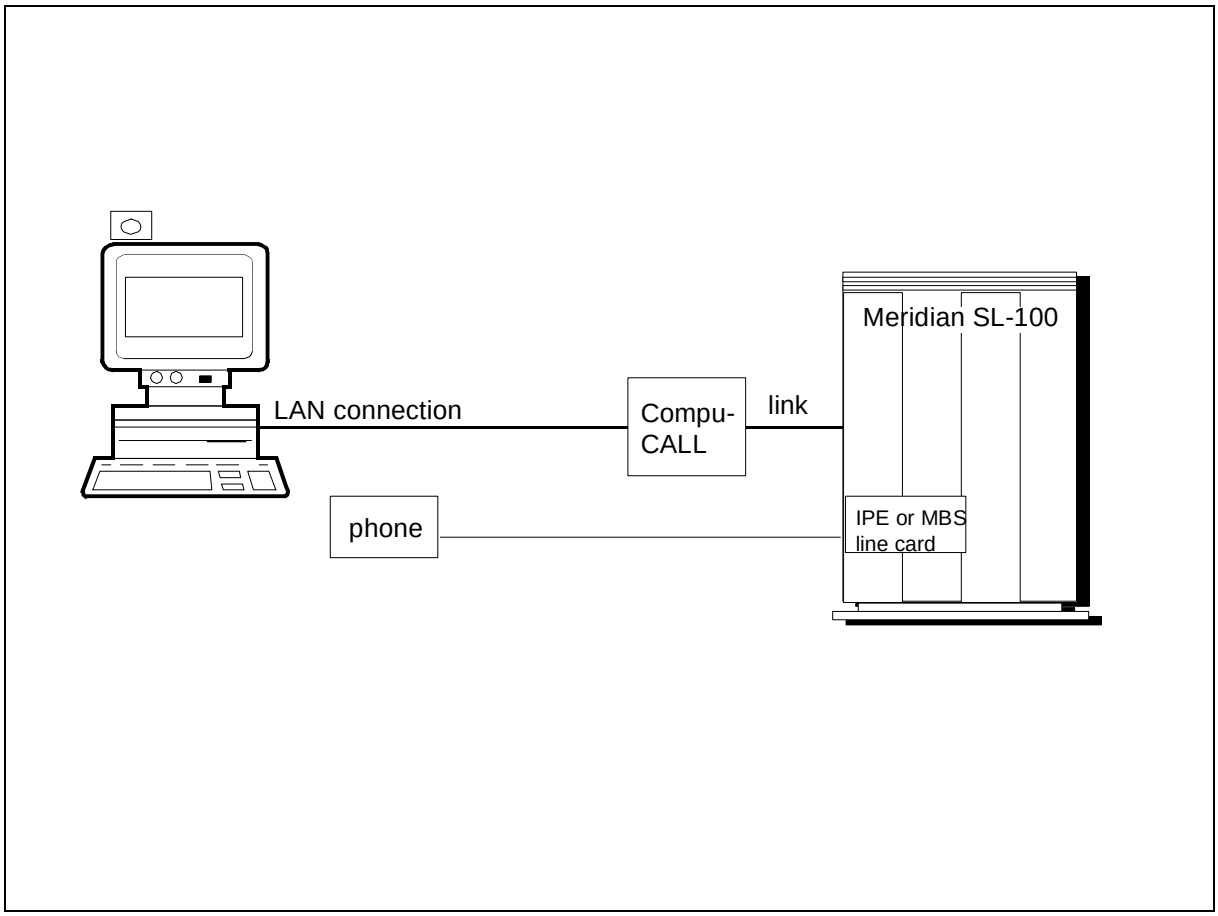


Figure 11-4 SYMPOSIUM Call Manager connection options - CompuCALL link



SYMPOSIUM Messenger

SYMPOSIUM Messenger brings time-saving tools to the desktop with a unified multimedia messaging solution. You can selectively prioritize, compose, view, print, return and forward all your messages in a single window on your PC.

SYMPOSIUM Messenger is a client-server application providing multimedia messaging capabilities to help manage all incoming messages. SYMPOSIUM Messenger provides users with a single, integrated screen interface for managing voice mail, fax mail, and electronic mail.

SYMPOSIUM Messenger integrates Meridian Mail voice messaging features with fax messaging and E-mail in a common icon-based interface. Features of the Meridian Mail platform are available when using SYMPOSIUM Messenger. Fax users can view, print and send messages. E-mail users can use standard commands for viewing, composing, sending and forwarding messages. It connects to Meridian Mail through an RS-232 connection.

Benefits

Key benefits of SYMPOSIUM Messenger include:

- point and click access to Meridian Mail functionality
- access to all voice, fax and e-mail messages directly on your PC window
- forward voice, fax and e-mail messages to another location
- print fax and e-mail messages by using any network printer
- save fax and e-mail messages as computer documents
- send computer documents as faxes and e-mail
- create customized personal directories and distribution lists

Features

Key features of SYMPOSIUM Messenger include:

- power folders
- express folders
- scan messages
- fax mail
- electronic mail
- fax on demand
- broadcast fax
- fax store and forward
- screen-based fax review
- fax transmission from any PC application

Capacities

SYMPOSIUM Messenger capacities include:

- full compatibility with popular LAN operating systems such as Novell NetWare and Microsoft LAN Manager using Ethernet or Token Ring.
- integration with all Simple MAPI e-mail packages.

Connectivity

Meridian business sets (P-phone) require the stand-alone VIU to act as the interface between the telephone and computer.

SYMPOSIUM Messenger integrates with all Simple MAPI e-mail packages. Meridian Mail, a LAN connection, and the MAPI server are required for Meridian application server operation.

SYMPOSIUM CompuCALL TAPI driver

See the *Call management* section of this publication.

12 Meridian Integrated Conference Bridge

Meridian Integrated Conference Bridge (MICB)

The MICB is an intelligent peripheral equipment (IPE) card that supports up to 32 ports. The system software must contain the automatic call distribution (ACD) features and routing software modules to support the MICB operation. Each MICB port is configured as an ACD M2616 digital telephone set. The Meridian SL-100 system ACD function routes the incoming calls to the MICB, where each MICB port is treated as an ACD agent. All MICB ports belong to the same ACD queue and are treated as a pool of ports with equal status.

The MICB supports several conferences simultaneously. The number of conferences depends on the number of MICB ports available and the number of participants (conferees) in each conference. For two MICB cards with 64 ports, there can be a maximum of 20 conferences with three or four participants in each conference, one conference with a maximum of 62 participants, or any combination that equals 62 participants. Two of the conference ports are used to tie two 32-port MICB cards together.

The directory numbers (DN) and the corresponding line equipment numbers (LEN) are system resources (cannot be used for other Meridian SL-100 stations) when assigned to the MICB ports.

For two MICB cards with 64 ports, the following configurations are supported.

- a maximum of 20 simultaneous conferences would require 40 ACD DNs for the conferees and chairpersons to dial to enter the conferences
- 128 ACD DNs and 64 LENs assigned to the ports (one prime ACD DN and one secondary DN for each port)
- one ACD DN assigned to each MICB card

Pay special attention to the use of system resources when configuring the MICB card.

Fore more information on the MICB, refer to the *Meridian Integrated Conference Bridge Reference Manual*.

MICB functional characteristics

The function of the MICB card is to schedule and administer multiple simultaneous conferences. These conferences are scheduled based on time of day, duration of each conference, and the number of conferees or ports allocated for each conference.

The MICB card provides pre-programmed announcements and tones that correspond to specific events during conferences. These events include:

- advise the chairperson and other conferees of the status of the conference connection
- indicate when a conferee joins or leaves the conference
- warn the chairperson and the conferees when the scheduled conference time is about to expire

System compatibility features

The following is a list of the MICB compatibility features.

- compatible with the followong IPE module in any system that supports the IPE
  - — NT8D37AA/DC slots 0, 4, 8, 12 only
  - — NT8D37BA/EC all slots
- emulates a digital telephone set (for example, the M2616 set) on each MICB port
- supports both the A-law and the Mu-law signal coding/decoding
- provides full-duplex communication
- supports dual tone multi frequency (DTMF) detection
- provides system reporting

MICB DSP firmware features

The following is a list of the features supported through the MICB digital signal processor (DSP) firmware.

- selects two active speakers in a conference of up to 64 conferees
  - — analyzes the loudness of all received signals continuously and selects the two loudest signals to be the two active speakers
  - — the two speakers are not selected globally, but are selected on the signal strength associated with each time slot.
- handles two-way conversation in conferences with two to 64 conferees
- supports a maximum of 20 simultaneous conferences
- normalizes the pulse code modulation (PCM) input samples
- provides gain control on all output samples

MICB conference features

The following is a list of the features supported by the MICB.

- provides for one or more permanent bridge configurations
- supports multiple conferences simultaneously
- allows conference extention beyond the scheduled time
- provides automatic conference expansion, allowing additional conferees to join the conference

  Note: For the expansion to work, the ports hosting the additional conferees must be both unassigned and available. Also, expansion ports are assigned on a first-come, first-served basis.

- currently two versions, each supporting up to five different languages on each PCMCIA hard drive.
  - — The version for North, Central, and South America and Europe supports North American English, British English, French, Spanish, and Brazilian Portuguese.
  - — The version for Asia Pacific supports North American English, British English, Japanese, Chinese, and Korean.
- provides conference security (password option)
- automatically starts and terminates conferences based on reservations scheduled in advance
- issues 10-minute warning before the conference termination
- support of dial-in conference
- provides conference entry and exit tones or messages
- allows conference music turn off for the first conferee joining the conference
- controls access to the conference in progress by monitoring the maximum number of scheduled attendees at each conference
- manages time and date for scheduled conferences, reserves ports for each conference, and prevents overbooking of ports
- provides recorded announcements and tones to ports and conferences by playing pre-recorded files stored on the PCMCIA hard drive card
- supports administration features such as system configuration, scheduling, management, and report generation
- routes conferees to the appropriate conference based on the dialed DN
- allows recording of a brand line greeting for each conference

- issues audible responses to conferees based on the conference activity
- provides conference traffic report

Chairperson features

The following is a list of chairperson features.

- provides one chairperson per conference
- allows conference music turn off if the chairperson is first to join the conference (or turn on the music if the music is off)
- allows the chairperson to dial *0# for assistance
- allows chairperson's access and command execution such as dial-out, drop conferees, count conferees, and lock/unlock conference.

MICB hardware design characteristics

The MICB card occupies one IPE slot in an IPE module. It has the following hardware interface characteristics.

- uses the MPU based on the 25MHz MC68EN360 integrated communications controller
- uses standard interface buses and PCMCIA cards and handles MS-DOS compatible files on the PCMCIA storage device
- access all 64 DS-30X voice/signaling time slots
- provides echo canceling
- supports automatic gain control
- supports Card-LAN interfaces
- performs X11 signaling protocol messages for input and output
- uses DSP for conferencing and DTMF detection
- provides self-test of internal hardware components and allows card monitoring and maintenance through the maintenance port
- provides one RS-232 serial port for administration and maintenance access
- provides optional Ethernet interface over the MMI
- provides either an embedded or an external web-based server

13 Remote access

While new businesses, shopping centers, and residential developments fuel the demand for new revenue-generating services, the pressure of rapid growth requires flexible solutions to extend these high-demand services to remotely located areas simply and quickly. Nortel Networks private branch exchange (PBX) remote peripherals offer cost-effective solutions for this changing environment, delivering host services to remotely located subscribers. These solutions minimize the number of links back to the central office through concentration and intraswitching at the remote terminals.

For customers needing a distributed campus-style switching system with one or more remote sites, the remote peripherals provide the capability for serving analog and digital telephone sets and data terminals at a physical location remote to the host Meridian SL-100 . This method of private local networking provides the customer with the most cost-effective means of serving multiple smaller remote sites while still retaining all the features and services of the larger host.

The remote peripherals are specially equipped units located at a maximum distance of 100 miles (240 km) from the host Meridian SL-100 system, but operate as peripheral modules of the Meridian SL-100 system through DS-1 links. The Meridian SL-100 host office can accommodate up to 64 remote sites, depending on the configuration.

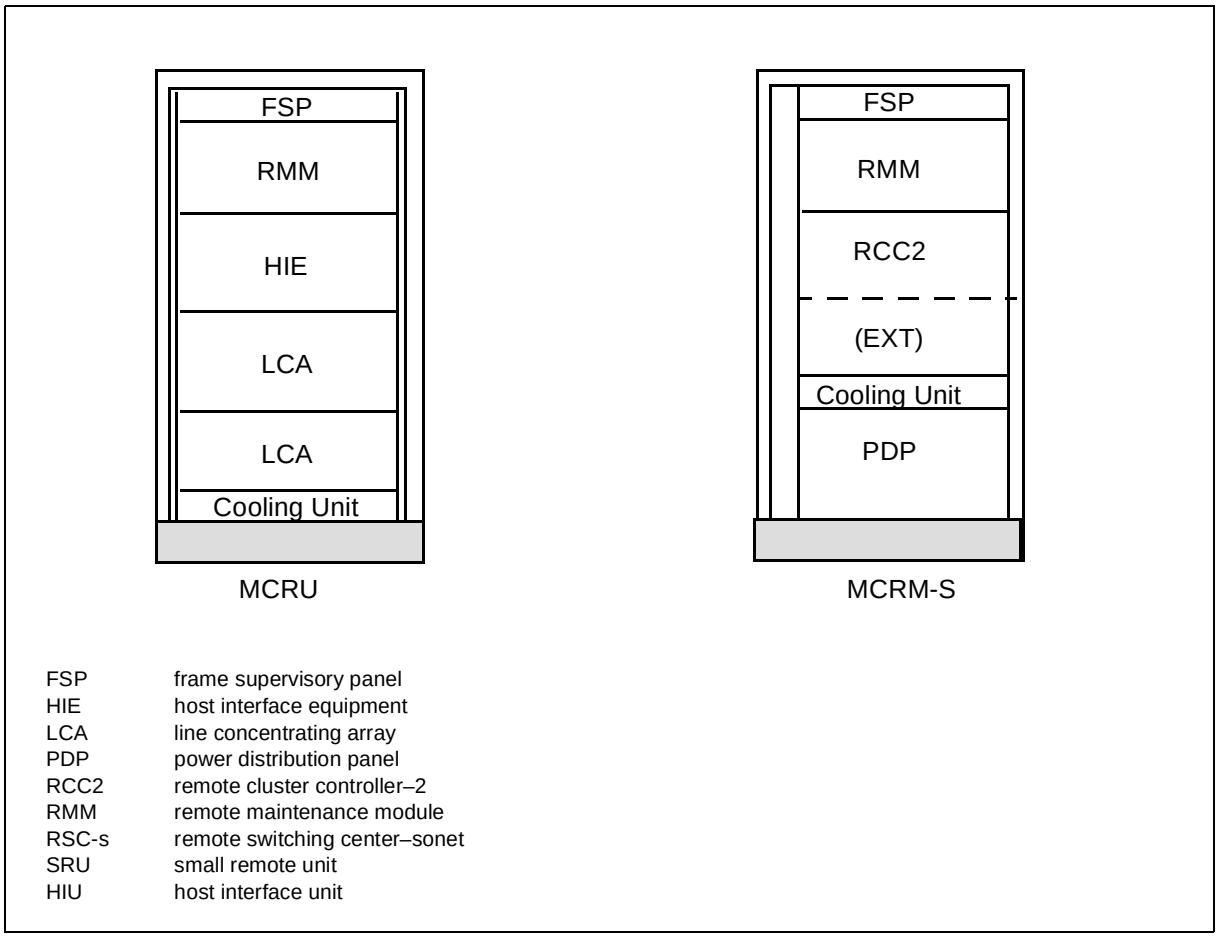
The Meridian SL-100 remote access family includes

- AccessNode
- Meridian cabinet remote module: synchronous optical network (SONET) (MCRM-S)
- Meridian cabinet remote unit (MCRU)

Note: RSC has migrated to the MCRM-S. The RSC has been discontinued. The MCRM has migrated to the MCRM-S. The MCRM has been discontinued.

The following figure illustrates cabinets associated with the remote access functionality.

Figure 13-1 Remote access cabinets



For more information about Meridian SL-100 remote access functionality, refer to the *Translations Guide*, the *RSC Maintenance Manual*, 297-8221-550, the *Meridian SL-100 Remote Peripherals General Description*, *Small Carrier Module-100 Urban Maintenance Manual*, 297-8241-550, and the *Configuration and Equipment Description*, 323-3001-100.

Remote peripherals connectivity

Remote switching can be routed to the host Meridian SL-100 through one or more Meridian cabinet remote units (MCRU), through one or more MCRM-Ss or through the MCRU connected to an MCRM-S.

The interface between the remotes and the host Meridian SL-100 is through standard DS-1 links: 2 to 6 primary links for the MCRU and 2 to 16 primary links for the MCRM-S. The DS-1 links are terminated on a line trunk controller (LTC) at the host Meridian SL-100. All links from an MCRU or MCRM-S must terminate on the same LTC.

The host extended peripheral module (XPM) can be an LTC. The following definitions apply to the host XPM:

- terminates DS-1 links from the remote cluster controller (RCC), or RCC-2 and switches them through the network
- optionally can terminate Meridian cabinet line modules (MCLM) directly
- must be LTC if there are trunks off the RCC-2

The maximum distance from the remotes to the Meridian SL-100 host is 100 miles (240 km).

An intraswitching capability allows calls that both originate and terminate within the same MCRM-S to use channels internal to the MCRM-S. After call setup, an intra-MCRM-S call is transferred to the MCRM-S internal link and remains there, thus releasing its DS-1 channel to the host. However, this does not apply to calls requiring resources resident at the host, such as attendant consoles.

In the event that communication between a remote and the host is lost, the emergency stand alone (ESA) feature supplies only local, basic intracalling service to remote stations until the connection with the host is restored. This is an optional feature, and may require additional hardware and software if the feature is elected.

Maintenance and administration of the remotes are performed using maintenance and administration position (MAP) workstations located at either the host or the remote site. MAP workstations at the remote site communicate with the host through dial-up lines, except during ESA mode.

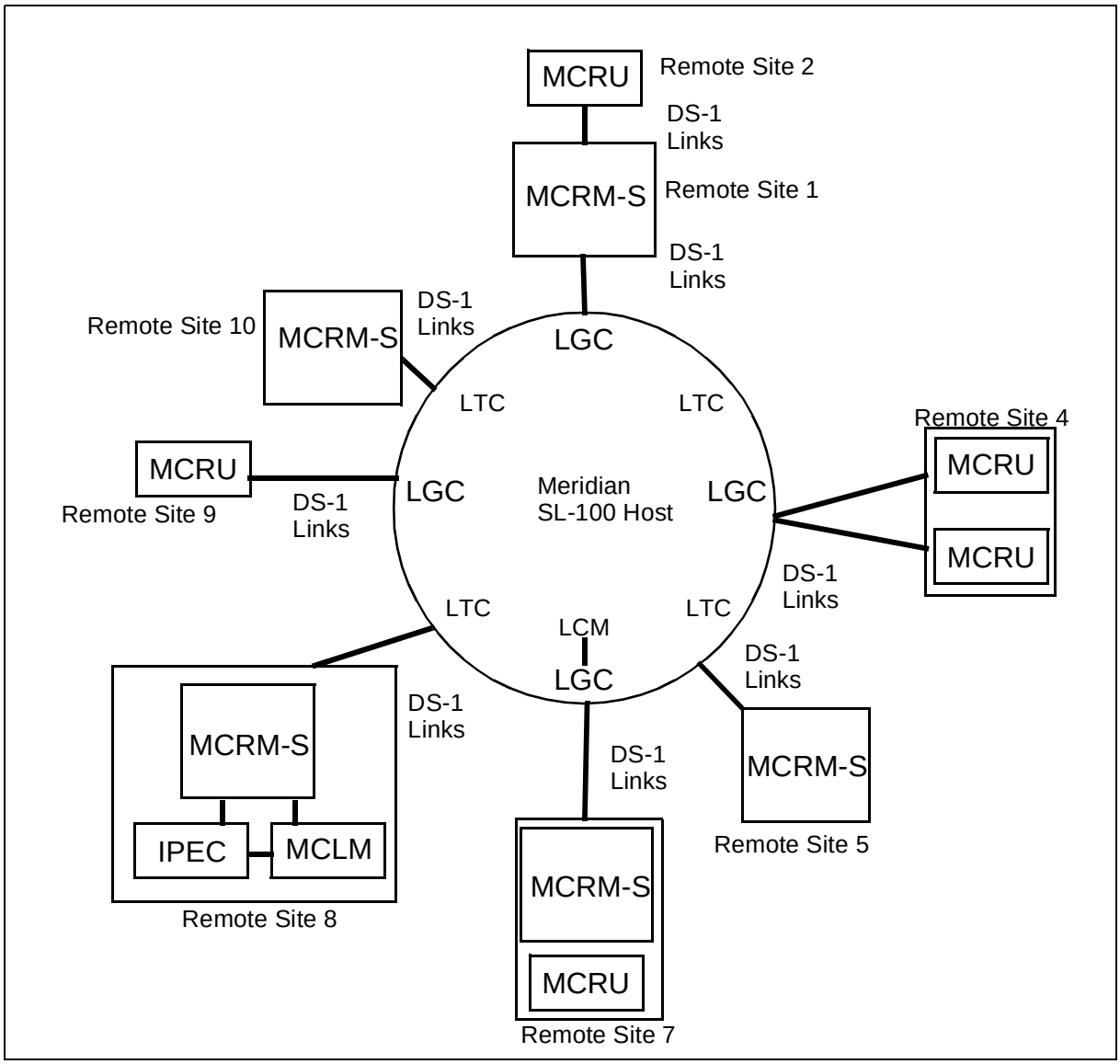
Figure "Host-remote interface examples" on page 13-4 illustrates one configuration of DMS host-remote interface.

Cabinet concept

The remotes are housed in cabinets to provide the same efficiency and design improvements afforded by the cabinetized Meridian SL-100, as described in Section 3 of this guide.

The MCRM-S and MCRU are remote hardware switching modules which are mounted in 6-ft (1.8-m), Meridian gray product cabinets. This modularity gives the system flexibility in physical capability, allowing easy system expansion. The following figure illustrates the remote cabinets.

Figure 13-2 Host-remote interface examples



Because a majority of Meridian SL-100 applications fall within identified capacity parameters, the remotes have pre-engineered hardware modules. The modules are packaged in cabinets as off-the-shelf products to enable configurations to be determined quickly.

Meridian cabinet remote module-SONET (MCRM-S)

An MCRM-S is a peripheral remote module designed specifically to serve medium-sized remote applications and offers a platform for evolution into SONET technology. Its application flexibility makes the MCRM-S an ideal

vehicle for PBX replacement, central office (CO) capping, and medium-sized single- or multiple-customer business applications, such as integrated services digital network (ISDN). The MCRM-S also supports direct digital trunking to PBXs and provides remote-off-remote configurations for the MCRM-S.

The MCRM-S cabinet replaces the ISDN version of the Meridian cabinet remote module (MCRM-I) and performs all of the existing functions of the MCRM-I.

The MCRM-S supports any combination of analog sets, Meridian business sets, ISDN sets, or data terminals, up to the traffic-capacity limit of the RCC-2.

Key benefits

The MCRM-S key benefits include

- increased capacity over the RSC.
- a platform for evolution to the SONET.
- remote termination of subscribers.
- full-feature functionality of the host switch.
- preconfigured, factory-assembled, cabled, and tested modules requiring reduced installation intervals.
- modular system that easily expands and accommodates variations in system size and feature choices.

Software

Software features for the MCRM-S are obtained through a combination of standard RSC packages and the MCRM-S basic package. Individual features are provisioned through RSC packages, while the MCRM-S basic package is used to activate these features and to provide all specific MCRM-S capabilities.

Software packages that are required for the MCRM-S include

- Remote Switching Center (RSC)
- RSC/Intra-RSC Calling
- RSC-S Basic

Hardware components

Hardware components include

- frame supervisory panel (FSP): distributes and controls power and alarms in the cabinet.
- remote maintenance module (RMM) shelf assembly: provides the local test and service circuits for use by the RCC-2.

- RCC-2: the master controller for all peripheral modules connected to the MCRM-S.
- extension shelf assembly: provides additional DS-1 links or supports additional D-channel handlers (DCH) to accommodate ISDN line requirements.
- cooling unit: provides the environmental cooling for the MCRM-S
- power distribution panel: provides fused power distribution to the MCRM-S and additional line cabinets.

MCRM-S capabilities

MCRM-S provides the following improved capabilities:

- Intraswitching allows switching of calls originating and terminating on the same MCRM-S without using host links.
- Remote-off-remote allows subtending remotes off the MCRM-S.
- Dynamic trunking provides calls to and from subtending trunks supporting PBXs.
- ESA allows the continuation of service within the MCRM-S if communication with the host is lost.

MCRM-S connectivity

MCRM-S connects to a host Meridian SuperNode switch or Meridian RemoteNode switch through DS-1 links that can use any available digital transmission facility. The MCRM-S is connected to a DMS host office by the line trunk controllers (LTC) at the host switch. The MCRM-S can function in ESA condition if the links that connect the MCRM-S to the host are lost. The MCRM-S can perform intraswitching, which allows calls originating and terminating on the MCRM-S to be switched using the local time switch without using host links. The MCRM-S is also capable of terminating external DS-1 trunk groups for commercial or tie-trunk access, allowing any calls that originate in the MCRM-S to use these trunks. The MCRM-S does not support precedence and preemption on Defense Switched Network (DSN) trunks. Refer to Figure "Host-remote interface examples" on page 13-4 for an illustration of host-remote connectivity.

The MCRM-S is located up to 100 miles from the host office over DS-1 links. If the MCRM-S is supporting an MCRU, the distance limitation applies for the host to MCRM-S, as well as the host-to-remote off MCRM-S.

Dual MCRM-S

The dual MCRM-S has the same characteristics as the MCRM-S with twice the power and capacity.

The following enhancements describe the evolution of RSC to MCRM-S:

- The increased capacity of the MCRM-S minimizes the costs of delivering business applications (including ISDN) for each line.
- The MCRM-S can be installed initially as a single cabinet.
- The MCRM-S provides seamless growth. This starts with as little as 200 lines and accommodates up to 12,000 lines.
- MCRM-S simplifies engineering rules for both peripheral side (P-side) and central side (C-side) interfaces.
- MCRM-S limits product support costs due to a common hardware base and common software features for host and remote applications.

Benefits and features

Key dual MCRM-S benefits and features are the same as MCRM-S but for larger serving areas.

Components

Dual MCRM-S main components are

- typically packaged in 4 to 22 standard equipment bays.
- 32 DS-1 links to the host switch.
- subscriber-side trunks
- subscriber-side lines

Capacities

The dual MCRM-S capacities are

- support for more than 12,800 lines or 960 trunks to serve locations up to 650 miles from the switch.
- support for 10.4 originating calls per second.
- both the dual MCRM-S and the MCRM-S can serve as hosts for the remote line concentrating module (RLCM) in remote-off-remote configuration and for TR-08 digital loop carriers.

For more information about the RSC-S, refer to the *RSC Maintenance Manual*, 297-8221-550

AccessNode

AccessNode is an intelligent digital transmission system that connects terminal devices (such as telephones and computers located in homes and office building) to service nodes residing in a central office. AccessNode is a fiber access vehicle and business server with the capability of supporting hundreds of narrowband and wideband services side by side. It can simultaneously support wideband and broadband services (from DS-0 to

OC-3c subscriber interfaces) with fiber or copper links to digital or analog switches. AccessNode systems possess a tremendous capacity for service growth and offers the ease of SONET operations and other efficiencies.

The AccessNode allows customers to move from traditional voice services to multimedia communications such as two-way interactive video, imaging, PC screen sharing, and high-speed datalinks between telecommuters and their offices. As a business server, AccessNode can extend a full range of advanced business services without regard for loop length.

For more information about AccessNode, refer to the *Configuration and Equipment Description*, 323-3001-100.

Benefits and features

Key AccessNode benefits and features include

- Service-adaptive access line cards: provide the ability to provision or change services through software instructions, without on-site visits to the network element.
- SONET rings are available either for traditional point-to-point networks or with the OC-12 rate ring configuration, optical interfaces for hubbing of tributary routes, and add-drop multiplexing configurations.
- Integrated operations, administration, maintenance, and provisioning: An integrated circuit pack provides a single interface for network management.
- Integrated line and loop testing: An optional integrated remote test unit eliminates the need for external test equipment and test bypass pairs for digital and analog testing of all services.
- Broadband-ready service slots and backplane: Each slot is able to transport 155 megabits of traffic per second, or three DS-3 signals on a single slot. Network transport up to OC-12 is possible on a bidirectional line switched ring or point-to-point network.
- Survivable ring architecture: Protection strategies ensure network and service availability, even if disaster strikes. Readily available standby components disallow any single component to cause a service outage.

Components

AccessNode main components include

- fiber central office terminal (FCOT) network element: the center of control for the subnetwork and is located in a central office and interfaces with all central office equipment.
- remote fiber terminal (RFT) network element (also referred to as remote digital terminal or RDT): a type of AccessNode that is located at a remote location and interfaces to the subscriber equipment.

Packaging

The AccessNode is assembled from modular components

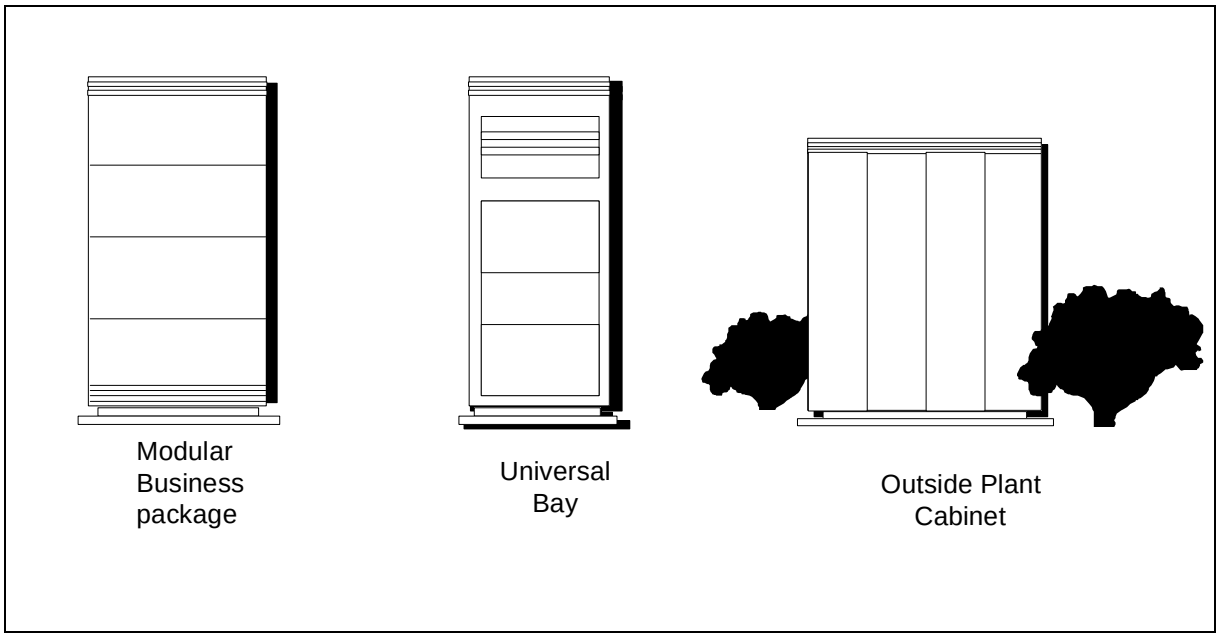
- mounted in bays and modular business packages
- modular business package (MBP): an AccessNode packaging option installed as customer premise equipment (CPE)
- Outside Plant (OSP) cabinet: an AccessNode packaging option that is installed as an RFT

Figure "AccessNode packaging" on page 13-10 illustrates the AccessNode packaging options.

Optional systems for AccessNode systems include

- cost-saving AccessNode Express using service-adaptive card technology which allows provisioning to be performed from a remote position through software.
- AccessNode Data Direct (an upgrade to the AccessNode service adaptive access line cards) is a simple, cost-effective solution for relieving your switching system of resource-consuming, bursty internet data traffic. Data direct enables the AccessNode system to recognize internet provider numbers and route those resource-consuming calls from the public switched network to a dialup data switch.
- AccessNode Express LAN module is a compact unit that provides transparent LAN interconnection from the same AccessNode Express network element that supports voice and narrowband data.

Figure 13-3 AccessNode packaging



Applications

The AccessNode supported applications include

- Business Access: The AccessNode delivers the full complement of business services. All business services from plain ordinary telephone service (POTS), Meridian Digital Centrex, ISDN, special services, DS-1/T1, to broadband can be provisioned using a single vehicle with broadband capacity back to the central office. These capabilities, coupled with software downloading and service adaptive line cards, greatly simplify both service provisioning and engineering. The multiple link level precedence (MLPP) functionality is currently not supported on the AccessNode, but can be supported through funded development.
- SONET fiber feeder: The AccessNode has the high-capacity bandwidth management capabilities to provide a SONET feeder interface to other SuperNode remotes and other digital loop carrier systems, further protecting investment in these areas and adding survivability enhancements to the feeder plant. It can also provision fiber feeder directly to residential and business locations.
- Residential fiber access: The AccessNode handles both fiber as well as copper loops. It supports a variety of remote architectural elements capable of providing the required number of service channels in residential areas. Broadband upgrades to meet video services can be installed as the demand arises, requiring no investment to be shared by subscribers who do not use broadband services.

Capacities

The AccessNode capacities includes

- The AccessNode handles both fiber as well as copper loops.
- It supports a variety of remote architectural elements capable of providing the required number of service channels in residential areas.
- Each Broadband-ready service slot is able to transport 155 megabits of traffic per second, or three DS-3 signals on a single slot.
- Network transport up to OC-12 is possible on a bidirectional line switched ring or point-to-point network.
- Simultaneous support of wideband and broadband services (from DS-0 to OC-3c subscriber interfaces) with fiber or copper links to digital or analog switches.

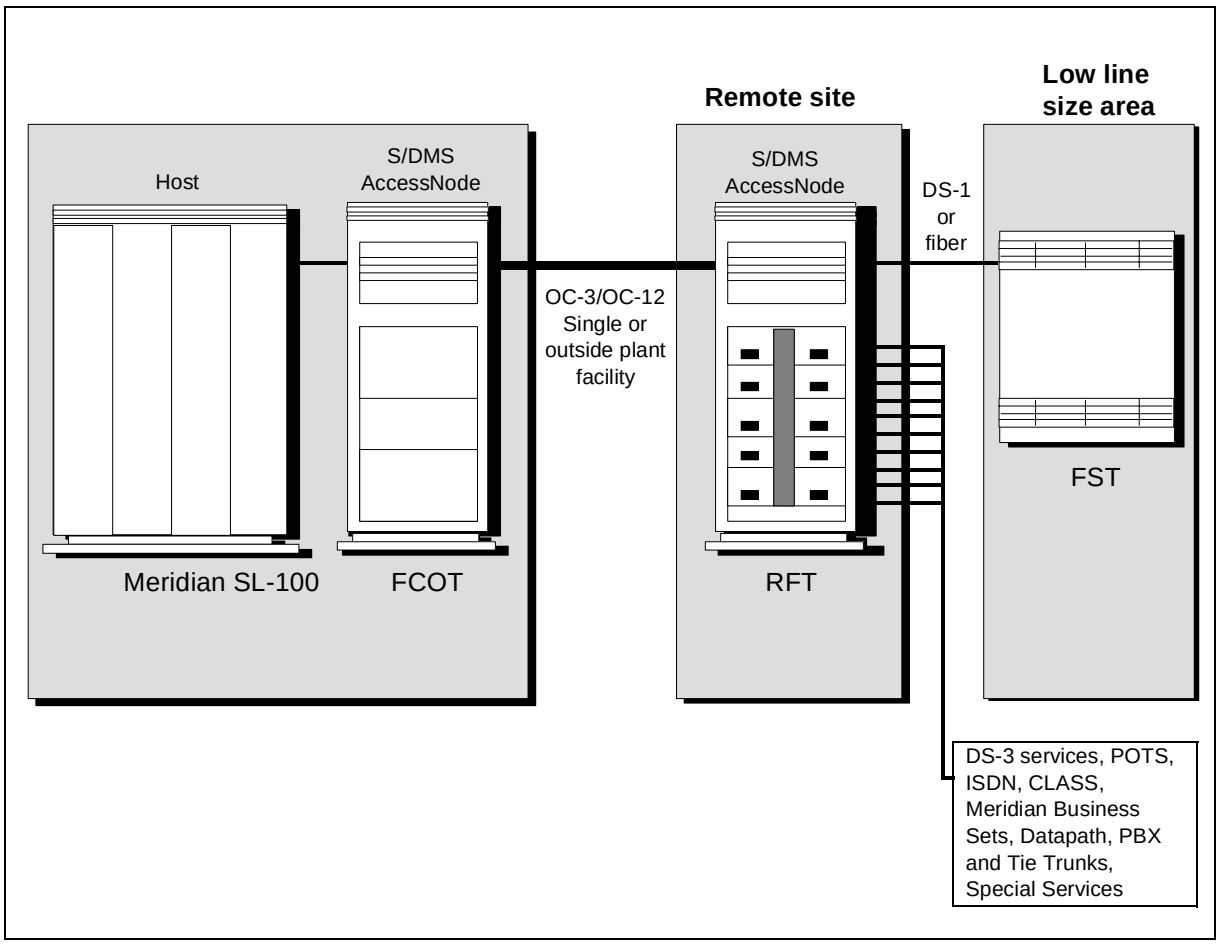
Connectivity

Connectivity is achieved in a variety of ways between the AccessNode components (RFT, FCOT, and OPC) and Meridian SL-100 SuperNode. The subscriber carrier module-100 access (ESMA) provides a digital interface between a SuperNode and an AccessNode. Figure "AccessNode configuration example" on page 13-12 illustrates an example of an AccessNode configuration.

The maximum number of AccessNodes that can be connected to a DMS SuperNode is 40.

The RFT provides interfacing and multiplexing to allow traffic on subscriber lines to be carried to and from the central office by way of a fiber transmission facility.

Figure 13-4 AccessNode configuration example



The FCOT terminates connections from service nodes such as DMS SuperNode and fiber transmission facilities from the RFT.

The AccessNode LAN module is a compact unit that can be mounted in an AccessNode bay frame, modular business package, or modular power package. A modular architecture allows mixing and matching interfaces to support Ethernet, token ring, and LANs, plus high-speed ports. Internet, intranet, and virtual private networks over ATM can be achieved on a single LAN connection.

Meridian cabinet remote unit (MCRU)

The MCRU is a remote peripheral that serves as an interface between remotely located subscriber lines and the Merdian SL-100 host. The MCRU supports the ESA feature package. If the link between the host and the MCRU is interrupted, telephone calls which originate and terminate within the MCRU are completed, but calls to or from the host are not possible.

In the event of a complete outage of all DS-1 links between the remotes and the host office, the ESA feature provides the capability to maintain basic service for remote subscribers. Additional hardware is required for this optional service.

For more information about the MCRU, refer to the *Remote Peripherals General Description*.

Capacities

Each MCRU supports up to 640 lines (depending on traffic), providing the same line quality as the Meridian SL-100 host. The MCRU is configured to operate at a distance of 100 miles (160.9 km) from the host office.

The MCRU provides an interface for the following types of equipment:

- 500/2500-type telephone sets
- electronic telephone sets (ETS)
- low-speed data units (LSDU)
- high-speed data units (HSDU)
- asynchronous interface modules (AIM)
- personal computer (PC) interfaces
- asynchronous interface line units (AILU)
- RS-422-compatible devices
- ISDN-compliant devices using the ISDN line drawer for remotes (ILDR)

These devices connect to the MCRU by plug-in line circuit cards. Each telephone set or data device has its own line card in the MCRU. This allows replacement of a faulty card without interruption of service to another line. The MCRU sends control data and digitized voice information from the subscriber to the line group controller (LGC) or the line trunk controller (LTC) at the host site.

Connectivity

The MCRU cabinet is a remote peripheral connected to a host line trunk controller. The MCRU serves as an interface between remotely located subscriber lines and the Meridian SL-100 host. The MCRU is connected to the host either directly through DS-1 links, or through an MCRM-S connected to the host.

The MCRU cabinet can interface up to 640 remote subscribers (depending on the traffic) to a Meridian SL-100 host. The MCRU provides an intra-calling capability, allowing calls between subscribers served by the same MCRU to be switched within that MCRU. In the event of a complete outage of all DS-1

links between the remote and host, the ESA feature provides the capability to maintain basic service for remote subscribers.

Devices such as ETS, LSDU, HSDU, and AIM connect to the MCRU by plug-in line circuit cards. Each telephone set or data device has its own line card in the MCRU. This allows replacement of a faulty card without interruption of service to another line.

Components

The MCRU is a single cabinet, supporting up to 640 lines. If -48 V power is not locally available, an optional power cabinet can be supplied for powering up to eight MCRU cabinets.

The MCRU cabinet contains the following components: (Figure "Remote access cabinets" on page 13-2 includes an illustration of a basic MCRU cabinet layout.)

- Cooling unit: The cooling unit provides forced air cooling with a 2-speed fan. The fan normally runs at low speed to minimize noise. If a condition of thermal stress occurs, the fan switches to high speed.
- Line Concentrating Array (LCA): The LCA occupies two shelves and provides 640 line cards (320 lines per shelf). Each shelf has its own Central Control (CC). If one CC fails, the CC in the other shelf assumes control, serving all 640 lines, but with limited call processing capacity.
- Host Interface Equipment (HIE): The HIE supports DS-1 host link interface packs, ringing generators, Emergency Stand Alone (ESA) hardware (optional), and two Link Control Cards (LCC) which control the DS-30A links to each Line Concentrating Module (LCM) shelf.
- Remote Maintenance Module (RMM): The RMM supports Metallic Test Access (MTA), incoming/outgoing test trunks, Line Test Unit (LTU), Scan and Signal Distribution (SD) points, and DIGITONE receivers for ESA (optional).
- Frame Supervisory Panel (FSP): The FSP distributes and controls power and alarms in the cabinet.

14 Enterprise Solutions

Enterprise Solutions is a network business group within Nortel Networks that has the broadest, most diverse product portfolio and customer base. Its mission is to deliver custom designed enterprise network solutions for major and small businesses worldwide.

Enterprise Solutions provides business solutions for real-world business needs including:

- network consolidation
- local area network (LAN) networking
- integrated messaging
- call centers
- telecommuting
- computer-telephony integration (CTI)
- remote branch offices
- mobility
- multimedia conferencing

The scope of Enterprise Solutions operations can be arranged into four business groupings consisting of switching systems, applications, terminals, and wireless systems.

Switching systems

Enterprise Solutions switching systems include:

- Magellan Family
- Rapport Dialup
- Meridian 1 PBX

For more information about Enterprise Solutions switching systems, refer to the *Network Description*, 241-1001-100, the *Magellan Passport General Description*, 241-7001-110, the *Vector General Description*, 241-9501-010, and the *Concorde General Description Guide*, 241-9001-010.

Magellan

The Magellan Family is a portfolio of enterprise network switches for data and multimedia networking. The Magellan product portfolio offers cost-effective connectivity for large corporate headquarters or small branch offices. Magellan products can evolve to asynchronous transfer mode (ATM) while

supporting existing services. It also provides complete network management using standards-based management protocols, and industry-standard platforms such as HP OpenView, IBM NetView, and Cabletron SPECTRUM.

The Magellan portfolio includes access products for extending multimedia applications to the branch access layer. There are three types of Magellan access products:

- multimedia access such as Passport Access, Magellan Access Integrator (MAI) 2K, and Passport 50.
- multiprotocol data access (local area network (LAN) and legacy) such as Magellan Access switch (MAS) 6X.
- legacy data access such as Magellan access PAD (MAP), DPN-100/1.

The Magellan portfolio also includes:

- Passport
- Concorde
- Vector
- DPN-100 data networking switch.

Magellan Passport

Passport is a Magellan switch that provides cost efficiencies through services consolidation on a single networking platform and delivers network solutions that can smoothly migrate to support multimedia applications in the near future or the longer term. Passport is used to build service-specific networks for frame relay, voice switching, ATM, and SNA services. In small service provider networks, Passport provides both access adaptation and backbone switching. Passport operates with other Magellan products to provide an end-to-end networking solution.

Passport offers both wideband and narrowband connectivity with extensive support for traditional services.

The Magellan Passport benefits include

- consolidation of data services (including frame relay, LAN, SNA, ATM, voice, video)
- dynamic bandwidth management using Magellan's multiple priority system (MPS).
- voice-over-ATM, an industry-first delivery of variable bit rate voice-over-ATM.
- dynamic voice compression: up to 8:1 compression is available by using 16 kbit/s compression plus silence suppression.

- switched virtual circuits (SVC) for dynamic call setup supporting any-to-any connectivity.
- interLAN switching provides LAN interconnectivity across the campus or over the wide area network by consolidating.

Magellan Vector

Vector is a standards-based 5 Gbit/s edge/backbone ATM switch providing power end-to-end networking solution which enables service providers to extend ATM networks and services to enterprise user locations. The Magellan Vector system is most commonly deployed as an ATM service consolidation switch for multiplexing and concentrating ATM access interfaces with low utilization onto one or more ATM network trunks. The Magellan Vector system can be deployed as an ATM edge switch providing the capacity to support different classes of service on a single switch (or even a single port) without allowing characteristics of any one service class to degrade the level of service of another class. The Magellan Vector system can be deployed as a high-capacity ATM backbone switch for smaller networks.

The Vector system benefits include

- low cell transfer delays provides excellent end-to-end performance
- Industry-leading traffic management and routing capabilities for superior utilization of network resources while meeting service guarantees.
- Standards-based connection options provides switched virtual circuits (SVC), permanent virtual circuits (PVC), soft PVC, permanent virtual paths (PVP), and soft PVP in both point-to-point and point-to-multipoint configurations
- Market-leading connection resilience for PVC and SVC connections
- A suite of interfaces with a wide range of access speeds from T1/E1 through OC-12c/STM4
- Data collection system provides comprehensive call record and performance data

Magellan Concorde

Magellan Concorde is a superior ATM backbone switch for broadband multimedia networks. It offers a wide range of features including SVC and PVC services, enhanced traffic and congestion managements switching.

Magellan Concorde's layered architecture provides full redundancy in all of the critical system elements as required by in public carrier networks. Magellan Concorde's distributed architecture enables service providers to take advantage of the latest computing technologies by separating switch functions into discrete layers. The type of distributed architecture offers significant advantages such as the ability to modify one layer without affecting functions

in another layer. It also allows more efficient management of diverse tasks such as development of custom applications.

The Magellan Concorde system benefits include

- industry-leading traffic management and standards-based connection options including SVC, PVC, soft PVC, PVP, and soft PVP in both point-to-point and point-to-multipoint configurations
- distributed architecture allows each layer to be separately optimized for performance or customized independently to add new features and service functionality
- scalable capacity from 10 to 40 Gbit/s and beyond with full suite of access interfaces
- Full redundancy of all critical real-time system elements

DPN-100

The DPN-100 is a Magellan standards-based data networking system for interconnecting diverse host, applications, and end-user environments. The DPN-100 system addresses the needs of organizations for reliable multiprotocol data services such as frame relay, system network architecture (SNA) and X.25 at speeds up to T1/E1. It supports a wide range of physical interfaces including V.24, V.35, V.36, X.21, G.703, and token ring. The highest availability (99.999%) is achieved through networking features, built-in redundancy, and modular design for non-disruptive growth.

The Magellan DPN-100 benefits include

- network connectivity for all sizes of networks provided in a diversified portfolio of products and services fully scalable from under 300 bit/s up to 16 Mbit/s.
- powerful Magellan network management system (NMS) provides workstation-based integrated management functions with an intuitive graphical interface.
- automatic adaptive routing provided in the MPS class of service routing automatically ensures that traffic is routed in a fair and timely fashion

Rapport Dialup Family

Rapport Dialup Family is a product family that makes internet dialup access reliable and cost-effective for carriers, service providers and their customers. This portfolio is designed as a platform for service providers, universities, and major enterprises to enable high performance, high density access to the internet or the enterprise inter-network over the public switched telephone network.

Three core functions of the Rapport Dialup Family of products are:

- Dialup: the ability for a remote access user to dial-in to their network from any location and access network services as if they were directly connected.
- Dial-out: the ability for a user on a LAN to share LAN-connected, centrally managed modems to perform character-based connections to remote hosts.
- LAN-to-LAN capability: the ability to link two or more LANs together in a routed network.

Meridian 1

Meridian 1 switching systems are built on digital technology and create a private branch exchange (PBX) exchange for business with 30 to 6000 users. The Meridian 1 switch offers data connecting, LAN, together with voice and data capabilities. Meridian 1 switches are available in scalable options, the smallest Option 11 model and the largest Option 81, and SuperNode systems.

The Meridian SuperNode switch is called Option 211 and is the largest member of the Meridian 1 family. It features Meridian SL-100 modular hardware and software. The Meridian SuperNode is a single system solution for large commercial and government environments.

Meridian 1 portfolio of private digital communications systems benefits include

- modular client/server architecture that provides inherent flexibility and cost savings
- commercial processors for scalable realtime processing capacity
- realtime, multitasking commercial software operating system and server-based software functionality
- scalable, distributed platform for seamless growth from 30 to 10,000 ports
- powerful networking features

Multimedia business applications

Enterprise Solutions multimedia business applications enhance corporate communications in areas such as call centers, multimedia messaging (combining voice, fax, and e-mail), and CTI applications. To complement the capabilities of core switching platforms, Enterprise Solutions products in this area are Meridian ACD, Meridian Mail, the SYMPOSIUM Family of applications, the network applications vehicle (NAV), and CTI.

SYMPOSIUM

The SYMPOSIUM family (formerly known as the VISIT family) of personal computer-based multimedia applications featuring desktop videoconferencing, shared computer screens, high-speed file transfers, and call management capabilities.

Meridian Mail

Meridian Mail voice mail systems support fax-on-demand to automate operations for callers. To integrate multimedia messaging at the desktop, SYMPOSIUM Messenger, a client-server application, unifies voice mail, electronic mail, and faxes by adding the convenience and simplicity of a graphic interface and point-and-click control.

CTI

CTI applications combine the power of the personal computer with the simplicity of the telephone. SYMPOSIUM FastCall is a prime example. It offers intelligent call routing based on calling or called numbers, and matches that information to deliver a computer screen pop of corresponding database files.

Terminals

Enterprise Solutions terminals lead the industry in delivering innovative and feature-rich telephones for business, home, and telecommuting use. Terminal offerings range from cordless phones with calling name and number displays, to integrated digital answering machines, and modular sets that incorporate screens to support display-based and advanced calling services.

The terminals portfolio includes

- Meridian digital terminals
- Meridian business sets
- CLASS terminals
- attendant console
- COMPANION C3050 portable telephones

Wireless systems

Meridian SL-100 wireless capability consists of the Meridian COMPANION system and the COMPANION microcellular system. The basic difference between them is Meridian COMPANION operates within a facility or building while COMPANION microcellular operates within a facility and outside using cellular service outside and a microcell base station inside.

Meridian COMPANION

COMPANION systems are set up similar to cellular systems (such as support for hand-off of calls between cells and the ability to roam through- out the coverage area). One big difference of the Meridian COMPANION system is that there are no air time charges for usage since it integrates with the existing telephone system. Also, no licensing to operate and no contract is required since the Meridian COMPANION system operates as a private wireless system. In the United States, all COMPANION products are designed to meet the low-power, digital personal communication interface standard.

COMPANION Microcellular

The COMPANION microcellular system combines the advantages of office phones and cellular phones to accomplish communication with customers and colleagues inside a building or facility or outside using only one phone. Subscribers use standard cellular phones inside on a private in-building network and also outside on a regular cellular network. The COMPANION microcellular system works with existing phone systems and also offers digital communications security. It turns any standard IS-136 cellular into an in-building portable phone.

15 Wireless

Meridian SL-100 wireless capability consists of the Meridian COMPANION system and the COMPANION microcellular system. The basic difference between them is Meridian COMPANION operates inside a facility or building while COMPANION microcellular operates inside and outside a facility using cellular service outside and a microcell base station inside.

Meridian COMPANION

COMPANION systems are set up similar to cellular systems (such as support for hand-off of calls between cells and the ability to roam through out the coverage area), one big difference of the Meridian COMPANION system is that there are no air time charges for usage since it integrates with the existing telephone system. Also no licensing to operate and no contract is required since the Meridian COMPANION system operates as a private wireless system. In the United States, all COMPANION products are designed to meet the low-power, digital personal communication interface standard.

The Meridian SL-100 wireless capability is called Meridian COMPANION. Meridian COMPANION is also referred to as the COMPANION C200. The Meridian COMPANION system is a powerful, fully-integrated wireless option for the Meridian SL-100 system. Portable telephone conversations are transmitted to the COMPANION base stations mounted throughout the building. Calls are then sent over standard twisted pair wiring to the controller cards in the Meridian SL-100 system, which processes and manages traffic from all base stations.

The Meridian COMPANION system is an Meridian SL-100 switch wireless system designed to work with existing telephone systems to provide portable telephone access within a building using lightweight portable telephones.

The Meridian COMPANION system has four main components:

- controller
- base stations
- portable telephones
- administration tools

Figure "Multimedia conferencing suite application with Meridian modular sets and MCA" on page 15-3 illustrates how the Meridian COMPANION system works with an existing telephone system.

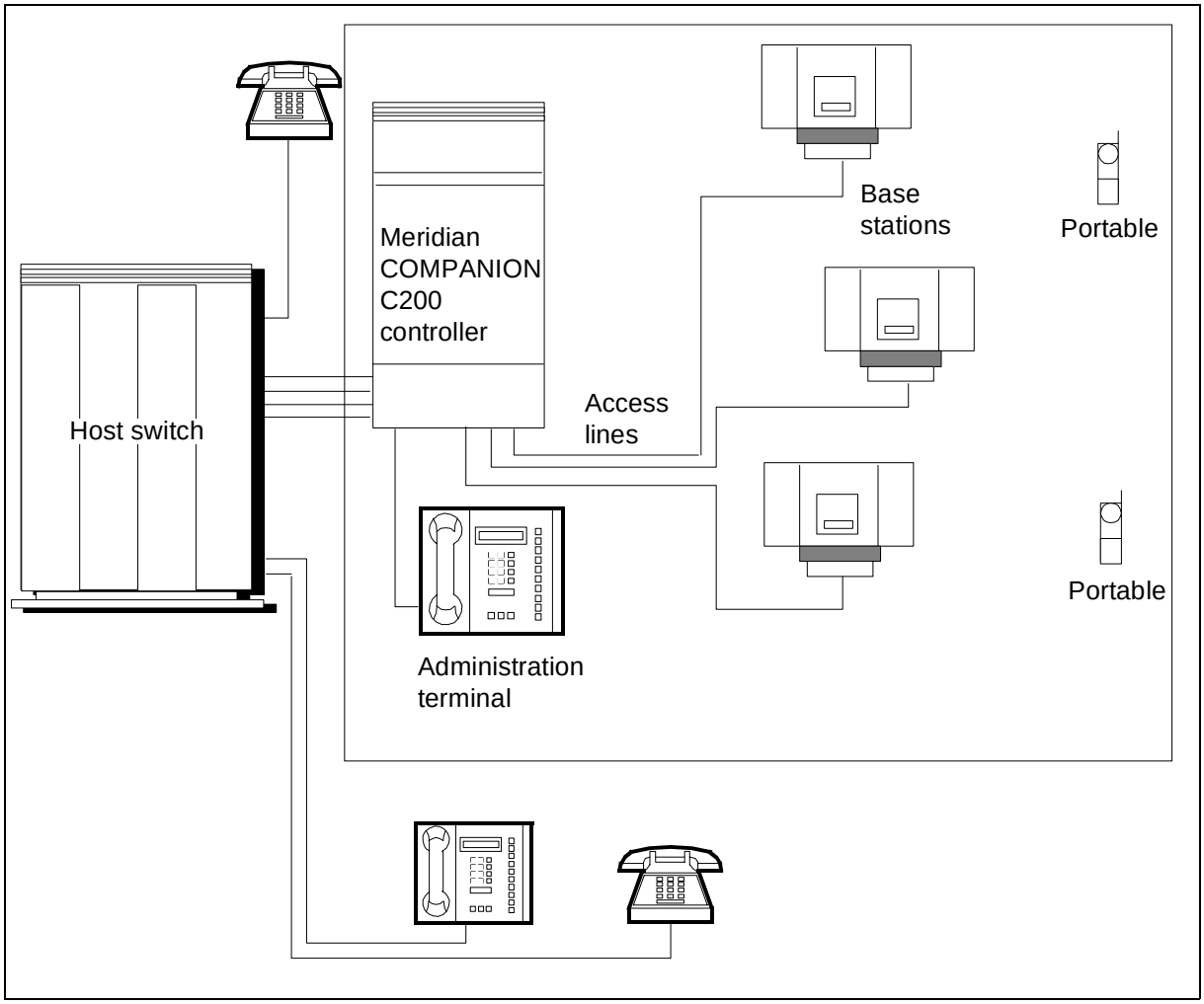
For more information about the Meridian COMPANION system, refer to the *COMPANION 200 Operations Guide*.

Key benefits and features

The Meridian COMPANION system key benefits include

- extends all the features of a conventional telephone where no desk or conventional telephone can reach
- provides enhanced business features on portable telephones such as calling line identification, calling party name display, and visual message waiting indicator
- ability to enhance any business communication system that supports analog telephones to support Meridian COMPANION portable telephones
- does not affect existing telephone operation
- synchronizes talk and listen modes between base stations and between portable phones
- power control determines the transmit power of the portable telephone. The strength of the radio power does not affect the volume of loudness of the audio as heard by the user.
- provides authorized access to prevent unauthorized access by requiring every portable telephone to be registered on the system
- provides programming by connecting a PC to the system and running COMPANION manager software
- continuous roaming enables portable telephone users to activate host system features and makes and receive calls anywhere within the facility.
- provides call hand-off feature to maintain strength and quality of a radio channel connection by handing-off a call to a most suitable base station as the user moves throughout the coverage area

Figure 15-1 Multimedia conferencing suite application with Meridian modular sets and MCA



Components

The Meridian COMPANION system requires a COMPANION C200 controller (with controller card, base station interface cards, line interface cards, software and a daughterboard), base stations, portable telephones, antennas, and the administration tool. COMPANION also requires line connectivity to a PBX system, such as a Meridian 1.

COMPANION C200 controller

The COMPANION C200 controller is the interface between the host switch of the existing telephone system and the portable telephones. The host switch connects to the ports on the controller by access lines. Each portable telephone requires its own access line, which is programmed on the host switch as an analog telephone. To the host switch, the controller is a group of analog telephones.

The COMPANION C200 controller works with any host system that supports standard analog lines and requires one dedicated 2500-port on the host for each portable phone. The COMPANION C200 controller connects to a host system using the analog lines.

Base stations

Base stations interface the controller with the portable telephone. The portable telephones communicate through radios contained in the base stations mounted throughout your office. Base stations are installed either on ceilings or high on walls. Each base station contains two radio transceivers and can handle two portable telephone calls simultaneously. The radio transceivers transmit and receive signals between portable telephones and Meridian COMPANION system radios. The base stations connect to the controller with standard telephone wiring.

Base stations are positioned indoors and grouped in cells that provide continuous telephone service in a specific area of the business premises. Each base station supports two simultaneous calls and can be grouped with up to three additional base stations in a single cell to form a higher call capacity cell. Each base station connects to a C200 controller with a standard two or four twisted-pair telephone cable.

Portable telephones

The C3050 portable telephones used with Meridian COMPANION systems in the United States are small, lightweight units with fully digital performance to provide clear voice quality. The portable telephone features a 2-line, 16-character display window, scrollable directory, a tactile alerter (vibrating capability), headset options and a data port. Full two-way calling is supported and all standard business features such as three-way call and call forwarding are also accessible from the portable telephone.

The C3050 terminal along with the Meridian COMPANION system provides complete voice business services to mobile users including

- calling name and number identification
- directory storage and dialing
- intra-system hand-off roaming
- soft keys for simple access to local and host based features
- alerter control for noisy and discrete situations

Administration tool

The administration terminal can be used to program the Meridian COMPANION system using a M7310 digital telephone set. This tool is used to assign portable telephones to the system, check base station parameters, enable and disable registration. Diagnostic software allows the capability of

running diagnostics either locally or remotely using a personal computer. You cannot make or receive calls on the administration terminal.

Capabilities

The Meridian COMPANION system provides the following capabilities:

- support for up to 152 users with 32 base stations, or 224 base stations with 8 users
- additional base stations can be added in increments of 16 with the increase of each new base station module
- two radios can support two simultaneous calls
- range of up to 660 feet in open environment, 60 to 700 feet in-building
- distance from the COMPANION C200 controller is 4000 feet maximum
- dynamic channel allocation
- received-signal strength indicator measurement capability
- self maintenance functions
- additional portable telephones can be added in increments of 4 with the increase of each new line card

Connectivity

The controller uses access lines to connect to the external telephone system and ports to connect to base stations or other peripheral devices. Base stations communicate with nearby portables by radio. This communication is called a link. The maximum distance or range between a portable and base station depends on the environment, and varies from 9 to 168 m (30 to 550 feet).

Base stations interface the controller with the portable telephone. The base stations connect to the controller with standard telephone wiring. The base station has two radios and each has four internal antennas and two external antenna ports. The external antenna ports for each can be connected to external antennas by way of coaxial cables.

COMPANION microcellular

The COMPANION microcellular system combines the advantages of office phones and cellular phones to accomplish communication with customers and colleagues inside a building or facility or outside using only one phone. Subscribers use standard cellular phones inside on a private in-building network and also outside on a regular cellular network. The COMPANION microcellular system works with existing phone systems and also offers digital communications security. It turns any standard IS-136 cellular into an in-building portable phone.

The fundamental difference between the COMPANION microcellular and the Meridian COMPANION is the operating radio spectrum. The COMPANION microcellular uses the licensed radio spectrum which requires coordination and approval by the license holder for the operation. The end-user difference is the ability to use one portable handset for both in-building and wide area wireless service.

Key benefits and features

The COMPANION microcellular system key benefits include

- works with the existing phone system
- cellular phones work as usual outside the workplace
- confidentiality and security
- uses industry standard, dual mode AMPS/TDMA portables. IS-136 portable phones offer extended battery life and talk-time

Capabilities

The COMPANION microcellular system provides the following capabilities:

- supports up to 1500 cellular phones within an area of 10 million square feet. Cellular capacity depends on the coverage provided by local cellular operators.
- handles data transferring applications such as fax and electronic mail.
- supports a multi-site networking option when integrated with a Meridian 1 network of systems. If operating in a campus-type environment, this option allows you to make and receive calls from different buildings or sites.
- distributed antenna system provides in-building coverage up to 400 meters.

Components

The COMPANION microcellular system consists of much the same components as the Meridian COMPANION system such as a Meridian 1 PBX system, portable telephones, antennas, and the administration tool. However, the system also requires microcell base stations, standard IS-136 cellular telephones with cellular provider service.

Connectivity

The system uses standard IS-136 cellular telephones when within range of the microcellular radio coverage area and operates as extensions off of the Meridian 1 PBX with full feature access.

Beyond the range of facility-wide coverage, the portable cellular telephone can register to the public, macrocell network to make and receive calls throughout the cellular provider's coverage area including any roaming arrangements with other cellular operators.

Voice transcoding and base stations interface using standard twisted pair wiring. Re-use of standard 800MHz public cellular spectrum coupled with the built-in distributed antenna system provides wireless communications inside a building. Cellular service operators provide outside area coverage.

COMPANION C3050 portable telephones

The COMPANION C3050 portable telephone is used with the COMPANION system to provide mobile communication in the workplace. The C3050's combination of digital technology and noise-cancelling microphone provides clean clear audio quality indistinguishable from that of a desk telephone.

The C3050 is compact and lightweight and provides the same features of a regular office telephone such as call forward, conferencing, and voice mail with message waiting indication.

The COMPANION C3050 portable phone features also include

- large display for caller identification
- call notification
- built-in vibrating alerter
- 50-item directory
- programmable softkeys
- headset options
- security options
- low power consumption

16 Terminals

Introduction

Terminals and terminal peripheral equipment associated with the Meridian SuperNode SL-100 private branch exchange (PBX) include

- Meridian Digital Telephones
- Meridian Communications Adapter (MCA)
- Analog Terminal Adapter (ATA)
- Meridian business sets
- CLASS Terminals
- Meridian Services Attendant Console (MSAC)
- Personal Directory PC Utility
- Meridian External Alerter and Recording Interface (MEARI)
- Meridian Key-Based Access Expansion Module
- Meridian Display-Based Access Expansion Module

For more information about Meridian SuperNode terminals, refer to the *M2000 Digital Telephones Reference Manual*, the *M3000 Touchphone Reference Manual*, the *M3900 Series Meridian Digital Telephone Reference Manual*, *the Meridian Modular Telephones Reference Manual*, and the *Meridian Communications Adapter (MCA) Reference Manual*.

Voice

Older model M2006 and M2008 sets are equipped with a piezo-disc transducer for alerting tones and on-hook dialing. Newer sets are equipped with a loudspeaker. The M2616, M2008, M3902, M3903, and M3904 sets are equipped with a loudspeaker for both handsfree voice communications and alerting tones.

Data

Asynchronous ASCII terminals and personal computers can be connected through an RS-232-C interface directly to an M2000 series Meridian Digital Telephone at speeds from 110 bps to 19,200 Kbps asynchronous and 56 or 64 Kbps synchronous to allow for data calls. Data capability is provided by the optional Meridian communication adapter (MCA), that is a single printed circuit pack (PCP) mounted within the telephone. The MCA works in conjunction with the digital interface chip also residing in the telephone. The firmware in the MCA serves as an interface between the user and the Meridian SL-100 system for establishing data calls.

The Meridian SL-100 MCA Keyboard Dialing (KBD) provides user interaction with the MCA. With KBD, a menu of features displays on the data terminal. A user enters a number, and information displays call progress messages or error condition messages, all in English phrases. After the data call is established, the KBD becomes inactive. When the call is disconnected, the KBD resumes operation.

Meridian Digital Telephones

Meridian Digital Telephones consists of the M2000 series, and the M3900 series. The following lists detail the different models within each series.

M2000 series

Meridian Digital Telephones M2000 series consists of the following models.

- M2006: a single line telephone with five programmable feature keys and a primary directory number (PDN) key
- M2008: a multiline digital telephone with seven programmable feature keys, plus a built-in 2-way speakerphone
- M2008HF: The M2008HF modular telephone is a multiline digital telephone with the same features, functionality, and attributes as the M2008 set, plus the addition of a built-in 2-way speakerphone.
- M2016S: The M2016S modular telephone is a telephone security group (TSG) Class 2 type accepted digital telephone designed to provide on-hook security that is required for certain government contractor applications.
- M2216 Performance-Plus: a multiline integrated voice and data (IVD) digital set for automatic call distribution (ACD) with 15 feature keys and a PDN key, a factory-installed display module, and two RJ-32 jacks for modular electret headsets. (The M2216 has the same features as the M2216-1 set. The M2216-1 and M2216-2 have been manufacture discontinued.)
- M2616: a high performance multiline telephone with 15 programmable feature keys and a PDN key, and an integrated handsfree unit
- M2616CT: a cordless multiline telephone with 15 programmable feature keys and a PDN key, and an integrated handsfree unit

The Meridian Digital Telephones are designed to provide cost-effective integrated voice and data communications capability. These telephone sets communicate with the Meridian SL-100 Integrated Services Network, using digital transmission over standard twisted-pair wiring. The telephones interface with the Meridian SL-100 system using the enhanced digital port card (EDPC), which has 16 ports that support 16 digital telephones and data units. No additional hardware is required in the loop circuit to provide data communications. Analog-to-digital and digital-to-analog conversion of voice signals are accomplished at the terminal by a codec.

Meridian Digital Telephones are connected to the system through a two-wire loop carrying two independent 64-Kbps pulse code modulation (PCM) channels with two associated 8-Kbps signaling channels. One of the two PCM channels is dedicated to voice, and the other channel is dedicated to data traffic. Line cords and handset cords on all Meridian modular telephones are equipped with snap-in TELADAPT connectors for easy and quick connection.

M2006

The M2006 modular telephone is a single-line telephone with five programmable function keys having the following characteristics:

- There are five assignable key/liquid crystal display (LCD) indicator pairs in addition to the PDN key (Key 1).
- A piezo-disc transducer on older phones or speaker on newer models provides alerting tones and on-hook dialing.
- It is loop-powered, but when equipped with the MCA, it requires an external power supply option.
- If equipped with the MCA, the top right feature key (Key 6) becomes dedicated as the local program mode key.

M2008

The M2008 modular telephone is a multiline set with seven programmable function keys having the following characteristics:

- seven assignable key/LCD indicator pairs in addition to the PDN key (Key 1)
- A piezo-disc transducer (older models) or loudspeaker (newer models) provides alerting tones and on-hook dialing.
- If equipped with the MCA, the top right feature key (Key 8) becomes dedicated as the local program mode key.
- the display option

M2008HF

The M2008HF modular telephone is a multiline digital telephone with the same features, functionality, and attributes as the M2008 set, plus a built-in two-way speakerphone.

- If the data option or display option (or both) is installed, the top right feature key (key 8) functions as a local program mode key.
- If neither the data option nor the display option is installed, key 8 operates as a normal system programmable key, sending key press and release messages to the PBX and receiving indicator status messages from the PBX.

- If Group Listening is enabled at the set (hardware plug), key 7 becomes the Group Listening key. In this capacity, this key will not send any message to the PBX.
- Key 7 is the programmable Handsfree key. It is controlled through software activation/deactivation using service order (SERVORD). This key functions the same as the Handsfree key on the M2616 sets. If the handsfree option is selected, then no other feature or DN can be assigned to key 7.

M2016S

The M2016S modular telephone is a telephone security group (TSG) Class 2 type accepted digital telephone designed to provide on-hook security that is required for certain government contractor applications. This security is accomplished through the use of relay circuitry that physically disconnects the handset and the piezo from the telephone circuit when the hook switch is pressed.

The message-waiting LCD in the upper right hand corner of the telephone provides a visual indication of security as well as message waiting. The red LED triangle lamp lights up when the telephone set is not secure and blinks when a message is waiting. (The telephone set is not secure when the hook switch is up, when the telephone is ringing, or any time that the handset or piezo relays are connected.) The indication of a non-secure state takes precedence over a message-waiting indication.

Due to the circuitry required to provide this on-hook security, the M2016S modular telephone requires auxiliary power and cannot accommodate the external alerter interface. When commercial power fails, the M2016S modular telephone cannot function unless the telephone is powered by a closet power supply that is backed up by an uninterrupted power supply (UPS).

M2616

The M2616 modular telephone is a high performance multiline set with 15 programmable function keys and an integrated handsfree unit.

The M2616 set has the following characteristics:

- There are 15 assignable key/LCD indicator pairs in addition to the PDN key/LCD indicator (Key 1). If selected, one pair is assigned for the use of the optional Handsfree/Mute function (Key 16).
- A loudspeaker is provided for alerting tone and for voice reproduction during handsfree operation.
- A microphone is included.
- If equipped with the MCA, it requires an external power supply option.

- If equipped with the MCA, the set's top right feature key (Key 8) becomes dedicated as the local program mode key.
- It may have the display option.
- One or two 22-key expansion modules may be added, giving the set from 38 to as many as 60 keys. New model phones require a longer cable (A0671007). This cable is provided with the key expansion module.

M2216

The M2216 is a multiline set for Automatic Call Distribution (ACD) operations with 15 programmable function keys.

Note: The M2216 replaces the M2216-1, which has been manufacture discontinued.

The M2216 has the following characteristics:

- There are 15 assignable key/LCD indicator pairs in addition to the PDN key/LCD indicator (Key 1).
- A special ACD display module is provided.
- A built-in power supply is optional.
- Two RJ-32 jacks for modular electret headsets are provided, one agent and one supervisor monitor.
- One or two 22-key lamp modules may be added giving the set a total of 38 to 60 keys.

M2616CT

The M2616CT cordless telephone is a high performance multiline set with 15 programmable function keys and an integrated handsfree unit.

The M2616CT set has the following characteristics:

- There are 15 assignable key/LCD indicator pairs in addition to the PDN key/LCD indicator (Key 1). If selected, one pair is assigned for the use of the optional Handsfree/Mute function (Key 16).
- A loudspeaker is provided for alerting tone and for voice reproduction during handsfree operation.
- A microphone is included.
- If equipped with the MCA, it requires an external power supply option.
- If equipped with the MCA, the set's top right feature key (Key 8) becomes dedicated as the local program mode key.

- An LCD display is optional.
- One or two 22-key expansion modules may be added, giving the set from 38 to as many as 60 keys. New model phones require a longer cable (A0671007). This cable is provided with the key expansion module.

M3900 series

The following sections give brief characteristics of the Meridian Digital Telephone M3900 series. For more detail, please refer to the M3900 Series Meridian Digital Telephone Reference Manual.

M3901

The M3901 set is a single line set with no display. It supports one directory number (DN) and five programmable features. This set also includes fixed keys for Line, Feature, Hold, Goodbye, and Volume Up/Down.

M3902

The M3902 set is a single line set with a two-line display. It supports one DN, three programmable feature keys that are self-labeled, and three fixed keys for Message, Transfer, and Options. Although the Message and Transfer keys are permanently labeled, they are not restricted to those features. This set also includes fixed keys for Hold, Goodbye, Smart Mute with light emitting diode (LED), Volume Up/Down, Handsfree (with LED), and four Navigation keys (up, down, left, and right). One accessory port is provided.

M3903

This is a four-DN set with a three-line display. It supports two self-labeled programmable line/feature keys with a Shift key to page between the two layers of feature keys, and four keys to access context-sensitive softkeys. It also has five fixed feature/application keys which are Options, Message, Call Log(includes redial), Applications, and a Shift key used to page between the two layers of line/feature keys. The Message key is permanently labeled as such, but is not restricted to that feature. The set includes fixed keys for Hold, Goodbye, Smart Mute (with LED), Volume Up/Down, Headset (with LED), Handsfree (with LED), and four Navigation keys (up, down, left, right). It also has Copy and Quit keys for applications and features. Two accessory ports are provided.

M3904

This is a professional set with a five-line display. It supports six self-labeled programmable line/feature keys with a Shift key to page between the two layers of feature keys, for a total of 12. This set also includes four context-sensitive softkeys used to access features. The fixed feature/application keys are: Options, Message, Directory/ Log(includes Personal Directory, Call Log, and Redial), Applications, and Shift. Fixed keys, Copy and Quit are the same as in M3903. Two accessory ports are provided.

M3905

This is a Call Center set that supports eight self-labeled programmable DN/feature keys with a four-line display. It has four context-sensitive softkeys used to access the features. It also includes six fixed feature/application keys for ACD features Supervisor, Emergency, Not Ready, Make Busy, In Calls, and Headset. These keys are permanently labeled, but not restricted to those features. This set has fixed keys for Hold, Goodbye, Mute (with LED), Volume Up/Down, Headset (with LED), and Supervisor Observe (with LED). There are four Navigation keys (up, down, left, right) and Copy and Quit keys for applications and features. Two accessory ports are provided.

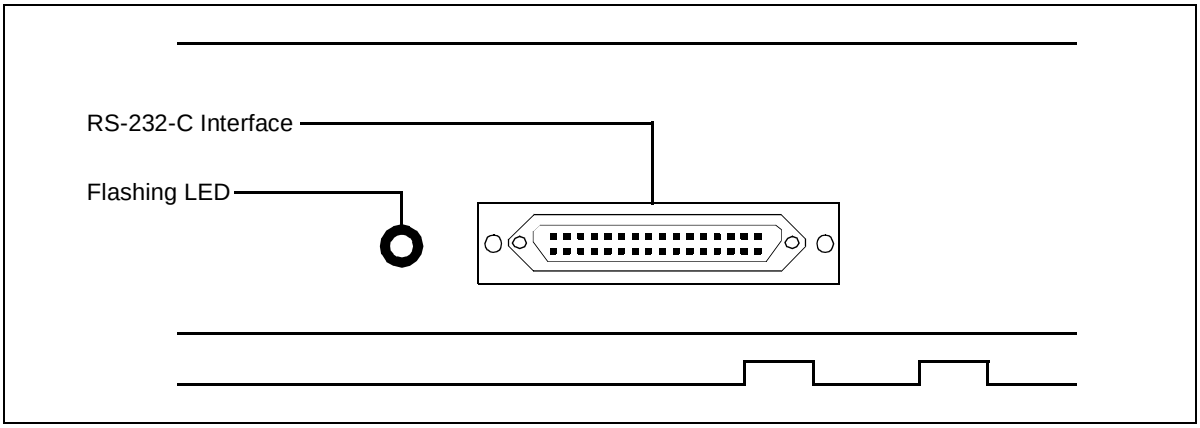
Meridian communications adapter (MCA)

The Meridian communications adapter (MCA) is an integrated data module that fits into the base of the Meridian Digital Telephone M2000 series. The MCA consists of a single PCP that is mounted within the telephone and allows synchronous (64 kbps) and asynchronous (110 to 19,200 bps) ASCII terminals, personal computers, and printers to be connected to the set through an RS-232-C interface. The MCA is a part of data communications equipment (DCE). The MCA also requires an additional power supply. Figure 16-1, "Back of telephone set showing the MCA" on page 16-8 illustrates the back of a set, showing an MCA.

The MCA is equipped with the Hayes dialing feature. This feature enables the user to originate data calls to local and remote data terminating equipment (DTE) directly from a data terminal keyboard or personal computer if connected to the MCA.

Users of personal computers already equipped with a Hayes Smartmodem or users who have a stand-alone Hayes Smartmodem can substitute the MCA for Meridian SL-100 data integration. The Hayes dialing feature, when used with third party communication software and the digital telephone, supports most of the Hayes Smartmodem features. Third party terminal emulation packages can also be used with Hayes dialing.

Figure 16-1 Back of telephone set showing the MCA



The MCA supports the following features:

- Enhanced Hayes commands, including upper and lower case dialing, voice call origination through AT dialing, data call disconnection, and on-line disconnect of voice call
- Script files allowing you to program multiple data resources for automatic resource access

The keyboard dialing routine may vary with the data equipment being used. Therefore, reference to the user's data terminal manual may be necessary. For more detailed information, refer to the *Meridian Communications Adapter (MCA) Reference Manual*.

Key-based access expansion module (KBA)

The Key-based Access Expansion Module (KBA) is equipped with 22 keys which can be used as additional keys beyond the currently available physical and self-labeled programmable feature keys on the M3904 and M3905. The sets and modules look and feel like one integrated unit. The M3904 and M3905 sets can support up to two KBAs with 22 keys each.

Display-based access expansion module (DBA)

The Display-based Access Expansion Module (DBA) is an optional add-on module for the M3904 and M3905 sets exclusively. The module is physically attached to a Meridian digital set and increases the number of programmable feature keys on the set by 24. The DBA supports up to three layers of eight programmable feature keys. The DBA also contains eight self-labeled feature labels. Each label is next to a key. A Page fixed key allows switching between the three layers of self-labeled programmable feature keys. When shifting through the display, the labels change according to the features programmed

for the next logical set of feature keys. Visual indication is provided to indicate which page (or layer) of the self-labeled programmable feature keys is in use.

Analog terminal adapter (ATA)

The Analog Terminal Adapter (ATA) adds an analog port to a digital terminal. The ATA fits into the base of the models M2006, M2008, M2009HF, M2216, M2616, and M2616CT. On the M3902, M3903, and M3904 phone sets, the ATA slides into an Accessory Connection Module, which is attached to the M3900 set. The ATA has the same interface and control into the Meridian SL-100 system as the existing M2006 phone set. It is datafillable on the odd line equipment number (LEN) of a digital link module/intelligent peripheral equipment (DLM/IPE). Whereas, the M2006 phone set along with all other voice sets, is only datafillable on the even LEN of the DLM/IPE.

Meridian business sets

Meridian business sets are Nortel Networks telephone sets available in the M5000 series. Meridian business sets consists of the following types of telephone sets:

- M5008: a multiline digital telephone with eight programmable keys for feature or directory number access.
- M5009: a multiline digital telephone with nine programmable keys for feature or directory number access. The M5009 business set is manufacture discontinued.
- M5112: a multiline digital telephone with 12 programmable keys for feature or directory number access. The M5112 business set is manufacture discontinued.
- M5208: a multiline digital telephone with eight programmable keys and a display (an enhanced M5008 set).
- M5209: a multiline digital telephone with nine programmable keys and a display. The M5209 business set is manufacture discontinued.
- M5212: a multiline digital telephone with 12 programmable keys and a display. The M5212 business set is manufacture discontinued.
- M5216: a multiline digital telephone with 12 programmable keys, a display, and handsfree (recommended for ACD applications).
- M5312: a multiline digital telephone with 12 programmable keys, a display, and handsfree. The M5312 business set is manufacture discontinued.
- M5316: a multiline digital telephone with 16 programmable keys, handsfree, and capability to add up to two Meridian mate 22 units.

Meridian business set add-ons

Three add-ons are available for the Meridian business sets. They are

- M518: an 18 button add-on. The M518 add-on is manufacture discontinued.
- M522: a 22 button add-on only available for the M5216 and M5316 sets
- M536: a 36 button add-on. The M536 add-on is discontinued.

CLASS terminals

CLASS terminals are telephone sets with CLASS feature capability. Meridian SuperNode CLASS features interwork fully with any terminal that supports the individual features and that complies with Bellcore specification TR-TSY-000030. Refer to the Subscriber services section of this document for an overview of CLASS features.

CLASS features require customer premises equipment (CPE) with display capability to receive and display incoming call information. Meridian SL-100 has an extensive terminals portfolio that meet the special requirements of CLASS features.

The Meridian SL-100 CLASS terminals portfolio includes

- Meridian 8000 series phone sets (M8000)
- Meridian 9000 series phone sets (M9000)
- Maestro Family of terminals
- PowerTouch universal base
- caller ID units

M8000 terminal sets

The M8000 terminal portfolio consists of single-line and multiline sets. The portfolio includes models for standard telephone service (basic) to advanced, fully featured telephones with integrated handsfree and multiline capabilities (handsfree and two-line handsfree).

M8000 phones require type A or type E line cards or analog IPE line cards to connect to the Meridian SuperNode. Each model has programmable autodialers for single-button feature activation and deactivation and each supports CLASS features on the LCM, except incoming calling line identification, incoming call display, or CLASS message waiting.

The M8000 series of analog phones include

- M8001: basic telephone service
- M8003: link, mute and redial capabilities

- M8009: six memory keys
- M8314: handsfree capability
- M8417: two-line handsfree capability

M9000 terminal sets

The M9000 terminal portfolio offers single-button feature activation and deactivation together with with calling name and number display capability.

The M9000 series of analog phones include

- M9216: name featured
- M9316: name featured and handsfree
- M9417: two-line handsfree capability
- M9516: digital answering device and mailboxes

Meridian Digital Telephone Sets (or M2000/M3900 terminal sets)

The Meridian Digital Telephones are designed to provide cost-effective integrated voice and data communications capability. These telephone sets communicate with the Meridian SL-100 Integrated Services Network using digital transmission over standard twisted-pair wiring.

The Meridian Digital Telephones support the CLASS features COT, SCF, ACB, ACRJ, and AR include

- M2008
- M2009
- M2016S
- M2018
- M2112
- M2216A
- M2216B
- M2317
- M2616
- M2616CT
- M3902
- M3903
- M3904
- M3905

Refer to the previous section, Meridian Digital Telephones, in this chapter, for more information on Meridian Digital Telephone telephone sets. For more information on the CLASS features, refer to chapter 10.

Maestro Family of terminals

The Maestro portfolio offers common terminal features such as calling name and number delivery, preferred name match, CLASS message waiting display and indicator light, scroll capability, and hold key with display and indicator light.

The Maestro portfolio includes five types of terminals:

- Maestro 1500: basic CLASS set
- Maestro 2500: CLASS set with six network features keys
- Maestro 3500: CLASS set with speakerphone
- Maestro 4500CT: CLASS cordless set with caller ID (manufacture discontinued)
- Maestro 4600CT: CLASS cordless set with caller ID and speakerphone (manufacture discontinued)

PowerTouch terminal sets

The PowerTouch universal base is common to all PowerTouch terminals sets providing features such as speakerphone with mute option, adjustable speaker, receiver, and ringer volume, multifunction indicator lights, and option keys for customizing features.

PowerTouch offers modular upgradeable feature capability allowing terminal set upgrades without requiring complete terminal replacement. The PowerTouch Vista base is designed to accommodate the interchangeable PowerTouch Vista displays.

Features common to the PowerTouch terminal portfolio are

- Universal base features
- calling name and number delivery
- CLASS message waiting indication
- preferred name match
- five-number redial
- editing capabilities using scroll keys

The PowerTouch portfolio includes five types of terminals:

- PowerTouch 225: modular with caller ID capability
- PowerTouch 250: modular with caller ID and call waiting capability
- PowerTouch 350: Analog display services interface (ADSI) capability

Caller identification units

The caller ID units for CLASS terminals are called Prevue and Prevue Deluxe. Prevue units feature call logs, extension-in-use indicator, and special keys for answering call waiting calls and return calling. Prevue Deluxe units feature all the capabilities of Prevue units plus an expanded call log, call timer, and the backlit display doubles as a clock.

Meridian services attendant console (MSAC)

The Meridian Services Attendant Console (MSAC [NT4X09]) is manufacture discontinued as of MSL10. Nortel Networks worked with third-party vendors who have developed computer-based consoles. Packages provided by these vendors include software, designed to run on an IBM-compatible PC, and interface hardware needed to connect the computer to various networks. These third-party vendor packages use the same software features used by the MSAC, plus offer significant feature and capability enhancements.

The MSAC features, together with an easy-to-read 16-character alphanumeric display, provide professional call processing and screening. Features can be easily added and configured to support your unique requirements. A wild card key allows expansion of a virtually unlimited number of features assigned to the console. Features such as call transfer with automatic recall, multiple listed directory numbers, trunk group access control, and message waiting activation are available with the MSAC.

Personal directory PC utility

The Personal Directory PC Utility provides a faster, easier way to create or modify a personal directory. Users can enter names and numbers into a Personal Directory file on their PCs. Users can download the file directly from the PC to the M3904 telephone. Users can also upload (read) a directory from the M3904 set to a PC and modify the directory. The Personal Directory PC Utility requires an Accessory Connection Module (ACM) and a power supply.

Meridian external alerter and recording interface (MEARI)

The Meridian External Alerter and Recording Interface (MEARI) provides a remote ringer device installed in a location separate from the telephone. The MEARI provides access to a standard, off-the-shelf remote ringer, call status relay, audio recorder or visual indicator.

The MEARI connects to any Meridian Digital Telephone M3900 series, except the M3901 set, which has no accessory dock. The MEARI requires an Accessory Connection Module (ACM) and a power supply (purchased separately) in the footstand.

The MEARI provides

- Ring relay contact
- Call status (off-hook) relay contact
- Record audio

For more information on this accessory, please refer to the Meridian Modular Telephone Reference Manual.

List of terms

ac

See alternating current.

ACB

See Automatic Call Back.

ACD

See Automatic Call Distribution.

ADSI

See analog display services interface.

A-Law

The method of encoding sampled audio waveforms used in the 2048 kilobits per second 30-channel pulse code modulated primary system used mostly in non-North American countries. For example, Europe uses this method.

ALT

See automatic line test.

alternating current (ac)

Alternating current is an electric current that reverses its direction at regularly recurring intervals.

AMA

See automatic message accounting.

American Wire Gauge (AWG)

American Wire Gauge is a standard American method of classifying wire diameter.

AMIS

See audio messaging interchange specification.

ANA

See automatic number announcer.

Analog display services interface (ADSI)

A feature used to distinguish between the audio and visual types of access for visual screen list editing (VSLE). Also referred to as a protocol that allows softkey data to be transferred to an ADSI set on an application-specific basis.

analog message waiting line card (MLC)

The MLC functions the same as an ALC that supports message waiting lamp sets in addition to the 500/2500 sets. The MLC can be inserted into any line card slot in the IPE shelf. Each MLC supports a maximum of 16 analog sets with message waiting lamps and can support the attendant console.

ANI

See automatic number identification.

ANSI

American National Standards Institute.

application specific unit (ASU)

The first subsystem in an external link peripheral processor (LPP) cabinet contains a group of three link interface shelves (LIS) that house modular, add-in cards known as application specific units. Examples of ASUs are the link interface unit (LIU) for Common Channel Signaling 7 (CCS7) applications and the X.25/X.75/X.75' link interface unit (XLIU) for DMS packet handler applications. Another type of ASU, the network interface Unit (NIU), uses DS30 links to route messages between the ASUs in the LPP and the Enhanced Network (ENET).

AR

See Automatic Recall.

ASU

See application specific unit.

asynchronous transfer mode (ATM)

A type of data transfer allowing the transfer of multimedia traffic over networks.

ATA

Analog terminal adapter. A terminal type that adds an analog port to a digital terminal. The ATA has the same interface and control into the MSL-100 system as the existing M2006 phone set.

ATC

Applied Technology Council

ATM

See asynchronous transfer mode.

ATT

See automatic trunk test.

audio messaging interchange specification (AMIS)

AMIS allows networking among non-Meridian mail users without predefining any of the remote sites. A message can be addressed to any subscriber using a direct dial system access number and a unique mailbox identifier. AMIS networking is available with MMUI or VMUIF.

Automatic Call Back (ACB)

A CLASS feature that allows the user to dial a feature code that automatically sets up a call to the last directory number (DN) that was dialed from that set. If the call cannot be completed immediately because of a busy line, call completion is attempted when both stations are idle.

Automatic Call Distribution (ACD)

ACD provides the capability of distributing a large number of incoming calls placed to one or more central directory numbers among a fixed group of agent positions. This configuration results in a call management system suitable for service industries where a large number of incoming calls are answered by a group of agents.

automatic line test (ALT)

The automatic line test provides a simple method for testing large numbers of lines. Currently the following tests are available: transhybrid loss test, line card diagnostic, line insulation test, and on-hook balance network. These tests can be run immediately or scheduled for daily operation.

automatic message accounting (AMA)

Automatic message accounting is an automated recording system that documents all the necessary billing data of subscriber-dialed long distance calls.

automatic number announcer (ANA)

The automatic number announcer returns a recorded voice announcement of the calling number.

automatic number identification (ANI)

A system whereby a calling number is identified automatically and transmitted to the automatic message accounting (AMA) office equipment for billing.

automatic recall (AR)

A CLASS feature that allows a user to dial a feature code that places a call to the last station that called the user. If the destination line is busy, call completion is attempted when both stations are idle.

automatic trunk test (ATT)

AWG

See American Wire Gauge.

basic rate interface (BRI)

Basic Rate Interface refers to a type of access to ISDN service provided by a set of time-division multiplexed digital channels of information, including two B-channels, one D-channel, and one or more maintenance channels, often described as 2B+D. Basic rate interface is typically used on lines between customer premises and the host switch.

batch change supplement (BCS)

A batch change supplement refers to a software release.

battery return (BR)

Battery return is a conductor that carries the -48 V return current.

BCLID

See Bulk Calling Line Identification.

BCS

See batch change supplement.

BPG

building principle ground

BR

See battery return.

BRI

See basic rate interface.

BRISC

BNR reduced instruction set computing.

BRR

battery return reference

building principle ground (BPG)

The main point within a building at which the ground potential is established. The BPG is directly connected to earth by water pipes or electrodes driven into the earth.

bulk calling line identification (BCLID)

A feature that provides information about calls to members of a BCLID group. It allows data to be collected in one central location for all calls received by lines that are members of the group. The BCLID group is defined through datafill and can have from one to 16 data link assigned.

cabinetized integrated services module (CISM)

The CISM is a modular, standard-wired cabinet with shelves that contain up to four integrated service modules.

cabinetized international peripheral equipment (CIPE)

The CIPE is the international version of the cabinetized control peripheral equipment (CCPE). It contains two dual-shelf extended peripheral modules configured as either line group controllers (LGC) or digital trunk controller (DTC). Each shelf contains two LGC/DTC processor boards. The CIPE connects to the network through either DS30 trunks or DS512 trunks.

cabinetized miscellaneous spares storage (CMSS)

A cabinet used for spare card storage.

cabinetized multi-vendor interface (CMVI)

The CMVI cabinet contains two main SMA2 shelves and one SMA2 extension shelf that supports the main shelves. The CMVI cabinet supports up to 96 P-side DS1 links.

cabinetized power distribution center (CPDC)

The CPDC is a single cabinet used to distribute power to the MSL-100 cabinets in the corresponding lineup. It provides dc power distribution and protection and optional inverted ac power for endguard outlets. The CPDC is the first cabinet in a linup of up to 11 cabinets. The CPDC provides a common product for numerous applications in both hosts and remotes. It also provides a compact configuration for small applications with the option for seamless growth. The CPDC provides electromagnetic interference (EMI) compliance at the system level for all power distribution and at the cabinet level for all input power cabling.

Call Center Management Information System (CC MIS)

The CC MIS is a powerful, flexible, and user-friendly call center management tool for the Meridian SuperNode ACD call center. It is designed for call centers comprising either traditional Meridian ACD groups or larger supergroup configurations served by a single Meridian SuperNode.

call forward busy (CFB)

CFB permits all calls to a busy station to be forwarded to a destination station within the customer group.

call forward don't answer (CFD)

CFD permits an incoming call not answered within a specified length of time to be forwarded to another designated station.

call processing (CP)

Call Processing refers to the software system that handles the processes involved in setting up connections through the network between calling and called parties.

calling line identification (CLID)

An advanced networking service allowing a called terminal to be notified by the network of the address from which the call has originated.

calling number delivery (CND)

A CLASS feature that shows, for each incoming call, the DN of the calling party and the date and time of the call. The calling party's DN is displayed in ten-digit format.

calling number delivery blocking (CNDB)

A CLASS feature for outgoing calls that allows users to block the display of their DN on the set of a called party.

cancel call waiting (CCW)

A feature that allows a calling party to prevent (block) incoming calls from activating the call waiting feature.

CBN

common bonding network

CC

See central control complex.

CCC

See central control complex.

CCM

DMS-100 Common. A layer within the DMS-100 software used by MSL-100 software and features.

CC MIS

See Call Center Management Information System.

CCS

See Common Channel Signaling.

CCS7

See Common Channel Signaling 7.

CD-ROM

See compact disc-read-only memory.

central control complex (CCC)

The NT40 system consists of the central control complex, which performs call processing and other operations for the system. The CCC is duplicated for reliability with one plane being in-service (active) while the other plane (standby) checks for variations between itself and the active plane. The CCC consists of the following elements: central processing unit (CPU), program store (PS), data store (DS), and central message controller (CMC).

central message controller (CMC)

The central message controller, which is part of the NT40 central control complex (CCC), controls the flow and priority of messages between the other units of the CCC and the network message controller (NMC) in the Network Module (NM) or the input/output controller (IOC).

central office data processor (CODP)

An adjunct processor attached to the stored program controller (SPC) whose function is to maintain transaction capability application part (TCAP) links to DMS switches.

central processing unit (CPU)

The central processing unit, which is part of the NT40 central control complex (CCC), acts as the central processor for the Meridian SuperNode system. The CPU has access to memories where stored programs and network data are located. The CPU uses this data to decide what action is required to satisfy the needs of the network and issues the commands to carry out the action.

CI

See command interface.

CIPE

See cabinetized international peripheral equipment.

CISM

See cabinetized integrated services module.

CLASS

See Custom Local Area Signaling Service.

CLID

See calling line identification.

class modem resource (CMR)

The card used by CLASS features to transmit calling number and name information.

class of service (COS)

A COS is a template containing information about subscriber mailbox capabilities. Values are assigned to specific parameters for these capabilities. A subscriber can be assigned to a personal COS or to 1-15 system COS to which the subscriber belongs.

CM

See computing module.

CMC

See central message controller.

CMS

Call Management Service. *See* Custom Local Area Signaling Service.

CMSS

See cabinetized miscellaneous spares storage.

CMVI

See cabinetized multi-vendor interface.

Codec

The encoder-decoder board for the video signal. It has its own video conferencing processor for fast quality encoding to send video conferencing audio and video signals, and to decode the incoming audio and video signals. This is the hardware that makes the difference in quality between video conferencing systems that use a codec versus those that try to accomplish the call processing using only the personal computer's processor.

CODP

See central office data processor.

command interface (CI)

The command interface component refers to a support operating system that functions as the main interface between the machine and the user. The major roles of the CI component include the following functions:

- reading lines entered by a terminal user
- breaking each line into recognizable units
- analyzing the units
- recognizing command item-numbers on the input lines
- activating these commands

Common Bonding Network (CBN)

Common Bonding Network is the principle means of bonding and grounding inside a telecommunications building. It consists of all metallic components that are interconnected to form the principle bonding network in the building. A common bonding network has a mesh configuration and is connected to the grounding electrode system.

Common Channel Signaling (CCS)

Common Channel Signaling refers to a signaling method in which a single channel conveys, by the means of labeled messages, signaling information relating to a multiplicity of circuits and other information. No supervision or addressing appears on individual trunks, they are used for voice only.

Common Channel Signaling 7 (CCS7)

Common Channel Signaling 7 is a digital, message-based network signaling standard defined by the CCITT that separates call signaling information from voice channels so that interoffice signaling is exchanged over a separate signaling link.

common peripheral controller (CPC)

The Meridian cabinet trunk module-ISDN (MCTM-I) cabinet contains up to two duplicated common peripheral controllers that can be configured as a line trunk controller-ISDN (LTC-I), line group controller-ISDN (LGC-I), or digital trunk controller-ISDN (DTC-I). The CPCs are wired as an LTC-I to eliminate custom engineering, but can be configured as an LGC-I or DTC-I with the appropriate circuit packs.

common peripheral module (CPM)

A family of peripheral modules used in the Meridian SuperNode system. The CPM replaces the XMS-based peripheral module (XPM).

Compact Disc-Read-Only Memory (CD-ROM)

CD-ROM is a technology on which Nortel Networks provides the latest Nortel Networks technical publications (NTP). Extensive search functions allow the user to search quickly virtually every word of every document. One CD-ROM stores approximately 200,000 pages of text and graphics.

Companion

A wireless phone set that works with Nortel Networks' line of PBXs.

computer-telephony integration (CTI)

The convergence of telephone voice communication systems and computer technology.

computing module (CM)

The computing module is part of the SuperNode Core that performs call processing functions. The computing module, which is housed in the dual

plane combined core (DPCC) cabinet, contains two CM planes. Each plane contains the following elements: processor used for call management, message switch (MS) interfaces, reset terminal interface, and memory circuit packs.

coordinated voice and data (CVD)

A switch-to-computer application interface (SCAI) option which provides an agent with a screen of information about a caller at the same time the call is being received. The agent is able to speak on the telephone while examining call-related information on the desktop terminal.

COS

See class of service.

COT

See customer oriented trace.

CP

See call processing.

CPC

See common peripheral controller.

CPDC

See cabinetized power distribution center.

CPE

See customer premises equipment.

CPM

See common peripheral module.

CPU

See central processing unit.

CTI

See computer-telephony integration.

Custom Local Area Signaling Service (CLASS)

CLASS, sometimes referred to as call management service (CMS) in Canada, is a set of advanced calling capabilities which offer convenience and control beyond custom calling features. This feature enhances the signaling capabilities of analog stored program controller (SPC) switches to integrate some CCS7-based network features such as calling number display, automatic call setup, and screening list editing features.

customer oriented trace (COT)

A CLASS feature that allows the user to dial a feature code to generate a trace report for the last incoming call. The report supports a customer complaint about a malicious call.

customer premises equipment (CPE)

Nortel Networks telephony equipment located at the customer's site. A CPE carrier is a private businesses that does not have its own PBX but does have its own MSM and maintains its own voice messaging system.

CVD

See coordinated voice and data.

data communications equipment (DCE)

See data circuit-terminating equipment.

Data Circuit-terminating Equipment (DCE)

The equipment that provides the functions required to establish, maintain, and terminate a connection as well as the signal conversion required for communications between the data terminal equipment (DTE) and the telephone line or data circuit. Also known as data communications equipment, data set.

data link connection identifier (DLCI)

A unique two-byte code included in each data packet. By identifying the logical connection to which the packet belongs, it lets many virtual channels share a single physical channel (for example, a non-channelized T1).

data modification order (DMO)

A data modification order is a request to switch personnel to change system information.

data packet network (DPN)

A packet-switched networking system that is manufactured by Nortel Networks. The DPN-100 data networking system is an enterprise-wide data communications system for the interconnection of host, applications, and end-user environments.

data store (DS)

The data store module, which is part of the NT40 central control complex (CCC), contains transient information on a per-call basis, customer data, and office parameters.

D-channel handler (DCH)

A card in an ISDN line group controller (LGCI) or in an ISDN line trunk controller (LTCI) that provides the primary interface to all D-channels. The DCH also performs Q.921 link access procedures on the D-channel (LAPD)

layer 2 processing. The DCH is connected permanently to an ISDN loop and receives or sends messages on the signaling/packet data channel.

dc

See direct current.

DC

See device controller.

DCE

See data communications equipment.

DCH

See D-channel handler.

DDN

See dialable number delivery.

DDU

See disk drive unit.

Defense Switched Network (DSN)

The telephone network used by government agencies.

device controller (DC)

Input/output controllers (IOC) use the device controllers to communicate with input/output devices.

device independent recording package (DIRP)

DIRP is a utility that manages the reading and writing of data between various subsystems and recording devices.

dialable number delivery (DDN)

A CLASS feature that delivers the DN of the calling party in a dialable format and the date and time of the incoming call to a calling number delivery (CND) set.

dialable wideband service (DWS)

Dialable wideband service is Nortel Networks' multirate ISDN switched service aimed at satisfying end-user needs for flexible, wideband connectivity. It provides a simple way to extend existing ISDN services to match the higher bandwidth requirements emerging for videoconferencing, multimedia, imaging, and other high-speed applications. DWS bridges the gap between narrowband services (< 64 kbp) and broadband services (> 1.536 Mbp). DWS offers a flexible, dialable, real-time network connection with rates from 128 kbit/s to 1.536 Mbit/s in 64-kbit/s increments.

digital line card (DLC)

The DLC is a digital line card that interfaces to Meridian integrated voice and data (IVD) digital terminals. These terminals include the M2000 series, the M3000 Touchphone, and their respective data options. The DLC inserts into any line card slot on the intelligent peripheral equipment (IPE) shelf and can interface with a maximum of 16 digital sets for each DLC card for a total of 32 ports.

digital line module (DLM)

The digital line module is a 23-position peripheral module developed to allow the Meridian SuperNode system to interface with the M2000 series of telephone sets.

digital recorded announcement machine (DRAM)

The digital recorded announcement machine is a peripheral module in which voice messages are stored in digital form, providing access to up to 30 different service voice announcements.

digital trunk controller (DTC)

The digital trunk controller is a peripheral module that connects DS30 links from the network with digital trunk circuits.

digital trunk controller-ISDN (DTC-I)

The digital trunk controller-ISDN is a peripheral module that connects DS30 links from the network with digital trunk circuits and that supports ISDN packfill.

DIOC

dual input/output controller

direct current (dc)

Direct current is an electric current flowing in one direction only and substantially constant in value.

DIRP

See device independent recording package.

disk drive unit (DDU)

A disk drive unit consists of two 8-inch or 5.25-inch Nortel disk units, providing 220 to 440 Mbytes of formatted storage. The DDU is housed in the Meridian cabinet general module (MCGM), the Meridian cabinet auxiliary module phase 3 (MCAM3), or the cabinetized integrated services module (CISM). The MCGM is manufacture discontinued and is replaced with the MCAM3 or the CISM.

distinctive ringing/call waiting (DRCW)

A feature that identifies certain terminating calls by a distinctive pattern of alerting: a distinctive ring (long, short, long) or, if busy, a distinctive call waiting tone (short, long, short). The caller receives a standard audible ringback tone.

DLC

See digital line card.

DLCI

See data link connection identifier.

DLM

See digital line module.

DMO

See data modification order.

DN

Directory number. A number assigned to a telephone set on the MSL-100 system.

DPCC

See dual plane combined core.

DPN

See data packet network.

DRAM

See digital recorded announcement machine.

DRCW

See distinctive ringing/call waiting.

DS

See data store.

DSN

See dual shelf network.*See* Defense Switched Network.

DTC

See digital trunk controller.

DTC-I

See digital trunk controller-ISDN.

dual plane combined core (DPCC)

The dual plane combined core is the SuperNode core cabinet that packages the following components: a dual-plane message switch (MS), a computing module (CM), and a system load module (SLM).

dual shelf network (DSN)

The dual shelf network, which is housed in the NT40 Meridian cabinet core module (MCCM) cabinet, initially provides 64 Peripheral-side (P-side) ports with a capability to add 64 more.

dual tone multi-frequency (DTMF)

A service-related telephony dialing feature that allows address information to be generated from a telephone set in the form of DTMF signals by pressing non-locking buttons. Contrast with pulse dialing.

DWS

See dialable wideband service.

EAP prefix

A prefix (10xxx) that accesses either a feature group C or feature group D carrier. The first two digits (10) of the prefix form a reserved access code. The EAP prefix is either dialed by the subscriber or added by the system software.

EBS

See electronic business set.

ECM

See extended call management.

EDCH

See enhanced D-channel handler.

EDRAM

See enhanced digital recorded announcement machine.

EIU

See ethernet interface unit.

EKTS

See electronic key telephone systems.

ELD

See enhanced line drawer

electromagnetic interference (EMI)

Electromagnetic Interference refers to the phenomenon that results when electromagnetic energy causes an unacceptable or undesirable response, malfunction, degradation, or interruption of the intended operation of the electronic equipment, subsystem, or system.

electronic business set (EBS)

The electronic business set is a telephone set that provides subscribers with pushbutton access to various business features.

electrostatic discharge (ESD)

Electrostatic discharge is a transfer of an electrostatic charge either caused by direct contact between two bodies that are at different electrostatic potentials or induced by an electrostatic field.

electronic key telephone systems (EKTS)

A set of services for ISDN voice terminals on a basic rate interface (BRI). EDTS provides shared directory numbers (DN), multiple DNs for each service profile, and conference and intercom calling.

ELM

See enhanced line module.

EMAP

See enhanced MAP workstation.

EMC

See enhanced miscellaneous cabinet.

emergency standalone (ESA)

Emergency standalone refers to an emergency service that permits local calling within a remote peripheral in the event of a loss of communication with the host office.

EMI

See Electromagnetic Interference.

EMPC

See enhanced multiprocessor controller.

ENET

See enhanced network.

Enhanced D-channel handler (EDCH)

A card in an ISDN line group controller (LGC) or in an ISDN line trunk controller (LTCI) that provides the primary interface to all D-channels. The EDCH also perform Q.921 LAPD layer 2 processing. It is connected

permanently to an ISDN loop, and receives or sends messages on the signaling and packet data channel.

enhanced digital recorded announcement machine (EDRAM)

The EDRAM offers service providers time and cost savings by automating the process of providing instructions to a subscriber during a call. A single EDRAM circuit pack offers the same functionality of a 13-card Digital Recorded Announcement shelf, including enhancements in audio quality, reliability, and flexibility.

enhanced line drawer (ELD)

An enhanced hardware device in the line module and line concentrating module (LCM) that contains line circuit (LC) cards.

enhanced line module (ELM)

The enhanced line module, which is housed in the Meridian cabinet line module (MCLM) cabinet, contains 8 line drawers, which house 512 line cards. All four line drawers on each MCLM shelf are located on the left side, while the control equipment is located on the right side. This arrangement allows easier removal of line cards from the drawers.

enhanced MAP (EMAP) workstation

The enhanced MAP workstation combines the functionality of the MAP visual display unit (VDU) and a compact disc-read-only memory (CD-ROM) drive into one workstation. This workstation provides Meridian SuperNode technicians with the ability to perform tasks on the MAP window and access Helmsman software simultaneously.

enhanced multipurpose cabinet (EMC)

A cabinet containing one or more single shelf link peripheral processors (SSLPP).

enhanced multiprocessor controller (EMPC)

An enhanced data communications card that allows data communications between a DMS-100 switch and an external computer.

enhanced network (ENET)

The enhanced network is the new generation of switching networks that replaces the junctored network modules. The ENET is a nonblocking, junctorless, single-stage time switch that can expand its capacity from 4K to 128K unidirectional channels. The ENET is available in a 64K single-cabinet or 128K dual-cabinet configuration. The ENET is also available as an optional 16K ENET shelf in the SuperNode Combined Core (SCC) cabinet for SuperNode SE systems.

enhanced service providers (ESP)

A third-party vendor supplying value-added services to the subscriber.

ESA

See emergency standalone.

ESD

See electrostatic discharge.

ESMA

enhanced subscriber carrier module-100 access. *See* subscriber carrier module-100 access, second version.

ESP

See enhanced service providers.

ETAS

See emergency technical assistance service.

Ethernet interface unit (EIU)

An application specific unit (ASU) that connects the MSL-100 switch to the local area network.

extended call management (ECM)

An application such as CompuCALL allowing concurrent delivery of voice calls and data from the user's host computer to an answering automatic call distribution (ACD) agent.

extended Multiprocessor System (XMS)

A workstation-based microcomputer with networking capabilities based on a Motorola 68000 microprocessor with system software written in Bell-Northern Research (BNR) Pascal.

extended system monitor (XSM)

The extended system monitor is a microprocessor-based circuit pack located in the intelligent peripheral equipment (IPE) pedestal base. The XSM monitors the operation and status of the IPE power supplies, ringing generators, column thermal sensors, and blower units.

FCC

See Federal Communications Commission.

Federal Communications Commission (FCC)

The FCC is a board composed of seven commissioners with the power to regulate all interstate and foreign electrical communications systems originating in the United States, including radio, television, facsimile, telegraph, telephone, and cable systems.

fiber central office terminal (FCOT)

A component of the S/DMS AccessNode that terminates connections from service nodes and fiber optic transmission facilities from remote fiber terminals (RFT). The primary function of the FCOT is to convey traffic arriving on the fiber optic transmission facilities to the appropriate service nodes and to direct traffic arriving from the service nodes to the proper fiber optic transmission facilities.

FCOT

See fiber central office terminal.

FG

frame ground

FLIS

fiber link interface shelf. *see* single shelf link processor (SSLP).

frame ground (FG)

A metallic connection to the earth to establish zero potential or voltage with respect to ground or earth.

frame relay

An approach to packet switching that offers faster access speeds and higher performance than X.25-based packet switching.

frame relay interface unit (FRIU)

A relay interface unit that supports DataSPAN frame relay services by providing the physical connection for T1 carriers at the LPP. DataSPAN uses T1 carriers as its transmission facilities and the FRIU terminates the T1 carriers at the switch. The FRIU analyzes incoming frames and addresses them for routing to the LIM unit. DataSPAN, loaded into each APU at datafill, allows LANs from different locations to be logically connected into a single data network.

frame relay service

The global term used to describe the system defined by the CCITT recommendation I.122.

frame supervisory panel (FSP)

The frame supervisory panel distributes and controls power and alarms in a cabinet.

FRIU

See frame relay interface unit.

FRS

See frame relay service.

FSP

See frame supervisory panel.

FST

An optional package with 48 to 96 lines connected to its host AccessNode over DS-1 links providing the ability to provision or change services through software instructions, without on-site visits to the network element.

GND

ground

GP

general purpose. *See* modular option (GP).

GUI

graphical user interace. The way information appears on a workstation monitor for easy user access. A GUI consists of buttons, pull-down menus, and toolbars.

HABC

See high availability bus controller.

HDLC

See high-level data-link control.

HIE

See host interface equipment shelf.

high availability bus controller (HABC)

A bus controller card providing 2 Mbyte of RAM storage for programs and data and contains circuitry that allows interconnection of nodes in multi-node configurations through an external bus or DVS bus.

high-level data-link control

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

host interface equipment (HIE) shelf

A single shelf that allows the line concentrating array (LCA) shelves to connect to both the remote maintenance module (RMM) and the host office.

IBN

isolated bonding network.

IBN

integrated business network. Refers to analog phones with no display, usually 500/2500 sets.

IEC

See Interexchange Carriers.

input/output controller (IOC)

input/output controllers interface between the various input/output devices used for maintenance and administration purposes and the messaging component (the NT40 central message controller or the SuperNode and SuperNode SE message switch bu).

input/output device (IOD)

The input/output device subsystem monitors the input/output controllers and provides access to the Meridian Supernode system for maintenance and administration. Typical input/output devices include the MAP workstation (and other visual display unit), printers, magnetic tape drives, and disk drive units.

Integrated Service Digital Network (ISDN)

ISDN is a collection of standardized national and international digital telecommunications interfaces and signaling protocols that provide digital circuit-switched voice and data, as well as packet-switched data services.

integrated voice and data (IVD)

The integrated voice and data service provides simultaneous voice and data communications at speeds up to 19.2 kbps over a single, twisted-pair subscriber loop.

intelligent peripheral equipment (IPE)

The IPE is a single-shelf module containing a controller card and 16 slots available for analog and integrated voice and data (IVD) digital lines. IPEs are packaged as modular, stackable units. Up to four IPEs can be contained in one intelligent peripheral equipment column (IPEC). The IPE also provides a simplex, single common peripheral with common line cards for the Meridian SuperNode system, SL-1, and Meridian SuperNode system, as well as a cost-effective solution for system upgrades and extensions.

intelligent peripheral equipment column (IPEC)

The IPEC houses all equipment for IPE functionality, which includes up to four universal equipment modules (UEM), up to four IPE modules, a pedestal base, an expansion kit, two module side cover panels, a top cap, cable harnesses, trim panels and labels, and the Extended System Monitor (XSM) card.

interactive voice response (IVR)

IVR is a generic term given to applications which allow callers to interact directly with information stored in computer databases using a touchtone phone. The typical IVR application initiates a predefined sequence of verbal prompts, providing options and instructions to the caller. It allows the caller to respond to these verbal prompts and instructions via their telephone touchtone keys as if the keys were on the keyboard of a computer terminal. In this way, information inquiries and transactions can be carried out directly by the caller with no need for additional human intervention or terminal interface. Nortel Networks provides two interactive voice response systems (IVR): Meridian IVR and OPEN IVR.

intraswitching

A service in which calls are switched within one double-bay remote line module (RLM) frame without using the host office switching network.

interexchange carriers (IEC)

Any carrier authorized to carry customer transmissions between local access and transport areas (LATA) interstate or intrastate.

IOC

See input/output controller.

IOD

See input/output device.

IPE

See Intelligent peripheral equipment.

IPEC

See intelligent peripheral equipment column.

ISDN

See Integrated Services Digital Network.

ISDN User Part (ISUP)

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

isolated bonding network (IBN)

A bonding network that has a single point of connection to either the common bonding network or to another IBN.

ISUP

See ISDN user part.

ITU

International Telecommunications Union.

IVD

See integrated voice and data.

IVR

See interactive voice response.

JNET

See junctored network.

junctored network (JNET)

The junctored network employs four stages of time switching for each voice connection between the originating and terminating peripheral modules. JNET hardware is housed in the Meridian cabinet network module (MCNM) cabinet and is applicable to NT40 systems.

L+

positive line voltage

L-

negative line voltage

LAPD

See link access procedure on the D-channel.

LATA

See local access and transport area.

LCA

See line concentrating array.

LCD

liquid crystal display. A low power display that aligns material suspended in a liquid under the influence of a low voltage so it reflects ambient light and displays alphanumeric characters. LCD displays are finding great use as methods of displaying information on electronic telephones, especially those positioned behind a PBX.

LCM-E

See line concentrating module-enhanced.

LED

See light-emitting diode.

LEN

See line equipment number.

LFC

LIS Fbus controller

LFI

LIS fiber interface

LGC

See line group controller.

LGC-I

See line group controller-ISDN.

light-emitting diode (LED)

The LED is a solid-state device that emits light when the appropriate voltage is applied to it. Several LEDs are used in components as front panel indicators. They are usually off when the status of the equipment is normal.

line concentrating array (LCA)

A unit of the line concentrating module (LCM). An LCM has two LCA shelves.

line concentrating module-enhanced (LCM-E)

The line concentrating module-enhanced is a dual unit peripheral module that terminates ISDN lines, electronic business set (EBS) lines, and Datapath lines. The LCM-E occupies two shelves in the Meridian cabinet line module-ISDN (MCLM-E) and supports a total of eight physical line drawers.

line equipment number (LEN)

The LEN provides a seven-digit function reference used to identify line circuits. The LEN provides physical location information on equipment such as site, frame number, unit number, line subgroup (shelf), and circuit pack.

line group controller (LGC)

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

line group controller-ISDN (LGC-I)

The line group controller-ISDN is a peripheral module that connects DS30 links from the network to the line concentrating module (LCM). The LGC-I is essentially the same as the LTC-I; however, the LGC-I adds line support.

line test position (LTP)

The line test position provides the tools and functions required to locate and verify faults and checks that corrective action is successful. The Line Test Position consists of four MAP workstation levels: LTP, LTPLTA, LTPDATA, and LTPMAN.

line test position data (LTPDATA)

The LTPDATA is a MAP workstation level under the line test position (LTP) area that provides line transmission test tools for ISDN basic rate interface (BRI) lines.

line test position local test access (LTPLTA)

The LTPLTA is a MAP workstation level under the line test position (LTP) area that provides facility tests.

line test position manual (LTPMAN)

The LTPMAN is a MAP workstation level under the line test position (LTP) area that provides line transmission test tools.

line trunk controller (LTC)

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

line trunk controller-ISDN (LTC-I)

The line trunk controller-ISDN is a peripheral module that is a combination of the line group controller and the digital trunk controller and provides all the services offered by both. The LTC-I is wired to support up to 8 line concentrating modules (LCM) or digital line modules (DLM) requiring up to 20 DS-30A trunk ports and 16 DS30 line ports.

link access procedure on the D-channel (LAPD)

An ISDN access protocol used with links established on a D-channel.

link interface shelf (LIS)

The link interface shelf is a single-shelf link peripheral processor that houses modular, add-in cards known as application specific units (ASU). Each LIS can house up to 12 ASUs for a total of 36 ASU slots. The LIS resides either in the link peripheral processor (LPP) cabinet or optionally in the SuperNode combined core (SCC) SuperNode SE cabinet.

link interface unit (LIU)

The link interface unit is an application specific unit (ASU) used for Common Channel Signaling 7 (CCS7) applications. The LIU can be provisioned either in the link peripheral processor (LPP) cabinet or optionally in the SuperNode combined core (SCC) SuperNode SE cabinet.

link peripheral processor (LPP)

The link peripheral processor is a new generation peripheral based on the SuperNode cabinet architecture. The LPP is supported on both the SuperNode and SuperNode SE systems. The LPP allows network providers to add special applications, such as Common Channel Signaling 7 (CCS7) and the DMS packet handler.

LIS

See link interface shelf.

LIU

See link interface unit.

LIU7

See line interface unit 7.

LMI

See local management interface.

local access and transport area (LATA)

A geographic area within which an operating company may offer telecommunications-related services.

local management interface (LMI)

A protocol that provides high-level communication between destination devices and the DataSPAN frame relay service.

LPP

See link peripheral processor.

LR

logic return

LTC

See line trunk controller.

LTC-I

See line trunk controller-ISDN.

LTP

See line test position.

LTPLTA

See line test position local test access.

LTPDATA

See line test position data.

LTPMAN

See line test position manual.

MADN

See multiple appearance directory number.

Magellan access integrator (MAI)

A series of wide are network (WAN) access products that integrate branch-office voice, fax, data, and LAN traffic. MAI connects to a Magellan backbone using a private leased line or public frame relay.

magnetic tape drive (MTD)

A magnetic tape drive is a device used to record data. An MTD can reside in the Meridian cabinet memory module (MCMM), the Meridian cabinet general module (MCGM), the Meridian cabinet auxiliary module phase 3 (MCAM3), or the cabinetized integrated services module (CISM). The MCGM is manufacture discontinued and is replaced by the MCAM3 or the CISM.

MAI

See Magellan access integrator.

main distribution frame (MDF)

The main distribution frame contains terminal blocks where cables from outside plant and office equipment are terminated.

maintenance trunk module (MTM)

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

MAPCI

See MAP command interpreter.

MAP command interpreter (MAPCI)

The MAPCI is a MAP workstation level for accessing maintenance and other functional levels.

MBP

See modular business package.

MBS

See Meridian business set (MBS).

MByte

megabyte. A unit of measurement for data storage equal to 1,048,576 bytes.

MC7M

See Meridian cabinet CCS7 module.

MCA

See Meridian communications adapter.

MCAM3

See Meridian cabinet auxiliary module phase 3.

MCCM

See Meridian cabinet core module.

MCDM

See Meridian cabinet digital module.

MCDR

See Meridian cabinet digital remote.

MCGM

See Meridian cabinet general module.

MCLM

See Meridian cabinet line module.

MCLM-E

See Meridian cabinet line module-ISDN.

MCMM

See Meridian cabinet memory module.

MCNI

See Meridian cabinet network interface.

MCNM

See Meridian cabinet network module.

MCPM

See Meridian cabinet power module.

MCRM

See Meridian cabinet remote module.

MCRM-S

See Meridian cabinet remote module-SONET.

MCRU

See Meridian cabinet remote unit.

MCSM

See Meridian cabinet service module.

MCSS

See Meridian cabinet spares storage.

MCTM-I

See Meridian cabinet trunk module-ISDN.

MCU

See Multipoint conferencing unit.

MDC

See Meridian digital centrex.

MDF

See main distribution frame.

Meridian business set (MBS)

A telephone set that provides subscribers with push-button access to various business features. This set, used by the supervisor, has one more field display than the electronic business set (EBS).

Meridian cabinet auxiliary module phase 3 (MCAM3)

The MCAM3 cabinet provides power to the system lineup. This cabinet also houses service trunk modules (STM) and maintenance trunk modules (MTM).

Meridian cabinet CCS7 module (MC7M)

The MC7M cabinet is no longer manufactured or supported. It is replaced by the link peripheral processor (LPP) or the fiber link interface shelf (FLIS).

Meridian cabinet core module (MCCM)

The MCCM cabinet is a double-wide cabinet containing the duplicated system that is the NT40 central control complex (CCC) for the switch.

Meridian cabinet digital module (MCDM)

The MCDM cabinet contains four digital line modules (DLM) that service a total of 640 M2000 and M3000 Meridian digital sets, data terminals, or both. It is manufacture discontinued and is replaced by the intelligent peripheral equipment column (IPEC).

Meridian cabinet digital remote (MCDR)

The MCDR cabinet is a remotely located digital line module (DLM) connected to a host line trunk controller. The MCDR serves the complete line of Meridian digital telephones (M2000 and M3000 series), supporting

both voice and data options. The MCDR is no longer manufactured or supported.

Meridian cabinet general module (MCGM)

The MCGM cabinet allows the customer to choose custom features and hardware and locate all customized features into one cabinet. This controls the amount of special engineering required for the system and keeps other cabinets standardized. The MCGM cabinet packages the disk drive unit (DDU), dual input/output controller (DIOC), and magnetic tape drive (MTD) for the SuperNode and SuperNode SE systems. The MCGM is manufacture discontinued and is replaced by the MCAM3 or the CISM.

Meridian cabinet line module (MCLM)

The MCLM cabinet houses two duplicated enhanced line modules (ELM). Each ELM has eight line drawers, which house 512 line cards. The MCLM cabinet provides 1024 single line card slots.

Meridian Cabinet Line Module-ISDN (MCLM-E)

The MCLM-E cabinet houses two duplicated ISDN line concentrating module-enhanced (LCM-E). The LCM-Es provide ISDN basic rate interface (BRI) and standard line capability. The LCM-Es provide 480 ISDN U-lines or 240 ISDN T-lines.

Meridian cabinet memory module (MCMM)

The MCMM cabinet provides memory expansion for the NT40 Core and houses a magnetic tape drive (MTD) and data store (DS).

Meridian cabinet network interface (MCNI)

The MCNI cabinet, combines ENET and LIS shelves into one cabinet. The MCNI addresses user requirements for providing networking capabilities in a singular, inexpensive package.

Meridian cabinet network module (MCNM)

The MCNM cabinet, provisioned with NT40 systems, contains two fully duplicated dual shelf network (DSN) modules.

Meridian cabinet power module (MCPM)

The MCPM cabinet provides power to the first lineup of the system through the power distribution panel (PDP). This cabinet also houses two disk drive units (DDU) and two maintenance trunk modules (MTM). The MCPM is manufacture discontinued and is replaced by the MCAM3.

Meridian cabinet remote module (MCRM)

The MCRM cabinet can interface up to 3000 remote subscriber lines to a Meridian SuperNode host, depending on traffic. The MCRM cabinet also provides an intra-calling capability, allowing calls between subscribers served by the same MCRM to be switched within that MCRM. The MCRM

is manufacture discontinued and is replaced by the Meridian cabinet remote unit (MCRU) or the Meridian cabinet remote module-ISDN (MCRM-S).

Meridian cabinet remote module-SONET (MCRM-S)

The MCRM-S cabinet replaces the replaces the ISDN version of the Meridian cabinet remote module (MCRM-I) and performs all of the existing functions of the MCRM-I with a new platform that provides an interface for future fiber optics.

Meridian cabinet remote unit (MCRU)

The MCRU cabinet can interface up to 640 remote subscribers to a Meridian SuperNode host. The MCRU provides an intra-calling capability, allowing calls between subscribers served by the same MCRU to be switched within that MCRU. In the event of a complete outage of all DS-1 links between the remote and the host, the emergency standalone (ESA) feature provides the capability to maintain basic service for remote subscribers.

Meridian cabinet service module (MCSM)

The MCSM cabinet contains eight service trunk modules (STM) having digital service circuits, such as digital recorded announcement machines (DRAM) and conference bridges. The MCSM is manufacture discontinued and is replaced by the MCAM3 or the CISM.

Meridian cabinet spares storage (MCSS)

The MCSS cabinet contains eight standard shelves where spare circuit packs can be stored. Four shelves can be mounted in the front of the cabinet, and four shelves can be mounted in the rear of the cabinet. The MCSS is manufacture discontinued and is replaced by the cabinetized miscellaneous spares storage (CMSS).

Meridian cabinet trunk module-ISDN (MCTM-I)

The MCTM-I cabinet contains up to two duplicated common peripheral controllers (CPC) that can be configured as a line trunk controller-ISDN (LTC-I), line group controller-ISDN (LGC-I), or digital trunk controller-ISDN (DTC-I).

Meridian communications adapter (MCA)

A part of data communications equipment. A single printed circuit pack (PCP) mounted within the telphone and works in conjunction with the digital interface chip also residing in the telephone. The firmware in the MCA serves as an interface between the user and the Meridian SL-100 system for establishing data calls. It allows asynchronous (110 to 19,200) ASCII terminals, personal computers, and printers to be connected to the telephone set through RS-232-C interface.

Meridian digital centrex (MDC)

A special DMS business services package that uses the data-handling capabilities of DMS-100 family offices to provide a centralized telephone exchange service. Formerly known as integrated business network (IBN).

Meridian feature transparency (MFT)

A line option that delivers the complete set of all Meridian digital Centrex (MDC) features. MFT allows a customer to convert to ISDN while retaining familiar MDC features on selected lines.

Meridian integrated conference bridge (MICB)

The MICB is an intelligent peripheral equipment (IPE) card that supports up to 32 ports. The system software must contain the automatic call distribution (ACD) features and routing software modules to support the MICB operation. Each MICB port is configured as an ACD M2616 digital telephone set. The Meridian SL-100 (MSL-100) system ACD function routes the incoming calls to the MICB, where each MICB port is treated as an ACD agent. All MICB ports belong to the same ACD queue and are treated as a pool of ports with equal status.

Meridian mail user interface (MMUI)

MMUI is Nortel Networks fully featured proprietary voice mail interface for DTMF sets available on Meridian and other-vendor switches. The MMUI interface is a command-driven voice mail interface primarily designed for business users.

Meridian power distribution center (MPDC)

When enhanced capabilities; such as the SuperNode, SuperNode SE, line peripheral processor (LPP), or intelligent peripheral equipment column (IPEC) products; are added to a new or existing Meridian SuperNode system, an external common power source (the MPDC cabinet) is required. The MPDC cabinet accepts -48 Vdc from the power board and distributes this power to the cabinet assigned. The MPDC is manufacture discontinued and is replaced by the cabinetized power distribution center (CPDC).

Meridian programmable data adapter (MPDA)

A single printed circuit pack that is mounted in the Meridian Aries digital telephone set.

message services module (MSM)

The MSM is a Nortel Networks-manufactured, central office-compliant, multi-applications voice processing system. The MSM is a highly reliable solution for medium-sized voice processing applications.

message switch (MS)

The message switch, housed in both the SuperNode and SuperNode SE systems, performs the system message functions and acts as the messaging

hub for the system. The message switch contains the following elements: 128-Mbit/sec message bus system, message switch control complex, provisionable message port interfaces, and a central system clock.

message switch buffer (MSB)

The message switch buffer is a peripheral module used along with a signaling terminal (ST) to act as an interface to and operate within a Common Channel Signaling (CCS) environment. The MSB supports the ST and routes the messages received by the ST through the network module. The MSB also receives messages from the central control (CC) and routes them to the signaling link through the ST.

message transfer part (MTP)

A CCITT No. 7 Signaling protocol that provides a connectionless transport system for carrying common channel interoffice signaling no. 6 (CCIS6) and common channel signaling (CCS7) signaling messages between user locations or applications functions. Also known as message transport part.

message waiting indication (MWI)

A change of state of an indicator (such as stuttered dial tone, a steadily lit or flashing message-waiting lamp) that informs the user that a message has been queued against the station.

metallic test access (MTA)

Metallic test access is a hardware device that provides metallic connections between test access points (for example, in subscriber line circuit) and various types of test equipment.

MF

See multifrequency.

MFT

See Meridian feature transparency.

MICB

See Meridian integrated conference bridge.

MLC

See analog message waiting line card.

MMI

See user interface.

MMUI

See Meridian mail user interface.

modular business package (MBP)
An AccessNode packaging option installed as customer premise equipment (CPE).

Modular Option (GP)
Modular Option general purpose. The Modular Option (GP) system is a Nortel-manufactured, central office-compliant, multi-applications voice processing system. The MSM is a highly reliable solution for small to medium-sized voice processing applications.

MPC
See multiprotocol controller.

MPDA
See Meridian programmable data adapter.

MPDC
See Meridian power distribution center.

MPS
See multiple priority system.

MRS/AP
See multimedia resource server.

MS
See message switch.

MSB
See message switch buffer.

MSL
Meridian Stored Logic. Used with MSL-100, a large PBX.

MSM
See message services module.

MTA
See metallic test access.

MTD
See magnetic tape drive.

MTP
See message transfer part.

MTM

See maintenance trunk module.

MTU

See multiline test unit.

Mu-Law

The PCM coding and companding standard used in Japan and North America. *See* A-Law.

multifrequency (MF)

A signaling method that makes use of pairs of standard tones to transmit signaling codes, digit pulsing, and coin-control signals. This method is used by interregister signaling on analog trunks.

multiline test unit (MTU)

The multiline test unit performs tests and measurements on subscriber lines. The MTU is connected to lines under test by the metallic test access (MTA) card.

multimedia resource server (MRS/AP)

The multimedia resource server and application processor provide the information processing and the interface to the telephony network for the OPEN IVR. MRS offers full voice processing capabilities plus advanced technologies such as speech recognition, ADSI and text-to-speech. MRS/AP uses state of the art DSP-based technology and industry standard circuit boards.

multiple appearance directory number (MADN)

A director number (DN) that appears on more than one Meridian digital centrex (MDC) station. The stations that are assigned these numbers are referred to as a MADN group. MADN groups can be configured with either single or multiple call arrangement.

multiple priority system (MPS)

A Magellan Passport system allowing the capability to manage different traffic types and allocate network resources based on application needs and business priorities.

multipoint conferencing unit (MCU)

A multipoint multimedia conferencing server. These servers can support many communication interfaces (such as ISDN BRI) and various numbers of ports. An MCU handles the multiplexing of video and audio signals among various machines.

multiprotocol controller (MPC)

A general purpose card that allows data communications between a DMS-100 switch and an external computer. The MPC card resides on the I/O controller (IOC) shelf. MPC card protocol software is downloaded from the DMS-100 CPU and then used to support software routines for data packet network (DPN) communications.

multi-vendor interface (MVI)

The interface that provides connection capabilities between the Meridian SuperNode system and switching equipment produced by other vendors, remote digital terminals (RDT), and the S/DMS AccessNode.

MVI

See multi-vendor interface.

MWI

See message waiting indication.

NAC

See network access code.

NAV

See network applications vehicle.

NEBS

new equipment building specifications

NET

See Network.

network (NET)

The Network subsystem monitors the network module (NM) and the speech links to the peripheral modules.

Network Access Code (NAC)

Canadian call management services.

network applications vehicle (NAV)

Platforms for creating and deploying interactive screen-based telephone services, flexible voice recognition, advanced call management and control, voice-activated dialing, and others.

network interface unit (NIU)

The network interface unit is a type of application specific unit (ASU) that uses DS30 links to route messages between the ASUs in the link peripheral processor (LPP) and the enhanced network (ENET).

network management (NWM)

Network Management provides controls that can be applied through the MAP workstation to maintain optimum transmission capacity and to offset the effects of traffic variations or component failures.

network message controller (NMC)

Each network module (NM) contains a network message controller that exchanges messages with the central control complex (CCC) and the peripheral module through the central message controller (CMC) in NT40 systems. In SuperNode systems, the NMC exchanges messages with the computing module (CM) and the peripheral module through the message switch (MS) bus.

network message service (NMS)

An optional network interface for Meridian mail host offices. NMS encourages centralized voice processing service provisioning by allowing message service to be provided to an entire city or local access and transport area (LATA) from a centralized Meridian mail messaging node. NMS provides the means for incoming CCS7 signaling trunks to be terminated on the SMDI link handler (thereby enabling the pass-through of called and calling directory number (DN) information). Each Meridian mail messaging node serving subscriber mailbox lines also requires NMS to deliver message waiting using CCS7.

network module (NM)

Network modules are a main functional area of the Meridian SuperNode system. The NM components of the network are duplicated as two parallel sets (Plane 0 and Plane 1) of the two-way transmission paths for each connected channel between the peripheral modules (PM).

network termination 1 (NT1)

An access point for basic rate interface (BRI) to ISDN. This component is situated on customer premises an is typically located between the terminals and the exchange termination. An NT1 is required when ISDN lines are terminated by U-line cards.

nibble

A byte has eight bits. A nibble is four bits, or one half of one byte.

NIU

See network interface unit.

NM

See network module.

NMC

See network message controller.

NMS

See network message service.

Nortel Networks technical publication (NTP)

An NTP is a document that contains descriptive information about Nortel Networks hardware or software modules and performance-oriented practices for installing, testing, and maintaining the system. NTPs are often supplied as part of the standard documentation package provided to a customer.

NT1

See network termination 1.

NTP

See Nortel Networks technical publication.

NWM

See network management.

OM

See operational measurement.

OPC

See originating point code.

OPM

See Outside plant module.

originating point code (OPC)

A Common Channel Signaling 7 (CCS7) term defining the address of a signaling point that generated the message.

OPEN IVR

OPEN IVR is one of the two IVR products that can be used with both DMS and non-DMS switches. Open IVR is a stand-alone product that provides a number of network interfaces and independent voice ports that allow for connection to a wide variety of switches.

operational measurement (OM)

System performance is constantly and automatically recorded by the Operational Measurement system. The measurements are stored in OM registers, either individually every time an event occurs (a peg count) or on the basis of a scan that is conducted at regular intervals, regardless of the time of occurrence of the event (a usage measurement).

Optivity Telephony Manager for Meridian SL-100, 2.0

Optivity Telephony Manager is a graphical user interface (GUI)-based management platform for the MSL-100 product . The Optivity Telephony Manager for Meridian SL-100 product was formerly referred to as Switch Manager.

OSP

See outside plant (OSP) cabinet.

outside plant (OSP) cabinet

An AccessNode packaging option installed as an RFT.

outside plant module (OMP)

A stand-alone weatherproofed enclosure equipped to connect from two to six DS-1 links from a line group controller (LGC) at a host office and up to 640 locally connected subscriber lines. n OPM consists of one line concentrating module (LCM), a remote maintenance module (RMM), a host interface equipment (HIE) shelf, a power supply, environmental control equipment, and a cable cross-connection for up to 1280 pairs.

PCI

personal communication interface

PCL

product CM loads.

PCM

See pulse code modulation.

PDP

See power distribution panel.

PEPS

See peripheral equipment power supply.

peripheral equipment power supply (PEPS)

A PEPS card resides on each intelligent peripheral equipment (IPE) shelf. The PEPS provides power to the IPE shelf and regulates all the voltages required by the cards on its shelf.

peripheral module (PM)

A peripheral module refers to all hardware or modules of the system that provide interfaces between the network module and external line, trunk, or service facilities. A PM contains peripheral processors, which perform local routines, thus relieving the load on the central processing unit (CPU).

peripheral processor (PP)

Each peripheral module (PM) has a peripheral processor function that performs local processing action within its PM and controls the flow of messages between itself and the central control complex (CCC) for NT40 systems or the computing module (CM) for SuperNode and SuperNode SE systems. This independent action by the PP relieves the CCC or CM of routine local processing.

permanent virtual circuit (PVC)

A continuously available virtual path between remote applications and DMS applications. The PVC eliminates the need to establish a circuit on an each call basis.

personal information manager (PIM)

A format directory in which multiple phone and data numbers, address, company, title, and a memo for details can all be stored for easy retrieval.

PHG

personal hazard ground

PIM

See personal information manager.

PM

See peripheral module.

power distribution panel (PDP)

The power distribution panel supplies power to a maximum of 11 cabinets in the lineup, including the cabinet in which the PDP resides. The PDP resides in both the Meridian cabinet power module (MCPM) and the Meridian cabinet auxiliary module phase 3 (MCAM3).

power supply module (PSM)

Each SuperNode dual plane combined core (DPCC) cabinet contains a power supply module at both ends of each shelf. Each PSM consists of one +5 V/80 A and one -5 V/20 A power converter circuit packs.

PP

See peripheral processor.

PPSN

See public packet switching network.

PRI

See primary rate interface.

primary rate interface (PRI)

An interface that carries nB+D channels over a digital DS-1 facility (23B+D in North America and 30B+D in Europe). PRI is used to link private networking facilities, such as private branch exchanges (PBX), local area networks (LAN), and host computers with a standardized architecture acting as the bridge between private switching equipment and the public network. Formerly known as primary rate access. A PRI card provides the physical interface to the DS-1 for the MSL-100.

program store (PS)

The program store module contains the program instructions required by the central processing unit (CPU) for call processing and maintenance and administrative tasks.

PS

See program store.

PSM

See power supply module.

PTS

per trunk signaling. A conventional telephony method of signaling that multiplexes the control signal of a call with voice or data over the same trunk.

public packet switching network (PPSN)

A common carrier network designed to carry data in the form of packets between public users.

pulse code modulation (PCM)

Pulse code modulation is a form of modulation in which the modulating signal is sampled and the sample quantized and coded, so that each element of information consists of different kinds or numbers of pulses and spaces.

PVC

See permanent virtual circuit.

PVP

See permanent virtual circuit.

RCC

See remote cluster controller.

RCC2

See remote cluster controller 2.

RDLM

See remote digital line module.

RDT

See remote digital terminal.

read-only memory (ROM)

ROM is a solid state memory device that has information permanently written into the memory during manufacture.

Ready to Send (RTS)

A configurable MCA data call option. When the RTS is on, the MCA force the RTS lead active and assumes the local DTE is always ready to transmit or receive data. There is no flow control. Turning RTS allows RTS/CTS hardware flow control handshaking.

remote cluster controller (RCC)

A dual-shelf peripheral module that provides a master controller for all units at the remote switching center (RSC) and is, in turn, controlled by the host line trunk controller (LTC).

remote cluster controller 2 (RCC2)

A remote cluster controller (RCC) for the remote switching center-SONET (RSC-S). The RCC2 is an enhanced RCC that provides the central control of the RSC-S. It is connected to the host by metallic or fiber connections. The RCC2 is a single-shelf peripheral module (PM) that provides the same functions for all units at the RSC.

remote digital line module (RDLM)

A peripheral module developed to allow the MSL-100 system to interface with the M2000 series of digital telephones.

remote digital terminal (RDT)

A multi-vendor interface access remote or S/DMS AccessNode remote.

remote fiber terminal (RFT)

A FiberWorld network element that is the Nortel Networks version of a remote digital terminal. The RFT terminates subscriber lines and multiplexes them onto a synchronous optical network SONET facility.

remote maintenance module (RMM)

A peripheral module (PM) with a configuration similar to the maintenance trunk module. An RMM accommodates up to 12 service and test cards.

remote office test line (ROTL)

The remote office test line is part of the centralized automatic trunk testing system. The ROTL schedules and performs transmission and signaling tests on trunk circuits between offices.

remote switching center (RSC)

A remote common peripheral module (CPM) that provides an interface with a large number of analog lines, digital trunking, or both at a remote location. The RSC also handles remote-off-remote connections from other remote sites.

remote switching center-SONET (RSC-S)

An enhanced version of the RSC. The RSC-S is a remote common peripheral module (CPM) peripheral that provides all the functions and features of the existing RSC, but with increased capacity and the option of fiber optic connectivity.

RFT

See remote fiber terminal.

RMM

See remote maintenance module.

ROM

See read-only memory.

ROTL

See remote office test line.

RSC

See remote switching center.

RSC-S

See remote switching center-SONET.

RTS

See Ready to Send.

SCA

See single call arrangement.

SCAI

See switch-to-computer application interface.

SCC

See SuperNode combined core.

SCCP

See signaling connection control part.

SCP

See service control point.

SCU

See system control signal unit.

SDL

See signaling data link.

selective call forwarding (SCF)

An incoming call management feature that allows subscribers to define a special list of telephone numbers and remote destination numbers. Calls that terminate on a station with SCF are forwarded only if the originating station directory number matches one of the defined numbers.

service control point (SCP)

A node in a common channel signaling 7 (CCS7) signaling network that supports application databases. The function of an SCP is to accept a query for information, retrieve the requested information from one of its application databases, and send a response message to the originator of the request.

service switching point (SSP)

A DMS-100F/DMS SuperNode switching system equipped with signaling capabilities can originate or terminate CCS7 messages and queries to network service control points (SCP).

service trunk module (STM)

The service trunk module, provisioned in both the Meridian cabinet service module (MCSM) and Meridian cabinet auxiliary module phase 3 (MCAM3) cabinets, provides conference bridges and other digital service circuits, such as the enhanced digital recorded announcement machine (EDRAM). (EDRAM can be provisioned only in STM in the MCAM3 cabinet.)

Siemens KNS-4100 System

A PBX manufactured by Siemens that is used primarily in Europe.

signal processing node (SPN)

A node on the MSM that is used for signal processing. SPNs handle all voice processing and is associated with a storage module to hold user data. SPNs are paired for reliability through redundancy.

Signaling Connection Control Part (SCCP)

A level of Common Channel Signaling 7 (CCS7) layered protocol. It supports advanced services such as E800 and service switching point (SSP) and the automatic calling card service (ACCS) feature. The main functions of the SCCP include the transfer of signaling units with or without the use of a logical signaling connection and the provisioning of flexible global title translations (GTT) for different applications.

signaling data link (SDL)

A bidirectional transmission path for signaling. An SDL consists of two data channels operating together in opposite directions at the same data rate. It constitutes the lowest functional level (level 1) of CCITT no. 6 signaling (N6), common channel interoffice signaling no. 6 (CCIS6), and common channel signaling 7 (CCS7) hierarchies.

signaling point (SP)

A node in a Common Channel Signaling (CCS7) network that originates, terminates, or transfers signaling messages from one signaling link (SL) to another.

signaling terminal (ST)

The signaling terminal is the hardware that performs error checking, coding, and decoding of signaling messages.

signaling transfer point (STP)

A node in a CCS7 network that routes messages between nodes. STPs transfer messages between incoming and outgoing signaling links but, with the exception of network management information, do not originate or terminate messages. STPs are deployed in pairs. If one STP fails, the mate takes over, ensuring that service continues without interruption.

Simple network management protocol (SNMP)

Although SNMP was designed as the transmission control protocol's (TCP) stack network management protocol, it can now manage virtually any network type and has been extended to include non-TCP devices such as 802.1 Ethernet bridges. SNMP is widely deployed in TCP/IP (transmission control protocol/internet protocol) networks, but actual transport independence means it is not limited to TCP/IP. In 1991, Microsoft started referring to SNMP as SubNetwork Access Protocol. In November of 1993 Cisco Systems announced that its internetwork routers will support version 2 of SNMP. Nortel Networks uses SNMP in its MAT GUI product (feature AX0377).

Simplified message desk interface (SMDI)

The simplified message desk interface (SMDI) is a standardized protocol used to connect a voice mail system to a switch. The MSM base

configuration includes a single SMDI link through a single internal modem or a redundant internal modem pair.

single call arrangement (SCA)

An option that allows only one station to be active, either originating or terminating calls, on a multiple appearance directory number (MADN).

single point ground (SPG)

The point at which the isolated bonding network is connected to the common bonding network. The SPG is usually the copper bar serving as the grounding electrode or its extension.

single shelf link peripheral processor (SSLPP)

An alternative to a full link peripheral processor (LPP) where the number of link interface unit (LIU7) application specific units (ASU) desired does not make the full LPP a cost effective option or offices lacking floor space near the core processor makes it impossible to install an LPP cabinet.

SLM

See system load module.

SMA

See subscriber carrier module-100 access

SMA2

See subscriber carrier module-100 access, second version

small remote unit (SRU)

A small integrated services digital network ISDN line concentrating module whose hardware and software are based on the DMS-100 switch series-II peripherals.

SMDI

See simplified message desk interface.

SMDR

See station message detail recording.

SMU

See subscriber carrier module-100 urban.

SNA

System network architecture.

SNMP

See simple network management protocol.

SNSE

See SuperNode space enhanced.

SPN

See signal processing node.

SONET

See synchronous optical network.

special tone receiver (STR)

The special tone receiver is a digital signal tone processing tone receiver for applications that are characterized by per call, long holding time (30+ second) receiver requirements. Examples of this type of receiver are Reorigination and Blue Box Fraud detection.

Spectrum peripheral module (SPM)

The SPM is a trunking peripheral with OC-3 optical interface and improved signal processing capacity. It is a multi-application high-speed Meridian SuperNode peripheral platform with a flexible modular and highly reliable architecture.

SP

See signaling point.

SPC

See stored program controller.

SPG

single point ground

SPM

See Spectrum peripheral module.

SRU

See small remote unit.

SSLP

See single shelf link peripheral processor.

SSP

See service switching point.

ST

See signaling terminal.

station message detail recording (SMDR)

Station message detail recording records details of billable and non-billable calls for each business group.

STM

See service trunk module.

stored program control (SPC)

Control of an automatic switching arrangement in which the call processing is determined by a program stored in an alterable memory.

STP

See signal transfer point.

STR

See special tone receiver.

subscriber carrier module-100 access (SMA)

The LTC based DMS peripheral that provides common signaling channel/embedded operations channel (CSC/EOC) link management, DS-1 facility management, and the interface to the DMS-core component.

subscriber carrier module-100 access, second version (SMA2)

The digital interface between a Meridian SuperNode and a multi-vendor interface remote digital terminal or an S/DMS AccessNode.

subscriber carrier module-100 Urban (SMU)

A subscriber carrier module that provides an interface between the remote carrier urban (RCU) of a DMS-1 switch and the central office (CO) of a DMS-100 Family switch.

SuperNode combined core (SCC)

The SCC cabinet provides the SuperNode SE core. This cabinet differs from a standard SuperNode cabinet in that the SCC combines the two message switch (MS) shelves into one shelf and combines the computing module (CM) and system load module (SLM) shelves into a single shelf.

SuperNode space enhanced (SNSE)

The SuperNode space enhanced (SuperNode SE) is a scaled-down version of the standard SuperNode core and is designed to serve smaller offices with a maximum of 20,000 lines. The SNSE system is also referred to as Meridian 1 Option 201.

SVC

See switched virtual circuit.

switch-to-computer application interface (SCAI)

Switch-to-computer application interface (SCAI) is a protocol standard set by the ANSI T1S1 committee. Meridian SCAI (also referred to CompuCALL) is Nortel's implementation this emerging standard. Meridian SCAI provides a SCAI signaling channel between the Meridian SuperNode and a customer site host computer. This signaling channel exchanges information between the customer's host computer and the Meridian SuperNode to enhance call processing.

switched virtual circuit (SVC)

A logical end-to-end connection for data communications made through a data packet network (DPN). An SVC is established dynamically.

Synchronous Optical Network (SONET)

SONET is a standard for optical transport that defines optical carrier levels and their electrically equivalent synchronous transport signals.

system control signal unit (SCSU)

A control signal in CCITT No. 6 signaling that is used to transmit changeover, load transfer, and standby-ready signals.

system load module (SLM)

The system load module is the mass storage system used for storing office images and for booting new loads or stored images into the computing module (CM). The SLM resides in both the dual plane combined core (DPCC) and the SuperNode combined core (SCC) cabinets.

T1

A digital transmission link with the capacity of 1.544 MBps (1,544,000 bits per second). T1 handles 24 voice conversations, each one digitized at 64 Kpbs. T1 is the standard for digital transmission in the United States, Canada, Hong Kong, and Japan. In Europe, T1 is called E1.

TAPI

See telephony application programming interface.

TBB

transmission bonding bar.

TBR

Talk Battery Return.

TCAP

See Transaction Capabilities Application Part.

TCM

time compression multiplexing.

TDM

time division multiplexing.

TDMA

time division multiplexing accessing.

Technical Assistance Service (TAS)

Technical Assistance Service, offered by Nortel Networks on a dial-up basis, provides assistance to system maintenance personnel if a problem arises that cannot be corrected by normal procedures.

telephony application programming interface (TAPI)

An industry standard (led by Microsoft) for CTI-based applications serving as a critical building block for wide-scale development and implementation of CTI applications at the desktop A programming interface for direct links between desktop computers and key telephone systems or PBX.

text messaging system (TMS)

A text messaging system uses a visual display unit with a keyboard to provide a message desk agent with an incoming call information display, a text entry facility to record messages, and a text retrieval facility to display all the messages for a user.

TMS

See text messaging system.

transmission test trunk (TTT)

The transmission test trunk is a facility used by the trunk test position to provide circuitry for performing loss and noise measurements.

Transaction Capabilities Application Part (TCAP)

A service that provides a common protocol for remote operations across the Common Channel Signaling 7 (CCS7) network. The protocol consists of message formatting, content rules, and exchange procedures. TCAP provides the ability for the service switching point (SSP) to communicate with a service control point (SCP). TCAP is used by the ISDN layer facility message to transport service information for transaction signaling, not associated with an active call, over primary rate interface (PRI) links.

transmission test unit (TTU)

The Transmission test unit is a digital signal processor used to perform transmission measurements on lines and trunks.

trunk test position (TTP)

The trunk test position handles four levels of testing:

- diagnostic test, performed by the diagnostic test process
- monitor level test, which allows all trunks to be monitored in both talk path directions
- test line tests, performed by the test line process
- manual test connections, performed by the TTP process

TS

time switch

TTP

See trunk test position.

TTT

See transmission test trunk.

TTU

See transmission test unit.

tuple

A field within a data schema table. Tuples are accessed and updated using an editor on a MAP workstation.

user administration terminal (UAT)

A secondary MSM administration terminal that is used to perform user administrative functions but not system administrative functions.

UBC

uniform building codes

UEM

See universal equipment module.

UNI

user network interface.

universal equipment module (UEM)

The universal equipment module provides the framework for housing the intelligent peripheral equipment (IPE) module.

universal tone receiver (UTR)

The universal tone receiver is an optional peripheral module (PM) card. The UTR is a 32-channel tone receiver. Thirty channels detect a variety of tones including dual-tone multifrequency (DTMF) for lines and multifrequency

(MF) for trunks. The UTR identifies tones and sends the results to the signaling processor.

UTR

See universal tone receiver.

variable call detail recording (VCDR)

A billing platform that collects comprehensive NSS call details on a per IBN customer group basis and allows the NSS customer to select one or more formats for their billing records. Replaced in MSL-100 release MSL07 with SMDR.

VCDR

See variable call detail recording.

VDU

See visual display unit.

VISIT interface unit (VIU)

The standalone hardware interface between the telephone and the computer.

visual display unit (VDU)

A VDU is an electronic output device that presents data to a terminal user in the form of a television picture. In the Meridian SuperNode system, the VDU is one of the components of the MAP workstation and, along with a keyboard, provides the main user interface to the switch.

VIU

See VISIT interface unit.

VMS

See voice messaging system.

VMUIF

See voice messaging user interface forum.

Voice messaging user interface forum (VMUIF)

A self-contained, menu-driven call answering and voice messaging interface. It is the Industry Information Association's (IIA) recommended user interface for public network call answering. VMUIF can be set up to receive and send composed messages, provide the user with simple call answering capabilities or full voice messaging functionality.

voice messaging system (VMS)

A voice messaging system is an automated recording device that automatically stores and plays back a caller's voice message. The message

is transmitted exactly as it was delivered, without the intervention of a human agent.

X.25/X.75/X.75' link interface unit (XLIU)

The XLIU is a type of application specific unit (ASU) that is used for DMS packet handler applications.

XLIU

See X.25/X.75/X.75' link interface unit.

XPM

See XMS-based peripheral module (XPM).

XMS

See extended multiprocessor system (XMS)

XMS-based peripheral module (XPM)

The generic name for peripheral modules (PM) that use the Motorola 68000 microprocessor. An XPM has two processors in a hot-standby configuration: a master processor (MP) and a signaling processor (SP).

XNET

Also called IT1000. A technology designed to transport large data streams while simultaneously providing transport for analog voice and/or CLASS services over existing installed base wiring. Designed to provide higher speed data services using established twisted pair phone lines to customers. This service addresses the rapidly expanding home office and internet access markets.

XSM

See extended system monitor.

Meridian SuperNode

Meridian SL-100

Product Guide

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Information is subject to change without notice. Nortel Networks reserves the right to make changes in design or components as progress in engineering and manufacturing may warrant.

This equipment has been tested and found to comply with the limits for a Class A digital device pursuant to Part 15 of the FCC Rules, and the radio interference regulations of the Canadian Department of Communications. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at the user's own expense. Allowing this equipment to be operated in such a manner as to not provide for proper answer supervision is a violation of Part 68 of the FCC Rules, Docket No. 89-114, 55FR46066.

The MSL-100 system is certified by the Canadian Standards Association (CSA) with the Nationally Recognized Testing Laboratory (NRTL).

This equipment is capable of providing users with access to interstate providers of operator services through the use of equal access codes. Modifications by aggregators to alter these capabilities is a violation of the Telephone Operator Consumer Service Improvement Act of 1990 and Part 68 of the FCC Rules.

This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numerique de la classe A respecte toutes les exigences du Reglement sur le materiel brouilleur du Canada.

YEAR 2000 READINESS DISCLOSURE

This information was originally published prior to October 19,1998. The foregoing legend applies retroactively in accordance with the U.S. Year 2000 Information and Readiness Act and on an ongoing basis.

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