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Meridian SL-100

Product

Guide

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NORTEL NETWORKS™

Meridian SL-100

Product

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September 2001

Version 18.01, Preliminary, MSL17. This version removes service and features information, as this is described in more detail in the *Meridian SL-100 Application Planning Guides*.

May 2001

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

Contents

About this document

Purpose and audience

This document describes the hardware components, operation, and software of the Meridian SL-100 system. It is part of the documentation package that supports Nortel Networks Meridian SL-100 products. This document applies to all Meridian SL-100 offices. The audience for this document is anyone requiring an introduction to the Meridian SL-100.

Structure

This document contains the following sections:

- **Introduction** – introduces the Meridian SL-100, it components, and cabinet structure.
- **General functions** – describes the Meridian SL-100 system functionality, network modules, peripheral modules, and maintenance and administration structure.
- **Cabinet modular hardware** – provides detailed descriptions of all the currently available cabinet options.
- **System configuration** – provides information about the available system configurations.
- **System performance** – provides requirements for power consumption, floor loading, and temperature and humidity.
- **System software** – describes how the software is made up of individual processes that perform the functions necessary for system operation.
- **Maintenance and administration system** – provides detailed information about the Maintenance and Administration Position (MAP).
- **Remote access** – describes the capability for serving analog and digital telephone sets and data terminals at a physical location remote to the host Meridian SL-100.
- **List of terms** – contains acronyms and abbreviations of terms used in this document.

How to check the version and issue of this document

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

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

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

FOR MORE INFORMATION

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

References in this document

This 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 General Description*
  - *Meridian SL-100 Feature Description Manual*
  - *Meridian SL-100 Hardware Description 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 Routine Maintenance Procedures*
  - *Meridian SL-100 Intelligent Peripheral Equipment (IPE) Reference Manual*

- *Meridian SL-100 ISDN PRI Reference Manual*
- *Meridian SL-100 Meridian 1 Interworking Services Guide*

- DMS-100 manuals
  - *DMS-100 Family Provisioning Manual*
  - *DMS-100 Family Peripheral Modules*
  - *DMS SuperNode Technical Specification*
  - *RSC Maintenance Manual*
  - *MDC Simplified Message Desk Interface Setup and Operation*
  - *Small Carrier Module-100 Urban Maintenance Manual*
  - *Simplified Message Desk Interface Setup & Operation*
  - *Basic Translations Tools Guide*
  - *Non-Menu Commands Reference Manual*
  - *Menu Commands Reference Manual*
  - *Common Channel Signaling 7 Maintenance Reference Guide*
  - *Common Channel Signaling 7 Services Guide*
  - *Input/Output System Reference Manual*
  - *DMS-100 Family Hardware Description Manual*

Introduction

The Meridian SL-100 or 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 “General functions” on page 21.

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 (PMs) 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 “General functions” on page 21.

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.

General functions

The Meridian SuperNode system consists of the functional areas illustrated and described in this chapter, 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 two-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 1 on page 23 and Figure 2 on page 24, 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 1 on page 23) 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 1
Functional areas of the Meridian SuperNode system (one of duplicated planes)

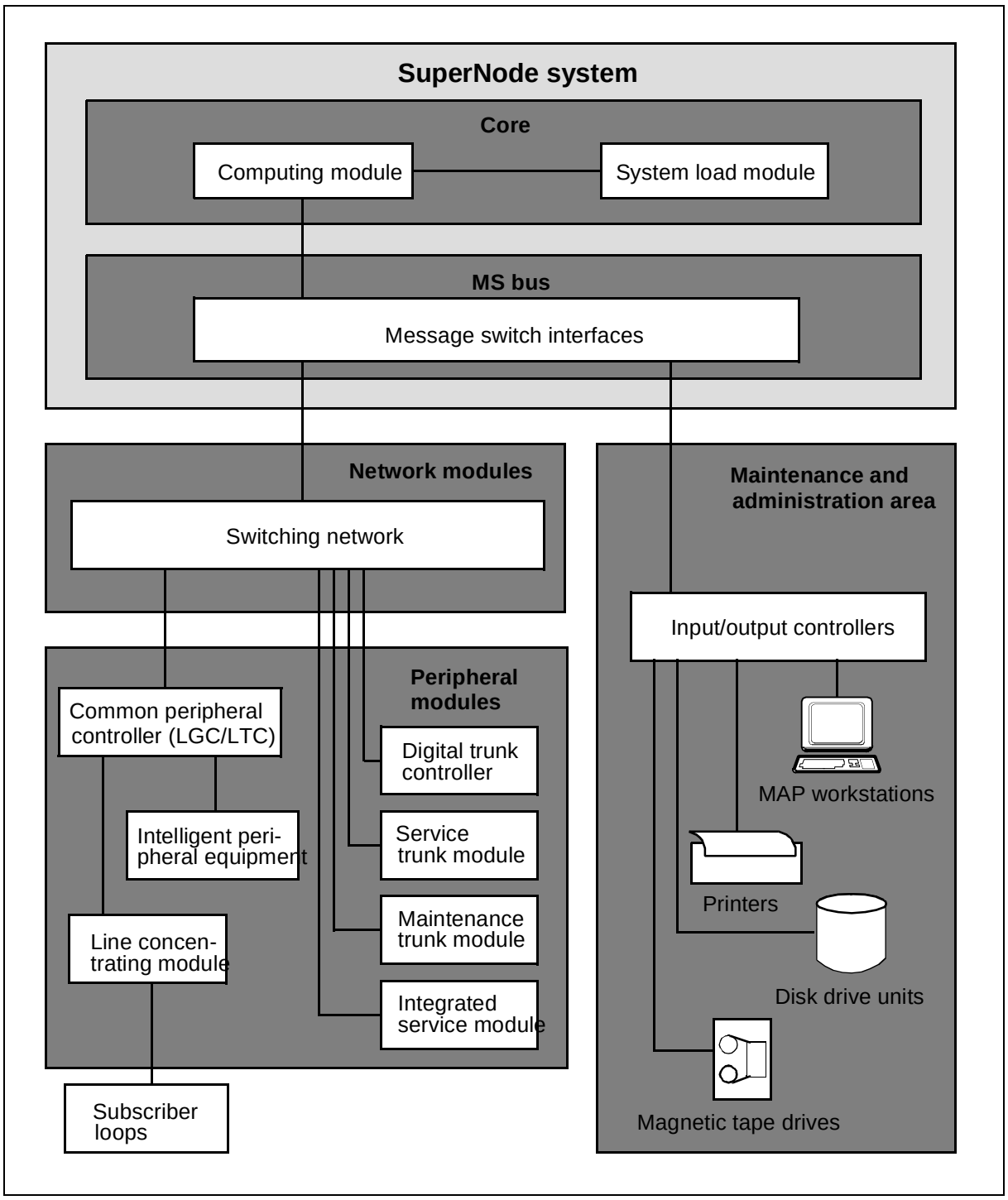
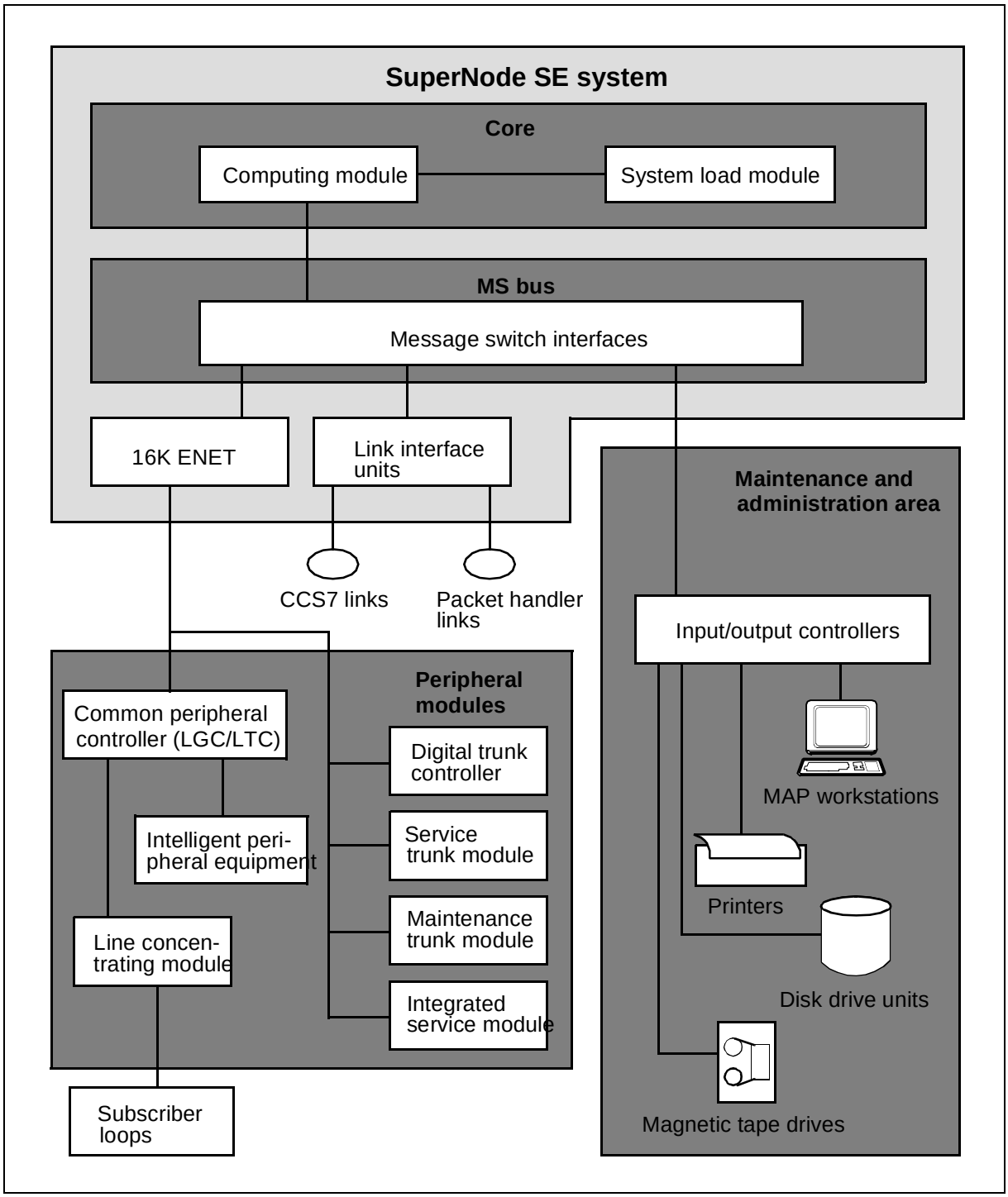


Figure 2
Functional areas of the Meridian SuperNode SE system with internal 16K ENET and optional LIUs (one of duplicated planes)



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

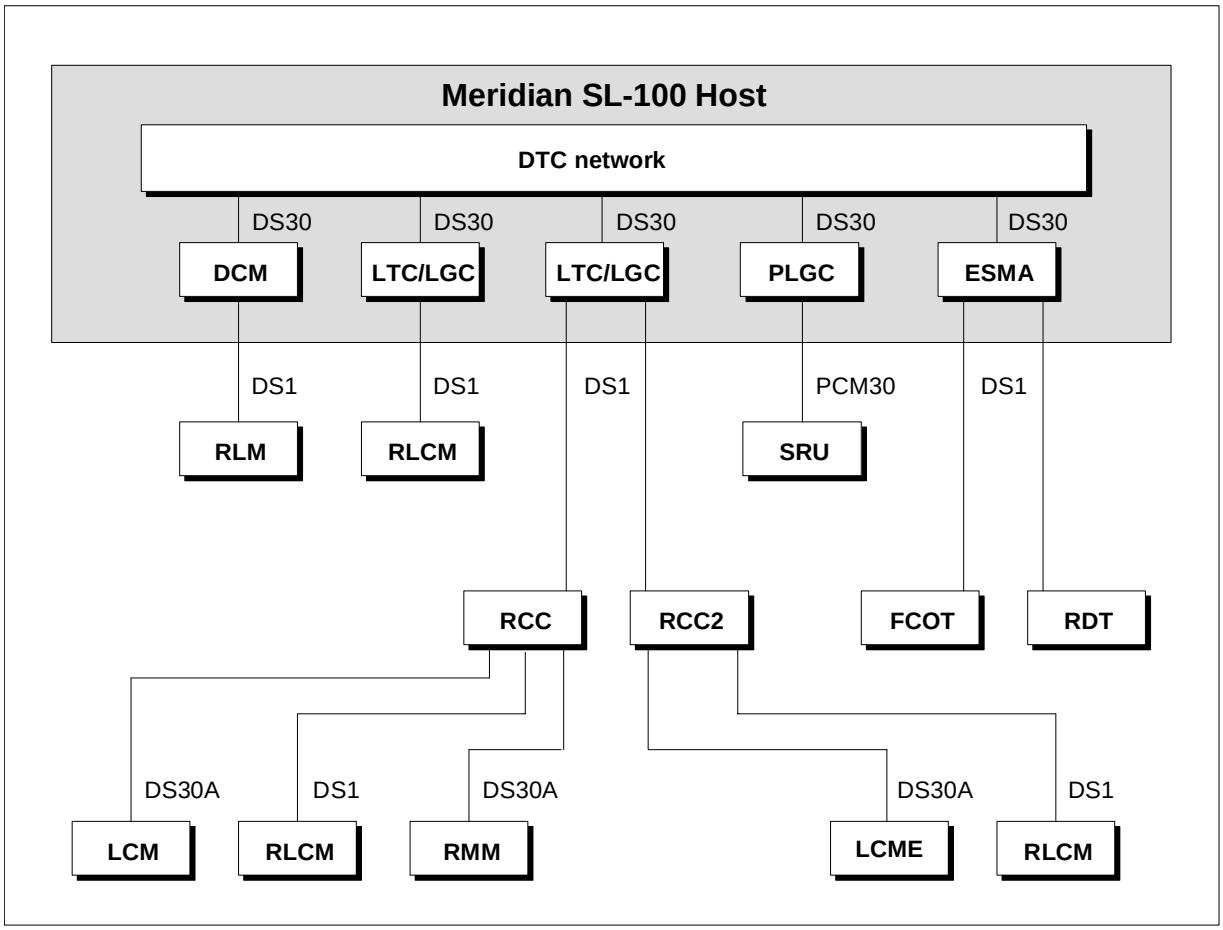
The network module (NM) is one of the main functional components of the Meridian SuperNode system that connects to the MS bus. Figure 3 on page 26 is an illustration of the NM and Figure 4 on page 27 is an illustration of the NM using the enhanced network (ENET).

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 3
Functional areas of the Meridian SL-100 network module



Junctored network

Multi-stage time switching

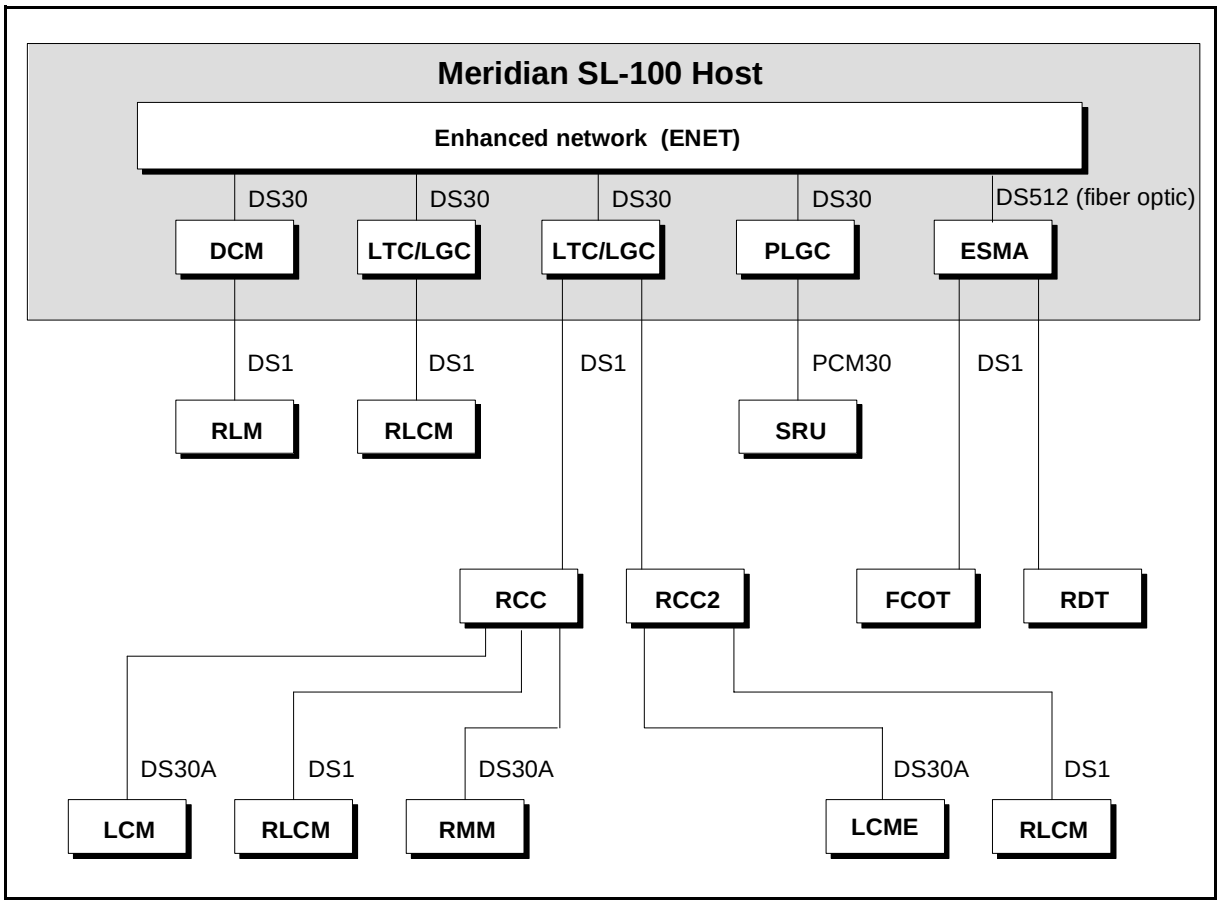
The junctored network employs four stages of time switching for each voice connection between the originating PM and the terminating PM. The paths for each connection through the network are controlled by the central processing unit (CPU). The network also distributes the control messages to and from 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 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 5 on page 32 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)

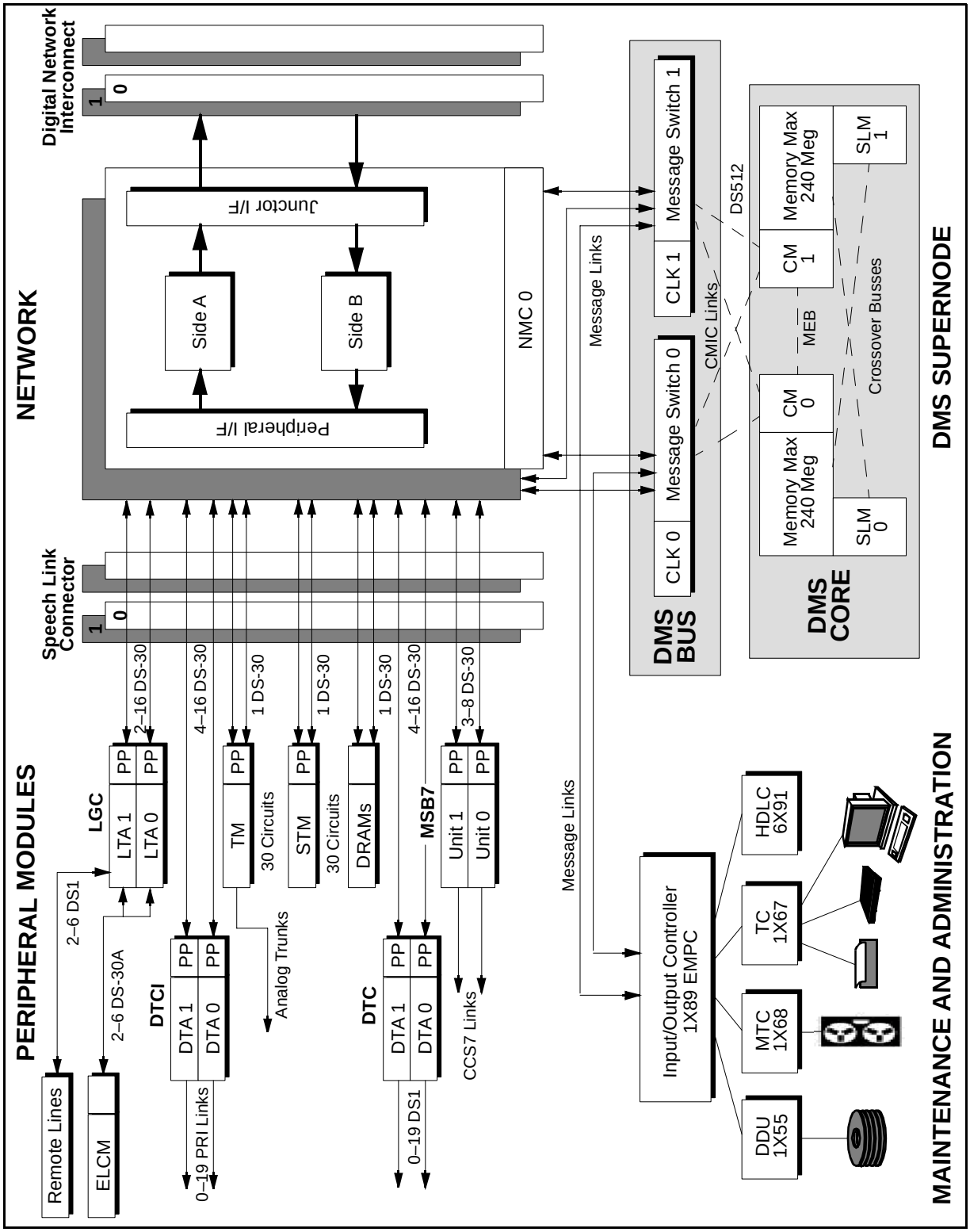
Series II peripherals

Series II peripherals are 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.

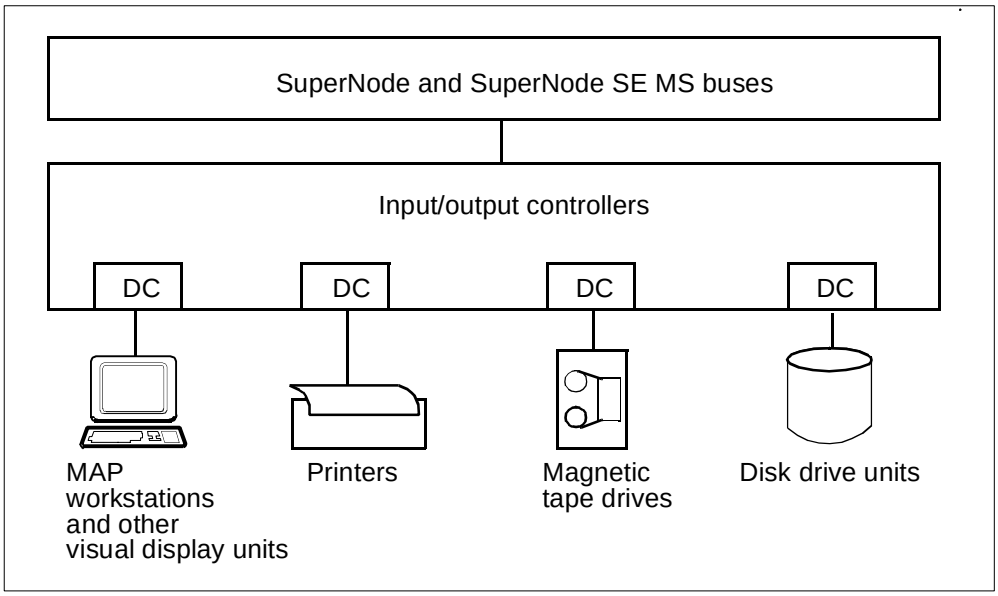
Input/output controllers

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 6 on page 34.

- 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 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: “Maintenance and administration system” on page 117 provides details on Meridian SuperNode maintenance, line maintenance, trunk maintenance, administration subsystems, the access control system, and emergency assistance.

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.

The table that follows provides a list of the MD and end of life cabinets and their replacements.

Table 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)

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 1
Meridian cabinets update (Sheet 2 of 3)

Cabinet name	Manufacture discontinued	End of life	New	Replacement
Meridian Cabinet Peripheral Maintenance (MCPM)	X			Meridian Cabinet Auxiliary Module phase 3 (MCAM3)
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 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 chapter 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 chapter 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 chapter 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 available 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 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

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

Cabinet or column	Height	Width	Depth	Weight
ENET	72 in	42 in	28 in	1600 lb
	180 cm	106.7 cm	71.1 cm	725.7 kg
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

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

Cabinet or column	Height	Width	Depth	Weight
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
	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.

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 “System configuration” on page 95 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.

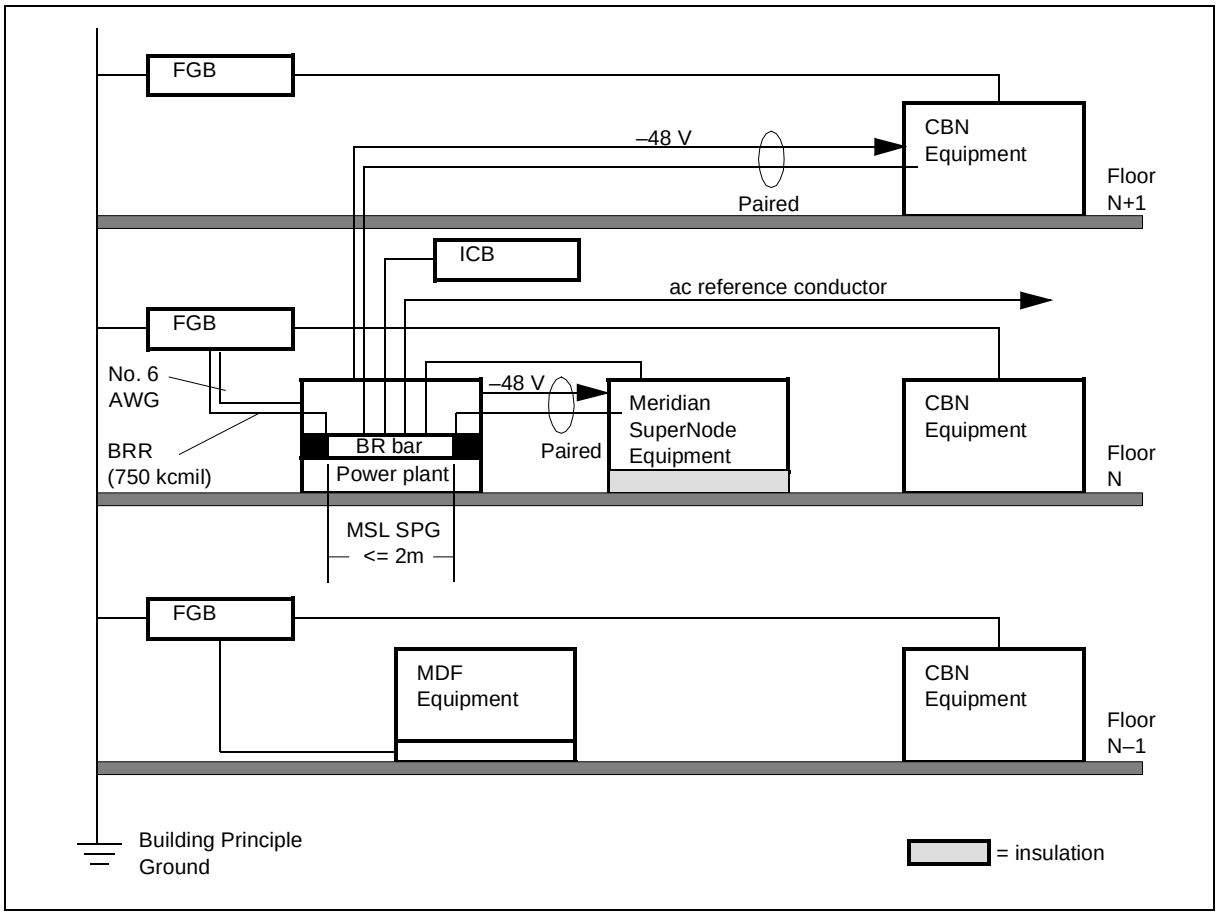
Power plant configuration

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 is 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 7
Power plant topology



System grounding and bonding

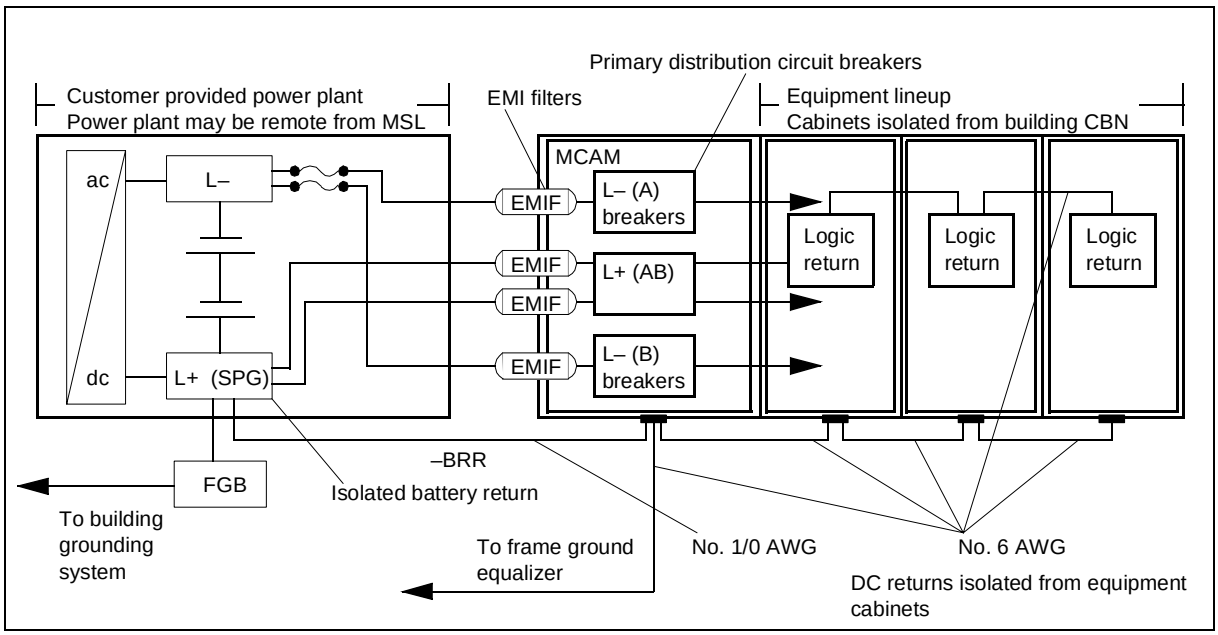
The figure that follows shows a typical configuration, grounding the system with all cabinets bonded together and connected to the building principle ground (BPG). This illustration shows the system connected to a single, building principle ground. The grounding design for the cabinets fully isolates 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.

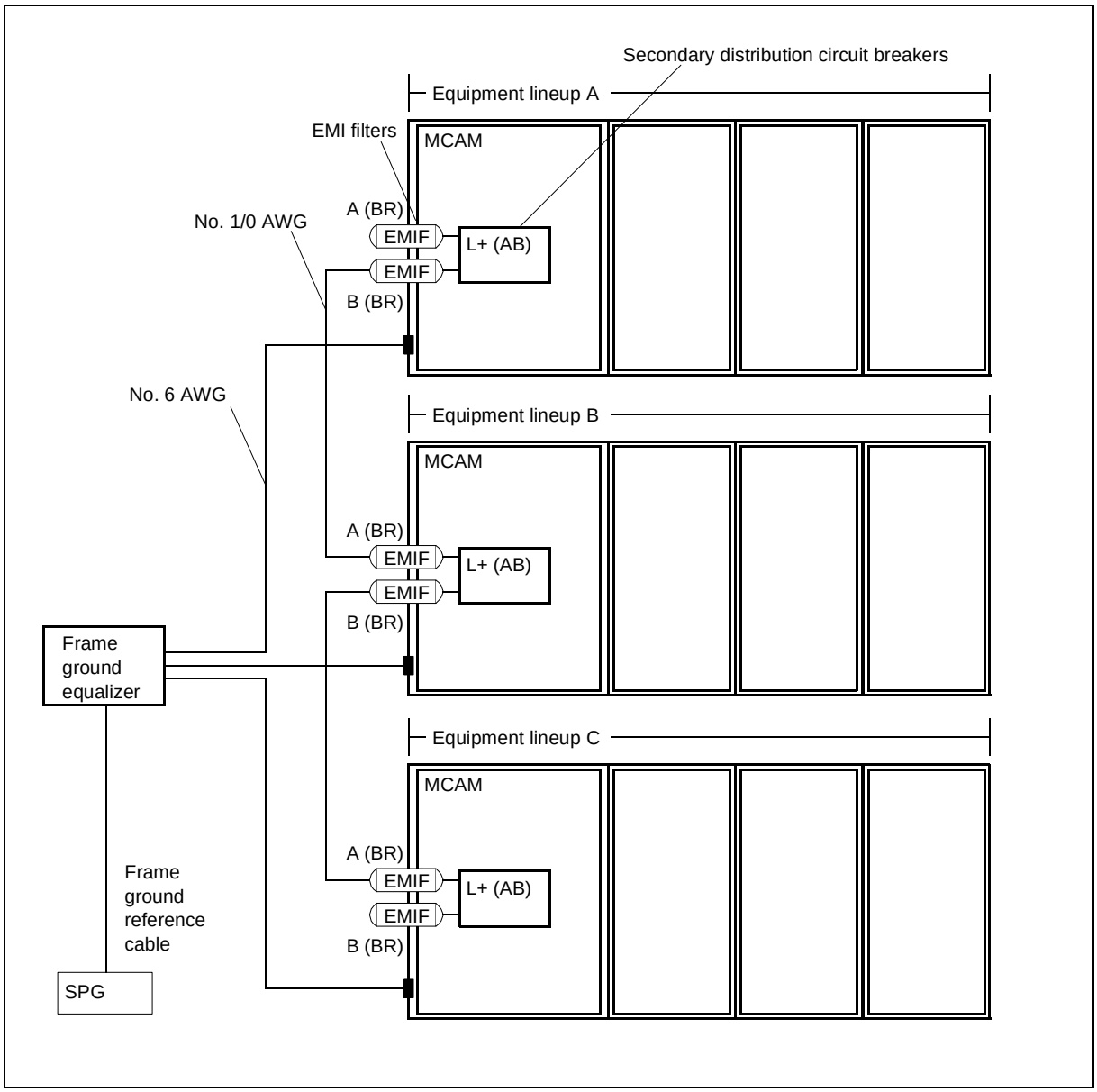
- All LRs are daisy chained and referenced to the BR plate of the MPDC or MCAM3 in the lineup.
- Intra- and inter-system communication is dc-isolated.
- The lineups are physically isolated from the building using adequate insulation.

Figure 8
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.

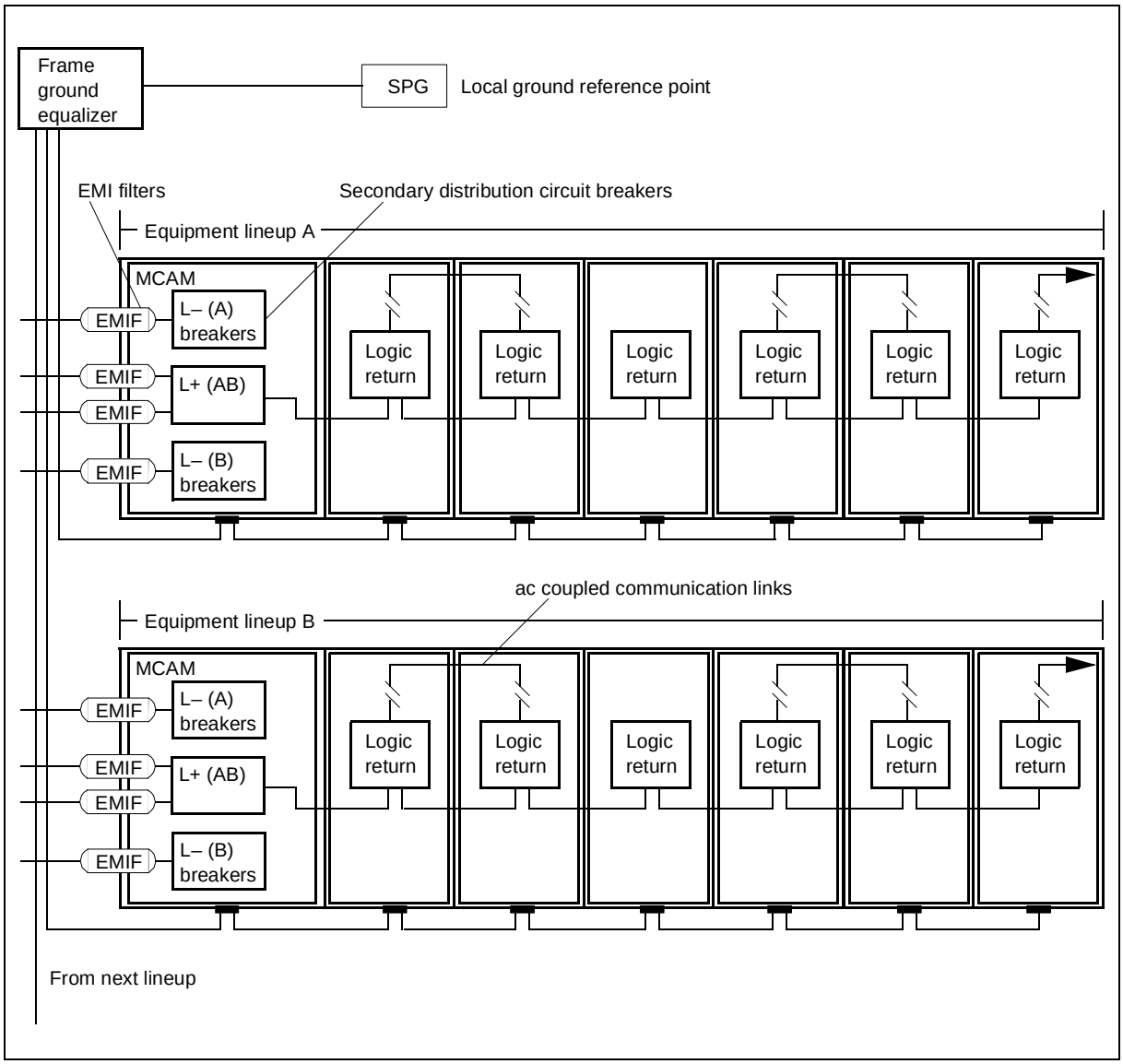
Figure 9
Frame ground and battery return connections



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 10
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 collocated 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 Unit (MCRU)
- Meridian Power Remote Module-SONET (MCRM-S)

For more illustrations and detailed information on IPECs, refer to the *Intelligent Peripheral Equipment (IPE) Reference Manual.*

For system lineup details, see “System configuration” on page 95.

Figure 11
Core and memory expansion cabinets

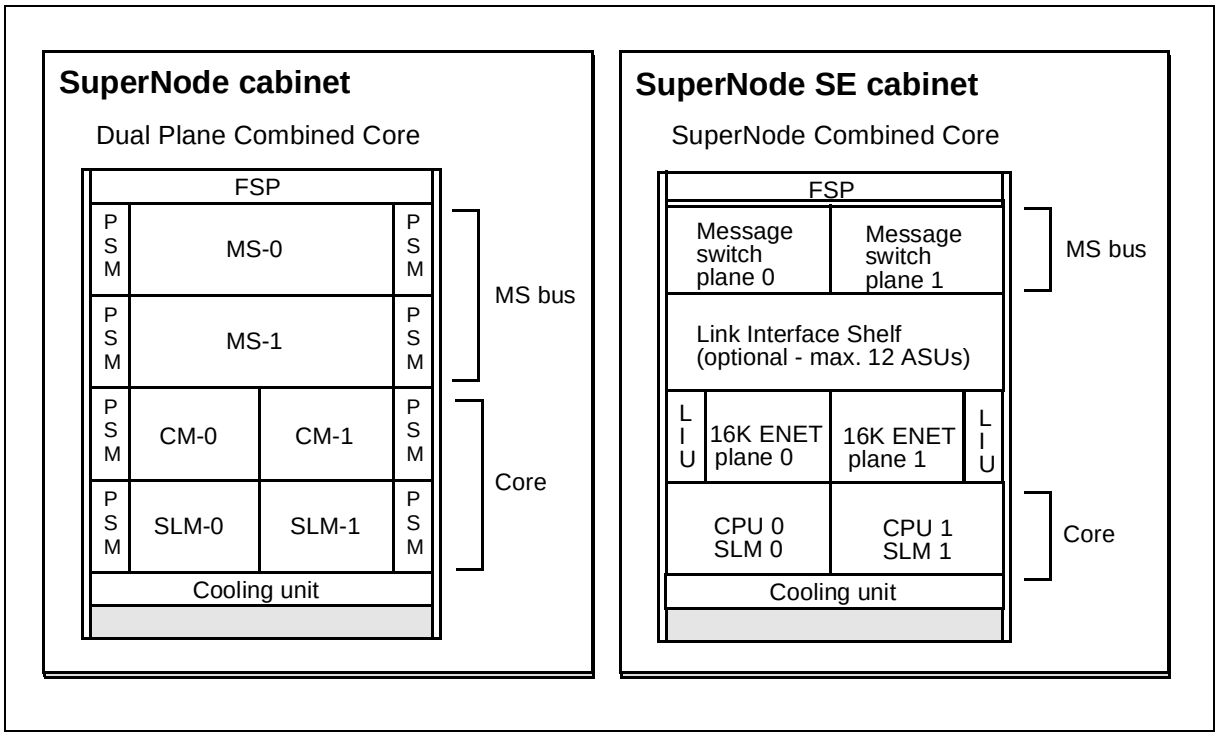


Figure 12
Peripheral cabinets

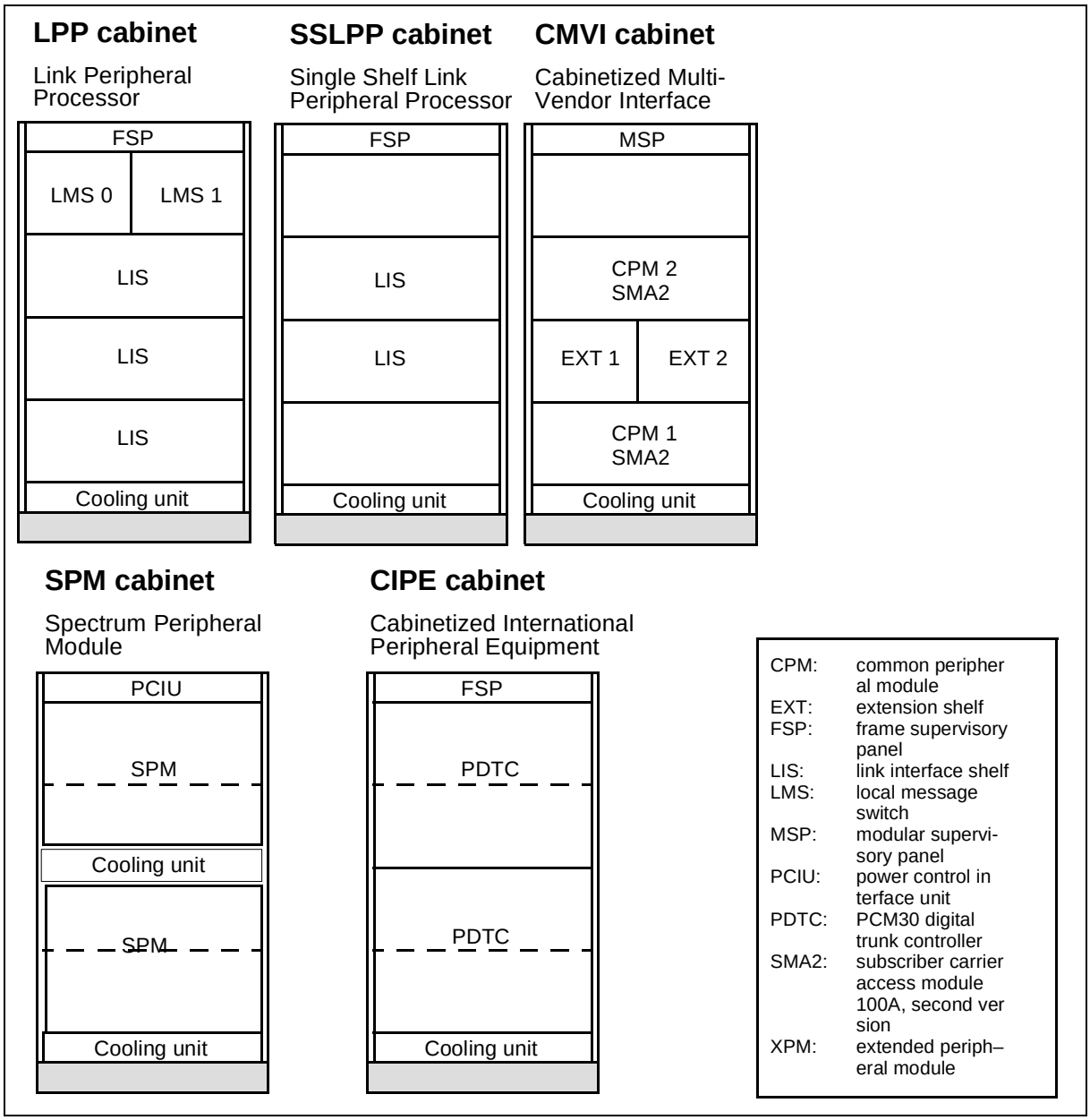


Figure 13
Trunk cabinets

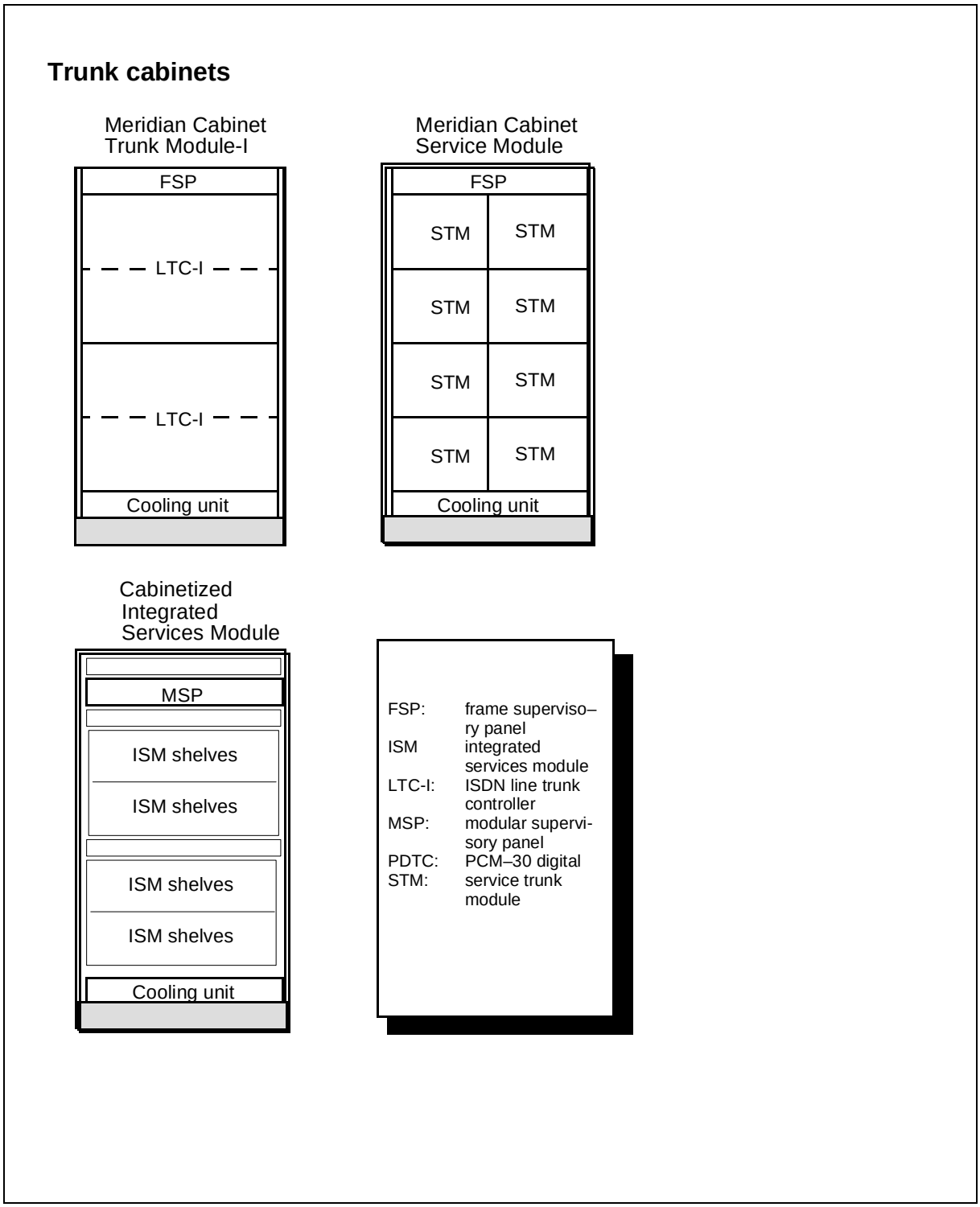


Figure 14
Line cabinets

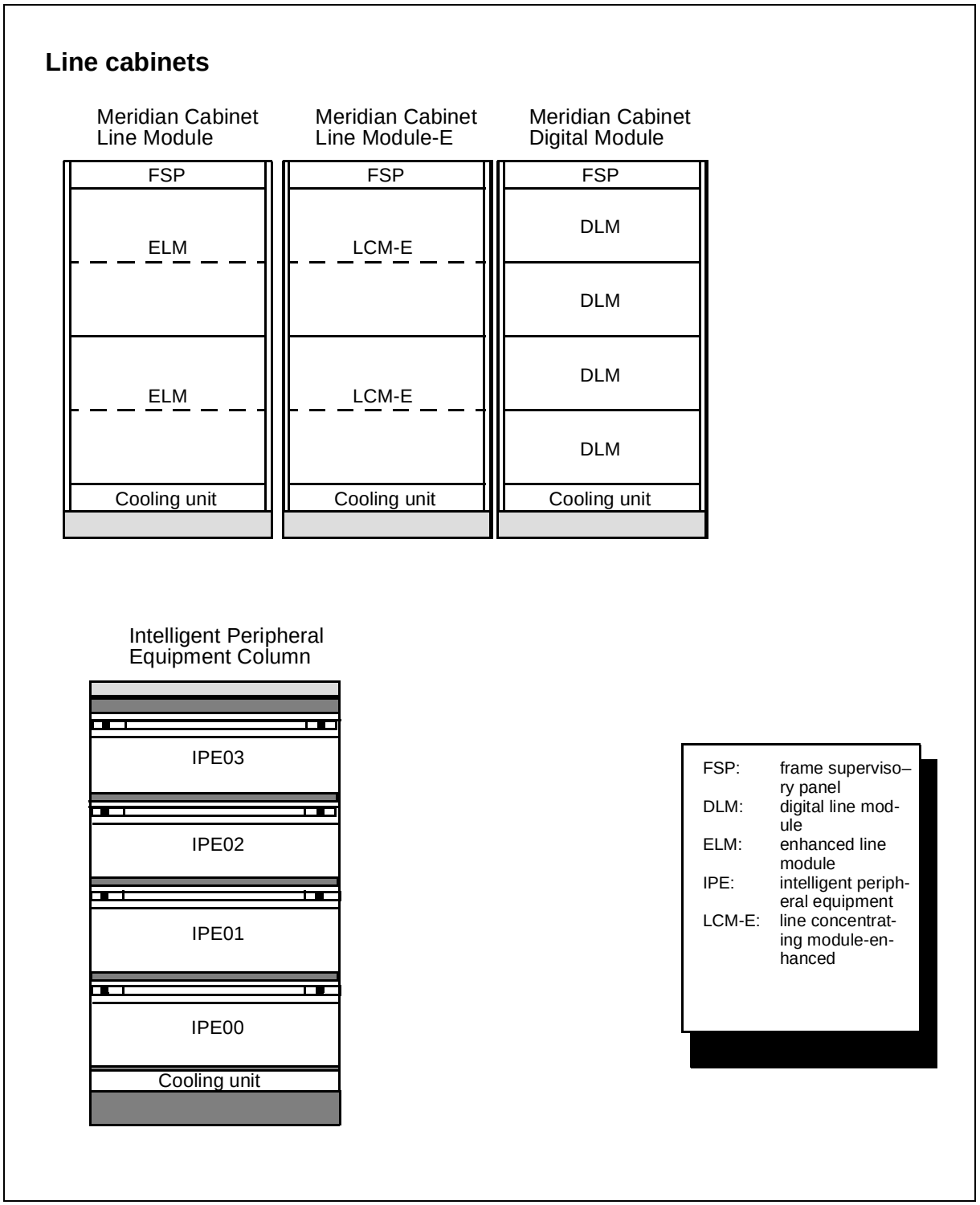


Figure 15
Network cabinets

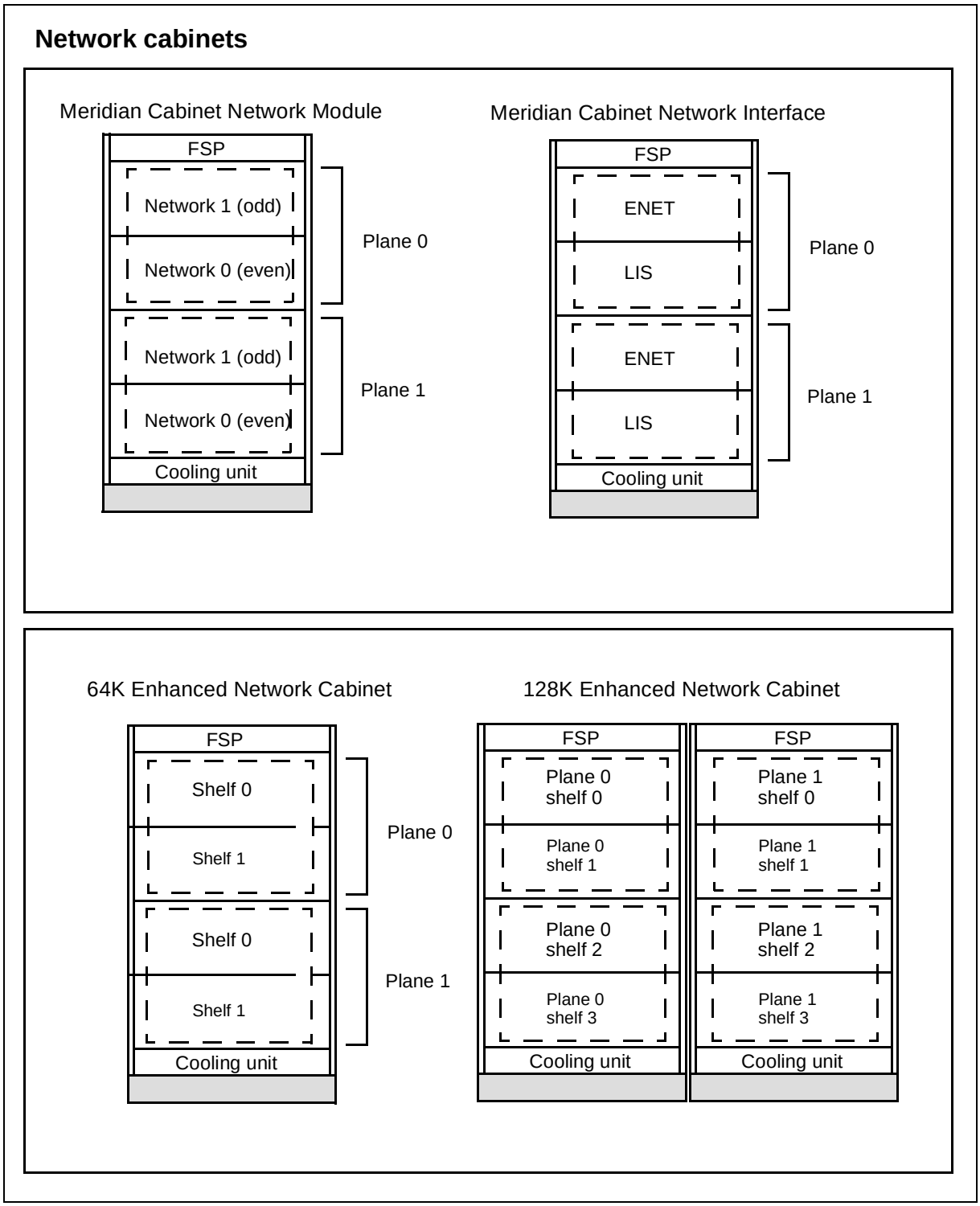


Figure 16
Maintenance and administration cabinets

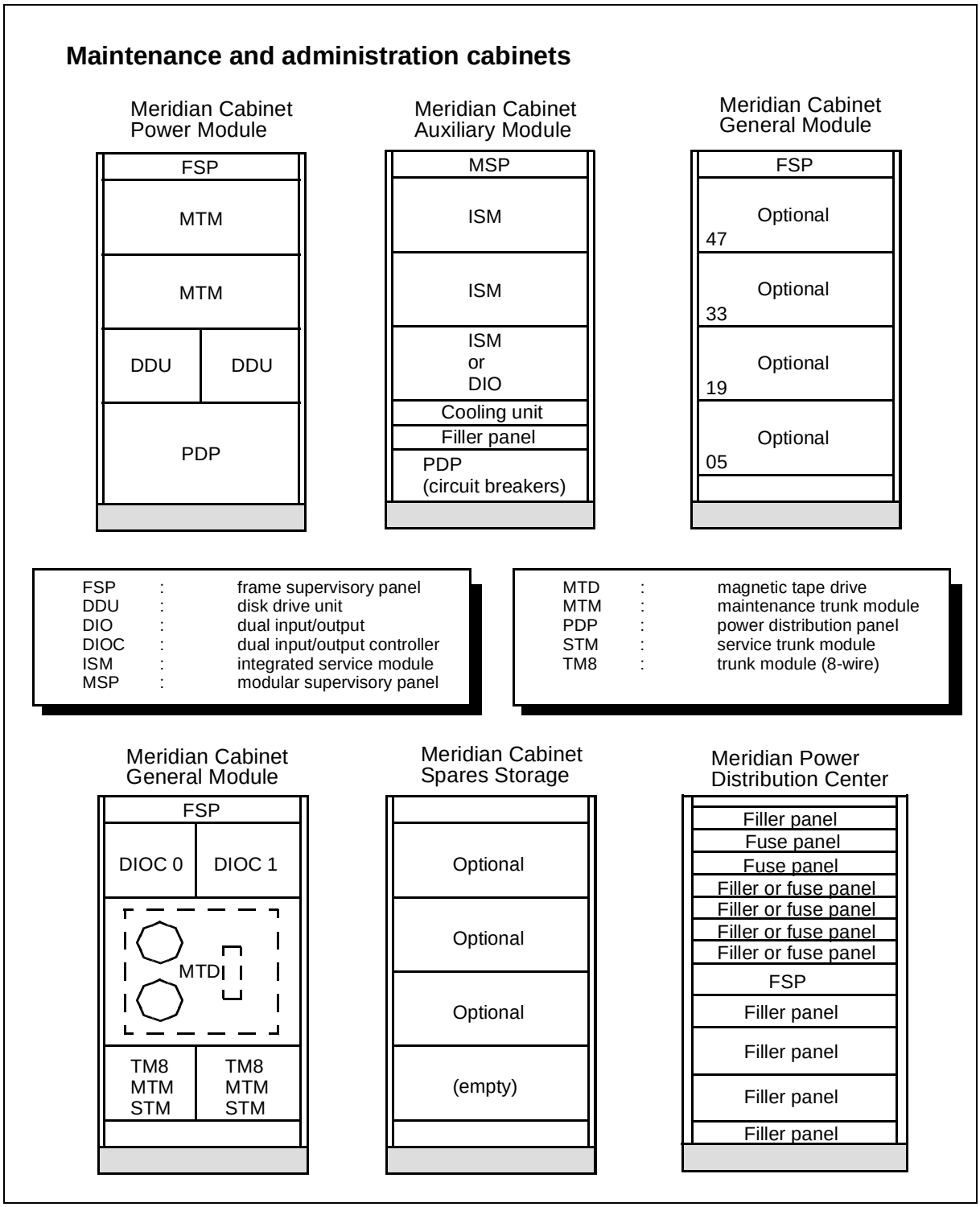
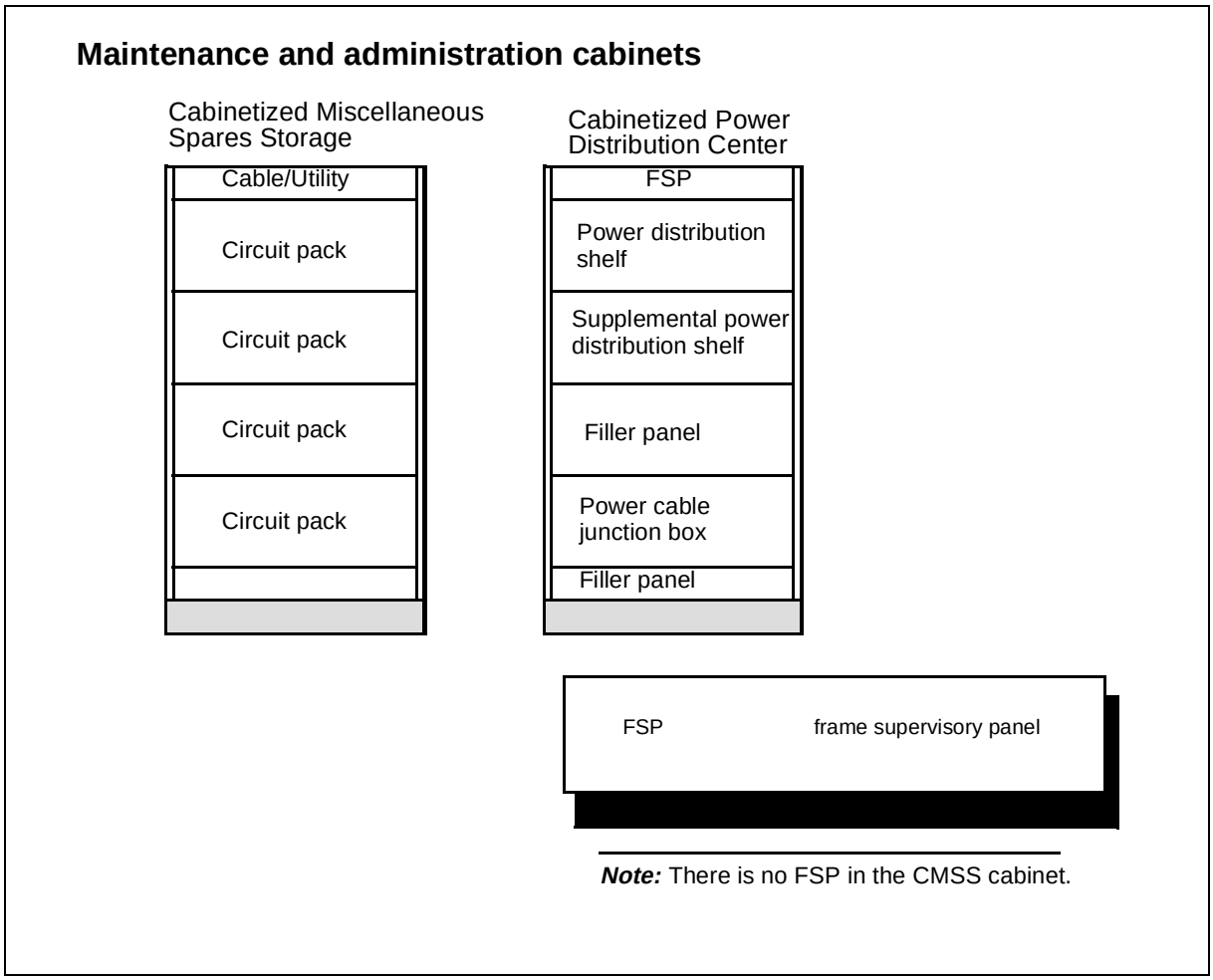


Figure 17
Maintenance and administration cabinets (2)



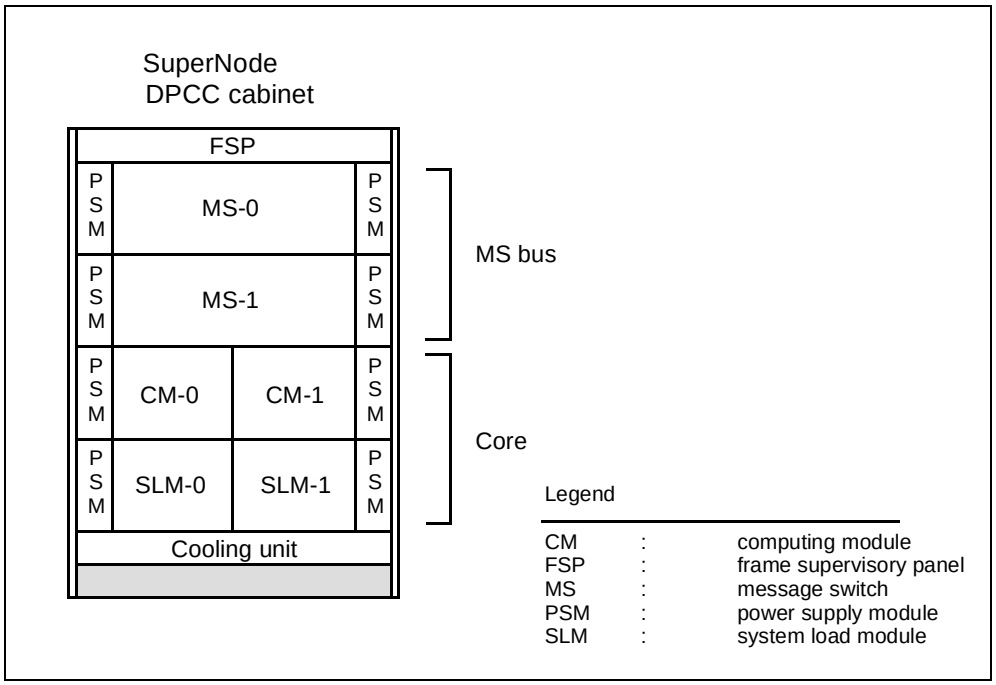
SuperNode cabinet module

The SuperNode Dual Plane Combined Core (DPCC) consists of four shelves, as shown in Figure 18 on page 59. 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 18
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 card.

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 cards

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 card.

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 “Maintenance and administration cabinet modules” on page 86.

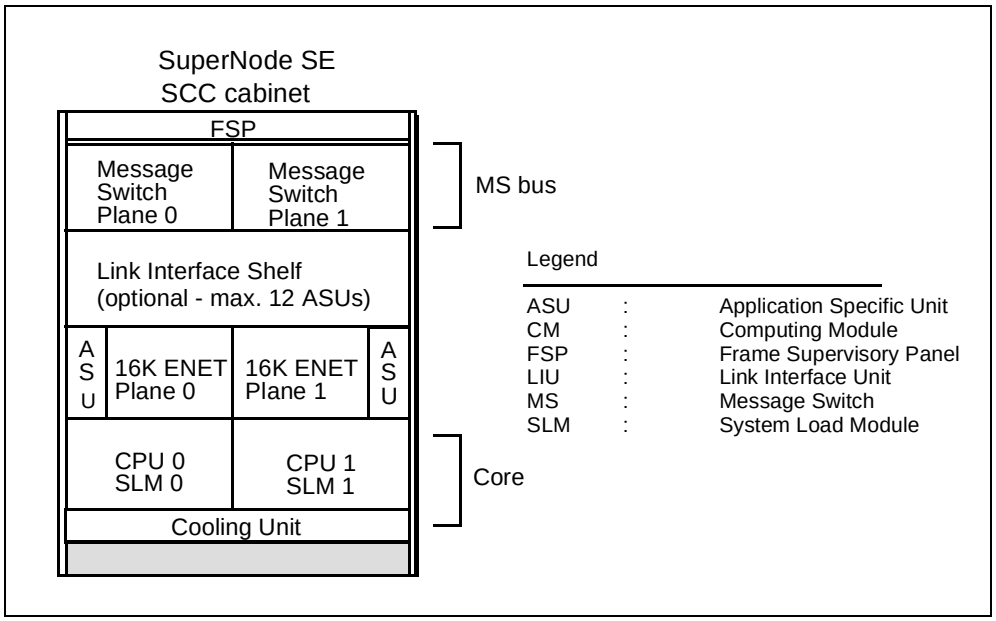
SuperNode SE cabinet

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 19
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 two 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 “System configuration” on page 95.

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.

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 20 on page 64) or a 128k ENET dual-cabinet consisting of one cabinet serving as plane 0 and a second cabinet serving as plane 1 (see Figure 21 on page 64). All cabinets are provisioned with four ENET shelves, an FSP, and a cooling unit. ENET cards are installed in the shelves as needed.

Figure 20
64K single-cabinet ENET components

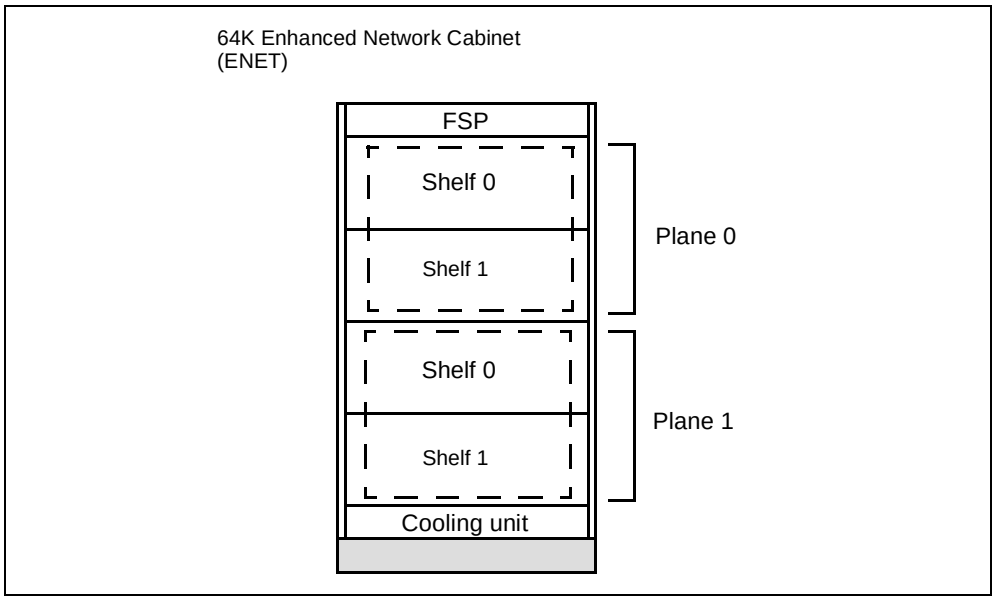
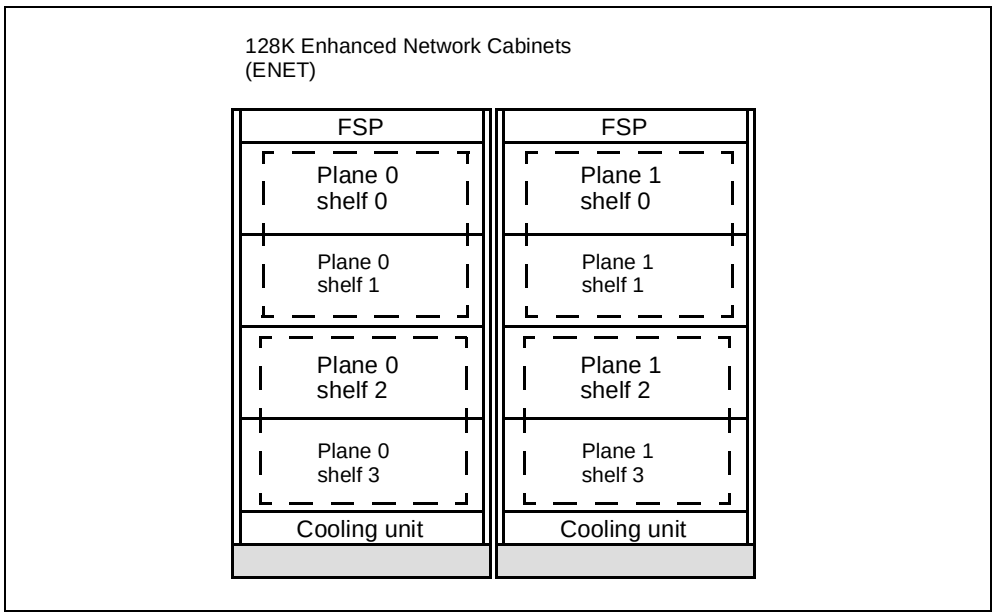


Figure 21
128K dual-cabinet ENET components



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 cards. 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 "Maintenance and administration cabinet modules" on page 86.

Note: For detailed information on ENET, refer to the *DMS SuperNode Product Guide* and *Peripheral Modules.*

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:

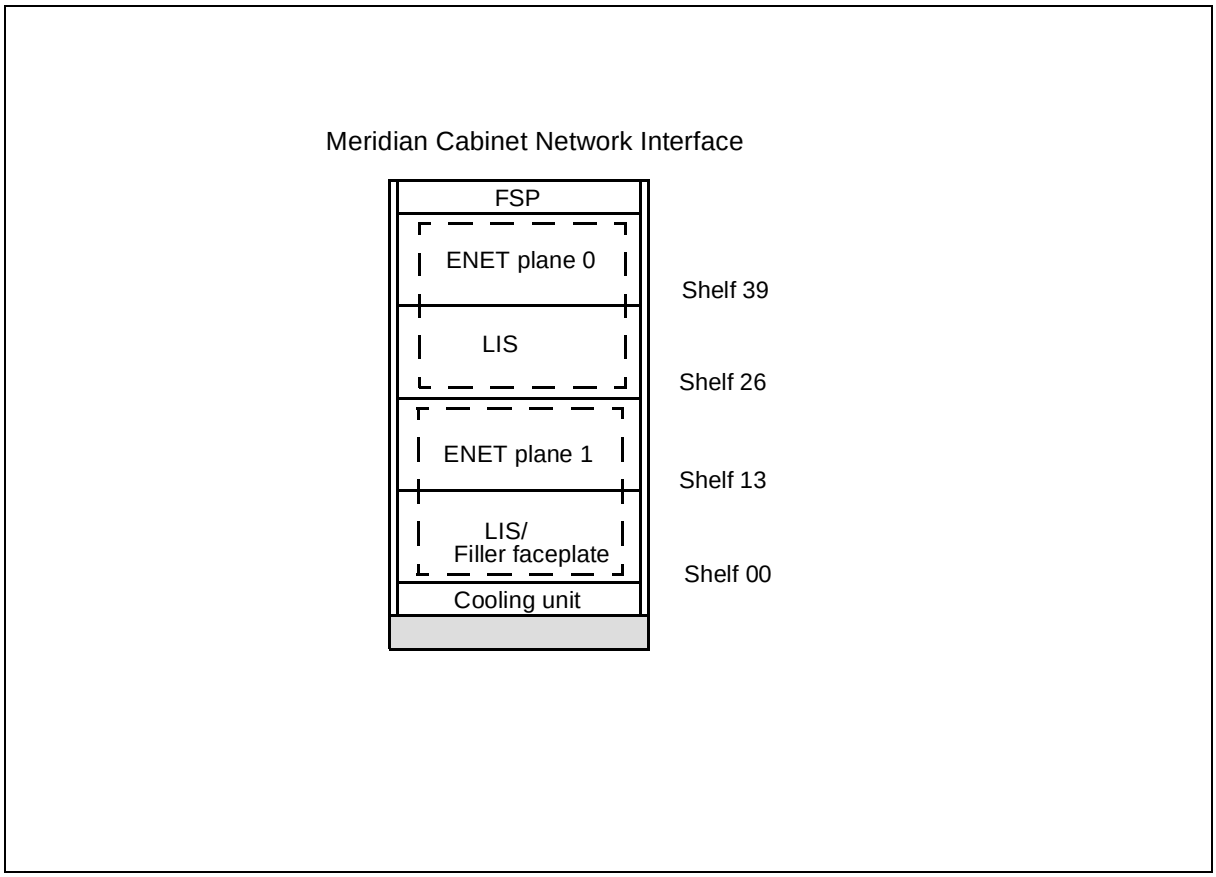
- users who have a 32K enhanced network (ENET) cabinet and wish to add the capability of a fiberized link interface shelf (FLIS), and the variety of features it makes possible. This is provided by NTYA05UK.
- users who wish to replace their junctured network (JNET) systems with a 32K ENET and acquire FLIS capability in one cabinet can 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 “Enhanced network” on page 62 and “Link peripheral processor” on page 76, respectively. The following figure illustrates the MCNI components.

Figure 22
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 cards. The LTC-I is used in Figure 23 on page 69, which shows the MCTM-I components. The components of this cabinet module are described in subsequent paragraphs.

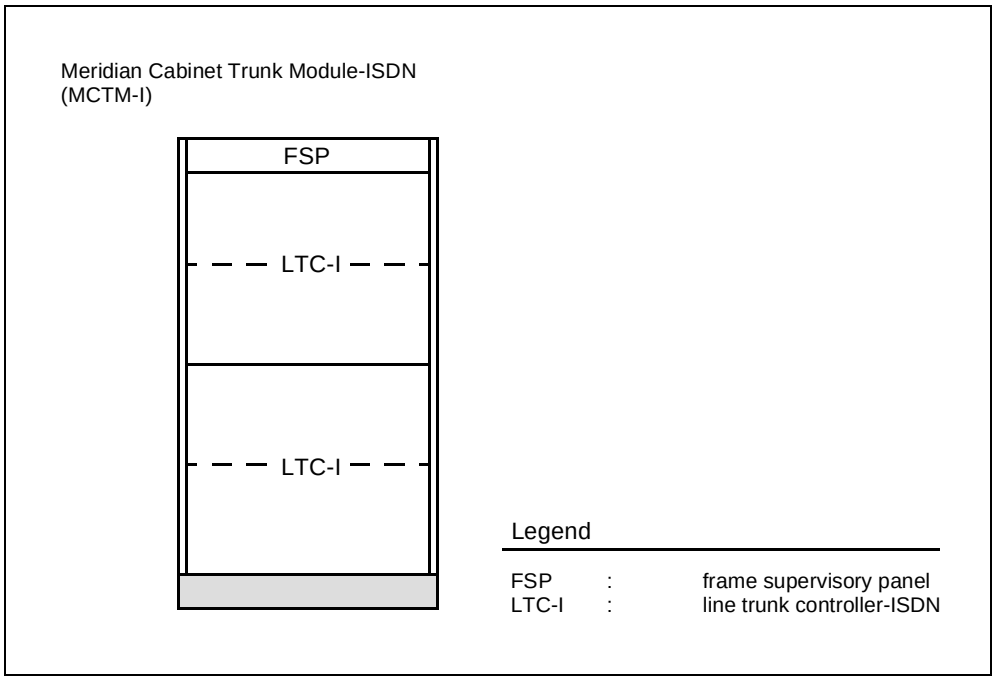
Line trunk controller-ISDN

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 23
MCTM-I components



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

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.

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).

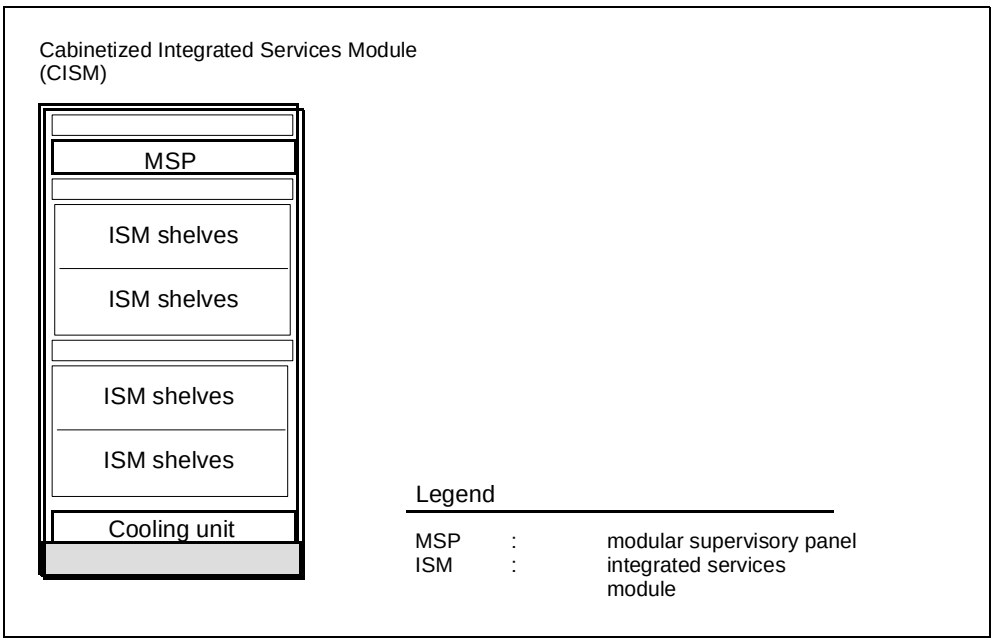
Modular supervisory panel

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 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.

Figure 24
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)

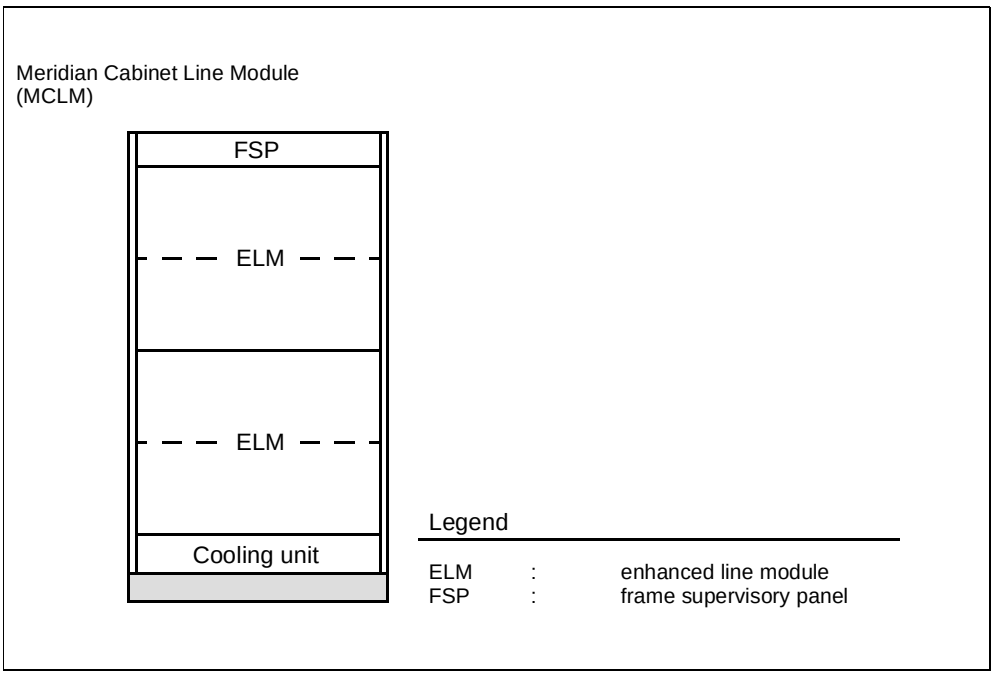
These are described and illustrated on the following pages.

Meridian cabinet line module

The MCLM contains two duplicated ELMs. Each ELM has eight 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 25
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 chapter).

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 Nortel Networks 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.

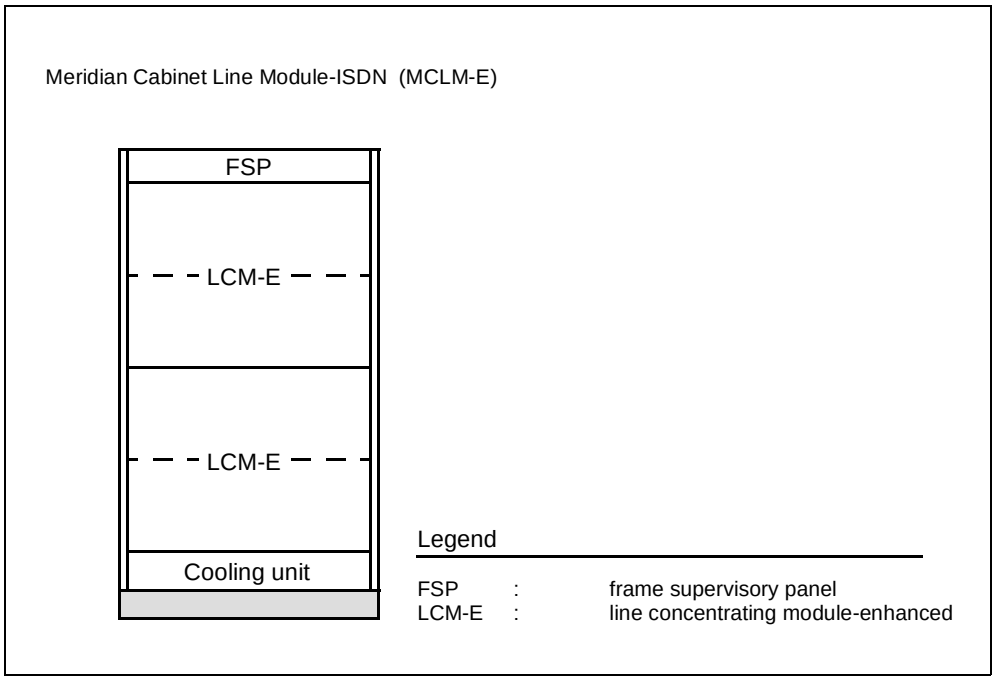
Refer to the *DMS-100 Family Hardware Description Manual* and the *Installation Safety Manual (ISM)* for more safety information.

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 26
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 eight 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 Nortel Networks 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* 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.

Intelligent peripheral equipment column

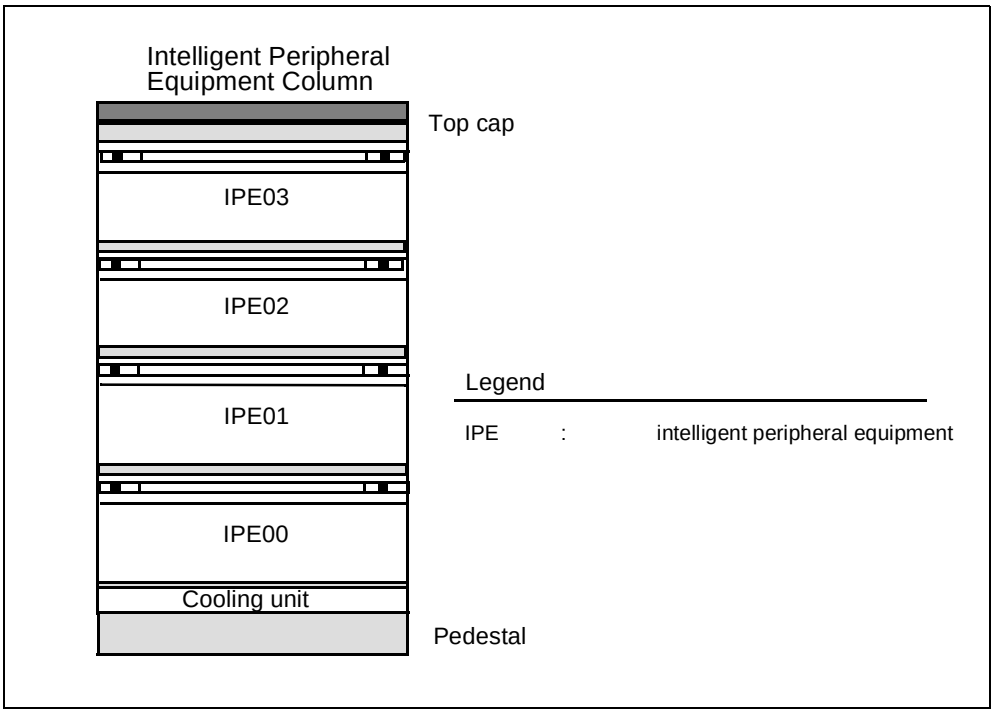
The IPEC contains up to four universal equipment modules (UEM) to house the intelligent peripheral equipment (IPE) modules. One UEM provides the framework for housing one IPE module.

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 27
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) can 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 "Maintenance and administration cabinet modules" on page 86.

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)

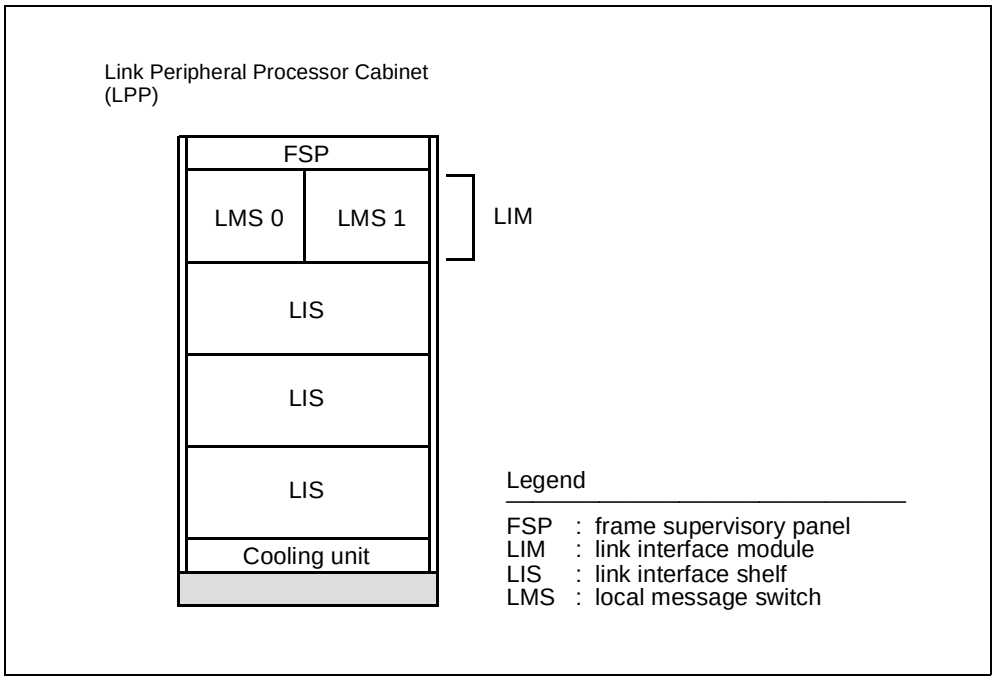
These cabinets are described and illustrated on the following pages.

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 28
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.

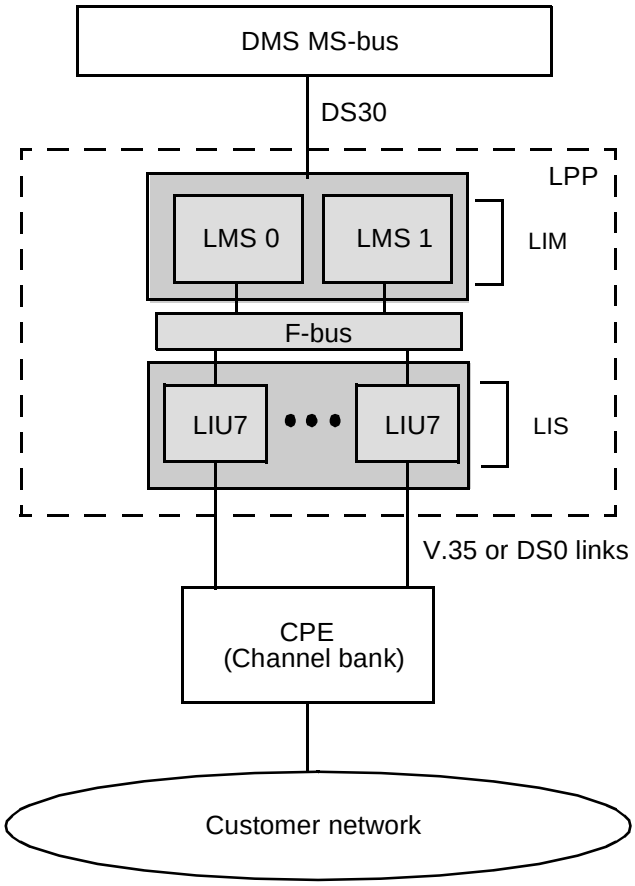
- ASU paddleboard

  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 29 on page 79 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 Figure 30 on page 80 for an illustration of this configuration.

Figure 29
ASU paddleboard configuration



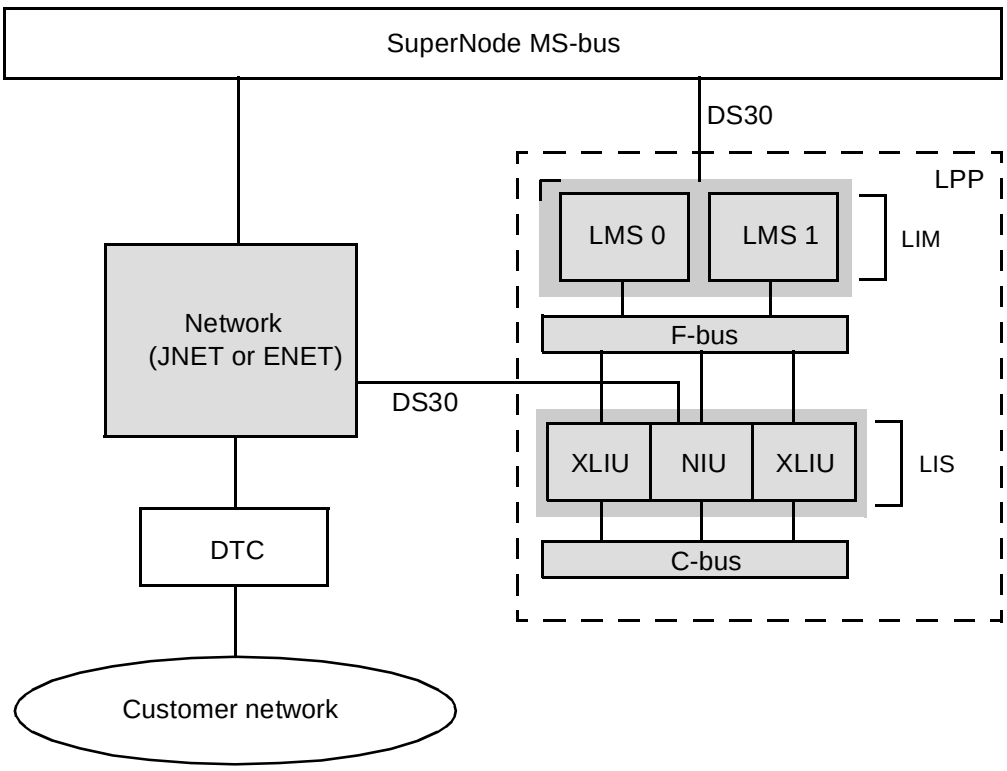
LPP components

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 30
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 can 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 can be configured with one or two shelves supporting up to 24 ASUs (12 ASUs for each shelf).

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 Meridian SL-100 systems that do not require such high capacity as the LPP, require a more economical method of accessing EIU/LPP services. The SSLPP 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 *DMS-100 Family Provisioning Manual*.

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 "Maintenance and administration cabinet modules" on page 86.

Note: For detailed information on the LPP, refer to the *Peripheral Modules.*

Cabinetized multi-vendor interface

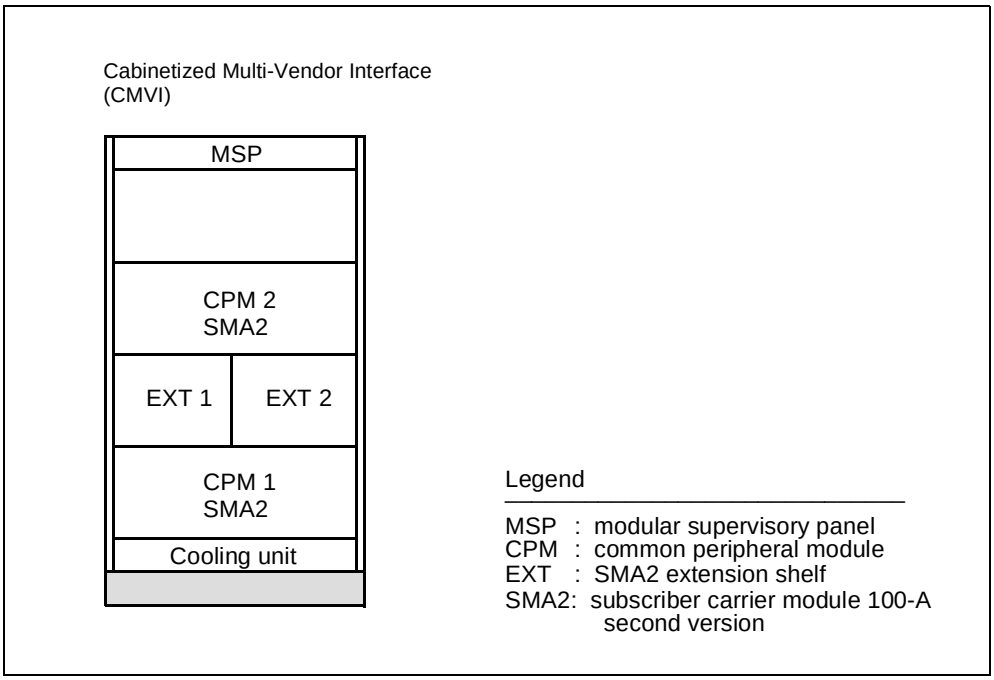
The CMVI provides the multi-vendor interface between the Meridian SuperNode system and the S/DMS AccessNode and other remote digital terminals (RDT). The Subscriber Carrier Module-100 Access, second version (SMA2), which resides in the CMVI cabinet, allows the Meridian SuperNode system to connect to 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 31
CMVI components



Subscriber carrier module-100A second version (SMA2)
The SMA2 main shelves are dual unit shelves. Each unit on the main SMA2 shelf contains 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 “Maintenance and administration cabinet modules” on page 86.

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.

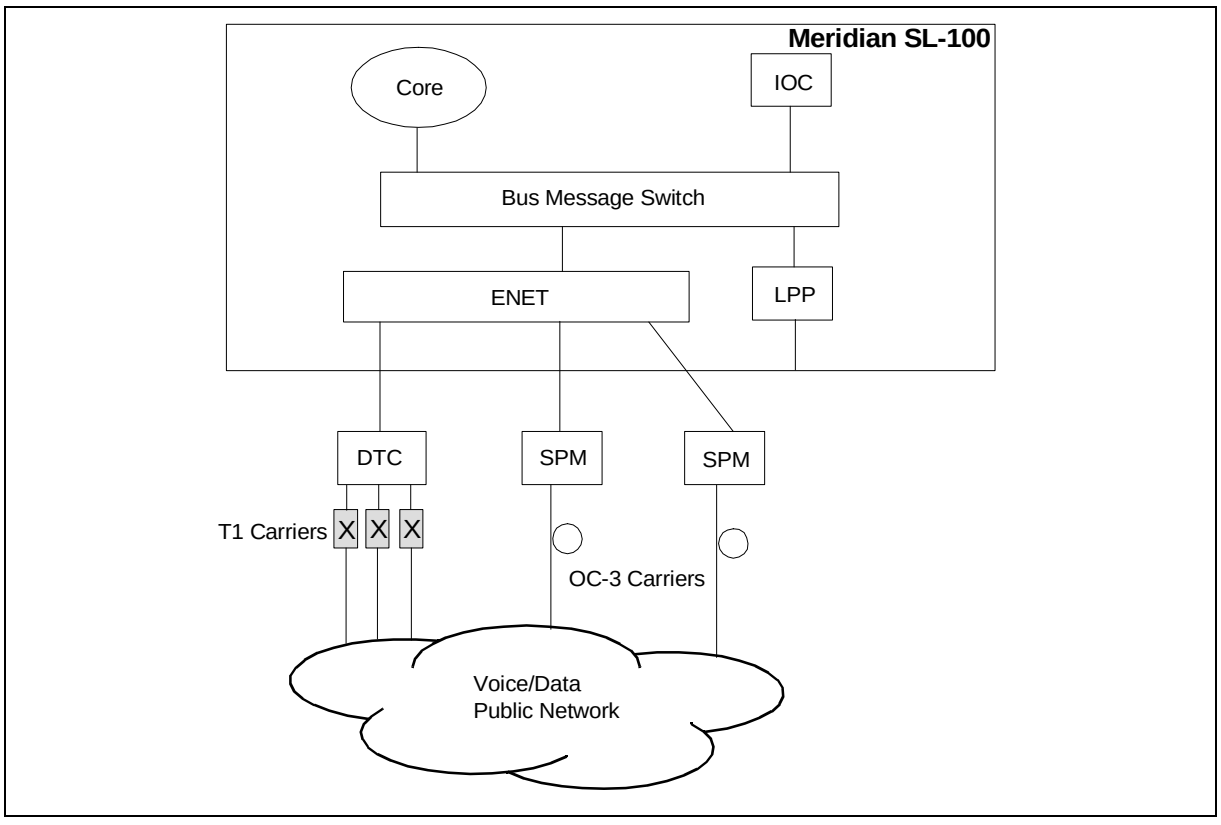
Spectrum peripheral module

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 32
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)

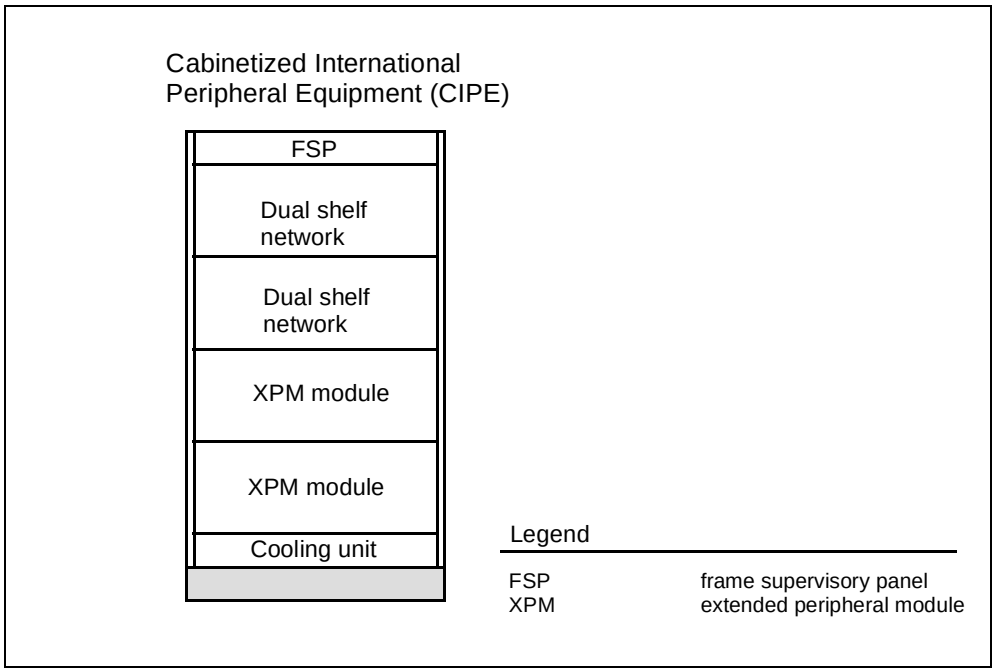
Each module (cabinetized line group equipment [CLGE] and cabinetized digital trunk equipment [CDTE]) is housed in two adjacent shelves. One pair of shelves is in positions 47 and 33 and a pair of shelves is in positions 19 and 05.

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 33
CIPE 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.

Maintenance and administration cabinet modules

The maintenance and administration cabinets include the following modules:

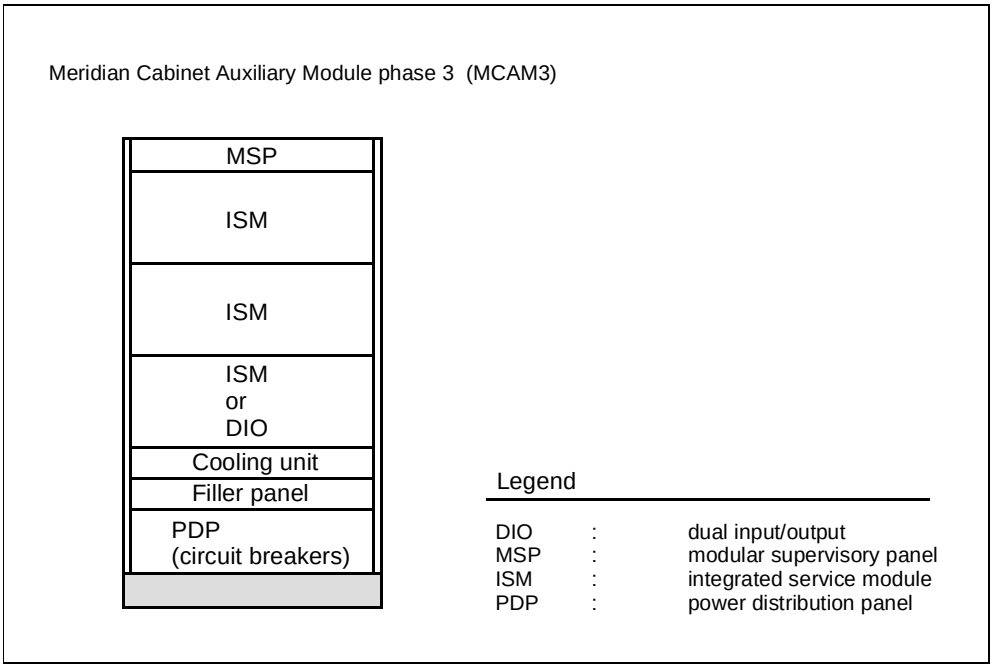
- Meridian Cabinet Auxiliary Module phase 3 (MCAM3)
- Cabinetized Miscellaneous Spares Storage (CMSS)
- Cabinetized Power Distribution Center (CPDC)

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 34
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.

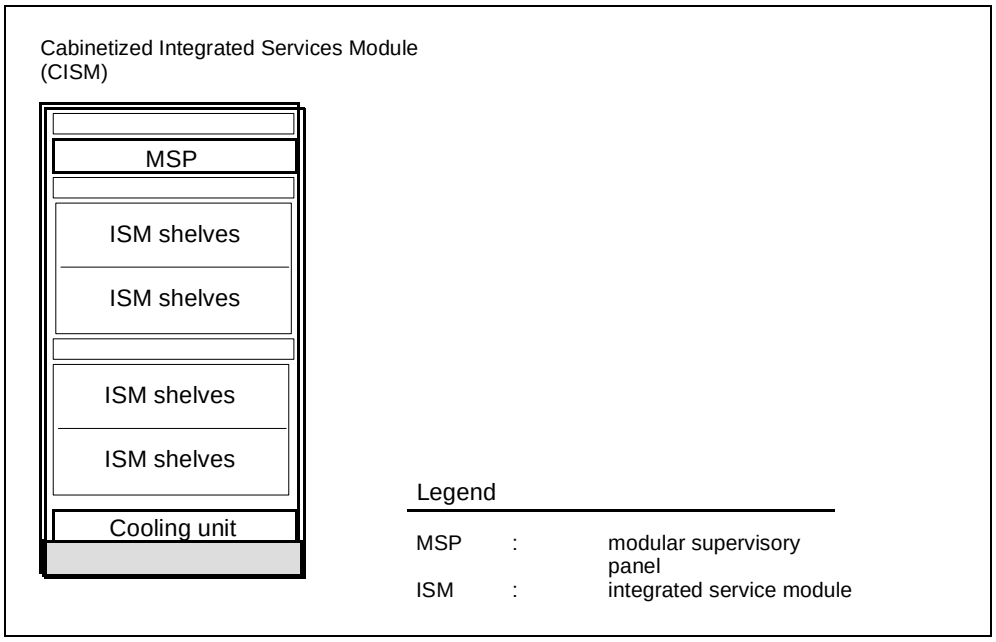
External power supply

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.

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 35
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.

Cabinetized miscellaneous spares storage

The CMSS can be configured with shelves and shelf inserts to provide storage for circuit cards 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 cards. The shelf accommodates a maximum of 54 circuit cards (22.2 mm [.875 in.] wide) or 42 circuit cards (28.5 mm [1.124 in.] wide). One shelf can 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 card 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 card 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

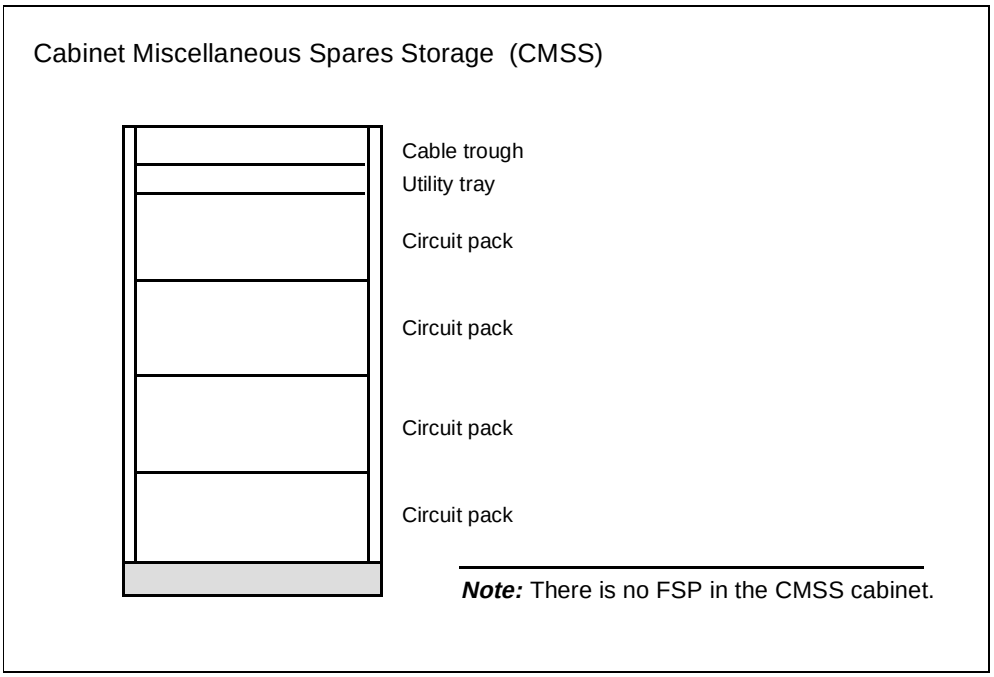
The storage shelf assembly insert provides storage for odd size circuit cards. The shelf insert stores a maximum of 22 circuit cards. Two shelf insert assemblies can be installed into the bottom storage shelf assembly at location 03. One storage shelf assembly insert is placed in the left side of the 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 36
CMSS components



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 lineup 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 “Power distribution shelf” on page 91.

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

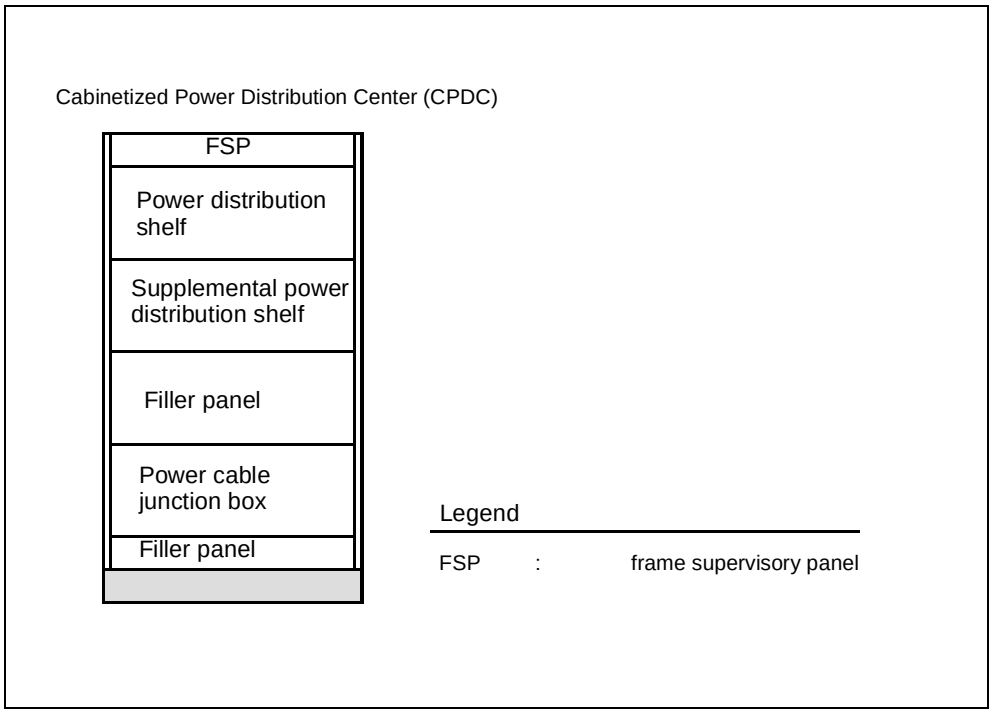
500W inverter (optional)
The 500W inverter is an optional component that serves convenience outlets located in the equipment lineup endguards. The inverter kit contains the A0367433 LaMarch inverter, which converts the -48 V (nominal) dc from the office battery to 110 V ac.

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 37
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 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 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.

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.

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 1 on page 37 provides a list of the MD and end of life cabinets and their replacements.

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 Meridian SL-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* and the *DMS-100 Family Provisioning Manual*.

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 38 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.

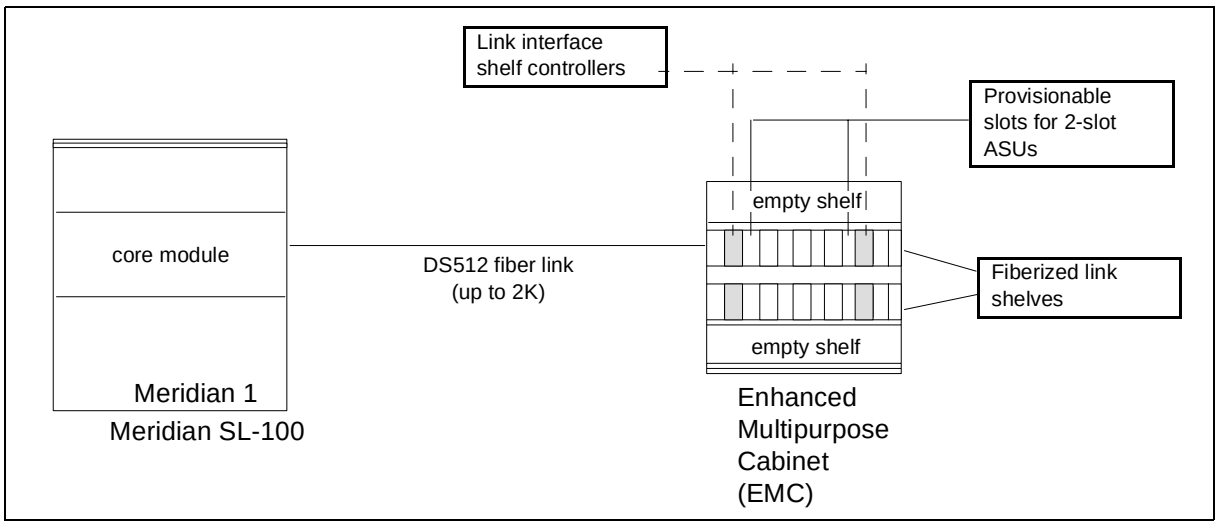
Hardware requirements are:

- 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 38
SSLP/FLIS configuration



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

Standard group configurations

Every SuperNode system requires a three-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 can be configured with a two- or three-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.

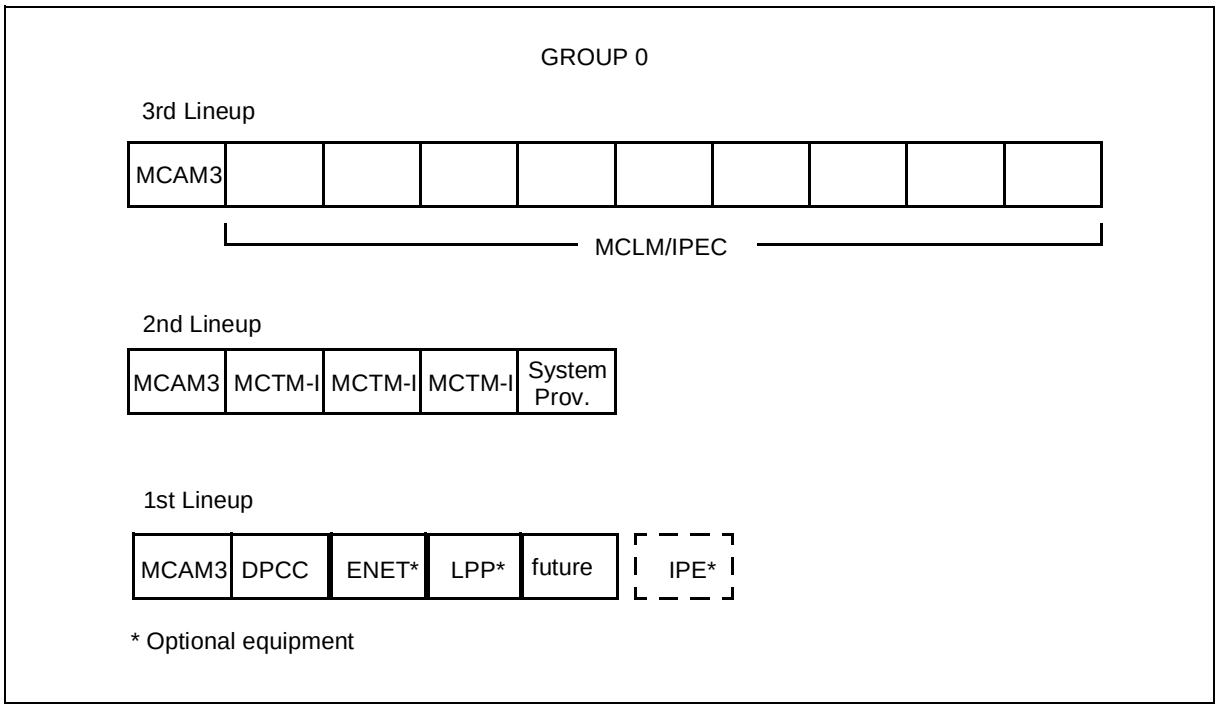
Note 1: The ENET cabinet is optional for SuperNode systems. The SuperNode can interface with existing junctored networks (JNET), which are housed in the Meridian Cabinet Network Module (MCNM).

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 “Cabinet modular hardware” on page 37.

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

Figure 39
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.

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.

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 40 on page 100), and systems powered by an MCAM3 require two lineups (Figure 41 on page 100).

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 40 on page 100).

The SuperNode SE system's second lineup of cabinets consists of the MCAM3, followed by three MCTM-Is and a system provisionable cabinet (Figure 40 on page 100). 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 40 on page 100).

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 40
Primary group – SuperNode SE powered by MPDC

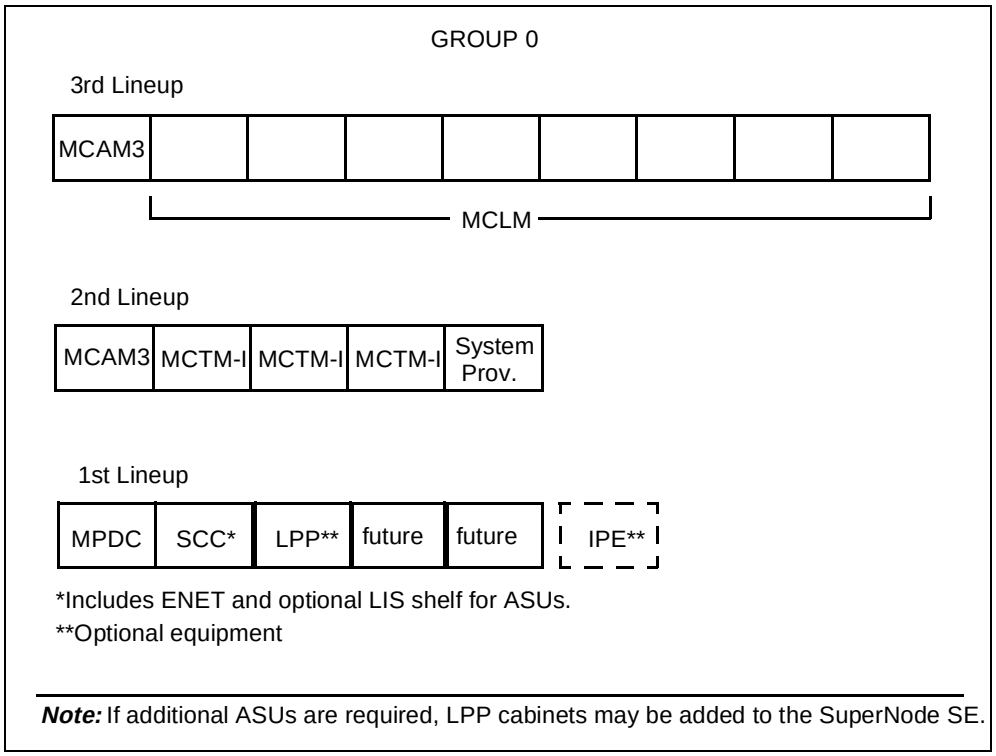
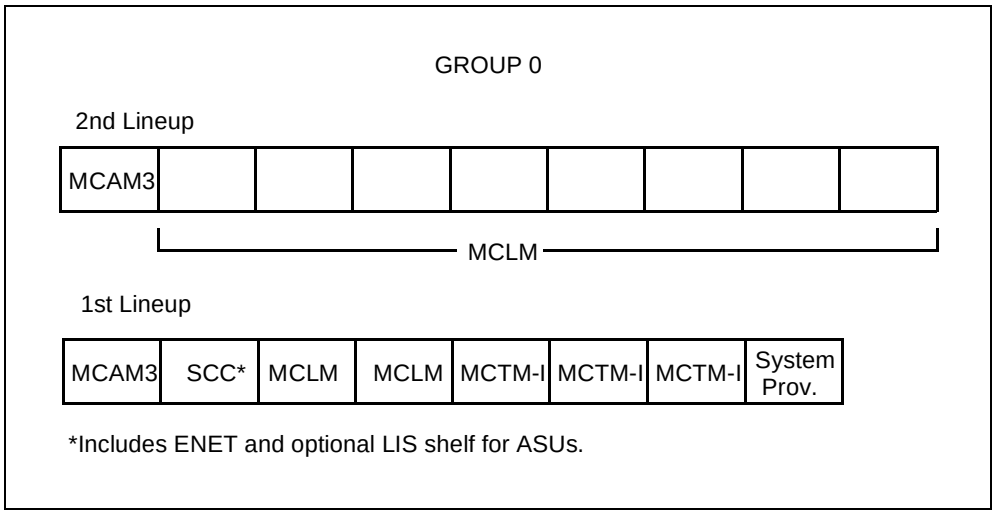


Figure 41
Primary group – SuperNode SE powered by MCAM



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 41 on page 100). 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 41 on page 100).

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

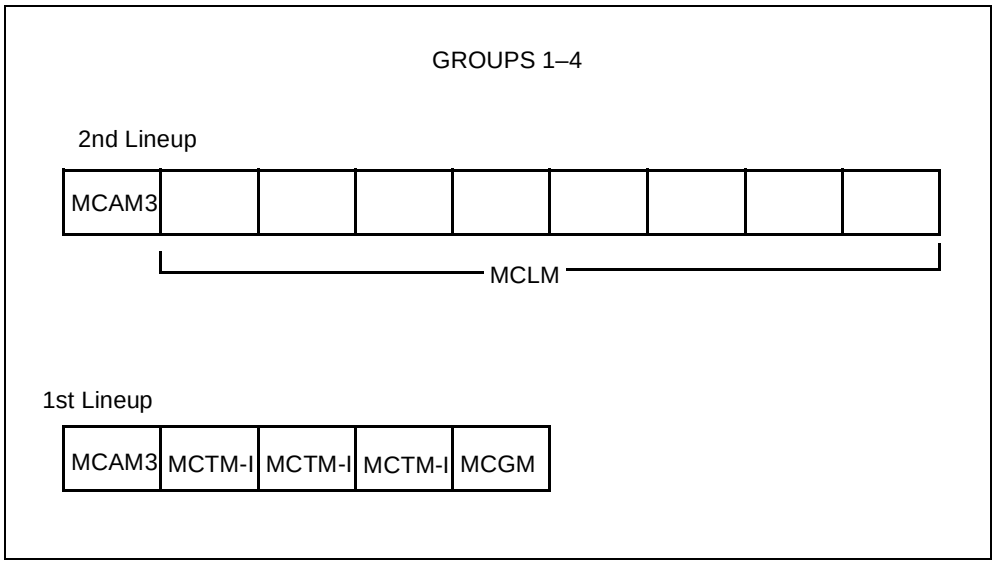
The other four secondary groups (Groups 1 to 4) are alike and use a similar two-lineup configuration for the SuperNode and SuperNode SE systems.

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 42 on page 102 would not be provisioned.

The first lineup of a secondary group in a typical configuration contains the MCAM3 followed by MCTM-Is (Figure 42 on page 102).

The second lineup of a secondary group consists of the MCAM3 plus MCLMs. It supports up to ten cabinets for each lineup (Figure 42 on page 102).

Figure 42
Cabinet lineups for secondary groups



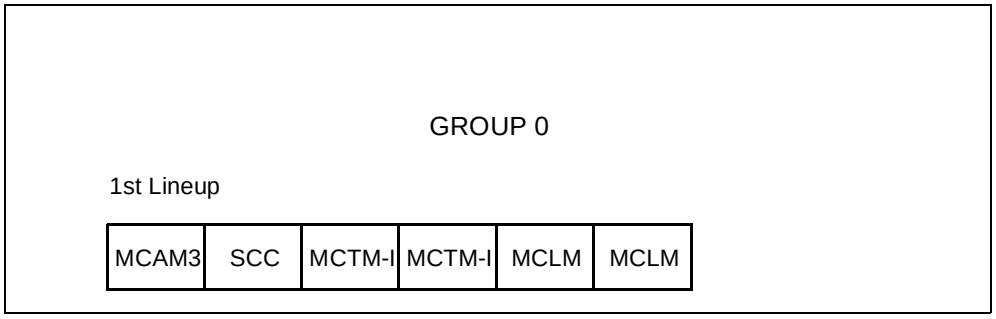
Merged lineups or non-standard configurations

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 43.

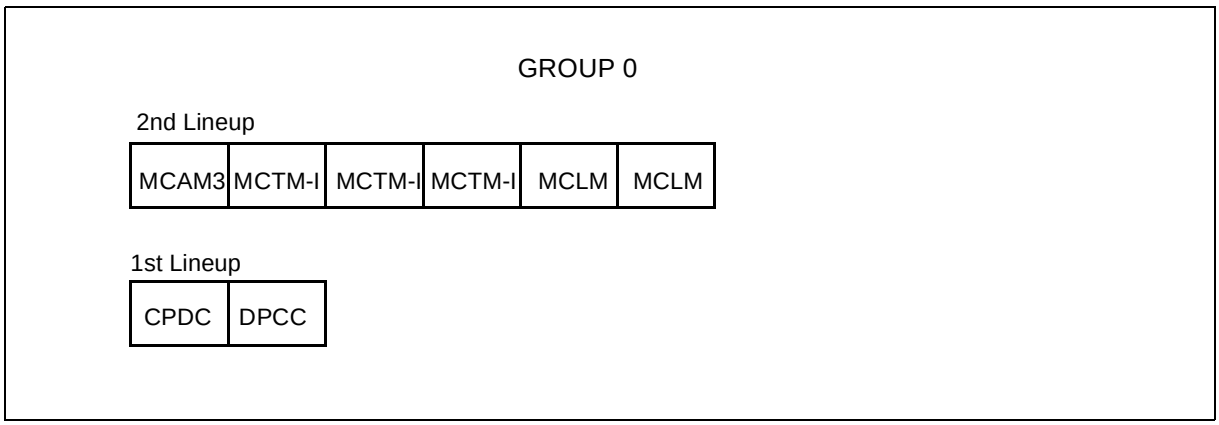
Figure 43
SuperNode SE Group 0 merged into a single lineup



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.

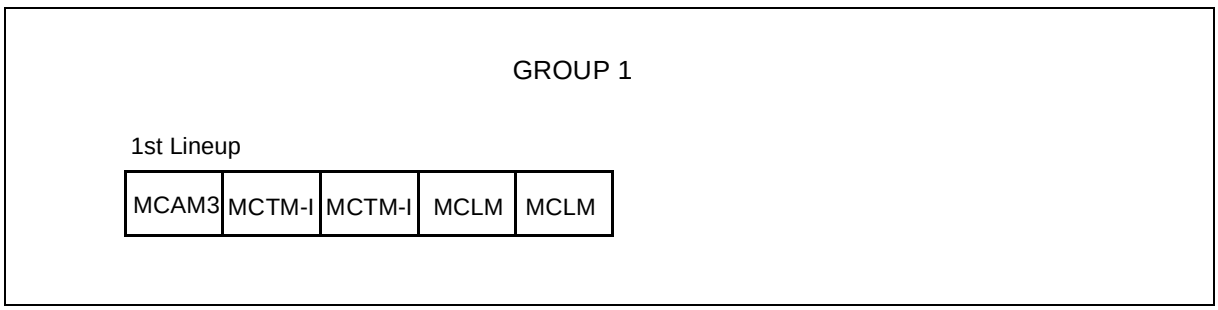
For initial SuperNode systems, the primary group can be merged into two lineups to minimize the amount of floor space used (Figure 44).

Figure 44
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 45.

Figure 45
Secondary group merged into a single lineup



System performance

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

- power consumption
- floor loading
- temperature and humidity environment

This chapter 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 3 shows the typical power requirements for the cabinet modules.

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

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 3
Typical power requirements for cabinets (Sheet 2 of 2)

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
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 “Cabinet modular hardware” on page 37.

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 Table 4 and Table 5 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 4
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
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*.

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.

At the end of this chapter, 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

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

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 Networks 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.*

Maintenance and administration system

Overview

The MAP workstation provides an interface between telecommunications personnel and the Meridian SuperNode system. This chapter 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*, the *Non-Menu Commands Reference Manual*, and the *Menu Commands Reference Manual*.

This chapter 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

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

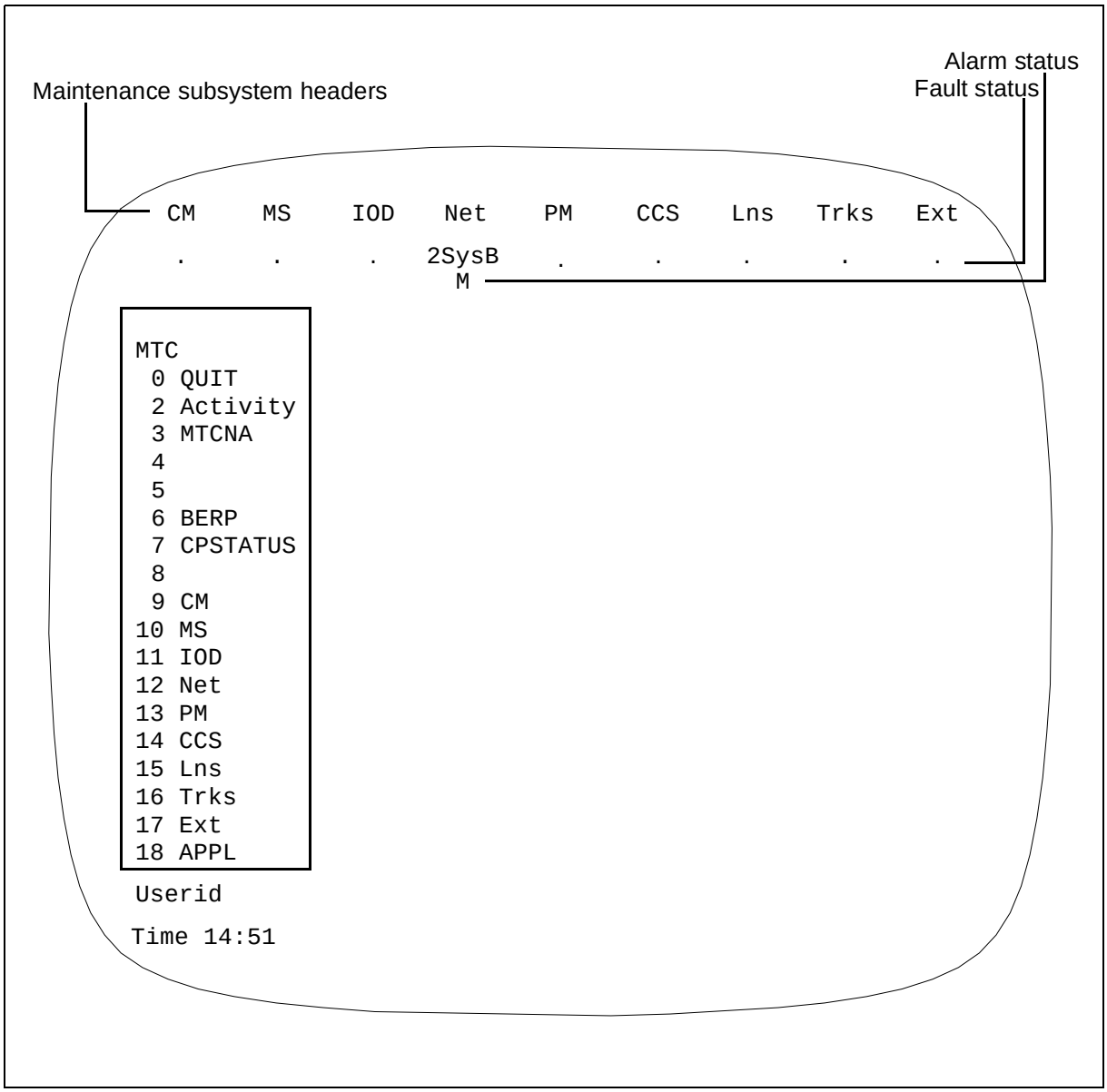
To perform the various maintenance tasks, a sequence of commands is entered on the MAP workstation keyboard. The user is prompted by responses displayed on the video display unit.

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.

Figure 46 on page 119 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 46
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 "Maintenance and administration cabinet modules" on page 86 for details.

Table 6
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 6
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 can 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 Routine Maintenance Procedures* and the *Menu Commands Reference Manual*.

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 Routine Maintenance Procedures* and the *Menu Commands Reference Manual*.

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 is 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, this information can be viewed from several clients.

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

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

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

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

Enhancements to system management

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

- EIU interface
- reduced SNMP messaging to the switch (server only)
- user administration with logins and privileges
- increased capacity for events and equipment inventory
- new log event browsing features with log event annotations
- new E-IPE (Enhanced Intelligent Peripheral Equipment) controller card loading while in-service
- integration with Optivity NMS (Network Management System) and Optivity Telephony Manager for Meridian 1 (if required)

- maintenance of firmware loads for M3900 series phone sets through E-IPEs

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

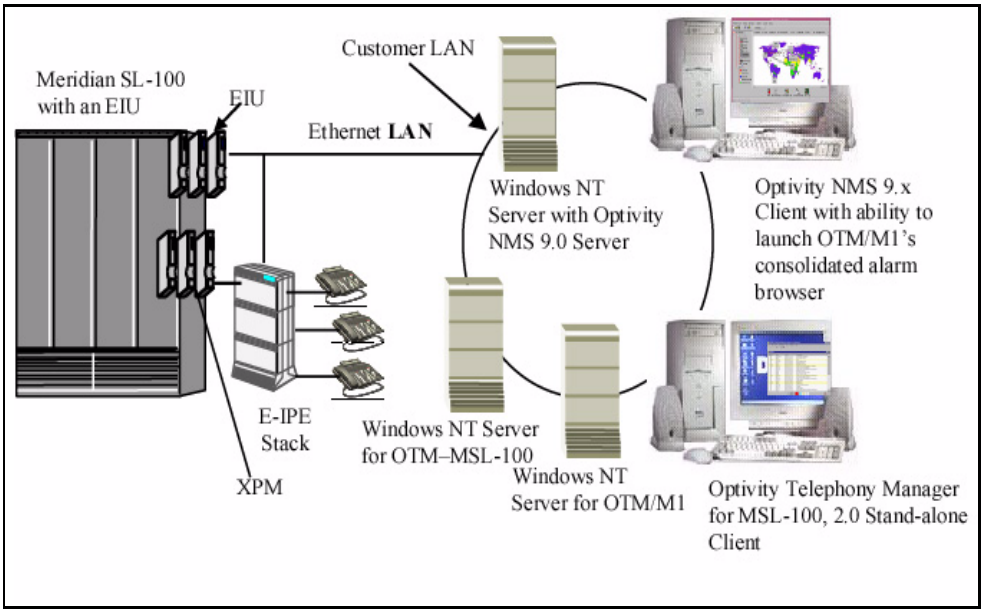
Integration of Optivity Telephony Manager for Meridian SL-100, 2.0, with Optivity Network Management System (NMS) is available through Optivity Telephony Manager for Meridian 1.

Attributes of Optivity Network Management System (NMS) integration

- 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 47
Optivity Telephony Manager and Optivity NMS Integration



For more information on the Optivity Telephony Manager for Meridian SL-100, 2.0, refer to the *Meridian 1 Interworking Services Guide*.

Remote access

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.

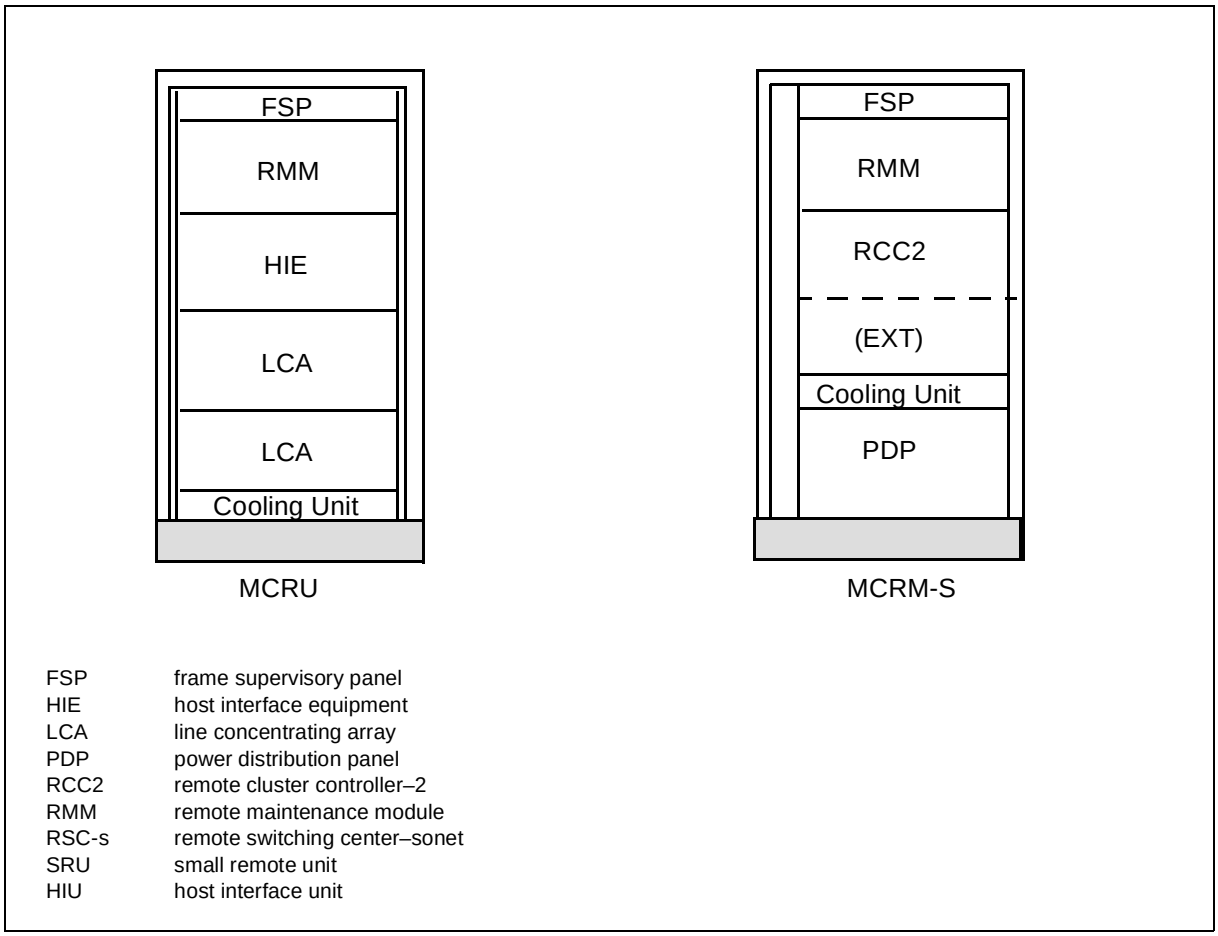
The Meridian SL-100 remote access family includes

- 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 48
Remote access cabinets



FSP	frame supervisory panel
HIE	host interface equipment
LCA	line concentrating array
PDP	power distribution panel
RCC2	remote cluster controller–2
RMM	remote maintenance module
RSC-s	remote switching center–sonet
SRU	small remote unit
HIU	host interface unit

For more information about Meridian SL-100 remote access functionality, refer to the *Translations Guide*, the *RSC Maintenance Manual*, the *Meridian SL-100 Remote Peripherals General Description*, *Small Carrier Module-100 Urban Maintenance Manual*, and the *Configuration and Equipment Description*.

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.

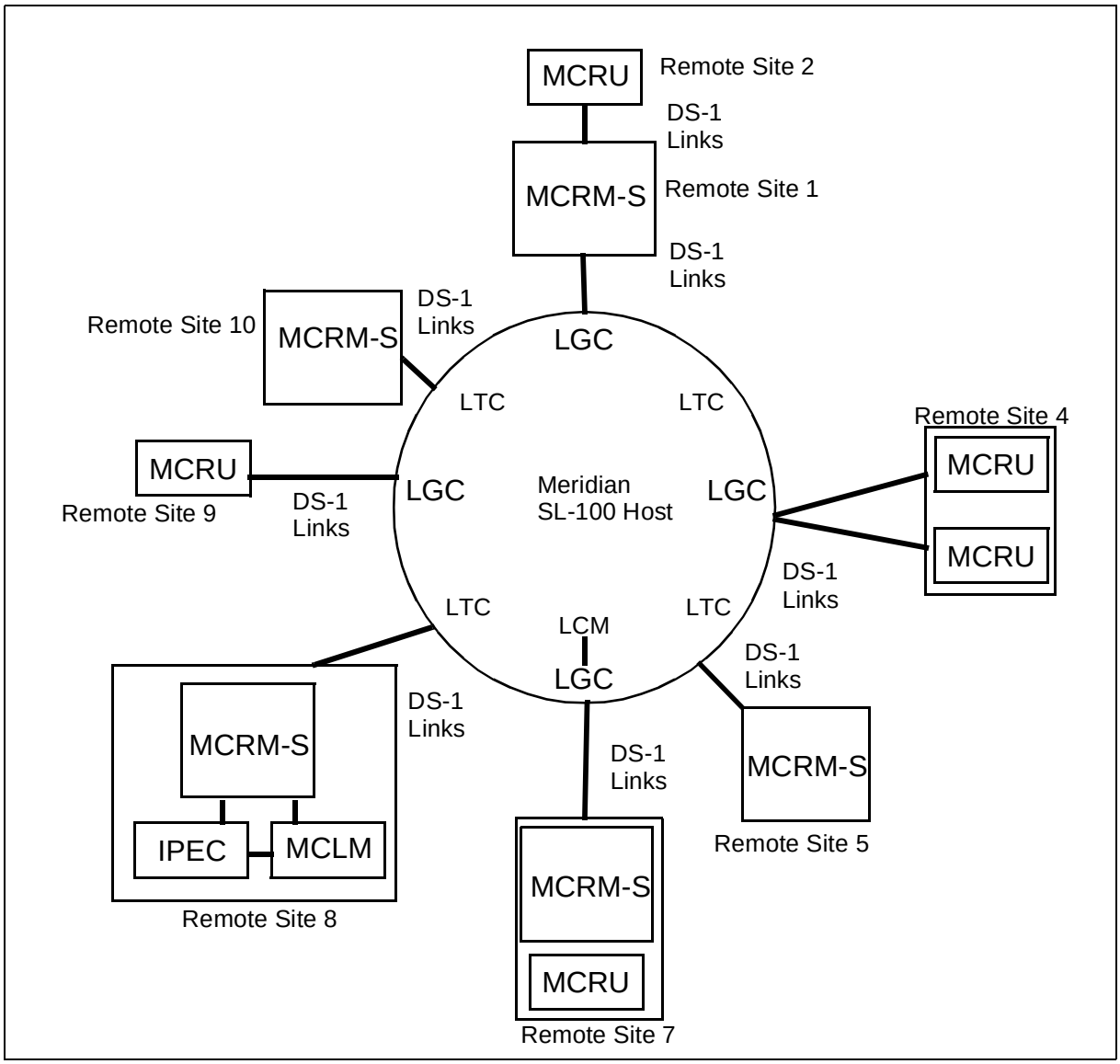
Figure 49 on page 134 illustrates one configuration of DMS host-remote interface.

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 “Cabinet modular hardware” on page 37.

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 49
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 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 49 on page 134 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*.

Meridian cabinet remote unit (MCRU)

The MCRU is a remote peripheral that serves as an interface between remotely located subscriber lines and the Meridian 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 48 on page 132 includes an illustration of a basic MCRU cabinet layout):

- Cooling unit: The cooling unit provides forced air cooling with a two-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 cards, 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.

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.

ATM

See asynchronous transfer mode.

ATT

See automatic trunk test.

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.

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.

BCS
See batch change supplement.

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 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.

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.

CCS7
See Common Channel Signaling 7.

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.

CLID

See calling line identification.

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.

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 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).

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.

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.

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 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.

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.

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.

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.

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.

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.

ECM

See extended call management.

EDCH

See enhanced D-channel handler.

EDRAM

See enhanced digital recorded announcement machine.

EIU

See ethernet interface unit.

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.

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.

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 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 supervisory panel (FSP)
The frame supervisory panel distributes and controls power and alarms in a cabinet.

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

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.

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.

ISUP
See ISDN user part.

ITU
International Telecommunications Union.

IVD
See integrated voice and data.

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.

local access and transport area (LATA)

A geographic area within which an operating company may offer telecommunications-related services.

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.

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.

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.

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 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 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.

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.

MPC
See multiprotocol controller.

MPDA
See Meridian programmable data adapter.

MPDC
See Meridian power distribution center.

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.

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.

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.

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.

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.

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.

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.)

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.

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.

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.

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.

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.

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 SL-100

Product

Guide

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