meridian SL-1

Engineering Handbook

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northern telecom

MERIDIAN SL-1

ENGINEERING HANDBOOK

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SYSTEM OVERVIEW

Introduction

The Meridian SL-1 Integrated Services Network is built upon a foundation that utilizes digital switching techniques and stored program control. It offers the advantages of economy, flexibility, and maintainability by providing service capabilities defined by software programs which can be changed and expanded as needs evolve.

The focal point of Meridian SL-1 is a circuit-switched digital sub-system that links together a common control, switching network, and peripheral interface unit. A significant extension to the architecture integrates packet switching capabilities to optimize utilization of bandwidth for high speed communications. It is this framework, under software control, that provides the features and capabilities of today's Meridian SL-1.

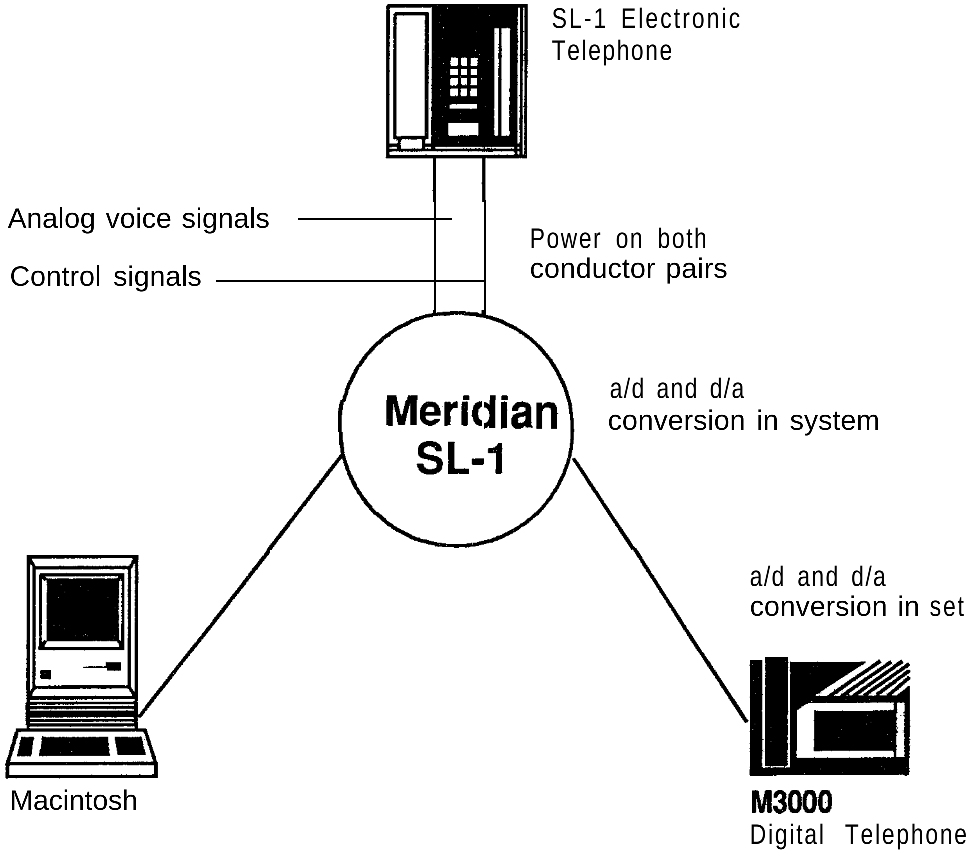
System Description

The central control acts as the prime source of logic guiding the entire system operation. It consists of a computer and memory which contains the instructions that control the operations of the network and the interface.

The network performs the actual switching operation, providing full connectivity from any one device to all others. Upon appropriate commands from the central control, the network provides a transmission path linking any specific input to any specific output.

The interface units terminate all peripheral devices and perform analog to digital conversion before digital switching is performed by the network. After switching, the signal is converted back to its original analog forrn.

The conversion method used is Pulse Code Modulation (PCM). In PCM the analog signal amplitude is sampled at a rate more than twice the highest signal frequency and the amplitude of each sample is transmitted as a series of pulses in a coded format. The digital conversion into standard eight-bit PCM signals is accomplished by a single encoder/decoder (codec) provisioned for each analog peripheral port. The codec is a unique, custom designed chip that utilizes very large scale integration (VLSI) techniques. For analog devices, such as a 2500 type single line telephone, the codec is located on the associated peripheral interface port of a circuit card within the Meridian SL-1 cabinet. For the Meridian family of digital telephones, the codec is located within the set itself (Figure 2-l).



The Meridian SL-1 architecture uses a star technique that permits uniform distributed wiring methods to connect each peripheral device to the switching system. This approach provides significant benefits in the area of administration, installation, maintenance and reliability.

FIGURE 2-l: STAR DISTRIBUTION

Basic Partitioning

The Meridian SL-1 architecture is comprised of three main functional partitions (Figure 2-2): Common Equipment (CE), Peripheral Equipment (PE), and Packet Transport.

The CE and PE, also referred to as Circuit Switch Equipment (CSE), are always an inherent part of each Meridian SL-1 system. The Packet Transport is applicable on an optional basis to certain models of the Meridian SL-1 family.

Common Equipment (CE)

Common Equipment (CE), the heart of the system, performs the control and circuit switched functions for the connecting peripheral devices. Various CE segments carry out the following vital system operations:

- The Central Processing Unit (CPU) provides the computing power essential for entire system operation

- The Read/Write (R/W) random access memory stores all operating software programs and data unique to the particular Meridian SL-1, including switching sequences, features, class of service information, and quantity and types of terminals

- The Mass Storage Unit provides for high speed loading of the operating programs and data into the R/W memory

- The Network Circuit Cards provide a digital matrix for circuit-switched connections to associated peripheral devices

- The Digital Service Circuits provide for functions such as dial and ringing tones, and call conferencing capabilities

- The Serial Data Interface (SDI) provides a RS232C communications link for administration and maintenance on either a local or remote basis.

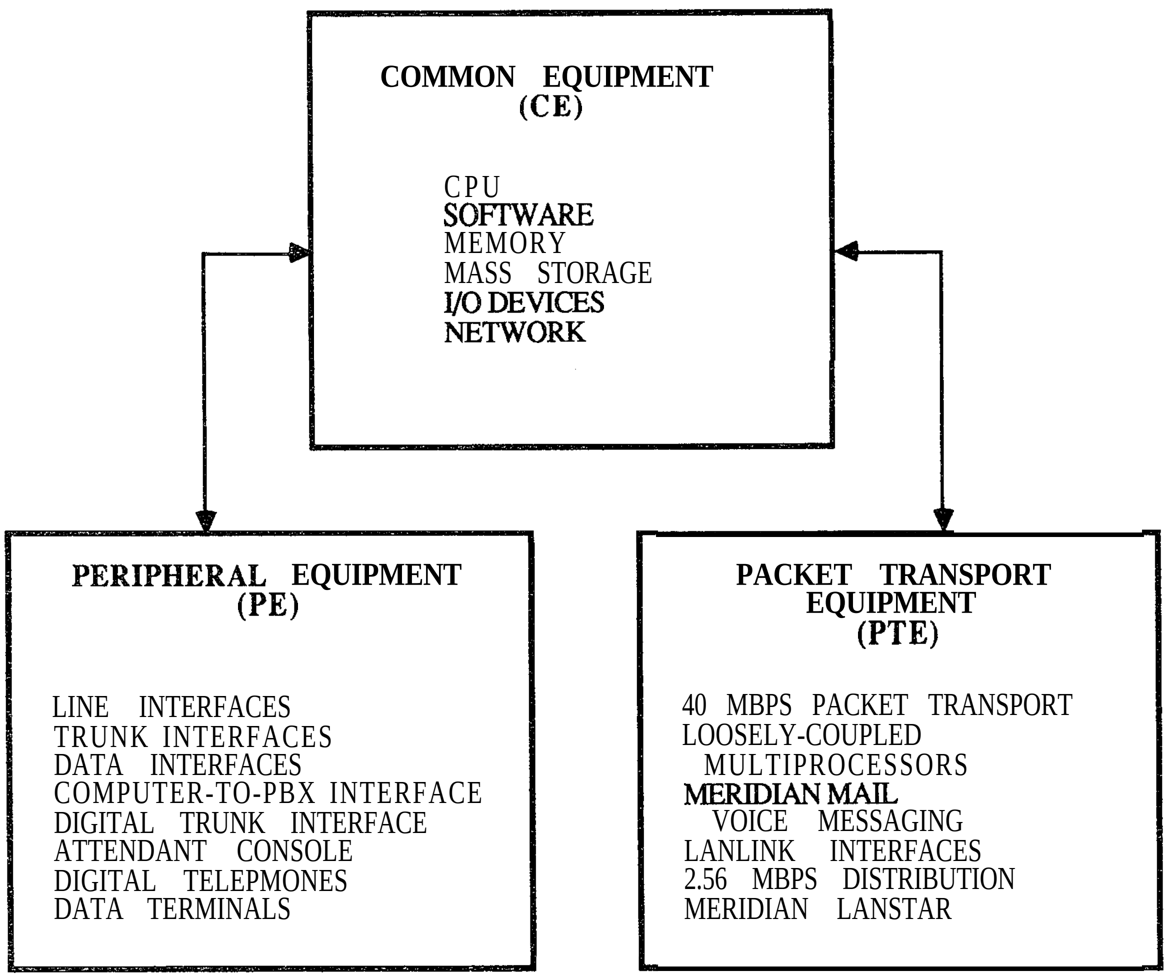


FIGURE 2-2: BASIC PARTITIONING

The CE Units communicate over a common control bus which carries a constant flow of program instructions and data under direct control of the CPU. The digitized speech signals follow a separate path on a network switching bus which allows communications links to be established between any of the peripheral devices.

Peripheral Equipment (PE)

Peripheral Equipment performs the interface function for the telephones and terminals that utilize the 64 kbps clear channel bandwidth capability of the circuit-switched network. Where necessary, analog to digital conversion (and vice versa) is accomplished on a per port basis by means of a single channel codec (coder-decoder) located on the appropriate interface cards. An exception to this is the Meridian family of digital telephones, which reside on the PE, but include individual codecs built into the set for cost-effective data capabilities.

Packet Transport

Packet Transport represents a major extension to the circuit-switch architecture by providing three key enhancements for delivering advanced communications to the user:

- a 40 Mbps packet transport that allocates bandwidth on demand
- a high speed digital distribution system that delivers 2.56 Mbps to the desktop over standard telephone wiring, and
- a loosely-coupled multiprocessor operating system.

The heart of the Packet Transport is the high speed 40 Mbps transport system whose characteristics include dynamic bandwidth allocation because the bandwidth can be dynamically allocated to circuit or to packets. The combination of the transport and the high speed 2.56 Mbps digital distribution introduces a high performance capability in a local area network environment with a total capacity of 40 megabits per second. The third element, the multiprocessing capability, consists of loosely coupled independent units, each comprised of a processor and associated memory, which plug into the transport system and are optionally configured depending upon application.

Equipment Configuration

The Meridian SL-1 hardware is housed in equipment cabinets that are provisioned to suit specific applications. Except for the mass storage unit, power supplies and associated distribution units, the hardware consists of plug-in circuit cards inserted into equipment shelves, mounted in the cabinets. Associated backplanes extend the length of the shelves to provide a feed for powering and signaling of the circuit cards. The system is configured by simply inserting the appropriate quantity and combination of the various circuit cards in the equipment shelves.

Software Control

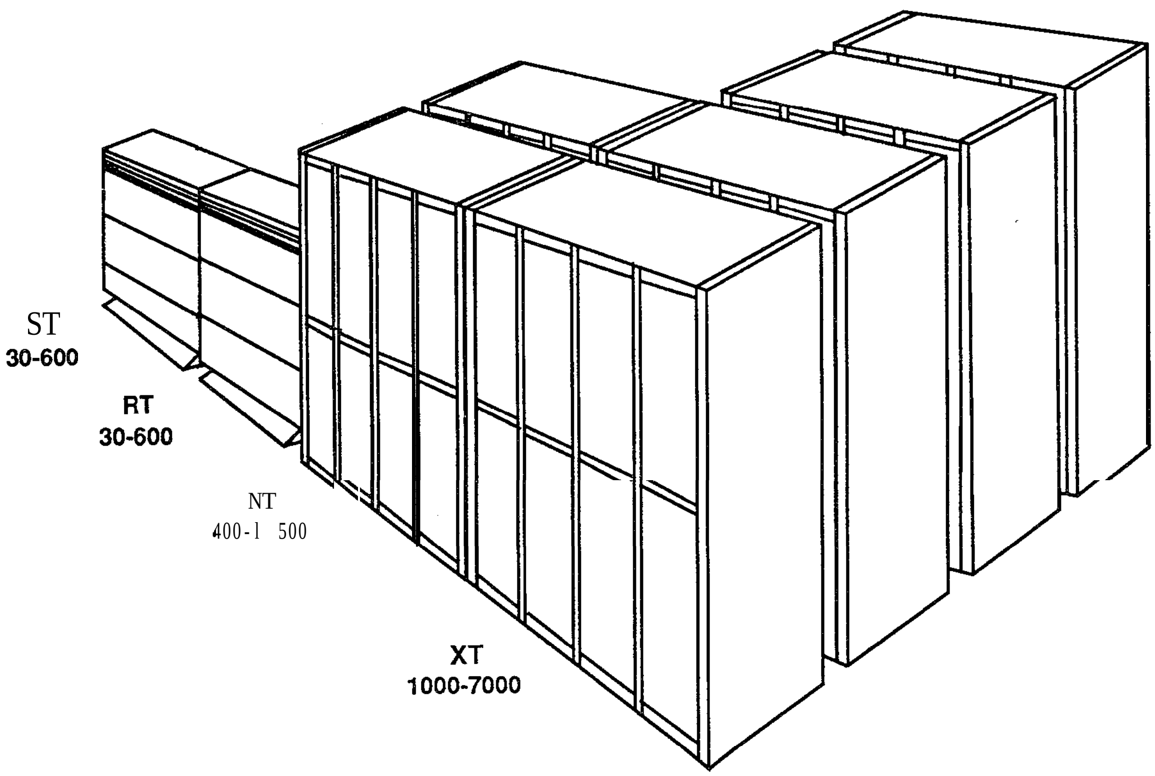
The Meridian SL-1 can economically provide a wide range of sophisticated custom communications services and features for utilization by typically 30 to 7000 station users. All software programs instructing the CPU how to process calls are written in a proprietary High Level Language (I-ILL). The language permits programs to be written extremely rapidly, concisely, and accurately, using a minimum of storage space in the system memory. Its use greatly reduces the development time required to incorporate ongoing feature enhancements into the system.

Administration & Maintenance

An important factor of the Meridian SL-1 is its inherent system administration and maintenance capability. Messages convey traffic, service change, and diagnostic information on a teletypewriter. Traffic output messages typically indicate on a regular basis the load on the different parts of the system along with the associated grade of service. Service changes include reassignment of features and additions or deletions of equipment under software control without the need for hardware rewiring. This operation can be performed locally or at a remote location. Maintenance messages provide diagnostic and fault recognition capability to the service personnel. Software routines may be enabled automatically by the CPU which alternatively may be instructed to execute certain diagnostic programs.

Product Family

The Meridian SL-1 provides various models which address the business requirements of organizations ranging from 30 to 7000 lines (Figure 2-3). Each system is designed to address specific segments within that range. The ultimate capacity of a particular model depends upon application and is governed by a number of independent factors: CPU real time, traffic, memory allocation, and network terminations. Each member always consists of two basic elements: Common and Peripheral Equipment. The modular structure readily permits expansion from one system type to another to accommodate future growth. Peripheral Equipment, the bulk of the system investment, is common to all product models and may be retained in place when performing such expansions. Packet Transport is applicable on an optional basis.



The Meridian SL-I product family offers three system models to meet the business requirements of organizations ranging in size from 30 to 7000 users.

FIGURE 2-3: MERIDIAN SL-1 PRODUCT FAMILY

Summary

The foregoing provides an overview of the Meridian SL-1 delivered today. Its flexible design will permit ongoing evolution to meet the sophisticated demands of tomorrow's communications environment.

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SECTION : 3 SYSTEM ARCHITECTURE

PACKET TRANSPORT

SYSTEM ARCHITECTURE

Introduction

One of the most important aspects of the Meridian SL-1 is the design of the system architecture. It utilizes an efficient and flexible approach, employing modular construction in all phases of the equipment along with state-of-the-art commercial and custom components. The result is a compact digital system which is flexible in terms of operational, maintenance, and administrative features.

Digital technology lends itself to a modular format. Thus, with increasing demand for features and services, the system can grow simply by software administration and the addition of plug-in units. Techniques such as the use of time-division, multiplexed links allow the switching network to be compact and flexible.

In some areas of the system, high reliability is ensured by providing redundancy or duplication of equipment which is critical to the operation.

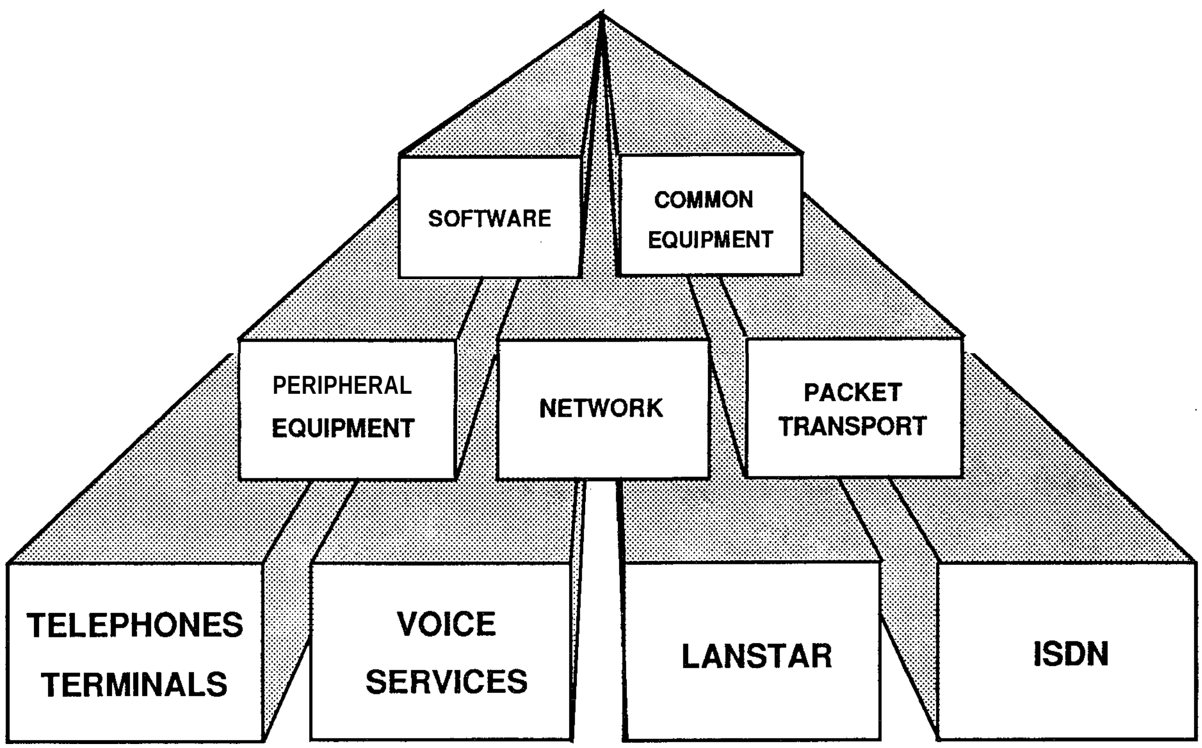
Modular Structure

The key aspect of the Meridian SL- 1 architecture is its partitioning into independent modules each of which combine to form a total system design (Figure 3-l). These modules are grouped by function as follows:

CONTROL: Comprises the SOFTWARE and COMMON EQUIPMENT that provides the prime source of logic for guiding system operations.

SWITCHING: A digital switching matrix called the NETWORK that links both PERIPHERAL EQUIPMENT and PACKET TRANSPORT.

DISTRIBUTION: A service capability that allows users to communicate and exploit the powerful system resources to the full. This element is comprised of modules such as TELEPHONES AND TERMINALS, VOICE SERVICES, LANSTAR, and the interface to ISDN.



As demands dictate, each independent module can be enhanced, singularly or in combination with others, and then placed back in an operating environment to achieve overall improvements in system performance. This evolutionary capability has enabled the Meridian SL-1 to continually adapt to meet changing market requirements.

FIGURE 3-1: MERIDIAN SL-1 FUNCTIONAL MODULES

MODULE 1 - Software

Introduction

The adaptability of software control provides a complete array of services and features tailored to meet changing requirements. Basically, software constitutes the instructions to tell the central processor what to do, how to do it in the progressive steps of machine language, and where to find the information that it needs to accomplish the task. A translation process is necessary to convert the high level language (HLL) program into machine-executable form. The program that performs such a translation is known as the compiler. With Meridian SL-1, the simplicity of the language, compiler design, and implementation is straightforward and the processor architecture is designed specifically to execute compiled machine instructions. Besides telling the processor without ambiguity the operations it must perform, the programming language provides a clear statement of the operation to the programmer so that ongoing enhancements can be readily incorporated to meet evolutionary trends.

Call processing, maintenance and administration of the Meridian SL-1 are controlled by software programs stored either as resident programs in the system memory, or as non-resident programs on magnetic tape. In the Meridian SL-1 there are two program groups which are referred to as firmware and software. The information which describes system configuration and associated peripheral equipment is termed office data. This data resides in the system read/write memory and on magnetic tape.

Firmware

These are fundamental programs consisting of hard-wired logic instructions Programmable Read Only Memory (PROM) which manipulate data in the central processor and control input/output operations, error diagnostic and recovery routines. The sequences are similar in all Meridian SL-1 models.

Software

Software programs consist of instruction sequences that control call processing, peripheral equipment, administration and maintenance functions. These sequences are interpreted by the firmware programs into machine instructions. Several generic software programs with optional feature packages are available to satisfy varying requirements.

Office Data

The office data describes the characteristics of the system in terms of configuration and call dependent information such as features and services. The data is arranged into blocks defining peripheral equipment, system configuration and transient data. These data blocks permit configuration of a Meridian SL-1 to specific customer needs.

The adoption of this type of program and data structure renders the instruction compiling process independent of hardware. It also makes the Meridian SL-1 software readily changeable and extendable.

Resident Programs

Resident Programs are programs always available in memory during system operation as either firmware or protected read/write memory. Firmware programs control other resident programs and provide all CPU arithmetic operations. The other resident programs are those which are automatically loaded into the system memory from the mass storage unit on system power-up under control of the firmware "bootstrap" program, Once loaded, these programs remain in read/write memory unless corrupted by a fault or power failure.

Non-Resident Programs

Non-Resident Programs are the overlay programs stored on disk which are loaded into the "overlay area" of the system memory when required to perform specific tasks. Only one overlay program may be loaded at a time and is aborted from the overlay area when no longer required. Overlay programs can be loaded either automatically by the system under programmed control or manually via an administrative terminal. When called up manually, the overlay programs provide the system interface for such functions as maintenance, service change, and traffic measurement. They may be run concurrently with normal call processing without interfering with system traffic.

Once the user has logged into the system, commands for specific overlay programs are processed by the overlay loader program. When loaded, the overlay program assumes control.

Only one administrative terminal can input into the overlay area at one time. More than one device, however, can receive outputs simultaneously. The terminals may be configured as input -only or output only devices.

Each overlay program is independent and has its own specific set of commands and formats.

There are five main categories of overlay programs:

1. Service Change and Print Routines

Service changes do not generally require hardware intervention. Instead, the service administration programs are used to create or modify all aspects of the system from individual feature key assignments to complete system configurations. There are also programs and print routines for retrieving the data from the system to check the status of office data assignments.

2. Maintenance Diagnostics

These programs are the primary instruments for maintenance purposes. Individual programs are used for automatically or manually testing the CE and PE. The programs may be entered into the overlay area at the request of maintenance personnel as the result of a fault detected by hardware or as part of a daily maintenance routine initiated by the system automatically at a specified time. In addition, background and signaling diagnostic routines can occupy the overlay area when it is not in use.

3. Traffic

All systems are equipped with traffic data accumulation programs. There is also a resident traffic print program which examines the schedules, transfers data from accumulating to holding registers in accordance with schedules, and prints the traffic data. In addition, there is a traffic overlay program which is used to query and modify schedules, options, and thresholds.

4. Equipment Data Dump

When making service changes, the changes should be transferred to disk in order to save them. When the equipment data dump program is invoked, all the office data in the read/write memory is written to the system disk. The program is also used to install a new generic version, or issue and capture protected data store information which may be changed by the user, such as speed call lists. The program may be invoked automatically during a midnight routine or on a conditional basis (i.e., data dump only occurs if a software service change has been made). It may also be invoked manually via the input/output (I/O) interface to the system.

5. Software Audit

This program monitors system operation and gives an indication of the general state of the system operation. The program is concerned mainly with the system software. When a software problem is encountered, the program attempts to clear the problem automatically.

Introduction

The systems processing power is in the control equipment. It has two main elements: the central processing unit (CPU) which directs lower level subsystems in the hierarchy, and the system memory which stores the operating programs. Other important elements are the Mass Storage Unit (MSU) which provides for high speed loading of the software into the Read/Write memory, and the Input/Output interface for communicating with the system.

Central Processing Unit (CPU)

The CPU performs the control and switching sequences required by the system. The software that directs these functions is loaded into the system memory from the mass storage unit by the CPU. Information flows between the CPU, I/O devices, and the system memory over the CPU bus.

The data required by the CPU to perform its control and switching functions is held during system operation in Random Access Memory (RAM) and fed to the CPU via the CPU bus. The operating data is loaded into the RAM from floppy diskettes on system power-up.

The CPU is based on a fast, microprogrammable, general purpose microprocessor which uses High-Level Language (FILL). For system models S, MS, N, ST, and XN, the CPU has the following characteristics:

1 (i-bit data words

storage is organized in pages of 65,536 (64K) 16-bit words each; addressing is via four page bits and 16 address bits.

Meridian SL-1RT, Meridian SL-1NT, and Meridian SL-1XT incorporate a new CPU design that is identical for each system's applications. For these system models, the CPU characteristics are:

24-bit data words plus l-bit parity

24-bit linear addressing that permits memory allocation to be assigned on a contiguous basis instead of the 64K pages partitioning referenced above

16M words - subdivided for up to 12M words of physical memory space and a remainder of 4M words for I/O spaces.

Other characteristics generic to the CPU are:

asynchronous (handshake) bus operation

16 file registers used to hold address and data for all operations

a sense (interrupt) input line to indicate that a particular device (tape, TTY, PE, etc.) requires action by the CPU

a trap facility is provided which, when activated by an external signal, causes the CPU to immediately begin executing instructions starting at a particular address; this facility is used to enter a recovery routine when a fault is detected.

The CPU is comprised of circuit cards which include Read-Only-Memory Firmware that contains fault clearing programs and instructions to control the loading of system memory from the mass storage unit.

Mass Storage Unit

A mass storage unit equipped with two floppy diskettes is used for the high speed loading of the resident operating programs and office data into the system memory. The loading process is controlled by instructions held in the Read-Only-Memory (ROM) firmware. When loading is complete, the diskettes remain in the mass storage unit to provide a non-volatile store for automatic loading purposes in the event of software being erased from memory during a power failure. Non-resident software is loaded from the disk automatically or by manual request when required.

This storage capability is provided by the following hardware configurations:

- a pair of 5.25" 1.2 Mbyte floppy disk drives (providing 2.4 Mbytes of formatted capacity) as a standard system offering,

- an optional Winchester Hard Disk with 10 Mbytes of formatted capacity. When this option is equipped, the pair of floppy disks is utilized for backup and system loading.

The application of the Mass Storage Unit (MSU) is independent of the CPU and therefore is retrofittable on any existing Meridian SL-1 system supported by Software Generic Xl 1 Release 8. Such system models are S, MS, LE, VLE, XL, N, and XN. This procedure involves replacing the Magnetic Tape Transport and associated tape interface with the Mass Storage Unit and equivalent Mass Storage Interface Card (MSI). Physically, the Mass Storage Unit requires no more space than that required for the magnetic tape unit.

The Mass Storage Interface (MSI) card is designed to interface with external devices that are compatible to the industry standard Small Computer System Interface (SCSI).

Input / Output (I/O) Interfaces

There are various methods of communicating with the Meridian SL-1. A Serial Data Interface (SDI) circuit card provides two channels each conforming to EIA Data Interchange Standard RS-232-C. The I/O addressing is under switch control of the SDI card and allows up to 16 RS-232-C compatible devices, such as a teletypewriter, to communicate with the system. The devices are used to input commands and/or receive responses from the system during administration and maintenance procedures. Messages such as feature assignments and service instructions may conveniently be entered - remotely if desired - on an input/output device which can also print out responses from the CPU.

Memory

Firmware, software and data are stored in a read/write Random Access Memory (RAM). The memory is a critical part of the stored program control system. Essentially, it is a storage device which will accept information and retain it for subsequent use by the CPU. It contains the memory stores of all of the basic operating instructions for the system, plus data on the configuration of the particular application being served. Memory utilization is dependent upon what features are programmed into the system and the number of peripheral terminations being served.

The memory is split into four segments to facilitate processor address purposes and permit a functional separation of programs as follows:

Unprotected Data Store (UDS)

These pages hold the transient or unprotected data that is required during call processing. Included are the timing queues and call registers.

Protected Data Store (PDS)

This protected data store holds the office data blocks that are particular to specific installations.

Program Store (BS)

Allocations within the Program Store are as follows:

Firmware: This portion of the memory is a non-volatile Read Only Memory (ROM) used for storage of all system firmware. The ROM is programmed during manufacture and the instructions are permanent and indestructible. It stores the basic rules of operation necessary to initialize the system and bring it into a working state. A recovery or "trap sequence" is included in firmware which is automatically invoked in response to power-on, system reset, or when certain faults are detected.

Overlay: This portion of the memory may be loaded with various non-resident programs as required during automatic diagnostics, service order change, traffic measurement, or maintenance.

Software: The remainder of this memory page is reserved for all of the system software such as the call processing and optional programs. Additional software storage capability is provided by the incremental addition of more memory pages within this category.

Input / Output Addresses

There are no RAM modules utilized for this page. Instead the address range is reserved for Input/Output (I/O) device addresses. These devices include signaling for peripheral equipment along with magnetic tape and teletypewriter assignments.

MODULE 3 - Switching Network

The Meridian SL-1 Integrated Services Network performs the prime task of interconnecting terminal devices for communication with each other. Network loop circuits provide the transmission links required between the originating and terminating devices. The building blocks for network growth are the associated circuit cards contained in each network shelf.

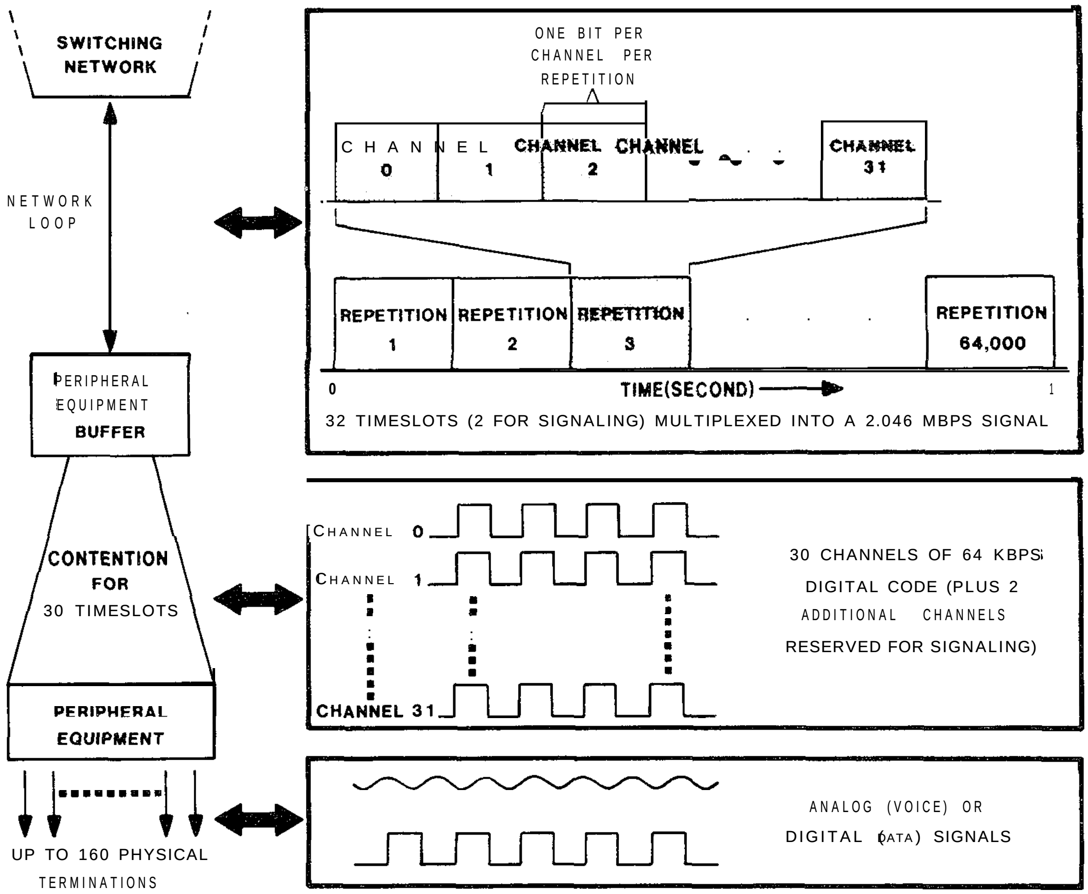
The network shelf interfaces with the common equipment using the common control bus and with the peripheral equipment via digital multiplex loops. Each multiplexed loop consists of an 18-pair cable and connecting circuitry that carries signaling and communication information into and out of the digital switching network. There are two such network loop circuits on a single network card. The data bit streams on each loop are transmitted at 2.048 Mbps and consist of 32 time slots each operating at 64 Kbps. One of the time slots is used for signaling purposes and one is spare leaving 30 timeslots, or channels, for network switching. Two channels are utilized for each connection - one for each peripheral device used in the call. Up to 160 terminals may share the same network loop circuit and therefore contend for the 30 channels available. Thus the allocation of peripheral equipment to the network loop determines the traffic handling capability of the switching network. The lower the terminations the higher the loop traffic capacity and vice versa.

Digital service circuit cards (tone and digit switches) provide call progress tones and outpulsing as instructed by the CPU. Peripheral signaling cards perform the scanning and signal distribution. Each conference card provides thirty channels which may be utilized in various combinations to effect connections between three or more conferees.

In its maximum configuration, the network shelf can accommodate 16 network loops. Two such shelves constitute what is termed a Network Group. A single network group can theoretically house thirty two network loops. However, in the practical sense, service circuits (tone and digit switch and conference) are typically provisioned one each per network shelf. Since they are single circuit cards, their allocation on the network bus is done so at the expense of the network card, and, therefore, the two network loops contained therein. Thus, in the single network group arrangement (Meridian SL-1NT), the maximum configuration is usually 24 network loops, 2 tone and digit switches, and 2 conference cards, accommodating typically 1500 peripheral terminations depending upon traffic handling requirements. Meridian SL- 1ST is considered a half-network group configuration and may accommodate typically 12 network loops, 1 tone and digit switch, and a conference card.

Connection between network loops within a group is effected via the network bus. Printed circuit traces on the backplane of the network shelves provide thirty two links - one assigned to each network loop in the group. Information is transmitted from a loop by means of its designated link and is broadcasted to all other links for reception. Each network loop can receive PCM data from any other link but can only transmit onto its own dedicated link. Any peripheral device served by the network loop can be enabled to transmit on an available channel (timeslots 2 to 31) allocated to it. A control memory associated with each network loop stores the information relative to which terminal to enable and which link (associated with the terminating device) to receive the information on. Each connection path from one peripheral termination to another is created in the specific time slots assigned. Two channels are utilized - one for each peripheral termination in the connection path. Thus an inn-a-loop connection will take two channels of the thirty available on that particular network loop whereas an inter-loop connection will take one channel from each of the respective originating and terminating loops.

For applications beyond the traffic handling capability of the single network group, additional switching stages are introduced to form a multi-group arrangement. Five network groups constitute the switching capacity of the Meridian SL-1 with any one group being connected to all others by means of inter-group switch cards and associated cables. These connecting paths are



HARDWARE SIGNALS

This figure illustrates the principle of time division multiplexing as used in the multiplexed loops. Thirty-two digital signals are sent over a common path by transmitting them sequentially at different instants of time. As a result of eight-bit PCM encoding, the individual signals are at 64 kilobits per second, giving a combined rate of 2.048 megabits per second for each loop. This may be thought of as 64,000 repetitions per second of a sequence of 32 time slots or channels.

FIGURE 3-2: TIME DIVISION MULTIPLEXING

called junctors and are merely an extension of the originating and terminating network loop involved in a call. There are eight one way junctors from each group to all others. Since each junctor provides thirty connecting channels, a total of 480 connection paths exist from one group to another - 240 in each direction.

The flexibility of the network loop plays an important role in the Meridian SL-1 architecture. Besides the ability to increase circuit-switched bandwidth on an incremental card basis for cost-effective growth, application may be varied for value added services. The network loop is a key element in the implementation of Computer to PBX Interface (CPI) and Digital Trunk Interface (DTT). CPI provides an integrated interface for connecting large numbers of host computer ports via 24 channels each supporting up to 19.2 kbps for asynchronous data or up to 56 kbps for synchronous data. DTI provides a digital link of 24 channels each of which may be flexibly allocated for both voice and data communications. Both CPI and DTI use the North American T-l standard (DS-1 format) and each equipped link is assigned an associated network loop.

A similar arrangement is used to connect the circuit-switched network to the Packet Transport. Depending on size and traffic characteristics of the system, one or more 24-channel DS-1 interfaces are used as links to the Packet Transport with each being assigned to a network loop. Voice channels link voice lines and trunks to the voice messaging capabilities of the Packet Transport and provide access to voice/data intelligent terminals connected to the Packet Transport. Data channels link applications on the Packet Transport to terminals and host computers on the peripheral equipment of the circuit switch. The network structure allows for the full connectivity of all devices irrespective of how they connect to the system.

MODULE 4 - Peripheral Equipment

The Peripheral Equipment (PE) is the hardware that interfaces with the various terminal devices utilized in the Meridian SL-1 user environment. Additionally, circuits provide the supervisory and transmission functions needed for the connecting links involved with the external telecommunications network.

The main task of the PE is to convert incoming analog signals into digital signals which are then passed on to the network for digital switching. This conversion is accomplished by a single integrated encoder/decoder (codec) silicon chip that includes active filters for each analog line or trunk port. The reverse process takes place with outgoing signals to the analog interfaces. The PE also performs the first stage of multiplexing signals from the various terminals, emits timing signals, and carries out other functions associated with the control of the peripheral circuits.

The Meridian SL-I codec and its associated low-passjlters are manufactured on a single silicon chip. Both coding and decoding are performed by the same circuit alternately at the standard PCM repetition frequency of 8 kHz. The codec is located on each individual peripheral interface port for analog devices or else in the terminal itself for Meridian digital telephones.

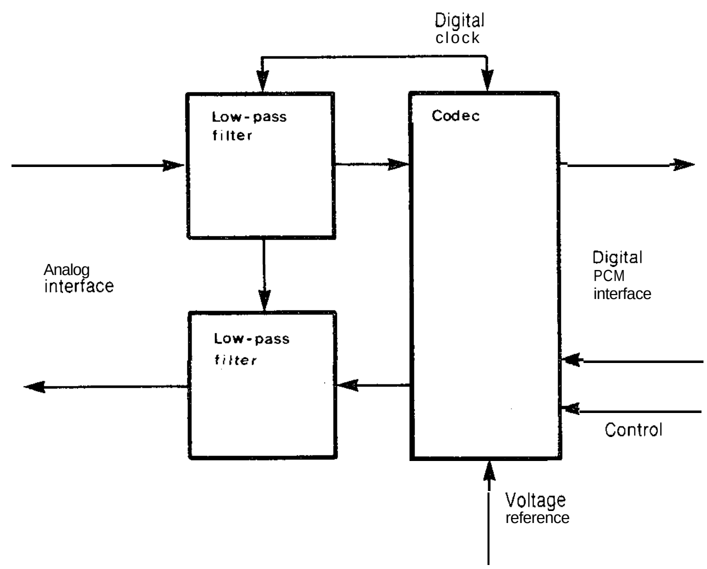
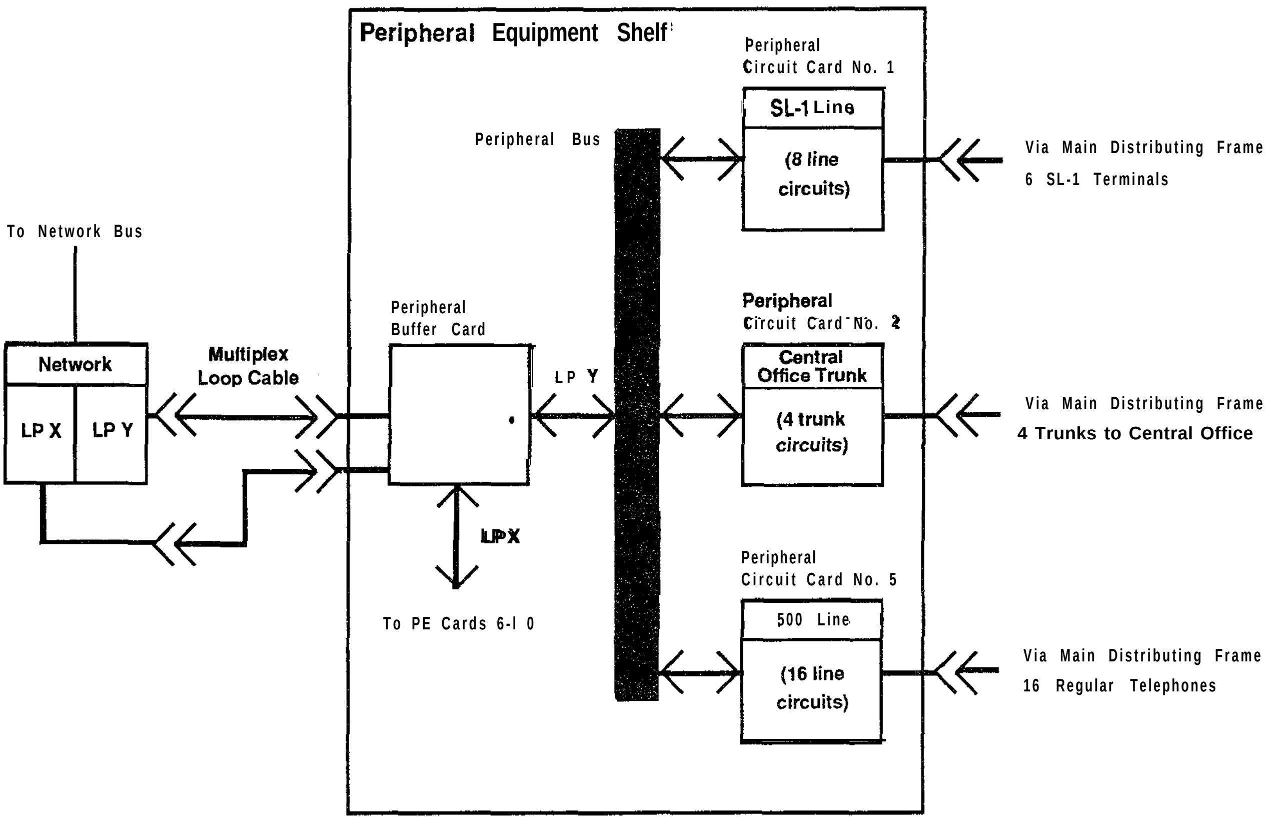


FIGURE 3-3: SINGLE CHANNEL CODEC

When service is required the codec's digital interface is connected to a time slot on a multiplexed loop leading into the digital switching network. Pulse Code Modulation (PCM) is used to represent an analog signal by a sequence of digital words. Each word is a quantized approximation to the amplitude of the signal at a specific instant in time. The standard PCM sampling frequency used in telecommunications is 8 KHz and the codec filters are designed to pass signals up to 3.4 KHz with minimum time delay and low phase distortion. The latter characteristic is not required for voice communication but is necessary because many voice channels also carry data. Companding (compressing - expanding) PCM is the standard technique for using words of only 8 bits to represent the wide dynamic range of signal levels found in telecommunications. Two versions are internationally recognized: The mu-255 law for North American applications and the A-law for international service. The Meridian SL-1 W05 custom filter codec device conforms to these standards and is packaged in different PE cards for use in both.

A PE shelf accommodates the various peripheral interface cards. Each shelf utilizes a universal concept that permits any type of PE circuit card to be located in it. This technique lends itself to extreme flexibility that permits hardware to be equipped to suit specific applications without the need to reserve space for individual card types. The PE shelf can house up to ten peripheral cards plus a single peripheral buffer. The latest available version of the latter permits two network loops to connect to a single PE shelf. In turn, the PE shelf may be logically split so that each network loop can service the peripheral equipment accommodated in each half (Figure 3-4).

All cards plug into a common peripheral bus on the printed circuit shelf backplane which also includes cable connectors for power, interface, and signal connections. The peripheral buffer drives signals to and receives signals from the peripheral bus and interfaces the PE circuit card with the multiplexed loop by means of a faceplate connector cabled to the associated network loop circuit. Thus, individual lines and trunk circuits have access to the thirty channels available for digital transmission under buffer control of the addressing and timing information also carried by the multiplexed loop cable. The buffer also regulates and distributes power voltages to all cards located in the shelf.



The functional organization of a PE shelf is illustrated here. A peripheral buffer card drives signals to and receives signals from the peripheral bus on the backpanel of the shelf The buffer interfaces associated peripheral cards of any mix with the multiplexed loop, which connects to a switching network circuit in the CE. The peripheral buffer also regulates and distributes power voltages to all cards in the same shelf Connections from the line and trunk circuit packs to their transmission facilities are carried from the backpanel via connections on the side of the shelf to an interface panel where they inter-connect via plug-ended cables to the main distributing frame.

FIGURE 3-4: PERIPHERAL SHELF ORGANIZATION

Remote Peripheral Equipment (RPE)

In a local operating environment, the peripheral equipment may be housed up to 50 feet from the common equipment. The RPE feature extends this range to approximately 70 miles between local and remote facilities. This extension is made possible by converting the multiplexed loop signals to a form compatible with the commonly used T-l type digital transmission system. Any medium conforming to DS-1 format (1.544 Mbps) may be used to link local and remote sites, including digital microwave radio and fiber optics. As shown in Figure 3-5, the peripheral equipment is remoted on a network loop basis using two T-l lines. Since each T-l line has 24 channels, the interface to the network with 30 channels provides built-in redundancy. Twenty of the time slots are split equally between each of the two T-l lines so that if one of the latter should fail, service is maintained on the other at reduced traffic capacity. At the remote location, the two T-l lines are converted back to the Meridian SL-1 format of 2.048 Mbps so that the remote peripheral equipment can be connected.

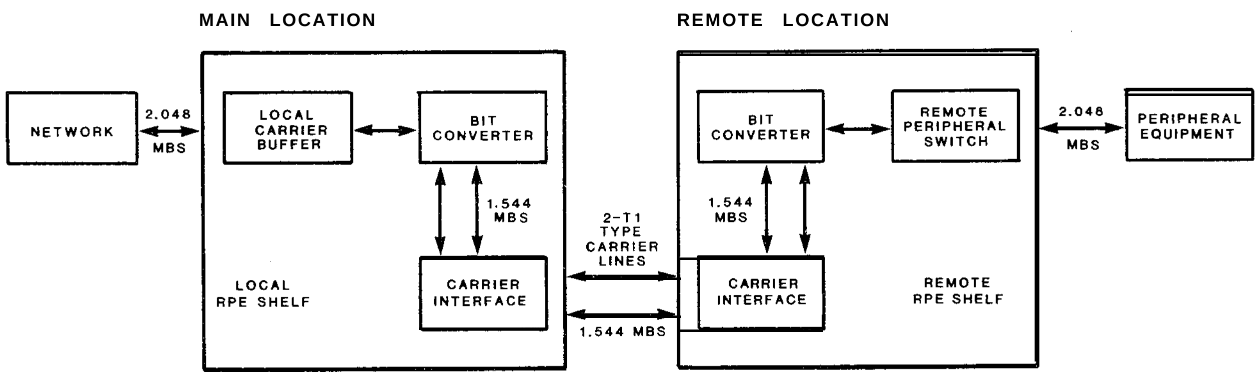


FIGURE 3-5: REMOTE PERIPHERAL EQUIPMENT

The Meridian SL-1 Peripheral Equipment provides an optimal solution for voice and circuit-switched data communications at speeds of 64 kbps or less. However, in recognition of the rapid growth of distributing processing and personal computers in the office environment, then high speed data access and the ability to handle long packets of user data becomes more apparent.

MODULE 5 - Packet Transport

Packet Transport represents a significant extension to the system architecture of the Meridian SL-1 by providing packet switching to support the high speed data access normally associated with local area networks. By combining the best characteristics of a digital PBX with those of a LAN, an unprecedented range of voice and data communications together with processing services can evolve. Three major innovations provide advanced communications capabilities to the user:

- a 40 Mbps packet transport that allocates handwidth on demand,
- a loosely-coupled, multiprocessor operating system, and
- a high-speed digital distribution system that delivers 2.56 Mbps to the desktop over standard telephone wiring.

The main components of the Packet Transport (Figure 3-6) are:

- Transport Bus, an integrated circuit/packet bus with an available bandwidth of 40 Mbps that can be allocated to circuit-switched voice or data as well as packet switched data.
- Transport Controller, which controls asynchronous data access to the transport bus and ensures data integrity. Asynchronous data normally is packet switched so that bandwidth is required only when valid characters are being transmitted.
- Loosely-coupled multiple processors, each with their own complement of memory, provisioned in accordance with application requirements to execute the software. The distributed multiple processor technology allows for an increase in function and capacity. Each processor communicates with others as an independent peer over the 40 Mbps transport.
- DS-1 Interface, which allows the Packet Transport to communicate with the circuit-switched network and central processing unit over one or more links of 24 channels. It consists of a T1 type digital trunk plus a protocol converter. Voice or data to be circuit-switched within the Packet Transport is routed directly from a channel on the T1 link to a bus cycle on the Packet Transport.
- Mass Storage Interface, which is an intelligent peripheral used to control disk and streaming tape drives.
- Lanlink Interface, which interconnects Meridian LANSTAR workstations to the packet transport via the 2.56 Mbps high-speed digital distribution over twisted pair telephone wiring. The data rate is 2.56 Mbps in each direction giving a total access bandwidth of 5.12 Mbps, while the Packet Transport bus provides a total system bandwidth of 40 Mbps.
- Meridian Mail, a Voice Processing Sub-System, which includes a Voice Compressor and Tone Detector. The Voice Compressor receives standard PCM voice from the transport bus and compresses and expands it for storage and playback. The Tone Detector recognizes standard DTMF tones and generates various call progress tones.

The Packet Transport's node orientation provides numerous advantages:

Growth:	Hardware can be added on an incremental basis
Evolution:	Advancements in processor and storage technologies can be readily incorporated
Administration:	All aspects of the system can be administered from a single terminal
Reliability:	Redundancy is cost-effective allowing, for example, one additional processor card to act as a hot standby.

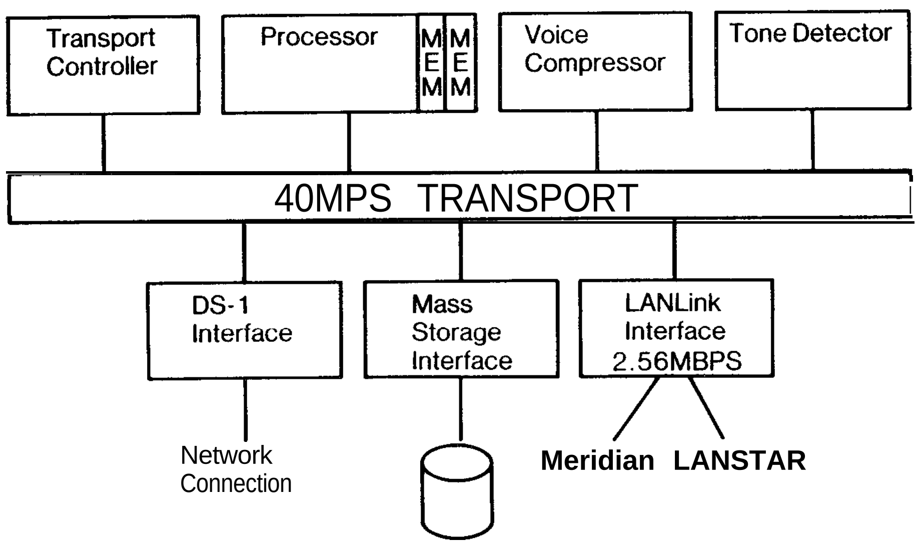


FIGURE 3-6: PACKET TRANSPORT ORGANIZATION

MODULE 6 - Telephones and Terminals

To the user, the telephone or terminal is the most visible part of the business communications system. The Meridian SL-1 permits a wide array of such devices to be connected to allow the user to exploit the system's capabilities to the full in an easy and effective way.

Northern Telecom was the first manufacturer to introduce a proprietary electronic telephone that provides simple, direct selection of services and unambiguous responses to indicate the progress of calls. However, it was also realized that in many instances, the user organization would have the need to utilize industry standard telephones with both pushbutton and rotary dials (Figure 3-7). This requirement was met by having a separate circuit in the Peripheral Equipment (PE) for each type of line.

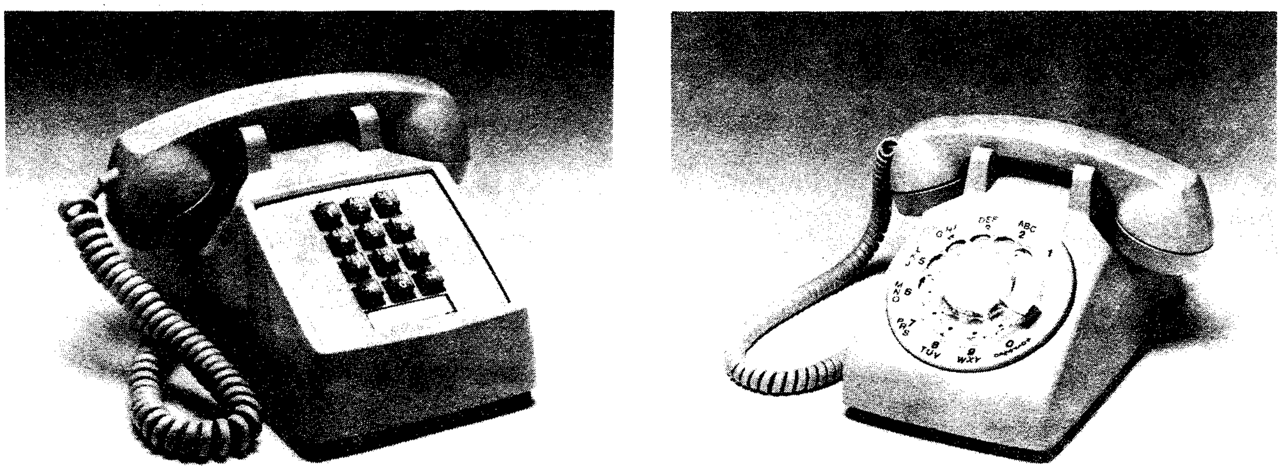
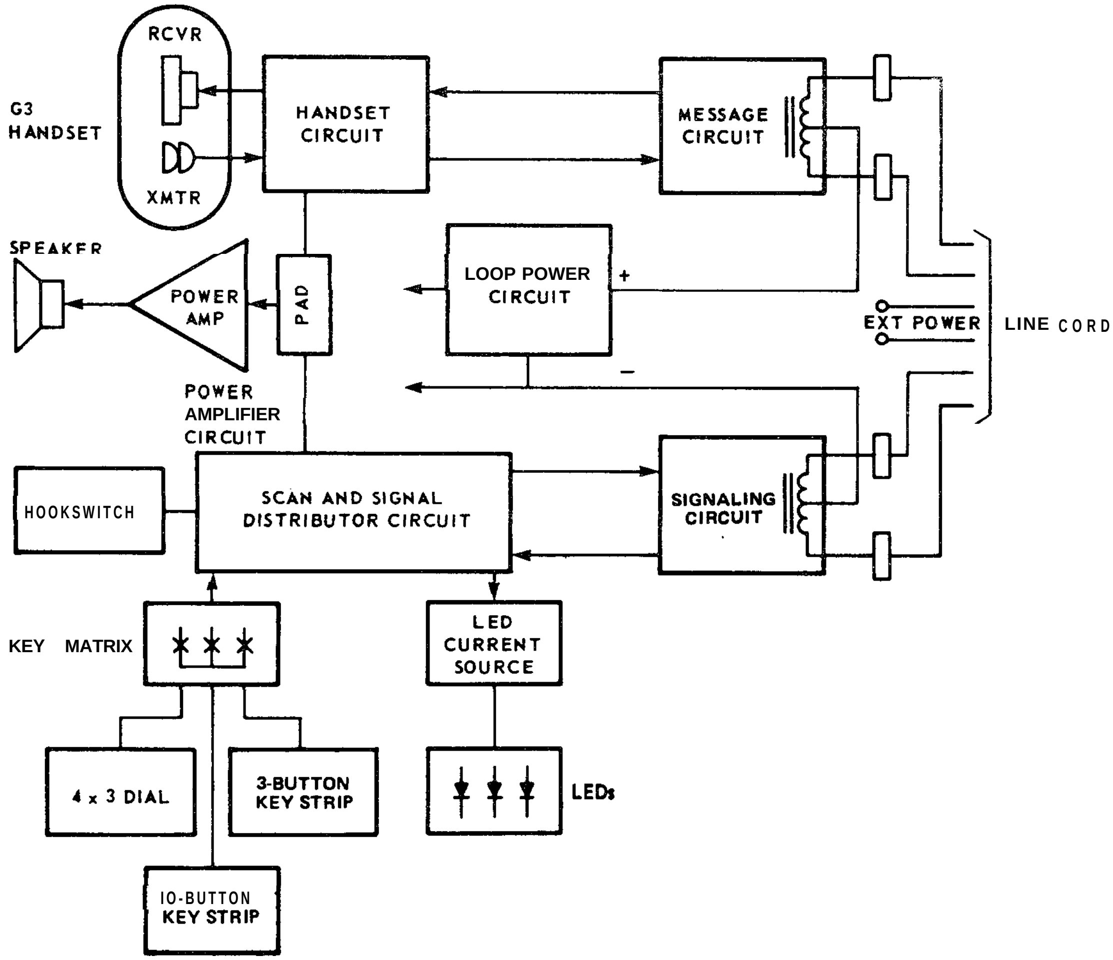


FIGURE 3-7: SINGLE LINE TELEPHONES

Another main requirement was to reduce the size of the interconnecting cable used for existing key telephones (for example, a six button set requires a 25 pair cable). This was achieved by using a form of distributed control in the SL-1 electronic set (Figure 3-8). A scan and signal distributor (SSD) acts as a gatekeeper for all the input and output devices on the set. It scans all inputs from the key pad, hook switch, and feature keys sequentially and if depressed, passes on the appropriate control signal to the Common Equipment (CE). Similarly, when it receives an output signal from the CE, the SSD actuates the correct output device on the set, be it an LED lamp, buzzer, or volume control.



The SL-1 telephone uses a six-conductor line cord. The main functional parts are shown above. Analog voice signals are carried to and from the handset over a standard cable pair. Tone ringing, tone buzzing, and voice calling features are provided by a speaker driven by a power amplifier. An attenuation pad under CPU control issues the gain to this amplifier. All signaling information between the set and PE is transmitted over a digital control link utilizing one cable pair. The link operates full duplex in both directions simultaneously at a data rate of 2400 bits per second. Twenty-five momentary contact keys on the faceplate of the set are used for dialing, selecting features, and controlling volumes. The SSD sequentially checks their status and generates and receives control signals to and from the CE accordingly. Power for the SL-1 terminal is derived from the voice and signaling pairs. Add-on modules expand the feature key capabilities of the basic SL-1 set and the third cable pair may be utilized to provide the external power required. The six-conductor *line cord is one of the major advantages of the SL-1 set design since each terminal is connected to the PE using the same cable and procedures used for conventional single line telephones. This permits office buildings to be prewiredfor the eventual workstation use of either type of set.*

FIGURE 3-8: FUNCTIONAL ELEMENTS OF THE SL-1 TELEPHONE

The family of modular electronic telephone sets enable the user to choose the components needed at a given time with the opportunity for simple expansion later. The family includes the basic set (Figure 3-9) with its 12-button dial pad, 10-feature keys, and LED indicator lamps. When expansion of the set's capability is required, a 10 or 20-button add-on module may be attached. A plug-in handsfree speaker unit may also be added to the SL- 1 set.

Another version of the SL-1 telephone is specially designed to serve Automatic Call Distribution (ACD) applications. It is equipped with dual headset jacks instead of a handset for ACD agents and supervisors.

The Meridian Ml109 Compact telephone (Figure 3-10) is a multi-line telephone with inherent Handsfree communications capability. It has eight assignable feature or line keys, a hands free/mute key and color coded Hold and Release Keys. The Compact Telephone does not accept additional add-on modules like the SL-1 Telephone, but provides a compact footprint and styling commensurate with the Meridian M2000 series of digital telephones.

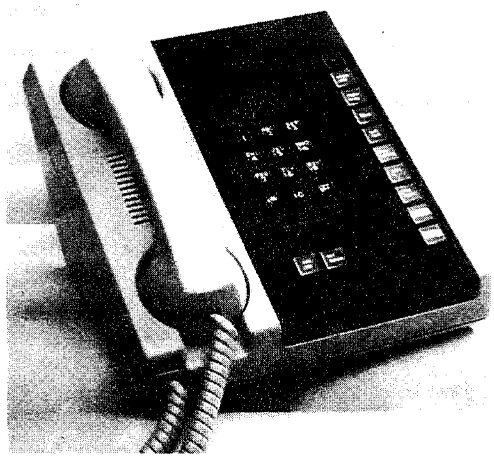


FIGURE 3-9: SL-1 TELEPHONE

FIGURE 3-10: MERIDIAN Ml 109 COMPACT TELEPHONE

The attendant console and optional busy lamp field provides for fast, efficient call handling by the attendant.

Displayphone Terminals

The Displayphone (Figure 3- 11) is a compact desk-top stand alone unit that combines the voice communication function of the telephone with a computer terminal's ability to transmit and receive data. It contains a microprocessor that enables it to control the telephone's features, provide access to a variety of data bases, and also give users a visual account of what is transpiring through appropriate prompts on the video screen. User programmable information such as directory, reminder service, log-on procedures and soft keys is stored in the Displayphone memory. A built-in modem permits access to remote data base services. The simultaneous voice and data capability allows the user to talk on the telephone while searching through electronic files. There are various versions available, including the SL- 1 Displayphone which combines the features of the SL- 1 Electronic telephone with those of the Displayphone and is specifically designed for use with the Meridian SL- 1. The built-in data communications module handles digital data transmission at up to 9600 bits per second over twisted pair wiring. A voice conversation can be carried on at the same time as data and text appear on the screen. As a fully featured business telephone, SL-1 Displayphone can be assigned the powerful features of the Meridian SL-1 such as Conference, Ring Again, and Call Forward for single-key activation. Two voice lines and a data line are available. Dial Intercom, Group Call, and Private Line can be assigned to meet individual needs.

The Displayphone Plus is a portable, integrated communications unit that provides the ability to emulate terminals of most major computer manufacturers. It is available as a direct-connect model with an internal modem. It also features a full-size retractable keyboard and an amber screen. Its telephone unit includes a 90-number directory, an automatic dialing feature and hands-free speaking.

The latest member of the Displayphone portfolio is the Displayphone 220. As a data terminal, it brings local and remote data communication capabilities to the users and emulates the DEC VT 220/100/52 with access also to IBM PC applications. As a business telephone, the Displayphone 220 features two 500/2500 compatible lines, automatic dialing, last number redial, on-hook dial-up, programmable telephone feature keys, a recall list, and a 90 number voice and data directory. Options include an integral modem and hard-copy printer.

FIGURE 3-l 1: DISPLAYPHONE TERMINAL

All connections between terminals and data line PE cards in the Meridian SL-1 are over one or two pair telephone wiring distribution. Flexible expansion can easily be achieved by adding more data cards and terminal interface modules. This approach to providing data communications has not required any changes to the Meridian SL-1 hardware and software architecture.

Digital Telephones

The Meridian family of digital telephones (Figure 3-12) have been optimized for applications where data communications is required. They offer an integral data option that can be field installed to provide simultaneous voice and data communications over single pair wiring to a port on an Integrated Services Digital Line Card (ISDLC) residing in the Peripheral Equipment (PE) of Meridian SL- 1.

Analog-to-digital conversion tables place in the set itself rather than in the associated peripheral line card. This eliminates the attenuation, distortion, and noise generated over telephone lines, and results in a voice quality that is exceptionally clear and crisp. Signaling and control functions are also handled digitally. An eight-bit microprocessor in the telephone set monitors all keypad and hookswitch operations and sends digital messages, multiplexed into a digital transmission stream, to communicate to the system any change in status. Lamp indications, ringing, and handsfree operation are controlled with similar messages and sent from the system to the telephone set.

Meridian M2000 Series

Various digital telephones are available as follows:

Meridian M2009 provides the benefits of multiple lines and feature flexibility through utilization of its nine programmable keys.

Meridian M2112 has a built-in handsfree capability and provides eleven feature keys which can be assigned in any combination of lines and features. The 12th key is the Handsfree/Mute key.

Meridian M2018 offers 18 keys for the additional lines and features required in typical secretarial environments.

Meridian M23 17 provides 11 programmable keys for any combination of features and directory numbers, 5 context sensitive softkeys, handsfree conversation capability and a 2 line x 40 character alphanumeric display.

Release and Hold keys are color coded as are changeable key caps to distinguish lines from features. Large LCD's for each key provide a distinctive indication of call status and feature activation. A built-in speaker means that the user does not have to lift the handset until the other party is on the line.

Meridian M3000 Touchphone

Meridian M3000 Touchphone is a digital telephone which provides complete communications control via a unique touch-sensitive liquid crystal display. It gives access to the full complement of calling features of Meridian SL-1 to meet the demanding requirements of business decision-makers. The telephone screen indicates which features can be used at any given time and a feature labeled "Explain" provides access to a built-in user guide.

The Meridian Touchphone is equipped with a full list of standard features. Six lines can be configured as directory numbers, private lines, and intercoms. Handsfree with automatic answerback is built-in. A private Directory of over 100 names and numbers permits the dialing of voice, data, and intercom calls by simply touching a name on the LCD screen.

FIGURE 3- 12: MERIDIAN DIGITAL TELEPHONES

Time Compression Multiplexing

TCM is used to integrate the voice, data, and signaling information over a single pair of telephone wires. TCM compresses the continuous bit stream between the system and digital set into bursts and leaves sufficient space between bursts for data to be received without interference from the far end. The transmit-receive cycle with TCM is as follows: the system sends one burst of 20 data bits to the digital set; the set processes the bits and sends a similar burst back to the system. Once this exchange is completed, the cycle is repeated up to 8,000 times per second. Every transmitted burst is compressed into two 64 Kbps traffic channels plus two 16 Kbps signaling channels. The TCM technique, often referred to as "ping-pong" transmission, provides a total bandwidth of 512 Kbps in the following ISDN-like format:

Voice	=	64 Kbps x 2	=	128 Kbps
Data	=	64 Kbps x 2	=	128 Kbps
Signal	=	16Kbps x 2	=	32 Kbps
Framing			=	80 Kbps
wait			=	144 Kbps
		Total		512 Kbps

Figure 3- 13 shows the concept of TCM for application with Meridian SL- 1.

Asynchronous Data Option

The Asynchronous Data Option can be equipped in each digital telephone to allow data communications at speeds up to 19,200 bits per second from an associated ASCII terminal or personal computer. Data calls are performed entirely from the data terminal keyboard. Powerful conveniences such as Speed Calling and Ring Again (which notifies the user when a busy computer port is free) are selected from a menu displayed on the terminal screen.

If the data option is not equipped in a set initially, it can be added easily in the field at any time. The data options are located inside the telephones and utilize digital transmission over the same pair of wires used for voice. Therefore, there are no additional hardware rearrangements in the line circuit when the data option is added.

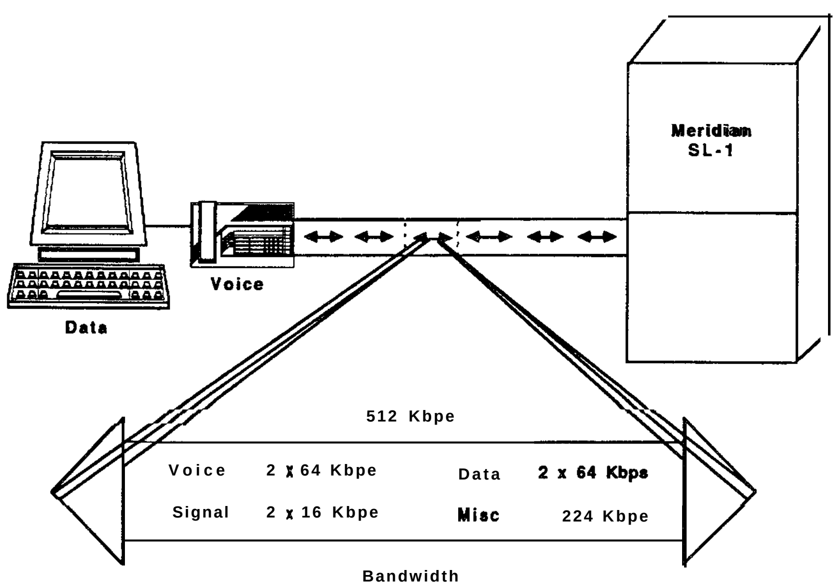


FIGURE 3- 13: TIME COMPRESSION MULTIPLEXING

MODULE 7 - Voice Services

The voice services of the Meridian SL-1 offers a wide selection of features to meet individual business needs. A modular format permits the system software to be tailored for specific industry segments. The voice services provide management tools to assist in the cost-efficient allocation of resources as well as features to improve productivity and time management. In excess of ninety optional feature complements, in addition to those inherent in the system, may be selected on a menu type basis to address specific user needs.

There are numerous cost control features available:

- Automatic Route Selection lowers the cost of long distance communications by automatically routing calls over the least expensive trunk facility

- Call Detail Recording monitors incoming and/or outgoing call costs and facility usage

- Direct Inward System Access allows a remote caller outside of the Meridian SL-1 to access a defined sub-set of system resources

- Class of Service restrictions can be placed at both the user and resource level

- Attendant Administration reduces recurring operating costs associated with telephone relocation and feature amendments

In terms of productivity and time management, features include:

- the fast, accurate dialing of speed call on both a user and system basis

- ring again to alert and connect the user to a previously busy extension or facility

- the convenience of both stored and last number redial

- call forward which permits calls to be forwarded to an alternative location within or external to the system

- hunting to enable calls to skip over busy facilities.

Numerous communication applications provide significant benefits to business operations, including:

- Automatic Call Distribution (ACD) which evenly distributes a high volume of calls to designated personnel for fast, efficient customer service

- Multi-Tenant permits the resale of communications services to as many as 512 tenants within each of 32 customer groups on a per system basis

- Electronic Switched Network (ESN) extends Meridian SL-1 cost control capabilities to each hub in a corporate communication network

Centralized Attendant Service (CAS) consolidates all attendant operations at a single centralized location

Meridian Mail, an integral part of Meridian SL-1, provides voice messaging capabilities to eliminate the problem of telephone tag and diverse time zones by always being available to answer the telephone

MODULE 8 - LANSTAR

The design and architecture of the Meridian SL-1 were specifically developed to accommodate the rapidly expanding requirements for data as well as voice communications. Since its introduction, the Meridian SL-1 product line has evolved to include a wide portfolio of data communications capabilities.

LANSTAR is the umbrella name describing the local area network capability of the Meridian SL-1. As such, LANSTAR designates an entire family of data connectivity products and services. LANSTAR products bring together the diverse applications and equipment of today's business user. A single system can serve both voice and data communications needs--by integrating the functions of a Local Area Network (LAN) and PBX.

There are tremendous advantages in using a single unified system for both voice and data communications. Perhaps the most obvious benefit is the inherent efficiency of managing resources as part of one system. Resources such as cabling, transmission lines, host computer ports, terminals, personal computers and peripherals may be administered more intelligently within a single cabling arrangement. The Meridian SL-l's call accounting functions can be used to monitor data traffic and to optimize system performance.

LANSTAR offers a comprehensive local area networking solution which gives users quick access to multiple sources of information--access which can mean saved time and money. Users can make use of a variety of terminal and computer equipment, with many options for acquiring and distributing information.

All connections to the Meridian SL-1 are made with standard twisted pair telephone wire. This type of wiring is already required (and consequently already installed) for voice communications. By using the Meridian SL-1 for integrated voice and data connectivity, duplicate wiring is avoided. Dedicated terminal connections are eliminated, and long runs of RS232 cable, coaxial cable, or shielded cable become unnecessary. Moves and changes are accomplished with complete coordination of voice and data connections, and with less expense.

Port contention permits many users to share scarce computer ports on an as needed basis. This is especially important where many users do not need an eight hour per day connection. Port contention can be successfully implemented due to Meridian SL- 1 convenience features such as port hunting, auto dial, and ring again.

Users who encounter a busy group of computer ports may use the ring again feature to queue for the first available port. Traffic management functions of the Meridian SL-1 allow a precise allocation of resources, so that users can have the level of service they need, without having ports and connections which are idle most of the day.

Concentration allows multiple data devices to share a common communications line, such as a T-l line or a modem link to a packet-switched network.

Domain Switching provides the ability to connect a single data terminal to different hosts without rewiring or manual switching. This means that ASCII terminals and personal computers may be used to access a variety of host computers (including IBM hosts), public databases, electronic mail and other applications. Instead of a terminal dedicated to a single computer port (via a hard-wired connection), terminals may be used flexibly with many different applications. Domain Switching eliminates the "two terminals on a desk" problem, provides significant cost savings, and greatly expands the usefulness of ASCII terminals and personal computers.

LANSTAR utilizes the circuit switch and packet transport architectures of Meridian SL-1 to optimize services to specific data environments. A comprehensive portfolio of LANSTAR products are available to address the following applications:

- Terminal Access
- Local Area Networking
- Host Computer Access
- IBM Access
- Wide Area Networking

In addition, through a Strategic Alliances Program, Northern Telecom maintains working relationships with leading computer and office automation vendors to ensure connectivity and compatibility between their respective products.

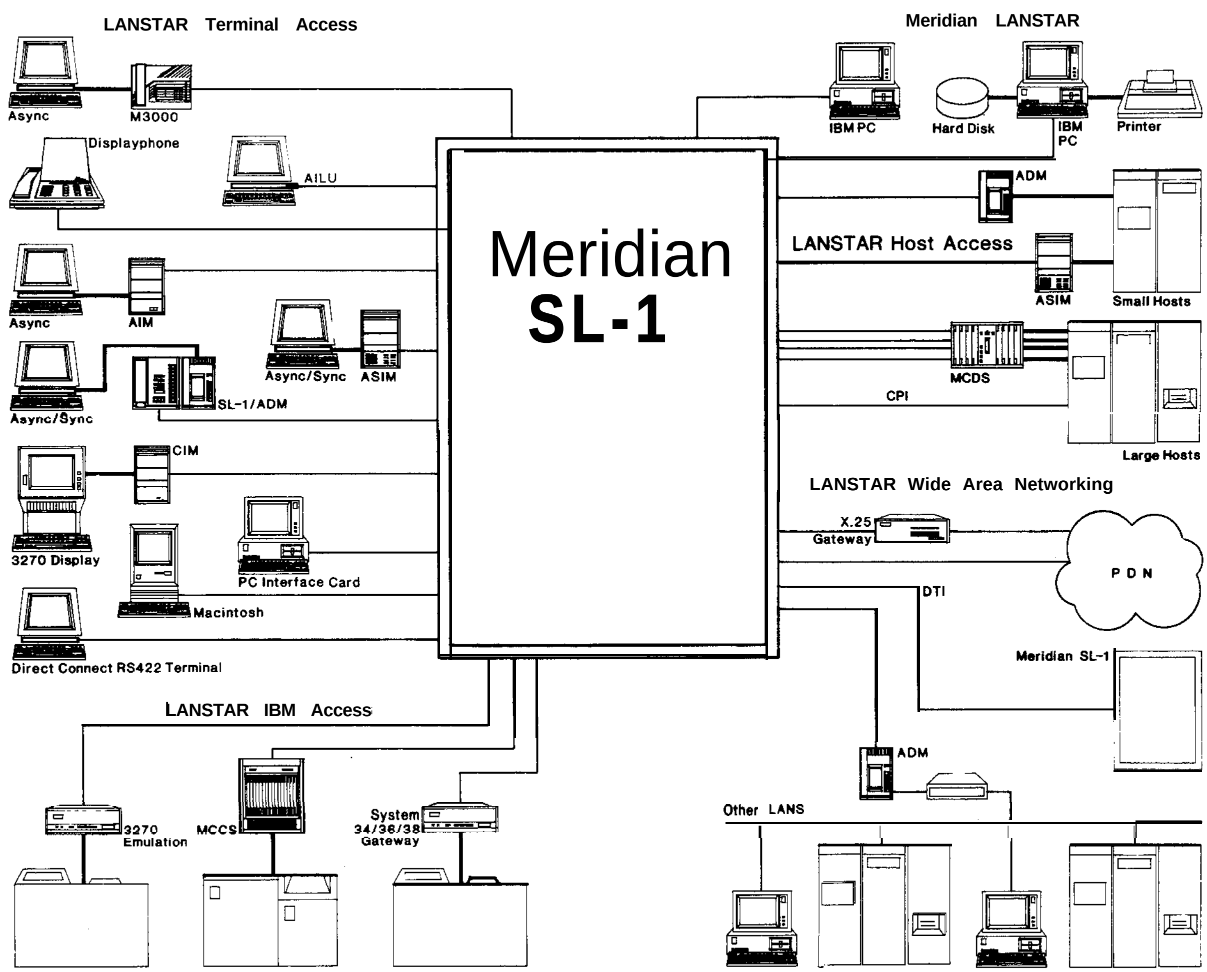


FIGURE 3-14: LANSTAR DATA SERVICES

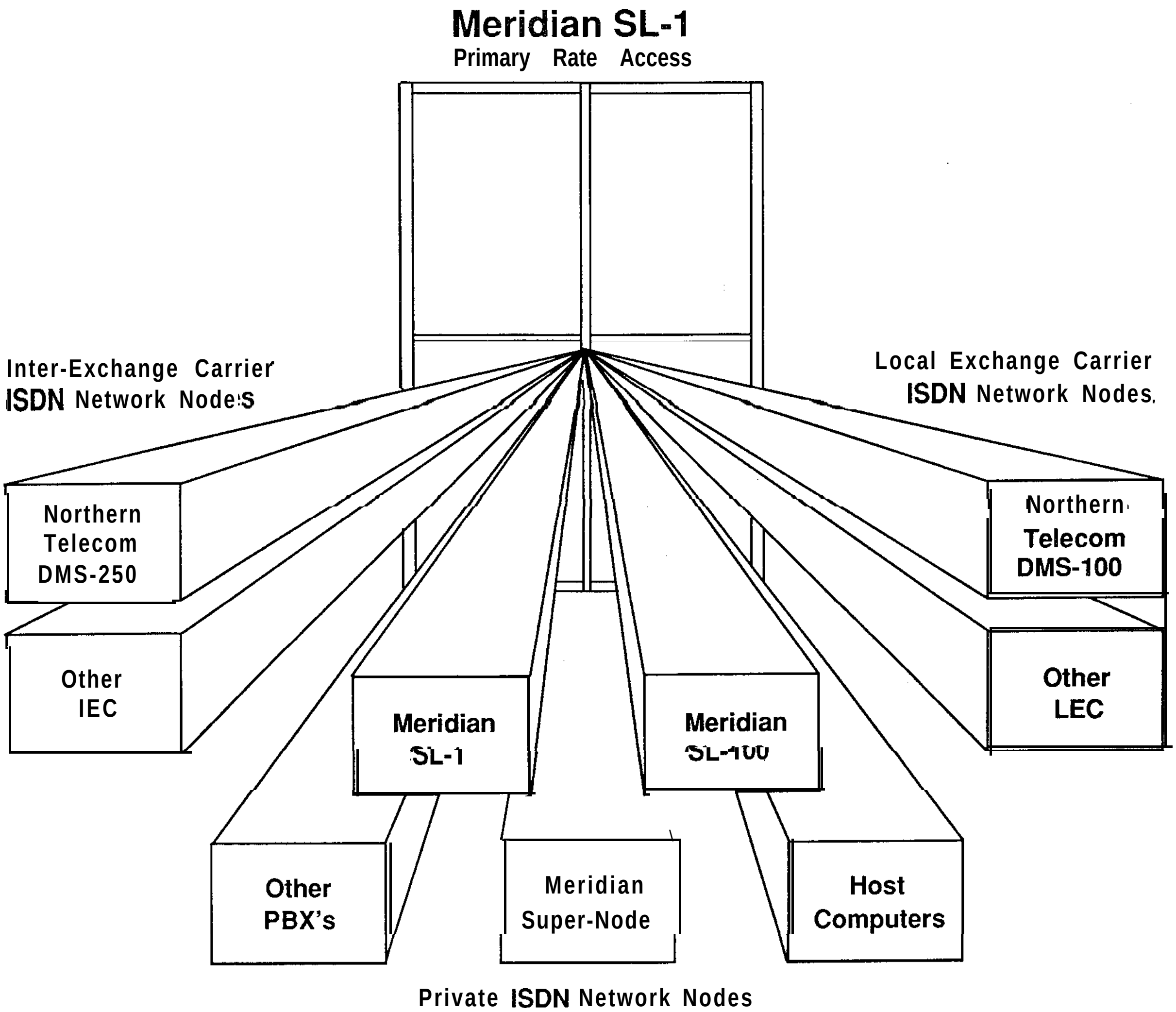
MODULE 9 - ISDN

The concept of the Integrated Services Digital Network (ISDN) is to provide end-to-end digital connectivity to support a wide range of voice and non-voice services to which subscribers have access via a set of standard multi-purpose user to network interfaces. The major factor which characterizes ISDN is the ability to use a single communication channel for all forms of information transfer regardless of its source. As such, its main purpose is to replace present analog communication systems with digital counterparts so that subscribers will have direct access to a high-speed pipeline capable of simultaneous voice, data, and various other services and calling features. ISDN is no longer just a concept but a reality that is being designed into many of today's communications systems.

A goal of the ISDN is to provide a limited number of standard interfaces. The basic service unit is a channel which represents a specified portion of the information carrying capacity of the interface. Channels are described and classified by type and are combined into interface structures. The most fundamental channel is called the 'B' channel. Most basic services are based on a number of 'B' channels, each of which is a 64 Kbps clear channel. The 'B' channel does not carry network signaling information and the entire 64 Kbps stream is available for user information such as digitized voice or data. Another channel, the 'D' channel, is used to convey network signaling information and operates at 16 Kbps. The building blocks of ISDN access are the interface structures which define the format of the connection in terms of channel types as well as the total information carrying capacity at the network interface point.

Two types of access to an ISDN have been defined to date. Basic Rate Access is an interface structure called the 2B + D arrangement. The bit pipe is a 192 Kbps digital stream, time division multiplexed into two independent 64 Kbps B channels and a 16 Kbps D channel. Primary rate interfaces provide much more capacity than the basic interface. Primary Rate Access is based upon the use of primary rate digital transmission multiplexing techniques such as the 'T1' rate of 1.544 Mbps used in North America and Japan, and the 2.048 Mbps used in Europe and elsewhere. The primary rate structures are 23 B channels plus a 64 Kbps D channel at 1.544 Mbps, and 30B channels plus a D channel at 64 Kbps for the 2.048 Mbps rate. This type of access is primarily intended to meet the initial needs of PBX access.

Two key aspects of ISDN position Meridian SL-1 for immediate implementation of ISDN Primary Rate Interface. First, since primary rate facilities (T-carrier) have been in use for over 20 years, support of the associated physical interface already exists on Meridian SL-1. Second, the architecture of Meridian SL-1 need not be changed to support ISDN. Voice is currently handled within the system by Pulse Code Modulation (PCM) which utilizes 8 bit sampling 8000 times per second, resulting in 64 Kbps PCM. By utilizing the inherent "clear channel" digital architecture as well as the modular design of Meridian SL-1, the ISDN implementation will be accomplished through hardware, firmware, and software enhancements. In fact, Meridian SL-1 already provides users with ISDN-like capabilities today with products such as Digital Trunk Interface (DTI), Computer to PBX Interface (CPI), and digital telephones. The latter offer two "clear" 64 Kbps channels with an associated 16 Kbps signaling channel.



Meridian SL-I ISDN Primary Rate Access provides a 1544 Mbps (23 B + D Channels) link to Local Exchange Carriers, Inter-Exchange Carriers or Private Network nodes.

FIGURE 3-15: ISDN PRIMARY RATE ACCESS

System Organization

The design approach to the Meridian SL-1 architecture combined with modular components has produced an extremely flexible system adaptable to many applications in the business environment. Each system is organized around three functional areas: control (which includes the common equipment and software), circuit-switched network, and peripheral equipment. A fourth element, Packet Transport, may be additionally specified for certain Meridian SL-1 system types.

The CPU communicates with the system memory, network, and input-output devices via a common control bus which extends across the backplanes of both control and network equipment shelves. In the larger versions of Meridian SL-1, the CPU and memory are provided in a completely redundant mode. The system memory is sub-divided into functional blocks and resides on the common control bus along with the mass storage unit for loading and storage of software, and the teletypewriter for administrative activities.

The network shelves interface to the peripheral shelves via the digital multiplexed loops which carry both control and traffic information. A dedicated channel routes the signaling information from the PE to the CPU by means of a peripheral signaling card located on the network shelf. Two network shelves constitute a network group and can switch a maximum of thirty two (32) multiplexed loops. A multigroup switching arrangement extends the network matrix to a maximum of five network groups accommodating a total of 160 multiplexed loops.

Service circuits that generate tones and set up conference calls are provided on the network bus by simply replacing the switching network cards with service cards in accordance with recommended traffic procedures.

Each multiplexed loop can terminate to a maximum of 160 peripheral terminations. The universal PE bus structure permits any mix of PE card types to be located on the PE shelf. Provisioning of PE cards and their associated density (number of ports) determines the network loop to PE shelf configuration. Single density (4 port lines) permits four, two, or one PE shelf respectively to be connected to the network loop. Lower density PE cards may be freely intermixed with higher density BE cards on the higher density PE shelf but not vice versa. The quantity and type of terminal assignments are allocated to optimize the traffic handling capabilities of the switching network. Complete modularity permits voice and data modules to be segregated so that the specific traffic patterns of one may be met without impeding the other.

A peripheral buffer acts as the interface between PE and CE providing power control, timing, and switching control signals for the peripheral interface cards. Digital conversion into eight-bit PCM signals is accomplished by a single encoder/decoder (codec) for each analog peripheral port. In the case of the Meridian family of digital telephones, the codec resides in the set itself. The PE buffer may be used in a dual mode to permit separate network loops to be connected to each half of the PE shelf for high traffic requirements.

Besides the connection to peripheral equipment, optional allocation of circuit-switched bandwidth may also be made on a network loop basis to Computer to PBX Interface (CPI), Digital Trunk Interface (DTI), or Packet Transport. Each of these optional links is based on the standard T-l format (DS-1 24 channel) used in digital transmission networks.

CPI provides an integrated interface for connecting large numbers of host computer ports via a link of 24 full duplex channels each supporting up to 19.2 Kbps asynchronous data or up to 56 Kbps for synchronous data.

DTI allows for the replacement of 24 conventional analog trunks by a single T-l digital link. Each of the 24 channels provides up to 56 Kbps for voice and synchronous data transmission, or up to 19.2 Kbps for asynchronous data. Both DTI and CPI use the same interface card which is located in the circuit switch equipment of Meridian SE- 1.

The Packet Transport enables many devices and programs to communicate over a common information channel that supports both voice and data traffic. It delivers a usable bandwidth of approximately 40 Mbps of which a guaranteed minimum of 10 Mbps is available for asynchronous traffic and 30 Mbps for synchronous voice and data. Unused synchronous capacity is available for asynchronous traffic. The Packet Transport is connected to the Circuit Switch Common Equipment over one or more of the high-speed 1.544 Mbps DS-1 links. The Common Equipment, Peripheral Equipment, and Packet Transport work together to provide flexible support for a broad range of devices, applications, and services. Thus, terminals connected to the PE have access to the powerful services of the Packet Transport via the switching network. Likewise, a user terminal connected to the Packet Transport can make use of the facilities and resources supported by the PE. The complete system architecture is depicted in Figure 3- 16.

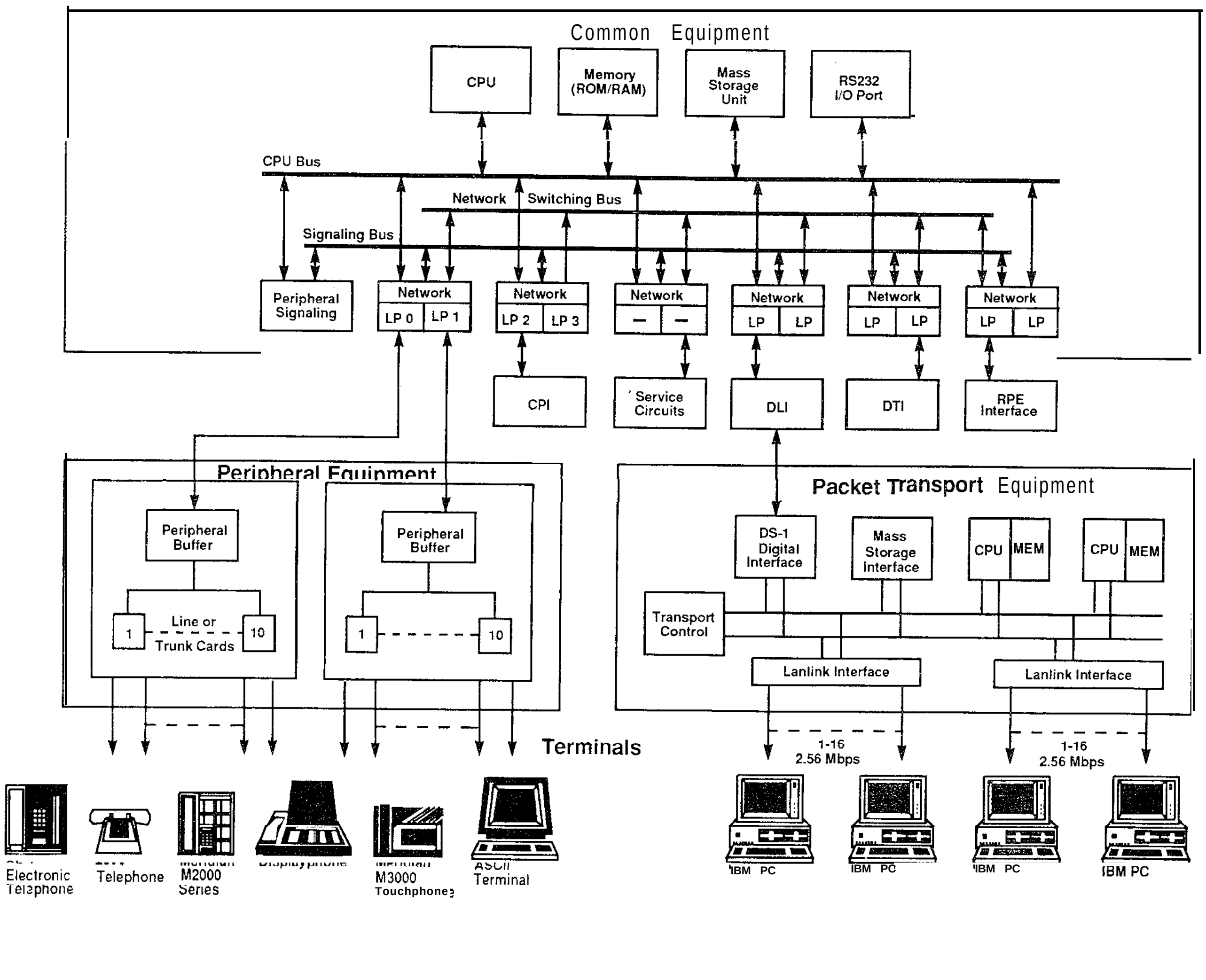


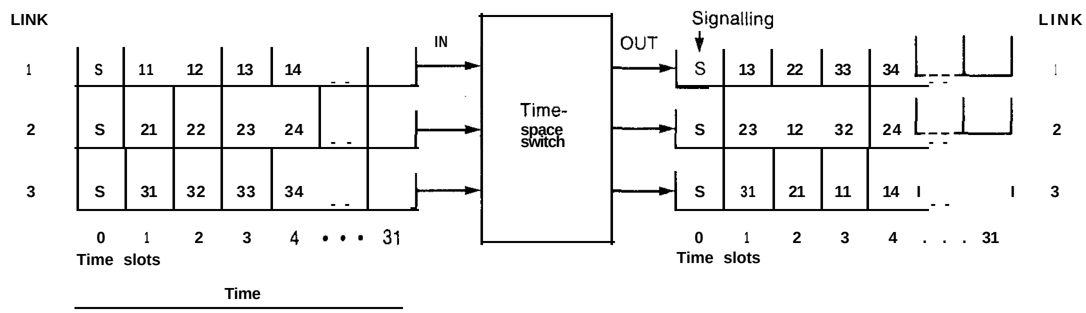
FIGURE 3-16: MERIDIAN SL-1 SYSTEM ARCHITECTURE

Switching Matrix

Many systems such as crossbar employ what is known as "space switching" where each individual switching stage is a matrix of inlets and outlets. To connect an inlet to an outlet the corresponding crosspoint is closed.

The advent of digital switching and time division multiplexing (TDM) provides the capability for time switching. Thus conversations, instead of being placed on different lines, are sampled and placed in different channels or time slots in each frame and can be switched to any other time slot in that frame. The same physical connections can carry many conversations simultaneously.

A third type of switching is a combination of time and space switching (Figure 3-17), where a conversation coming in on any time slot of any input line can be switched to any time slot of any output line.

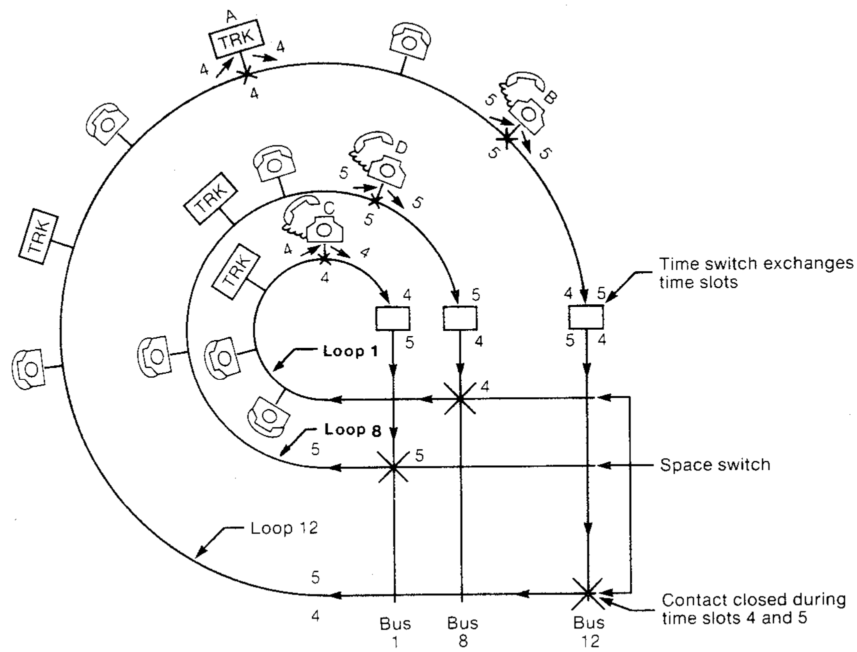


With time-space switching, a conversation occupying any time slot on any inlet link can be switched to any time slot on any outlet link. For example, the conversation in time slot 1 on link 1 (denoted by 11) is switched to slot 3 on link 3. However, a conversation need not necessarily encounter any change in space or time position (eg. conversation 24).

FIGURE 3-17: TIME-SPACE SWITCHING

The Meridian SL-1 circuit-switched network provides the simple approach of using space switching in conjunction with time division multiplexing.

To trace a call in the circuit-switched matrix consider the arrangement shown in Figure 3-18. Trunk A and telephone B are conversing. Trunk A uses time slot 4 for transmitting and receiving while telephone B uses time slot 5. Time slot exchange from 4 to 5 and 5 to 4 is performed in the time slot interchanger allowing the two to converse with each other. The space switch on network loop 12 closes on bus 12 during time slots 4 and 5 to complete the connection path. In a second call, telephone C in loop 1 is connected to telephone D in loop 8. The space switch connections are shown in the figure. Time slots 4 and 5 are again used to demonstrate that many conversations are possible on the same time slots but on different network loops.



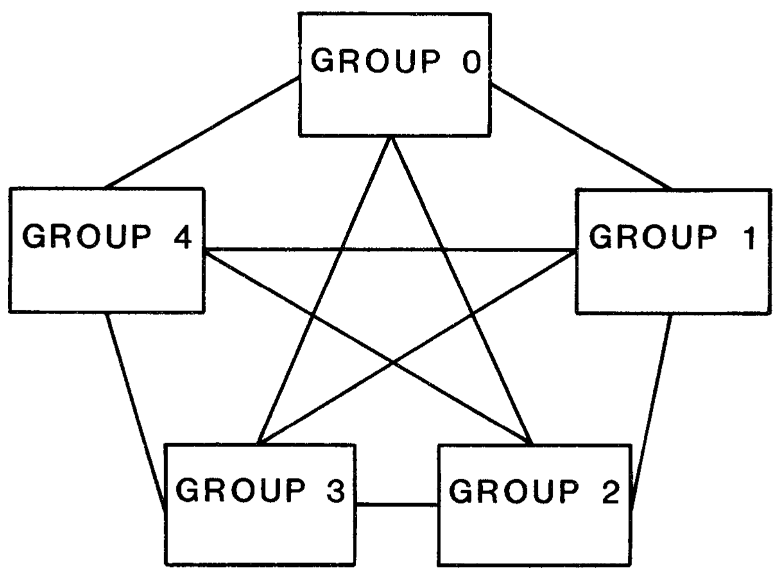
Meridian SL-1 uses the simple space switch to route calls over its network. However, since the conversations are sampled and placed into time slots, new connections are made for every time slot instead of lasting for the duration of the conversation. There are 32 time slots in each loop, with 2 through 31 being used for conversations. Each terminal (trunk or telephone set) uses a single slot to receive and to transmit information. A time slot interchanger exchanges the time slots within each pair to allow conversations within a loop.

FIGURE 3-18: TRACING A CALL

The method of searching for a free path through the switching matrix differs depending upon the system model of the Meridian SL- 1. The use of a sequential search pattern was utilized in the earlier systems with time slots being chosen from a set of admissible pairs. In later systems, an enhancement to the network permits individual time slots to be selected by a random search method so that a non-blocking switching matrix may be obtained.

In the maximum configuration of the single group arrangement, (Meridian SL-1NT), the network bus consists of 32 connection paths each of which is called a link. The links provide the pathways for speech (or data) transmission between network loops. The 32 links correspond to the 32 network loops within the network group. Each network loop can receive PCM speech bits from any link but can only transmit on its own dedicated link. In each of the speech time slots (2 to 31) a different terminal device will be enabled to transmit information. Each conversational path from one line port to another is created in the specific time slots assigned. The line connection memory of the network loop stores the information relative to which terminal to enable, and which link to receive speech bits. The terminal and link will be different for each time slot. Each line connection memory contains 32 words corresponding to each one of the 32 timeslots within the network loop.

The multi-group network configuration (Meridian SL-1XT) adds additional switching stages that utilize junctors to connect each of the possible five individual groups together (Figure 3-19).



In the multi-group arrangement, junctors provide an additional switching stage to extend the originating and terminating network loops from any one group to any other. Five network groups may be interconnected to constitute the capacity of the digital switching matrix.

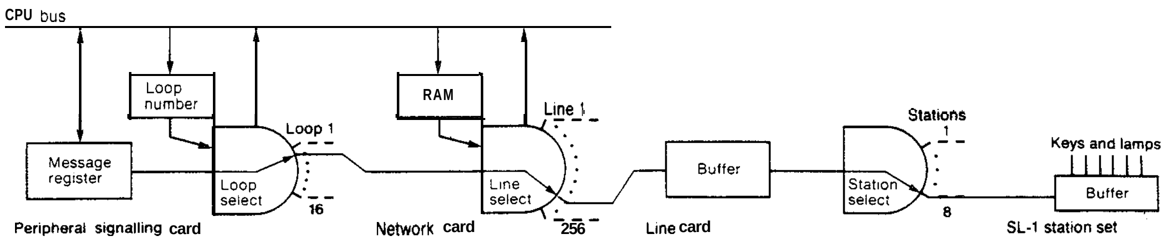
FIGURE 3-19: MULTI-NETWORK GROUP ARRANGEMENT

Signaling Scheme

Signaling is the means by which the CPU communicates with the various telephones, terminals, and trunks. The Meridian SL-1 utilizes a common channel signaling scheme whereby the signaling information is carried separately from the voice and data.

A simplified diagram of the signaling path is shown in Figure 3-20.

One of the 32 time slots in each network loop - time slot 0 - is reserved for carrying all the signaling information to the CPU from the peripheral devices and vice versa.



This is a simplified diagram of the signaling path between the central processing unit (CPU) and an SL-1 telephone set or console. The Meridian SL-1 scans for incoming signals at three levels. The peripheral signaling pack scans sixteen loops, while each network loop in turn scans 256 lines. At the station level, the line card scans eight SL-1 telephone sets. To send a signaling message to a station set, the CPU loads the message into the message register, and puts the address of the desired station set into two registers - the loop number block and a random access memory (RAM). The loop scan and the line scan select the required line card using the information provided by these registers. The message is then transferred serially from the message register to a buffer on the line card. The line card stops its scan at the required station set, and transmits the message serially to the buffer in the station set. This in turn transfers the message in parallel to the lamps and buzzers. If the station user or the attenaimt produces a signal (pushing or releasing a button, offhook, or on hook), the action, coded as a digital signal, is transferred in parallel to the buffer in the telephone set. When the station scan reaches this telephone, the message is serially transmitted to a buffer on the line card. The line scan and then the loop scan find and lock in on this line card. The message is then transferred to the register on the peripheral signaling pack and the CPU is interrupted to retrieve the message.

FIGURE 3-20: SIMPLIFIED SIGNALING PATH

The CPU handles all tasks sequentially through a work scheduling cycle (Figure 3-21) which is repeated constantly while the system is operating. A list of priorities for call processing and other functions governs all CPU activities. As a result, the CPU first goes to the highest priority level and deals with these input messages, then goes to the next level and handles those tasks, and so on through the work cycle. All activities within a level of the cycle are checked approximately eight times a second. The CPU suspends response to lower priority functions in favor of higher priority tasks that could not be completed within each 128 millisecond period. When the CPU is free, it processes the lower priority tasks from the delayed queue in which they entered during the overload condition.

All activities of the Meridian SL-I central processing unit are governed by priorities set up in a scheduling algorithm as shown here. The top of the list contains high priority tasks that must be dealt with first, while the less important functions are at the bottom. Signal messagesfrom the input buffer are examined and processed first. Next in line is the 128ms timing list, which controls the activities that need to be timed, such as recognizing the end of dialing. The third level priority task is the 2 second ringing list to announce an incoming call, and the fourth level analyzes the teletypewriter input to the CPU. At the bottom of the priority list there are many tasks which are done in sequence. These include running overlay programs for the teletypewriter request, providing dial tones, checking to see whether an attendant is free for answering calls, and updating the status of the lamps.

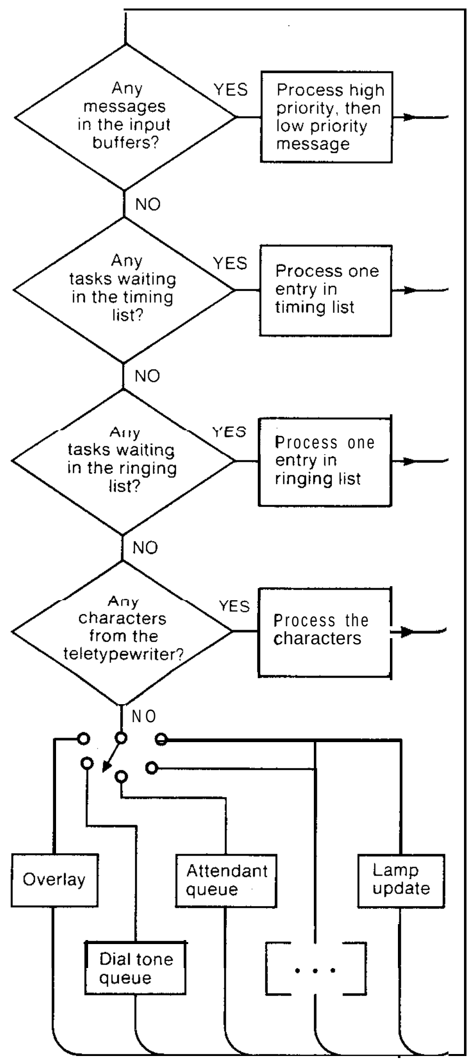
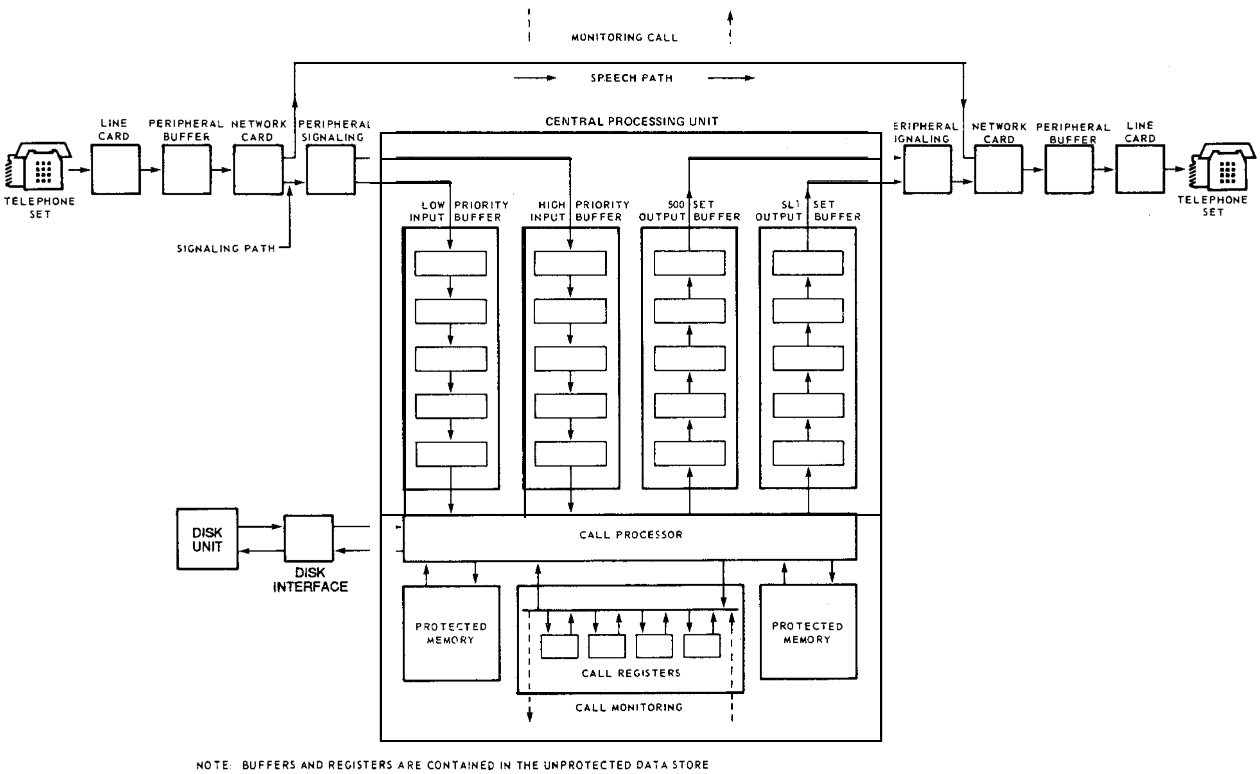


FIGURE 3-21: WORK SCHEDULING CYCLE

An interrupt is generated whenever a change of state occurs in the peripheral equipment. This signal causes the CPU to interrupt its current activity and route the incoming message to a high or low priority input buffer (Figure 3-22). Messages from circuit cards located in position one of each peripheral shelf are always routed to a high priority buffer, whereas those from circuit cards located in positions two through ten are placed into a low priority buffer. Having stored the message in one of the buffers, the CPU returns to the activity it was performing prior to the interrupt. On completion of current activity, the CPU examines the input buffer and deals with the messages in a sequential order of priority. Similarly, the CPU loads the outgoing messages onto associated output buffers and the signaling system takes these messages and routes them to their various destinations.



A register is associated with and maintained throughout each call. The call register is a block of unprotected data, which holds transient information relative to the call in progress such as call status - dial tone, dialing dialed digits, and so on. It is used during timing, queuing, on-hook detection, and the like.

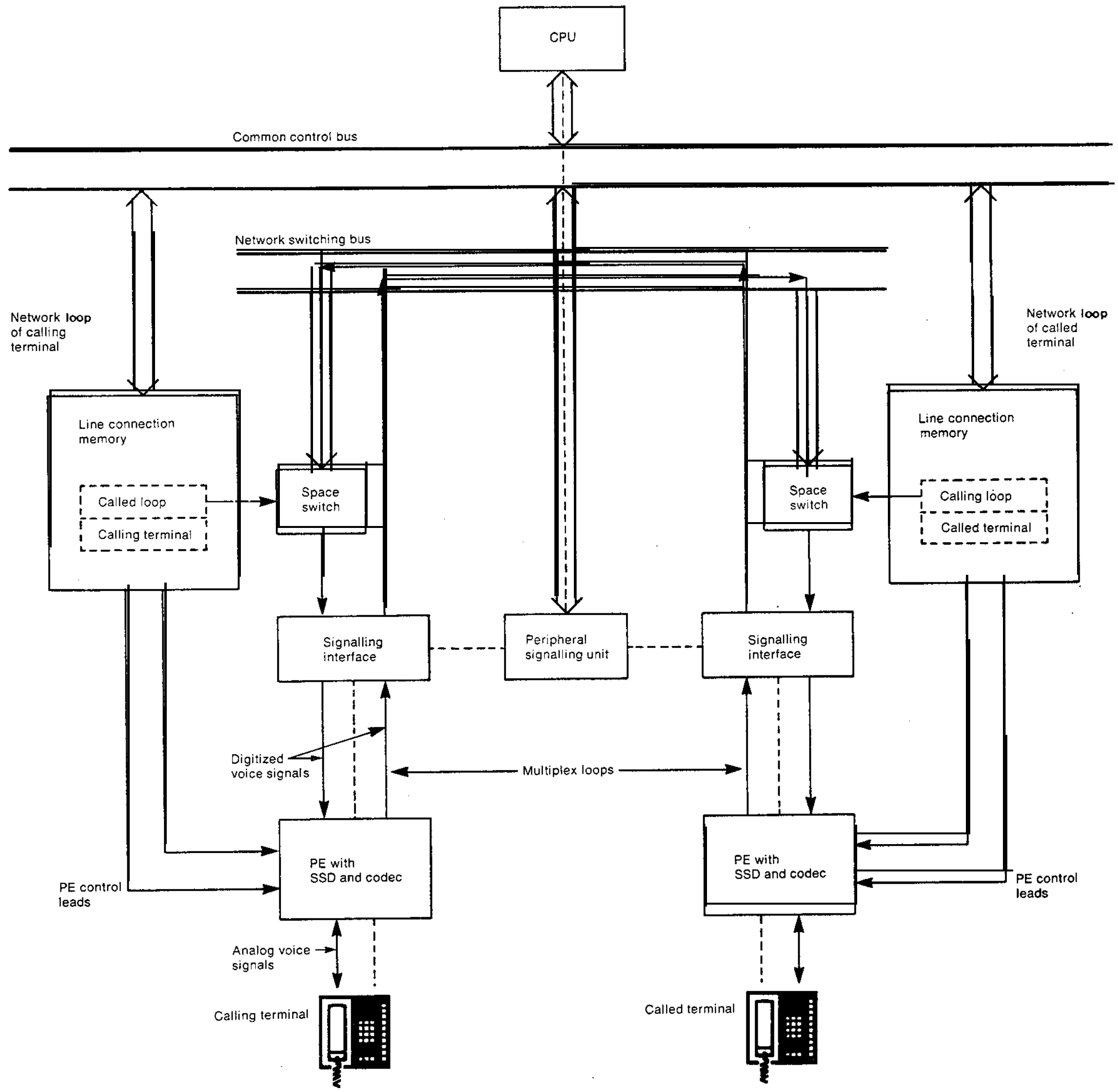
FIGURE 3-22: CALL CONNECTION

Setting Up a Call

To illustrate call processing, consider a call between two SL-1 telephones (Figure 3-23). When a user lifts the handset or depresses a feature key on the SL-1 electronic telephone, a change of status is detected by the Scan and Signal Distributor (SSD) which formats the message for the CPU. Using the dedicated signaling channel (time slot 0) of the multiplex loop, the network unit scans the PE looking for terminals with such messages. Under control of the peripheral signaling device, the message is sent to the CPU indicating a call to be processed.

The CPU takes over the supervision of the call, and by means of a service circuit (TDS) on the network bus, arranges for dial tone and tone ringing to be sent to the appropriate parties. The CPU also controls the interconnection of the calling and called parties as follows. Each network unit has a line connection memory to receive information on the calling and called terminals that enables them to output and accept speech signals. By writing the directory number of the calling SL-1 telephone into the network memory, the CPU causes the associated PE to output one bit of digitized speech during the allotted time slot. At the same time this PE will accept one bit in to decode into an audio signal for the calling terminal. The line connection memory also stores the network loop number of the called SL-1 telephone. This information is used to operate the space switch on the network loop to select the appropriate link on the network bus so that the two parties can be connected during their assigned time slots.

The speech path from each SL-1 telephone to their associated line interface circuit is in analog form. From line circuit to line circuit, the speech is digital having been converted by the codec associated with the specific port involved. (For the Meridian digital telephone, the codecs are located in the set itself). The digital 8 bit speech samples are assigned a specific time slot (from 2 to 31) during which to be transmitted from one line port to the other. The assigned time slot occurs 8 times during the 125 microsecond interval so that all 8 bits can be transmitted. Since speech samples flow in both directions, a time slot must be assigned for each of the two terminals.



This illustration shows how a call is set up on the Meridian SL-1. When a user lifts the handset to make a call, an SSD in the PE detects a change of state in the terminal. Under control of the peripheral signaling device, a message is sent to the CPU indicating that the user wants to make a call. The CPU now takes over supervision of the call. It arranges for all further signals, such as dial tone and ringing tone, to be sent to the appropriate parties. By writing information on the calling and called terminals into line connection memories on the network cards, the CPU causes these terminals to output and to accept speech signals. The line connection memories control space switches on the network cards, which select the correct leads from the network bus to enable the two parties to be interconnected.

FIGURE 3-23: CALL SET UP

PACKET TRANSPORT

The Packet Transport extends the Meridian SL-1 circuit switch architecture to support the distributed multi-processing, packet switching, and high-speed data access normally associated with Local Area Networks (LANs). It retains the star topology, twisted-pair telephone wiring, and supports voice and data communications together with information processing services.

Circuit Switch Connection

One or more DS-1 digital trunk interfaces link the circuit-switched network to the Packet Transport. The number of 24-channel DS-1 interfaces required depends on the size and traffic characteristics of the system. Voice channels link voice lines and trunks to Meridian Mail, the voice messaging capability of the Packet Transport. Data channels link applications on the Packet Transport to terminals and host computers on the circuit switch. The system flexibly, and instantaneously, adapts to any mix of voice or data connections. Figure 3-24 shows the connectivity between the various elements of Meridian SL- 1.

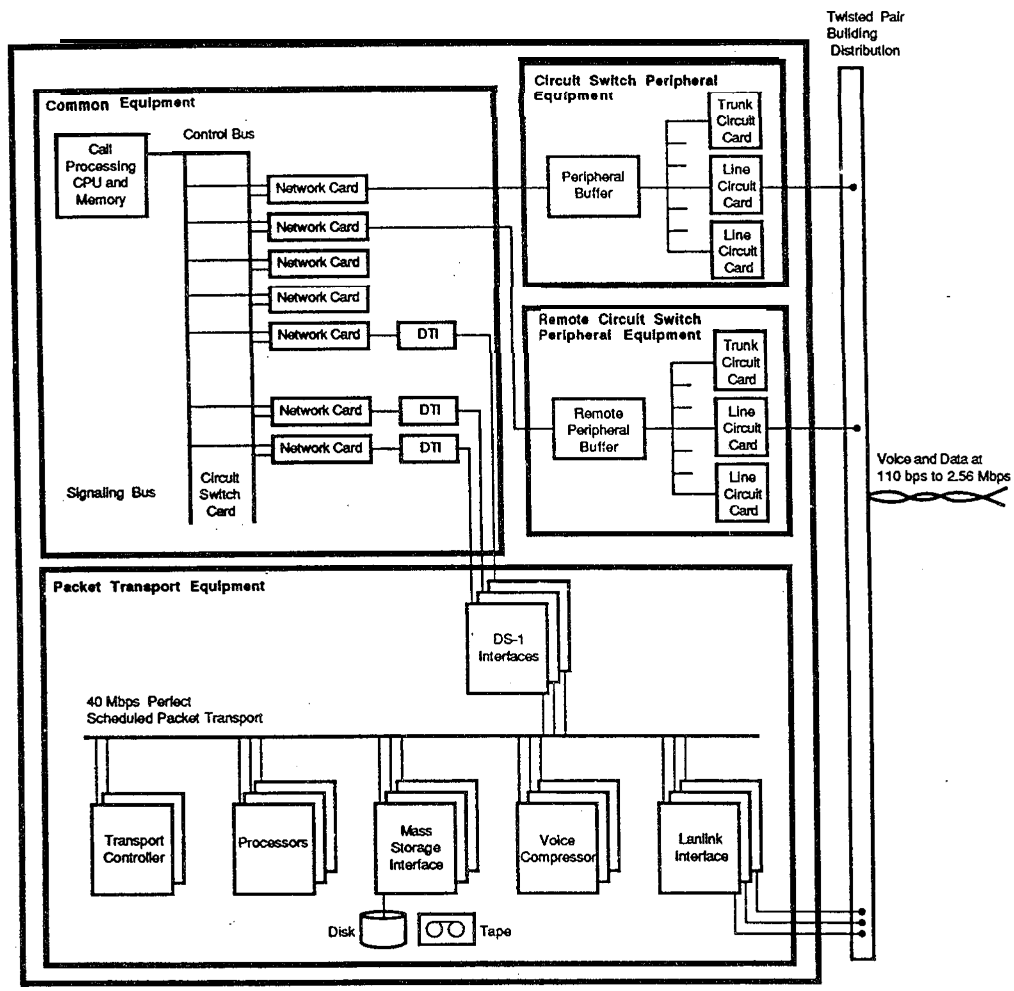


FIGURE 3-24: MERIDIAN SL-1 INTEGRATED SERVICES NETWORK

As shown in Figure 3-25, each DS-1 link is associated with one network loop on the Circuit Switch Equipment (CSE). On the Packet Transport, the 24-channel link is provided by the DS-1 and Infolink circuits. The Infolink converts the circuit-switched format of the asynchronous data to packet switched within the Packet Transport. If the DS-1 channels are only used for voice and synchronous data, the Infolink is not required. Common channel signaling is used for call set-up and status messages between the Circuit Switch Equipment and the Packet Transport. The Command and Status Link (CSL) uses one of the T-l channels of the DS-1 Interface and can be configured in a duplicate mode for added reliability. Figure 3-26 shows the arrangement of the CSL configuration.

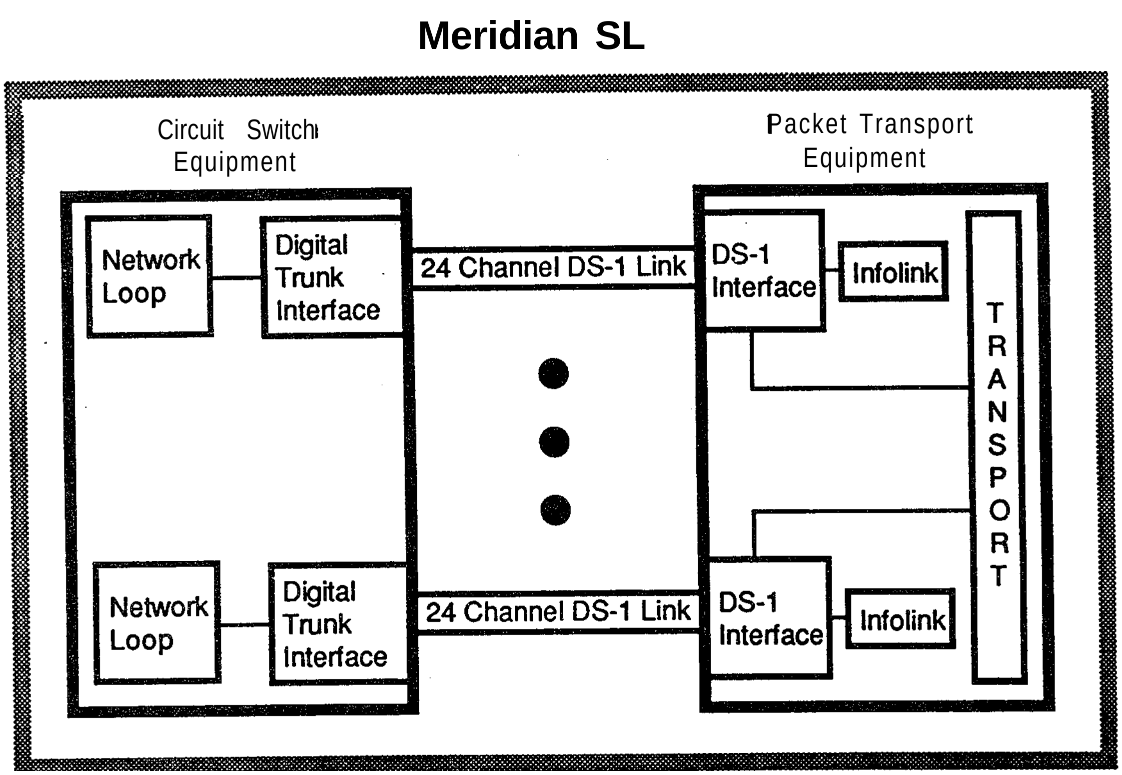
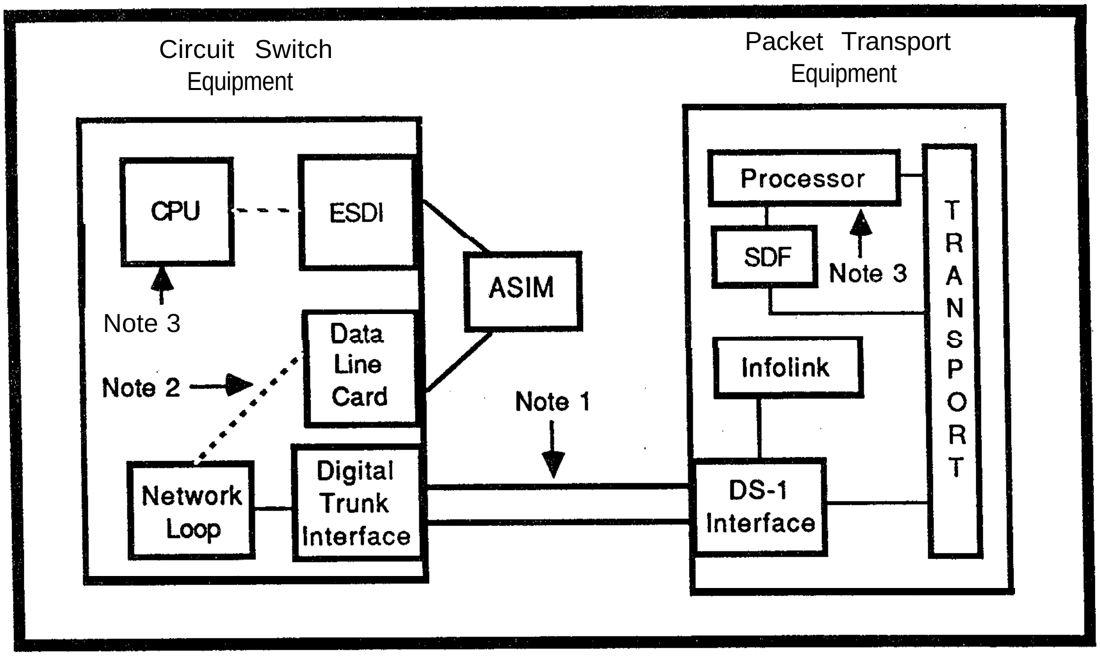


FIGURE 3-25: TYPICAL DS-1 LINK CONFIGURATION

Meridian SL-1



Legend:

CPU	Central Processing Unit
ESDI	Enhanced Serial Data Interface
ASIM	Asynchronous/Synchronous Interface Module
SDF	Synchronous Data Formatter

Notes:

1. CSL uses 1 of 24 DS-1 channels.
   Standby uses 1 additional DS-1 channel.

2. Connection is made at system initialization by call processing.

3. Processor performs message analysis and determines messages to be sent to front end.

FIGURE 3-26: COMMAND AND STATUS LINK

Transport

The essential element in the Packet Transport is an integrated circuit/packet bus with an available bandwidth of approximately 40 Mbps. This bandwidth can be allocated to circuit-switched voice or data, as well as to packet-switched data.

The transport is characterized by uniformity so that all devices can share it to communicate with each other. The logical structure of the transport includes data, polling and control buses, as well as a transport controller. The transport and the transport controller may be fully duplicated for reliability. The foundation of the physical architecture of the Packet Transport is the Basic Module. The latter contains the prime Transport (designated A) and the optional redundant Transport (designated B).

Physically, the transport is divided into six segments, connected as shown in Figure 3-27. Each segment supports up to 32 addressable entities, most typically printed circuit cards. Segments are physically packaged on two Digital Shelves each providing 16 of the 32 Segment address locations. Up to 3 such shelves may be located in the Packet Transport Cabinet. The Basic Module is therefore comprised of twelve Digital Shelves for a total of 192 addressable locations (i.e. card slots). The Basic Module also includes a Disk/Tape Shelf which does not connect directly to the Transport but instead via a Mass Storage Interface (MASI).

Transport Controller

The transport controller is the heart of the transport. It controls asynchronous data access to the transport and ensures data integrity. Asynchronous data normally is packet switched so that transport bandwidth is required only when valid characters are being transmitted. Synchronous data normally is circuit switched in a protocol-independent manner.

The Digital Shelves are interconnected through transport repeater circuitry. The Transport Controller contains repeaters for two segments (four Digital Shelves) and, beyond this configuration, additional Transport Repeaters are required. Each Digital Shelf has one or two Transport Terminators for terminating the signals on the A and B Transports.

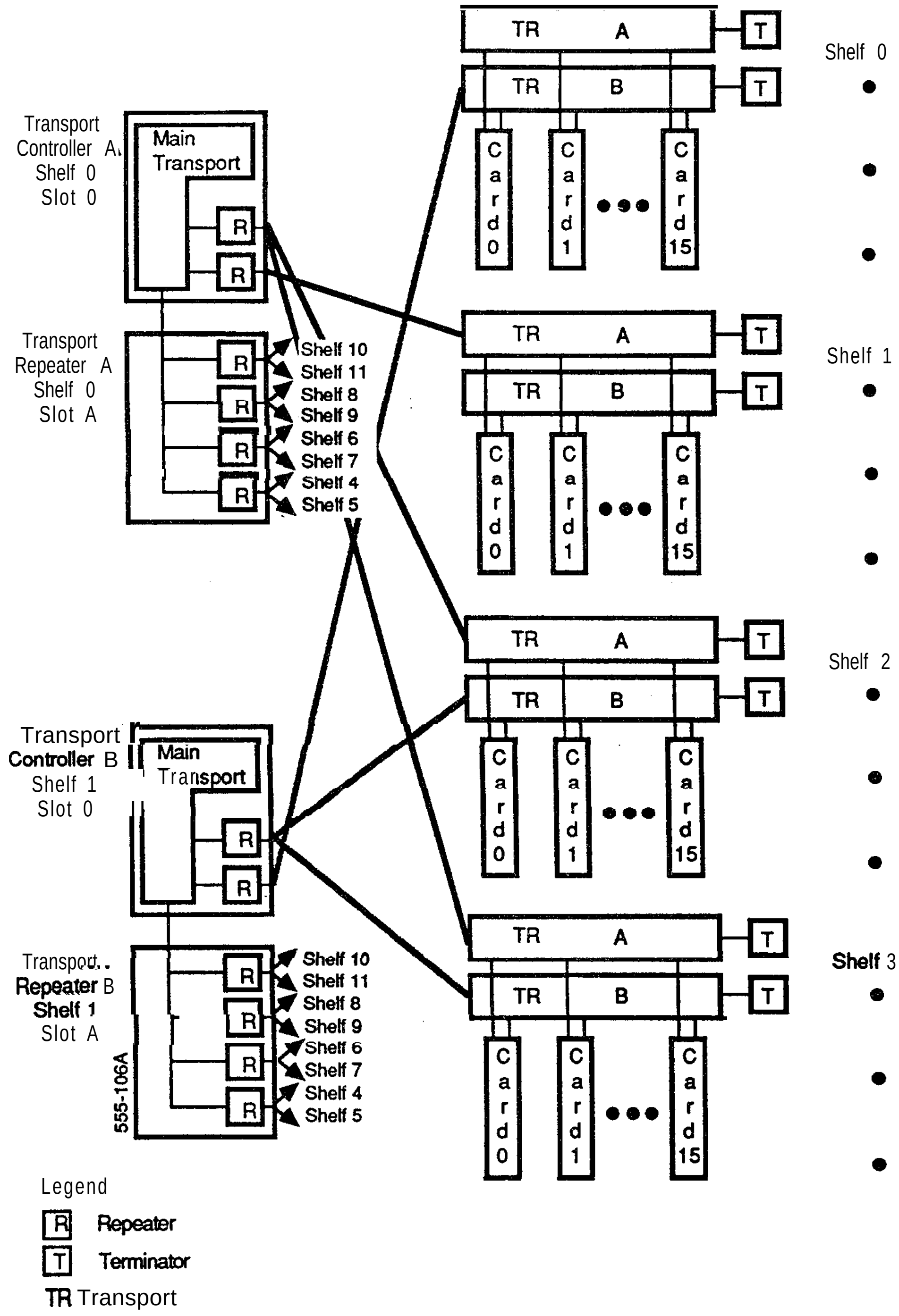


FIGURE 3-27: PACKET TRANSPORT PHYSICAL ORGANIZATION

Transport Communications

There are two modes of communication for devices and processes on the Transport: Packet Data and Synchronous Transport Cycle communication. For the former, data is transmitted in packets each of which include the address of the receiver. Packet data is used for all types of asynchronous communications such as low speed data signaling, file transfers, and interprocessor messages. Synchronous Data is used for voice and high-speed synchronous data. In this mode, Transport bandwidth is divided into frames of 125 microseconds with each frame divided into 640 bus cycles (Figure 3-28). All data, whether circuit or packet-switched, is sent at the rate of one byte per bus cycle. The Transport design ensures maximum utilization of bandwidth. When synchronous data is sent over the Transport, both the sender and receiver communicate over a dedicated Transport cycle. If the Transport cycle is not required by the sender, then it is relinquished to packet data transmission. In all cases, a minimum bandwidth of 10 Mbps is guaranteed for packet (asynchronous) data transmission. Synchronous data is guaranteed access to up to 30 Mbps of bandwidth. An asynchronous packet can be interrupted at any time by a Transport cycle for synchronous data requiring bandwidth. The transmission of packet data resumes after the Transport cycle has been granted to asynchronous data. All unused synchronous cycles are available for use by packet data. Thus, if the Packet Transport is configured as a LAN only, it is a fully redundant 40 Mbps Local Area Network.

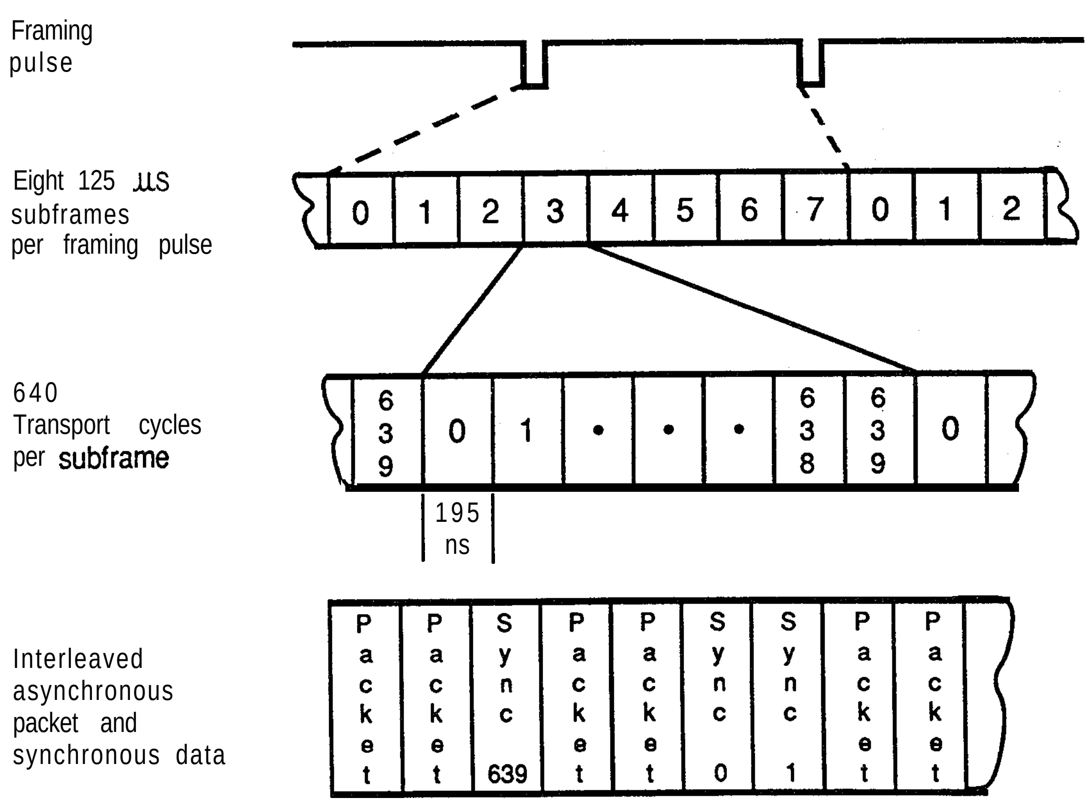


FIGURE 3-28: TRANSPORT COMMUNICATIONS

Packet Transport Elements

In addition to the Transport bus and its DS-1 interface to the Circuit Switch Equipment, there are several other elements in the Packet Transport architecture (Figure 3-29). The distributed multiple processor technology allows for an increase in function and capacity on an incremental card basis. The processors execute the software provisioned for the required communications and information applications. Each Processor can address up to 8 megabytes of Random Access Memory packaged on one or more 2 Mbyte memory cards. Communication between Processor and Memory is via a separate private bus (P-Bus) that is completely independent from the transport. A Synchronous Data Formatter (SDF) performs buffering and framing tasks on synchronous data that is destined for the Packet Transport Processors. The SDF allows the Processor to transmit and receive synchronous data at up to 64 Kbps and, when equipped, reduces the maximum number of configurable 2 Mbyte memory cards per Processor to three.

The Mass Storage Interface (MASI) is a two-card assembly that controls access to Disk and Tape Units. Large capacity disk drives and streaming tapes connect with the Transport bus through standard synchronous circuit-switched interface protocol and the MASI.

The Voice Compressor processes voice messages for storage and retrieval from Disk. It compresses the Pulse Code Modulation (PCM) - encoded 64 Kbps message to 16 Kbps for storage, eliminates silent periods, and reverses the process for playback. The Tone Detector provides a 16-channel interface to the Transport for Dual Tone Multi-Frequency (DTMF) detection.

The Lanlink Interface provides a high-speed 2.56 Mbps full duplex link to the desktop. Each interface assembly consists of two adjacent circuit cards which provide 16 ports for connection to IBM Personal Computers and compatibles or Macintosh II computers configured in the Meridian LANSTAR Local Area Network. In this mode, each computer is equipped with an associated LANSTAR PC Interface Card or Macintosh II Interface Card respectively.

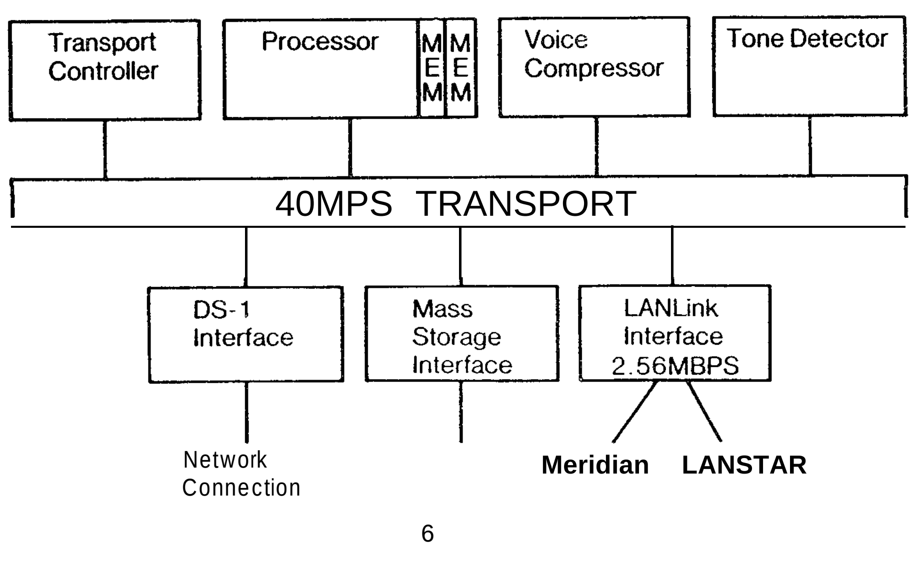


FIGURE 3-29: PACKET TRANSPORT ELEMENTS

Software

The Packet Transport Software programs (Figure 3-30) run in protected address spaces called locales and each processing node, consisting of a processor and memory, may be dynamically partitioned to contain up to 256 locales. Communication between tasks running in the same locale, in different locales, or in different nodes is routed by a kernel running in each processing node. The software environment meets the needs of call processing, data communications, transaction processing, and parallel processing. Software applications running on the Packet Transport are not dedicated to specific processors. Instead, the processors form a pool to support all applications. A terminal user may have several processors involved in a single application or else utilize multiple applications on the same processor.

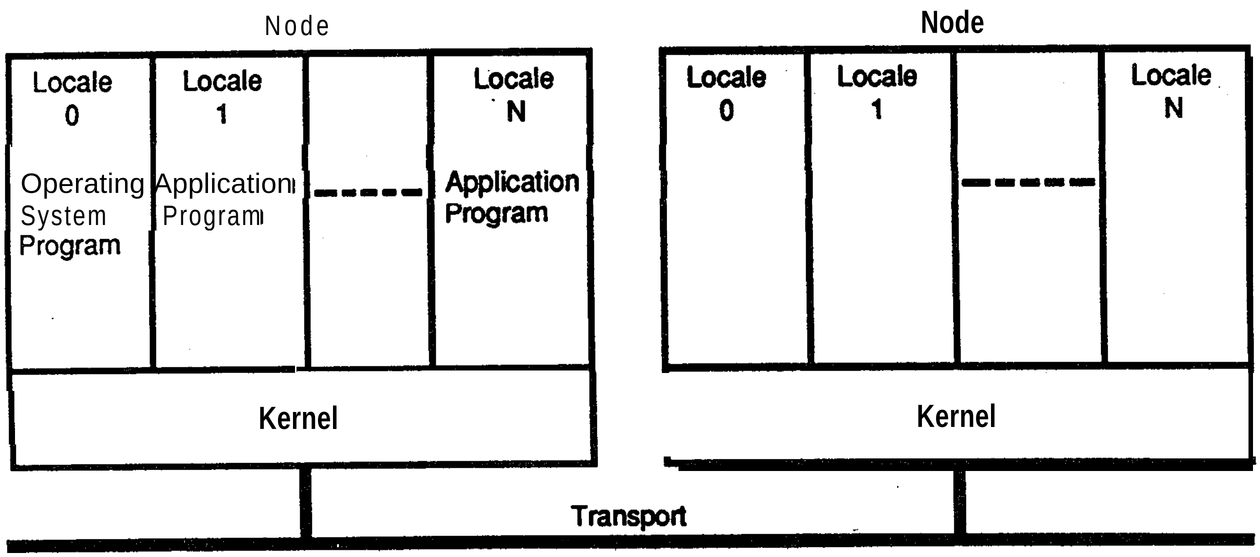


FIGURE 3-30: SOFTWARE ORGANIZATION

CONTENTS

SECTION : 4 PRODUCT EVOLUTION

PRODUCTEVOLUTION

Introduction

In the early seventies Northern Telecom recognized the need for a versatile state-of-the-art product that could adapt readily and quickly to changing conditions - a product that would give it a continual edge in a very competitive marketplace. The SL-1 PABX (Private Automatic Branch Exchange) emerged utilizing a digital switching matrix under computer control. The fiit system shipment was in 1975 and since then the product has continually evolved to incorporate new technology as it became available. As a result, numerous enhancements have enabled the SL-1 to be functionally comparable to much later product entries while maintaining the very significant advantage of a vast installed base.

The foresight of the original development team continues to pay dividends. The challenge was to design a system that would meet the then current needs while retaining the ability to evolve without obsolescence. The key aspect of the system design is its flexible architecture where the main elements can be independently changed in whole or in part to address ongoing market needs.

All models of the SL-1 share similar digital technology and modular hardware along with the systems custom software. They differ only in their hardware packaging and the number of peripheral terminations that they support. The availability of various members of the SL family ensures that the user can select the size, system, and particular features best suited to meet specific needs.

In 1975 Northern Telecom introduced the SL-1L as its first member. The system was configured in a single network group arrangement with the optional choice of one or two Central Processing Units. Memory was packaged on 4K word modules and structured in a N + 1 concept such that a spare module was available for utilization in the event of a memory failure.

The system met the immediate demand of providing a full range of capabilities in a cost-effective manner. Besides functioning as a Private Branch Exchange (PBX) it also included key telephone and custom calling features. This was achieved by incorporating some notable firsts in the industry. The high level software language (HLL) provided significant advantages over assembler language in terms of simplicity and implementation. It also permitted better and simpler ways for users to communicate with the system. To complement that, a custom LSI chip was incorporated in

Meridian SL-1 offers one of the most comprehensive complements of voice and data features available today. From the beginning, it was &signed as a system that could evolve over the years, providing users with continuity from the past and present to the future. It is this ongoing evolution and protection from obsolescence that allows organizations to plan for the future.

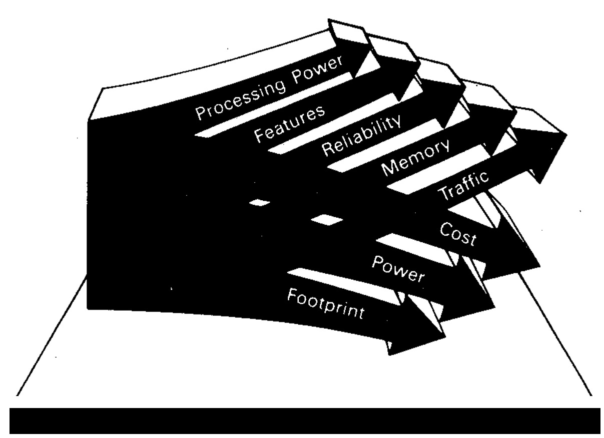


FIGURE 4-l: PRODUCT EVOLUTION

a proprietary electronic telephone and its associated peripheral interface. From a human factors point of view, replacing the conventional telephone with a new electronic set was a prerequisite for more effective business communications service. The SL-1 electronic telephone provided for simple, direct selection of features and unambiguous system responses to indicate the progress of calls.

Another main requirement - to reduce the size of interconnecting cable as opposed to that used for existing key telephone sets -was achieved by using a form of distributed control in the SL-1 set. The six-conductor line cord in the latter permitted systems to be pre-cabled irrespective of the eventual use of either SL-1 or conventional 500/2500 type single line telephones at a terminal location.

Another first was the utilization of the codec on a per port basis to take full advantage of digital technology. Ongoing silicon enhancements could be introduced without affecting more centralized equipment in the system. Peripheral equipment was packaged in increments of four line circuits and two trunk circuits on associated individual cards.

From a software point of view, Generic 101 was introduced to support the SL-1L systems. In addition to many standard features and services inherent in the system, optional software packages provided multi-customer and advanced SL- 1 set features.

Multi-customer was unique in that it allowed a single SL-1 system to serve up to 32 different customers, each with independent feature complements, numbering plans, and peripheral equipment.

The advanced feature package provided Auto Dial, Call Forward, Override, Ring Again, Speed Call, and Voice Call capability to the SL-1 telephone user. The typical application of the SL-1L system was in the 100 - 1000 line range.

FIGURE 4-2: SL-1 ELECTRONIC TELEPHONE

The Digital World

In 1976, Northern Telecom became the first corporation to commit publicly, through the Digital World announcement, to producing a complete line of digital switching, business communications, and transmission systems. Every major telecommunications manufacturer has since followed this lead. Today, Northern Telecom is the principal supplier of fully digital systems in the world. Its family of digital business communications systems is among the world's most advanced multi-function integrated voice and data switching systems.

The SL-1VL was introduced in 1976 to address requirements beyond the capacity of the SL-1L. It consisted of a multi-group arrangement for up to five network groups, each capable of accommodating the 16 multiplexed loops provided for in the SL-1L. A similar design philosophy and many of the same components were used, the major differences between the two systems being in the area of common equipment.

The VL system utilized a more powerful and duplicated CPU, a repackaged memory in 8K word modules, and used a centralized powering concept. It was supported by software Generic 202 which added a number of feature enhancements over the initial system capability. The software was also adapted to the SL-1L as Generic 102.

Significant changes were made to the software in 1977. Major feature complements were made available under Generic X03, summarized as follows:

CALL DETAIL RECORDING (CDR)

CDR permits the recording, on a per call basis, of details related to incoming and outgoing calls such as the calling and called parties, time, and duration. The information is assembled by the software and stored as call records on either a g-track magnetic tape mounted in a CDR cabinet, hard-copy device such as a teletypewriter, or external unit conforming to RS-232-C interface. Downstream processing of the collected data permits usage reports to be generated.

RECORDED ANNOUNCEMENT (RAN)

RAN provides an interface to a Recorded Announcement machine and the capability of flexibly defining the intercept treatment for various call situations.

TIME AND DATE

Provides the capability of displaying and modifying the system time and date from the attendant console.

DO-NOT-DISTURB

Provides the capability for the attendant to make any individual directory number appear busy to incoming calls while maintaining it free for originating calls.

END-TO-END SIGNALING

Allows the use of the SL-1 electronic telephone on an established outgoing connection to utilize the pushbutton dial pad to effect Digitone end-to-end signaling, In 1978 common equipment enhancements capitalized on technology advances to effect reductions in cost and increases in system reliability. The result was the introduction of two new family members - SL-1LE for single network group and SL-1VLE for multi-network group applications. A new, denser memory module storing 64K words of data or program store was introduced to drastically reduce the number of associated circuit cards. The enhancement also increased the memory addressing capability to accommodate ongoing feature incorporation. A completely redundant (2N) memory bank was introduced in addition to the duplicate processor capability already available. Each processor could access both memory banks with the flow of information to the active processor controlled by an arbitrator rather than the conventional means of a single memory bank with duplicate spares. In addition, the concept of segmented busses was incorporated to allow recovery of call processing functions by reconfiguring the system hardware to effectively isolate the fault.

Generic X04 was also introduced in 1978 with the addition of further optional feature groups:

AUTOMATIC NUMBER IDENTIFICATION (ANI)

Provides the facility to automatically identify a station originating an outgoing toll call and to send this information by Multi-Frequency (MF) signaling to a central office toll-ticketing system. The feature is implemented by a combination of software and hardware, the latter consisting of a MF sender, located on the switching network bus, interfacing to an associated ANI trunk group.

ROUTE SELECTION - ANI (RS-ANI)

Route selection works in conjunction with the AN1 feature to route toll calls automatically over predetermined trunks.

AUTOMATIC ROUTE SELECTION (ARS)

Provides automatic selection of least expensive and efficient trunk routes under software control for outgoing calls. The ARS mechanism is accessed by dialing a special access code and can be arranged to route advance a call over up to eight trunk routes under two different time schedules.

REMOTE PERIPHERAL EQUIPMENT (RPE)

RPE increases the range of the multiplex loop between the CE and PE by using T1 type carrier facilities. The 2.048 Mbps local network loop is converted to a 1.544 Mbps format for transmission to a remote location and then reconverted back to 2.048 Mbps to interface to the remote peripheral equipment.

DO-NOT-DISTURB: GROUP

Permits the attendant to place a group of directory numbers into a Do-Not-Disturb mode so that they appear busy to all incoming calls, but free to originate calls.

MAKE SET BUSY (MSB)

Allows a SL-1 telephone user to busy out the set for incoming calls to all DN appearances but free to originate calls.

A substantial breakthrough in equipment repackaging was made in 1978. Although expandable to some 400 lines, the SL-1A emerged to address primarily the below 100 line range. Spare mounting space between the central uprights of the equipment cabinet was utilized to accommodate a mini-network shelf and the magnetic tape transport. This freed up conventional shelf positions for peripheral equipment thereby enabling a single CPU to service a maximum of 200 PE terminations in a single cabinet configuration.

The Intelligent Universe

In 1979, Northern Telecom unfolded the Intelligent Universe to announce the threshold of a new era for its product capabilities. Envisaged were new applications of digital technology to create efficient, harmonious global networks of simultaneous voice and data transmission that allow major office communication functions to be undertaken in a single integrated system. In addition, the formation of sophisticated networks would evolve to provide comprehensive communications through intelligent terminals in which information can be organized, stored, accessed, and received from any source in the world.

The demand for additional system features was so great that in 1979 a split in the Software Generic occurred to address specific market segments. Business Generic X04 formed the foundation for the separate generic streams to evolve.

Generic Xl4 was introduced for SL-1 interface to the Autovon (Automatic Voice Network) to present Northern Telecom with a key marketing strength in supplying the military and Government market with a proven cost-effective system. The SL-1 AUTQVON system provides full-featured PABX capabilities combined with requirements of the Defense Communications Agency (DCA) Circular 370-V175-6 specifications such as precedence and pre-emption of calls.

Generic X07 was aimed specifically at the Hotel/Motel communications management market. The full business features of X04 were incorporated with new features designed to provide additional hotel administration and management functions such as:

- Room Number Correlation
- Single Digit Access to Special Services
- Message Waiting
- Vacant Room Restriction
- Supervisory Attendant Console
- Toll Terminal Access
- Music-On-Hold
- System Call Park
- Room Status
- Control Class-of-Service
- Recorded Overflow Announcement

Additionally, X05 was introduced as the premium Business Generic, adding such major capabilities as:

AUTOMATIC CALL DISTRIBUTION (ACD)

Provides a means of sharing service among a group of answering positions such that calls are served in the order of their arrival. A number of administration capabilities are available for effective agent/supervisor communication. The flexibility of providing standalone ACD, combined PABX service, or a split among the two can be configured utilizing a single SL- 1 system.

ARS - PRIORITY QUEUING

Provides an improvement to the ARS feature by introducing a flexible class-of-service assignment of one of four priority levels for the access of least cost routes by each user.

AUTHORIZATION CODE

Allows selected users to temporarily override the access restriction assigned to any station or trunk by entering an authorization code.

CDR CHARGE ACCOUNT CODE

Permits a charge account code to be entered before dialing or during an established call to allow billing of calls to other than station directory numbers.

CENTRALIZED ATTENDANT SERVICE (CAS)

Allows customers with multiple locations to centralize their attendant services at a single facility. Operation is compatible with AT&T Technical Advisory Manual 10 (TA-10) with the SL-1 system serving as either a main or remote CAS installation.

DIGIT DISPLAY

Provides for the display of information relative to normal call processing and feature activation on any SL-1 telephone equipped with a digit display.

DIAL INTERCOM

Allows stations to be accessed by abbreviated dialing and be arranged into separate intercom groups within the SL-1 network.

DIRECT INWARD SYSTEM ACCESS @ISA)

Permits selected users to access the SL-1 from the external public network by dialing a special directory number from any Digitone type telephone.

MESSAGE CENTER

Allows an incoming call to be automatically routed to a message center if not answered at the original destination. A message waiting indication alerts the station user, who can then access the center for message retrieval

2500 SET FEATURES

Provides a subset of features, formerly available only to SL-1 telephones, to be utilized on 2500 type single line instruments. A Special Prefix Code (SPRE) is used in conjunction with the octothorpe key (#) to activate the following features:

- Call Forward (All Calls)
- Speed Call (User and/or Controller)
- Permanent Hold

Out of the SL-1 technology grew the SL-10 packet switching system, which bundles data together in packets before transmitting it. Each packet is transmitted from a subscriber's computer terminal to an SL-10 node where it is processed with packets from other terminals and transmitted to the network node nearest its final destination. It is then forwarded to the subscriber to whom it is addressed. Of significance is that the powerful processor utilized for data transmission in the SL- 10 was adapted to the SL-1 to form a new family member, SL-1XL. The latter was introduced in 1980, expanding the call processing capability through an increase in CPU real time capacity. The SL-1XL also provided more memory storage to allow further penetration into the 2000-5000 line range.

Generic X09 was introduced to support the SL-1XL and additionally provide enhancements to the ACD feature by adding load management administration and report capabilities.

One of the most significant changes in the business environment has been the need to manage data as well as voice communications. Once again, the concept of an evolutionary design has enabled the SL-1 to accommodate this demand. Since it is a digital system, the SL-1 does not need to distinguish between voice and data. As a result, all software features, administrative packages, access restrictions, and cost control features apply equally to both voice and data switching. The SL-1 offers a natural solution to data communication problems in the office environment. Each channel in the system has the inherent ability to carry voice or data at the present capacity of 64 Kbps. The integration of voice and data enables telephone wiring to provide all or a significant part of the transmission path between a terminal and a computer. Besides minimizing cabling requirements, it permits terminals to be more easily moved from one location to another. Another significant factor is that the SL-1 switching matrix permits multiple terminals to access multiple host computers through port contention and concentration using twisted pair wiring distribution.

In 1980, Northern Telecom was the first manufacturer to introduce Integrated Voice and Data Switching (IVDS) to the PBX. IVDS took the form of an add-on data module (ADM) and an associated data line card (DLC). The ADM serves as the interface to a terminal or a port on a mainframe computer. It is connected by standard telephone wiring to the DLC which resides in the SL- 1 peripheral equipment shelf. In its initial introduction, the ADM and DLC supported asynchronous data transmission at up to 9.6 Kbps. Voice and data remains two separate information streams within the system, permitting the user to receive and place voice calls during data transmission and data calls during voice transmission.

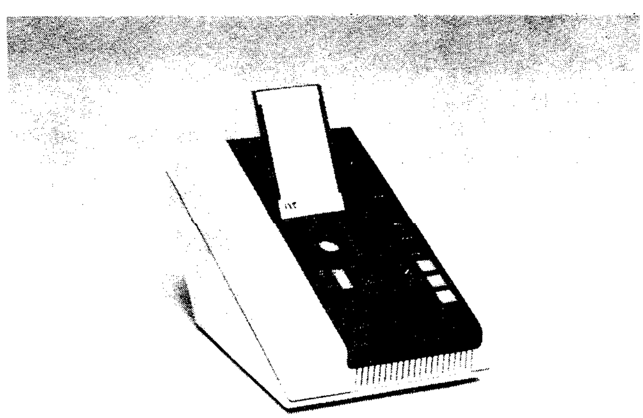
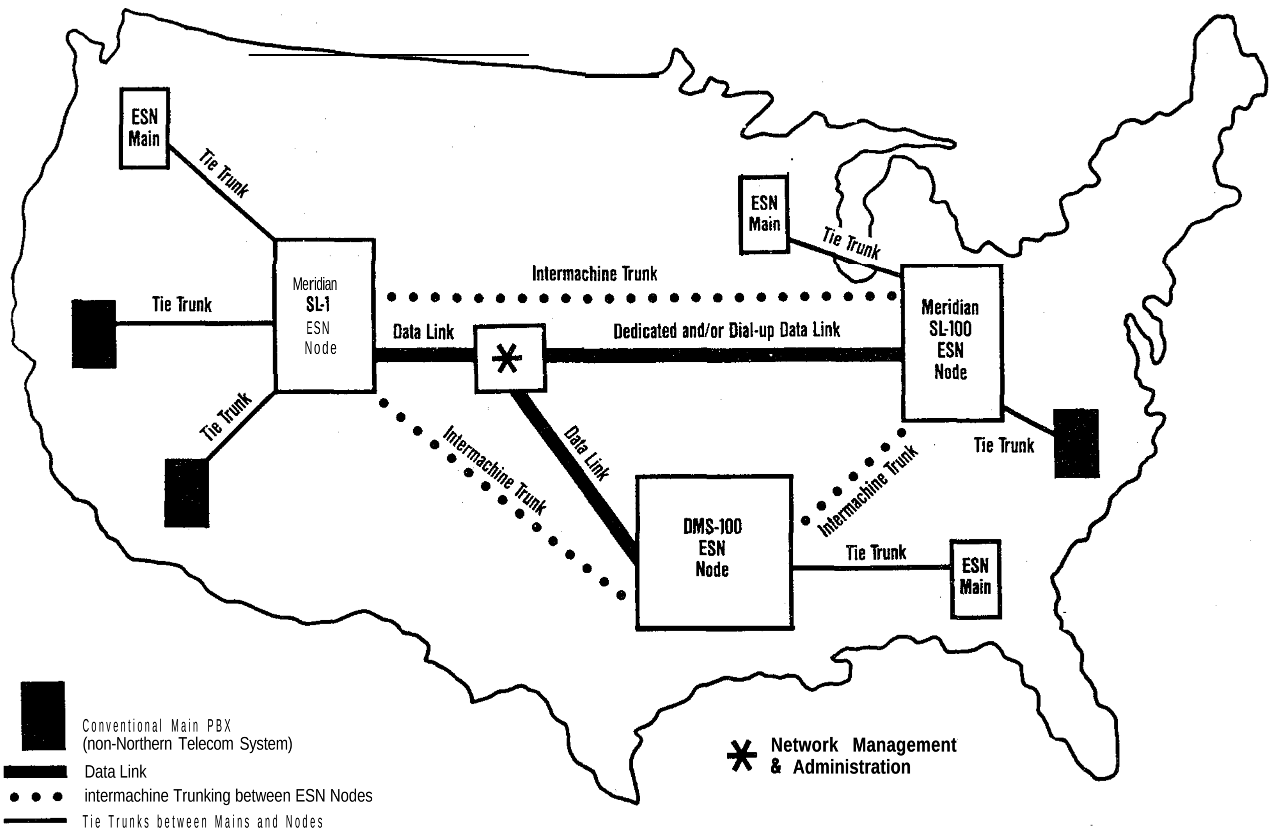


FIGURE 4-3: ADD-ON DATA MODULE

Electronic Switched Network (ESN) added network switching capabilities to the SL-1 in 1980 along with a minicomputer-based Communications Management Center (CMC). ESN enables convenience calling, automatic route selection, cost-control, and maintenance and diagnostic features to be provided over a whole private network. It simplifies the process of calling through the private network by enabling all locations located in the network to use the same uniform dialing plan. The operation of the network is maintained through the CMC which identifies problems, monitors traffic, and provides detailed call records. ESN was initially available only to the SL- 1XL system under control of software Generic 610.



ESN provides a custom designed network configuration capable of supporting voice and data communications over a widely dispersed national network with numerous locations.

FIGURE 4-4: ELECTRONIC SWITCHED NETWORK (ESN)

The OPEN World

In 1982, Northern Telecom's announcement of OPEN World promised to create integrated communication networks that open the technological barriers to user-controlled systems. The SL- 1 would act as the hub for such systems, giving the user the opportunity to install whatever equipment is most cost-effective for the application. The OPEN World concept encompasses the following five key criteria: continuity, compatibility, congeniality, control, and cost-effectiveness.

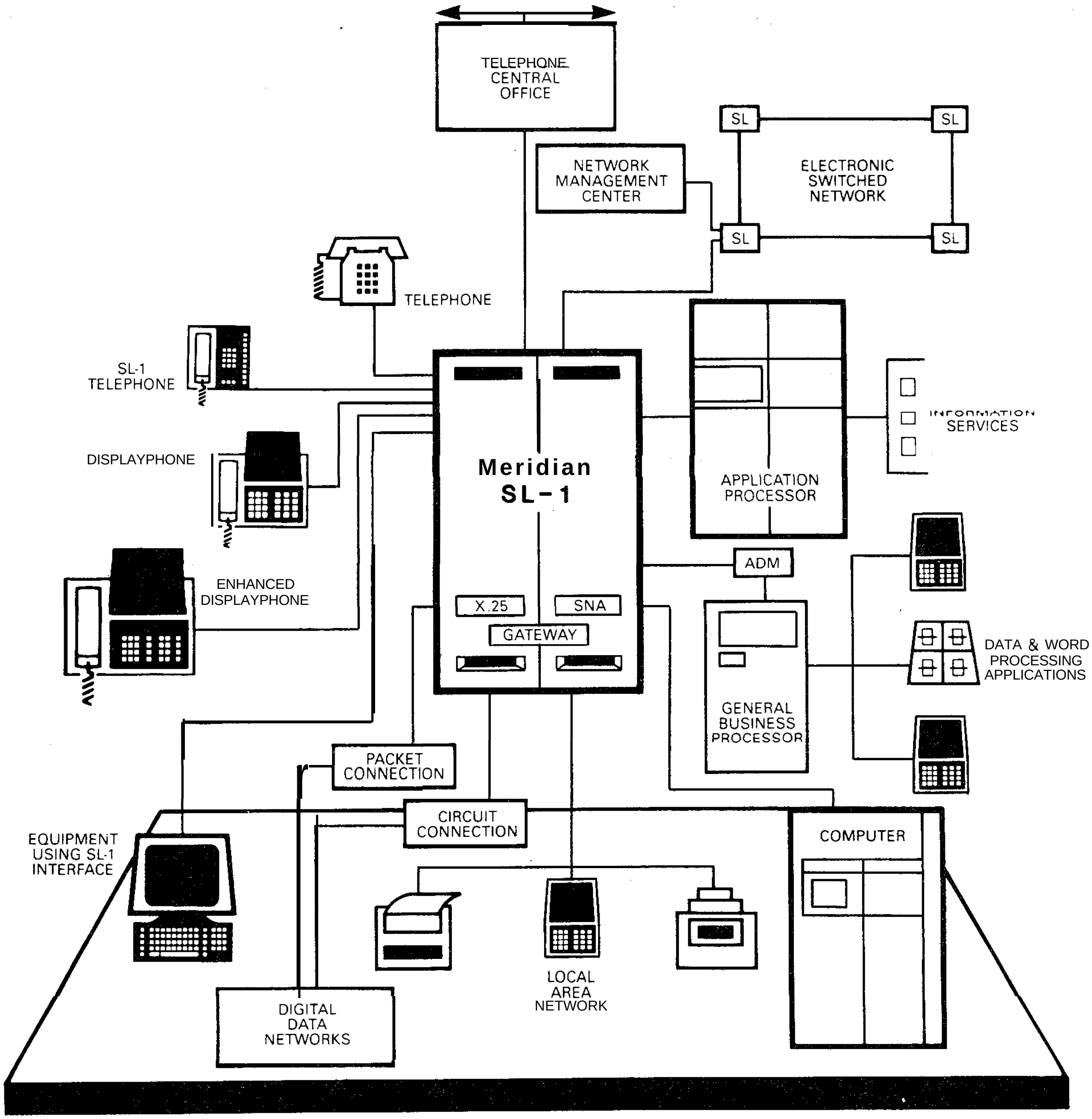
SL-1M was introduced in 1982 and with it the concept of front and rear cabinet access to take advantage of hardware repackaging and a subsequent reduction in footprint. A single cabinet supports a typical configuration 250 lines/40 trunks with expansion to a 400 line marketing limit by means of an additional peripheral cabinet. A new business Generic stream Xl 1 was utilized to support SL- 1M under 7 11, Release 1, which provided all the feature capabilities of its predecessors and added new capabilities aimed towards the small system user:

Attendant Overflow Position
Mini-CDR
History File
System Memory Automatic Recovery Technique (SMART)
Attendant Administration
Automatic Set Relocation

These feature enhancements, with the exception of mini-CDR and SMART, were later made available to the LE, VLE, and XL systems.

The year 1982 also saw the introduction of an innovative voice and data terminal, the Displayphone. (Figure 4-5) It combines the voice communication function of a telephone with a computer terminal's ability to transmit and receive data, aligning the use of both of these functions simultaneously. The unit is connected to the switched telephone network by two standard lines and includes a handset, video screen, a retractable hideaway keyboard, and built-in data modem. All of these components are integrated into an attractive, easy-to-use desk-top workstation.

FIGURE 4-5: DISPLAYPHONE TERMINAL



In 1982 Northern Telecom announced the OPEN World for information management systems. The OPEN (Open Protocol Enhanced Networks) World is an extension of Northern Telecom's proven expertise in the key areas of digital technology, semiconductors, software, and integrated communications capability. It presents a commitment to providing a planning framework, new products, features and services for the OPEN World.

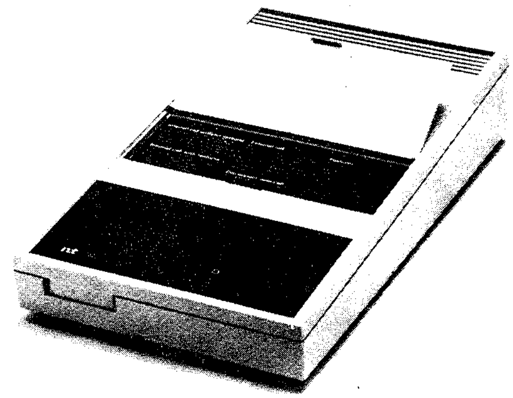
FIGURE 4-6: OPEN World

Additional data capabilities were made available to SL-1 during 1983. The ADM was enhanced to support asynchronous transmissions at up to 19.2 Kbs and synchronous transmission at up to 56 Kbs. Several new members were introduced to the IVDS. As its name suggests, SL-1 Displayphone is a version of Displayphone that has been adapted specifically for the SL-1.

The Multi-Channel Data System (MCDS) was developed to reduce the cost of the interface to the computer. The MCDS rack has two shelves for interface cards. Each shelf accommodates a power supply and up to eight (8) cards. Each MCDS card has four (4) ports, each of which can support half or full duplex asynchronous transmission at up to 19.2 Kbps. The MCDS can serve from as few as 4 up to a maximum of 64 computer ports as opposed to providing separate ADM units.

Inbound and outbound modem pooling allows remote users to access remote terminals and hosts respectively.

The Asynchronous Interface Module (AIM) provides asynchronous transmission at up to 19.2 Kbps over twisted pair wiring distribution. The AIM (Figure 4-7) serves as an interface to ASCII terminals and converts user data from RS-232-C format to RS-422-A format for interfacing to the SL-1 system.



The asynchronous interface module (AIM) has an RS-232-C interface through which it is connected to the asynchronous data terminal or personal computer that it serves. The AIM converts user data between the RS-232-C and RS-422-A formats; RS-422-A format data are transmitted over the two twisted wire pairs that connect the AIM to an asynchronous interface line card in the Meridian SL-1. The AIM also has a connector plug to which a rotary dial ***or pushbutton station set can be attached. The station set is*** used ***for*** voice ***calls and to set up data calls. If no station set is connected to the AIM, the user makes data calls from the keyboard the terminal or personal computer.***

FIGURE 4-7: AIM UNIT

The PC Interface Card was introduced in December, 1983. It is designed for use with the IBM Personal Computer or PC/XT to permit communication with other terminals or hosts connected to the SL-1 network.

Generic Xl 1 Release 2 was introduced in early 1983 to add the following feature enhancements to the M, LE, VLE and XL systems:

CALL PARR

Provides the capability for attendant or station user to place a call in a held state (park) where it can be retrieved by dial access from any console or telephone set in the system.

SYSTEM SPEED CALL

Allows the creation of a System Speed Call List (or lists) for access by any assigned station set irrespective of any class-of-service restrictions.

RECORDED OVERFLOW ANNOUNCEMENT

Permits incoming calls that are delayed in answering by the attendant to be routed to a recorded message notifying the caller accordingly.

FLEXIBLE CODE RESTRICTION

Allows the customer to specify whether stations with toll-denied class of service will be allowed or denied access to outgoing trunk routes based on specific number patterns and/or the number of digits dialed.

Extensions to the ACD capabilities were announced in 1983 with the formation of an additional feature group - Package D. The latter is utilized for large ACD operations that require sophisticated management reports and flexible dynamic resource allocation capabilities. ACD-D uses an auxiliary data system (Digital Equipment Corporation PDP-11 minicomputer) attached to the SL-1 to provide a comprehensive administration capability that includes status displays, reports, and load management functions.

In 1984, Generic X11 Release 4 became the business software standard and incorporated the Autovon capability previously only available on X14. Additional option groups became available as follows:

FLEXIBLE HOTLINE

Provides the capability to assign any single pre-determined destination to be automatically rung from an associated 500/2500 telephone when the latter goes off-hook.

DELUXE HOLD

Adds two capabilities for calls placed on hold in multiple appearance (single call arrangement) directory number environments:

Individual Hold

Held condition is indicated at the normal 120 ipm on the SL-1 telephone only that placed the call on hold. All other appearances of the DN receive a slow flicker. (50 ms off every 2 seconds.)

Exclusive Hold

Allows users with multiple appearance DN's to place calls on hold under the control only of their particular telephone. All other appearances of the DN do not indicate the held call and are excluded from entering it.

AUTOMATIC LINE SELECTION

This feature allows the SL- 1 telephone to automatically select a line in a prioritized order when the handset is lifted.

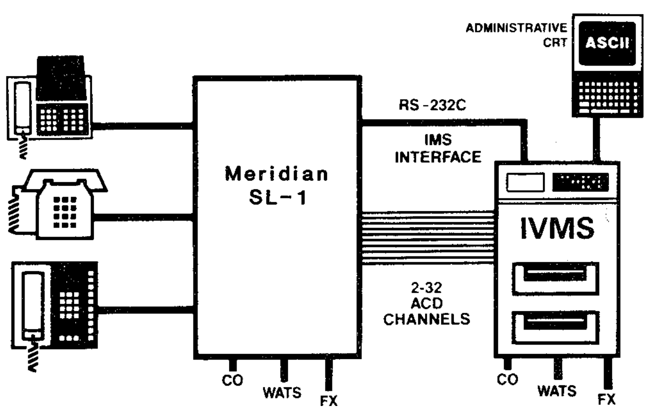
500 SET FEATURES

Provides rotary dial access to the speed call, call forward, and permanent hold features.

DISTINCTIVE RING

Allows calls over specified trunk routes to distinctively ring stations as opposed to the standard audible signaling arrangement.

Also supported by X11 Release 4 is the Integrated Voice Messaging System (IVMS) which expands previous SL-1 capabilities to include voice store and forward (VSF) messaging. Calls are automatically answered 24 hours a day without the need of a message attendant. The IVMS greets callers and receives and stores messages. The system notifies the called party when a message is waiting. Retrieval and replay of a stored message may be accomplished from an SL-1 electronic telephone or any 2500 type pushbutton telephone located anywhere in the world.



The Integrated Voice Messaging System (IVMS) illustrates once again the versatility of the Meridian SL-1. An auxiliary processor interacts with the latter to provide sophisticated voice messaging capabilities to the user.

FIGURE 4-8: INTEGRATED VOICE MESSAGING SYSTEM

Major changes to the SL-1 product line also occurred in 1984 with the introduction of four new family members for the following typical applications:

SL-1s	32 to 120 lines Single CPU-Single Memory Sub-System
SL-1MS	80 to 400 lines Single CPU-Single Memory Sub-System
SL-1N	100 to 1500 lines Single or Dual CPU, Single Network Group Duplicated Memory Sub-System
SL-1XN	up to 5000 lines Dual CPU, Multi-Network Group Duplicated Memory Sub-System

The systems were the result of an extensive development program that enhanced the major elements of the architecture:

Common Equipment Enhancements

The Common Equipment (CE) enhancements consisted of redesigning the Central Processing Unit (CPU) and Memory sub-systems.

A new type of central processor, based upon the SL-1XL microprocessor technology but with much simpler architecture, was introduced for single network group applications. Elimination of much of the discrete logic previously employed in separate Arithmetic Logic Unit (ALU) and Sequencer (SEQ) cards plus utilization of 64K EPROMS to store the firmware resulted in the CPU being housed on a single card. Thus the benefits of fewer components, less power requirements, along with a reduction in footprint were achieved without sacrificing performance. Indeed the reverse since the new microprocessor increased processing speed by as much as 55 percent over the equivalent earlier CPU models.

The introduction of 64 Kilobit Random Access Memory (RAM) chips permitted memory packaging in 192K modules as opposed to the previously available 64K modules. Additionally, the functions of the Memory Controller, formerly a separate card, were incorporated in the new memory module design. Two design types were developed - one incorporating automatic error correction and detection capability for systems using single memory subsystems (S and MS), and the other using conventional 17 bit per word formatting (16 data plus 1 parity) for the duplicated memory subsystems (N and XN). Further, two versions of each type in 128K and 192K modules were made available to facilitate memory addressing through efficient hardware provisioning for each SL- 1 family member.

Network Enhancement

Enhancements to the switching network were made primarily to address the requirements imposed by data communications on the SL-1 system. The existing network architecture was designed for applications in what was then a predominantly analog world. As such, to simplify the path search algorithm, available time slots or channels through the network were selected on a matched-pair basis. Thus a call originating on timeslot 4, for example, always terminated on timeslot 5 to complete the connection. This arrangement is certainly adequate for voice switching requirements. However, the recognition of the PBX as a viable hub to control the switching of integrated voice and data demanded improvements over the original design. Network enhancement achieved the following:

1. Removed the time slot matching pair constraint by selecting available channels on an individual basis. Thus the varying traffic requirements imposed by switching voice and data can be readily addressed by allocating network resources accordingly to meet the specific needs of each.

2. Doubled the number of links on the network backplane so that the associated equipment shelf could accommodate twice as many network loops. This was accomplished by the design of a new network card containing two loops as opposed to the single loop per card employed previously. Thus the number of network loops was doubled (16 to 32) within a network group. To complement this increase in traffic handling capability, the junctors, which are merely extensions of the originating and terminating loops between network groups, were also doubled (from 4 to 8 one-way junctors from one network group to each other).

Peripheral Equipment Enhancements

Introduction of Very Large Scale Integration (VLSI) components was instrumental in providing significant benefits from the PE enhancement program. In particular, a new custom filter codec chip, allocated on a per port basis, enabled peripheral card density to be doubled. Initial application of the chip, designated W05, to the most widely used PE cards, the SL-1 and 500/2500 line types, resulted in footprint savings and a reduction in per line power consumption. The next phase of the program introduced the W05 to the CO Trunk, DID Trunk and Message Waiting Line Cards respectively - again doubling the number of ports per card compared to their previous counterparts. The W05 meets the transmission standards for digital PBX's that are recommended by the U. S. Electronics Industries Association (EIA). These standards cover return loss, longitudinal balance, gain variation, idle channel noise, and other transmission characteristics.

Compliance to U.S. Federal Communications Commission (FCC) Part 15 regulations was mandatory for the continued marketing of the SL-1, which is classified as a Class A computing device.' These regulations cover Electromagnetic Interference (EMI) and Radio Frequency Interference (RFI) requirements and were addressed at both the circuit card and system levels under the PE enhancement program. At the circuit card level, EM1 and RFI were minimized through design practices that tackled the problem at the source. Use of CMOS (Complementary Metal Oxide Semiconductor) components, isolated circuit traces, and multilayer backplanes were contributing factors. From the system point of view, a new equipment cabinet was designed utilizing elaborate shielding techniques to prevent EMI and RFI being emitted from the SL- 1 equipment contained therein.

Not all facets of the enhancements were applicable to all systems. Instead, portions of the program were adapted as appropriate to benefit product application, a further indication of the modularity and flexibility of the SL- 1 design. Table 4- 1 outlines the compatibility of the 1984 enhancements to the SL-1 family members. It should be noted that Generic Xl 1 Release 4 is the software base that supports these enhancements. Consequently, X37, the hospitality generic, is not presently compatible to the new network enhancement portion of the program. For this reason, SL-1LE and XL systems were retained for use in X37 applications.

PROGRAM 1984	COMMON EQUIPMENT ENHANCEMENT		NETWORK ENHANCEMENT	PERIPHERAL EQUIPMENT ENHANCEMENT
SYSTEM	CPU	MEMORY		
S	YES	YES	NO	YES
MS	YES	YES	NO	YES
N	YES	YES	YES	YES
XN	NO	YES	YES	YES

TABLE 4- 1: ENHANCEMENT COMPATIBILITY (1984)

Additional capabilities for SL-1 data connectivity were announced during 1984:

- The stand-alone Asynchronous/Synchronous Interface Module (ASIM) provides both asynchronous and synchronous terminal access to multiple host computers.

- The Digital Trunk Interface (DTI) enables the SL-1 to be connected by digital transmission links to switching systems in the public and private networks. The DTI supports both voice and data transmission and uses the DS-1 digital format consisting of 24 time-division multiplexed channels.

- The Computer - PBX Interface (CPI) uses the same DS-1 link for bidirectional data communication between the SL-1 and a host computer.

- The X.25 Packet Assembler/Disassembler (PAD) provides a standard way to interconnect non-compatible multi-vendor computer terminals to packet-switched networks. Utilizing the switching capability of the SL-1, the X.25 PAD provides a flexible gateway to the services of Public Data Network (PDN) facilities.

- The SL-1/3270 Protocol Converter converts ASCII format data to either the bisynchronous or SNA/SDLC (System Network Architecture/Synchronous Data Line Control) format used by IBM host data bases. By means of the switched access capability of the SL-1, any associated terminal can be connected to any connected host computer to eliminate the need of having different terminals for different applications and data bases.

- The System 34/36/38 Gateway unites IBM 34/36/38 computers with ASCII terminals, personal computers, and printers in a common communications network. Port contention and concentration maximizes the use of the data port when utilizing dial up access to the gateway.

- The Coax Elimination and Switching System eliminates the direct connection restriction between the IBM 3178 or 3278 display terminal and its cluster controller. The switching matrix of the SL- 1 allows the flexibility of connecting any such terminal to any IBM 3274 or 3276 cluster controller via a Multi-Channel Coax System (MCCS) and a Coax Interface Module (CIM). Alternatively, each SL-1 data unit can be connected in a back-to-back mode to effectively bypass the switching network for use in a coax elimination arrangement.

Software Generic Xl 1 Release 5 was introduced during the second quarter of 1985. It consists of all the capabilities of Release 4 plus the following feature enhancements:

Business Features

- Interface to EPSCS (Enhanced Private Switched Communications Service) - a Private Network of AT&T which uses the No. 1 ESS as a switching host
- Departmental LDN Feature - allows up to four different departments to be identified by their own specific listed directory number
- Data Port Hunting - permits up to 128 data access modules to be assigned in a trunk group
- Privacy Override - allows multiple appearance, single call arrangement directory numbers assigned to SL-1 telephones to have class-of-service control of privacy
- Enhanced End-to-End Signaling - permits this capability to be invoked on all calls to and from the SL-1 telephone
- Call Register Enhancement - permits a separate logical memory page to be assigned to both call registers and trunk timing blocks, thereby increasing the number of call registers from 1200 to approximately 1500
- Double Density Trunks (CO and DID) and Message Waiting Line Cards - permits twice as many circuits to be packaged on a single card compared to their single density counterparts
- Memory Enhancement - increases the amount of memory available on the SL-1XN in the areas of Program Store and Protected Data Store

ESN Features

- Offnet Number Recognition for BARS/NARS Feature - removes the need to use two additional CO trunks to terminate a call at a company owned location.
- Incoming Trunk Group Exclusion - associated with the BARS/NARS feature, provides the capability to deny the routing of incoming trunk calls to specific prefix codes
- Multiple DID Office Code Screening for NARS - supports on-net to off-net conversion for sites having varying numbering schemes.

Meridian

On February 14, 1985, Northern Telecom, in keeping with the OPEN World promise, announced major enhancement capabilities to its SL family of digital switching systems. Under the banner of Meridian SL-1 Integrated Services Network, a new range of sophisticated information management services would evolve including:

- a Local Area Network (LAN) capability called LANSTAR whose services encompass both existing and new data products to interconnect a wide variety of terminals, personal computers, and mainframes

- a 40 Mbps Packet Transport which delivers bandwidth on demand for voice and data

- a unique, high speed 2.56 Mbps pipeline to the desktop via conventional twisted pair wiring distribution

- a wide range of enhanced services through the use of loosely coupled, multiple processors, provisioned as required to meet specific applications

- a range of fully digital telephones to augment the existing terminal portfolio using a new 5 12 Kbps digital distribution scheme

- an optional hardware package, called Packet Transport, which includes the 40 Mbps Packet Transport, main storage system, loosely coupled multi-processors, and Lanlink interface for the 2.56 Mbps digital distribution.

The foregoing enhancements are accomplished through architectural extensions that build upon the existing system foundation. As such, they can be applied to the installed base to re-emphasize once again Northern Telecom's commitment to a continuity program that guards against product obsolescence.

Meridian SL-1 encompasses the best characteristics of a tried and proven digital PBX with those of a high speed local area network. By adding packet switching via Packet Transport to the inherent circuit-switched capability of Common Equipment (CE) and Peripheral Equipment (PE), a capability for enhanced communications and information exchange services is derived.

Software Generic Xl 1 Release 7 was introduced to support these major enhancements. In addition, the following feature capabilities were also provided:

- Controlled Class of Service (CCOS), formally introduced for the Hotel/Motel industry, was applied to the business environment to permit a station's level of access to the external network to be changed to a predetermined system level via a controlling SL- 1 telephone.

- Multi-Tenant Service, which permits each of the 32 customer groups within the Meridian SL-1 to be partitioned into 5 12 tenants to facilitate resale of services.

- Automatic Trunk Maintenance, which provides a means of periodically testing network resources by measuring facility loss and noise parameters to prevent under utilization due to poor performance or service outage. Associated hardware to provide tone detection capabilities was also introduced.

- Station Category Indication (SCI) allows the attendant to selectively answer internal calls in accordance with a predetermined priority status.

Generic Xl 1 Release 7 is also the software base necessary to support the introduction of the Meridian family of digital telephones. An Integrated Services Digital Line Card (ISDLC), supporting eight combined voice/data ports and located in the Peripheral Equipment (PE) of Meridian SL- 1, interfaces the following digital telephones:

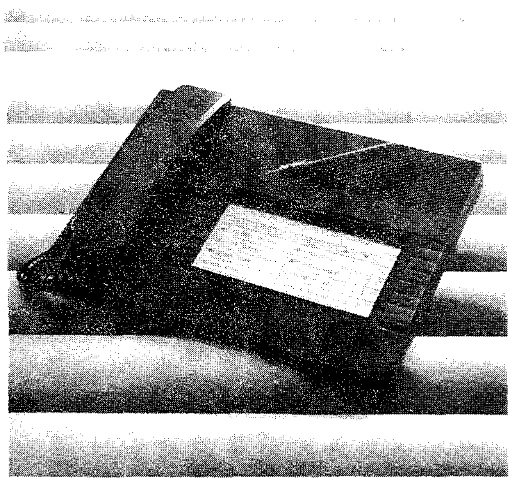
Meridian M2009
- provides nine key/LCD indicators that can be flexibly assigned to features and/or directory numbers

Meridian M2018
- provides eighteen flexible key assignments for personnel with back-up answering responsibilities

Meridian M2112
- provides twelve keys and incorporates handsfree communication capabilities

Meridian M3000 Touchphone
- an executive telephone that utilizes a touch sensitive LCD control screen for feature activation and call processing.

Each of these digital telephones can be readily optimized for data communications by incorporating a data option to support connection to an asynchronous terminal or personal computer at speeds up to 19.2 kbps.



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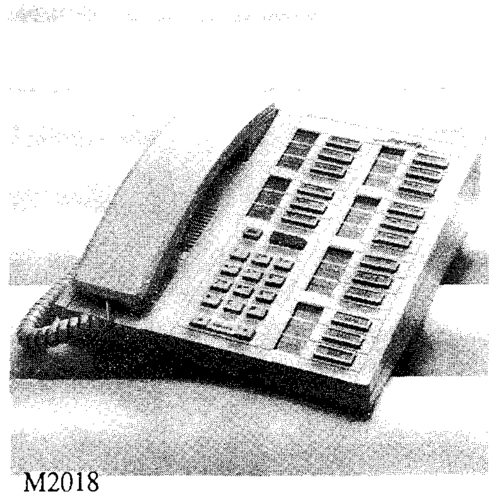

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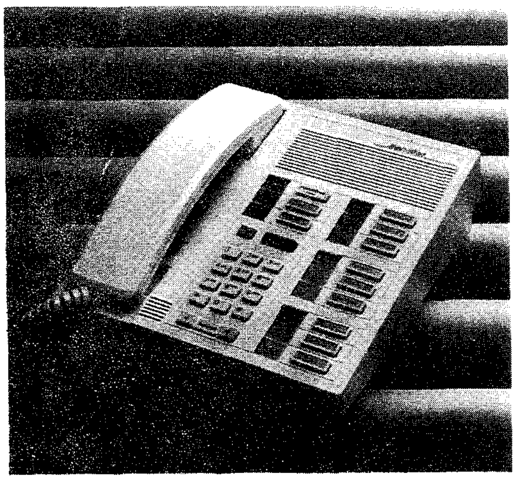

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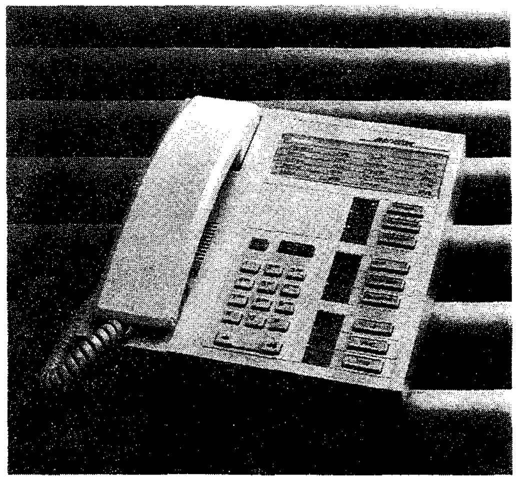


M2009

FIGURE 4-9: DIGITAL TELEPHONES

Major system enhancements were incorporated in 1986 as signified by the introduction of Meridian SL-1NT and Meridian SL-1XT. A Common Equipment Enhancement Program, supported by Software Generic Xl 1 Release 8, provides new key operating elements which results in significant improvements to system operating parameters. The new components, (Figure 4-10), are identical for use on both NT and XT as follows:

- Central Processing Unit

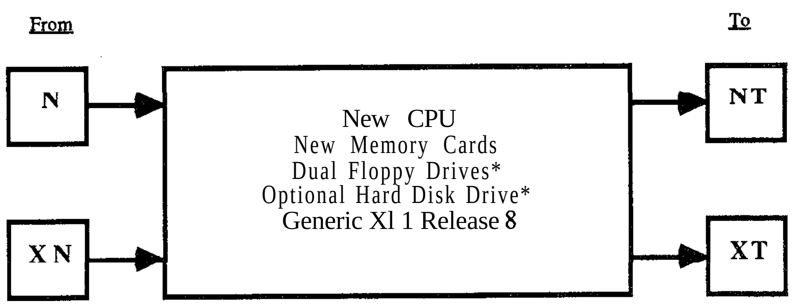
  A new CPU, contained on two printed circuit cards, provides in excess of fifty percent more real time capacity compared to that available on Meridian SL-1XN.

- Random Access Memory

  A new memory design that increases significantly the address range and eliminates the 64 K word page address partitions incorporated on earlier models of Meridian SL-1. The memory utilizes 256K dynamic random access memory chips to permit as much as 768K words of storage on a single circuit card.

- Mass Storage Sub-System

  A new mass storage system to replace the previous magnetic tape transport provides 75 percent more storage capability through the provision of a pair of floppy diskettes as a standard product offering. An optional 10 Mbyte Winchester hard disk may be also specified to further expand storage capacity. Since the Mass Storage Sub-System design is independent of the new CPU design, then it may be incorporated on other system models supported by Xl 1 Release 8 software. Besides additional storage capability, implementation reduces significantly the time associated with administration and maintenance routines.



*Also applicable to other system models supported by Release 8
(Hard Disk option not available on Meridian SL-1 S)

FIGURE 4-10: COMMON EQUIPMENT ENHANCEMENTS

Table 4-2 denotes the compatibility of the 1986 CE Enhancements to the Meridian SL-1 product family.

SYSTEM / COMPONENT	S	MS	N	XN	NT	XT
NEW PROCESSOR	No	No	No	No	Yes	Yes
NEW MEMORY	No	No	No	No	Yes	Yes
FLOPPY DISK DRIVES	Yes	Yes	Yes	Yes	Yes	Yes
HARD DISK DRIVE	No	Option	Option	Option	Option	Option

NOTE: Software Generic Xl 1 Release 8 is a prerequisite

TABLE 4-2: CE ENHANCEMENT COMPATIBILITY

Software Generic Xl 1 Release 8 also provides additional capabilities beyond the CE Enhancement Program as follows:

- Digital Trunk Interface (DTI), formerly introduced on Meridian SL-1N and XN, was extended to include the smaller sized MS system and also NT and XT models.
- Last Number Redial (LNR) allows users to simply redial the last number dialed without having to key in the digits again.
- Pretranslation provides a means of utilizing speed call lists to implement a flexible dialing plan.
- Supervisory Console allows one attendant in each customer group to function in a supervisory capacity when the associated console is placed in a position busy mode.
- 11 Digit Translation extends the previous three or four digit translation mechanism to eliminate potential routing conflicts when utilizing the BARS/NARS feature.
- 63 Attendant Consoles per customer group compared to the previous fifteen.
- Station to Station Call Waiting which allows internal calls to enter the call waiting state via a new station class of service.

LANSTAR data services were extended in 1986 to include the following:

- Coax Elimination and Switching enhancement to add VT100 terminal emulation to give the IBM 3270 terminal user additional functionality.
- Asynchronous Line Interface enhancement to support low cost connections for LANSTAR users on the Meridian SL-1 with a direct connection to a host Hewlett Packard HP3000 computer.
- Introduction of a LANSTAR Balun family of products for coaxial, twin-axial, and dual coaxial connected terminals.
- Asynchronous Interface Line Unit (AILU) as a low cost alternative to the Asynchronous Interface Module (AIM) by using a direct terminal connection without the need for an intermediate data module.
- EasyLAN, a personal computer software product from Server Technology, Inc., that can be used to network IBM and compatible PCs for "dial-up" resource sharing through the Meridian SL- 1.

Other Meridian SL-1 enhancements announced in 1986 were:

- Introduction of the smaller sized DEC Micro PDP 1 1/73 for ACD-D applications along with an unbundling of associated Generic 9000 software capabilities to permit greater user flexibility and management control.
- Integrated Building Distribution Network (IBDN) provides a comprehensive line of products for networking a variety of existing and future communication devices via copper twisted-pair and fiber optic media. The universal distribution architecture addresses connectivity requirements from the building entrance point to the terminal located at the workstation.

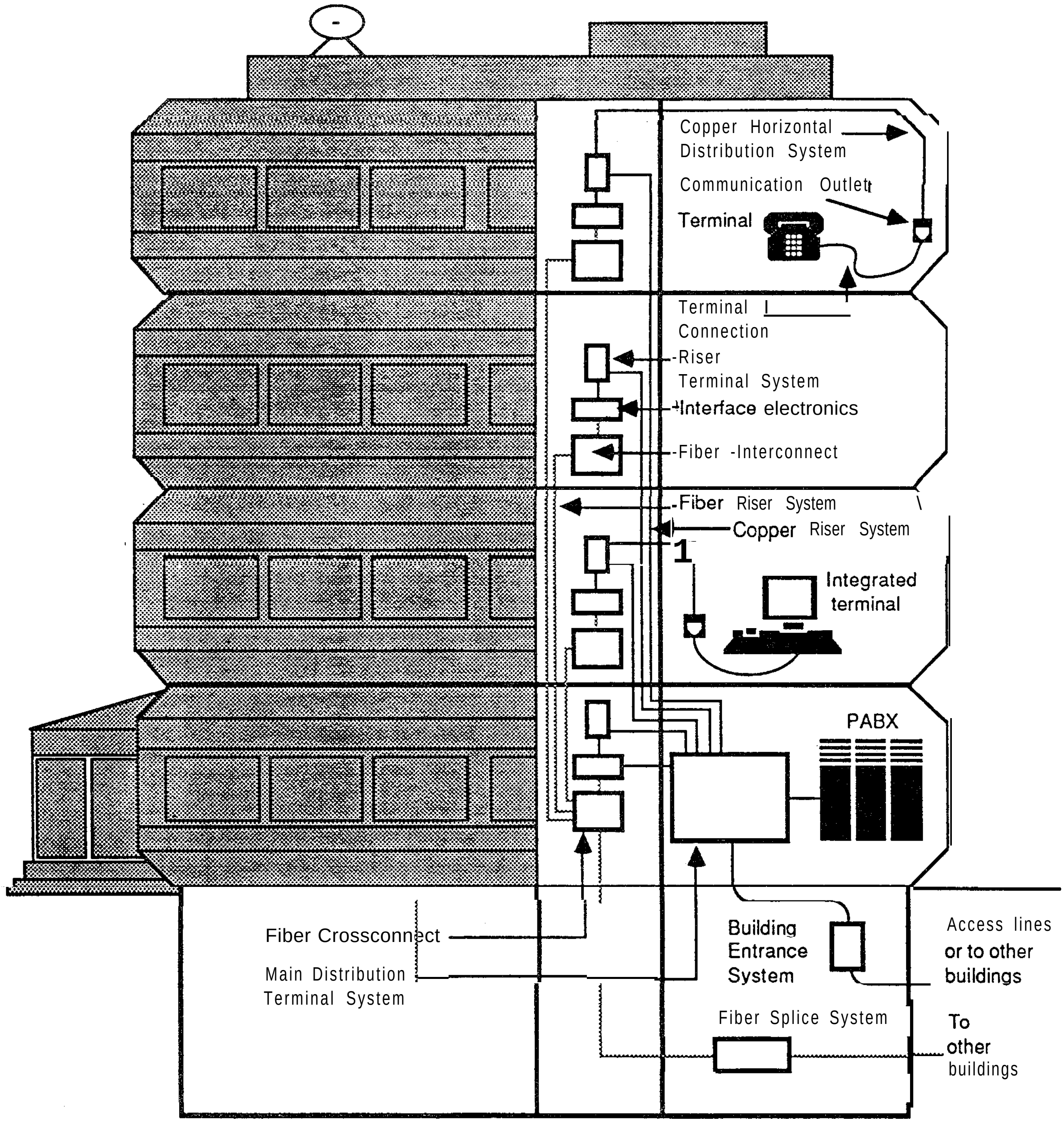


FIGURE 4-11: INTEGRATED BUILDING DISTRIBUTION NETWORK MAJOR NETWORK COMPONENTS (INTEGRATED COPPER & FIBER BASED SYSTEMS)

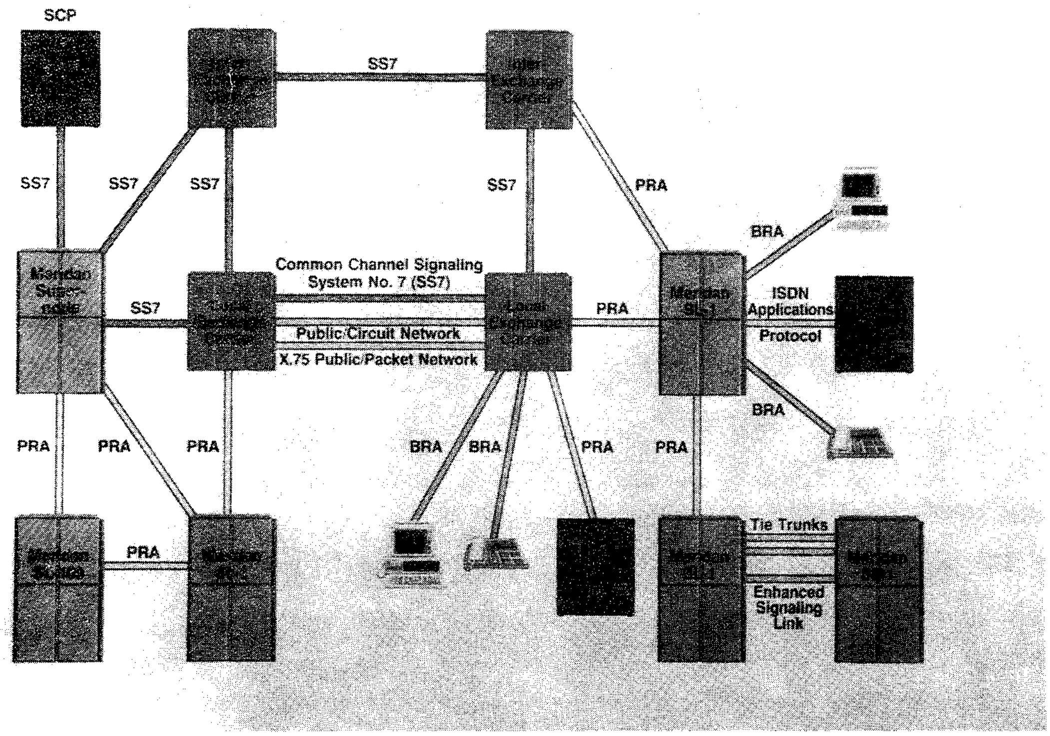
In 1987, Meridian SL-1ST was introduced to address the requirements of the small PBX market. Packaged in a small, attractive, modular cabinet, the system provides the functionality and feature capability of the much larger members of the Meridian SL-1 portfolio. In addition to a tiered arrangement of equipment shelves for flexible expansion, Meridian SL-1ST also introduced peripheral enhancements that were later adapted to the larger systems. These enhancements included the introduction of a 16-port 500/2500 line card and a split PE shelf accommodating a dual-loop buffer which in turn houses a dual-port digitone receiver. Expansion beyond the capabilities of the initial CE/PE cabinet is accomplished by means of an ST expansion cabinet utilizing similar packaging techniques. These same packaging concepts were also adapted for remote peripheral equipment applications through the introduction of a new RPE cabinet that provides existing feature capabilities in a much smaller hardware configuration.

Besides supporting Meridian SL-1ST, Software Generic Xl 1 Release 9 introduced new ACD-D enhancements that contribute to increased system flexibility. In addition, software was made available to support the latest member of the Meridian Digital Telephone portfolio -- the Meridian M2317, which provides 11 programmable keys, 5 context sensitive softkeys, handsfree capability, and a 2 line x 40 character alphanumeric display. PC based software packages announced for Meridian SL- 1 were the Station Data Base Automation System (STADATA) and Automatic Polling and Traffic Analysis System.

Packet Transport applications concentrated upon delivery of voice messaging and local area networking capabilities. Meridian Mail, the fully integrated voice messaging system of Meridian SL- 1, was enhanced via Release 1.3.3 to provide the following communications applications: On-Line Directory, Meridian Connection, and X.25 Access. A later offering (Software Release 2) provided additional feature enhancements including: Distribution Lists (Personal and System), Custom Transfer, Broadcast, User Changeable Passwords, and Short Call Deletion. Software Release 2 also supports further system enhancements: Increased Capacity (32 ports), Flexible Disk Storage, Operational Measurement Reports, Simplified User Administration, Larger X.25 Gateway Service (32 simultaneous users), and Reduced Footprint and Power Consumption.

Meridian LANSTAR, the unique communications system for IBM and compatible PCs, was enhanced to accommodate application of Macinotsh II computers through LANSTAR AppleTalk utilizing the 40 Mbps bandwidth and 2.56 Mbps distribution capabilities of the Packet Transport. Other applications introduced in 1987 included Meridian LANSTAR and VINES Network Program to produce a wide range of communications capabilities using a number of network server options from Banyan, and Meridian LANSTAR with NETBIOS and Microsofts Networks Program. The Packet Transport was further enhanced with the introduction of a smaller cabinet (PTE-S) for standalone LAN applications and a software program to facilitate Meridian LANSTAR node-diagnostic routines. LANSTAR data services, utilizing the circuit switch capabilities of Meridian SL-1, were broadened to include a direct RS-232C Interface Line Card (RILC) to significantly reduce connectivity costs to asynchronous ASCII computer equipment such as hosts, modems, protocol converters, X.25 PADS, and multiplexors. Enhancements to the existing Asynchronous Interface Line Card (AILC) and Coax Elimination and Switching System (CESS) were also introduced in 1987.

One of the most significant events during 1987 was the announcement of the introduction of ISDN Primary Rate Access for Meridian SL-1. Although not scheduled for implementation until 1988, the announcement of PRA capability is in accordance with strategic product positioning and the Meridian Customer Defined Network (Figure 4-12) that provides a basis for the broad portfolio of products, applications, and services from Northern Telecom to meet corporate networking needs.



Meridian Customer Defined Networking is the basis for custom private and hybrid networks that use a mix of ISDN interfaces, enhanced SS7 signaling, circuit and packet switching, bandwidth management, and advanced networking applications.

FIGURE 4-12: MERIDIAN CUSTOMER DEFINED NETWORKING

Another major announcement was the availability of Software Generic Xl 1 Release 10 for the first quarter of 1988. This software release introduced new business opportunities in key vertical markets such as Lodging, Health Care, Telemarketing, and the Federal Government. In addition, Generic Xl 1 Release 10 culminated the development program, embarked upon in 1984, to recombine the Hotel/Motel Generic (X37) into a single stream business offering. Thus users in the Lodging environment utilized features formerly only available to the business segment, and vice versa. Generic Xl 1 Release 10 introduced a total of 16 new features/enhancements, partitioned typically for the following vertical markets, but additionally available to all users of this software base:

Hospitality/Health Care
- Automatic Wakeup
- Room Status
- Message Registration
- Property Management System Interface
- Background Terminal

Federal Systems
- Station Loop Pre-emption
- Line Load Control

Telemarketing
- ACD Enhancements
  - Call Overflow by Time in Queue
  - Dialed Number Identification Service

General Business
- Call Party Name Display
- Call Forward No Answer/Hunt by Call Type
- Second Level Call Forward No Answer
- Six Party 2500 Set Conference
- Enhanced Motline
- Station-to-Station Call Detail Recording
- Malicious Call Trace

Also in 1988, the Meridian SL-1RT was introduced to address the needs of smaller sized organizations requiring redundancy. Packaged in a small modular cabinet similar to the Meridian SL-1ST, the RT has dual CPU and memory, making it completely reliable. The Meridian SL- 1 RT can be expanded by adding the same tiers designed for Meridian SL- 1 ST expansions. Other introductions for 1988 include:

16 Port 500-2500 Message Waiting Line Card

Generic Xl 1 Release 11
- Incoming DID Digit Conversion (IDC)
- Primary Rate Access (PRA)

Generic Xl 1 Release 12
- Automatic Call Distribution Auxiliary Security (ACD-D)
- Enhanced Music (EMUS)
- Directed Call Pick-up (DCP)
- ISDN Signaling Link (ISL)
- ISDN Advanced Features (IAF)
- Automatic Call Distribution Priority Agent
- ISDN Core Signaling (ICS)
- Call by Call Service (CBC)
- Calling Line Identification in CDR (CLID in CDR)
- Inter-Exchange Carrier (IEC)

Product Evolution

A summary of the Meridian SL-1 product evolution is provided in Chart 4- 1. System evolution is depicted in Figure 4-13 and software evolution in Figure 4-14. The software development path leading to the single stream generic is traced in Chart 4-2.

The Future

The future holds furtker evolution in store for Meridian SL-1. Every new technology generates new opportunities and new applications. The most important decisions will be on what to develop rather than how to develop it. These decisions must be made in the marketplace. Only the marketplace can decide what products should be developed by technology. It is not for technology to dictate what the marketplace should want. With this in mind, Meridian SL-1 is ready for the future and will always be on the leading edge of product generation.

'EAR	MODEL (EVENT)	HARDWARE	SOFTWARE
1975	SL-1L	FRONT ACCESS CABINET SINGLE DENSITY PE - 4 PORT LINE -2PORTTRUNK 4K MEMORY CARD	MULTI-CUSTOMER ADVANCE FEATURES: AUTO DIAL, CALL FORWARD OVERRIDE RING AGAIN SPEED CALL, VOICE CALL
1976	SL-1VL (DIGITAL WORLD)	CENTRALIZED POWER CABINET DIGIT DISPLAY CONSOLE 8K MEMORY CARD	
1977		CDR CABINET RAN TRUNK	AUTOMATIC IDENTIFICATION OF OUTWARD DIAL (AIOD) CALL DETAIL RECORDING RECORDED ANNOUNCEMENT DO NOT DISTURB (INDIVIDUAL) END TO END SIGNALING
1978	SL-1LE SL-1VLE	64K MEMORY CARD LOCAL / REMOTE RPE INTERFACE MF SENDER	REMOTE PERIPHERAL EQUIPMENT (RPE) AUTOMATIC NUMBER IDENTIFICATION (ANI) DO NOT DISTURB (GROUP) MAKE SET BUSY AUTOMATIC ROUTE SELECTION
1979	SL-1A (INTELLIGENT UNIVERSE)	4W E & M TRUNK	DIAL INTERCOM 2500 SET FEATURES DIGIT DISPLAY DIRECT INWARD SYSTEM ACCESS @ISA) CDR CHARGE ACCOUNT AUTHORIZATION CODE AUTOMATIC CALL DISTRIBUTION HOTEL / MOTEL AUTOVON MESSAGE CENTER
1980	SL-1XL	SL-10 PROCESSOR ADD-ON DATA MODULE (ADM) DATA LINE CARD	ACD PACKAGE B, C 1, C2 MUSIC-ON-HOLD ELECTRONIC SWITCHED NETWORK

CHART 4-l: MERIDIAN SL-1 PRODUCT EVOLUTION

YEAR	MODEL (EVENT)	HARDWARE	SOFTWARE
1981	SL-1LE SINGLE CPU		HOSPITAL / CLINIC AUTOMATIC WAKE-UP ROOM STATUS
1982	SL-1M (OPEN WORLD)	DISPLAYPHONE FRONT & REAR ACCESS CABINET	ATTENDANT ADMINISTRATION AUTOMATIC SET RELOCATION HISTORY FILE CALL PARK SYSTEM SPEED CALL RECORDED OVERFLOW ANNOUNCEMENT
1983		MULTI-CHANNEL DATA SYSTEM (MCDS) SL-1 DISPLAYPHONE PC INTERFACE CARD ASYNCHRONOUSINTERFACE MODULE (AIM) ACD AUXILIARY PROCESSOR	ACD-D STORED NUMBER REDIAL NETWORK CALL TRANSFER INTEGRATED MESSAGING SYSTEM (IMS)
1984	SL-1S SL-1MS SL-1N SL-1XN	DOUBLE DENSITY PE - 8 PORT LINE - 4 PORT TRUNK COAX ELIMINATION & SWITCHING SYSTEM (CESS) 3270 PROTOCOL CONVERTER ASYNCHRONOUS / SYNCHRONOUS INTERFACE MODULE (ASIM) 192K MEMORY CARD	AUTOVON ENHANCEMENTS INTEGRATED VOICE MESSAGING SYSTEM (IVMS) FLEXIBLE HOTLINE 500 SET FEATURES DISTINCTIVE RING
1985	(MERIDIAN)	SYSTEM 36 GATEWAY COMPUTER TO PBX INTERFACE (CPI) DIGITAL TRUNK INTERFACE (DTI) PACKET TRANSPORT EQUIPMENT DIGITAL TELEPHONES X.25 GATEWAY PAD INTEGRATED SERVICES DIGITAL LINE (ISDLC)	EPSCS INTERFACE ESN ENHANCEMENTS MULTI-TENANT SERVICE AUTOMATIC TRUNK MAINTENANCE

CHART 4-1: CONTINUED

YEAR	MODEL	HARDWARE	SOFTWARE
1986	MERIDIAN SL-1NT MERIDIAN SL- 1XT	COMMON EQUIPMENT ENHANCEMENTS: - NEW PROCESSOR - 768K MEMORY CARD - DISK STORAGE ASYNCHRONOUS INTERFACE LINE UNIT (AILU) BALUNS FAST TDS	LAST NUMBER REDIAL SUPERVISORY CONSOLE PRETRANSLATION
1987	MERIDIAN SL-1ST (MERIDIANMAIL) (MERIDIAN LANSTAR) [ANNOUNCEMENT]	PERIPHERAL EQUIPMENT ENHANCEMENTS -16 PORT 500/2500 CARD -DUAL LOOP BUFFER -SPLIT PE SHELF -DAUGHTERBOARD DTR NEW 50A RECTIFIER RS232C INTERFACE (RILC) PTE-S CABINET ST EXPANSION CABINET M23 17 DIGITAL TELEPHONE MACINTOSH II INTERFACE RPE CABINET ISDN PRA INTERFACE	ACD ENHANCEMENTS PC-BASED PACKAGES - STATION DATA BASE AUTOMATION SYSTEM - AUTOMATIC POLLING AND TRAFFIC ANALYSIS SINGLE STREAM SOFTWARE GENERIC (X11 RELEASE 10)
1988	MERIDIAN SL-1RT	COMMON EQUIPMENT ENHANCEMENTS: -16 PORT 500/2500 MESSAGE WAITING LINE CARD -NEW DUAL PROCESSOR -768K MEMORY CARD MERIDIAN M2018S - SECURE TELEPHONE MERIDIAN MAIL -MP, SP, OPTION NEW ROM CARD MERIDIAN M3000 PLUS TOUCHPHONB	NEW ACD-D ENHANCEMENTS CDR ENHANCEMENTS CDP ENHANCEMENTS ISDN APPLICATIONS PROTOCOL

CHART 4- 1: CONTINUED

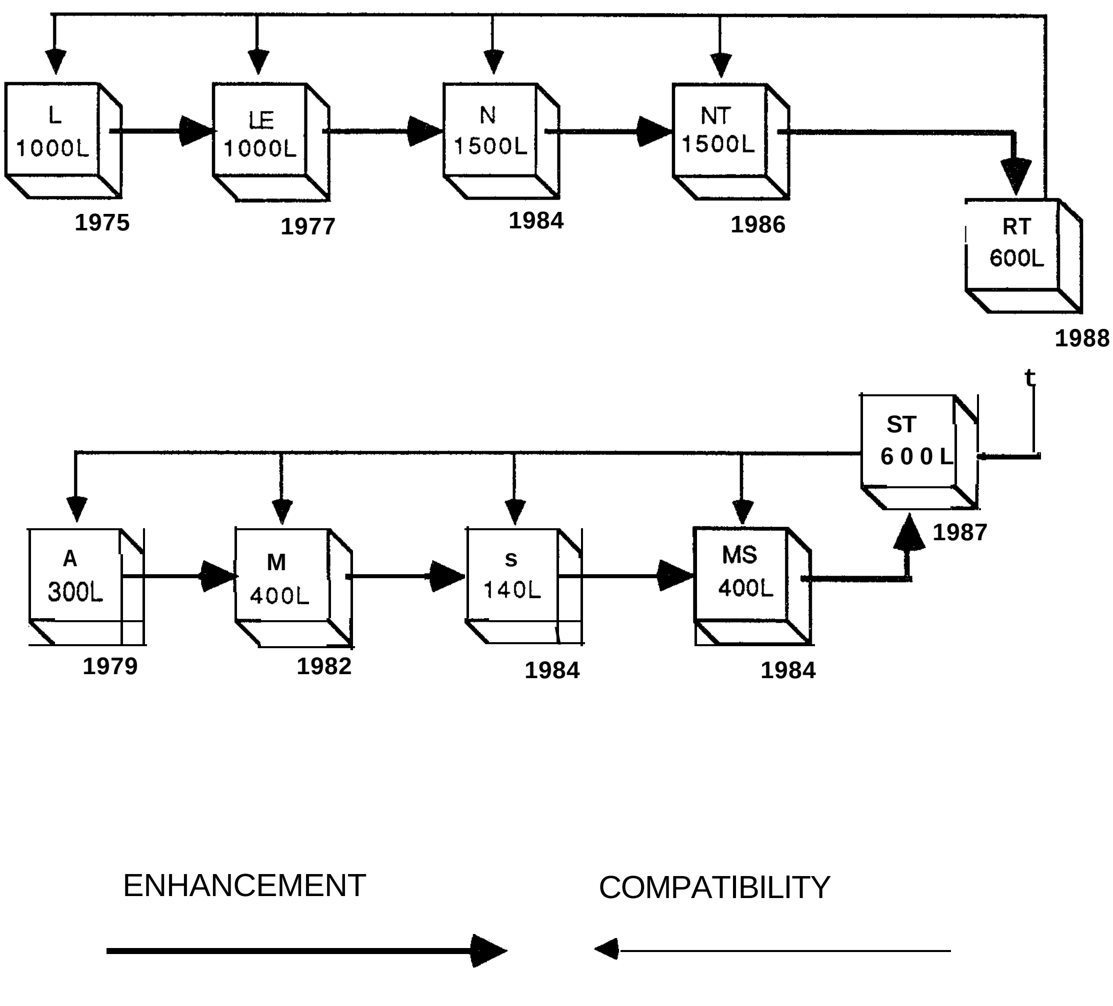


FIGURE 4-13: SYSTEM EVOLUTION

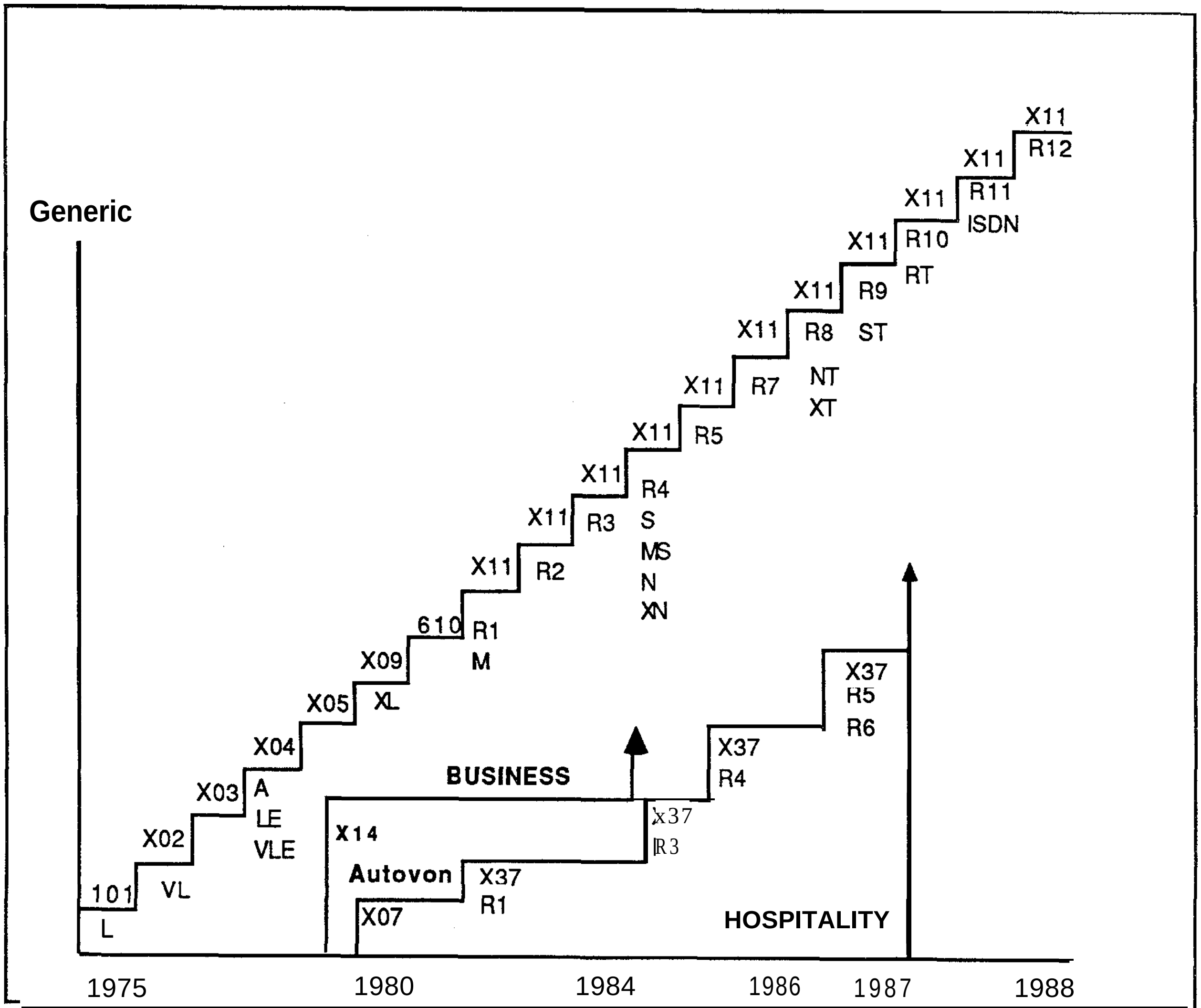


FIGURE 4-14: SOFTWARE EVOLUTION

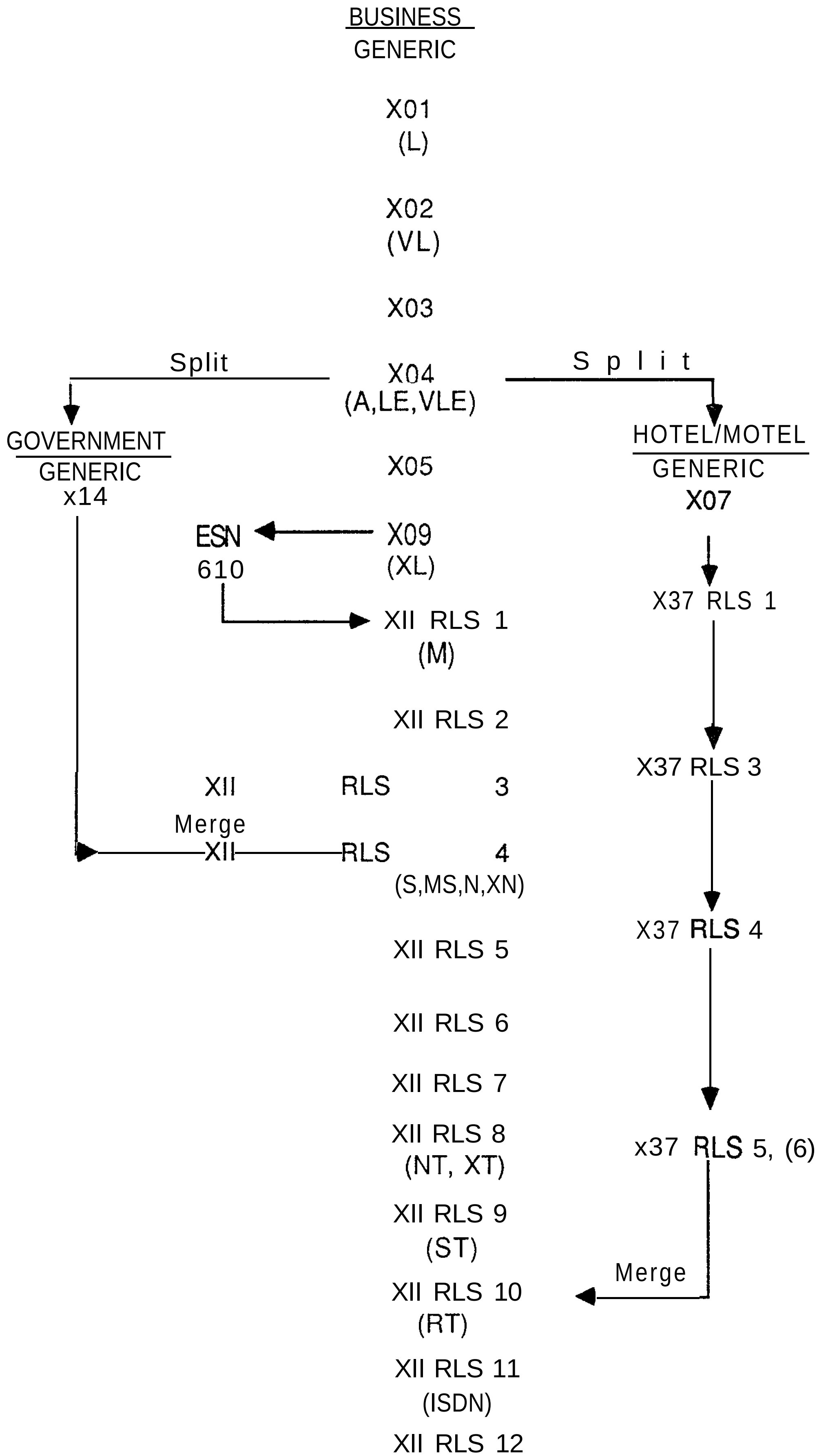


CHART 4-2: MERIDIAN SL-1 SOFTWARE EVOLUTION

CONTENTS

SECTION : 5 PRODUCT FAMILY

SECTION : 5 PRODUCT FAMILY (continued)

DESCRIPTION **PAGE**

PRODUCT FAMILY

Introduction

There are various members of the Meridian SL-1 family that address the business communications needs of the marketplace. Each member is designed on a common premise that provides modularity and flexibility through an evolving architecture. The essential difference between the system types is one of application, where each model is designed to address a specific range within the total product capability of typically 32 to 7000 lines. Maximum utilization of product resources ensures that each system can be configured effectively without the undue burden of extraneous hardware.

From a functional point of view, the Meridian SL- 1 is grouped as follows:

Models S and MS share identical hardware and software, their difference being only in the area of hardware packaging. Therefore, the MS can be considered as a larger version of the S. In addition to supporting the Xl 1 software generic for business applications, each model can also be utilized with the X37 Hospitality generic in the Hotel/Motel environment.

Models N and XN share a similar control, network, and memory design; their difference being only in terms of capacity. The XN, by employing an additional switching stage, can generally be considered to have five times the traffic capacity of the N. The N system is available for single CPU applications using the X11 business generic. The XN is now manufacture discontinued but is included in this section for reference purposes only to support the installed base.

Models NT and XT introduce common equipment enhancements compared to the N and XN systems respectively. The enhancements consist of new processor, random access memory, and mass storage capabilities that improve performance and increase capacity within these areas. These new components are identical in terms of hardware construction and share common ordering codes for utilization on both NT and XT systems. Each model operates on the Xl 1 business generic and includes a dual CPU and fully redundant memory as a standard product offering.

Model ST brings the technology, functionality, and performance normally associated with the larger Meridian SL-1 models to the small system environment. The ST is packaged in an attractive compact cabinet designed for the office environment that provides incremental growth capability through the addition of equipment shelf tiers. An expansion cabinet permits the ST to support applications up to 600 lines.

Model RT is the latest member of the Meridian SL-1 family. The RT system offers the dual common equipment found in the larger systems (NT and XT), but in a small system (ST) package. The RT provides absolute reliability for up to 600 lines.

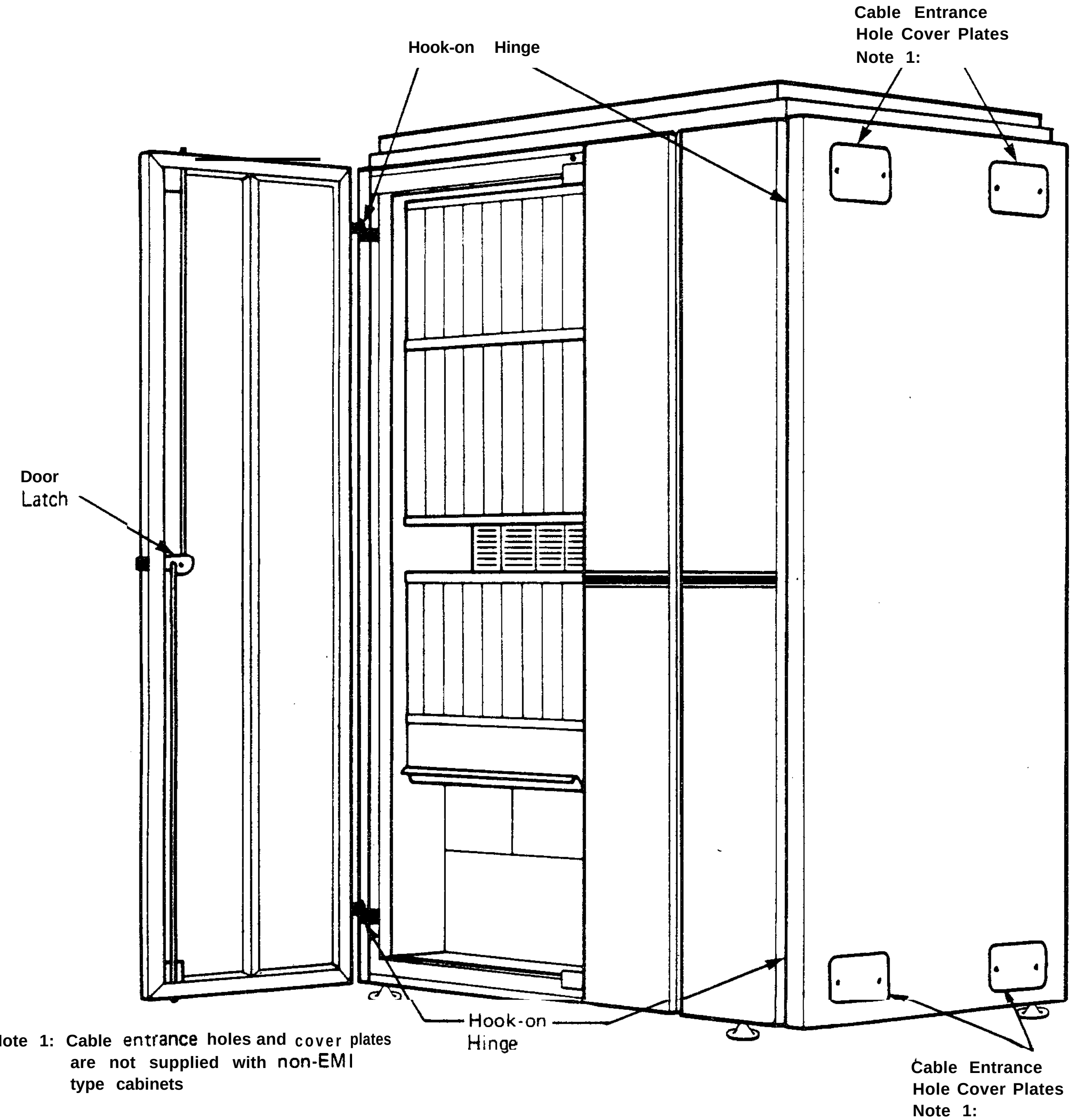
Peripheral Equipment (PE), including line and trunk interfaces, terminals, and data modules, is common to all models and may be freely intermixed. This commonality has significant benefits in spares inventory where any peripheral card can be utilized on any system type. Similarly, peripheral equipment is never made obsolete since ongoing system enhancements are always backwards compatible. The difference in application of PE from one system type to another is merely the cabinet placement of the associated equipment shelves.

Packet Transport is an extension to the circuit switch architecture of the Meridian SL-1 and is applicable to those system models that incorporate the 1984 network enhancements (N, XN, ST, NT, RT, and XT). One or more Packet Transport Cabinets accommodating processors, memory, storage, and interface components may be provisioned as necessary to meet applications. This section describes in more detail the differences from one system type to another.

Cabinets

Common and Peripheral Equipment

Except for the smaller Meridian SL-1S, ST and RT models, the mechanical construction of the CE and/or PE equipment cabinet is the same for all system models. Each cabinet (Figure 5-1), consists of metal frames enclosed by panels to house common and peripheral equipment shelves, power shelves. and associated units. Front and rear doors provide access to the equipment under control of a key operated locking mechanism.



Note 1: Cable entrance holes and cover plates are not supplied with non-EMI type cabinets

FIGURE 5- 1: TYPICAL EQUIPMENT CABINET

The cabinet is designed to minimize RFI/EMI radiation in compliance with FCC regulations. Interior frames and top and bottom panels are zinc plated to ensure proper metal-to-metal contact. The cabinet doors and side panels have gasketing strips riveted to the inside edges. In addition, the doors are structurally reinforced to allow one to push against the other when closed. Four holes, each equipped with a cover plate, are provided in each side panel to facilitate the routing of cables between adjacent cabinets. When utilized for this purpose, a bulkhead assembly ensures the bonding of cabinets together.

Separate flexible conduit for AC and DC power connections is provided in each cabinet. A top panel contains filter connectors required to interface PE and miscellaneous equipment cables. Internal cables are used internally to extend the PE shelf backplanes to the top panel where they mate with industry standard cables terminated on the Main Distribution Frame (MDF).

Overhead ducting is used as a shielded wireway for cables that need routing across equipment aisles. To minimize this requirement, careful consideration should be given to planning the floor layout. Where possible, cabinets should be placed side by side to facilitate cabling requirements.

The dimensions of the cabinet are:

Height - 71 inches
Width - 52 inches
Depth - 29 inches

The maximum weight of a fully equipped cabinet and its associated floor loading is:

Maximum weight	- 1500 lbs
Maximum Bearing Loading	- 50 lbs/ft^2
Maximum Puncture Loading	- 80 lbs/in^2

The above loading factors apply to cabinets in operating environments where enough clearance exists to open both front and rear doors. When cabinets are in storage, the floor loading factor could be as high as 170 lbs/ft^2 if cabinets are placed adjacent to each other.

To differentiate between applications and optimize packaging requirements, five versions of the equipment cabinet are utilized as detailed in Table 5-1.

CODE	CABLE HARNESS	POWER CONVERTER SHELF	POWER DISTRIB. BOX	MERIDIAN SL-1 MODEL	MODE
QCA55	QCA112	N.A.	QBL21	XT	CE
QCA58	QCAlll	QSP43	N.A.	N / NT	CE/PE
QCA74	QCAD18	QSP44	N.A.	MS / NT / XT	PE
QCA108	QCAlll	QSP43'	N.A.	XT	NET/PE
QCA108	QCAlll	QSP43	N.A.	N / NT	DTI/PE
QCA109	QCAlll	QSP43	N.A.	MS	CE/PE

NOTE: N.A. = NOT APPLICABLE

TABLE 5-l: EQUIPMENT CABINET CONFIGURATIONS

Meridian SL-1S

The compact size and hardware packaging permits Meridian SL-1S to be configured in a single, stand-alone cabinet designed aesthetically for the office environment (Figure 5-2). The cabinet consists of a sheet metal enclosure with covers, and includes six internal equipment shelves arranged for front access. The interior layout is designed for convection cooling and the cabinet conforms to FCC Part 15 Subpart J regulations pertaining to EMI/RFI.

The dimensions of the cabinet are:

Height - 56 inches
Width - 32 inches
Depth - 15 inches

A fully equipped cabinet weighs approximately 300 lbs.

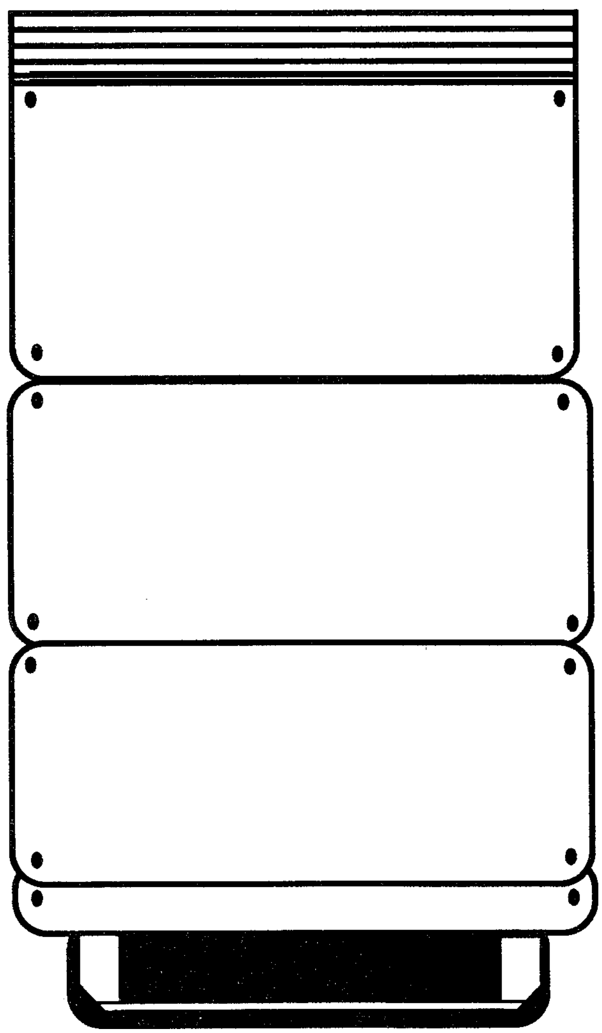


FIGURE 5-2: MERIDIAN SL- 1 S EQUIPMENT CABINET

Meridian SL- 1ST and Meridian SL- 1RT use a packaging concept that encompasses the benefits of the S system while adding to its functionality. The Meridian SL-1ST (Figure 5-3) measures 32 inches wide by 20.5 inches deep at the pedestal. The ST is fully functional, with a base single-tier measuring 33 inches high (weighing approximately 200 lbs). The Meridian SL-1RT (Figure 5-4A1) requires three tiers and has a base measurement of 15 inches wide and 20.5 inches deep (weighing approximately 400 lbs). Both the RT and ST can easily be expanded by connecting additional tiers. The cabinet enclosure is made of sheet metal with plastic covers and meets the FCC Part 15 EMI/RFI regulatory requirements.

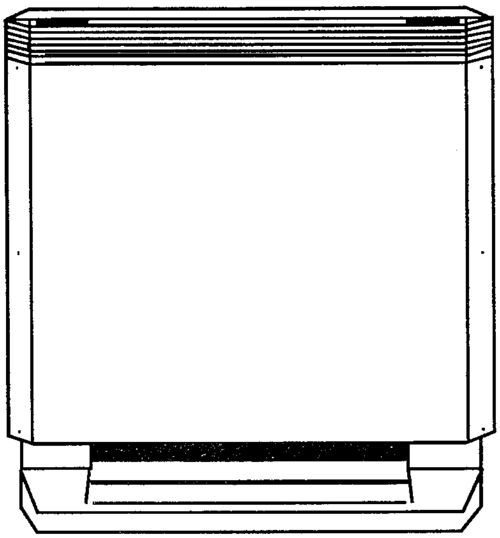


FIGURE 5-3: MERIDIAN SL- 1ST EQUIPMENTCABINET

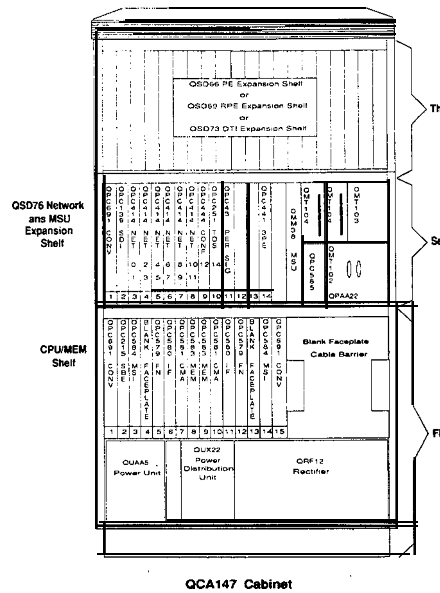


FIGURE 5-A1: MERIDIAN SL- 1RT EQUIPMENTCABINET

Packet Transport Cabinet

The Packet Transport Cabinet (Figure 5-4) is of metal construction and features front and rear doors and removable side panels. Equipment is accessable from the front in a single vertical alignment and cabled from the rear. The cabinet accommodates four shelf levels of which the top three may house any shelf type except power. The lower level shelf is reserved for an optional 48V rectifier and associated power monitor. The cabinet conforms to EM1 specifications and has the following dimensions:

Height - 72.00 inches
Width - 28.44 inches
Depth - 33.25 inches

A fully loaded cabinet weighs approximately 780 lbs.

A cabinet expansion kit is available for multiple Packet Transport Cabinet installations and provides all the necessary hardware for joining the cabinet together.

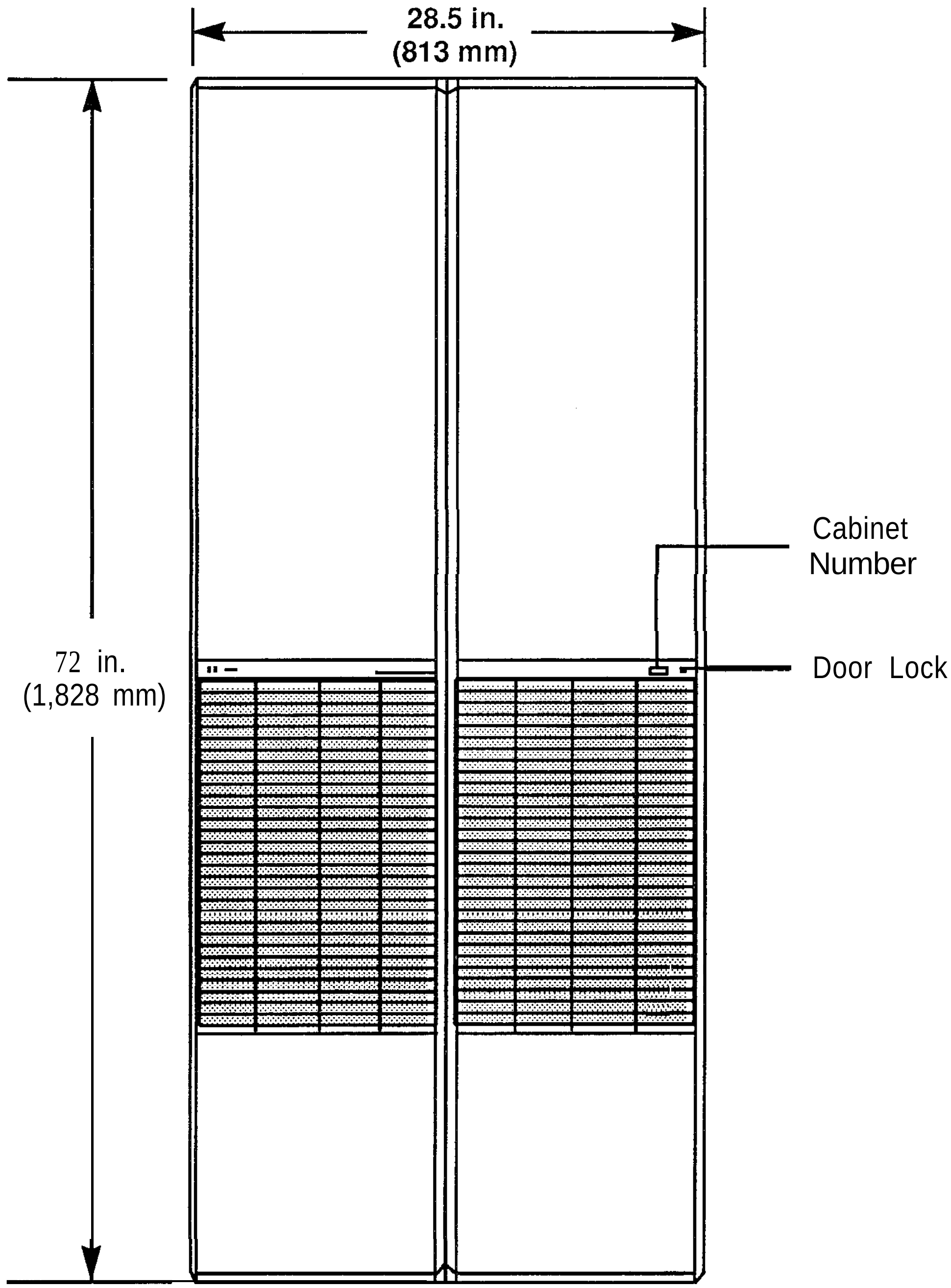


FIGURE 5-4: MERIDIAN SL-1 PACKET TRANSPORT CABINET

A smaller Packet Transport Cabinet (PTE-S) may be used for standalone Meridian LANSTAR applications, supporting up to 112 connections. The PTE-S is packaged in an attractive cabinet (Figure 5-5) suitable for installation in an office, computer room, or switch room environment. The cabinet has the following dimensions:

Height - 29.5 inches
Width - 23.3 inches
Depth - 25.5 inches

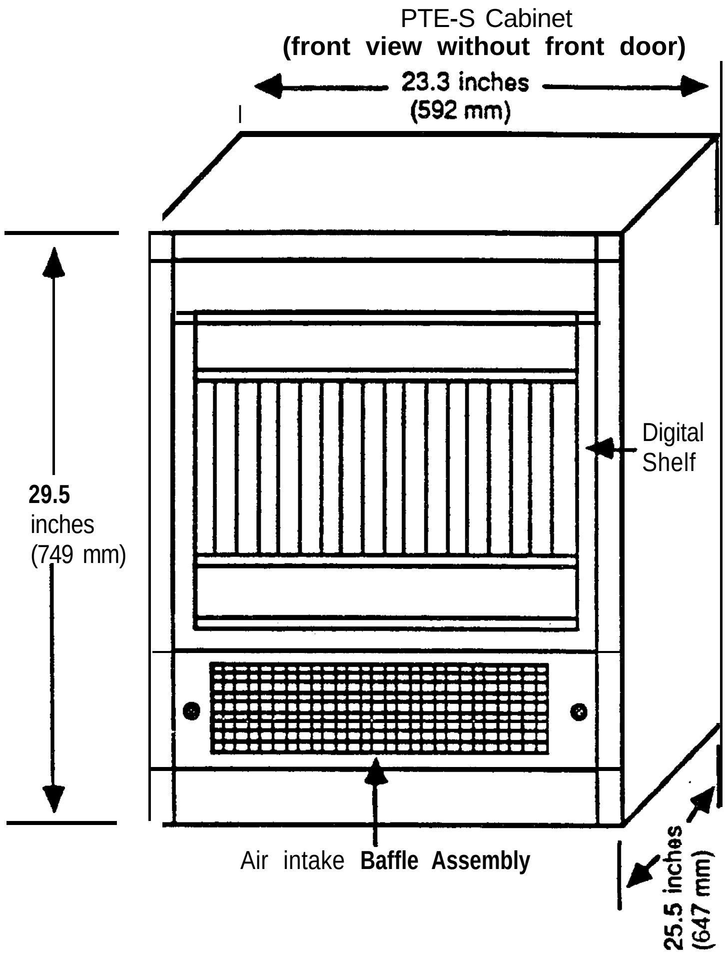


FIGURE 5-5: MERIDIAN SL-1 PTE-S CABINET

Centralized Power Cabinet

Power for both Meridian SL-1XN and XT is centralized in a cabinet (Figure 5-6) measuring 72 inches high, 51 inches wide and 20 inches deep. The cabinet is arranged for front access to associated rectifiers, control and fuse panels, and comprises a tubular steel framework enclosed by sheet metal covers. It conforms to FCC regulations and weighs approximately 1300 lbs when fully equipped with four rectifiers.

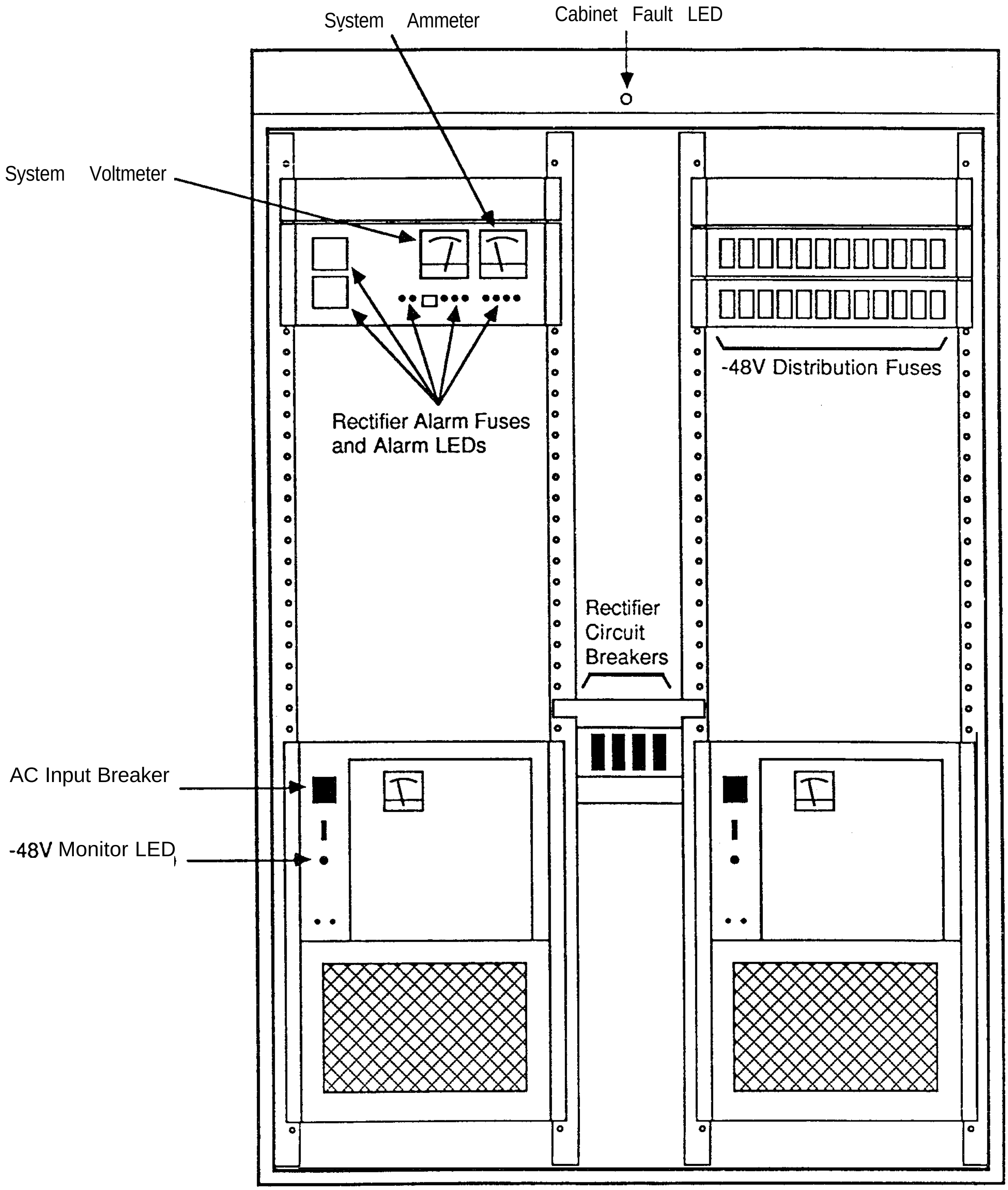


FIGURE 5-6: MERIDIAN SL-1XN/XT CENTRALIZED POWER CABINET

Shelves

Common and Peripheral Equipment

Meridian SL-1

Except for Meridian SL-1S and ST, equipment shelves are of metal construction and are screw-mounted to the cabinet frame structure. The shelves accommodate the CE, PE, and power circuit cards required for system control, switching, and interfacing. Inter-shelf connections are made via backplanes except when circuit card faceplates are equipped with connectors. A typical equipment shelf is shown in Figure 5-7. The shelves are arranged for 19 inch rack mounting with PE shelves measuring 15.75 inches high and all other shelves 14 inches high. The cantilever mounting design permits CE and PE to be located back-to-back in the equipment cabinet.

Meridian SL-1S

Shelves are of metal construction and are an integral part of the equipment cabinet. Three modules, each measuring 14.5 inches high, accommodate two equipment shelves in a horizontal plane for front access: the bottom module contains CE, magnetic tape unit, power distribution unit, and rectifier; the middle module contains PE and power control units; and the top module contains a second PE shelf and space for an optional CE or PE shelf.

Meridian SL-1ST

As with the S system, the shelves are of a metal construction and are an integral part of the base cabinet. The single-tier accommodates the common equipment, power equipment, disk drive unit, and a peripheral equipment capability for 10 PE cards plus associated PE buffer. One or two tiers can be added to expand the single-tier to a double or triple-tier cabinet. Each additional shelf accommodates two backplanes, each capable of housing 8 PE cards, a PE buffer, and a power converter. Alternate arrangements permit the use of a backplane to support up to 4 DTI cards or the capability to accommodate the Remote Peripheral Equipment (RPE) interface cards.

Meridian SL-1RT

The RT requires three tiers to be functional compared to the ST's single tier. The additional two tiers are needed to house the dual common equipment. The RT is expanded by adding the same tiers designed for ST expansions.

Packet Transport

Shelves are screw-mounted in the Packet Transport Cabinet and house the appropriate circuit cards and components for system operation and interface.

(i) Digital Shelves can be located in any of the top three shelf positions (levels O-2) of the cabinet. When fully loaded, the Digital Shelf weighs approximately 56 lbs and has the following dimensions:

Height	- 14 inches
Width	- 25.6 inches
Depth	- 17.3 inches

A single digital shelf can be accommodated in the smaller PTE-S cabinet.

(ii) Disk/Tape Shelf houses one or two Disks and one Tape Unit for the Packet Transport. The shelf has its own fusing and power control circuitry and is located is Cabinet Level 2. Provisioning is dependent upon mass storage requirements and a fully load Disk/Tape Shelf weighs approximately 96 lbs and has the following dimensions:

Height	- 14 inches
Width	- 25.6 inches
Depth	- 21.9 inches

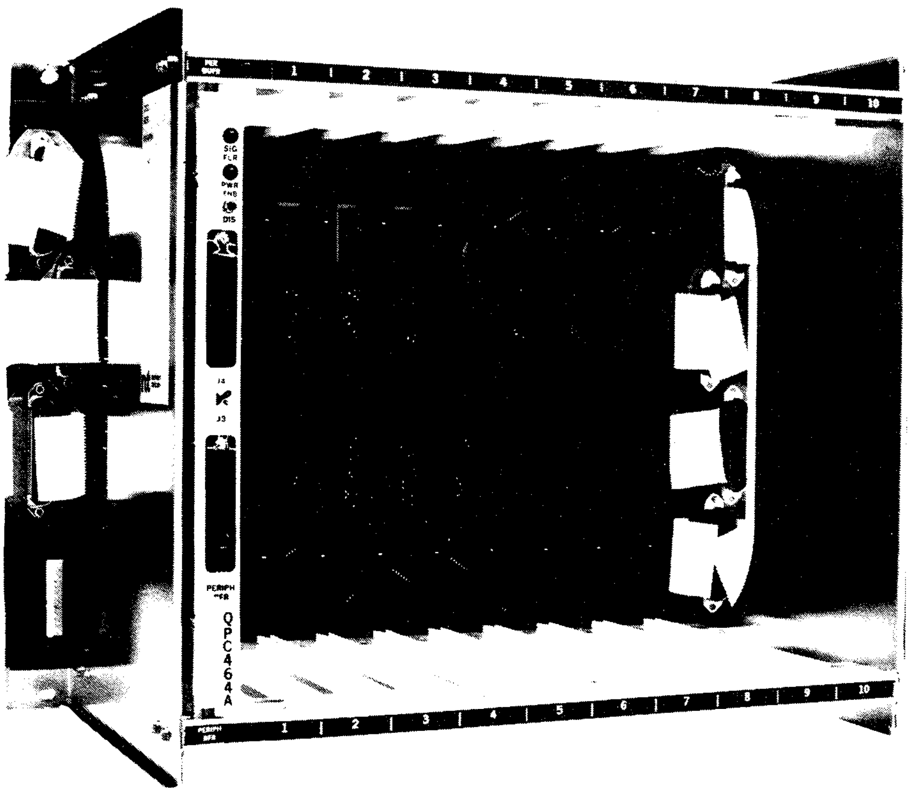


FIGURE 5-7: TYPICAL EQUIPMENT SHELF

Circuit Cards

Common and Peripheral Equipment

Various types of circuit cards are used in the Meridian SL-1. The CE circuit packs are double-sided printed circuit boards with two 60-contact connectors. The PE circuit packs are double-sided printed circuit boards with a single 80-contact connector. Power cards vary according to their usage and location. Some circuit cards are keyed so that they can be mounted only in the appropriate shelf slots (See Figure 5-8 for typical circuit cards).

All circuit cards are manufactured from fiberglass and have a faceplate labeled with the circuit card number and abbreviated name. Located at the top and bottom of each faceplate are locking devices which keep the cards in position, ensuring that good contact is made between the edge connectors and backplane jacks. Also located on the faceplate of some circuit cards are indicating Light Emitting Diodes (LEDs), and switches to enable or disable the card and cable connectors.

Packet Transport

Packet Transport circuit cards measure 12.5 inches by 15 inches by 0.875 inches and weigh approximately 21bs. Power unit cards measure 12.5 inches by 15 inches by 2.625 inches and weigh approximately 9 lbs. All cards located in the Digital Shelf contain a faceplate, locking devices, and are keyed to prevent insertion into an erroneous shelf position.

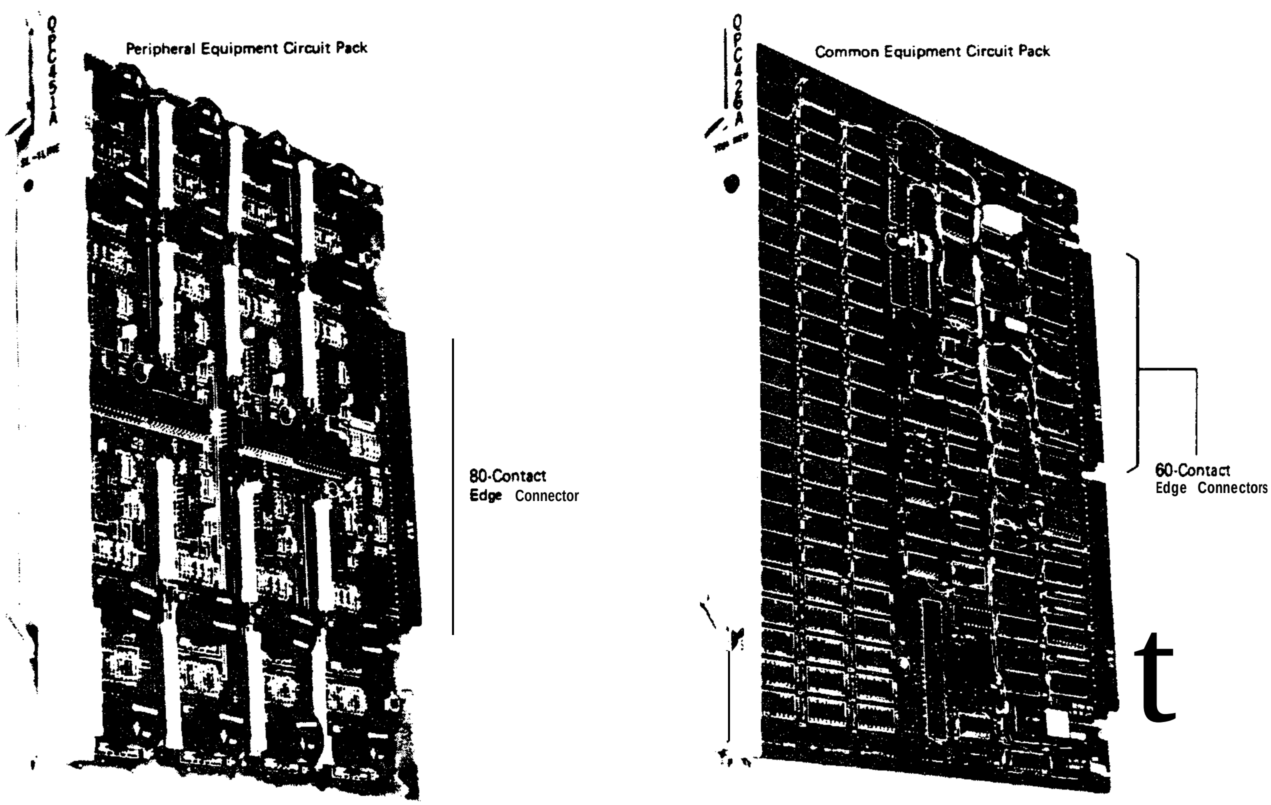


FIGURE 5-8: TYPICAL CIRCUIT CARDS

The Meridian SL-1 S provides the opportunity to deliver advanced communication capabilities to the small business system. Meridian SL-IS typically addresses the 32-140 line range, but with the comprehensive feature complement of a much larger system. The compact size and hardware packaging permits Meridian SL-IS to be configured in a single, stand-alone cabinet that is designed aesthetically for the office environment. It is compatible to both the Xl 1 and X37 Software Generics for use in the business and hotel / motel environment respectively.

Hardware

The Meridian SL- 1 S cabinet (Figure 5-9) measures 56 inches high, 32 inches wide, and 16 inches deep and derives its power from a 115/230 VAC, 50/60 Hz commercial source. The base, top, front and back panels are made of plastic, surrounding a metal frame.

Designated QCA60, the cabinet (Figure 5-10) has built-in equipment shelves designed for front access including: a QPC503 CE shelf; a QPC502 Power Converter Shelf; two lo-slot QPC500 PE shelves; and a QMM43 disk unit. An optional equipment shelf with eight card positions can be equipped to accommodate either additional PE or SDI cards. The central control consists of a single card CPU along with a memory subsystem that provides automatic error detection and correction capabilities. The CPU (QPC425) is a simplified version of the microprocessor technology formerly introduced on the SL-1XL svstem. and incorporates an SDI port and ROM daughter board to take full advantage of space savings on ‘the CE shelf.

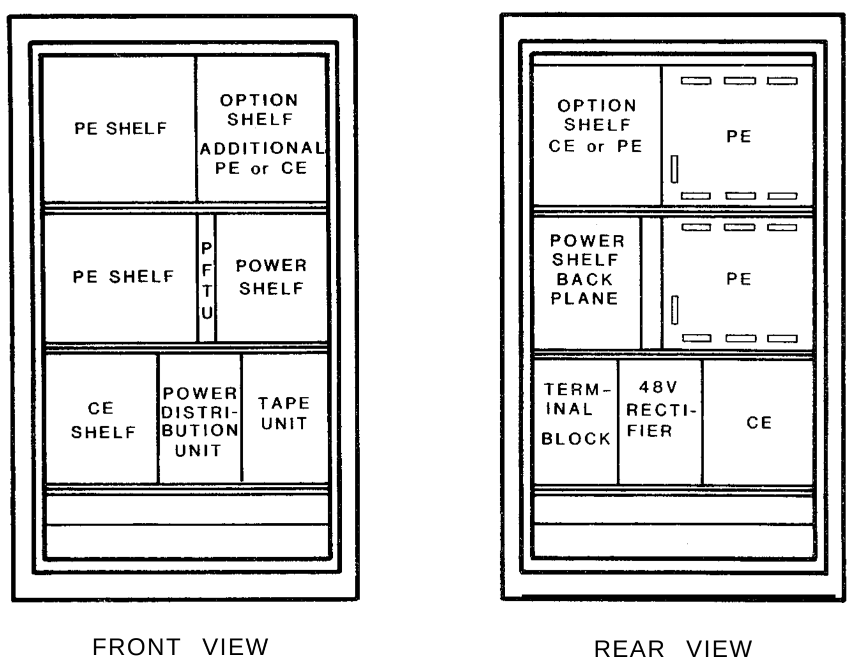


FIGURE 5-9: MERIDIAN SL- S EQUIPMENT CABINET

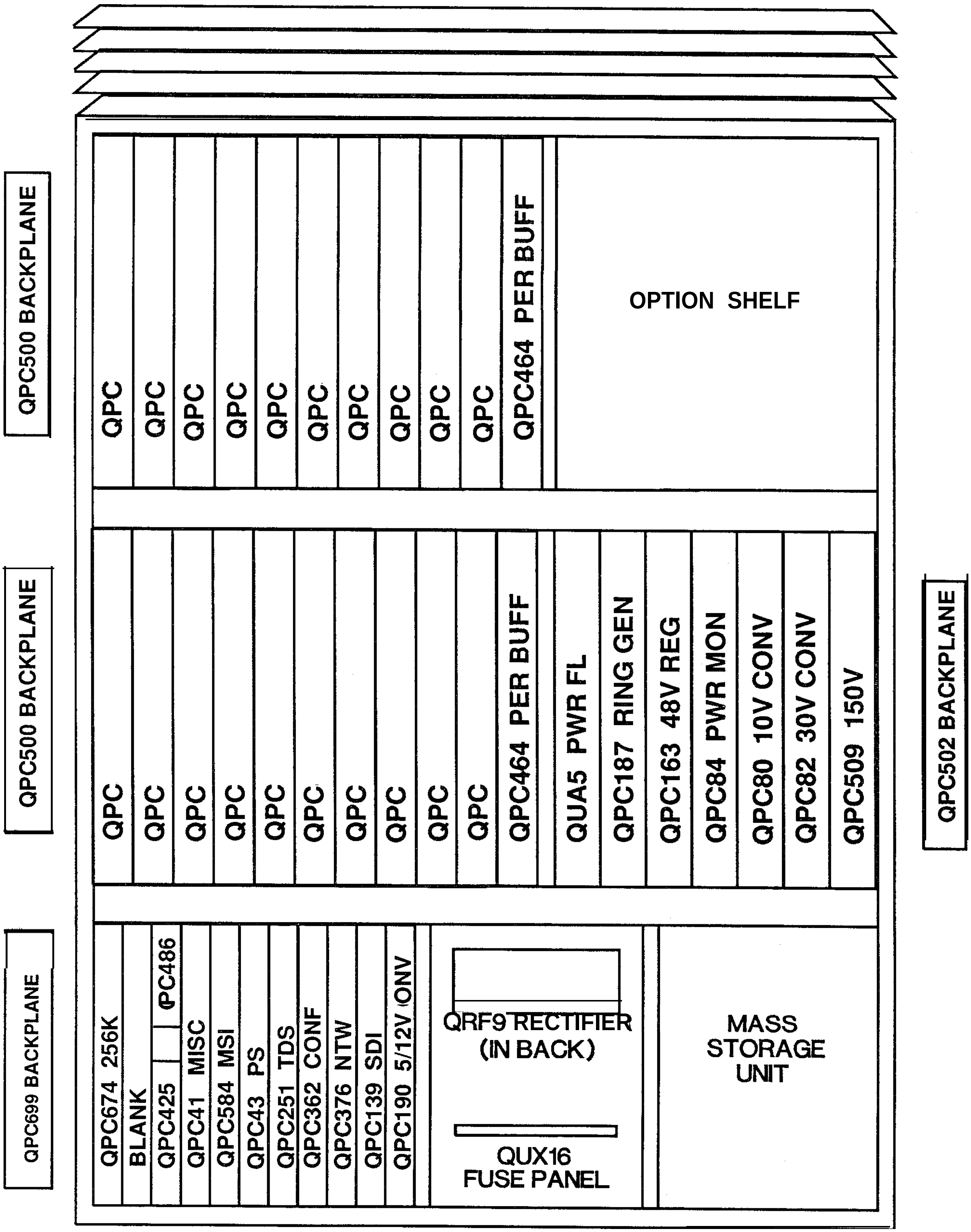


FIGURE 5-10: MERIDIAN SL-1S QCA60 CABINET LAYOUT

The maximum addressable memory range of 256K is provided by a single memory module (QPC674).

The network architecture utilizes a path search algorithm that selects time slots, or channels, in available pairs to complete a connection. This arrangement was introduced with the first ever SL-1 system and is more than adequate for small system applications.

Two multiplexed network loops on a single card (QPC376) provide a high traffic carrying capability to serve the peripheral equipment. Each loop terminates directly to an associated peripheral buffer (QPC464) located on the PE shelf. A tone and digit switch (QPC251) and a conference card (QPC362) provide the service circuits on the network bus.

Each PE shelf accommodates up to ten peripheral cards and provision of the PE optional shelf (QPC501) provides a maximum capacity of 28 PE card positions. Should the need arise to terminate the PE optional shelf to its own network loop, then a second network card can be added on the GE shelf. Such an arrangement permits up to three SDI ports • one located on the CPU and two ports on a QPC139 interface card. Alternatively, the optional PE shelf may be interconnected to a standard PE shelf via a multiplexed loop cable so that additional SDI or conference ports are available to the system

QPC674	QPC425	QPC41M	QPC584	QPC139	QPC43	QPC376	QPC376	QPC251	QPC362	QPC190
MEM ERRC	CPU	MISC	MSI	SDI	PER SIG	DUAL NET (LP 8/9)	DUAL NET (LP 10/11)	TDS (LP 12/13)	CONF NET (LP 14/15)	5/12V CONV
1	2	3	4	5	6	7	8	9	10	11

Note: Slot 10 is occupied by QPC215 SBE if remote CE shelf is equipped.

FIGURE 5-l 1: MERIDIAN SL-1S QPC503 CE SHELF

If the CE optional shelf is equipped in lieu of expanding the PE, additional SDI cards only can be accommodated. In this case, QPC215 bus extender cards, located one on each shelf, provide a cable termination to connect the standard and optional CE shelves together.

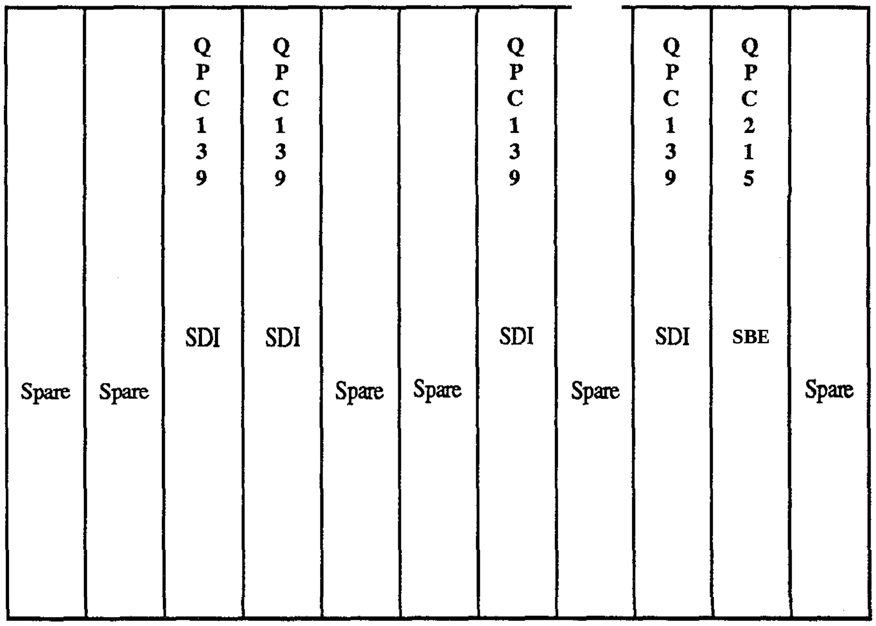


FIGURE 5-12: OPTIONAL CE SHELF

Software

Software Generic 711 Release 4 or later supports business applications of the Meridian SL-1S. Subject to memory availability, all the features available to the powerful Meridian SL-1XT may be utilized on Meridian SL-1S with the exception, for both practical and economical reasons, of the following:

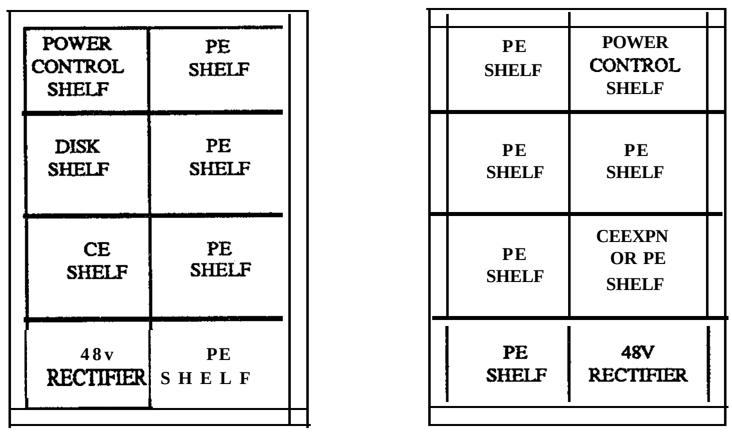
OPTION GROUP	MNEMONIC	DESCRIPTION
15	RPE	Remote Peripheral Equipment
31	MINICDR	Mini Call Detailed Recording
50, 51	ACD D	Automatic Call Distribution (Package D-Auxiliary Processor)
75	PBXI	Digital Trunk/Computer to PBX Interface
77	CSL	Packet Transport Application

Since 711 Release 4 supports the double density packaging concept introduced with PE enhancements, provisioning of the higher density four port trunk cards (711 Release 5 or later) permits an increase in termination capability on the Meridian SL-1S. Further, Software Generic 711 Release 7 or later supports the provision of the Meridian SL-1 family of digital telephones. In all cases, however, the governing factor is the maximum available capacity of 28 PE card positions.

Introduction

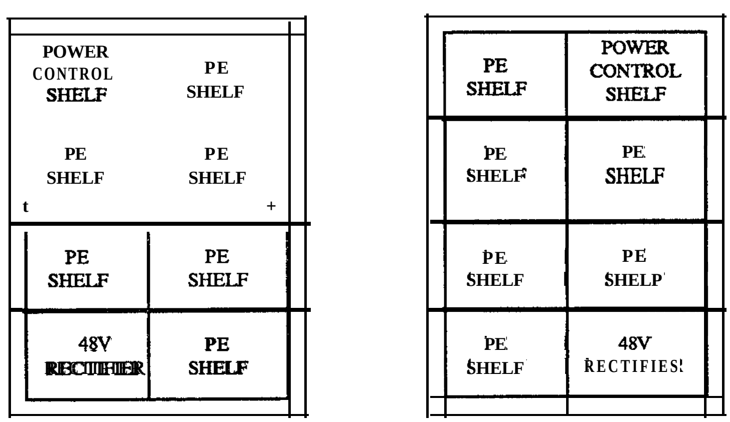
Incorporation of Common and Peripheral Equipment enhancements to the highly successful SL-1M system resulted in the introduction of Meridian SL-1MS. The latter is a single CPU system positioned to address the requirements of a digital communications system serving typically 80 to 400 lines.

A single CE/PE cabinet, QCA109, takes advantage of efficient hardware packaging to accommodate the majority of Meridian SL-1MS applications. The cabinet (Figure 5-13) utilizes the concept of back-to-back shelf mounting arranged for front and rear access to optimize space savings.



Front View Rear View

QCA109 CE/PE Cabinet



Front View Rear View

QCA74 PE Expansion Cabinet

FIGURE 5-13: MERIDIAN SL-1MS EQUIPMENT CABINETS

Features and Benefits

Among the features and capabilities of the Meridian SL-1MS are:

1. A single card CPU (QPC425), which:

   - combines the functions of the ALU, sequencer, ROM, and one SDI port formerly provided on discrete cards in the SL- 1M.

   - contains a daughter board to provide 8K ROM.

   - improves real time capacity over its previous equivalent CPU by over 50%.

2. A random access memory module, packaged on a single 256K circuit card, which:

   - replaces the previous memory controller card and an equivalent number of 64K memory modules used on SL-1M.

   - provides single bit error correction and double bit error detection for an increase in system availability.

3. A capability of supporting double density peripheral cards such as the 8 port SL-1 and 500/2500 line cards introduced with Software Generic 7 11 Release 4, and the 4 port CO and DID trunk and 8 port message waiting line cards introduced with Generic 711 Release 5.

4. A capability of supporting the application of digital telephones through the utilization of the Integrated Services Digital Line Card (ISDLC) located on the peripheral shelf when Generic 7 11 Release 7 or later is incorporated.

5. The introduction of Digital Trunk Interface (DTI) for those systems running on Generic 7 11 Release 8 or later.

These developments resulted in a number of significant benefits over the previous SL-1M:

1. **Increased memory addressing capability**

   The automatic error correction and detection capability eliminates the need for SMART-Single Memory Automatic Recovery Technique. The 16K memory store formerly associated with SMART is allocated instead to Unprotected Data Store to double its capability to a maximum addressable range of 32K. In addition, another memory page, partitioned to add 32K to Protected Data and 32K to Program Store, is incorporated in Meridian SL-1MS. The net effect is to remove what was previously the prime limiting factor associated with SL-1M capacity.

2. **Greater cabinet capacity**

   The combination of the CE/PE enhancements results in a much greater cabinet capacity. The CPU, memory, and network is packaged on a single shelf instead of the back-to-back CE shelf arrangement utilized on SL-1M. With the capability of the double density PE enhancements, associated PE shelves each provide a maximum of 80 terminations as opposed to the previous 40. Although expansion capability exists for both CE (by an expansion shelf) and PE (by an expansion cabinet), the initial cabinet can readily accommodate the recommended 400 line capacity on the ten (10) shelves available. This results in a cabinet savings compared to a similar configuration on SL-1M.

3. **Enhanced performance**

The more compact equipment packaging results in a lower power consumption and higher reliability.

4. **Improved traffic handling capability**

Unlike SL-1M, which paired back-to-back PE shelves to a network loop, Meridian SL-1MS terminates each multiplexed loop directly to an individual PE shelf. This facilitates high traffic applications such as ACD, where fewer PE terminations contend for the available thirty (30) time slots or channels. Such applications on SL-1M results in unusable rear shelf space, often forcing the addition of an expansion cabinet to obtain more individual network loop to PE shelf connections. Meridian SL-1MS provides the flexibility of either single or paired PE shelves to a network loop to address varying traffic requirements.

Hardware

Figure 5-14 shows the front layout of the QCA109 CE/PE cabinet. Power for the system is provided by equipment located in two shelf positions. The bottom left position contains a QRF8 48V Rectifier (40 amp) that connects to a 117, 208, or 230 VAC commercial power source. A cooling unit, QUD20, is located directly above it to dissipate heat generated by the common equipment. A filter unit prevents dust from contaminating the circuit cards. The top left position contains a QSP43 Power Control Shelf which accommodates the system voltage converter and regulator cards.

The QMM38 Mass Storage Unit replaces the QSD33 magnetic tape shelf previously utilized on the system. It accommodates two 5.25” floppy diskettes, an optional 10 MByte Winchester Drive (QMT103) and a Power Converter (QPC585). Software Generic 711 Release 8 is required to support the use of disk drives which provide significant benefits in terms of reliability and the administration of maintenance routines.

The QSP39 CE shelf accommodates the single card CPU (QPC425), miscellaneous card (QPC41),and interface (QPC584) to the mass storage unit. Random Access Memory, with automatic error detection and correction capabilities may be configured to capacity through the use of a single module (QPC674).

The network bus provides the capability for typically twelve network loops (6 - QPC376 dual network cards), one TDS (QPC197, QPC251, or QPC609) and one conference circuit (QPC362). The Peripheral Signaling card (QPC43) controls the signaling between the CPU and PE via the network.

An SDI port, capable of supporting speeds of 300, 600, 1200 or 1800 baud, is located on the faceplate of the QPC425 CPU. Additional ports can be provided by the insertion of QPC139 Dual SDI cards in available shelf space of the network bus. Otherwise an expansion CE shelf, mounted at the rear, can be installed. It should be noted that only additional SDI cards may be located on the CE expansion shelf which may not be used to expand the network bus. In fact, the provision of the

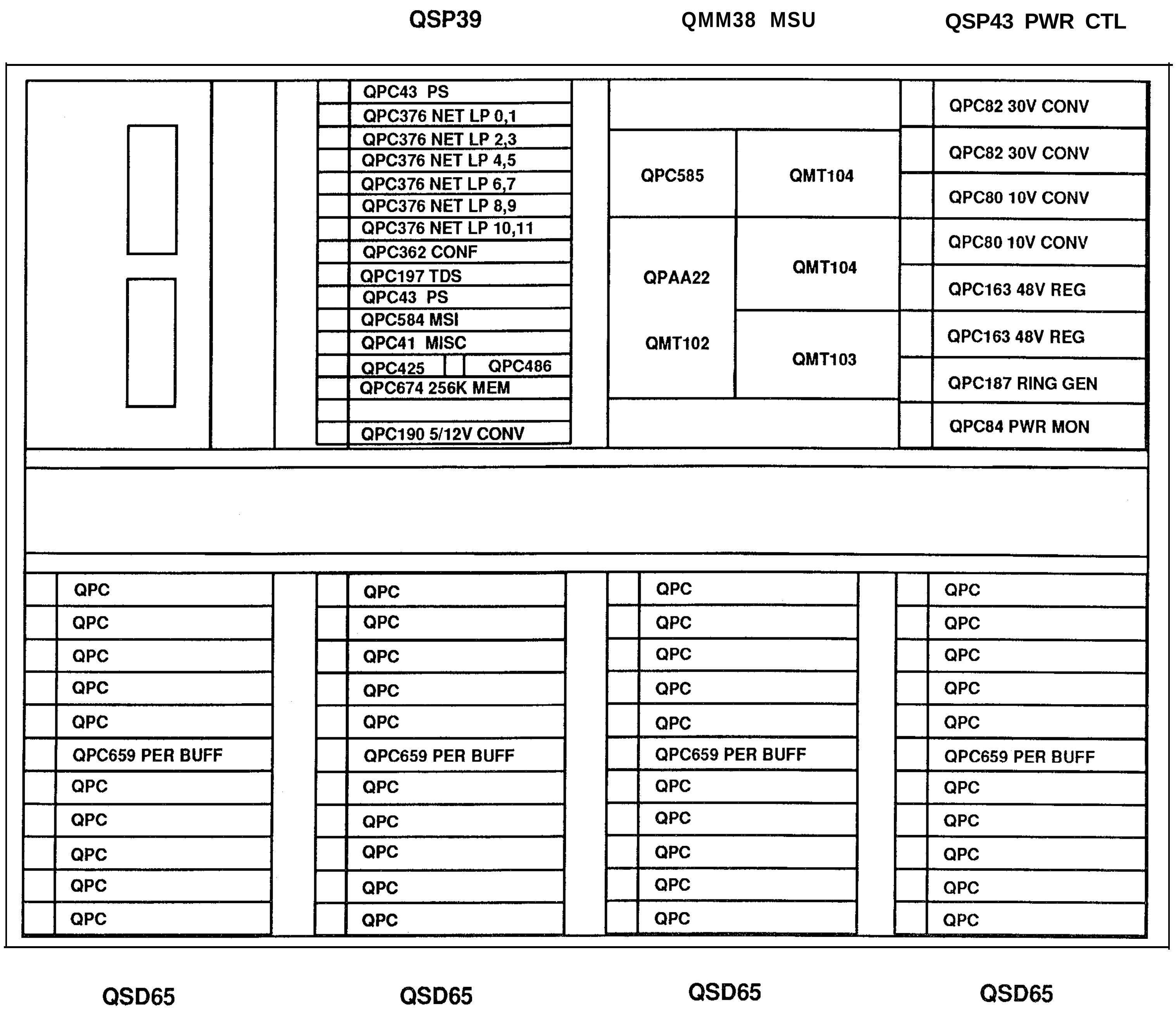


FIGURE 5-14: MERIDIAN SL-1MS QCA109 CABINET - FRONT VIEW

expansion shelf reduces the network capability by one card position since a QPC215 Extender card is required in each CE shelf for interconnection between the two. A second QUD20 cooling unit is also required when equipping the CE expansion shelf along with a QPC190 5/12V Power Converter.

The remaining cabinet space is taken up by PE shelves. A universal PE shelf (QSD64) replaces two earlier versions, QSP35 Bight Hand mount and QSP36 Left Hand mount respectively. A maximum of ten PE shelves may be equipped in the QCA109 Cabinet, unless the CE expansion shelf is equipped, in which case PE shelf capacity is reduced to nine.

Each PE shelf contains its own QPC464 Peripheral Buffer which terminates the network loop cable.

Figure 5-16 shows the rear layout of the CE/PE Cabinet. A fuse panel and circuit breakers are incorporated in the back of the QSP43 Power Control Shelf. There are also card positions for additional power converters or an optional QUA5 Power Transfer Unit. Alternatively, the latter, which is two card positions in width, can be located in any unused PE shelf locations.

A QBL15 Battery Distribution Unit is used to interface to a -48V battery string in reserve power installations.

Figure 5-49 provides a pictorial view of the QCA74 PE Expansion Cabinet although its provision on the Meridian SL-1MS is extremely rare.

QPC43	QPC376	QPC376	QPC376	QPC376	QPC376	QPC376	QPC362	QPC251	QPC43	QPC584	QPC41	QPC425	QPC674		QPC190
PS(0) NOTE	WAL NET	DUAL NET	DUAL NET	DUAL NET	DUAL NET	DUAL NET	CONF	TDS	PS(1) NOTE	MSI	MISC	CPU	256K MEM		5/12V CONV
	(LP O/l)	(LP 2/3)	(LP 4/5)	(LP 6/7)	(LP 8/9)	(LP 10/11)	(LP12)	(LP14)							
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

Note: Network packs in slots 2 to 5 are sewed by PSO.
Network packs in slots 6 to 9 are served by PS1.
Slot 13 requires a QPC215 SBE when a second CE shelf is equipped.
Slot 15 is spare if slot 14 is equipped with a QPC674 pack.

FIGURE 5-15: MERIDIAN SL-1MS QSP39 CE SHELF

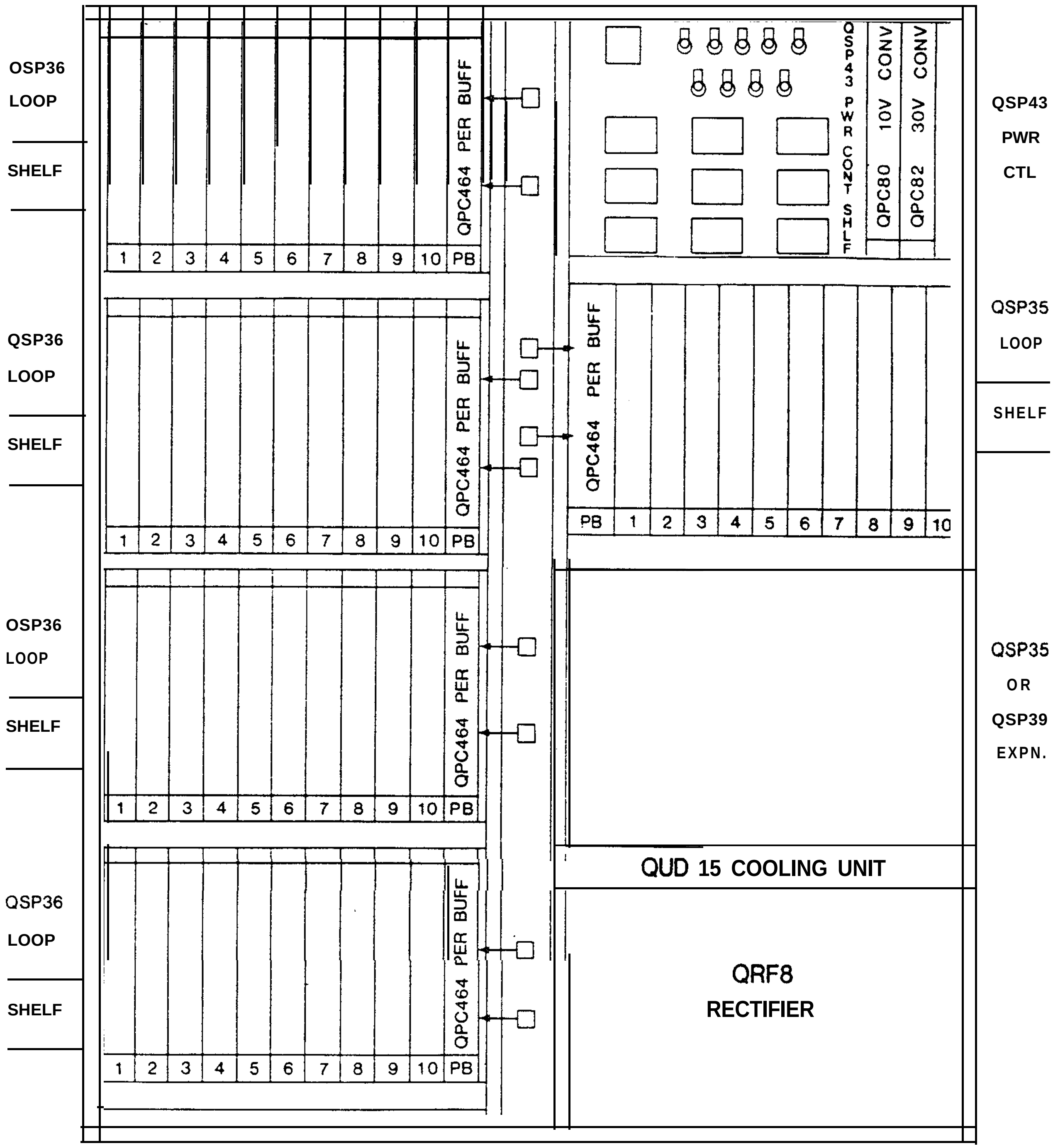


FIGURE 5-16: MERIDIAN SL-1MS QCA109 CE/PE CABINET - REAR VIEW

Software

Meridian SL-1MS is supported by Generic 711 Release 4 and later for business applications. Enhancements introduced with the subsequent software releases include:

Generic 7 11 Release 5:	Double density PE Cards: - C.O./FX/WATS Trunk (QPC450) - DID Trunk (QPC499) - MW Line (QPC494) Computer to PBX Interface (QPC472)
Generic 7 11 Release 7:	Quad density line- - ISDLC (QPC578) M2000 Series of Digital Telephones M3000 Touchphone
Generic 711 Release 8:	Mass Storage Unit (QMM38) Digital Trunk Interface (QPC47 1/2)
Generic 7 11 Release 9:	Quad density PE line - 16 port 500/2500 (QPC594) M2317 Digit Display Digital Telephone

In addition, Generic 737 Release 3 or later is used in the Hotel/Motel or Hospital/Clinic environment. However, it should be noted that Generic 737 Release 4 supports the double density packaging, introduced with the PE enhancement. For this reason, use of Meridian SL-1MS with 737 Release 3 software **is** limited to the provision of single density peripheral circuit cards.

MERIDIAN SL-1N

Introduction

Compared to the earlier LE system, the Meridian SL-1N takes full advantage of later enhancement programs in addressing the typical range of 100-1500 lines. The enhancements included both CPU and memory, network, and peripheral equipment sub-systems. Utilization of later technology resulted in a substantial savings in system real estate.

The CPU followed the migration concept of being based upon that of the SL-1XL, but with a less complicated architecture required for its single network group application. A single card, QPC424, contains the equivalent circuitry of the ALU, Sequencer, and ROM, formally provided on separate cards.

The memory redesign combined the memory controller and the equivalent of three 64K memory modules on a single 192K card (QPC426). A depopulated version, QPC478 128K module, is also available to facilitate efficient provisioning of the hardware required for addressing the memory capacity of 320K. The subsequent reduction in CPU and memory card count permits both functions to be accommodated in a fully duplicated mode on a single CE shelf (QSP41).

Network enhancement positioned the Meridian SL-1N to address the requirements imposed by the switching of integrated voice and data. Removal of the previous timeslot matching pair selection algorithm permits the system to be configured in a non-blocking mode. This is achieved by assigning thirty (30) or less PE terminations to the network loop. Traffic handling is further facilitated by doubling the number of links on the network backplane. This results in the doubling of network loops in the group from 16 to 32. The network card (QPC414), contains two network loops to permit a single shelf to accommodate eight such cards on the network bus. Two network shelves (QSD39 and QSD40) combine to form the network group. Provision of service circuits, QPC197 (or QPC251) Tone and Digit Switch and QPC444 Conference, are to the detriment of the 32 loop per group capacity. Since each service card contains one circuit, its provision is at the expense of two network loops.

The PE enhancements enabled the initial front and rear access cabinet, QCA58, (Figure 5-17) to combine both common and peripheral equipment packaging. Each PE shelf provides ten (10) card positions to accommodate both single and double density PE cards. The PE shelf capacity of the QCA58 is determined by one of two system configurations:

i) Single CPU Half Network Group provides one network shelf (QSD39) and permits nine (9) PE shelves (QSD64, QSP35, or QSP36) to be equipped.

ii) Dual CPU/Full Network Group provides two (2) network shelves (QSD39, and QSD40) and permits eight (8) PE shelves (QSD64, QSP35, or QSP36) to be equipped.

For today's business applications, the Meridian SL-1N is available only to support the single CPU/Half Network Group configuration. However, an expansion package (order code 148SL1-1) permits installed systems to be upgraded to the Dual CPU/Full Network Group capabilities.

Expansion beyond the PE capability of the QCA58 CE/PE Cabinet is achieved by providing a QCA74 PE Cabinet (Figure 5-17).

POWER CONTROL SHELF	PE SHELF
CPU/MEM SHELF	DISK SHELF
NETWORK SHELF	NETWORK OR PE SHELF
48V RECTIFIER	PE SHELF

Front View

PE SHELF	POWER CONTROL SHELF
PE SHELF	PE SHELF
PE SHELF	PE SHELF
PE SHELF	48V RECTIFIER

Rear View

QCA58 CE/PE CABINET

POWER CONTROL SHELF	PE SHELF
PE SHELF	PE SHELF
PE SHELF	PE SHELF
48V RECTIFIER	PE SHELF

Front View

PE SHELF	POWER CONTROL SHELF
PE SHELF	PE SHELF
PE SHELF	PE SHELF
PE SHELF	48V RECTIFIER

Rear View

QCA74 PE EXPANSION CABINET

FIGURE 5-17 - MERIDIAN SL-1N EQUIPMENT CABINETS

Features and Benefits

The Meridian SL- 1N offers a number of significant benefits compared to its predecessor, SL- 1LE:

1. Power is provisioned on a per cabinet basis as opposed to being distributed between adjacent cabinets.

2. Traffic handling capability is doubled because of the incorporation of network enhancements. As a result, Meridian SL-1N can address the majority of applications formally served by the SL-1VLE without the need and additional expense of a multi-group switching system.

3. Being an adaptation of the XL processor, the Meridian SL-1N CPU has more real time capacity to address applications where short holding times are predominant such as ACD Directory Assistance.

4. The selection of individual time slots permits systems to be engineered to suit specific traffic requirements. The flexibility of the network architecture allows the total system, single or multiple network loops, to be configured in a non-blocking mode. Both voice and data terminals can be segregated to their own network loops so that the traffic engineering needs of one does not impose on the different requirements of the other.

Subsequent enhancements made available to Meridian SL-1N since its introduction include:

- additional double density peripheral cards that include 4-port CO Trunk, 4-port DID Trunk, 8-port MW line, and 2-port Digitone Receiver.

- Computer-to-PBX Interface (CPI) and Digital Trunk Interface (DTI) which replace the equivalent of 24 analog facilities with a single link of 24 digital channels.

- Integrated Services Digital Line Card (ISDLC) to support the Meridian portfolio of digital telephones.

- Automatic Trunk Maintenance (ATM) which provides a means of periodically testing network resources.

- Packet Transport to extend the circuit switch architecture to support Meridian Mail and Meridian LANSTAR applications.

- Mass Storage Unit replacing the previous Magnetic Tape Transport.

- the capability to partition the PE shelf so that a network loop may terminate to each half to facilitate high traffic applications.

- support of the quad density 16 port 500/2500 line card.

Hardware

The front layout of the QCA58 CE/PE Cabinet is shown in Figure 5-18. The bottom left position contains a QRF8 48V Rectifier (40 Amp) which, along with converter and regulator cards located in the top left QSP43 Control Shelf, provides the necessary power.

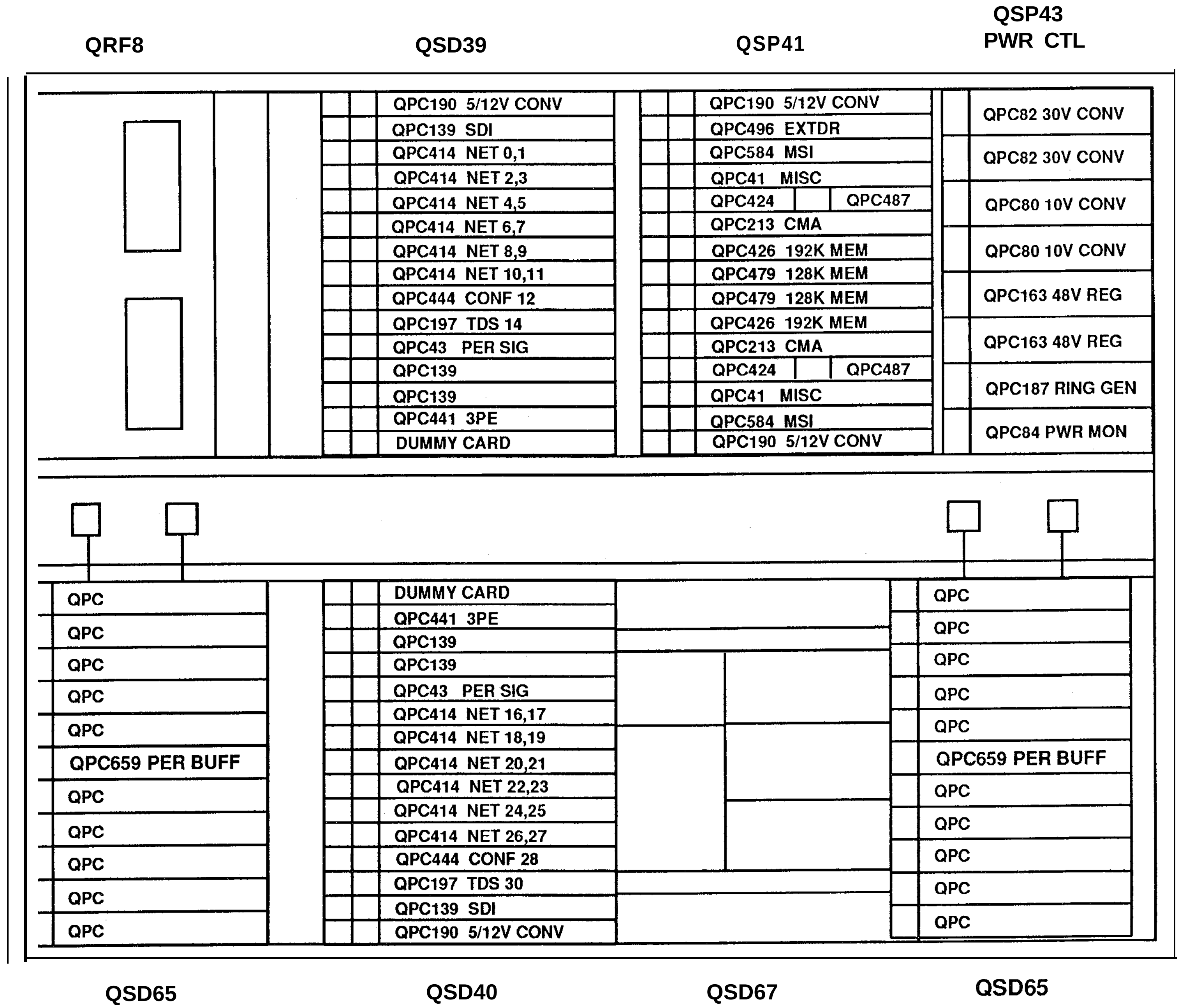


FIGURE 5-18: MERIDIAN SL-1N QCA58 CABINET - FRONT VIEW

The QSP41 CPU/Memory Shelf is electrically isolated to provide complete redundancy of the circuit cards located in each half. The CE packaging permits dual CPU and a fully duplicated memory bank to be accommodated on a single CE shelf. A QPC584 card is provisioned for each CPU to provide an interface to the mass storage unit located on the disk shelf. The CPU consists of a single QPC424 card used in conjunction with the QPC41 miscellaneous card. Memory is provided to its full addressable capability of 320K by the combination of a QPC426 192K module and a QPC479 128K module, provisioned in duplicate in a fully redundant mode.

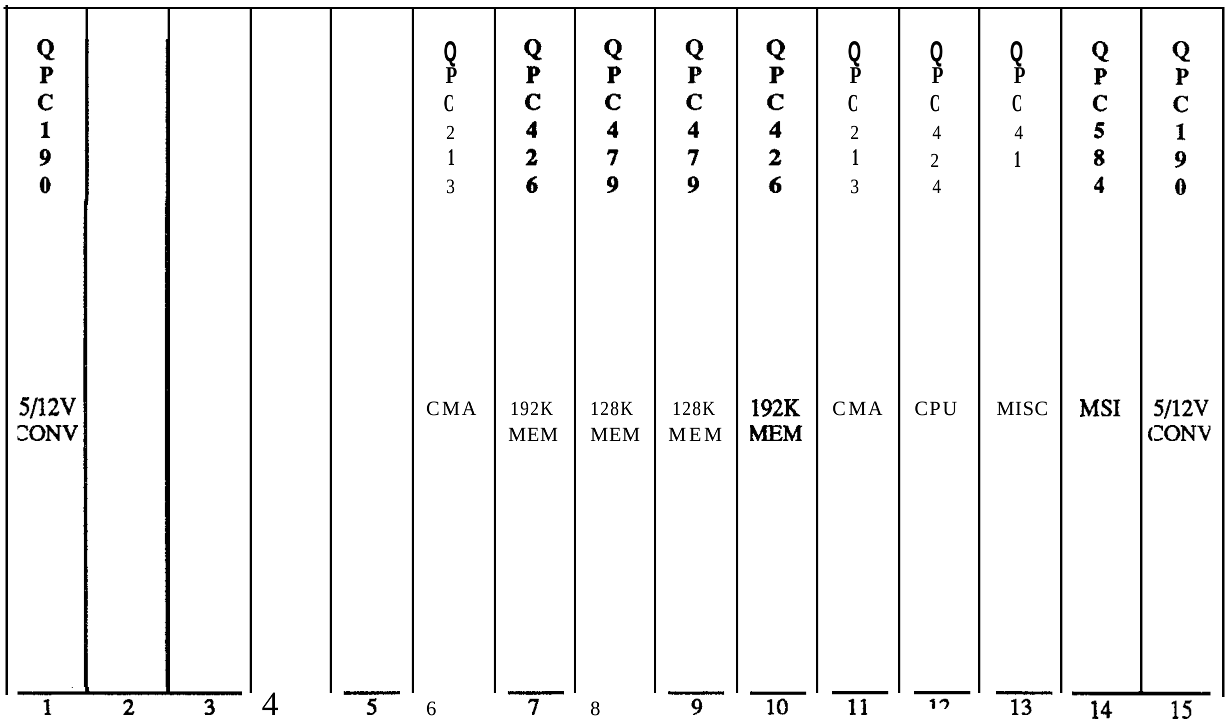


FIGURE 5-19: MERIDIAN SL-1N QSP41 CPU /MEMORY SHELF

A segmented bus extender, QPC496, is equipped to connect the CPU bus from the shelf backplane to the QSD40 Network Shelf 1 for full network group applications. The QSD39 Network Shelf 0 is always provided since it functions in both half and full network groups. Each network shelf accommodates eight (8) cards on the network bus. As shown in Figure 5-20, the typical configuration calls for provisioning 6-QPC414 Network cards (each 2 circuits), l-QPC197 (or QPC251) TDS, and l-QPC444 Conference on each network shelf before expansion to the multi-group system is necessary. A QPC441 Three-Port Extender provides faceplate connectors for the interconnect cabling between shelves.

The QPC190 (or QPC691) 5/12V Converter provides power to each CE shelf and heat dissipation is controlled by a QUD20 Cooling Unit. The remaining front and rear cabinet shelf space is allocated to QSD65 PE shelves. A QPC659 Dual Mode Peripheral Buffer associated with each PE shelf terminates the assigned network loop (or loops) by means of the 18 pair multiplexed cable connected to its faceplate connector.

Figure 5-21 shows a layout of the rear of the QCA58 cabinet. When expansion beyond the PE capability of the QCA58 is required, the QCA74 PE Expansion Cabinet (Figure 5-49) is utilized.

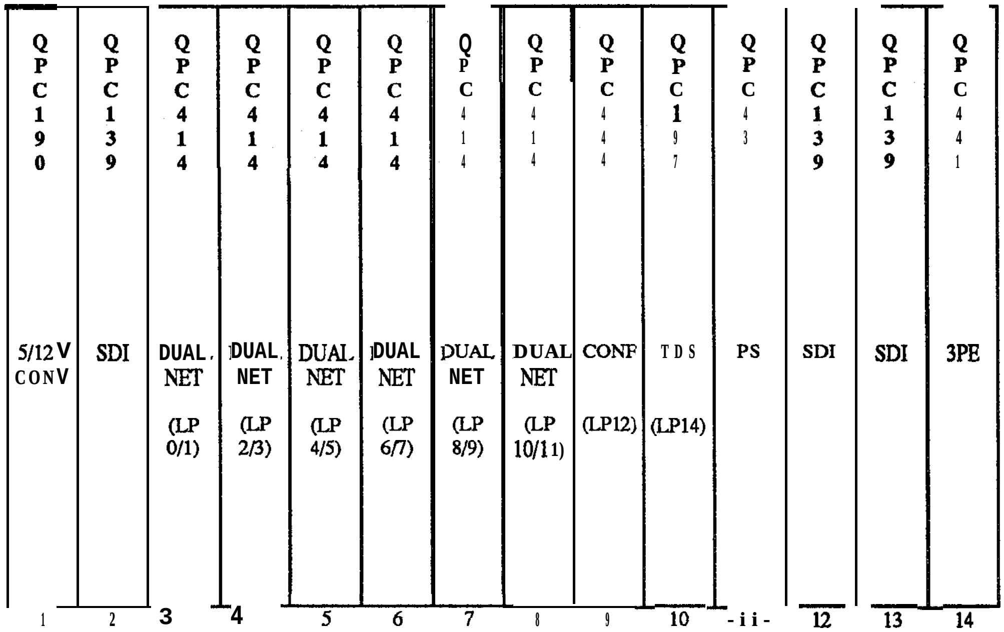


FIGURE520: MERIDIAN SL-1N - TYPICAL NETWORK SHELF

Software

Generic 811 Release 4 and later is the business software that supports Meridian SL-1N. Enhancements supported by the subsequent software releases include:

Generic 8 11 Release 5:	Double density PE cards: - C.O./FX/WATS Trunk (QPC450) - DID Trunk (QPC449) - MW Line (QPC494) Computer to PBX Interface (QPC472) Digital Trunk Interface (QPC47 1/2)
Generic 8 11 Release 7:	Quad Density PE Line - ISDLC (QPC578) M2000 Series of Digital Telephones M3000 Touchphone Packet Transport
Generic 8 11 Release 8:	Mass Storage Unit (QMM38)
Generic 811 Release 9:	Quad Density PE Line - 16 port 500/2500 (QPC594) M23 17 Digit Display Digital Telephone

It should be noted that Network Enhancement incorporated in Meridian SL-1N does not support the X37 Hospitality Generic. For this reason, the SL-1LE system type is retained for use in typical Hotel/Motel applications. However, provision of Generic X37 Release 4 and later supports the double density peripheral card packaging of the PE enhancement program.

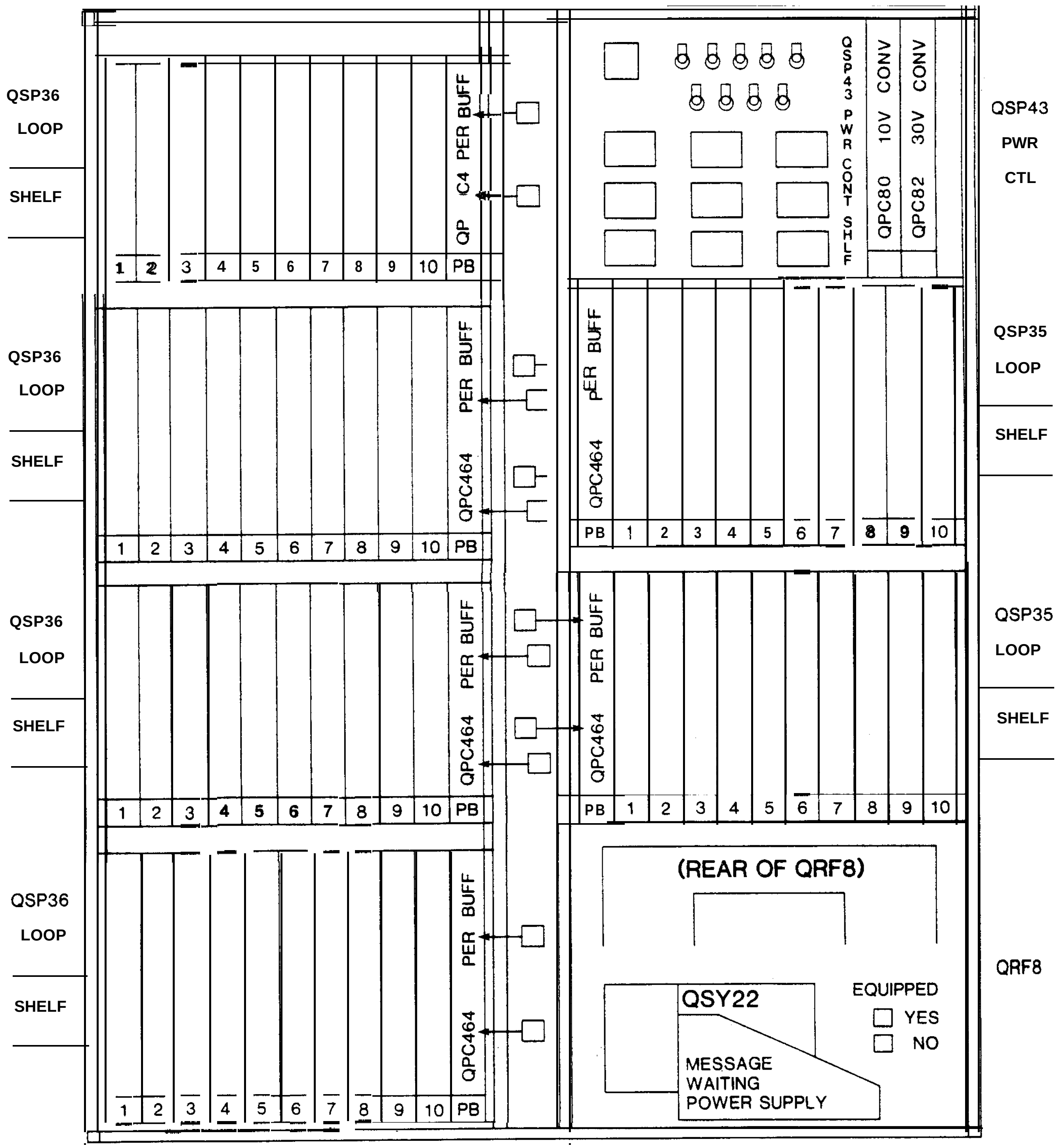


FIGURE 5-21: MERIDIAN SL-1N QCA58 CABINET - REAR VIEW

MERIDIAN SL-1XN

Introduction

Although now manufacture discontinued, an overview of the Meridian SL- 1XN is included in this section for reference purposes in support of the installed base. Introduction of the Meridian SL-1XN in 1984 ensured that the original objective of providing a system that addressed applications up to 5000 lines was maintained. Product evolution, particularly in the area of software development, provided enhanced feature capabilities which in turn impacted memory resources. Recognition of the digital PBX as a viable means for the control and connectivity of office products meant that the switching network had to be capable of handling new and more demanding traffic patterns. Network enhancement, along with memory expansion, provided a significant contribution to meeting these demands. Meridian SL-1XN provides more than twice the traffic handling capability of the XL that it replaced. A doubling of network loops ensures the availability of twice as many time slots or channels for contention by an equivalent number of PE terminations.

Features and Benefits

Meridian SL-1XN retains the capability of interconnecting up to five network groups. It is the availability of twice as many paths between and within the network groups that results in an extremely powerful switching matrix, considering that any one PE device is capable of terminating to any other. In addition, the XL requirement that consecutive channels in the loop be paired for selection is removed for XN by increasing the size of the memory within the network card. The system can be configured to meet any traffic requirement imposed by the different calling patterns of the wide array of diversant terminals that can be connected to the network. If necessary, non-blocking configurations ranging from 30 PE ports on an individual network loop up to 960 PE ports within a network group can be readily provided.

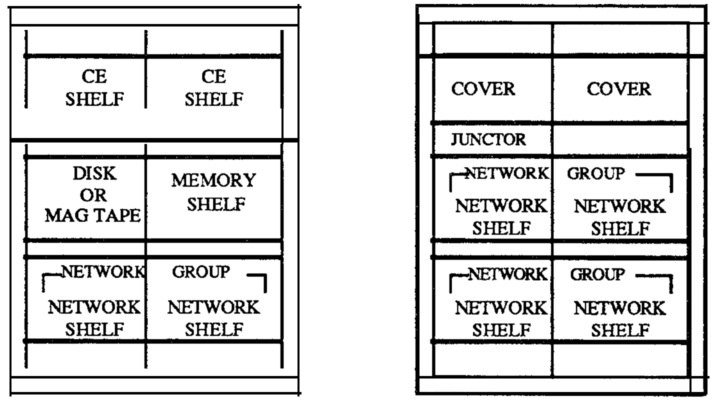
In a virtually non-blocking arrangement, non-blocking capability is provided within the network group, but a finite probability of blocking between groups is allowed.

The PE enhancement program provided substantial benefits to the Meridian SL-1XN. The system footprint is greatly reduced along with the per line power consumption. Besides providing a reduction in floor space requirements, additional cost benefits associated with distribution, warehousing, and inventory is also realized.

Each PE cabinet can accommodate up to fourteen peripheral shelves, each capable of housing ten single or double density PE cards of any mix and type. This provides for complete flexibility in the assignment of the peripheral equipment to the switching network.

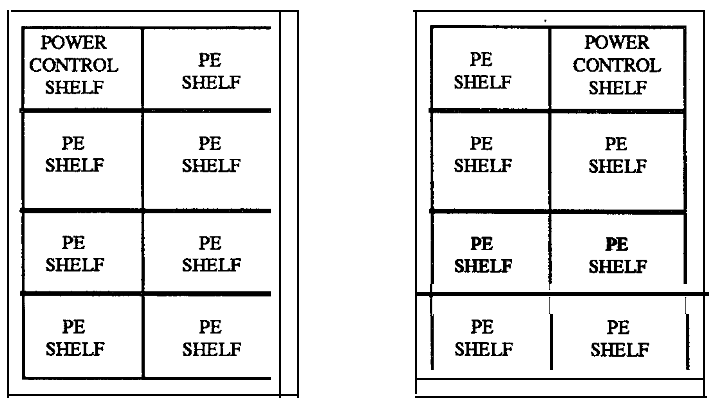
Hardware packaging provides up to three network groups in the initial CE cabinet. With twice as many loops in a group, this provides more traffic capacity than the maximum two fully equipped network cabinets of the XL. The net impact of reduced hardware is directly related to improvements in system reliability. This, coupled with enhanced performance capabilities, results in a reduction in maintenance actions and a subsequent increase in system availability.

The enhancements previously highlighted for the Meridian SL- 1N apply equally to the XN system. In addition, a memory expansion program supported by Software 9 11 Release 5, doubled the system memory capability over that available when the product was first introduced.



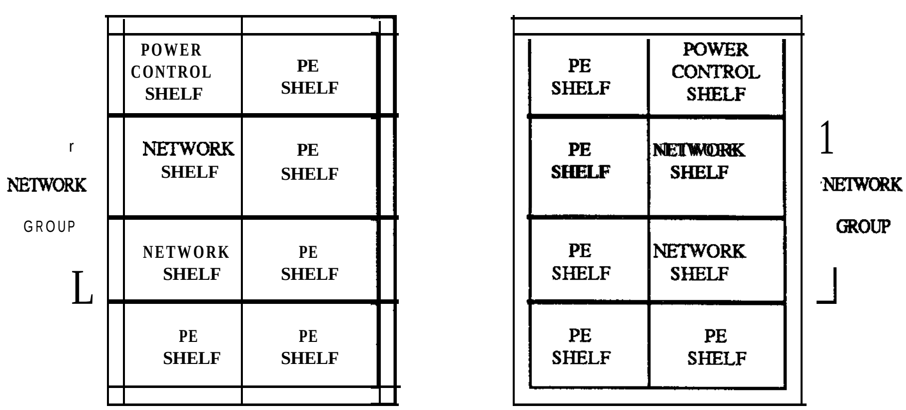
Front View **Rear View**

QCA55 CE Cabinet



Front View **Rear View**

QCA74 PE Cabinet



Front View **Rear View**

QCA108 NET/PE Cabinet

FIGURE 5-22: MERIDIAN SL- 1XN EQUIPMENT CABINETS

Hardware

The initial cabinet provisioning on the Meridian SL-1XN includes a Common Equipment Cabinet (QCA55) in conjunction with a Peripheral Cabinet (QCA74), each of which combine to form the basis for all system applications. The front layout of the QCA55 CE Cabinet is shown in Figure 5-23.

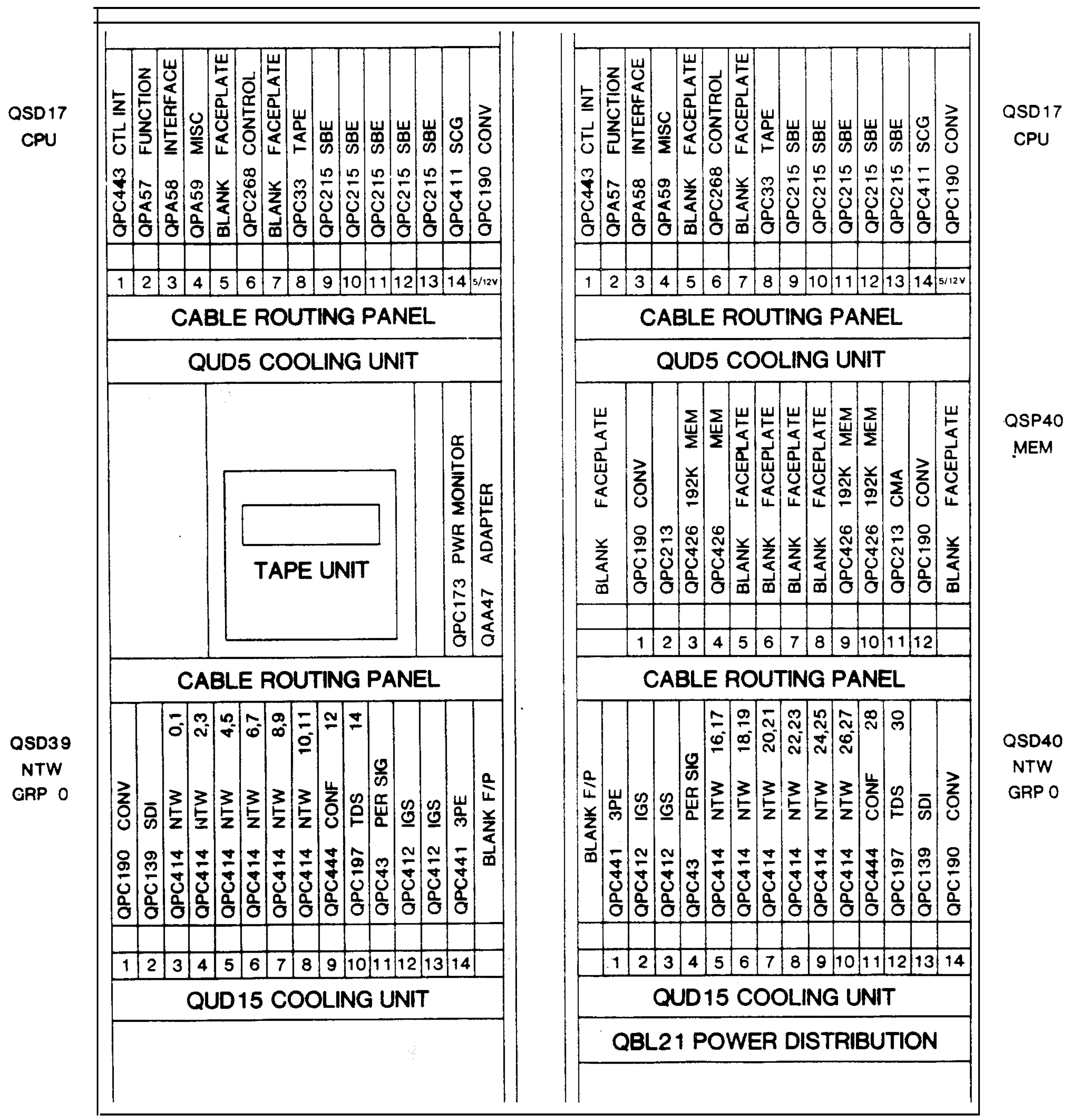


FIGURE 5-23: MERIDIAN SL-1XN QCA55 CABINET - FRONT VIEW

A Centralized Power Cabinet may be used to provide a consolidated power source for system operation. A reserve battery arrangement is used for noise filtering purposes and to maintain system operation in the event of a commercial power failure. Alternately, customer-provided power can be used via a Power Distribution Unit (QBL12) as interface to the Meridian SL-1 equipment. Expansion beyond the capacity of the initial cabinets is provided by a combined Network/Peripheral Cabinet (QCA108) and/or additional PE Cabinets (QCA74).

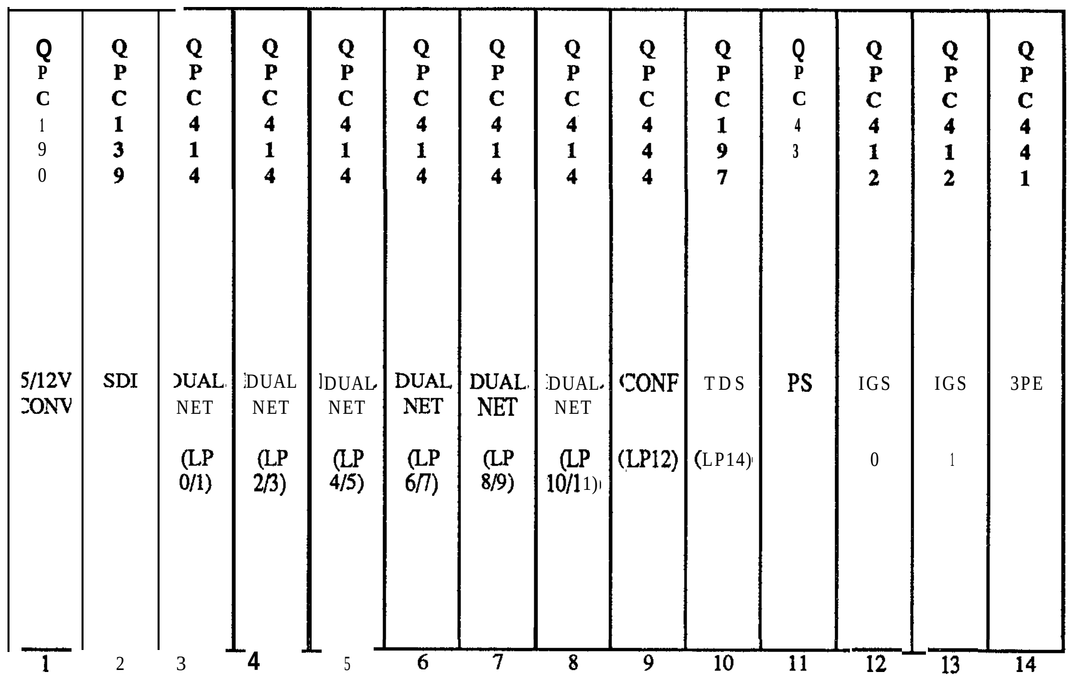


FIGURE 5-24 MERIDIAN SL-1XN - TYPICAL NETWORK SHELF

Four IGS Cards are provided per Network Group (two per network shelf) to provide 32 links to its associated network bus and 8 junctors to each other group. Two network shelves (QSD39 left and QSD40 right) always combine to form a Network Group. Each network shelf accommodates eight (8) cards on its network bus. As shown in Figure 5-23, the typical configuration calls for 12 - QPC414 Network Cards (each 2 circuits O/l through 10/1 1 and 16/17 through 26/27), 2 - QPC444 Conference, and 2 - QPC197 TDS before expansion to the next Network Group is required. Note that the QPC444 and QPC197 are single density cards and are provisioned at the expense of two network loops (one QPC414) on the network bus. The Peripheral Signal Card (QPC43) provides the signaling interface between the CPU and PE for each network shelf.

A fully redundant memory configuration is always provided with the Meridian SL-1XN. The amount of addressable memory is dependant on the associated software release. For Generic 9 11 Release 4, four QPC426 192K Memory Modules are provided for an addressable range of 384K in a fully duplicated mode. This capability may be expanded to the maximum addressable range of 768K (12 pages) by adding additional QPC426 modules when utilizing Generic 911 Release 5 or later and associated hardware.

For additional reliability, the CPU and its associated interface cards are provided in duplicate as a standard system offering. Each CPU is accommodated on its respective QSD17 Shelf located at the top of the cabinet.

The CPU consists of a number of circuit cards that are equipped in a CE shelf, provisioned in accordance with the appropriate release of Software Generic 9 11 as follows:

RELEASE 4	DESCRIPTION	RELEASE 5
QSD17	CE SHELF	QSD17C
QPA57	FUNCTION BOARD	QPC553
QPA58	INTERFACE BOARD	QPC554
QPA59	MISCELLANEOUS	QPC555
QPC443	CONTROL & TIMING	QPC552
QPC213	CONTROL MEMORY ARBITRATOR	QPC556

A QPC268 Control Interface and Memory Card is utilized irrespective of the level of software. Interface from each CPU to the Mass Storage Unit (or Magnetic Tape Unit) located on the QSD67 Disk Shelf (or QSP45 Tape Shelf) is provided by a QPC584 MSI card (or QPC33 TUI card). A QPC411 System Clock Generator provides master clock source and distribution functions. The QPC215 Segmented Bus Extender connects each half of the Network Group to the CPU bus via a cable connection to the Intergroup Switch Card (QPC412). Each ISG supports eight junctors, two of which go to each other Network Group.

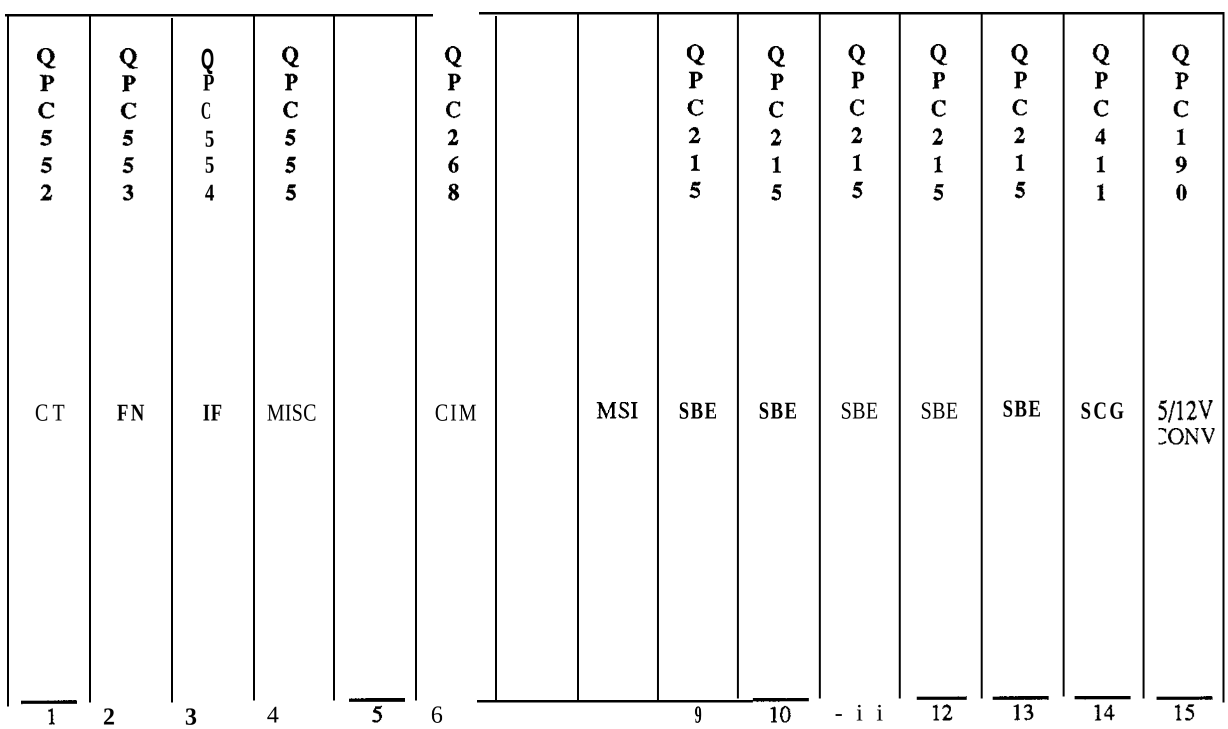


FIGURE 5-25: MERIDIAN SL-1XN QSD17 CPU SHELF

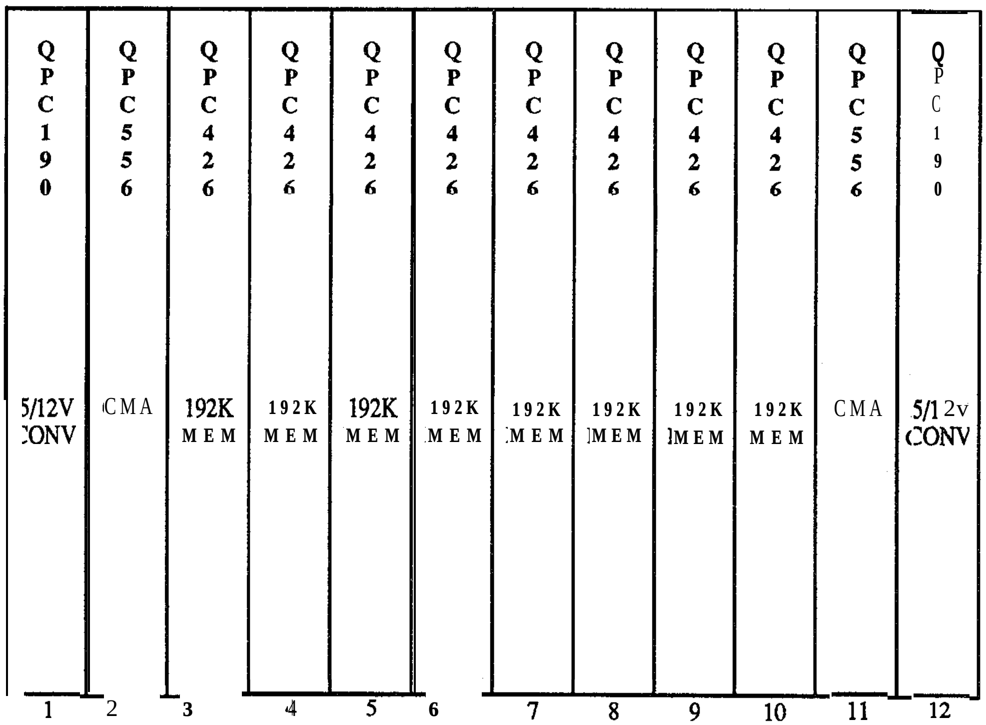


FIGURE 5-26: QSP40 MEMORY SHELF

The rear of the QCA55 Cabinet accommodates two additional Network Groups as shown in Figure 5-27. A QPC417 Junctor board provides a distribution point for the various cables that combine to form the space switching paths between the network groups. Expansion beyond the three network group capability of the QCA55 Cabinet is accomplished by means of adding a QCA108 Cabinet. The latter provides the capability of additionally accommodating peripheral equipment through the provisioning of up to 10-QSD64 (or QSP35/36) PE shelves. Figures 5-28 and 5-29 show the front and rear layout of the QCA108 Cabinet respectively. Note that Network Groups 3 and 4 are equipped in a vertical alignment so that a single QUD15 Cooling Unit can be used to dissipate the heat generated by the common equipment in each group.

A PE Cabinet (QCA74) accommodates a maximum 14-QSD64 (or QSP35/36) PE Shelves to meet peripheral expansion requirements. Since power is centralized, the shelf space typically accomodated by the 48V Rectifier can instead be utilized for two PE Shelves mounted in a back-to-back mode.

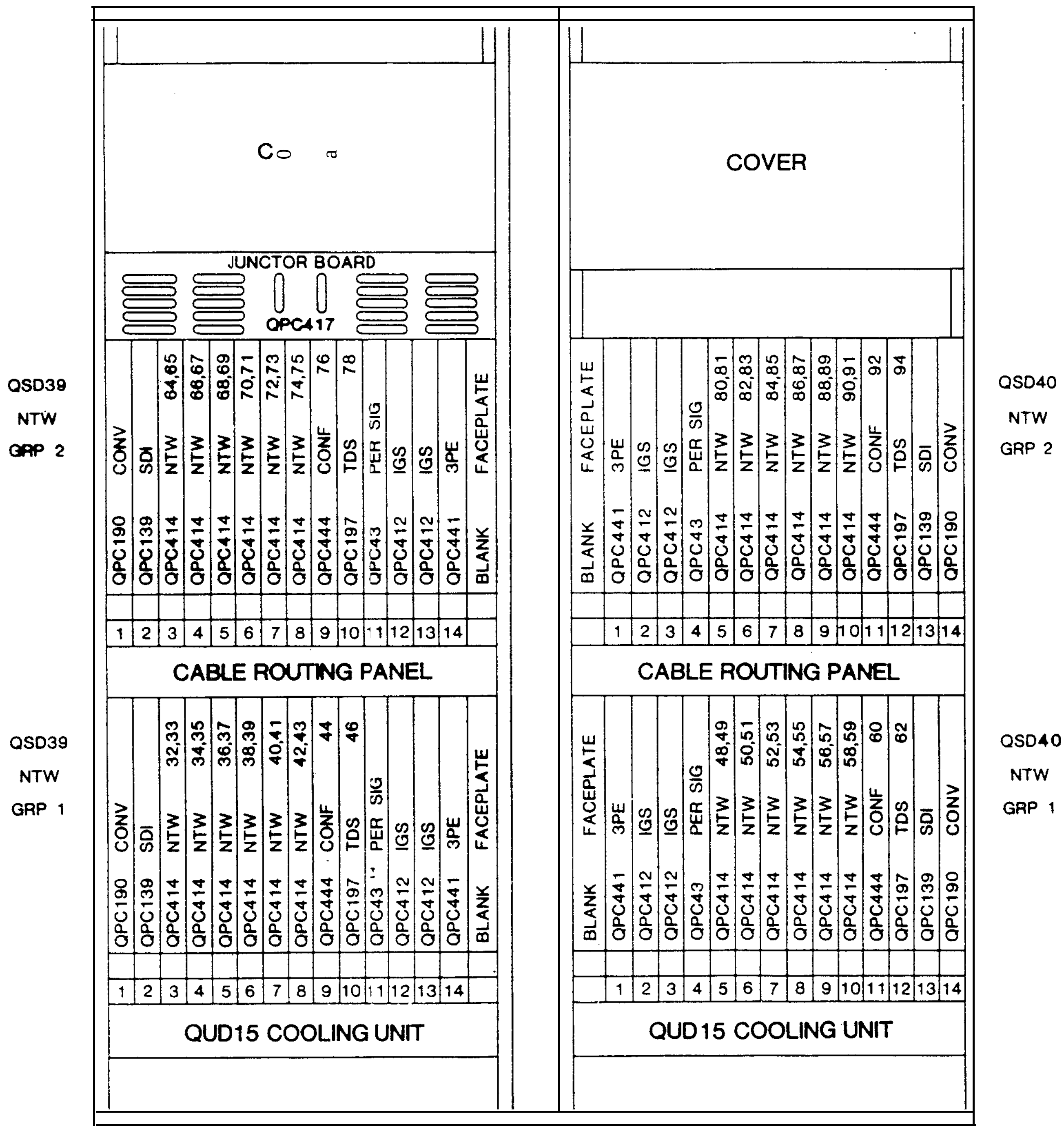


FIGURE 5-27: MERIDIAN SL-1XN QCA55 CABINET - REAR VIEW

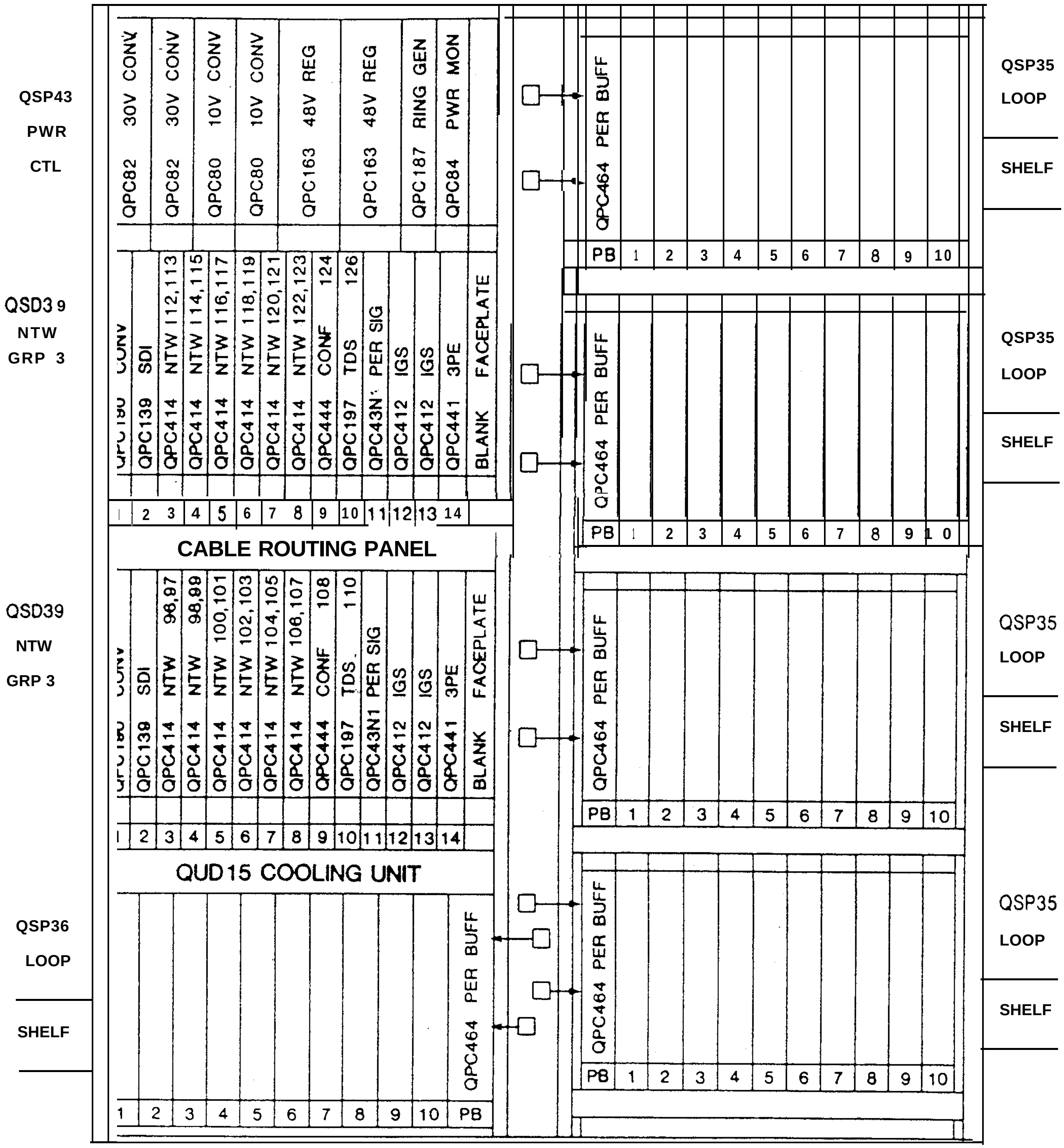


FIGURE 5-28: MERIDIAN SL-1XN QCA108 CABINET - FRONT VIEW

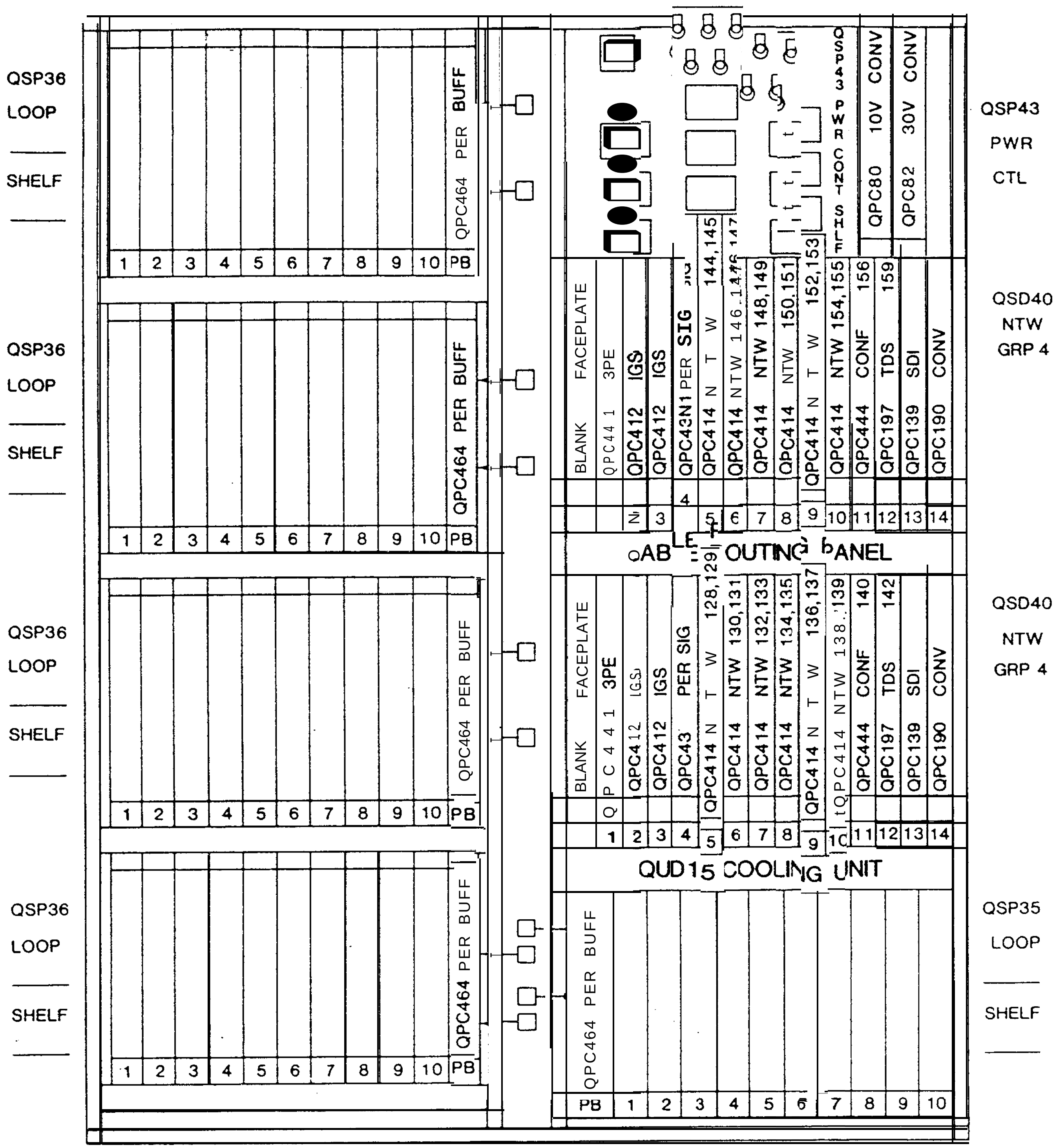


FIGURE 5-29: MERIDIAN SL-1XN QCA108 CABINET - REAR VIEW

Software

The minimum software level required for the Meridian SL-1XN system is 911 Release 4. A subsequent release (Release 5 or later) supports system memory expansion as follows:

SOFTWARE GENERIC 9 11	RELEASE 4	RELEASE 5
PROGRAM STORE	128K	448K
UNPROTECTED DATA	128K	128K
PROTECTED DATA	128K	192K

Other enhancements supported by the subsequent software releases include:

Generic 911 Release 5:	Double density PE cards: - C.O./FX/WATS Trunk (QPC450) - DID Trunk (QPC449) - MW Line (QPC494) Computer to PBX Interface (QPC472) Digital Trunk Interface (QPC47 1/2)
Generic 9 11 Release 7:	Quad Density PE Line - ISDLC (QPC578) M2000 Series of Digital Telephones M3000 Touchphone Packet Transport
Generic 911 Release 8:	Mass Storage Unit (QMM38)
Generic 911 Release 9:	Quad Density PE Line - 16 port 500/2500 (QPC594) M23 17 Digit Display Digital Telephone

Since the Network Enhancement incorporated in the Meridian SL-1XN does not support the X37 Hospitality Generic, the SL-1XL system type is retained for use in typical Hotel / Motel applications.

MERIDIAN SL-1NT

Introduction

The Meridian SL- 1NT builds upon the N system capability through significant enhancements of the Common Equipment. The NT addresses a typical range of 100- 1500 lines. The CE enhancements include new CPU, memory, and storage sub-systems. The incorporation of these enhancements yields an increase in system capacity within these areas and support for all optional feature groups in a single system. The NT incorporates the same powerful processor as that used on the much larger XT system to essentially quadruple the call processing capability compared to the N system. In addition, random-access memory (768K words on a single circuit card) makes storage capacity of the NT equivalent to that of the XN. The use of floppy disks provides more fixed storage, improves reliability, increases operating speed, and makes software upgrades more convenient to implement.

Features and Benefits

Generic 1111 Release 8 is the base software required to support the business applications of Meridian SL-1NT. The Common Equipment enhancement offers significant benefits in terms of system configuration and performance:

- **Increased Capacity**

  The new components have a dramatic impact upon the capacity of the system elements in which they function. So much so that their capabilities are far in excess of present Meridian SL-1 requirements, thereby positioning the product today to support the many enhancements planned for the future.

- **Central Processing Unit**

  Compared to the existing XN CPU, the new processor can process fifty percent more busy hour calls due to its increased word size and faster memory access time. This improvement in real time capacity is especially important in applications such as Automatic Call Distribution (ACD), where calls often have short holding times and are constantly being set up. And, since the XT processor is used in its entirety on the Meridian SL-1NT, the same powerful call processing benefits apply equally to the single-network group system.

- **Random-Access Memory**

  Utilization of 256K dynamic RAM chips enables much denser memory packaging on a per card basis, which in turn results in a significant increase in system memory. For example, the NT, using a single 768K memory card, provides an increase of 140 percent in memory capacity compared to the Meridian SL-1N. Thus, the NT memory capacity (768K words) is equivalent to the previously available XN system used in much larger business organizations.

- **Mass Storage**

  Implementation of disk storage as a replacement for magnetic tape provides an increase in fixed storage capability. The dual floppy diskettes - a standard offering on both NT and XT systems - yield an increase of approximately 75 percent compared to the storage capacity of the longest available magnetic tape previously employed on the Meridian SL-1XN. Incorporation of the optional 10 Mbyte Winchester Hard Disk expands this differential to 600 percent.

- **Full Feature Support**

  Meridian SL-1 software offers a large set of available features - many more than any one customer would typically utilize. The fact that new features are continually added each year means that memory and storage hardware must expand to support the sheer size of the system software. The new memory and storage components of the NT can readily accommodate the full complement of today's X 11 Software Generic and provides built-in capability to support a far greater number of features and services.

- **Improved Reliability**

  The standard configuration of the NT ensures that the high reliability one associates with Meridian SL-1 is retained. Dual central processors and a fully redundant memory bank, along with the replication of other key operating elements, are part and parcel of each NT system. The reduction in components results in more dense equipment packaging, which in turn improves reliability and reduces the amount of maintenance activity. With respect to the mass storage system, both hard disk and floppy diskettes have better reliability parameters than the magnetic tape transport. When the optional hard disk is installed, then the floppy diskettes serve as a back-up. And since the full 10 Mbyte storage capacity of the hard disk cannot be fully utilized, the software duplicates the storage in two 5 Mbyte segments for additional redundancy.

- **Less Installation and Maintenance**

  The reduction in card count and utilization of faster state of the art components reduces the time associated with system installation and maintenance activities. Sysloads, overlay access, and data dump procedures utilized with the disk storage sub-system are accomplished much quicker than those associated with magnetic tape. Maintenance displays on both the processor and mass storage interface cards are used to facilitate system administration.

- **Flexible Memory Segmentation**

  The new software design provides the ability to address up to 16 M words of data while maintaining compatibility of data structures across system types. By increasing the address range of the software pointers, the 64K page boundaries that are inherent on existing systems are eliminated on the NT. This permits memory to be flexibly allocated on a contiguous basis up to the capacity of the physical memory card equipped. The design also has a dramatic effect on the number of call registers that may be assigned. Under the new memory scheme, the quantity call registers are unlimited.

- **Commonality of Components**

  All hardware elements of the CE Enhancement Program are common to both NT and XT systems and may be freely interchanged. This capability affords key benefits in terms of spares planning, administration, and maintenance. In addition, the major common equipment components - CPU, memory, network and disk storage - are retained in the expansion from the NT to the XT system.

- **Backwards Compatibility**

As is the custom with all Meridian SL- 1 enhancements, the capabilities introduced on the NT system are backwards compatible to the installed base. This means that customers can keep pace with a dynamic environment and increase the functionality of their business communications without the trauma associated with a new system installation. Upgrading an existing Meridian SL- 1 to NT is completely transparent to the user with no change in telephone or terminal operation. Furthermore, the portability of floppy diskettes readily facilitates software updates. And, since the software is designed to run on existing and new CPU, upgrade implementation is effected in a smooth and expedient manner.

- **System Enhancements**

Further system enhancements incorporated after the initial introduction of the system include:

A Peripheral Equipment shelf (QSD65) that may be partitioned in two five-card slot increments. An associated dual-loop buffer (QPC659) supports a connection from each half of the PE shelf to an individual network loop. This is extremely beneficial in high traffic applications since less peripheral devices may contend for the thirty available network timeslots without the need to designate unusable shelf space to otherwise accomplish this. Complete flexibility is maintained since the PE shelf can be allocated singularly to a network loop or else daisy-chained to another PE shelf for low traffic applications. For the latter configuration, quad density PE cards (for example ISDLC) cannot be used since a maximum of 160 PE terminations are supported by the network loop.

A 2-port digitone receiver (QPC710), packaged as a daughterboard mounted on the dual loop buffer, frees up a PE shelf slot to accommodate other PE cards whenever the QPC659 buffer is operated in the dual loop mode.

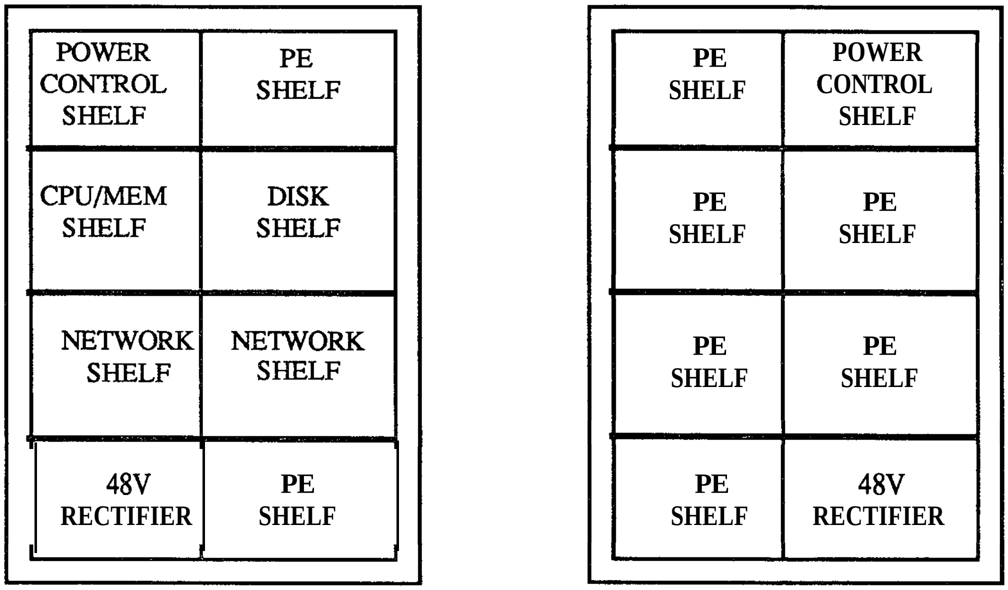
A 16-port quad density 500/2500 line card (QPC594) supported by Software Generic 1111 Release 9.

M2317 Digit Display Digital Telephone supported by software Generic 1111 Release 9.

HARDWARE

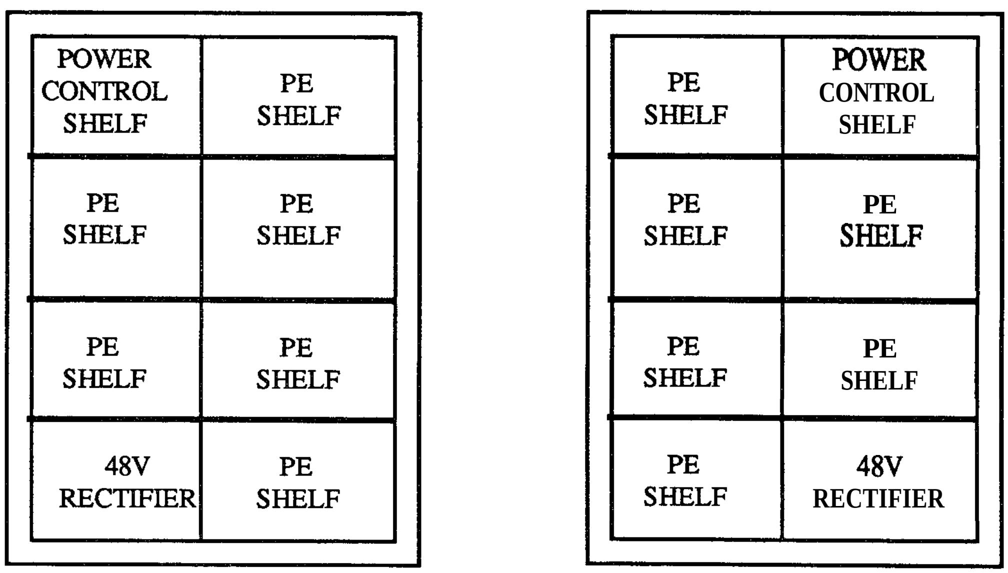
- **Equipment Cabinets**

The Meridian SL-1NT CE/PE equipment cabinet (QCA58) is identical to that used on the N system and combines both Common and Peripheral Equipment. Front and rear access to the cabinet permits eight peripheral shelves to be installed along with the associated Common Equipment. Each peripheral shelf houses 10 peripheral interface cards of any type such as trunk cards, line cards, or data line cards. Expansion beyond the PE capability of the QCA58 Cabinet is achieved by providing the QCA74 PE expansion cabinet. (Figure 5-30)



Front View Rear View

QCA58 CE/PE Cabinet



Front View Rear View

QCA74 PE Expansion Cabinet

FIGURE 5-30: MERIDIAN SL-1NT EQUIPMENT CABINETS

• Common Equipment Shelf

The Meridian SL-1NT utilizes a new Common Equipment shelf that is electrically isolated to provide complete redundancy of the circuit cards located in each half. The shelf, designated QSD60 (Figure 5-31), accommodates two CPUs and 768K duplicate memory. The new processor consists of two cards (QPC579 and QPC580) that are always provided in duplicate as a standard dual CPU configuration. The new memory card (QPC583) provides 768K words (24 bits plus parity), using 256K RAM chips. The memory is fully duplicated and is flexibly allocated to any of the system data stores on an as-needed basis. This means that the Program Store, Protected Data Store, Unprotected Data Store, and Call Registers have no specific size limitations (subject to the overall memory available). An interface card (QPC584) provides cable connectivity from each CPU to the Mass Storage Sub-System and includes a LED display to facilitate administration and maintenance functions. The CMA (QPC581) controls access from each CPU to each redundant memory bank.

A bus extender (QPC496) connects Network Shelf 1 to the CPU bus for the full network group arrangement used with the dual processor configuration. A 5/12V converter (QPC691), located at each end of the shelf provides power for the circuit cards.

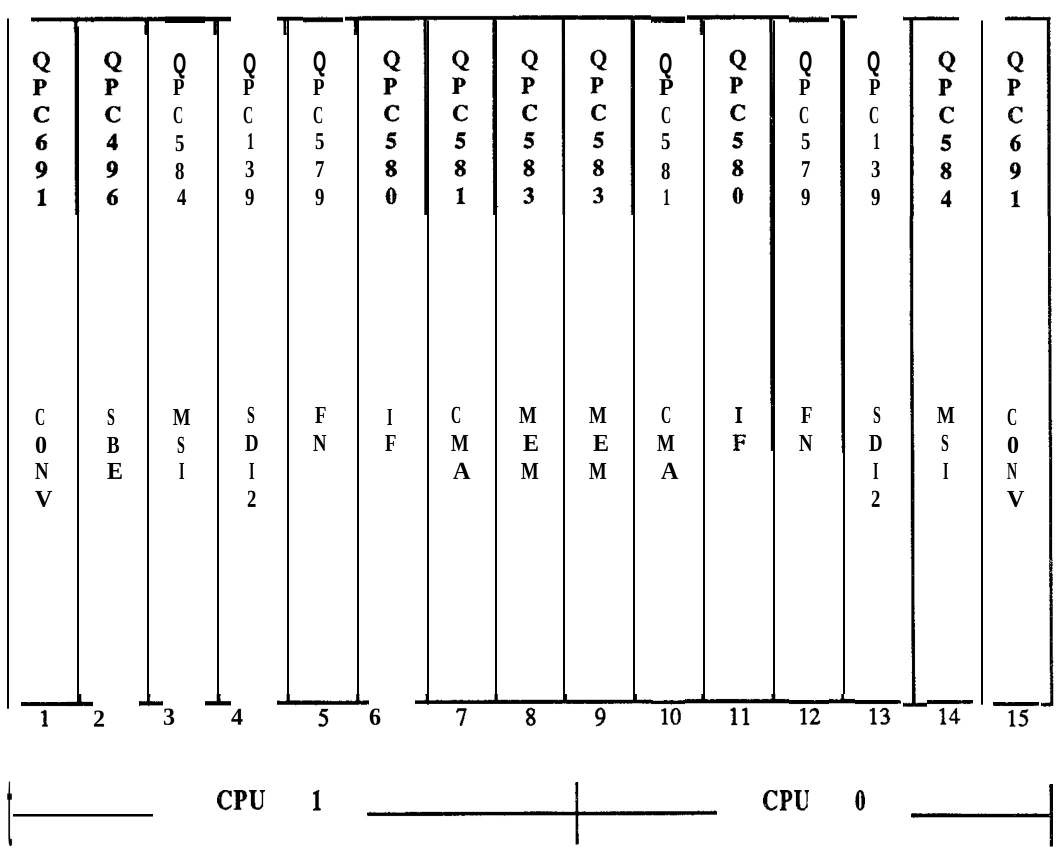


FIGURE 5-31: MERIDIAN SL-1NT CE SHELF

- **Disk Drive Shelf**

The Meridian SL-1NT also utilizes a new Disk Drive Shelf (QSD67), replacing the Tape Shelf of the N system. The Disk Drive Shelf houses a Mass Storage Unit (Figure 5-32) which accommodates two 5.25" floppy disk drives (QMT104), an optional half-height Winchester drive (QMT103), and a Power Converter (QPC585). Software Generic X11 Release 8 is required to support the use of disk drives. Each disk drive is plug-socketed for easy installation and removal. If a hard disk drive is used, the hard drive acts as the first backup for system reloading; the floppy drives load automatically if the hard drive fails. As with the N system, the data dump program is used to back up the current customer data.

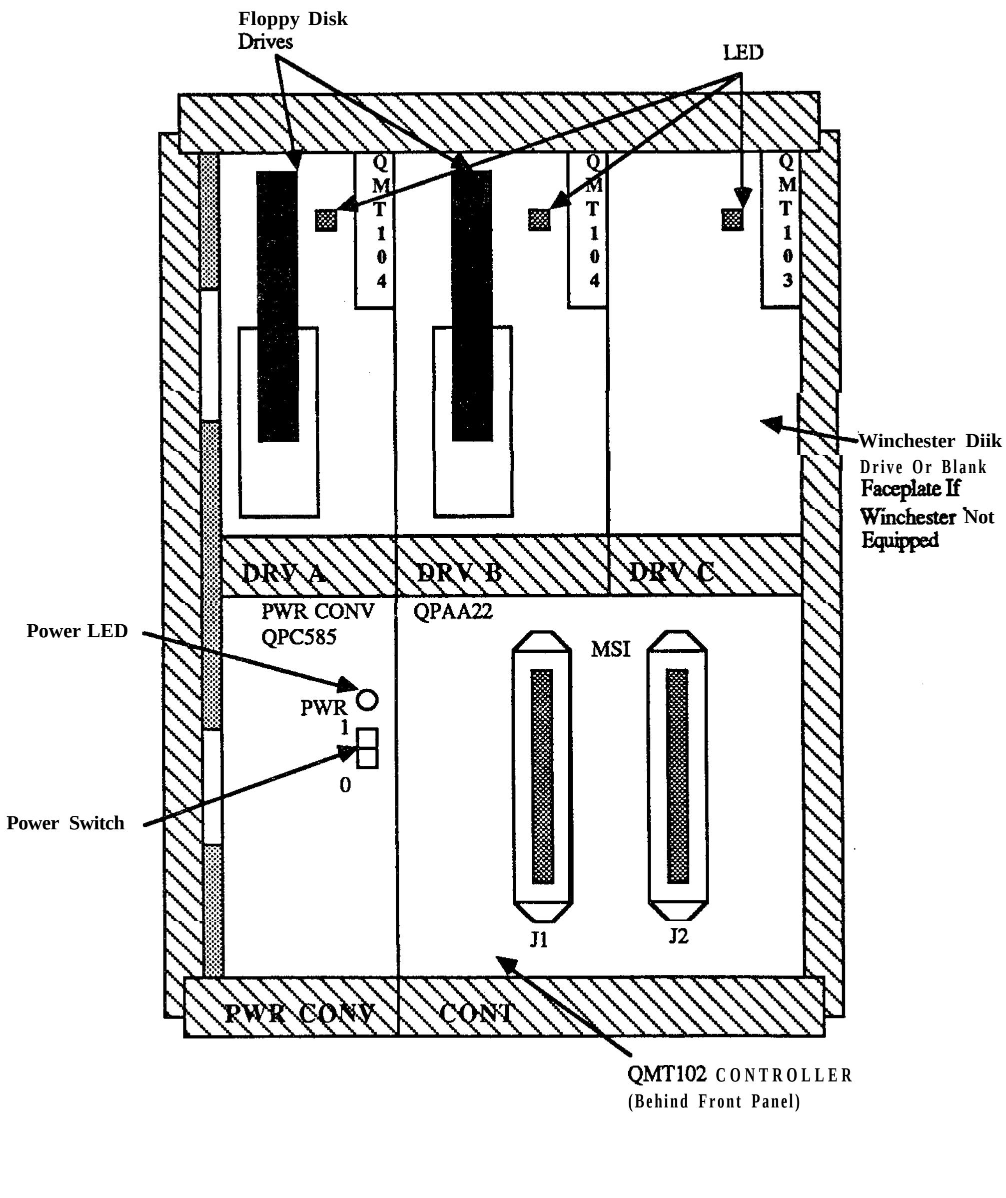


FIGURE 5-32: MASS STORAGE UNIT

- Network

The circuit-switched digital network capability of the Meridian SL-1N (1 Network Group; 32 Network loops per group) is retained in its entirety for the NT system. Two shelves (QSD39 on the left side and QSD40 on the right side) constitute the single network group. A typical network shelf layout is shown in Figure 5-33. The network card (QPC414) contains two network loops and, typically, six such cards may be installed in each network shelf. The network loop provides 32 time slots, each operating at 64 kbps for a total of 2.048 Mbps per network loop. Thirty of the time slots carry traffic (e.g. voice or data); one is used for signaling, and the other is spare. The network design uses an algorithm that selects available time slots on an individual basis. Thus, non-blocking capability may be achieved by assigning thirty or less peripheral devices to the associated network loop. The distributed network architecture allows complete flexibility in providing non-blocking on a loop, card, shelf, or system basis.

Tone generation and conferencing are handled digitally and the associated circuit cards occupy a network card position. The tone and digit switch (QPC197, QPC251, or QPC609) supplies call progress tones and cadences and each conference card (QPC444) provides thirty channels for use in multiple connections. A peripheral signaling card (QPC43) provides a signaling interface to the CPU and a three port extender (QPC441) provides faceplate connections for the interconnect cabling between equipment shelves. Circuit cards that may be optionally allocated on the network shelf include the Serial Data Interface (QPC139), Digital Trunk Interface (DTI) and associated Clock Controller (QPC471), and Computer to PBX Interface (CPI). The same type of circuit card (QPC472) is used for both DTI and CPI and occupies two slot positions on the shelf.

QPC190	QPC139	QPC414	QPC414	QPC414	QPC414	QPC414	QPC414	QPC444	QPC609	QPC43	QPC139	QPC139	QPC441
5/12V CONV	SDI	DUAL NET (LP 0/1)	DUAL NET (LP 2/3)	DUAL NET (LP 4/5)	DUAL NET (LP 6/7)	DUAL NET (LP 8/9)	DUAL NET (LP 10/11)	CONF (LP12)	TDS (LP14)	PS	SDI	SDI	3PE
1	2	3	4	5	6	7	8	9	10	11	12	13	14

FIGURE 5-33: MERIDIAN SL- 1NT NETWORK SHELF

- **Cabinet Layout**

The front layout of the QCA58 CE/PE Cabinet is shown in Figure 5-34. The bottom left position contains a QRF8 48V Rectifier (40 Amp) which, along with converter and regulator cards located in the top left QSP43 Control Shelf, provides the necessary power. Heat dissipation is controlled by a QUD20 Cooling Unit located beneath each network shelf (QSD39/40). The CPU/Memory Shelf (QSD60) and Disk Drive Shelf (QSD67) form the basis for the Common Equipment enhancements and differentiate the NT from the N system. The remaining front and rear cabinet shelf space may be allocated to a maximum of eight peripheral equipment shelves. A QPC659 Dual Loop Peripheral Buffer associated with each PE shelf terminates the assigned network loop (or loops) by means of the 18 pair multiplexed cable connected to its faceplate connector.

Figure 5-35 shows a layout of the rear of the QCA58 cabinet. When expansion beyond the PE capability of the QCA58 is required, the QCA74 PE Expansion cabinet is utilized.

Software

Generic 1111 Release 8 or later support, supports the business applications of Meridian SL- 1NT. The full range of Meridian SL-1 features and services is supported including the use of the Meridian portfolio of digital telephones, Meridian Mail, and Meridian LANSTAR. Generic 1111 Release 9 provides higher density peripheral packaging with the introduction of the 16 port 500/2500 line card. Since network enhancement is an inherent feature of Meridian SL-1NT, then X37, the Hospitality software generic, is not compatible. Thus, the LE system is used for Hotel/Motel applications.

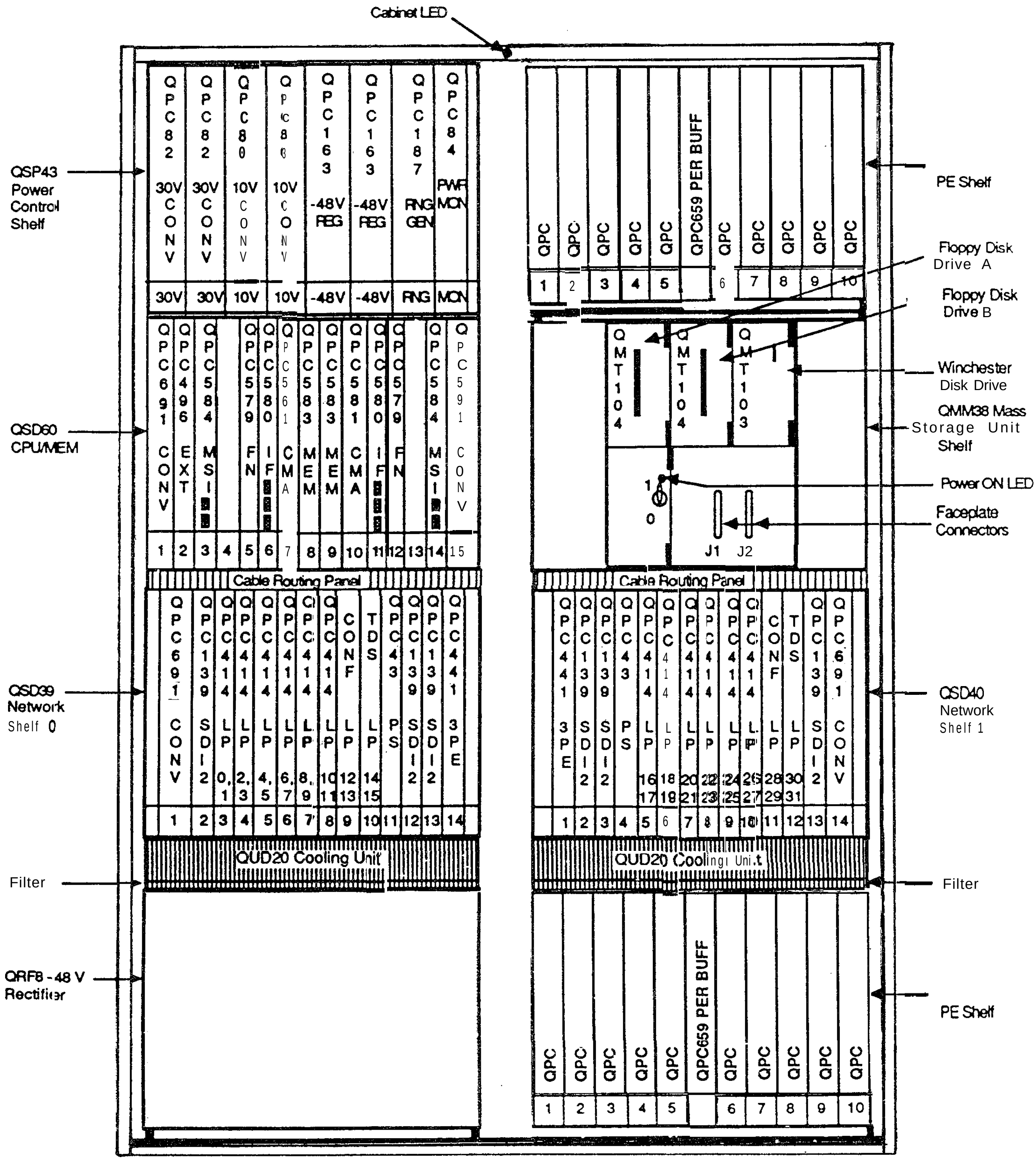


FIGURE 5-34: MERIDIAN SL-1NT QCA58 CABINET - FRONT VIEW

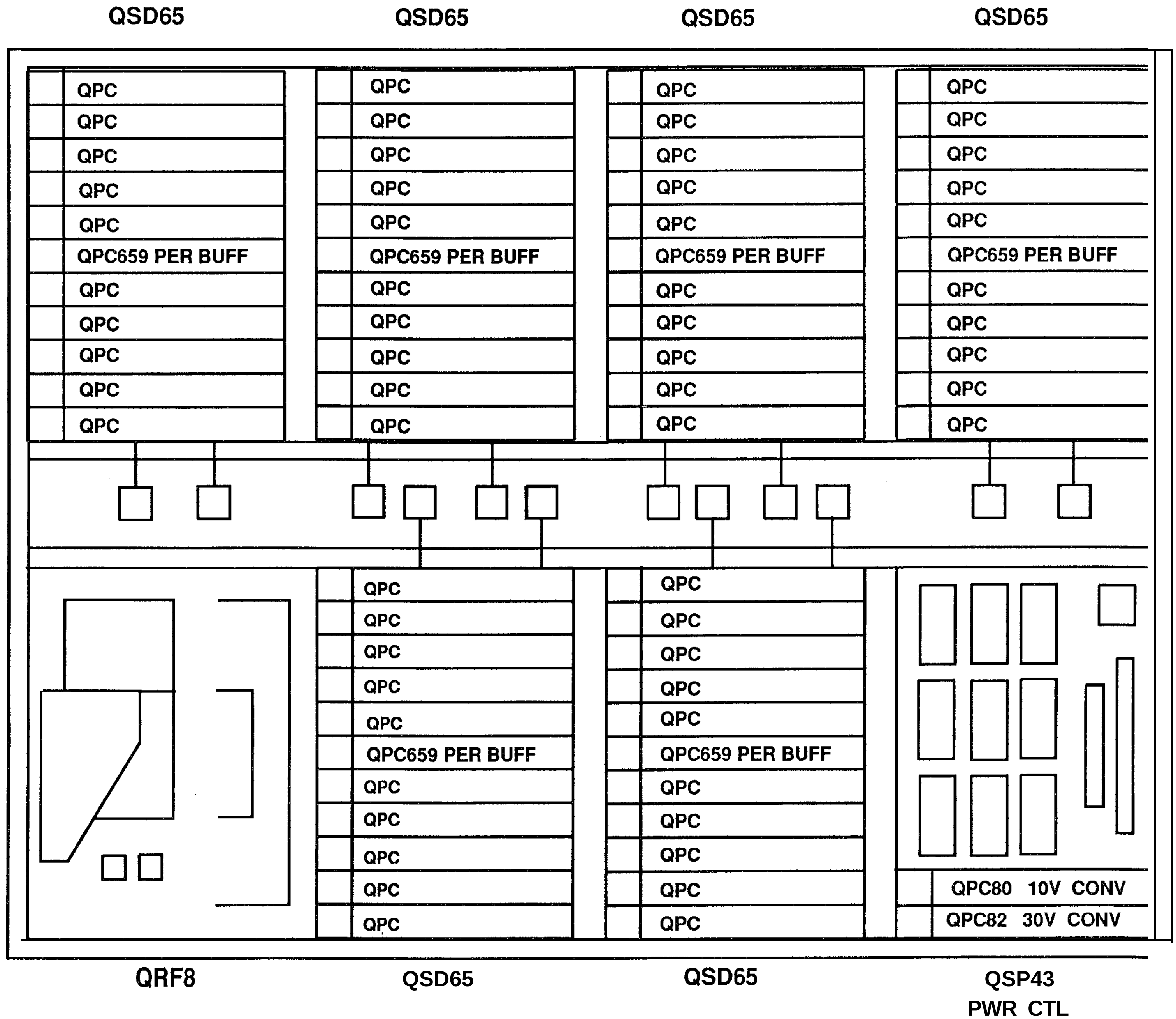


FIGURE 5-35: MERIDIAN SL-1NT QCA58 CABINET - REAR VIEW

MERIDIAN SL-1XT

Introduction

The Meridian SL-1XT extends the XN system capability through significant enhancements of the Common Equipment. The XT supports a maximum size of 5000 voice lines, 2000 data lines, 1000 trunks, and 500 ACD agents. The CE enhancements include new CPU, memory, and storage sub-systems. The incorportation of these enhancements yields an increase in system capacity within these areas and support for all optional feature groups in a single system. The new CPU provides the Meridian SL-1XT with fifty percent more real time capacity than the XN. In addition, the random-access memory (768K words on each of three circuit cards) triples the read/write storage capacity compared to that of the XN. The use of floppy disks provides more fixed storage, improves reliability, increases operating speed, and makes software upgrades more convenient to install. Incorporation of the optional 10 Mbyte hard disk adds further to reliability and storage capacity.

Features and Benefits

Generic 1211 Release 8 is the base software required to support the business applications of Meridian SL-1XT. The Common Equipment enhancement offers significant benefits in terms of system configuration and performance:

- **Increased Capacity**

  The new components have a dramatic impact upon the capacity of the system elements in which they function. So much so that their capabilities are far in excess of present Meridian SL-1 requirements, thereby positioning the product today to support the many enhancements planned for the future.

- **Central Processing Unit**

  Compared to the existing XN CPU, the new processor can process fifty percent more busy hour calls due to its increased word size and faster memory access time. This improvement in real time capacity is especially important in applications such as Automatic Call Distribution (ACD), where calls often have short holding times and are constantly being set up.

- **Random-Access Memory**

  Utilization of 256K dynamic RAM chips enables much denser memory packaging on a per card basis, which in turn results in a significant increase in system memory. The XT - using three 768K memory cards - yields 200 percent more memory than the XN system. Whereas the NT memory capacity is equivalent to the XN (768K words), the XT system triples it (2304K words).

- **Mass Storage**

  Implementation of disk storage as a replacement for magnetic tape provides an increase in fixed storage capability. The dual floppy diskettes - a standard offering on both NT and XT systems - yield an increase of approximately 75 percent compared to the storage capacity of the longest available magnetic tape previously employed on the Meridian SL-1XN. Incorporation of the optional 10 Mbyte Winchester Hard Disk expands this differential to 600 percent.

- **Full Feature Support**

  Meridian SL-1 software offers a large set of available features - many more than any one customer would typically utilize. The fact that new features are continually added each year means that memory and storage hardware must expand to support the sheer size of the system software. The new memory and storage components of the XT can readily accommodate the full complement of today's Xl 1 Software Generic and provides built-in capability to support a far greater number of features and services.

- **Improved Reliability**

  The standard configuration of the XT ensures that the high reliability one associates with Meridian SL-1 is retained. Dual central processors and a fully redundant memory bank, along with the replication of other key operating elements, are part and parcel of each XT system. The reduction in components results in more dense equipment packaging, which in turn improves reliability and reduces the amount of maintenance activity. With respect to the mass storage system, both hard disk and floppy diskettes have better reliability parameters than the magnetic tape transport. When the optional hard disk is installed, then the floppy diskettes serve as a back-up. And since the full 10 Mbyte storage capacity of the hard disk cannot be fully utilized, the software duplicates the storage in two 5 Mbyte segments for additional redundancy.

- **Less Installation and Maintenance**

  The reduction in card count and utilization of faster state of the art components reduces the time associated with system installation and maintenance activities. Sysloads, overlay access, and data dump procedures utilized with the disk storage sub-system are accomplished much quicker than those associated with magnetic tape. Maintenance displays on both the processor and mass storage interface cards are used to facilitate system administration.

- **Flexible Memory Segmentation**

  The new software design provides the ability to address up to 16 M words of data while maintaining compatibility of data structures across system types. By increasing the address range of the software pointers, the 64K page boundaries that are inherent on existing systems are eliminated on the XT. This permits memory to be flexibly allocated on a contiguous basis up to the number of physical memory cards equipped. The design also has a dramatic effect on the number of call registers that may be assigned. Under the new memory scheme, call registers are essentially unlimited, subject to the amount of memory available. Since a call register is involved with each established call, more simultaneous connections are supported by the XT compared to the XN.

- **Commonality of Components**

  All hardware elements of the CE Enhancement Program are common to both NT and XT systems and may be freely interchanged. This capability affords key benefits in terms of spares planning, administration, and maintenance.

Backwards Compatibility

As is the custom with all Meridian SL- 1 enhancements, the capabilities introduced on the XT system are backwards compatible to the installed base. This means that customers can keep pace with a dynamic environment and increase the functionality of their business communications without the trauma associated with a new system installation. Upgrading an existing Meridian SL-1 to XT is completely transparent to the user with no change in telephone or terminal operation. Furthermore, the portability of floppy diskettes readily facilitates software updates. And, since the software is designed to run on existing and new CPU, upgrade implementation is effected in a smooth and expedient manner.

• System Enhancements

Further system enhancements incorporated after the initial introduction of the system include:

A Peripheral Equipment shelf (QSD65) that may be partitioned in two five-card slot increments. An associated dual-loop buffer (QPC659) supports a connection from each half of the PE shelf to an individual network loop. This is extremely beneficial in high traffic applications since less peripheral devices may contend for the thirty available network timeslots without the need to designate unusable shelf space to otherwise accomplish this. Complete flexibility is maintained since the PE shelf can be allocated singularly to a network loop or else daisy-chained to another PE shelf for low traffic applications. For the latter configuration, quad density PE cards (for example ISDLC) cannot be used since a maximum of 160 PE terminations are supported by the network loop.

A 2-port digitone receiver (QPC710), packaged as a daughterboard mounted on the dual loop buffer, frees up a PE shelf slot to accommodate other PE cards whenever the QPC659 buffer is operated in the dual loop mode.

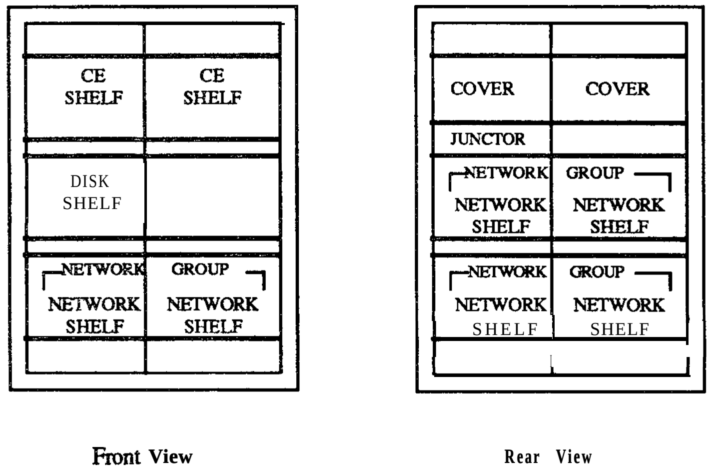
A 16-port quad density 500/2500 line card (QPC594) supported by Software Generic 1211 Release 9.

M2317 Digit Display Digital Telephone supported by Software Generic 1211 Release 9.

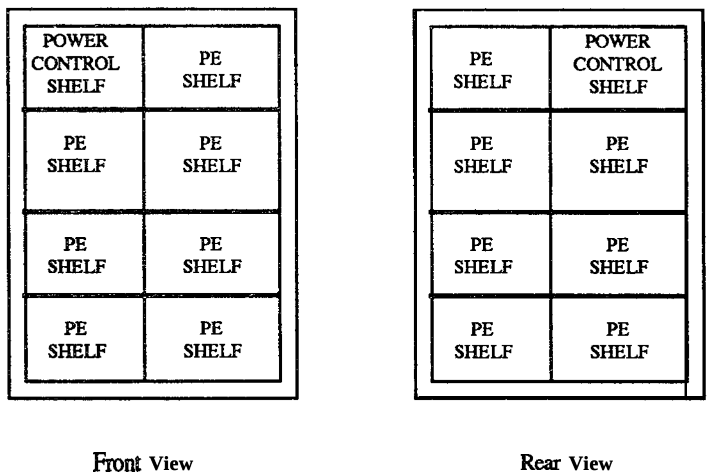
HARDWARE

- **Equipment Cabinets**

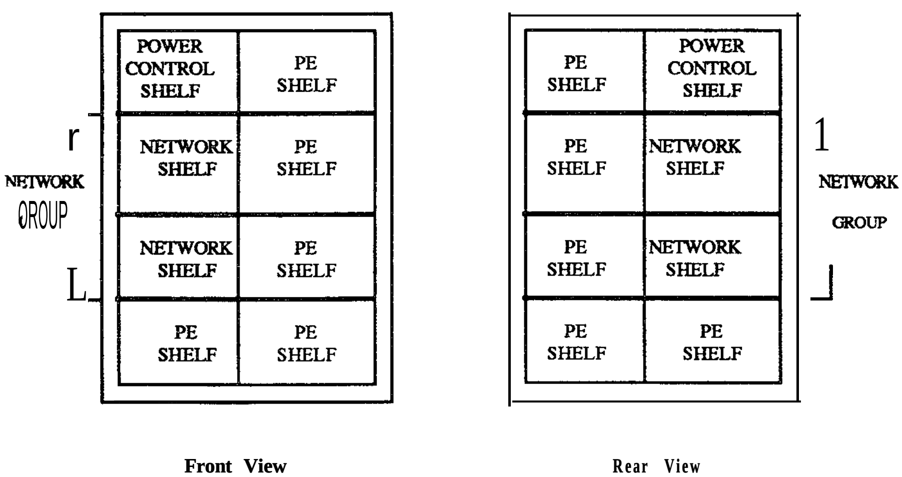
The initial cabinet provisioning on the Meridian SL-1XT includes a Common Equipment Cabinet - QCA55 in conjunction with a Peripheral Cabinet - QCA74 each of which combine to form the basis for all system applications. A Centralized Power Cabinet (QCA13) may be used to provide a consolidated power source for system operation. A reserve battery arrangement maintains system operation in the event of a commercial power failure. Alternately, customer-provided power can be used via a Power Distribution Unit (QBL12) as interface to the Meridian SL-1 equipment. Expansion beyond the capacity of the initial cabinets is provided by a combined Network/Peripheral Cabinet - QCA108 and/or additional PE Cabinets. (Figure 5-36).



QCA55 CE Cabinet



QCA74 PE Cabinet



QCA108 NET/PE Cabinet

FIGURE 5-36: MERIDIAN SL-1XT EQUIPMENT CABINETS

- **Common Equipment**

The Meridian SL-1XT utilizes a new Common Equipment shelf which accommodates the CPU and up to 2.3M words of random-access memory. The shelf, designated QSD62 (Figure 5-37) is duplicated to provide dual CPU and fully redundant memory bank. Each shelf is a left-hand cantilever mount type aligned adjacent to each other in a horizontal plane at the top of the cabinet. This arrangement frees up shelf space at the rear of the cabinet for future utilization as deemed necessary. The more dense CPU/Memory packaging combines both functions on the same shelf, and consequently reduces the CE shelf count from four to three compared to the XN.

The new CPU consists of two cards (QPC579 and QPC580) which are always provided in duplicate as a standard system offering. The new memory cards (QPC583) provide 768K words (each of 24 bits plus parity) using 256K RAM chips. Up to three memory cards may be allocated to each QSD62 shelf to provide complete duplication of each bank. The memory is flexibly allocated to any of the system data stores on an as-needed basis. This means that the Program Store, Protected Data Store, Unprotected Data Store, and Call Register have no specific size limitations (subject to overall memory available). An interface card (QPC584) provides cable connectivity from each CPU to the Mass Storage Sub-System and includes a LED display to facilitate administration and maintenance functions. The CMA (QPC581) controls access from each CPU to each redundant memory bank.

The Segmented Bus Extender (QPC215) is equipped as required to extend the CE bus to each network group provisioned in the system. Clock functions are provided by the System Clock Generator (QPC411) while the 5/12V Power Converter (QPC691) provides power for the circuit cards. The Serial Data Interface (QPC139) provides two RS232C ports for local or remote communications with the system. A Bus Termination Unit (BTU) is used to correctly terminate the CE busses.

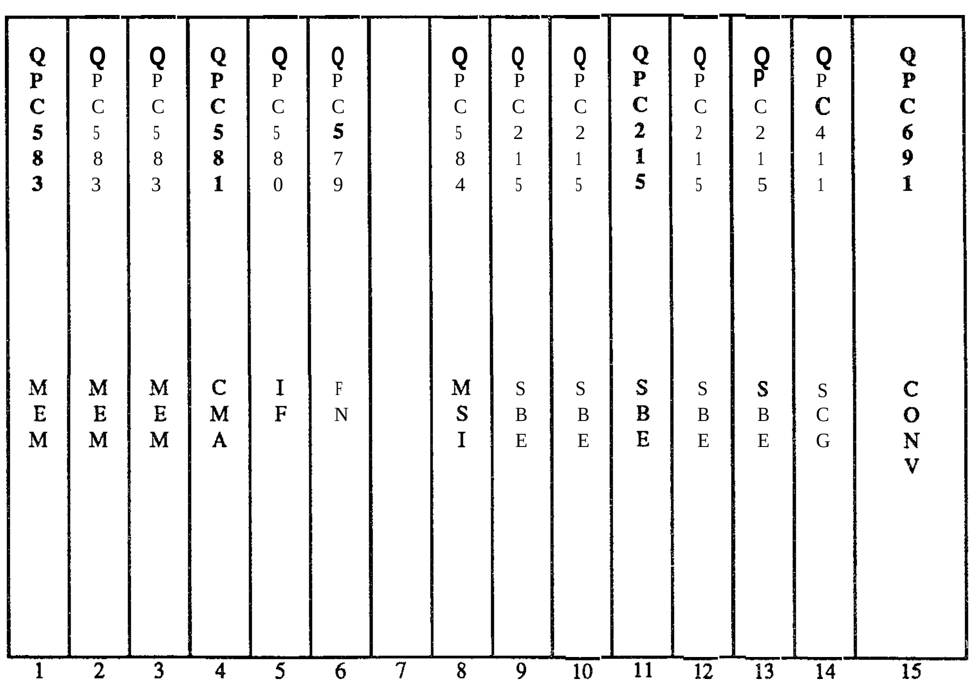


FIGURE 5-37: MERIDIAN SL-1XT CE SHELF

- **Disk Drive Shelf**

The Meridian SL-1XT also utilizes a new Disk Drive Shelf (QSD67) replacing the Tape Shelf of the XN system. The Disk Drive Shelf houses a Mass Storage Unit (Figure 5-38) which accommodates two 5.25" floppy disk drives (QMT104), an optional half-height 10 Mbyte Winchester drive (QMT103), and a Power Converter (QPC585). Software Generic Xl 1 Release 8 is required to support the use of disk drives. Each disk drive is plug-socketed for easy installation and removal. If a hard disk drive is used, the hard drive acts as the first backup for system reloading; the floppy drives load automatically if the hard drive fails. As with the XN system, the data dump program is used to back up the current customer data.

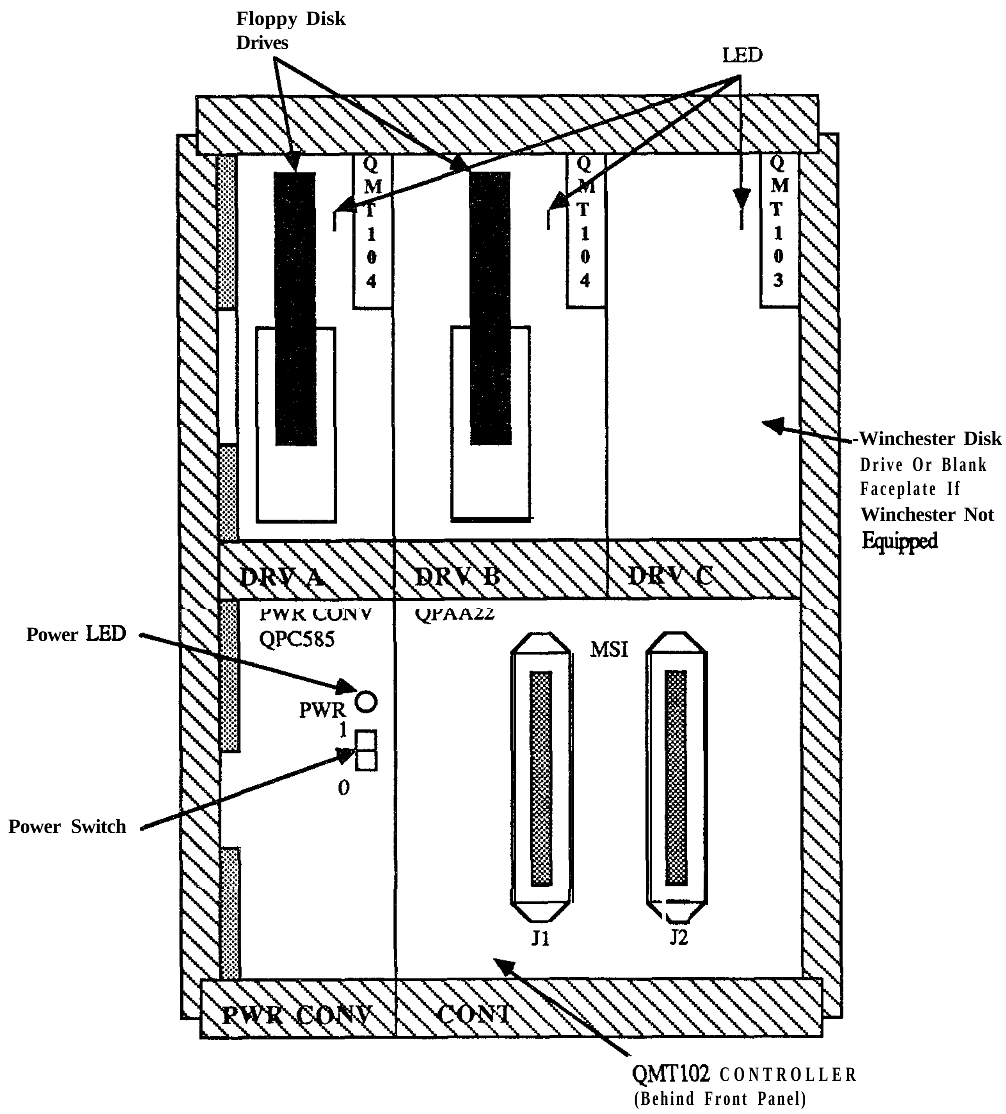


FIGURE 5-38: MASS STORAGE UNIT

- **Network**

The circuit-switched digital network capability of the Meridian SL-1XN (5 Network Groups; 32 Network loops per group) is retained in its entirety for the XT system. Two shelves (QSD39 on the left side and QSD40 on the right side) constitute the network group. A typical network shelf layout is shown in Figure 5-39. The network card (QPC414) contains two network loops and, typically, six such cards may be installed in each network shelf. The network loop provides 32 time slots, each operating at 64 kbps for a total of 2.048 Mbps per network loop. Thirty of the time slots carry traffic (e.g. voice or data); one is used for signaling, and the other is spare. The network design uses an algorithm that selects available time slots on an individual basis. Thus, non-blocking capability may be achieved by assigning thirty or less peripheral devices to the associated network loop. The distributed network architecture allows complete flexibility in providing non-blocking on a loop, card, shelf, or group basis.

Tone generation and conferencing are handled digitally and the associated circuit cards occupy a network card position. The tone and digit switch (QPC197, QPC251, or QPC609) supplies call progress tones and cadences and each conference card (QPC444) provides thirty channels for use in multiple connections. A peripheral signaling card (QPC43) provides a signaling interface between the CPU and Peripheral Equipment for each network shelf. Four Inter-Group Switch (IGS) cards (QPC412) - two per each network shelf - provide 32 links to its associated network bus and 8 one-way junctor paths (each of 30 time slots) to each other network group for both intra-group and inter-group communications.

Circuits that may be optionally allocated on the network shelf include the Serial Data Interface (QPC139), Digital Trunk Interface (DTI) and associated Clock Controller (QPC471),and Computer to PBX Interface(CPI). The same type of circuit card (QPC472) is used for both DTI and CPI and occupies two slot positions on the shelf.

QPC190	QPC139	QPC414	QPC414	QPC414	QPC414	QPC414	QPC414	QPC444	QPC609	QPC43	QPC412	QPC412	QPC441
5/12V CONV	SDI	DUAL NET	DUAL NET	DUAL NET	DUAL NET	DUAL NET	DUAL NJ3	CONF	TDS	PS	IGS	IGS	3PE
		(LP 0/1)	(LP 2/3)	(LP 4/5)	(LP 6/7)	(LP 8/9)	(LP 10/11)	(LP12)	(LP14)		0	1	
1	2	3	4	5	6		8	9	10	11	12	13	14

FIGURE 5-39: MERIDIAN SL-1XT TYPICAL NETWORK SHELF

- **Cabinet Layouts**

The front layout of the QCA55 CE Cabinet is shown in Figure 5-40. Each CPU/Memory Shelf (QSD62) is located in a horizontal plane at the top of the cabinet as viewed from the front. These shelves, along with the Disk Drive Shelf (QSD67), form the basis for the Common Equipment enhancements and differentiate the XT from the XN system. The remaining front and rear cabinet shelf space is allocated to a maximum of three network groups - each group consisting of a QSD39 and QSD40 Network Shelf which is always provisioned together as a pair. The rear cabinet layout is shown in Figure 5-41 and includes a Junctor Board (QPC417) that provides a distribution point for the various cables that combine to form the switching paths between network groups. Heat dissipation is controlled by associated cooling units located beneath each CE shelf.

Expansion beyond the three network group capability of the QCA55 Cabinet is accomplished by the addition of a QCA108 Cabinet. The latter provides the capability of additionally accommodating peripheral equipment through the provisioning of associated PE shelves. Figures 5-42 and 5-43 show the front and rear layout of the QCA108 Cabinet respectively. Note that Network Groups 3 and 4 are equipped in a vertical alignment so that a single Cooling Unit can be used to dissipate the heat generated by the common equipment in each group.

A PE Cabinet (QCA74) accommodates a maximum 14 - QSP35/36, QSD64, or QSD65 PE Shelves to meet peripheral expansion requirements. Since power is centralized, the shelf space typically accommodated by the 48V Rectifier can instead be utilized for two PE shelves mounted in a back-to-back mode.

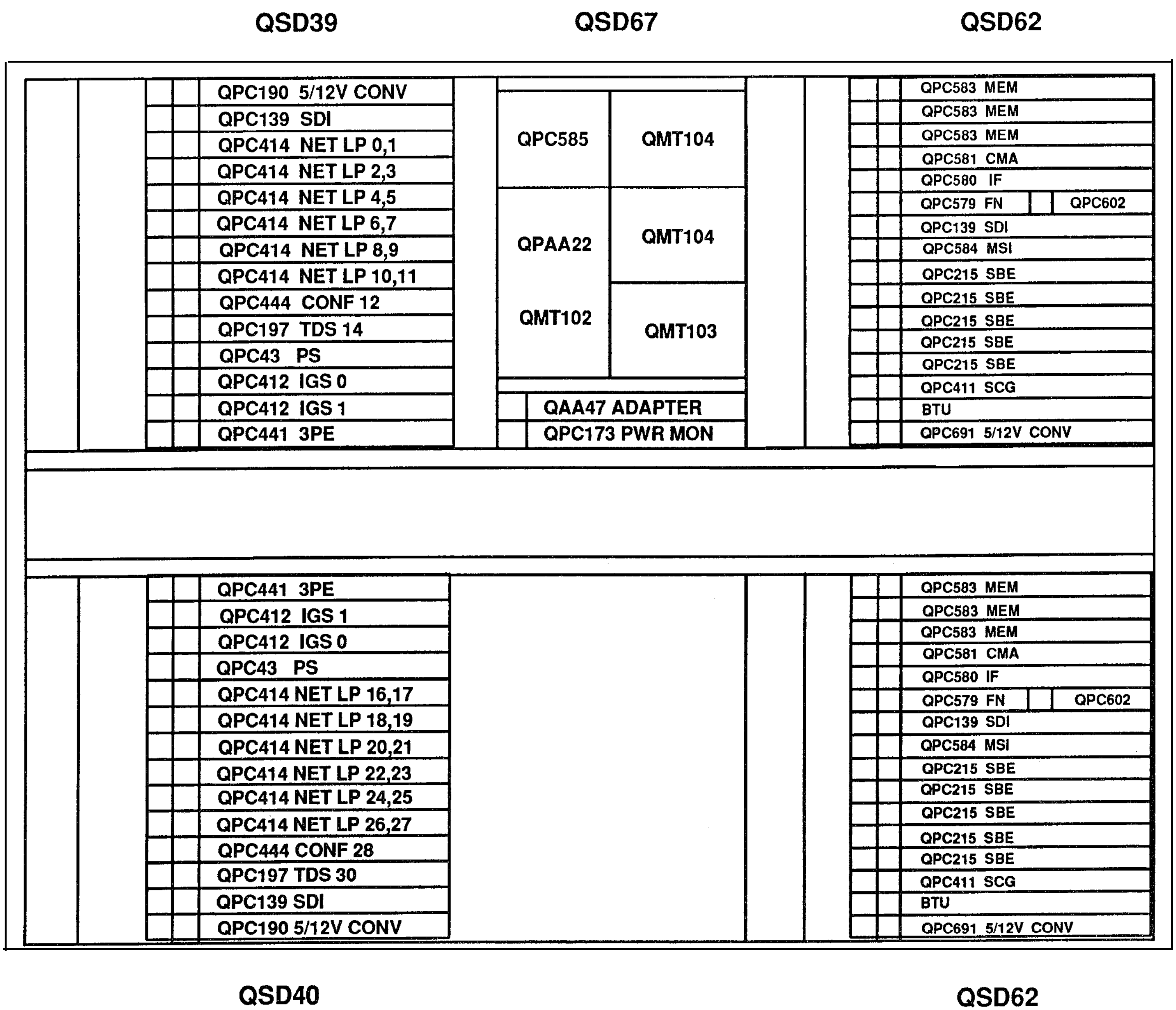


FIGURE 5-40: MERIDIAN SL-1XT QCA55 CE CABINET - FRONT VIEW

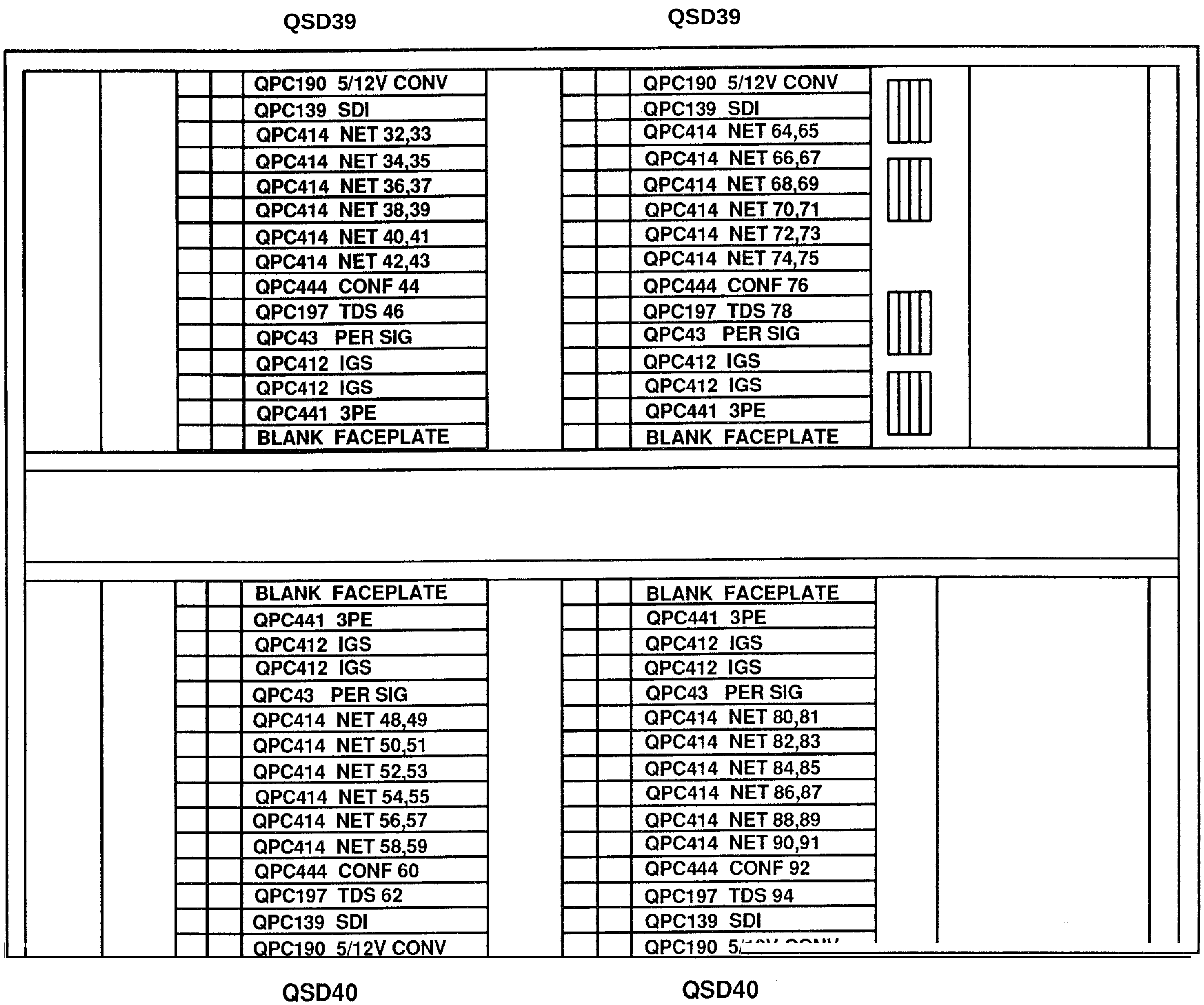


FIGURE 5-41: MERIDIAN SL-1XT QCA55 CE CABINET - REAR VIEW

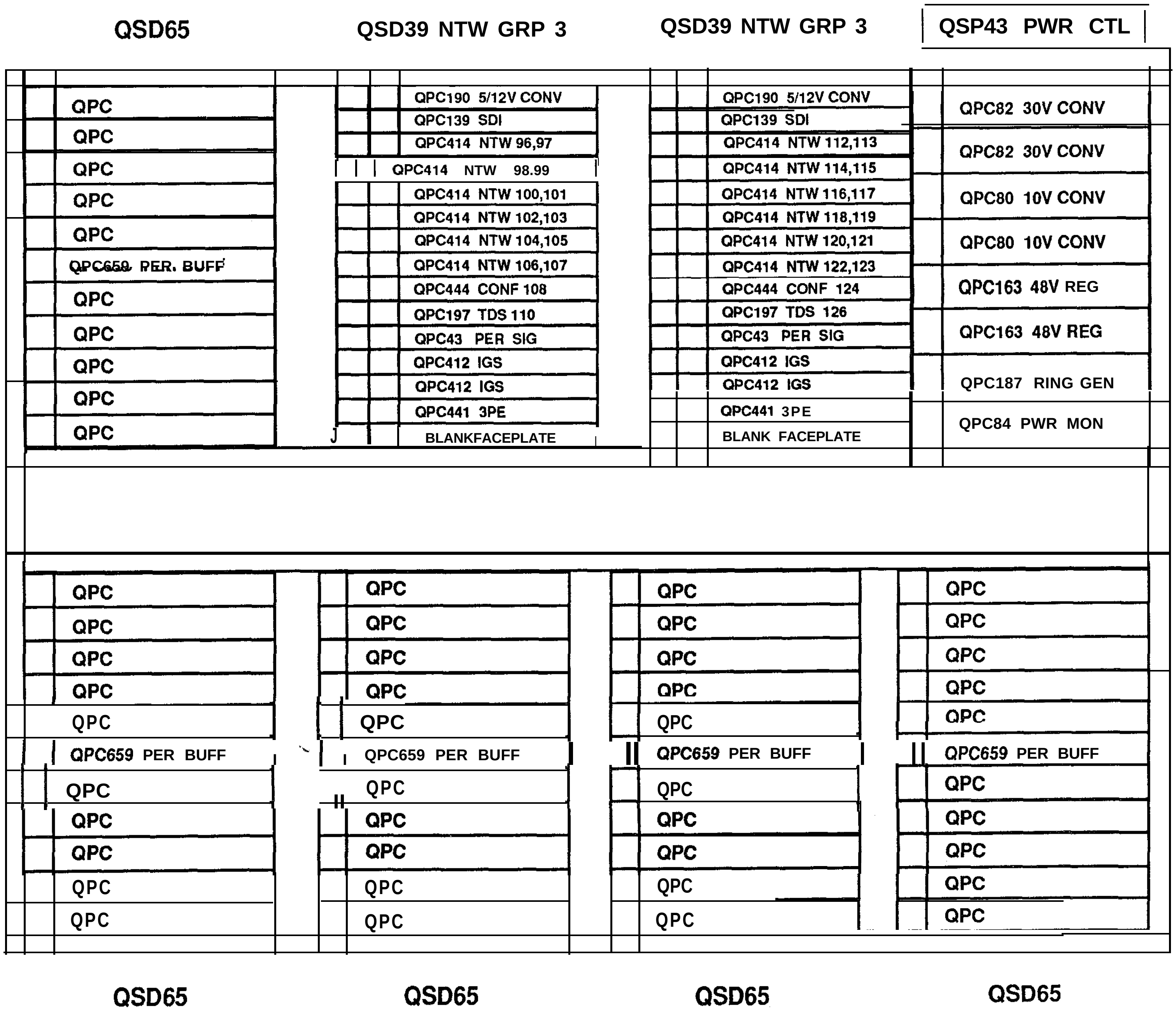


FIGURE 5-42: MERIDIAN SL-1XT QCA108 CABINET - FRONT VIEW

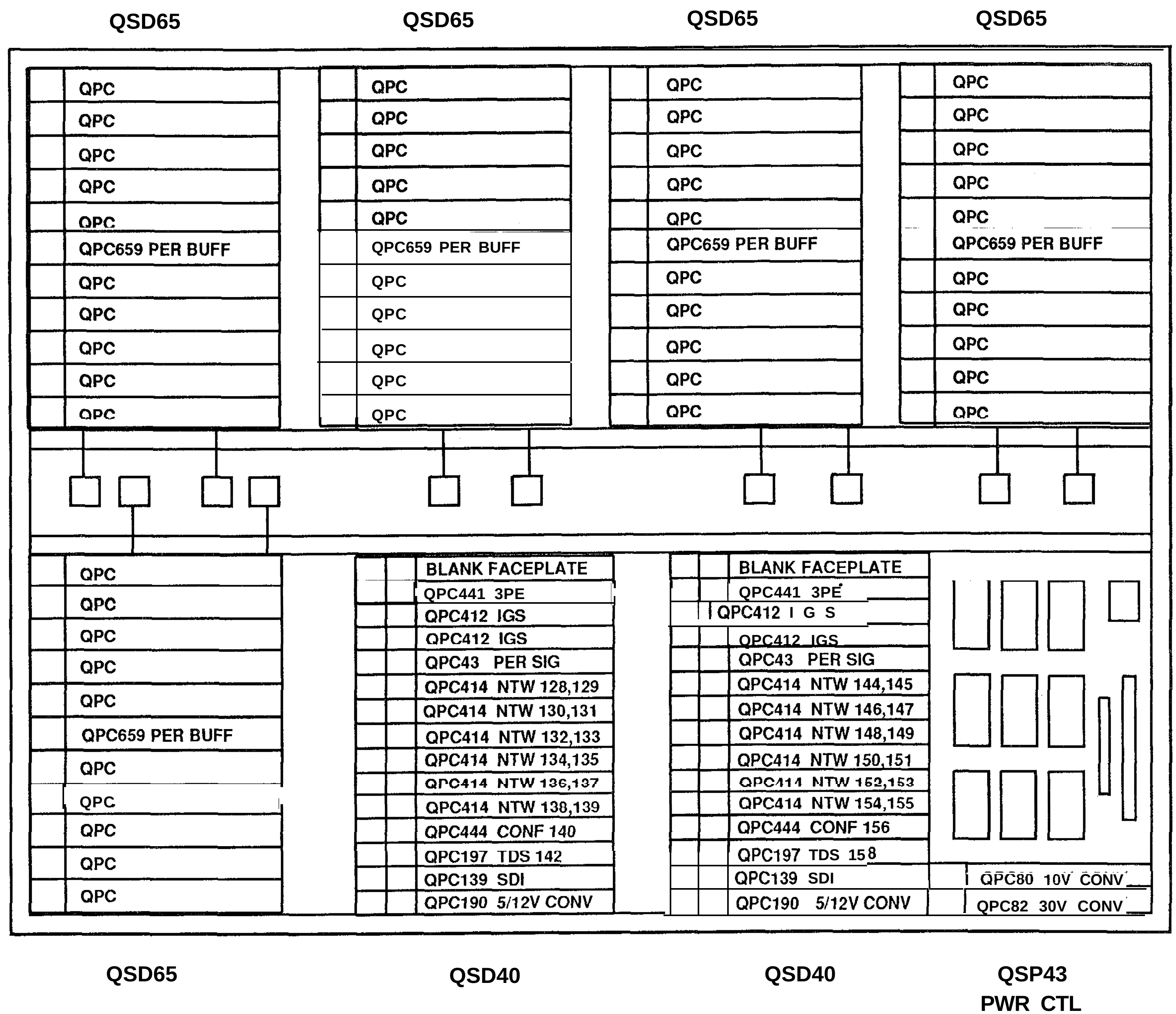


FIGURE 5-43: MERIDIAN SL-1XT QCA108 CABINET - REAR VIEW

- **Software**

  Generic 1211 Release 8 or later supports the business applications of Meridian SL-1XT. The full range of Meridian SL-1 features and services is supported including the use of the Meridian portfolio of digital telephones, Meridian Mail, and Meridian LANSTAR. Generic 1211 Release 9 provides higher density peripheral packaging with the introduction of the 16 port 500/2500 line card. Since network enhancement is an inherent feature of Meridian SL-1XT, then X37, the Hospitality software generic, is not compatible. Thus, the XL system is used for Hotel/Motel applications.

MERIDIAN SL-1ST

Introduction

Meridian SL-1ST sets a new standard for the small PBX market. By means of this system, the comprehensive feature capability of the largest member of the product family (Meridian SL-1XT) is made available to business organizations ranging from 32 to 400 lines. By use of an Expansion Cabinet the customer can expand this range to typically 600 lines.

The ST is built upon the technology and performance criteria that has resulted from over a decade of Meridian SL-1 evolution. It includes the major product developments associated with network enhancement, high density peripheral packaging and reduced common equipment components that have transpired from ongoing technological advances. The full complement of features and services available through the integration of voice and data communications on Meridian SL-1 may now be applied to the small business environment. Meridian SL-1ST is targeted to two specific markets. The branch locations of large businesses needing the networking functionality of ESN, Coordinated Dialing Plan (CDP), Digital Trunk Interface (DTI), and IBM data connectivity for access to headquarters or regional office's IBM host resources. Additionally, the productivity features of Meridian SL-1ST such as ACD, voice messaging, secretarial coverage, and all LANSTAR data connectivity products are supported. The second customer segment addressed by Meridian SL- 1ST is the single location business requiring a PBX capable of serving up to 600 users cost effectively. While networking capabilities are not as important to the single location business, cost control features are vital. Basic Automatic Route Selection (BARS), Call Detail Recording (CDR), Account (Billing) Codes, DISA for remote access, and Multi-level Toll Restriction are cost control and management tools of interest to small businesses.

Features and Benefits

The following key items position the Meridian SL-1ST as the best system available to address the small PBX marketplace, emphasizing superior capabilities in the areas of performance and functionality:

- Serving Range, Growth, and Modularity

- Call Processing Power using Meridian SL-1N Processor and Memory as the Common Control

- Networking Features and Capabilities
  - ESN and NARS
  - Digital Trunk Interface (DTI)
  - Coordinated Dialing Plan (CDP)

- Full Feature Complement via Xl 1 Release 9

  Value Added Services and Messaging
  - ACD with MIS Reports
  - Meridian Mail (Voice Messaging)

  LANSTAR Data Products
  - PC Networking (IBM and Apple)
  - IBM Host Access (3270 and X.25)
  - IBM System/36 Access
  - Modem Pooling
  - Meridian LANSTAR 2.56 MBPS Distribution
  - CPI (DEC VAX)
  - RS-422 Terminal/PC Connectivity

  Voice Terminal Support
  - Analog 500/2500, Unity, and others
  - Hybrid SL-1 sets, Ml 109
  - Digital Telephones and Terminals
    - Meridian M2000 series
    - Meridian M3000 Touchphone
  - Workstations
    - SL-1 Displayphone
    - Displayphone Plus
    - Displayphone 220

  Reliability and Survivability
  - Error Correcting Memory
  - Segmented Bus Networks
  - Battery Backup
  - Software Stability

System Enhancements

The Meridian SL-1ST incorporates a new PE buffer card. The latter has options that allow it to be used with a single network loop interface, and also with two network loop circuits terminated on one PE shelf when traffic requirements dictate. This enhancement allows for full utilization of the available card slots when provisioning for high traffic or non-blocking configurations.

The new buffer card has also been designed to accept an optional plug-in Digitone Receiver (DTR) card, thus eliminating the need for a dedicated PE card slot.

A new 16 port 500/2500 type line card is also introduced with the Meridian SL-1ST. This new card provides facilities for up to 16 500/2500 type terminations on a single card allowing for a reduction in PE shelf requirements and reduced footprint.

Enhancements to the power equipment have also been incorporated into the Meridian SL-1ST. A single power converter card supplies all of the secondary voltages (including message waiting power) to the PE cards that are located on each PE shelf (with the exception of the lower PE shelf in the base unit of the system). In the case of the lower shelf, power conversion equipment located in the base of the unit supplies the necessary secondary voltages as well as the primary voltages required for the entire system. Each converter card supplies sufficient power for all of the voltages required to support any configuration of peripheral equipment located on the shelf.

Hardware

A single 16-bit processor, 64K memory paging format, dual disk drive interface and enhanced network architecture is the foundation of the Meridian SL-1ST.

The equipment is packaged in a small, attractive modular cabinet (suitable for installation in an office environment) that supports from 32 lines to approximately 400 lines and associated trunks (Figure 5-44). The basic system cabinet is a tier that is 32 inches high and contains the Common Equipment (CE), Power Equipment and 10 Peripheral Equipment (PE) card slots. This configuration is known as a single tier system and supports from 32 to approximately 80 lines with associated trunks and an attendant console. Actual upper line sizes will vary depending on the PE density and the type of PE that is configured. Universal card slot technology applies, so that different configurations and densities of existing PE as well as CE utilized by other Meridian SL-1 systems remains compatible with the Meridian SL- 1 ST.

If a larger line size system is required, an expansion tier can be added directly to the top of the basic system tier without increasing the floor space requirements (Figure 5-45). This tier provides 16 additional PE card slots, split into two 8 PE card modules, for a substantial increase in growth. A typical configuration as a result of incorporating the expansion tier would be approximately 240 lines and 36 trunks. The maximum line/trunk combination will vary depending on the density of the peripheral equipment configured.

If an even larger line size is required, an additional duplicate expansion tier can be added directly to the top of the second tier (Figure 5-45). Thus sixteen additional PE card slots are made available to support an upper line size in excess of 400 lines and associated trunks. As stated earlier, the PE configuration will determine the actual upper line size as the system is expanded with additional PE tiers.

As an option, the Meridian SL-1ST second tier can be equipped with a split CE/PE expansion tier that provides additional card slots for the use of Digital Trunk Interface (DTI) equipment, while the balance of the tier provides 8 additional card slots for PE (Figure 5-46).

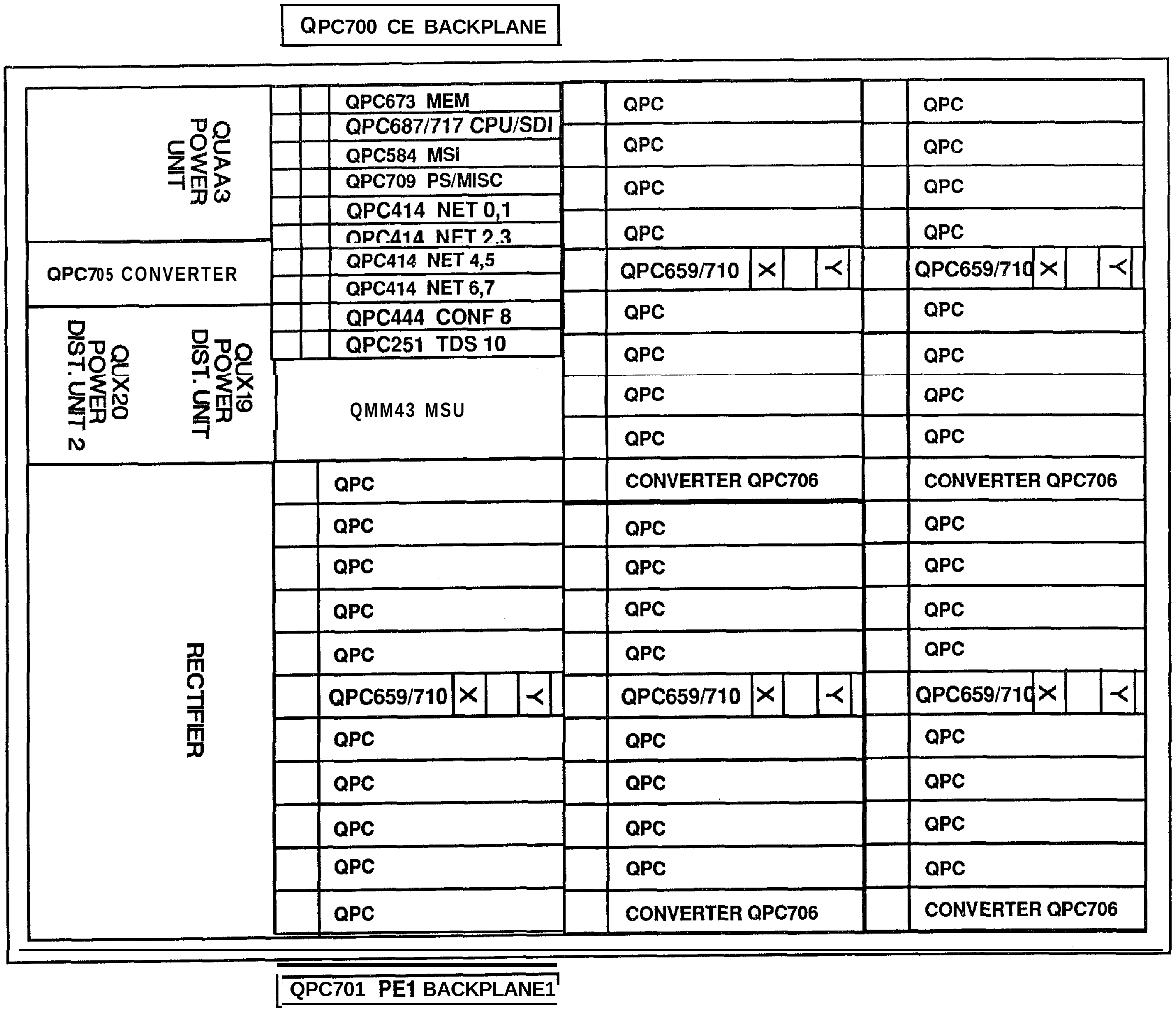
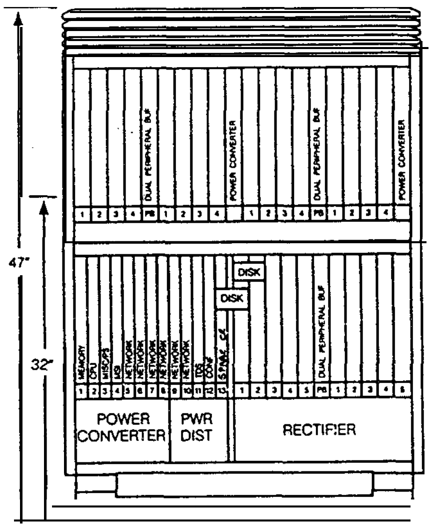
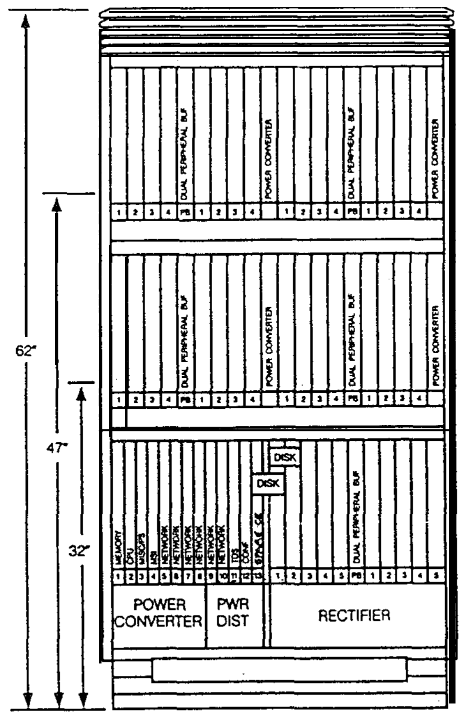


FIGURE 5-44: MERIDIAN SL-1ST QCA136 EQUIPMENT CABINET



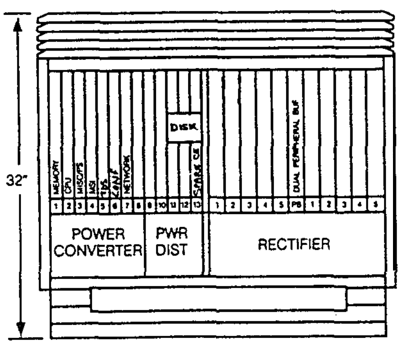
BASIC SYSTEM w/ ADDITIONAL TIER

- CE Module
- 3 PE Modules
  - 26 PE Card Slots



BASIC SYSTEM w/TWO ADDITIONAL TIERS

- CE Module
- 5 PE Modules
  - 42 PE Card Slots



BASIC SYSTEM

- CE Module
- PE Module
  - 10 PE Card Slots

FIGURE 5-45: MERIDIAN SL-1ST INITIAL CABINET CONFIGURATIONS

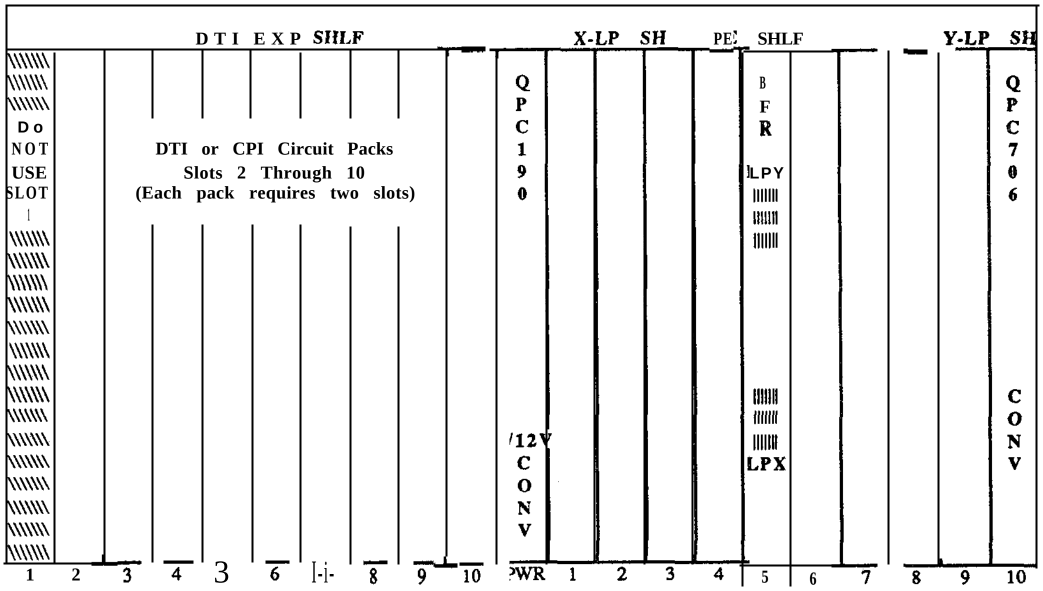


FIGURE 5-46: MERIDIAN SL-1ST/RT QSD73 CE EXPANSION SHELF

Another enhancement is the introduction of an RPE shelf for the Meridian SL-1ST. With this introduction, the packaging concept of the Meridian SL-1ST can also be used at either the local or remote site in RPE applications for other Meridian SL-1 system models. Thus, the remote site may be served by a cabinet with a footprint of only 4 square feet located in a normal office environment. The base RPE cabinet is equipped with an associated carrier shelf plus 10 slots of PE capacity which can be expanded with another RPE shelf or additional PE (Figure 5-47).

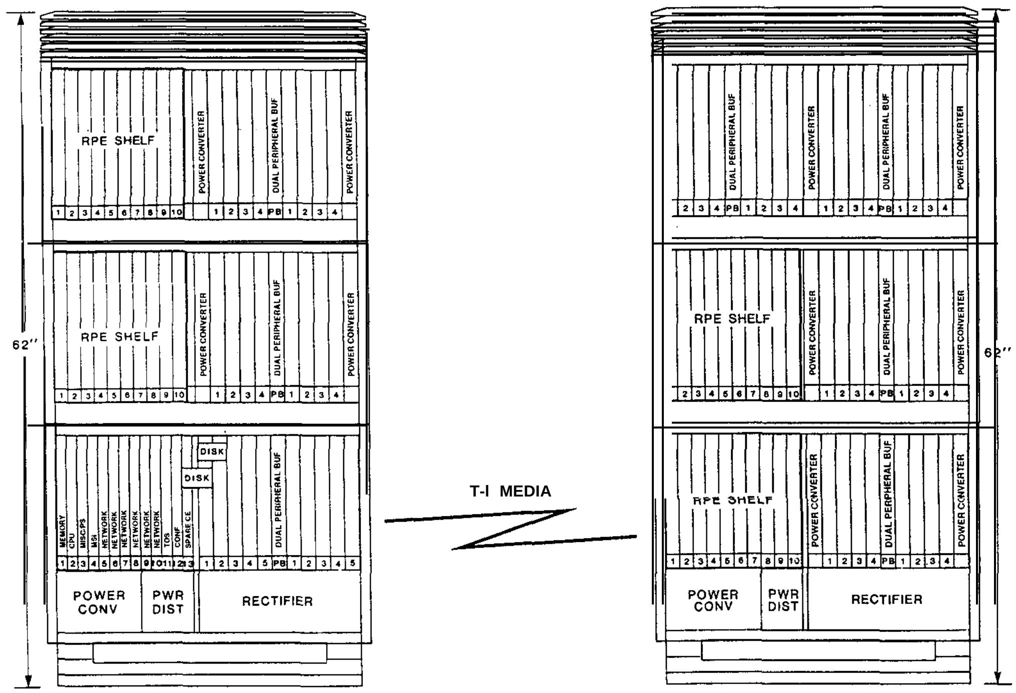


FIGURE 5-47: MERIDIAN SL-1ST - TYPICAL RPE CONFIGURATION

In addition, a PE expansion cabinet, identical in construction to the initial system cabinet but with no common equipment, extends the range of Meridian SL- 1ST to typically 600 lines plus associated trunks. Peripheral Expansion tiers may be added to the base in the same manner as described previously (Figure 5-48).

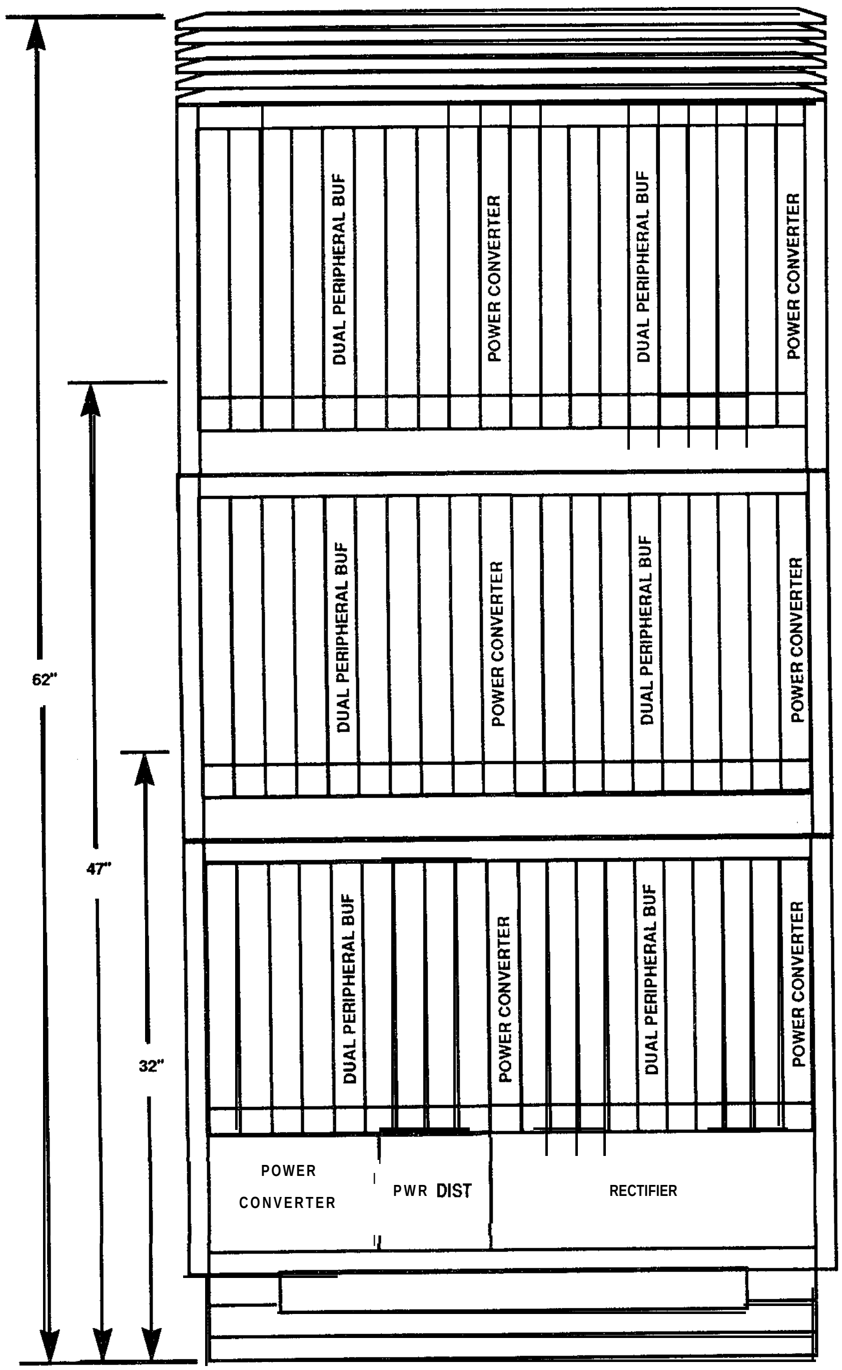


FIGURE 5-48: MERIDIAN SL-1ST/RT PE EXPANSION CABINET

A number of new product advancements are introduced with the Meridian SL-1ST, including new common equipment, peripheral equipment, and power equipment as follows:

Common Equipment

- Central Processing Unit (QPC687)
  - This new card uses the same powerful processor as the Meridian SL-1N system. A Serial Data Interface (SDI) port has been added to the card which, when added to the spare CE card slot that can accommodate an SDI card, allows for 3 SDI ports without infringing on network card slots.
- Memory Card (QPC673)
  - The Meridian SL-1ST provides 512K (1024 bytes) (Xl 1 Release 12 or later) of error correcting memory. This amount of memory capacity coupled with the new CPU means that a full feature complement is now available to the small line size system. Close inspection will show that all of the capacity and functionality of the single CPU, half-network group Meridian SL-1N system has been built into the Meridian SL- 1 ST.
- Memory Card (Optional) (QPC8 14)
  - This optional memory card provides 768K (1536K bytes) (Xl 1 Release 12 or later) of error correcting memory.
- Miscellaneous/Peripheral Signaling Card (QPC709)
  - The Miscellaneous Register and the Peripheral Signaling functions are combined in a single circuit card. The result is a spare CE card slot that can be used for additional SDI ports.

Peripheral Equipment

- 16 Port 500/2500 Line Card (QPC594)
  - Sixteen line port terminations are available on a single PE card to substantially increase the PE density and reduce the associated hardware packaging requirements.
- Dual Loop Peripheral Equipment Buffer Card (QPC659)
  - A new peripheral buffer card provides the network interface for a single PE shelf or daisy-chain to two PE shelves. However, a major enhancement has been added. The new buffer can now be used to interface a network loop to one-half of a shelf and a second network loop to the other half. In high traffic applications where only 4 cards are interfaced to a network loop, this new capability allows all of the PE card slots to be fully utilized.

- Digitone Receiver Card (QPC7 10)
  - The Digitone Receiver (DTR) is packaged as a daughterboard that mounts as an option on the Dual Loop Buffer (QPC659). Two DTR circuits are provided on each card and configured in the software as PE card position 10.

    Thus, when the QPC710 is utilized on the base tier, the buffer cannot be set to the single loop mode (10 card slots). It must be configured in the dual loop mode (two sets of five card slots). If single loop operation is required, the QPC710 is not used and the QPC574 digitone receivers are configured instead. There are no restrictions on the expansion tier buffers since these are always 8 card PE shelves.

Power Equipment

- Power Converter Unit (QUAA3)
  - Provides all non-optional secondary voltages for the basic system tier in a single unit.
- 30V/150V Power Converter Card (QPC705)
  - Provides optional 30V and 150V secondary voltages for the basic system tier. This unit is required if proprietary telephone sets or message waiting sets are configured in the first tier.
- Power Distribution Unit (QUX19)
  - Provides power distribution to the CE and PE in the basic system tier.
- Power Distribution Unit (QUX20) - Optional
  - Provides power distribution to additional expansion tiers.
- Secondary Voltage Converter Card (QPC706)
  - Resides on each PE module of the expansion tiers. Each card converts 48V to all of the secondary voltages required to operate 8 PE card slots.
- Power Rectifier (QRF12)
  - Converts 50 Hz or 60 Hz, 115V or 208V commercial power to -52.08V (nominal).
- Reserve Power Supply (QBL24)
  - The QBL24 unit provides optional battery back-up supply to the system. Each QBL24 is equipped with fusing and distribution equipment as well as 23 individual battery cells.
  - Additional battery units may be added if extended battery supply time is required.

- Each QBL24 provides from 0.5 to 2 hours reserve power depending on the system drain. If extended reserve power is required, a QBL15 Battery Distribution Unit and associated battery string may be configured.

- Cooling Unit (QUD24)
  - Two QUD24 units are equipped in the top section of the third tier of a 3-tier system in order to ensure a proper system operating temperature.

Software

The Meridian SL-1ST is supported on software Generic 1011, Release 9. This software release incorporates all the features currently available on all previous releases of Xl 1, bringing additional features to smaller line size organizations.

The same prepackaged software database offering for the Meridian SL-1S is also available for the Meridian SL- 1 ST and may be ordered where required.

MERIDIAN SL-1RT

Introduction

The Meridian SL- 1RT is the superior PBX for small and medium-sized organizations requiring the ultimate reliability of dual common equipment. All components in the Meridian SL-1RT are identical to those of the Meridian SL-1XT and Meridian SL-1NT, but at a system capacity of 50-600 lines.

The RT is built upon the technology and performance criteria that has resulted from over a decade of Meridian SL-1 evolution. It includes the major product developments associated with network enhancement, high density peripheral packaging and dual common equipment components that have transpired from ongoing technological advances. The full complement of features and services available through the integration of voice and data communications on Meridian SL-1 may now be applied to the small business environment. Meridian SL-1RT is perfect for organizations requiring ultimate reliability. The need is primarily reflected in specific vertical markets such as health care, state, federal, and local governments, utilities, and military installations. Meridian SL-1RT also meets the needs of the branch locations of large businesses needing the networking functionality of ESN, Coordinated Dialing Plan (CDP), Digital Trunk Interface (DTI), and IBM data connectivity for access to headquarters or regional office's IBM host resources. Additionally, the productivity features of Meridian SL-1RT such as ACD, voice messaging, secretarial coverage, and all LANSTAR data connectivity products are supported. Also addressed by Meridian SL-1RT is the single location business requiring a PBX capable of serving up to 600 users cost effectively with complete reliability. While networking capabilities are not as important to the single location business, cost control features are vital. Basic Automatic Route Selection (BARS), Call Detail Recording (CDR), Account (Billing) Codes, DISA for remote access, and Multi-level Toll Restriction are cost control and management tools of interest to small businesses.

Features and Benefits

The following key items position the Meridian SL-1RT as the best system available to address the small PBX marketplace, emphasizing superior capabilities in the areas of performance and functionality and reliability:

- Dual Common Equipment
- Serving Range, Growth, and Modularity
- Call Processing Power using Meridian SL-1NT/XT Processor and Memory as the Common Control
- Networking Features and Capabilities
  - ESN and NARS
  - Digital Trunk Interface (DTI)
  - Coordinated Dialing Plan (CDP)
- Full Feature Complement via Xl 1 Release 9
- Value Added Services and Messaging
  - ACD with MIS Reports
  - Meridian Mail (Voice Messaging)
- LANSTAR Data Products
  - PC Networking (IBM and Apple)
  - Modem Pooling
  - Meridian LANSTAR 2.56 MBPS Distribution
  - CPI (DEC VAX)
  - RS-422 Terminal/PC Connectivity
- Voice Terminal Support
  - Analog 500/2500, Unity, and others
  - Hybrid SL-1 sets, Ml 109
  - Digital Telephones and Terminals
    - Meridian M2000 series
    - Meridian M3000 Touchphone
  - Workstations
    - Displayphone 220
- Reliability and Survivability
  - Segmented Bus Networks
  - Battery Backup
  - Software Stability

System Enhancements

The redundant common equipment of the Meridian SL-1RT offers small and medium-sized organizations the reliability of a large system with the economical price and compact size of a small system.

The Meridian SL-1RT incorporates the new PE buffer card introduced with the Meridian SL-1ST. The latter has options that allow it to be used with a single network loop interface, and also with two network loop circuits terminated on one PE shelf when traffic requirements dictate. This enhancement allows for full utilization of the available card slots when provisioning for high traffic or non-blocking configurations.

The new buffer card has also been designed to accept an optional plug-in Digitone Receiver (DTR) card, thus eliminating the need for a dedicated PE card slot.

The 16 port 500/2500 type line card is also available with the Meridian SL- 1RT. This card provides facilities for up to 16 500/2500 type terminations on a single card allowing for a reduction in PE shelf requirements and reduced footprint.

Enhancements to the power equipment have also been incorporated into the Meridian SL- 1RT. A single power converter card supplies all of the secondary voltages (including message waiting power) to the PE cards that are located on each PE shelf. Each converter card supplies sufficient power for all of the voltages required to support any configuration of peripheral equipment located on the shelf.

Hardware

A 24-bit CPU with 768K RAM memory - both redundant, dual disk drive interface and enhanced network architecture is the foundation of the Meridian SL- 1RT.

Close inspection of the new Meridian SL-1RT will show that it is actually a one-half network group SL-1NT in a small system cabinet. It uses the same processor as the SL-1NT, with the same dynamically allocated memory. Meridian SL-1RT has all the power of the large system in a small system package.

This system grows modularly, exactly like the Meridian SL-1ST. All of the growth modules presently available with the Meridian SL- 1ST work with the new Meridian SL- 1RT. The same PE expansion tiers, DTI expansion tiers, RPE carrier tiers, and even expansion cabinets are needed. On this system, you can have up to two expansion cabinets. The Meridian SL-1RT is a small line size system with a competitive price and the ability to grow as demanded.

This new product offering includes an upgrade package so that today's Meridian SL-1STs with C vintage or later cabinets can be upgraded to Meridian SL-1RTs. Organizations who initially are satisfied with the single CPU and memory of the Meridian SL-1ST can upgrade to the Meridian SL-1RT when the need for added reliability arises.

Meridian SL-1RT

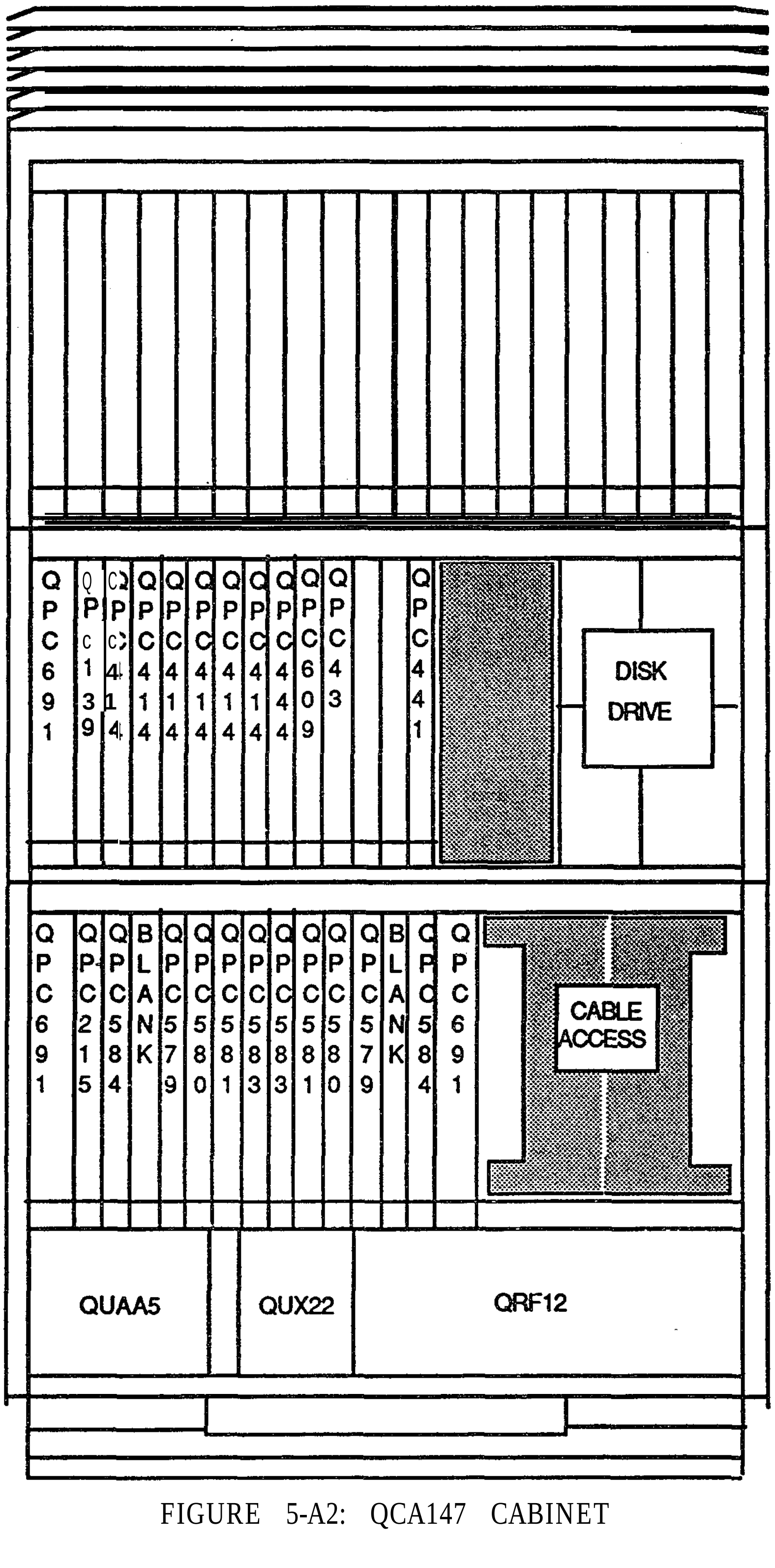


FIGURE 5-A2: QCA147 CABINET

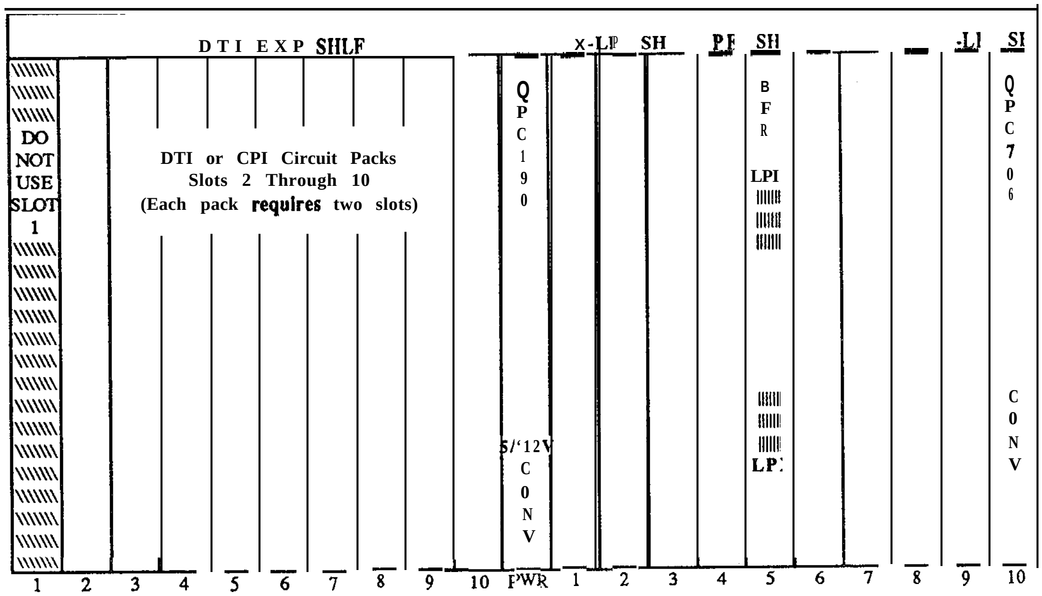


FIGURE 5-A3: MERIDIAN SL-1ST/RT QSD73 CE EXPANSION SHELF

Another enhancement is the RPE shelf for the Meridian SL- 1RT. With this, the packaging concept of the Meridian SL-1RT can also be used at either the local or remote site in RPE applications for other Meridian SL-1 system models. Thus, the remote site may be served by a cabinet with a footprint of only 4 square feet located in a normal office environment. The base RPE cabinet is equipped with an associated carrier shelf plus 10 slots of PE capacity which can be expanded with another RPE shelf or additional PE (Figure 5-A4).

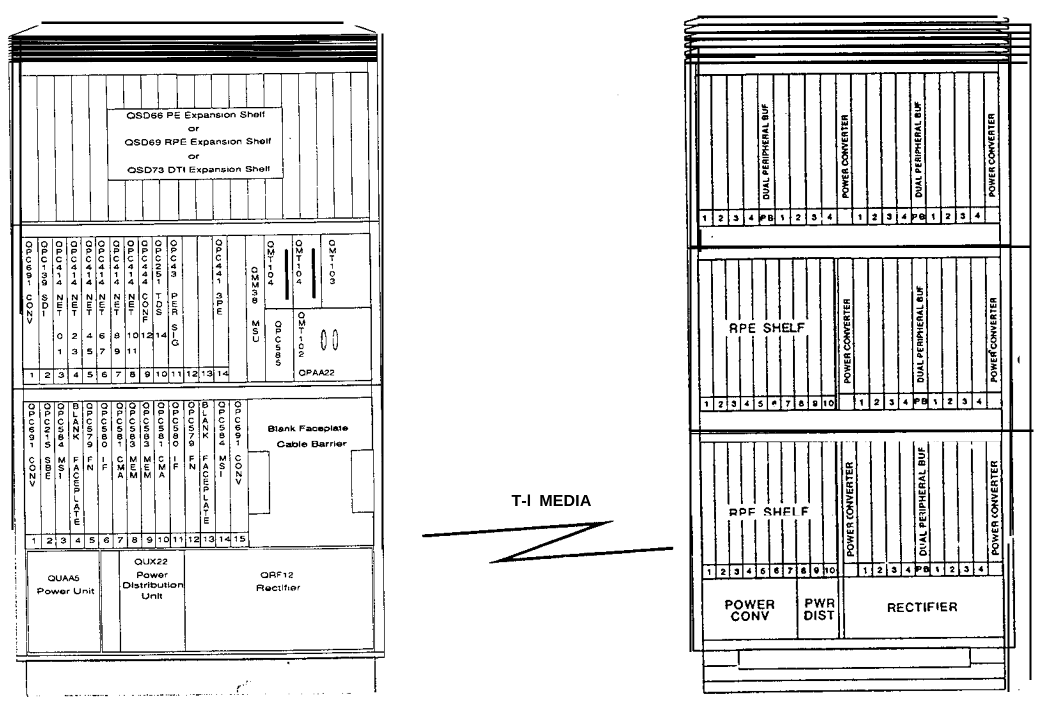


FIGURE 5-A4: MERIDIAN SL-1ST/RT - TYPICAL RPE CONFIGURATION

In addition, a PE expansion cabinet, identical in construction to the initial system cabinet but with no common equipment, extends the range of Meridian SL- 1RT to typically 600 lines plus associated trunks. Peripheral Expansion tiers may be added to the base in the same manner as described previously (Figure 5-A5).

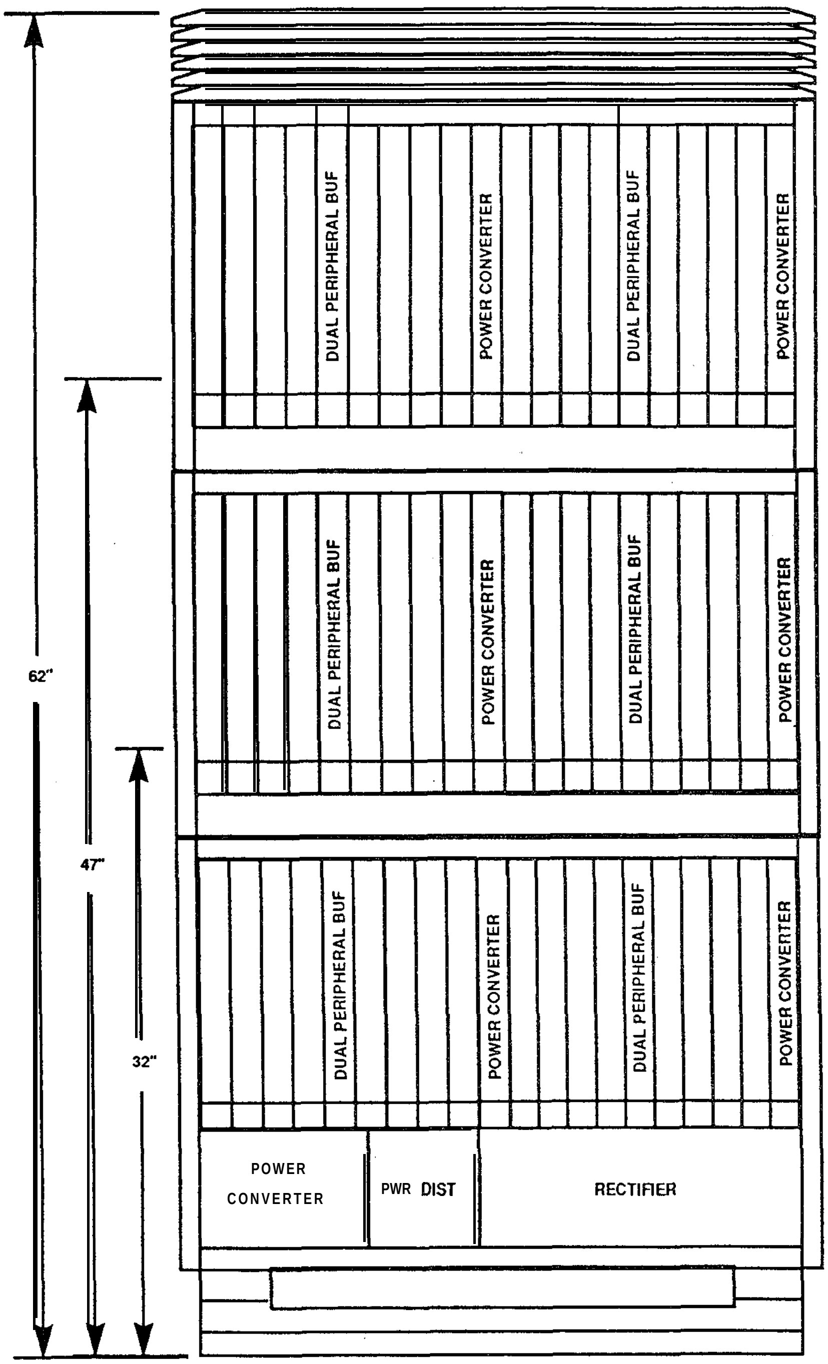


FIGURE 5-A5: MERIDIAN SL- 1 ST/RT PE EXPANSION CABINET

A number of new product advancements are introduced with the Meridian SL- 1RT, including new common equipment, peripheral equipment, and power equipment as follows:

Common Equipment

- Common Equipment Shelf (QSD76)

  - The Meridian SL-1RT utilizes a Common Equipment shelf that is electrically isolated to provide complete redundancy of the circuit cards located in each half. The shelf accommodates two CPUs and 768K duplicate memory. The new processor consists of two cards (QPC579 and QPC580) that are always provided in duplicate as a standard dual CPU configuration. The new memory card (QPC583) provides 768K words (24 bits plus parity), using 256K RAM chips. The memory is fully duplicated and is flexibly allocated to any of the system data stores on an as-needed basis. This means that the Program Store, Protected Data Store, Unprotected Data Store, and Call Registers have no specific size limitations (subject to the overall memory available). An interface card (QPC584) provides cable connectivity from each CPU to the Mass Storage Sub-System and includes a LED display to facilitate administration and maintenance functions. The CMA (QPC581) controls access from each CPU to each redundant memory bank.

- Miscellaneous/Peripheral Signaling Card (QPC43)

  - The Miscellaneous Register and the Peripheral Signaling functions are combined in a single circuit card. The result is a spare CE card slot that can be used for additional SDI ports.

Peripheral Equipment

- 16 Port 500/2500 Line Card (QPC594)

  - Sixteen line port terminations are available on a single PE card to substantially increase the PE density and reduce the associated hardware packaging requirements.

- Dual Loop Peripheral Equipment Buffer Card (QPC659)

  - A new peripheral buffer card provides the network interface for a single PE shelf or daisy-chain to two PE shelves. However, a major enhancement has been added. The new buffer can now be used to interface a network loop to one-half of a shelf and a second network loop to the other half. In high traffic applications where only 4 cards are interfaced to a network loop, this new capability allows all of the PE card slots to be fully utilized.

- Digitone Receiver Card (QPC7 10)

  - The Digitone Receiver (DTR) is packaged as a daughterboard that mounts as an option on the Dual Loop Buffer (QPC659). Two DTR circuits are provided on each card and configured in the software as PE card position 10.

    Thus, when the QPC710 is utilized on the base tier, the buffer cannot be set to the single loop mode (10 card slots). It must be configured in the dual loop mode (two sets of five card slots). If single loop operation is required, the QPC710 is not used and the QPC574 digitone receivers are configured instead. There are no restrictions on the expansion tier buffers since these are always 8 card PE shelves.

Power Equipment

- Power Converter Unit (QUAA5)
  - Provides all non-optional secondary voltages for the basic system tier in a single unit.
- 30V/150V Power Converter Card (QPC706)
  - Provides optional 30V and 150V secondary voltages for the basic system tier. This unit is required if proprietary telephone sets or message waiting sets are configured in the first tier.
- Power Distribution Unit (QUX22)
  - Provides power distribution to the CE and PE in the basic system tier.
- Power Distribution Unit (QUX20) - Optional
  - Provides power distribution to additional expansion tiers.
- Secondary Voltage Converter Card (QPC706)
  - Resides on each PE module of the expansion tiers. Each card converts 48V to all of the secondary voltages required to operate 8 PE card slots.
- Power Rectifier (QRF12)
  - Converts 50 Hz or 60 Hz, 115V or 208V commercial power to -52.08V (nominal).
- Reserve Power Supply (QBL24)
  - The QBL24 unit provides optional battery back-up supply to the system. Each QBL24 is equipped with fusing and distribution equipment as well as 23 individual battery cells.
  - Additional battery units may be added if extended battery supply time is required.
  - Each QBL24 provides from 0.5 to 2 hours reserve power depending on the system drain. If extended reserve power is required, a QBL15 Battery Distribution Unit and associated battery string may be configured.
- Cooling Unit (QUD24)
  - Two QUD24 units are equipped in the top section of the third tier of a 3-tier system in order to ensure a proper system operating temperature.

Software

The Meridian SL-1RT is supported on software Generic 13 11, Release 10. This software release incorporates all the features currently available on all previous releases of Xl 1, bringing additional features to smaller line size organizations.

Meridian SL-1RT prepackaged software, which offers a variety of options for the RT, is available for ordering.

Peripheral Equipment

The Peripheral Equipment (PE) contains the interface circuit cards that connect to the wide array of voice and data terminals utilized in the user environment. Adaptability of the same PE cards across all members of the Meridian SL-1 family provides significant benefits in terms of sparing and inventory requirements. This readily facilitates expansion from one model type to another since existing peripheral equipment is always retained in place.

The peripheral equipment shelf adopts a universal concept that permits any mix of interface cards to be located in each of the ten slot positions available. The PE shelves are housed in equipment cabinets that are configured for the most optimum packaging of system components. Thus, in the Meridian SL-1S, MS, N, ST, RT, and NT both common and peripheral equipment are contained in the initial equipment cabinet.

A dedicated PE cabinet, designated QCA74, may be used for peripheral requirements on models MS, N, NT, XN and XT of Meridian SL-1. The front layout (Figure 5-49) shows the allocation of the left-hand mount (QSP36) and right-hand mount (QSP35) PE shelves. A universal PE shelf (QSD64) may also be used in lieu of the QSP35 and QSP36. Each PE shelf contains a QPC464 Peripheral Buffer which is cabled directly from its faceplate to that of an allocated network loop. The circuits allocated on the peripheral shelf contend for the thirty time slots available on the network loop. For low traffic applications, two PE shelves can be connected together by means of a faceplate cable between their respective peripheral buffers. Figure 5-50 details the card positions of the peripheral shelves.

A peripheral enhancement, introduced with the Meridian SL-1ST, is also available on the N, RT, NT, and XT models. It consists of a dual-loop buffer (QPC659) which supports a network loop connection to each half of the associated peripheral shelf (QSD65). This arrangement is used to facilitate high traffic applications and avoids the need to designate unusable shelf space to otherwise accomplish this (Figure 5-5 1).

Since power is centralized in its own cabinet on the Meridian SL-1XN and XT, the space vacated by the QRF8 can accommodate two peripheral shelves (front and rear) for a total of fourteen maximum (Figure 5-52). However, installation of the QSY22 is done so at the expense of a PE shelf location.

The rear of the QCA74 PE cabinet is a mirror image of the front layout. Each QCA74 contains a QSP44 power control shelf to accommodate the various circuit cards that convert the -48 volt primary power to the required voltage levels for the interface cards. A typical power control shelf is shown in Figure 5-53.

When used on the Meridian SL-1MS, N, or NT, the QCA74 contains a QRF8 48V Rectifier. The latter is centrally mounted, and along with the power control shelf, utilizes two PE shelf positions (front and rear). A QSY22 Power Supply may be located behind the QRF8 when it is necessary to light message waiting lamps on associated single line telephones. Thus, a maximum of twelve PE shelves - six front and six rear - can be accommodated with this arrangement of the QCA74.

If Remote Peripheral Equipment (RPE) is equipped, each RPE carrier shelf (QSD6 or QSD1 1) is centrally mounted in lieu of two back-to-back PE shelves (QSD64, QSD65, or QSP35/36). An alternative arrangement for RPE is to use the packaging concept of Meridian SL-1ST/RT (Figure 5-54) at the remote location.

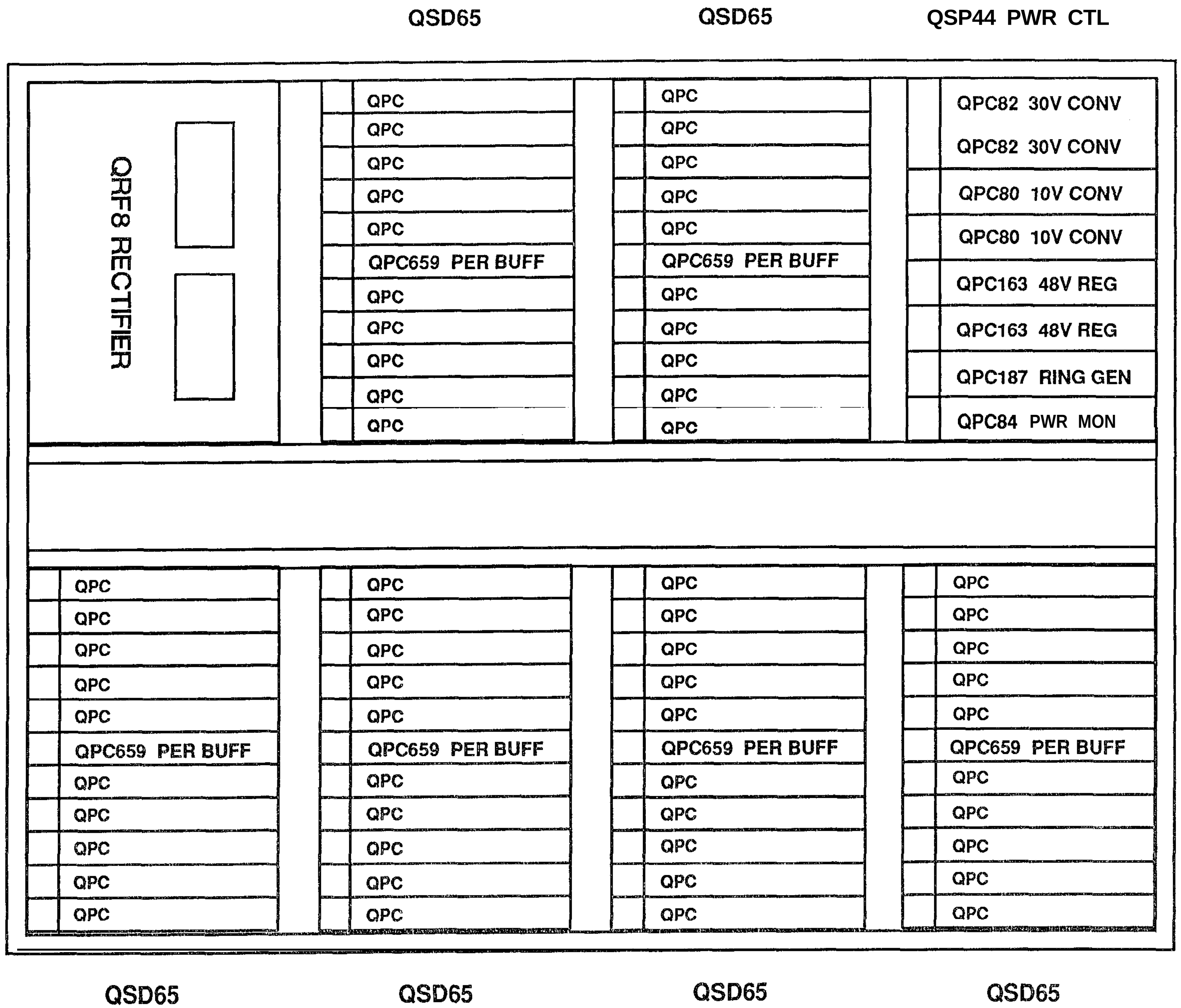


FIGURE 5-49- QCA74 PE EXPANSION CABINET - FRONT VIEW

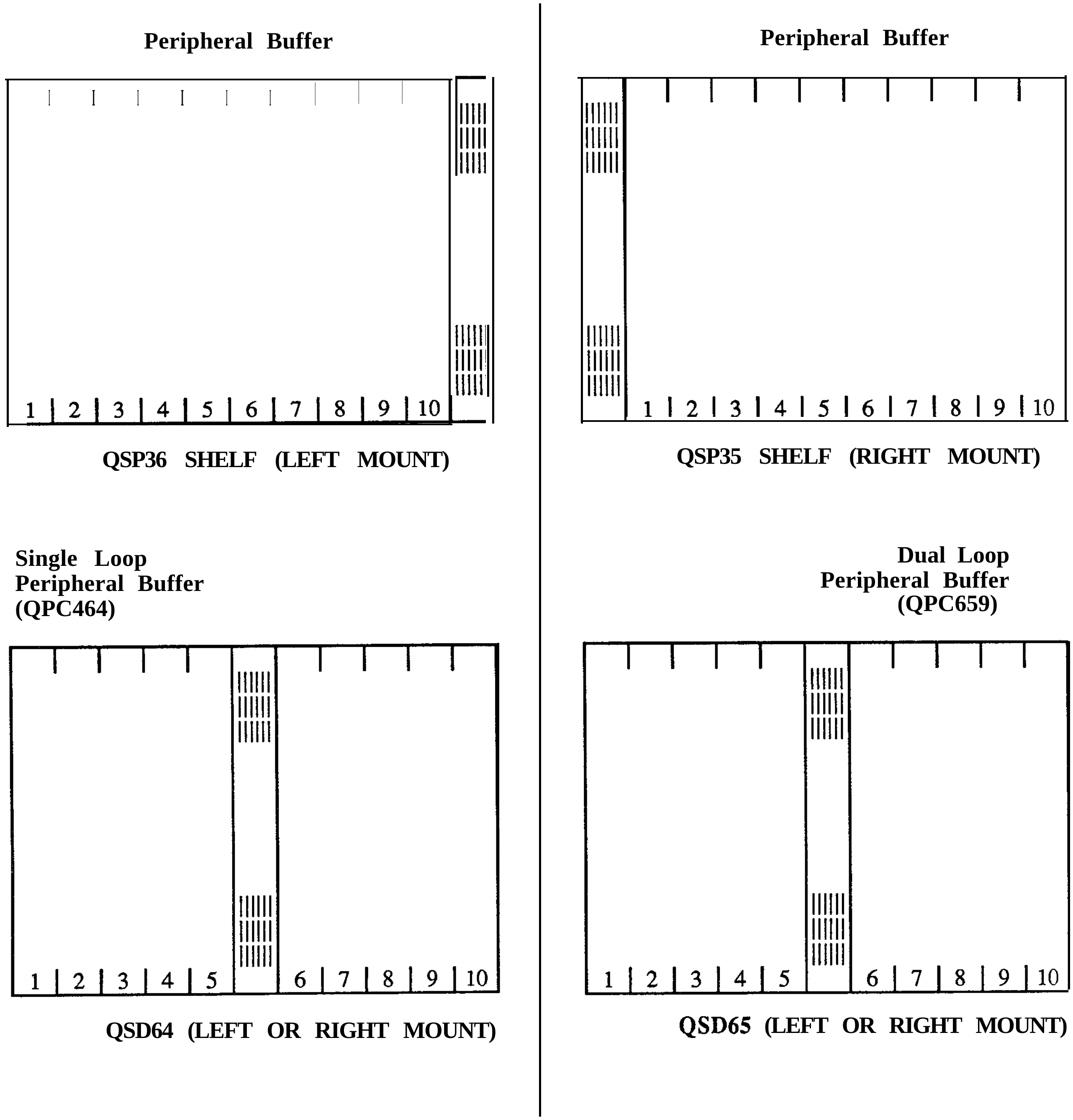


FIGURE 5-50: PERIPHERAL EQUIPMENT SHELF ARRANGEMENTS

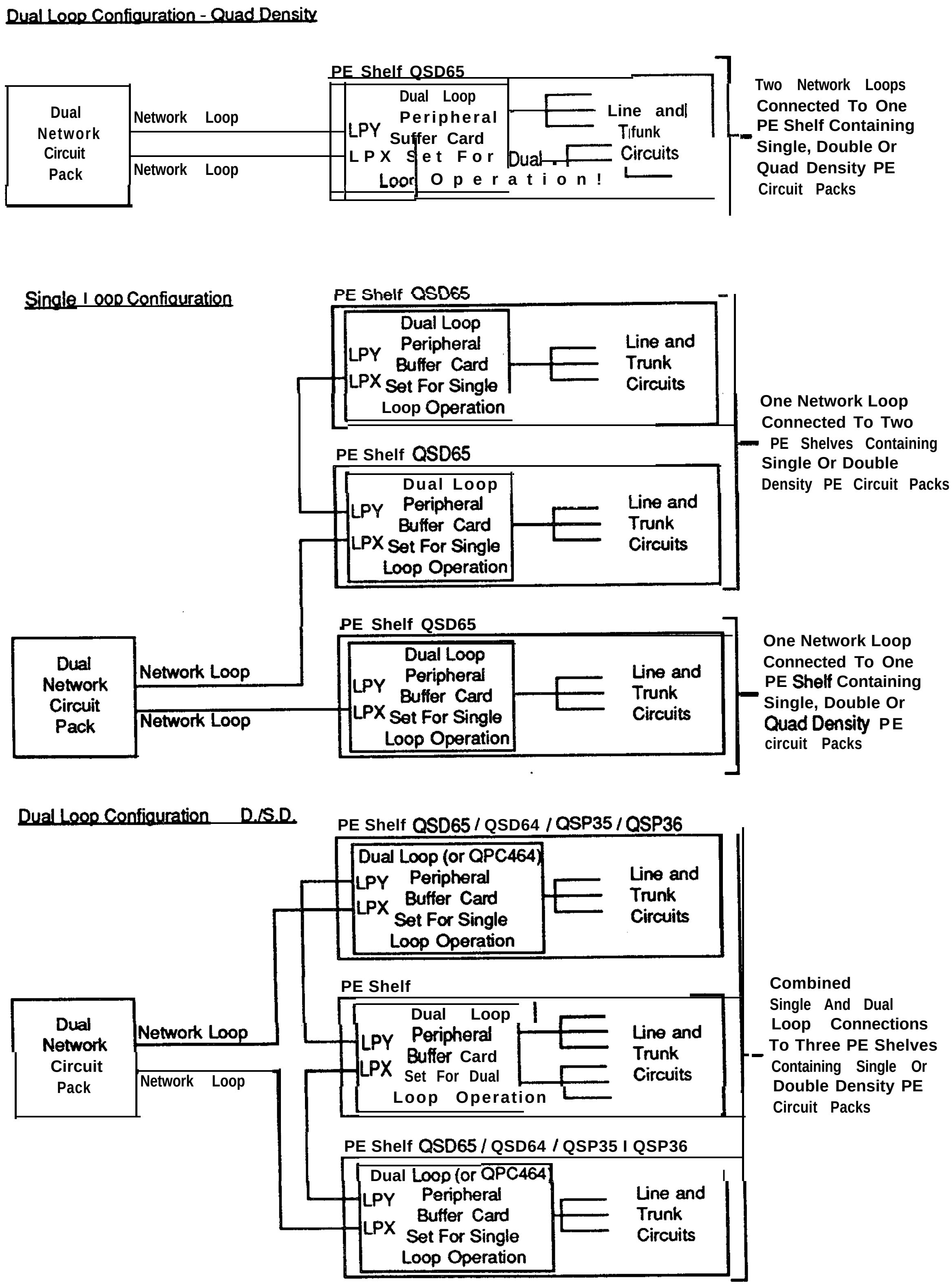


FIGURE 5-5 1: NETWORK - PE SHELF ORGANIZATION

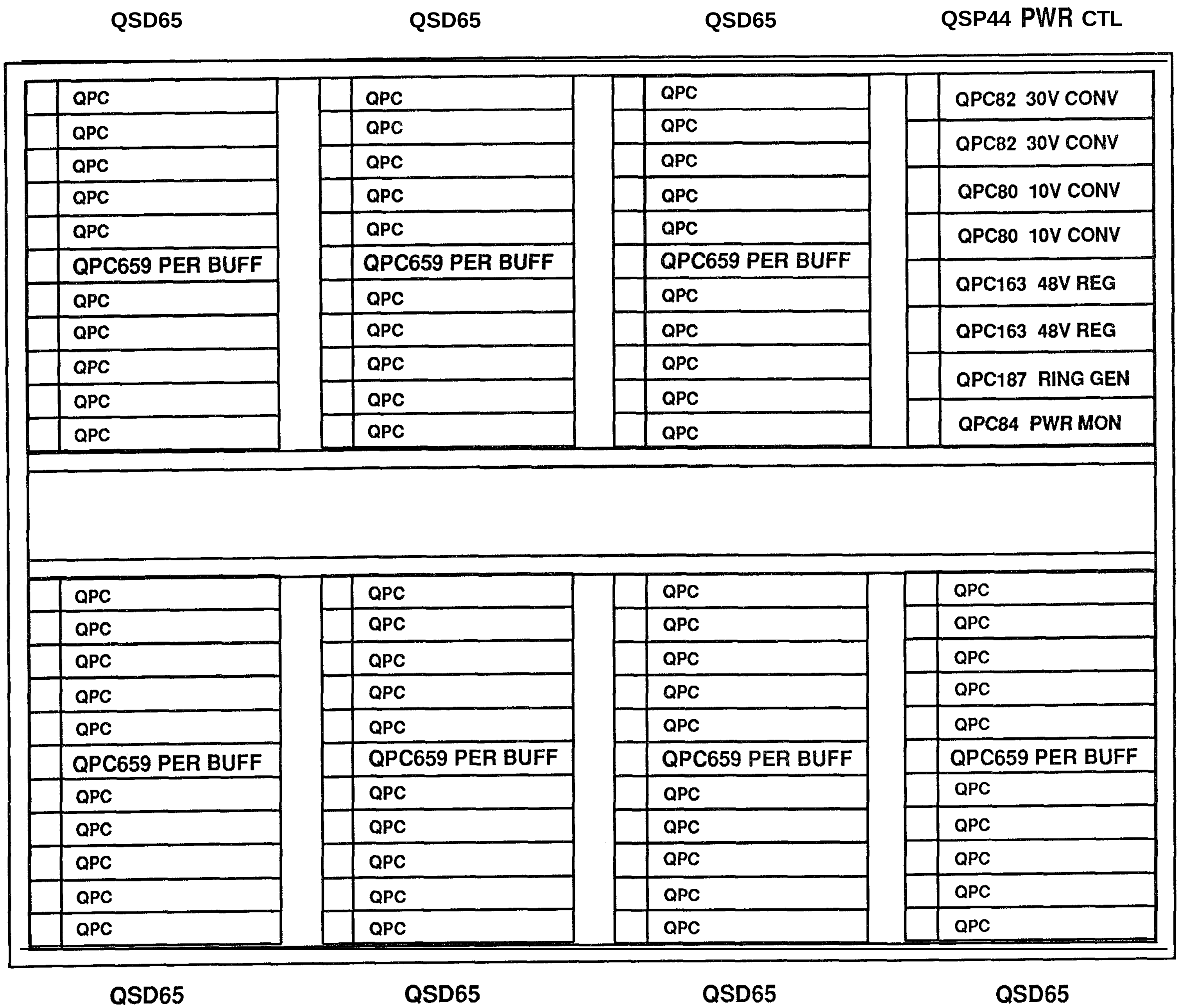


FIGURE 5-52: QCA74 PE EXPANSION CABINET - XN/XT

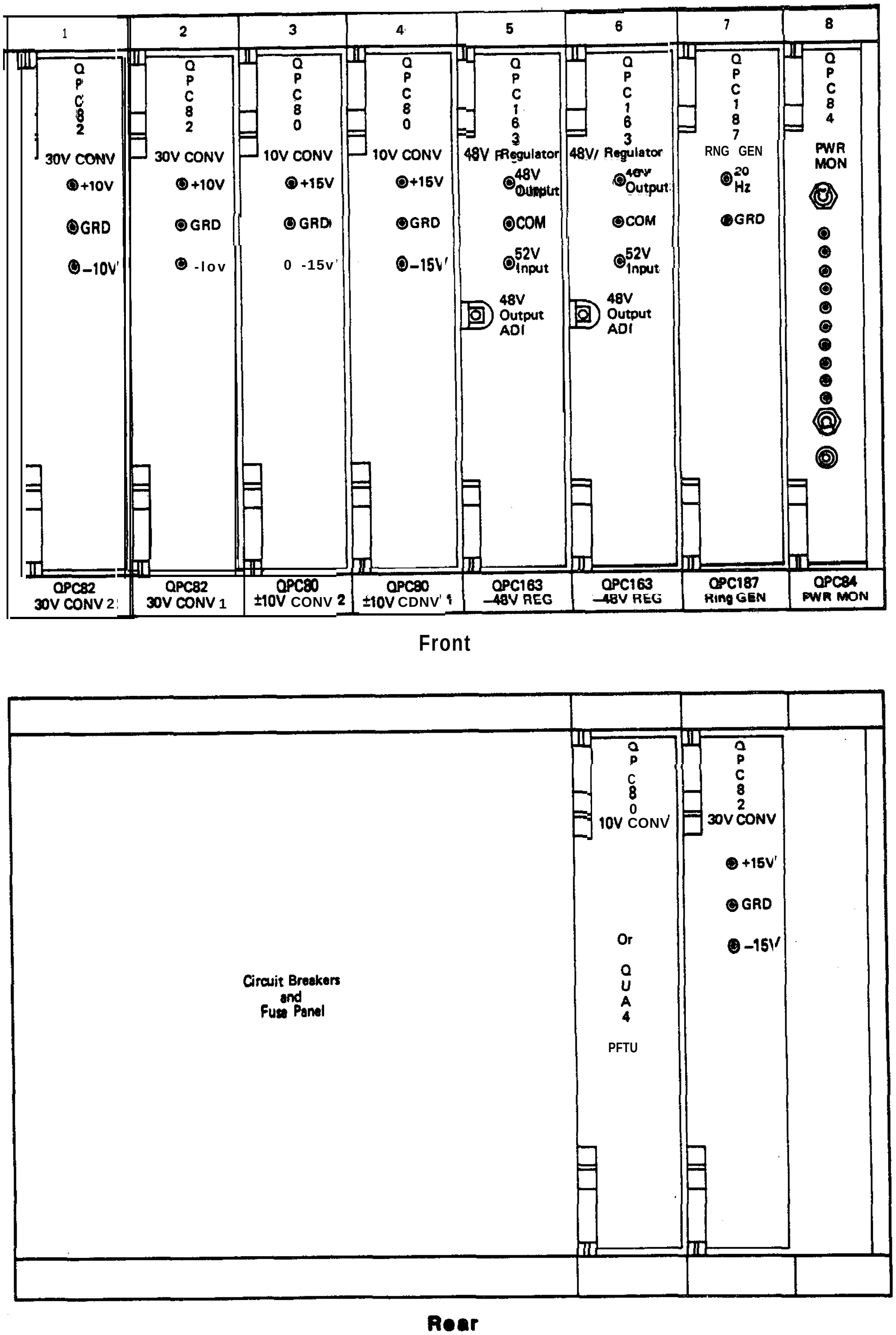


FIGURE 5-53: TYPICAL POWER CONTROL SHELF

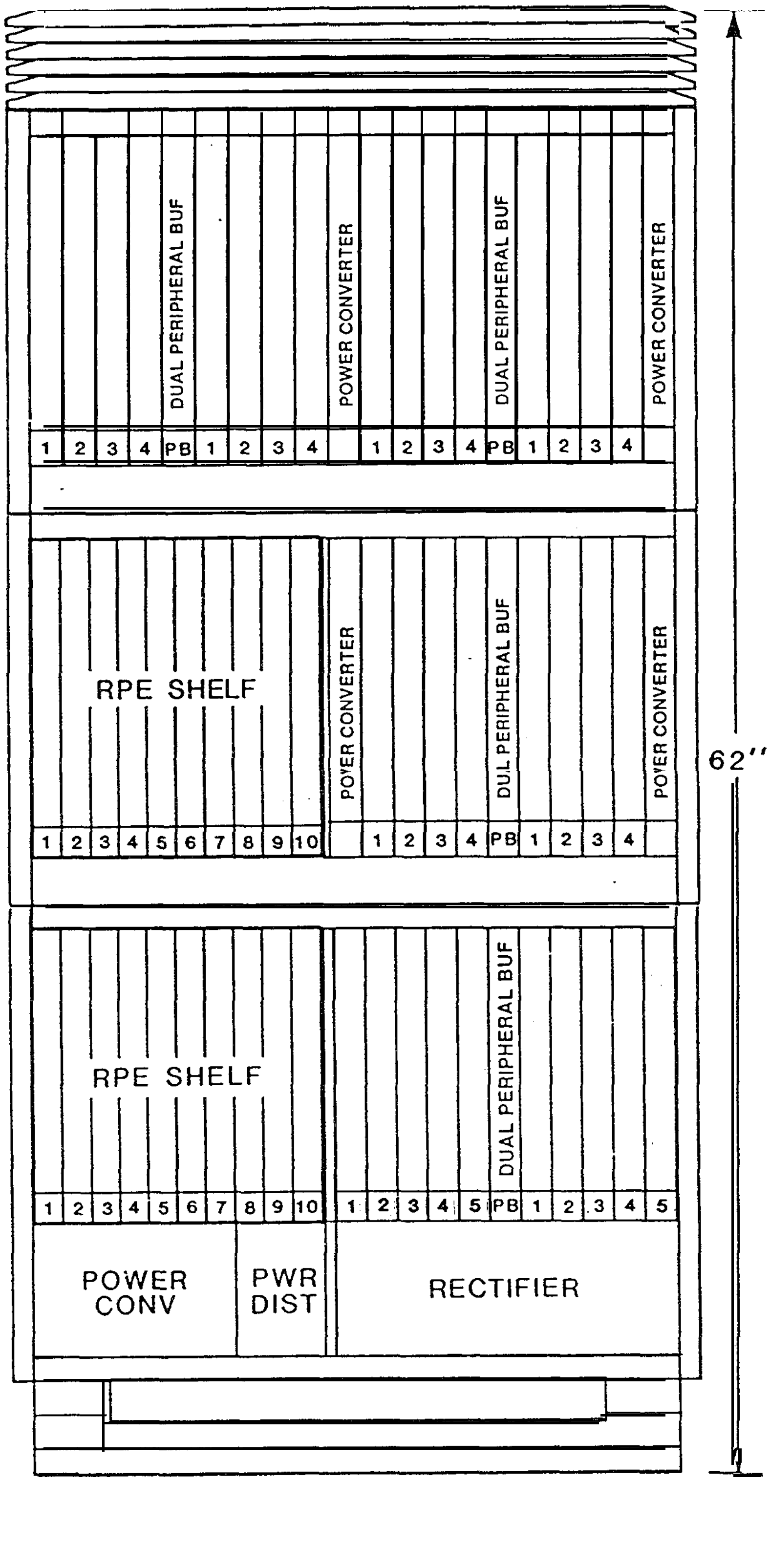


FIGURE 5-54: MERIDIAN SL-1 RPE CABINET CONFIGURATION

Packet Transport

Each Packet Transport Cabinet (NT2R02) is designated with the associated Basic Module number and cabinet number on the front and rear door. A typical configuration is shown in Figure 5-55.

Digital Shelves (NT2R07) may be located in Cabinet Levels O-2, although Level 2 is utilized to accommodate the Disk/Tape Shelf (NT2R24) when the latter is equipped. The bottom shelf position (Cabinet Level 3) is reserved for the optional QRF8 48V Rectifier and associated power components.

Both Digital and Disk/Tape Shelves require cooling. To dissipate heat generated by the circuit cards located in the Digital Shelves, cooling is provided by the NT2R23 Blower Assembly mounted below the lowest Digital Shelf in the cabinet. Disk/Tape cooling is provided by two internal fans located on the back of the associated shelf.

The Transport is physically packaged in the Basic Module which contains up to six Segments. Each Segment is packaged on 2 Digital Shelves.

There are 21 card slots in a Digital Shelf (Figure 5-56). Digital Power Units (NTOR52) occupy the two leftmost card positions followed by a further 18 card slots designated A, O-15, and Z. Slots A and Z do not have access to the Transport and are therefore not addressed. Slots O-15 provide 16 of the 32 card lost addresses that constitute a Segment. Thus a Basic Module with six Segments provides 192 card slots (address locations) on the Transport and 24 expansion slots (unaddressed) for a total of 216 slots.

Circuit cards are located in the Digital Shelf in accordance with the allocation parameters denoted in Figure 5-56. All units connected to the Transport have a unique unit identified and determined by its physical location or address on the Transport.

The Disk/Tape Shelf (NT2R24) is provisioned in accordance with mass storage requirements and houses one or two Disk Units (NT2R70) and one Tape Unit. Other components located on the shelf include the Disk/Tape Power Unit (NT0R53), Controller Card (NT2R60), and Fuse Alarm Panel Assembly (NT2R62). The PTE-S cabinet may be utilized for standalone Meridian LANSTAR applications. A typical configuration is shown in Figure 5-57.

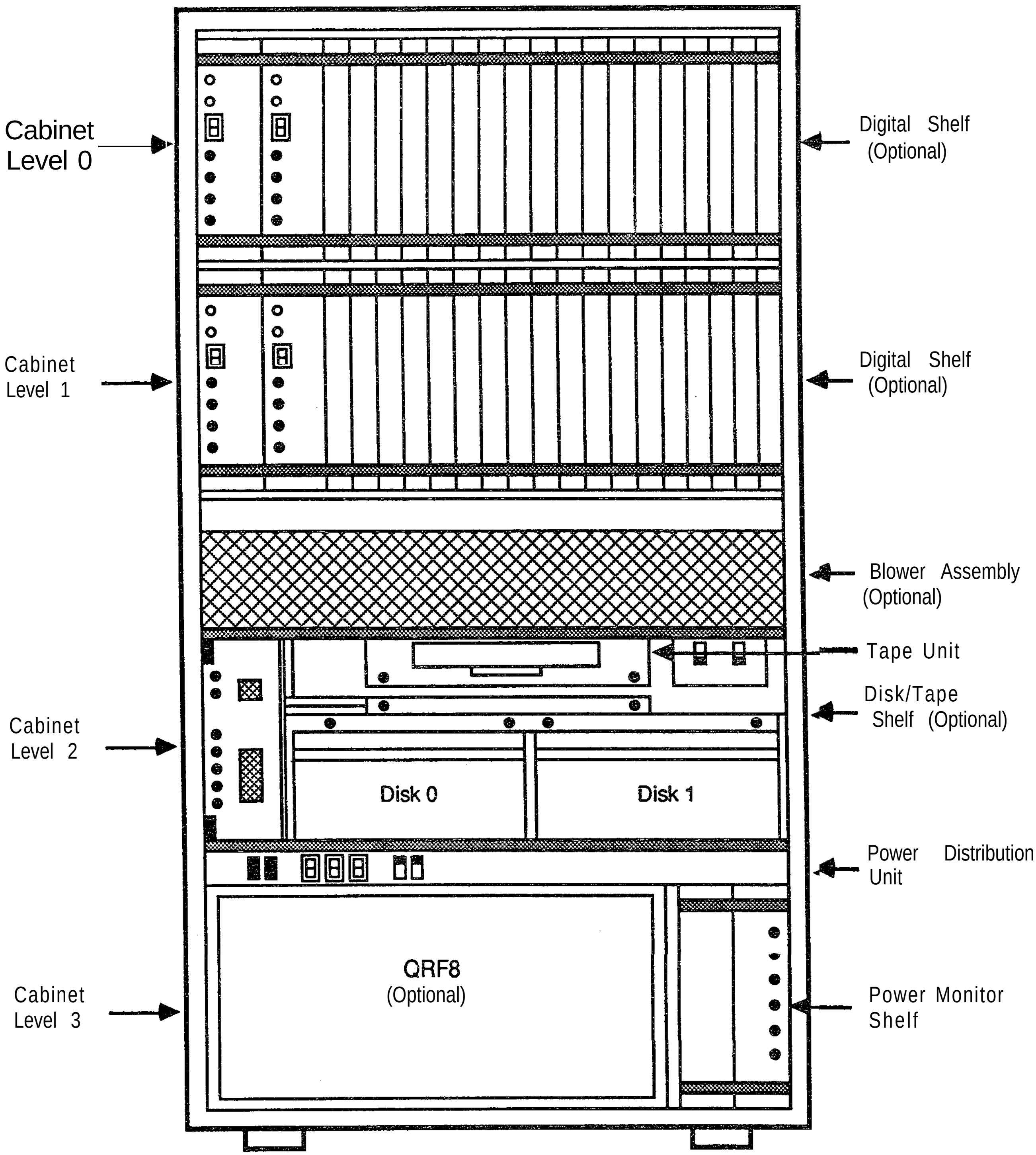
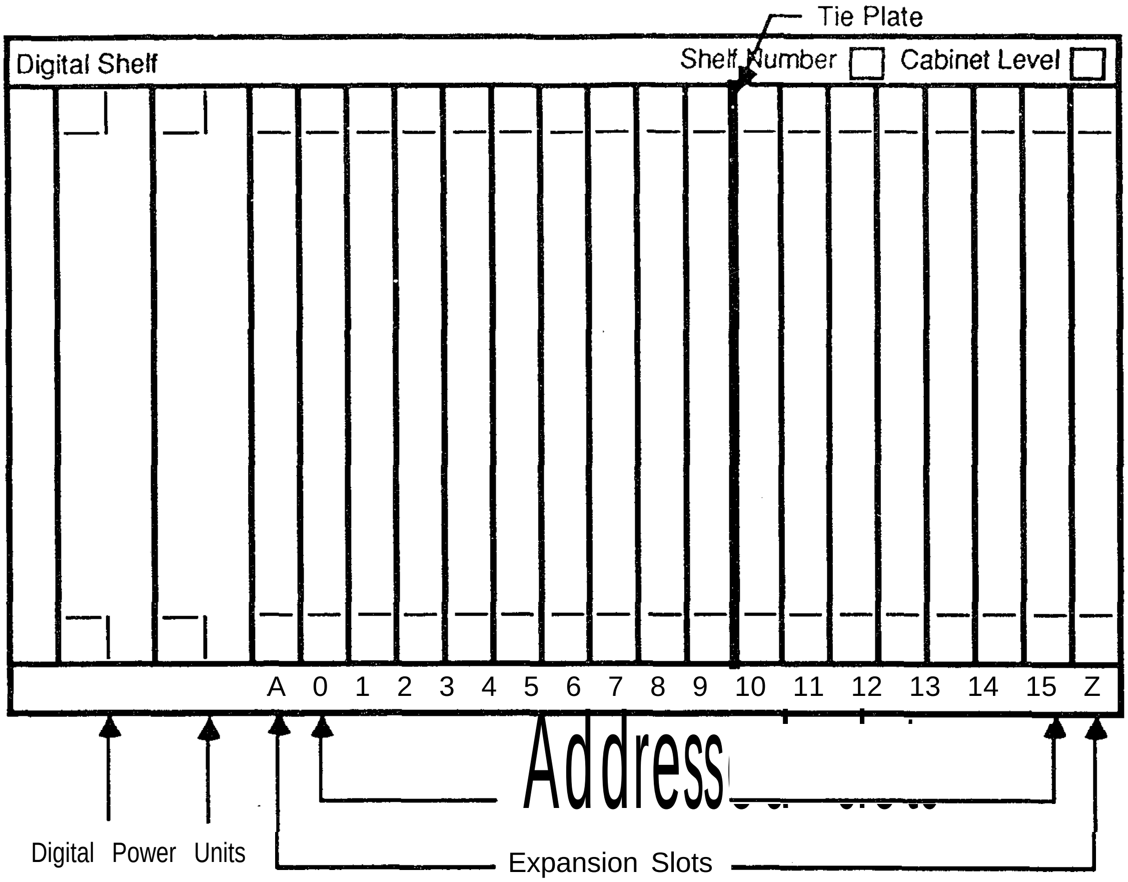


FIGURE 5-55: PACKET TRANSPORT CABINET CONFIGURATION



Card	Acceptable Slots	Card	Acceptable Slots
DS-1 Interface 1	**0 - 7, 9 - 14**	Processor (Note 2)	0-15
DS-1 Interface 2	1-8,10-15	Sync Data Formatter (Note 2)	0-15
Infolink (Note 1)	A, 0 - 15, Z	Tone Detector	0-15
Lanlink Interface 1	0-7,9-14	Transport Controller	0 or 15
Lanlink Interface 2	1 **- 8, 10 - 15**	Transport Repeater	**A or Z**
MASI 1	**A, 0 - 7, 9 - 14**	Voice Compressor 1	**A, 0 - 7, 9 - 14**
MASI 2	**0 - 8, 10 - 15**	Voice Compressor 2	**0 - 8, 10 - 15**
P-bus	JCA, 0-15, Z	2 M byte Memory (Note 2)	A, 0 - 15, Z
		Transport Terminator	0 or 15

Notes:

1. Must be located within two card slots of associated **DS1** Interface Assembly.
2. Must be located such that **P-Bus** (2 to 5 position) can link Processor, 2 M Byte Memory, and SDF (if required).
3. Do not install cards other than the Processor, SDF, or Memory in slots equipped with the P-Bus. Do not insert Processor, Memory or SDF cards in slots where **MASI** 1 card was inserted, until **MASI** cable has been removed from the backplane.

FIGURE 5-56: DIGITAL SHELF DESIGNATION

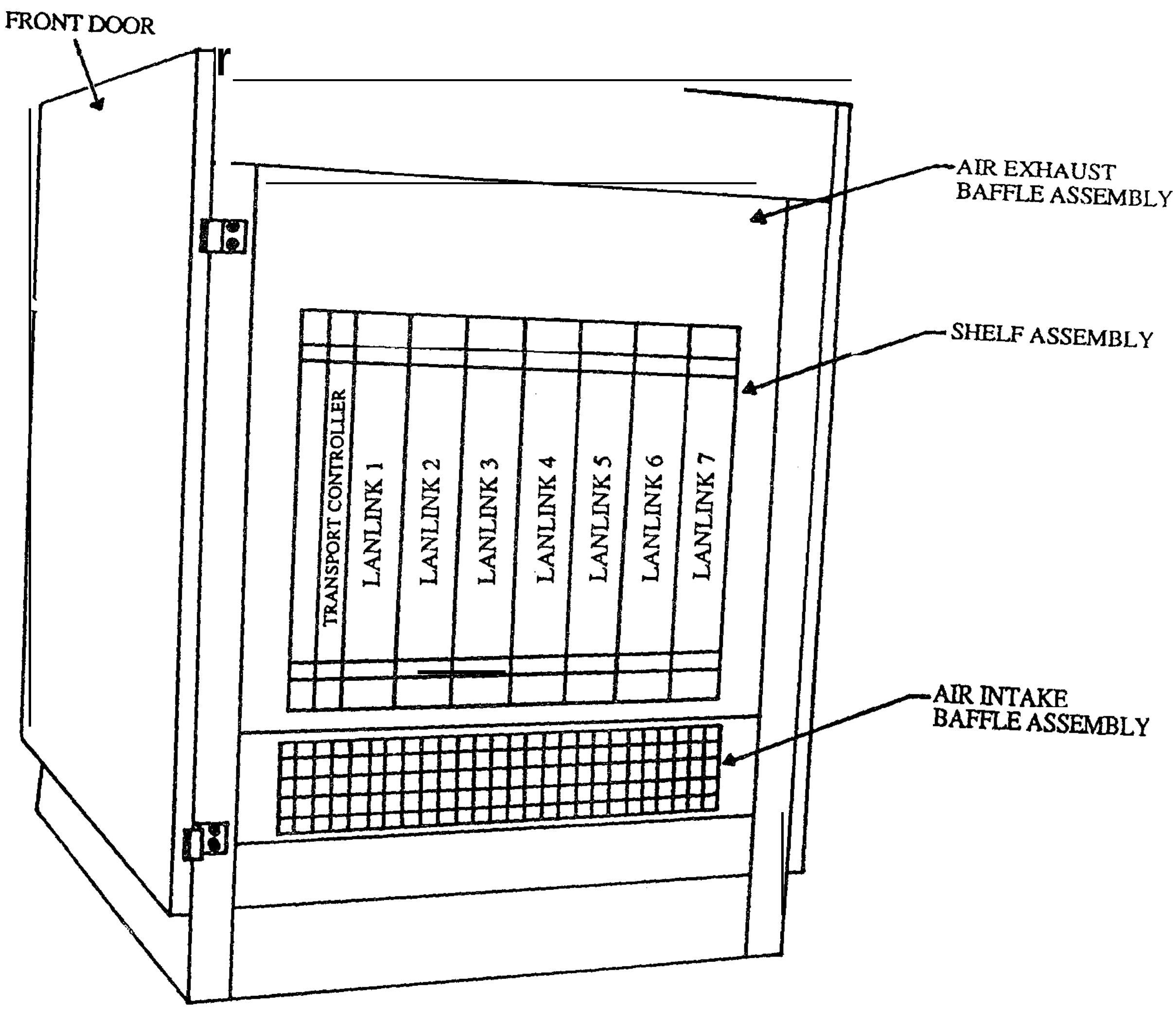


FIGURE 5-57: PTE-S CABINET CONFIGURATION

CONTENTS

SECTION : 6 TECHNICAL SPECIFICATIONS

DESCRIPTION **PAGE**

TECHNICALSPECIFICATIONS

Introduction

This section covers the technical specifications for Meridian SL-1. The information is partitioned as follows:

1. GENERIC SYSTEM INFORMATION

   Contains parameters that are generic in nature with respect to Meridian SL-1

2. CIRCUIT SWITCH

   Contains parameters that are specific to the Circuit Switch elements of Meridian SL-1. This includes information relative to the Common Equipment (CE) and Peripheral Equipment (PE) partitions that are inherent in each system.

3. PACKET TRANSPORT

   Contains parameters that are specific to the Packet Transport of Meridian SL- 1. Packet Transport is available on an optional basis for certain system models.

TECHNICAL SPECIFICATIONS

Generic System Information

1.1 EQUIPMENT ROOM

- General Requirements
- Typical floor plans

1.2 SIGNALING PARAMETERS

- DIGITONE sending
- Tones and frequencies

1.3 TRANSMISSION PARAMETERS

1.4 REGULATORY STANDARDS

- Abbreviation and Standards Nomenclature

1 .1 - Equipment Room

(a) General Requirements

The following requirements must be met when selecting an equipment room:

- Environment must be dry, clean and well ventilated.
- Large building multi-customer installations may require air conditioning and humidity control.
- Dust density should be Zone 4 (0.00014 g/m^3) or better. Average residential dust density is Zone 3 (0.00030 g/m^3).
- The room must be well lit, meet security requirements, and be easily accessible to personnel and heavy equipment.
- Minimum ceiling height is 8 feet (2438.4 mm).
- Ceiling must be capable of supporting cable racks in large installations.
- Floor must be capable of supporting minimum bearing loads of 100 lbs/ft^2 (490 kg/m^2) and puncture bearing of 100 lbs/in^2 (97.03 kg/cm^2). Special loading considerations may be required when batteries and rectifier equipment are to be installed.
- Subject to minimum vibrations (less then 0.5 g at 400 Hz).
- The equipment must stand solidly and level.

The equipment room may accommodate:

- equipment cabinets.
- a Main Distribution Frame (MDF) which terminates the entrance, building, and equipment cables.
- batteries for reserve power supply (ensure adequate ventilation over batteries).
- teletypewriter and table.
- miscellaneous equipment mounting apparatus for modems, 24V4 repeaters, DLL equipment, etc.

(b) Cabinet Locations

Cabinets must not be located in an area that is:

- under water pipes or steam pipes.
- within 10 feet (3.048 m) of a reproducing or copying machine. (The room must have an exhaust fan if the reproducing machine does not have a filter system).
- under or near sprinkler systems (when sprinklers are required to meet building codes, they should be equipped with high temperature heads and be mechanically protected by a wire cage).
- physically hazardous to equipment or maintenance personnel.
- next to a building heating system outlet or near a window through which heat from the sun could cause the temperature in the cabinet(s) to increase above the operating range.

(c) Future Expansion

Allow for expansion of the system when locating the cabinets in an equipment room

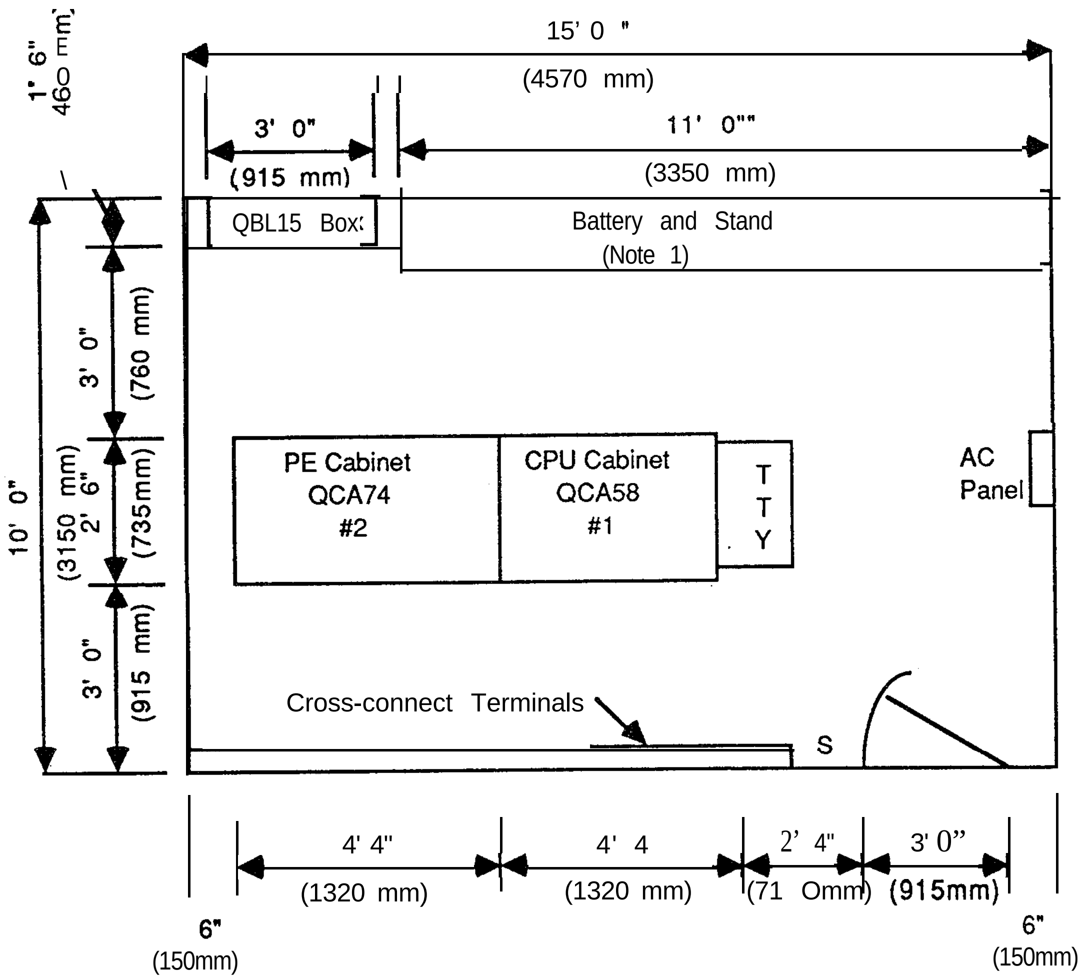


FIGURE 6- 1: TYPICAL MERIDIAN SL- 1NT FLOOR PLAN

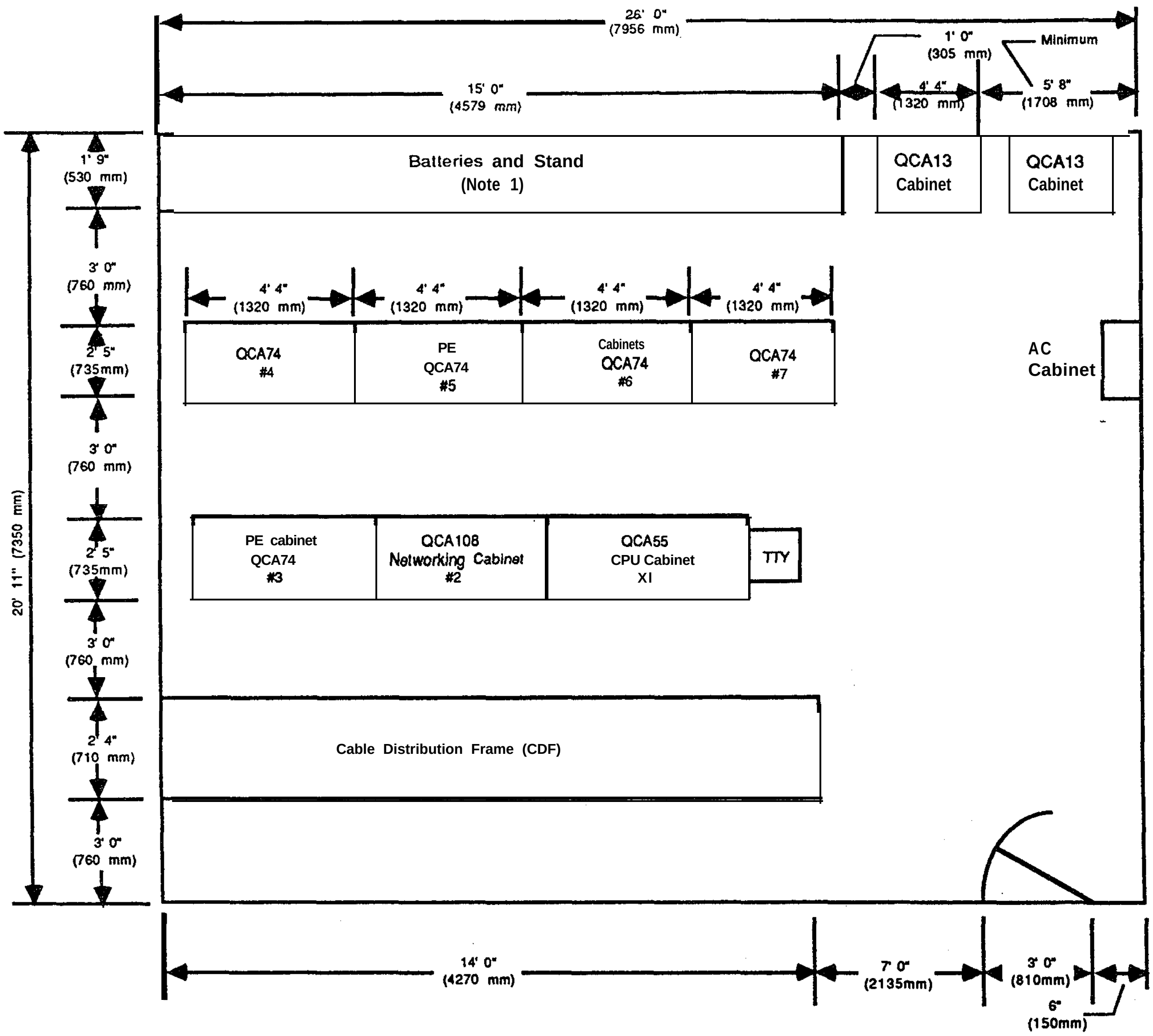


FIGURE 6-2: TYPICAL MERIDIAN SL-1XT FLOOR PLAN

1.2 - Signaling Parameters

(a) Transmitted Frequencies

Digitone Signaling Data

DIGIT	FREOUENCIES - +/-1.5% HZ
1	697 + 1209
2	697 + 1336
3	697 + 1477
4	770 + 1209
5	770 + 1336
6	770 + 1477
7	852 + 1209
8	852 + 1336
9	852 + 1477
0	941 + 1336
*	941 + 1209
#	941 + 1477

Minimum interdigital interval:	40 ms
Minimum pulse duration:	40 ms
Maximum speed:	12.5 digits per second

TONE	FREOUENCY (Hz)
Dial Tone ('IT)	350/440
Audible Ringback	440/480
High Tone (HT)	480
Low Tone (LT)	480/620
Misc. Tone (MT)	440

(b) **Tone Interruptions**

1) Audible Ringback 2 seconds, on 4 seconds off with near-immediate ring - 400 msec minimum ringing interval for first ring, and 400 msec maximum delay until the first ring.

2) Busy Tone - Low Tone interrupted at 60 ipm, .5 seconds on, .5 seconds off.

3) Overflow Tone - Low Tone interrupted at 120 ipm, .25 seconds on, .25 seconds off.

4) Miscellaneous Tone Requirements:

Camp on (MT) one burst of 0.256 second duration.

Call Waiting (MT) two bursts of 0.256 seconds duration separated by 0.128 seconds followed by two bursts of 0.256 seconds duration separated by 0.128 seconds 10 seconds later.

Busy verification and Barge-in (MT) 1.0 second burst followed by 0.256 second bursts at 6 second intervals.

Override tone (MT) 1.0 second burst followed by 0.256 second burst at 16 second intervals.

Special dial tone (TT) three bursts of 0.128 second duration separated by 0.128 seconds, followed by steady dial tone.

1.3 - TRANSMISSION PARAMETERS

The following information outlines the transmission requirements which the Meridian SL-1 Integrated System Network are designed to meet or exceed in mu-law applications.

(a) Insertion Loss At 1020 HZ

TYPE OF CONNECTION	NOMINAL INSERTION LOSS (dB)	INSERTION LOSS (dB)
line-to-line	5	+/- 1.0
line-to-trunk	1	+/- 0.7
Trunk-to-trunk	1	+/- 0.7

(b) Frequency Response (Amplitude Distortion)

CONNECTION	FREQUENCY RESPONSE (dB) AT FREQ (Hz) 200 MIN MAX	300 MIN MAX	3000 MIN MAX	3200 MIN MAX	3400 MIN MAX
Line-to-line or Line-to-Trunk or Trunk-to-Trunk	0.0-5.0	-5.0+1.0	-0.5+1.0	-0.5+1.5	-0.0+3.0

Note: Values are stated relative to loss at 1000 Hz. The symbol + denotes more loss; the symbol - denotes less loss than that measured at 1000 Hz.

(c) Overload Levels

TYPE OF CIRCUIT	NOMINAL OVERLOAD LEVEL (dBm) RECEIVE (A/D)	TRANSMIT (D/A)
Line	+7	+2
Trunk	+3	+6

Note: Receive and Transmit relate to Switch.

1.3 - TRANSMISSION PARAMETERS (Continued)

(d) Tracking (Linearity)

INPUT SIGNAL (db) BELOW OVERLOAD	TRACKING ERROR (dB)	
	MAXIMUM	AVERAGE
3 to 40	+/- 0.5	+/- 0.25
40 to 53	+/- 1.0	+/- 0.5

Note 1: Signal at 1020 Hz.

Note 2: Maximum specification for 99% of all connections

(e) Transhybrid Loss

TWO-WIRE PORT	TRANSHYBRID LOSS (dB)	
	200 to 3400 Hz	500 to 2500 Hz
Line	>17	>19
Trunk	>18	>21

Note 1: Measurement of transhybrid loss (THL) is made from equal-level (transmit and receive) four-wire port towards the two-wire port.

Note 2: The THL is the equivalent specification for design return loss for nonmu-Law PBXs.

Note 3: Two-wire port termination: 600 ohms, except for EIA-compatible trunk packs which need to be terminated with 350 ohms in series with 100 ohms, 0.21 uF.

1.3 - **TRANSMISSION PARAMETERS** (Continued)

(f) **Input Impedance**

CONNECTION FROM 4W TRUNK TO PORT	REFERENCE IMPEDANCE	FREQUENCY RANGE	MINIMUM RETURN LOSS
Line	600 ohms	200-500 Hz	20 dB
		500-3400 Hz	26 dB
Trunk	600 ohms	200-500 Hz	20 dB
		500-1000 Hz	26 dB
		1000-3400 Hz	30 dB

Note: A reference impedance of 600 ohms resistive or of 600 ohms in series with 2.16 uF capacitance is acceptable for trunk ports.

(g) Idle Channel Noise

CONNECTION TYPE	C-MESSAGE WEIGHTED (dBrnC)	3 kHz FLAT (dBrn)
Line-Line	<20	<38
Line-Trunk	<20 at line <23 at trunk	<38 at line <42 at trunk
Trunk-Trunk	<20	<38

(h) **Longitudinal Balance**

FREQUENCY (Hz)	MINIMUM BALANCE (dB)	AVERAGE BALANCE (dB)
200	58	63
500	58	63
1000	58	63
3000	53	58

Note 1: Measured according to IEEE Standard 455-1983.

Note 2: Requirement applies to trunks only.

1.3 - TRANSMISSION PARAMETERS **(Continued)**

(i) **Impulse Noise**

CONNECTION	NUMBER OF COUNTS ABOVE 55 dBrnC
All	0

Note: For test purposes, a five-minute counting interval is used.

(j) **Intermodulation Distortion**

CONNECTION TYPE	DISTORTION LIMITS (dB BELOW RECEIVED LEVEL)		TEST SIGNAL INPUT LEVEL
	R2	R3	(dBm)
Line-to-Line	40	43	-9
Line-to-Trunk	45	53	-9 at line -13 at trunk
Trunk-to-Trunk	45	53	-13

Note 1: Four-tone method is used.

Note 2: Test Signal Input level is the composite power level of all four tones.

(k) **Envelope Delay Distortion**

BANDWIDTH (Hz)	ENVELOPE DELAY DISTORTION (us) LINE-LINE	LINE-TRUNK/ TRUNK-TRUNK
800 to 2700	750	375
1000 to 2600	380	190
1150 to 2300	300	150

1.3 - TRANSMISSION PARAMETERS (Continued)

(1) Quantization Distortion

INPUT LEVEL BELOW OVERLOAD	SIGNAL/DISTORTION RATIO (db)
3 to 33	33
33 to 43	27
43 to 48	22

Note: Input signal is 1 kHz sinewave; output measured with C-message weighting.

(m) **Crosstalk**

CONNECTION	MINIMUM CROSSTALK ATTENUATION (dB)
Line-to-Line	75
Line-to-Trunk	75
Trunk-to-Trunk	75

Note: Input frequency range of 200 to 3200 Hz, 0 dBm level.

1.4 - REGULATORY STANDARDS

(1) FCC: **Federal Communications Commission (U.S.)**

(a) **Part 15, Radio Frequency Devices - Subpart J**

Pertains to limitations on the operation of incidental and restricted radiation devices with respect to electro-magnetic interference (EMT). Subpart J sets technical standards for computing equipment, defined as any electronic device that generates or uses timing signals at a clock rate of 10 KHz and uses digital techniques. Two categories are used:

Class A Computing: Device:

A computer that is marketed for use in a business/commercial/industrial area.

Class B Computing Device:

A computer that is marketed for use in a residential (home) environment.

Meridian SL-1 is considered a CLASS A computing device registered as follows:

FCC Registration Number:
AB-6982-14234-MFE
Service Code: 9.0F Ringer Equiv: 1.0A

It conforms to the following FCC requirements:

Technical Standards (Class A Computing Device)

(i) Radiation Limit

Emanation from a Class A computing device, including any network and apparatus converted thereto, shall not exceed the level of field strength specified in the following table:

Frequency (MHz)	Distance (meters)	Field Strength (uV/m)
	30	
30 to 88	30	30
88 to 216		50
216 to 1000	30	70

(ii) Conduction Limit

A Class A computing device which is designed to be connected to a low voltage public utility power line shall limit radius frequency voltage conducted back into the power lines to values below the levels specified in the following table:

Frequency (MHz)	Maximum RF Line Voltage (uV)
0.45 to 1.6	1000
1.6 to 30	3000

(b)Part 68, Connection of Terminal Equipment to the Telephone Network - Subpart D

Sets standards to protect the telephone network from harm caused by the connection of terminal equipment thereto. It provides for the registration of such equipment subject to specific limitations on the equipment's electrical characteristics at the interface to the network, and the conformance of such limitations during and subsequent to specified physical and electrical stress conditions.

(2) CCITT: International Telegraph and Telephone Consultative Committee

(a) V-Series: Recommendations for data transmission over the telephone network.

Example:

V.35: Data transmission at 48 kilobits per second using 60-108 KHz group band circuits. Defines the electrical and functional characteristics for Data Communications Equipment (DCE)/Data Terminal Equipment (DTE) for 48 Kbps synchronous (preferred at this rate) data transrnission.

(b) X-Series: Recommendations for data transmission over public data networks.

Example:

X.25: Defines the interface between data terminal equipment and data circuit terminating equipment for terminals operating in the packet mode.

(3) EIA: Electronic Industries Association (U.S.)

(a) RS: Recommended Standard (published)

Examples:

RS-232-C: Interface between Data Terminal Equipment (DTE) and Data Communications Equipment (DCE) employing serial binary data interchange.

RS-422-A: Electrical characteristics of Balanced Voltage Digital Interface circuits.

RS-423-A: Electrical characteristics of Unbalanced Voltage Digital Interface circuits.

RS-464 : Private Branch Exchange (PBX) Switching Equipment for voiceband applications.

RS-470 : Telephone instruments with loop signaling for voiceband applications.

(b) CIS : Communications Interim Standard (published - expected to be incorporated in a future RS).

(c) PN : Project Number (standard in preparation, currently in draft form)

Examples:

PN-1361 : Environmental and safety considerations for voice telephone terminals.

PN-1373 : Interface between data circuit-terminating equipment and the public switched telephone network.

PN-1429 : Digital Private Branch Exchange.

(4) UL: Underwriters Laboratory

(a) Draft Standard 1459 - Telephone Systems

Applies UL electrical and fire hazard standards to all parts of a communications system.

TECHNICAL SPECIFICATIONS

Circuit Switch

2.1 - ENVIRONMENTAL REQUIREMENTS

- Operating system
- Shipping and storage

2.2 EQUIPMENT CABINETS

- Dimensions
- Weight
- Floor loading

2.3 - POWER

- Commercial
- Dissipation
- Current drains

2.4 - CABLING

- Telephones
- Consoles

2.5 - ELECTRICAL CHARACTERISTICS

- Systems
- Telephones

2.6 - TECHNICAL INTERFACES

- Peripheral equipment parameters

2.1 - ENVIRONMENTAL REQUIREMENTS

(a) Meridian SL-1 Operating Environment

EQUIPMENT	TEMPERATURE AND HUMIDITY CONSIDERATIONS
Telephone Sets	0-50°C, 20-80% RH Continuous (32- 122°F)
Meridian SL-1 System (Common & Peripheral Equipment)	0-37°C, 20-80% RH Absolute Limits (32-98°F)
	15-30°C, 20-55% RH Recommended (59-80°F)
CDR	Cabinet equipped with COO48680 or COO49650 tape Absolute Limits 0-25°C, 20-80% RH Recommended 15-25°C, 20-55% RH
	Cabinet equipped with COO55295 tape Absolute Limits 0-35°C, 20-80% RH Recommended 15-30°C, 20-55% RH

Note: Exposure **to** absolute limits should not exceed 72 hours. Temperature readings should be taken 30 inches (762 mm) from the front of the cabinet and 5 feet (1.5 m) above the floor.

2.1 - ENVIRONMENTAL REQUIREMENTS (Continued)

(b) Shipping/Storage

EQUIPMENT	PARAMETER	CONDITION
Meridian SL-1 and telephone sets	Temperature	-50°C(-58°F) minimum +70°C(158°F) maximum
	Humidity	20% RH Minimum 95% RH Maximum (noncondensing) for a period not exceeding14 days Recommended 20% RH Minimum 80% RH Maximum (noncondensing)
	Temperature Rate of Change	10°C (18°F) Maximum
Tape Cartridge or Floppy Diskettes	Temperature	According to manufacturer's specification or -40°C (-40°F) minimum +60°C (140°F) maximum
	Humidity and temperature rate of change	According to manufacturer's specifications

Note: Tapes should be spooled from end-to-end prior to use.

2.2 - EQUIPMENT CABINETS

The Meridian SL-1 MS, N, NT, XN, and XT utilize the same cabinet construction to house common and peripheral equipment, power shelves and emergency transfer units. The dimensions of the cabinet are:

Height - 7 1 inches (1800 mm)
Width - 52 inches (1320 mm)
Depth - 29 inches (736 mm)

The maximum weight of a fully equipped cabinet of this type and associated floor loading is as follows:

Maximum Weight	- 1500 lbs (680 kg)
Maximum Bearing Loading	- 50 lbs/ft^2 (244.1 kg/m^2)
Maximum Puncture Loading	- 80 lbs/in^2 (5.6 kg/cm^2)

The maximum weight of a fully equipped Meridian SL-1XN/XT Power Cabinet and associated floor loading is as follows:

Maximum Weight	- 1300 lbs (557 kg)
Maximum Bearing Loading	- 80 lbs/ft^2 (390.7 kg/m^2)
Maximum Puncture Loading	- 70 lbs/in^2 (4.9 kg/cm^2)

The Meridian SL- 1S equipment cabinet has the following parameters:

Height	- 56 inches (1435 mm)
Width	- 32 inches (810 mm)
Depth	- 15 inches (380 mm) (20.5 inches [520 mm] deep at the pedestal)
Maximum Weight	- 300 lbs (136 kg)

The Meridian SL- 1ST and RT equipment cabinets have the following parameters:
(Meridian SL-1RT is always 3 tier)

Height (Single Tier)	- 32 inches (810 mm)
(Two Tier)	- 47 inches (1200 mm)
(Three Tier)	- 62 inches (1574 mm)
Width	- 32 inches (810 mm)
Depth	- 15 inches (380 mm) - (20.5 inches [520 mm] deep at the pedestal)
Weight (Single Tier)	- 200 lbs (91 kg)
(Two Tier)	- 300 lbs (136 kg)
(Three Tier)	- 400 lbs (182 kg)

2.3 - POWER

(a) Commercial Power Supply

The various power supplies for the system are as follows:

(a) 115 V 60 Hz terminated on commercial (i.e. ground) receptacles for each of the following:

- teletypewriter

- external equipment (powering for DLL, etc.).

(b) A power supply of 117,208, or 230 V, 50/60 Hz capable of delivering 40 A at 117 V or 25 A at 208/230 V to accommodate the rectifiers. This supply is terminated on separate 2320 Hubble-type receptacles (except 117 V which is wired directly) within 8 feet (2.5 m) of each rectifier.

Each power supply must:

- be wired and fused independently of all other receptacles

- be tagged at the power panel to prevent unauthorized interruption of power,

- not be controlled by a switch.

2.3 • POWER (Continued)

(b) **Maximum Power Dissipation**

Meridian SL- 1	CABINET	WATTS	BTU
S	QCA60	900	3069
MS	QCA109	1700	5797
	QCA74	1000	3410
ST	QCA136	1500	5115
RT	QCA147	1500	5115
N, NT	QCA58	1700	5797
	QCA74	1000	3410
XN, XT	QCA55	2400	8184
	QCA108	1600	5456
	QCA74	1000	3410

Note: 1. BTU (thermal load) = TOTAL POWER DISSIPATION x 3.41

2. For air conditioning purposes 1 TON = 12000 BTU.

3. Heat dissipated in the cabinet itself does not necessarily correspond to current drawn.

(c) **Maximum Current Drains**

CABINET	AMPERES @ 52 V
QCA109 e/w 2 CE and 9 PE shelves	30
QCA58 e/w 2 Network and 8 PE shelves	39
QCA55	50
QCA108 e/w 4 Network and 10 PE shelves	45
QCA74 e/w 14 PE shelves	30
QCA74 e/w 12 PE shelves	28
QCA60	15
QCA136 - Single Tier	10
- Two Tiers	17
- Three Tiers	24
QCA147	24

2.4 - CABLING

Cable Installation - Inside Wire-Cable for Telephones and Consoles

(a) **Attendant Consoles**

Normal operating range of the QCW4 Attendant Console is 8000 cable feet (2440 m) using cable rated at a maximum of 0.085uF per mile (1600 m).

i.e. 22 AWG wire range - 8000 feet (2440 m)
24 AWG wire range - 5500 feet (1675 m)
26 AWG wire range - 3700 feet (1125 m)

(b) **SL-1 Electronic Telephone**

Normal operating range

1. 189 ohms or 6000 cable feet (1830 m) whichever is reached first.

   i.e. 22 AWG wire range = 6000 feet (1830 m)
   24 AWG wire range = 3700 feet (1125 m)
   26 AWG wire range = 2300 feet (700 m)

2. SL-1 sets equipped with a QKK1 extension kit have a maximum range of 8000 feet (2440 m).

   i.e. 22 AWG wire range - 8000 feet (2440 m)
   24 AWG wire range - 5500 feet (1675 m)
   26 AWG wire range - 3700 feet (1125 m)

The outside plant cable must not exceed 0.085uF per mile (1600m).

(c) Meridian Digital Telephones

1. Cable pair selections must meet the following requirements:

   - AC signal loss must be less than 12.0 dB at 256 kHz due to all sources
   - DC loop resistance must be less than 175 ohms
   - Minimum loop length (mainframe bulkhead to telephone) of 40 ft
   - Near end crosstalk coupling loss > 38dB at Nyquist frequency of 256 kHz (not an issue for typical 22, 24 and 26 AWG twisted pair cable)
   - No bridge taps are permitted
   - No loading coils are permitted
   - Protection devices of the carbon-block and gas-filled type are permitted if the off-state shunting impedance is better than 10 Megohm resistive, and less than 0.5 pF capacitive

2. The following criteria have to be met where undercarpet cabling is used:

   - Characteristic impedance at 256 kHz, 100 ± 10 ohms
   - Insertion loss at 256 kHz, < 4.6 dB/kft.
   - Next pair-to-pair coupling loss at 256 kHz, > 40 dB

3. For the typical system of 22, 24 or 26 AWG standard twisted pair cable, the requirements translate to the following allowable loops:

   - Up to 3000 feet of 22 or 24 AWG cable
   - Up to 2100 feet of 26 AWG cable

2.5 - ELECTRICAL CHARACTERISTICS

(a) Meridian SL-1

CATEGORY	CHARACTERISTICS
Network Loop Limit	50 cable feet (15m)
Nominal System Impedance	600 ohm for station lines 600 or 900 ohm for trunks
Crosstalk Coupling (200 through 3400 Hz at - 10 dBm)	Line-to-line - 75 dB down Line-to-trunk - 75 dB down Trunk-to-trunk - 85 dB down
Tones	
Dial	350/440 Hz
Ringback	440/480 Hz - 2 s ON, 4 s OFF
Busy	480/620 Hz at 60 ipm 0.5s ON, 0.5 s OFF
Overflow	480/620 Hz at 120 ipm 0.25 s ON, 0.25 s OFF
Camp-On	440 Hz - one burst of 0.256 s at 6 s intervals
Call Waiting	440 Hz - two bursts of 0.256 s duration separated by 0.128 s and repeated 10 s later
Busy Verification Barge-In	440 Hz - 1.0 s burst followed by 0.256 s bursts at 6 s intervals
Override	440 Hz - 1.0 s burst followed by 0.256 s burst at 16 s intervals
Special Dial Tone	350/440 Hz - 3 bursts of 0.128 s separated by 0.128 s followed by steady dial tone

2.5 - ELECTRICAL CHARACTERISTICS (Continued)

(b) SL-1 Telephone Stations

CATEGORY	CHARACTERISTICS
Connecting SL- 1 Set	One telephone per line circuit - six conductors to PE: one pair for voice transmission, one pair for signaling, one pair for centralized powering.
Transmission Format	Full duplex-diphase transmission at 2.37 kbps.
Signal Level	0.75 + 0.05 V pp square wave.
Power Supply for SL-1 Set	Simplexed over voice and signaling pair.
Add-On Modules (powered locally or from central supply)	Logic Handsfree Unit QUS 1 Key/Lamp Expansion Modules: QMT1 - 10 keys, 8 lamps QMT2 - 20 keys, 16 lamps Add maximum 60 keys and 48 lamps to SL-1 telephones.
Station Loop Limits	189 ohms or 6000 cable feet (1830 m) of 22 AWG wire. Rated at 0.085 uF per mile (1.6 km).
Minimum Insulation	30,000 ohms
Resistance Tone Ringing	Immediate 533/666 Hz and 3rd and 5th harmonics, modulated at 10 Hz 2 s ON, 4 s OFF.
Tone Buzzing	300 Hz square wave

2.5 - ELECTRICAL CHARACTERISTICS (Continued)

(c) **500/2500** Type Stations

CATEGORY	CHARACTERISTICS
ALL NE-500/2500 TYPE SETS:	
Number of sets per line circuit	Dependent on loop resistance and NE-CE type Ringers (maximum five sets equipped)
Station loop limits	1000 ohms (excluding set)
Minimum insulation resistance	30,000 ohms
Switchhook flash	On-hook for 640 ms or less
Disconnect	On-hook for 640 ms or more
Ringing	85 V, 20 Hz (2 s on, 4 s off) 105 V,20 Hz (uninterrupted) 75 V, 25 Hz (2 s on, 4 s off) 92 V, 25 Hz (uninterrupted)
Ring trip	During silent or ringing interval
ROTARY DIAL:	
Speed range	8.0 to 12.0 pps
Minimum interdigital time	240 ms
Percent break	58 to 64%
DIGITONE DIAL:	
Maximum speed	12.5 digits/s
Minimum interdigital time	40 ms
Minimum pulse duration	40 ms

2.5 - ELECTRICAL CHARACTERISTICS (Continued)

(d) CO / FX / WATS Trunk

Nominal impedance	600 or 900 ohms selected at cross-connect terminal
Signaling range	1500 ohms
Signaling type	Ground or loop start
Far-end battery	-42.75 through -52.5 V
Near-end battery	-39 through -52.5V
Ground potential difference	+10 v
Low dc loop resistance during outpulsing	300 ohms
High dc loop resistance	Ground Start >20k ohms Loop Start >150k ohms
Line leakage	>30k ohms (TIP to RING, TIP to GND, RING to GND)
Effective loss	1 .O dB line-to-trunk 1.0 dB trunk-to-trunk

(e) Loop Trunk Circuit

CHARACTERISTICS	AS RELATED TO THE CIRCUIT CARD
CIRCUITS PER CARD	2 (QPC72); 4 (QPC449)
OPTIONS	600 or 900 ohms nominal impedance, selected at cross-connect terminal
LOOP TERMINATION	270 ohms
EFFECTIVE GAIN	1.0 dB line-to-trunk 1.0 dB trunk-to-trunk
LINE LEAKAGE	> 30 K ohms
POWER FEED	306/306 ohms balanced, 48 V nominal
EXTERNAL CIRCUIT RESISTANCE	2000 ohms max (for 16.2 mA)
GROUND POTENTIAL DIFFERENCE	+ 10 V max
FAR-END BATTERY LIMITS	-42.75 through -52.5 V
CARD OPTIONS	600/900 ohms nominal impedance ANI or non-ANI Loop, or battery/ground pulsing on ANI

2.5 - ELECTRICAL CHARACTERISTICS (Continued)

(f) 4-Wire E&M/DX Trunk

CHARACTERISTICS	COMMENTS
CIRCUITS PER CARD	2
OPTIONS:	
(1) Signaling	DX or E&M Type I or II
(2) DX loop resistance	Switchable, 0 to 2500 ohms or 2500 to 5000 ohms
DX SIGNALING:	
External circuit resistance allowed	5 k ohms maximum
Insulation resistance required	100 k ohms minimum
Ground potential difference allowed	+ 10V maximum
E&M SIGNALING:	
Feed Resistance	M lead, 100 ohms minimum
Contact bounce	M lead, 3 ms maximum
Operating range	Type I 100 - 150 ohms Type II 100 - 300 ohms
Dial Pulse Operation	Sending 10 pps, 58 to 64% break Receiving 10 pps, recognize 10 to 150 ms as break/make
Terminating impedance	600 ohms

2.5 - ELECTRICAL CHARACTERISTICS (Continued)

(g) E & M/DX Signaling and Paging Trunk Circuit

CHARACTERISTICS	COMMENTS
CIRCUITS PER CARD	2
OPTIONS	
(1) Nominal impedance	600 ohms, or 900 ohms
(2) Signaling	E&M or DX (2- or 4-wire)
(3) DX loop resistance	less than or greater than 2500 ohms
(4) Paging equipment interface	

Note: Option 1 is selected at the cross-connect terminal, and options 2 through 4 are selected by switch settings on the circuit card.

LINE LEAKAGE	>30 k ohms
DX LOOP RANGE	5 k ohms: with +20 V ground potential difference; far-end battery -42.75 V through -52.5 V

7 - TECHNICAL INTERFACES

Peripheral Equipment Parameters

(a) 500/2500 Line Interface

The 500/2500 line circuit interfaces to and is compatible with the equipment listed below:

DESCRIPTION	SPECIFICATION
NE-500 TYPE ROTARY DIAL SETS (or equivalent)	
Dial Speed	8.0 to 12.0 pps
Percent Break	58 to 69%
Interdigital Time	240 ms
NE-2500 TYPE DIGITONE SETS (or equivalent)	
Frequency Accuracy	+ 1.5%
Pulse Duration	40 ms
Interdigital Time	40 ms
Speed	12.5 digits/s
KEY TELEPHONE EQUIPMENT	NE-1A1, NE-lA2, or equivalent
RECORDED ANNOUNCEMENT	*Code-a-Phone 200 VCA RDY (unattended telephone answering set)
DIAL LONG LINE CIRCUIT	J99234T-2/SD96555-01
LOOP EXTENDERS	various
24V4 REPEATERS	J98615 AJ-1/SD97747-01 J98615 BJ-1/SD97747-01

* Code-a-Phone is a trademark of Ford Industries Inc.

TECHNICAL SUMMARY OF 500/2500 LINE CIRCUIT PACK

Impedance:	
QPC452, QPC494	600 ohms
QPC192	900 ohms
QPC594	600 ohms
Loop Limit (excluding set):	
QPC 192	1400 ohms at nominal -48 V
All others	1000 ohms at nominal -48 V
Leakage Resistance	30,000 ohms
Ring Trip	During silent or ringing intervals
Ringing Voltage	Determined by the type of ringing generator provided in the system
Signaling	Loop start
Supervision	Normal battery conditions are continuously applied (-48 V on ring; ground on tip)
Power input from shelf backplane	-52, -48, +6, -6, +2.5 V and ringing voltage; also 150 V on Message Waiting Line Card
Insertion loss	5 dB, +/- 1 dB, at 1020 Hz
Effective gain (QPC192)	1.5 dB at 1020 Hz

(b) **SL-1 Line Interface**

CHARACTERISTICS AS RELATED TO THE CIRCUIT CARD

CIRCUITS PER PACK	Eight individual circuits
IMPEDANCE	
Voice Pair	600 ohms
Signaling Pair	600 ohms
NORMAL INSERTION LOSS	5 dB line-to-line
LOOP LIMITS	189 ohms, or 6000 cable feet

WIRE GAUGE	DISTANCE
22	6000ft (1830 m)
24	3700ft (1150 m)
26	2300ft (675 m)

Note: Under certain conditions the loop limits may be extended to 8000 ft (2450 m).

SIGNALING PAIR	
Mode	Diphase
Rate	2.37K bit/s
Level	0.75 +0.05 V peak-to-peak across the line
AUDIO PAIR	
Mode	Analog (audio)

(c) Integrated Services Digital Line Card (ISDLC)

CHARACTERISTICS	DESCRIPTION
CIRCUITS PER PACK	8 voice/data
IMPEDANCE	100 ohms
LOOP LIMITS	3000 ft (900m) with 24 AWG PVC cable (+30 VDC at 60 mA)
LINE RATE	512 Kbps +/- 100 ppm
LINE CODING	bipolar return-to-zero alternate mark inversion (BPRZ-AMI)
POWER SUPPLY	-52 VDC unregulated or -48VDC regulated and +/- 6 VDC, +/- 15 VDC, +10 VDC
TRANSMITTER OUTPUT VOLTAGE	
successive ‘1’ bits	+1.5 +/- 0.15V and -1.5 +/- 0.15V
‘0’ bits	0 +/- 50mv

TECHNICAL SPECIFICATIONS

Packet Transport

3.1 EQUIPMENT ROOM
- Cabinet
- Floor Loading

3.2 EQUIPMENT CABINET
- Dimensions
- Weight

3.3 ENVIRONMENTAL SPECIFICATIONS
- Operating Parameters
- Shipping and Storage Parameters

3.4 POWER CONSUMPTION
- Units

3.5 PERIPHERAL DEVICE SPECIFICATIONS
- Personal Printer
- System Matrix Printer
- Letter Quality Printer

3.6 2.56 MBPS LINE SPECIFICATIONS
- General Rules
- Line Characteristics
- Cable Specifications

3.1- EQUIPMENT ROOM

Floor Loading

The equipment room floor must be capable of supporting the following loads:

CABINET	FLOOR LOADING
NT2R02 Packet Transport Cabinet	150 lb/ft^2 68 kg/m^2
QCA13	200 lb/ft^2 91 kg/m^2

Note: Floor loading requirements for batteries should be obtained from the battery manufacturers documentation. Additional load for cable and cable racks must also be considered.

DUST DENSITY	Recommended dust density in the equipment room is 0.00014 gm/m^3 or less.
DENSITY ALTITUDE	The system is capable of operating at a density altitude of 10.000 ft (3048 m) without special conditioning.

3.2 - EQUIPMENT CABINET

A typical fully loaded Packet Transport cabinet weighs approximately 780 lb (353 kg) and has the following dimensions:

Height - 72 inches (1828 mm)
Width - 28.44 inches (722 mm)
Depth - 33.25 inches (845 mm)

A smaller PTE-S cabinet is also available for standalone Meridian LANSTAR applications and has the following dimensions:

Height - 29.5 inches (749 mm)
Width - 23.3 inches (592 mm)
Depth - 25.5 inches (647 mm)

3.3 - ENVIRONMENTAL SPECIFICATIONS

(a) Operating Parameters

EQUIPMENT	PARAMETER	SPECIFICATION
System	Temperature	537°C 41-98.6°F
	Humidity	20-80% RH non-condensing
Circuit Cards	Temperature	0-70°C 32-158°F
	Humidity	10-95% RH non-condensing
Disk/Tape Controller (NT2R60)	Temperature	0-55°C 32-131°F
	Humidity	10-95% RH non-condensing
	Altitude	0-15,000 ft 0-4572 m
Disk Unit (NT2R40)	Temperature	5-40°C 41-104°F
	Humidity	20-80% non-condensing
	Temperature Change	15°C/hr non-condensing 27°K/hr non-condensing
	Altitude	10,000 ft (3048 m)
	Vibration	0.2 g maximum, 10ms (3 Hz to 60 Hz) Both ways 2 min X 30 cycle (sine wave)
	Shock	<2.0 g, 10ms
Disk Unit (NT2R70)	Temperature	5-40°C 41-104°F
	Temperature Change	10°C/hr 18°F/hr
	Humidity	20-80% non-condensing
	Humidity Change	20%/hr non-condensing
	Altitude	-1000-10,000 ft -304 m to 3048 m

3.3 - ENVIRONMENTAL SPECIFICATIONS

(a) **Operating Parameters** (continued)

EOUIPMENT	PARAMETER	SPECIFICATIONS
Disk Unit (NT2R70)	Vibration	Up to 2 g
	Shock	5 g not exceeding 10 ms, shock duration not to exceed 5 s
Tape Cartridge	Temperature	5-45°C 41-113°F
	Humidity	20-80% RH non-condensing
Tape Unit (NT2R50)	Temperature	5-45°C 41-113°F
	Humidity	20-80% RH non-condensing
	Altitude	-1000-10,000 ft -304 m to 3048 m

Note 1: The equipment room air conditioning must be able to maintain a temperature of 22°C (72°F). A temperature differential of greater then +/- 3°C (5°F) in the equipment room is not recommended.

Note 2: Exposure to absolute limits should not exceed 72 h. Temperature readings should be taken 30 in (762 mm) from the front of the cabinet and 5 ft (1.5 m) above the floor.

3.3 - ENVIRONMENTAL SPECIFICATIONS

(b) Shipping and Storage Parameters

EQUIPMENT	PARAMETER	SPECIFICATIONS
System	Temperature	-10°C to 55°C -50°F to 131°F
	Humidity	20% to 80% RH non-condensing
Circuit Cards	Temperature	-50°C to 78°C -122°F to 158°F
	Humidity	10% to 95% RH non-condensing
Disk/Tape Controller (NT2R60)	Temperature	-40” to 75°C -104°F to 167°F
	Humidity	10% to 95% RH non-condensing
	Altitude	0 to 15,000 ft above sea level 0 to 3048 m above sea level
Disk Unit (NT2R40)	Temperature	-40°C to 60°C -104°F to 140°F
	Humidity	5% to 95% RH non-condensing
Disk Unit (NT2R70)	Temperature (Transit)	-40°C to 55°C (90 day max.) -104°F to 131°F
	Temperature Change	20°C/hr 36°F/hr
	Temperature (Storage)	-40°C to 55°C (7 day max.) -104°F to 131°F
	Temperature Change	15°C/hr 27°F/hr
	Humidity (Transit)	5% to 95% RH non-condensing (7 day max)
	Humidity (Storage)	10% to 95% RH non-condensing (90 day max)
	Altitude	-1000 ft to 40,000 ft -304 m to 3048 m

3.3 - ENVIRONMENTAL SPECIFICATIONS

(b) **Shipping and Storage Parameters** (continued)

EQUIPMENT	PARAMETER	SPECIFICATIONS
Tape Cartridge	Temperature	5 to 45°C 41 to 113°F
	Humidity and Temperature Rate of Change	20 to 80% RH non-condensing 10°C/hr 18°F/hr
Tape Unit (NT2R50)	Temperature	-30 to 60°C -86 to 140°F
	Humidity	20% to 80% RH non-condensing
	Altitude	-1000 ft to 50,000 ft -304 m to 3048 m

3.4 - POWER CONSUMPTION

UNIT	WATTS
Blower Assembly	80.0
Disk/Tape Shelf (fully equipped)	260.0
DS-1 Interface 1 and 2	46.3
Infolink	26.5
Lanlink Interface 1 and 2	45.4
MASI 1 and 2	48.0
Power Monitor	13.0
Processor	39.5
Sync Data Formatter	17.3
Tone Detector	39.8
Transport Controller	35.9
Transport Repeater	6.6
Transport Terminator	1.5
Voice Processor 1 and 2	63.4
2M Byte Memory	13.2

Note: (1) To aid in the calculation of air conditioning requirements the following British Thermal Unit (BTU) figures (worst case) are provided. To calculate on a per cabinet basis allow:

- Cabinet with internal power (QRF8)--7000 BTU
- Cabinet with external power-- 10,500 BTU

(2) A fully loaded PTE-S cabinet consumes a maximum of 445 watts (1520 BTU).

3.5 - PERIPHERAL DEVICE SPECIFICATION

Equipment	Parameter	Specification
Personal Printer	Input Power	120 Vac (+/-5%, -10%); 47.5-63 Hz
	Power Usage	1 watt non-operational (3.5 BTU)
		8 watts operational (28 BTU)
	Interface	RS232 Serial Interface
	Temperature	-20 to 60°C (-4 to 140°F) nonoperating
	Temperature	10 to 40°C (50 to 104°F) operating
	Humidity	10% to 90% RH non-condensing
	Sound Pressure	Lpa 50 dB(A) @ 1 m (bystander position)
	Dimensions	H: 3.5 in (8.9 cm)
		W: 11.5 in (29.2 cm)
		D: 8.1 in (20.6 cm)
	Weight	7.4 lbs (3.36 kg)
	Cable Length	10 ft (3 m) Serial

3.5 - PERIPHERAL DEVICE SPECIFICATIONS

Equipment	Parameter	Specification
System Matrix Printer	Input Power	100 to 120 Vac; 48-65 Hz
		200 to 240 Vac; 48-65 Hz
	Power Usage	70 watts (240 BTU) standby
		140 watts (480 BTU) operational
	Interface	RS232 Serial Interface; Centronics Parallel
	Temperature	-0 to 40°C (32 to 110°F) operating
	Humidity	15% to 90% RH non-condensing
	Dimensions	H: 6.4 in (16.1 cm)
		W: 25 in (63.6 cm)
		D: 16.1 in (40.9 cm)
	Weight	33 lbs (15.1 kg)
Letter Quality	Input Power	100 to 200 Vac;
		200 to 240 Vac
	Power Usage	200 watts (700 BTU) maximum
	Interface	RS232 Serial Interface
	Temperature	7 to 41°C (45 to 105°F) operating
	Humidity	10% to 80% RH non-condensing
	Dimensions	H: 9.79 in (24.9 cm)
		W: 24.3 in (61.8 cm)
		D: 18.4 in (46.9 cm)
	Weight	60 lbs (27 kg)
	Sound Level	67 dBa
	Cable Length	10 ft (3 m) serial or parallel
	Certification	UL, CSA, CDE 0804/0871; FCC Class A and B

3.6 - 2.56 MBPS LINE SPECIFICATIONS

(a) General Rules

The following general rules must be applied to all 2.56 Mbps lines:

- Three pairs of wire to each device location are recommended.
- The line must NOT contain bridge taps.
- Maximum loop length is 1684 ft (513 m) of 24 AWG (0.51 mm) PVC-insulated cable. The distance includes cross-connection and the cord connecting the device to the wall connector.
- Runs of under carpet (flat twisted) cable with pair separation of more than 50 ft (15 m) are not allowed. Only 75 ohms or 100 ohms Zo under carpet cable is acceptable, and pair separation is required.
- Type Z station wire with a star quad lay-up is ONLY recommended for short runs. The cable should be arranged such that the leads in a pair are opposite each other (blue and yellow opposite/red and green opposite).
- The characteristic impedance of under carpet cable must be between 75 ohms and 100 ohms @ 1.28 MHz.
- Removal of twists in twisted-pair wire must be kept to a minimum.
- The total loop length must be reduced by 10 ft (3 m) for every foot (.3 m) of under carpet cable.
- The total loop length must be reduced by 5 ft (1.5 m) for every foot (0.3 m) of Quad station wire (where the blue and the yellow leads are opposite).

3.6 - 2.56 MBPS LINE SPECIFICATIONS (continued)

(b) **Line Characteristics**

PARAMETER	PARAMETER SPECIFICATION
Line Rate	2.56 Mbps
Information Rate	2.56 Mbps
Nyquist Rate	1.28 MHz
Coding	BPRZ-AMI
Peak Voltage	1.5 Volts dc
Range	2000 ft (610 m)
Minimum Signal to Noise Ratio	26dB
Bit Error Rate	1 x 10^{-9}
Equalizer	Adaptive Decision Feedback Line Equalizer
Pulse Duty Cycle	50%
Allowable Loop Loss	16dB

3.6 - 2.56 MBPS LINE SPECIFICATIONS

(c) Cable Specifications

CHARACTERISTICS	SPECIFICATIONS
Cable insulation	Polyvinyl chloride (PVC) Polyolefin (PIC) Pulp Teflon
Cable gauge	19 AWG (0.91 mm) 22 AWG (0.64 mm) 24 AWG (0.51 mm) 26 AWG (0.41 mm)
DC Loop Resistance at 16dB Loss	19 AWG (0.91 mm) < 46 ohms 22 AWG (0.64 mm) < 64 ohms 24 AWG (0.51 mm) < 104 ohms 26 AWG (0.41 mm) < 164 ohms
Mixed gauges	Permitted (Note 1)
Cable pairs permitted	3 to 4800 twisted
Bridged taps	Not permitted
Under-carpet cable	Maximum of 50 ft (15.2 m). Requires physical pair separation. The characteristic impedance must be between 75 ohms and 100 ohms @ 1.28 MHz.
Quad Wire	Not permitted if untwisted.
TELADAPT* Cables	"Silver satin" cable not permitted. Twisted-pair TELADAPT* cable may be used: NT0M96CA (A0321669), 3 ft (0.9 m) NT0M96CB (A0321670), 7 ft (2.1 m) NT0M96CC (A0321671), 14 ft (4.2 m) NT0M96CD (A0321672), 25 ft (7.6 m) NT0M96CE (A0321693), 37 ft (11.2 m) NT0M96CF (A0321694), 50 ft (15.2 m)
split pairs	Not permitted
Paralleled pairs	Not permitted
Maximum cable length	1684 ft (513 m) (Note 2 and 3)
Minimum cable length	0 ft (0 m); transmitter and receiver are able to operate back-to-back.

3.6 - 2.56 MBPS LINE SPECIFICATIONS

(c) Cable Specifications (continued)

CHARACTERISTICS	SPECIFICATIONS
Maximum loop loss allowed	16 dB @ 1.28 MHz
Mean near-end crosstalk loss 25-Pair environment	64 dB @ 1.28 MHz
Minimum near-end crosstalk loss 2-Pair environment (station wire)	40 dB @ 1.28 MHz

Note 1: If cable AWG (or metric equivalent) is unknown, then measurement of DC resistance will not provide useful information. Line loss should be tested further and replaced if necessary.

Note 2: Maximum cable length is determined by the amount of loss per 1000 ft (304.8 m) for a particular cable type, The worst cable type, 24 AWG (0.51 mm) D-Inside cable, has a loss of 9.5 dB per 1000 ft (304.8 m). For this cable type, maximum allowable loop loss of 16 dB occurs at a loop length of 1684 ft (5 13 m). Similarly, for 22 AWG (0.64 mm) cable, 16 dB loss is reached at 2125 ft (647 m).

Note 3: The total loop length must be reduced by 10 ft (3 m) for every foot of under carpet cable. The total loop length must also be reduced by 5 ft (1.5 m) for every foot of Quad station wire (where the blue and the yellow leads are opposite).

CONTENTS

SECTION : 7 TRAFFIC

DESCRIPTION **PAGE**

TRAFFIC

Introduction

All telecommunications networks possess two basic types of resources: call processing resources and call carrying resources.

Call processing resources set up and take down point-to-point connections within the network. They comprise route selection within the network, signaling between switching systems, billing, and controlling any special functions or features. Call processing resources are usually concentrated within the switching system. They take the form of relay or software-based logic, memory, and digit receivers/transmitters which are used to exchange signals between switching systems.

Call carrying resources are used to support a point-to-point connection established within the network. These resources consist of subscriber loops between telephone and switching systems, the connections through which the call passes within switching systems, and the transmission paths between all the switching systems in the end-to-end connection.

A fundamental quantity called traffic is derived from the product of two factors. One factor is the number of attempts or bids to use a network resource made per hour. The other is the average duration in hours that the resource is used per attempt.

Traffic Engineering

Traffic Engineering predicts the amount of equipment required to provide high quality service at the most economical cost. Most users take excellent telephone service for granted. It happens so quickly and automatically that there is a tendency to believe there are unlimited resources available in the switching network dedicated to each telephone. However, this is not the case; components of the switching equipment are shared among many callers. It is the traffic engineering which promotes this feeling of abundant equipment while still providing for an economical system.

The high quality of service is due in part to the establishment and adherence to communication traffic standards. The latter defines the quality of service that the user will experience when gaining access to the network and placing a call. In general, the higher the level of service, the greater the amount of switching and transmission resources required. Today the task of setting appropriate traffic standards is becoming more complicated because the nature of traffic is changing. Until recently, traffic consisted mainly of providing an adequate level of telephone service; now advances in digital technology make it feasible to integrate a variety of new services into a common network. The traffic characteristics of the integrated stream differs markedly from those of basic telephone traffic in three areas: holding time, number of network connections, and traffic pattern.

The holding time or duration of an ordinary telephone call tends to average about three minutes. In an integrated office traffic stream, holding times vary from short (a few seconds to transmit an electronic letter) to long (half an hour for a teleconference or longer for document processing). To determine the impact, the parameters that measure network performance, particularly those for blocking and access delay, must be considered.

Blocking probability is the probability that an attempt to invoke a service will be unsuccessful. At a given traffic level, the probability that blocking will occur increases as the number of simultaneous connections required increases.

Access delay is the amount of time the user waits to gain access to the service. In public networks, users are exposed to dial tone delay and to post-dialing delay. In a private network, access to resources may be gained on a delay basis.

Measurements of service quality have little meaning unless an objective or standard exists with which they can be compared. Traffic standards must be selected to strike a good balance between user service expectations and network cost.

Once service is deployed, operational measurements monitor traffic demands and the resulting quality of service. The data is also used to predict future load. The goal of this activity is to ensure that performance objectives are met now and in the future. The degree to which this goal is met depends largely on the accuracy of the traffic forecasts.

The average number of simultaneous calls during a given period is known as the traffic flow or intensity. The two commonly used units of traffic measurements are:

(1) ERLANG - by definition, one erlang is equal to the traffic intensity of one circuit fully occupied for one hour.

(2) CCS - hundred call seconds. Since there are 3600 seconds in each hour, one hour of traffic is equivalent to 36 CCS.

Thus the relationship between the two is that one hour of traffic is one erlang; one erlang is equal to 36 CCS.

UC =	Unit Call (expressed in 100 seconds or CCS)
CCS =	Hundred-second calls or the total amount of traffic in seconds divided by 100
ERLANG =	Traffic unit used when holding times are expressed in hours. It is usually designated as E.
E =	36 CCS and CCS = E/36

TABLE 7-l: TELEPHONE TRAFFIC UNITS

For planning purposes, calculations are usually made with the level of traffic measured during the busiest hour of the day. The busy hour, therefore, is the 60-minute time period in which the system carries the most traffic during a 24-hour period. The function of traffic engineering is to determine the minimum amount of equipment required to carry a given amount of traffic while maintaining an acceptable grade of service (GOS). Since busy hour traffic is an average measurement and equipment is provisioned to cater for it accordingly, the grade of service is the probability of a call being lost. Many mathematical formulae may be used to address grade of service and vary according to the assumptions made concerning the nature of the traffic. The three main formulae in use today are:

POISSON - Blocked Calls Held.
Calls that find no idle trunk remain in the system for the period that they would have occupied had they been connected and then leave the system. Time in system is equal to the expected call duration.

ERLANG B - Blocked Calls Cleared.
Calls which find no idle trunk are cleared immediately from the system. Time in the system is zero.

ERLANG C - Blocked Calls Delayed.
Calls which find no idle trunk wait in a queue until a trunk is free and then are connected normally. Time in system is equal to the waiting time plus the expected call duration.

The Poisson technique predicts the portion of time circuits are all busy when given the calling traffic. It utilizes what is called the "Lost Calls Held" (LCH) assumption which states that when a **call** receives an all trunks busy signal, the call is held waiting for a trunk to become available up to the length of its individual holding time. This assumption has been duly criticized with the widespread belief that Poisson inflates the amount of circuits recommended to maintain certain grades of service.

Unlike Poisson, Erlang B has been studied and acclaimed as a very accurate technique for predicting both blocking and trunk usage, particularly when alternate routes are automatically selected upon encountering blockage.

Erlang C is the technique used when calls are queued but has the limitation of assuming all callers encountering a delay will be willing to wait an indefinite period of time to be connected.

In summary, there are justified indictments against the traffic engineering techniques of Poisson, Erlang B, and Erlang C that result in a void in the capability of accounting for the way customers utilize today's enhanced communication services. The most pervasive influence on traffic standards comes from the development of new services. The way users perceive and interact with the network is changing, particularly in the business community as the electronic office becomes a reality. The traditional objective of high quality service must be balanced against the cost of deploying the service using the available technology. The Meridian SL-1, with its flexible architecture, distributed network, and inherent traffic measurement capabilities, can be suitably configured to meet any traffic engineering application with minimum penalty to cost.

Traffic Considerations

Many different analytical methods have been used for calculating the traffic capacity of the Meridian SL-1. Theoretical analysis, substantiated by simulation of the switching system, resulted in an admissable region of traffic handling capability that would satisfy intraloop and interloop blocking probabilities. Service loops were not considered in the simulation, since most of the services (such as dial tone) operate on a delay basis without contributing to the loss of traffic.

Grade of Service

To simplify the path search algorithm, the original SL-1 network design utilized a procedure of selecting time slots from a set of admissable pairs.

The following grade of service objectives are utilized for the switching network:

(a) No more than 1.5 percent of the originating calls have to wait more than 3 seconds for dial tone.

(b) No more than 1 percent of the incoming terminating calls will be lost provided the called line was free.

(c) No more than 1 percent of the originating outgoing calls will be lost in the system (excluding the loss due to the outgoing trunks being unavailable). Furthermore, no more than 2 percent of the calls will be lost due to all the trunks being busy.

(d) No more than 4 percent of the intraoffice calls will be lost provided the called line was free.

Thus originating calls will be delayed in obtaining dial tone if a time slot pair between originating loop and service loop is not available. Specification (a) suggests that such delays over 3 seconds should not be encountered by more than 1.5% of the calls.

Incoming terminating calls are assumed to be lost if there is no matching time slot available between the loop carrying the incoming trunk and the terminating loop. There is up to 1% loss allowable for this case.

Outgoing calls will be lost if no outgoing trunk is available and up to 2% loss is allowable. The failure to find a time slot pair match between the loop with the outgoing trunk and the service loop will cause loss of the outgoing call.

Furthermore, there is a possibility of loss in not being able to find a matching time slot pair between the loop carrying the outgoing trunk and the originating loop. The cumulative effect of these two losses must be less than 1%.

There is a loss of intraoffice calls only when there is no time slot pair match between the originating and terminating network loops with up to 4 percent allowable to meet grade of service objectives.

The grade of service (a) is concerned with dial tone delay specifications. The grade of service (b), (c), and (d), in effect, deal with the switching network and route blocking. Incoming, outgoing, and intraoffice matching losses are related to intraloop (BINT) and interloop (BEXT) blocking probabilities.

Specification (d) requires that BINT, BEXT be less than 4 percent.

Specification (b) means that 1 percent is the allowable limit on blocking for incoming terminating calls.

Specification (c) refers to the congestion in the switching network for an outgoing call and the maximum allowable blocking probability for this case is 1 percent.

A retrial procedure is used on outgoing trunks in attempting to find an available path through the network. Hence the blocking probability for the outgoing calls will be less than that for incoming calls. Thus if specification (b) is satisfied, specification (c) is automatically satisfied for the switching network.

In consideration of the foregoing specifications, the allowable range of BINT and BEXT can be obtained for a given number of traffic loops. Figure 7-l shows such a range for a 16 loop system of which 12 are assigned for traffic. In calculating the traffic capacity of the system it is desirable that the corresponding blocking probabilities, BINT and BEXT, should fall within the range depicted.

To verify analytical projections and ascertain capacity more precisely, traffic levels were empirically obtained by call simulation for various system sizes. The results of simulation for 12 traffic loops are shown in Figure 7-2. The intraloop and interloop blocking probabilities are plotted for various values of traffic per loop in CCS. The resultant curve, overlaid with the admissable region of BINT and BEXT, indicates that up to approximately 600 CCS per loop satisfies grade of service requirements. Hence, the recommended traffic is considered to be 600 CCS per loop.

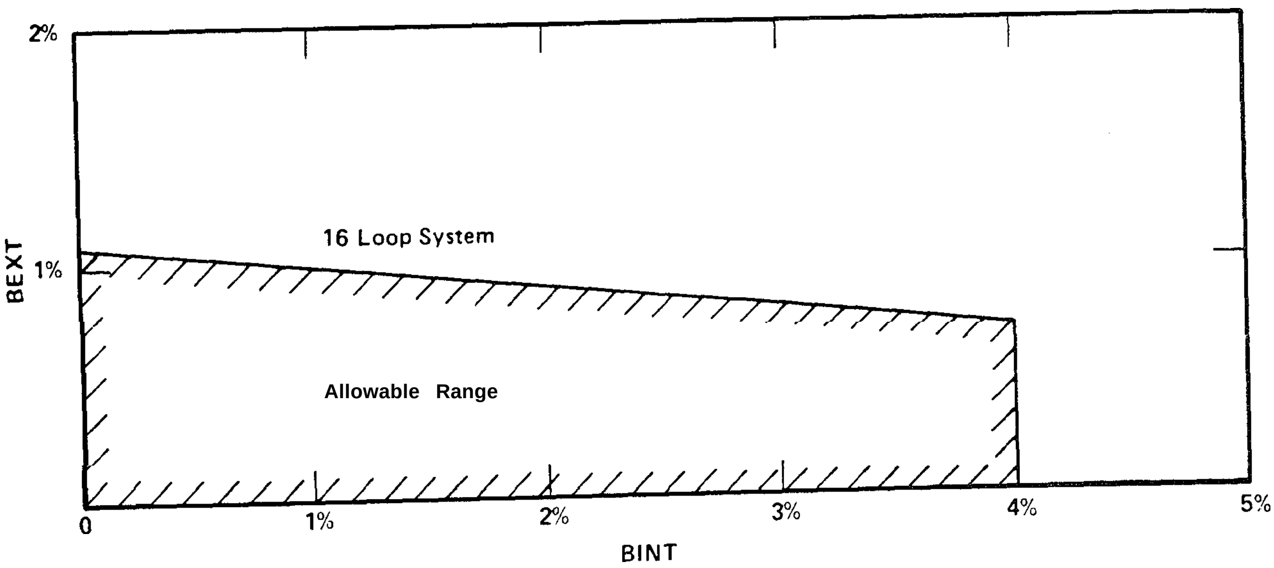


FIGURE 7-l: GRADE OF SERVICE - BLOCKING PROBABILITIES

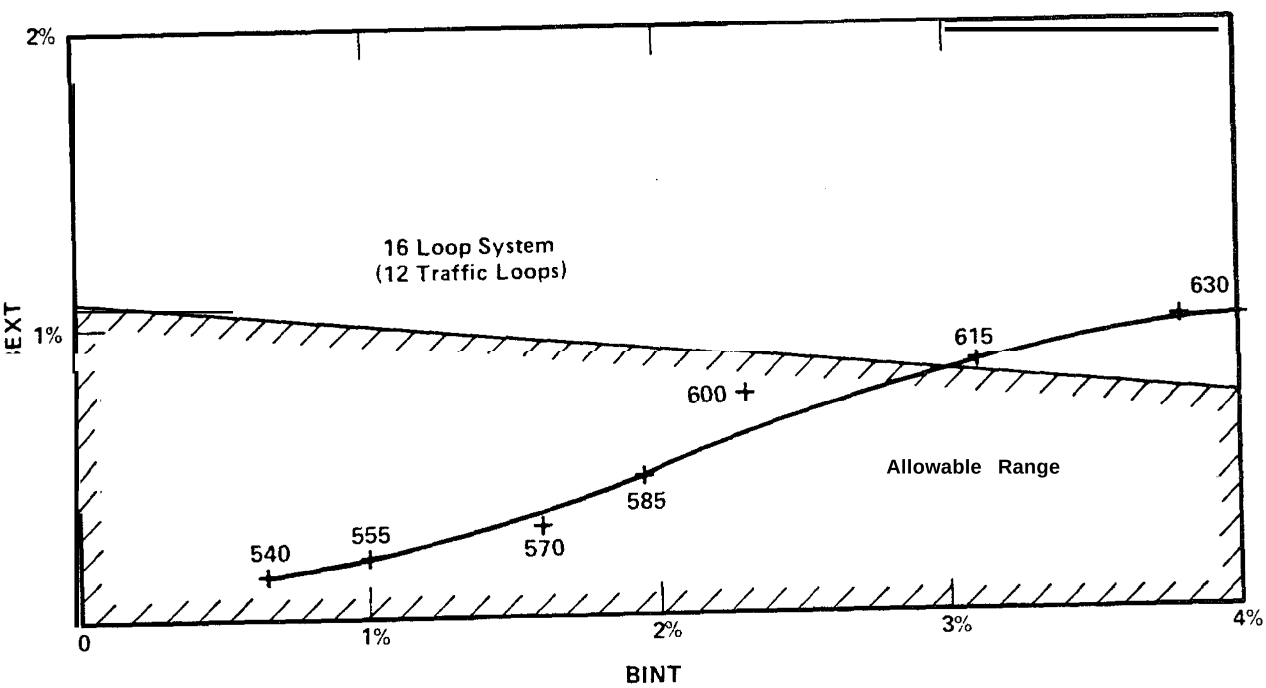


FIGURE 7-2: GRADE OF SERVICE - TRAFFIC LOOP CAPACITY

It should be noted that these are desirable guidelines to optimize network performance for the maximum 160 terminations on a network loop. In the practical sense, a mix of peripheral interface cards more often results in fewer terminations being serviced by the network loop. With less contention for time slots, the traffic handling capability exceeds the grade of service objectives and increases the traffic capacity of the network loop. Since any type of peripheral device (telephone, terminal, trunk, data unit, digitone receiver, etc.) may be used in a connection, the traffic capacity is obtained as the traffic that can be carried by all time slots in a loop. The sum of the traffic generated by all associated peripheral terminations constitutes what is known as the loop traffic.

In order to achieve the lowest blocking probability and facilitate the time slot matching pair algorithm, traffic should be evenly distributed over the available network loops. This is termed load balancing and is implemented to more readily accommodate variable traffic patterns. However, this procedure is quite meaningless if based upon unsubstantiated traffic projections prior to system installation. Although balanced from a theoretical point of view and engineered to meet grade of service recommendations, the allocation of users to peripheral devices and their subsequent network resource activity is the main criteria for achieving optimum system performance. It makes more sense to assign approximately the same number and type of terminals on each network loop and utilize the inherent system traffic measurement capabilities to determine if reassignments are necessary. All too often, inflationary traffic forecasts are made without substance and applied arbitrarily to system engineering. The result is a configuration that adopts a very conservative approach to traffic handling capability.

The method of searching for free time slots in admissable pairs is utilized in two of the present Meridian SL-1 business system offerings--models S and MS. The concept readily meets the traffic demands of small system applications. It is also utilized in the LE and XL in support of Software Generics 337 and 637 respectively. However, in recognition of the need to enhance and provide more switching capability to address the ongoing requirements of both voice and data, a new network design was introduced in 1984.

Network Enhancement

The traffic impacts of network enhancement are two-fold:

1) The removal of the time slot pairing constraint between originating and terminating calls. The selection instead of time slots on an individual basis reduces mismatch probability, improves network capacity, and provides the capability for a non-blocking matrix. The net effect is an increase in loop capability of approximately ten per cent (10%), i.e., from 600 CCS/loop to 660 CCS/loop for 160 PE terminations based on the Erlang B model as before.

2) The doubling of network loops within a group. In the enhanced network design, the number of loops in a group is doubled from 16 to 32. The associated network card supports two loops. The number of inter-group junctors is also increased from 4 to 8 to improve the grade of service and reduce blocking probability in the multi-group system.

The foregoing enhancements were instrumental in the formation of two Meridian SL-1 system models - N and XN. The network design has since been incorporated in the most recent members of the product family - Meridian SL- 1ST, Meridian SL- 1RT, Meridian SL-1NT, and Meridian SL- 1XT.

The unavailability of a time slot for call set up is a function of the amount of traffic then loaded on the loop (both voice and data) and, therefore, blockage due to all time slots being busy is the same for both voice calls and data calls. However, if the traffic level for different traffic sources varies a lot, the type of traffic sources with a lower load could encounter blocking if too many heavy traffic sources also generate traffic to the same circuit group. It is for this reason that data traffic, with its typically long holding times, be limited on inter-group junctors.

Network enhancement provides the viable alternative of assigning all data lines on a loop and data traffic within a group to effectively isolate the impact on voice traffic. It also provides complete flexibility in engineering network loops throughout the system to address the varying demands of both voice and data traffic accordingly.

Depending upon the origination and termination of a call, several situations contribute to the blocking probability which, for Meridian SL-1, is based on Erlang B formula at the network loop.

A) INTRA-LOOP, INTRA-GROUP BLOCKING

For an intra-loop intra-group call, blocking will occur when idle time slots in the network loop are less than two.

B) INTER-LOOP, INTRA-GROUP BLOCKING

Blocking of this type could occur when a call encounters no idle time slot at either the originating loop or terminating loop.

C) INTER-LOOP, INTER-GROUP BLOCKING

Calls of this type could be blocked at originating loop, terminating loop, and inter-group junctors. A junctor is served as an extension of the originating and terminating loop; the same time slot at both junctor and originating loop must be idle in order to succeed in the first half of the connection. A similar match is also required at the terminating side. The time slot at the terminating loop is independent of the originating time slot.

Each inter-group call initiated will require two idle time slots on the junctors to set up the path; one time slot on the originating junctor to match the originating loop and another time slot on the terminating junctor to match the terminating loop. In other words, one inter-group call will make two time slots on the junctors busy, one on each group of junctors. Since both originating and terminating traffic between two network groups pass the same sets of junctors, a junctor group handles traffic from both directions, even though it is associated with only one network group.

D) INTER-LOOP, INTRA-GROUP CALLS WITH SMALL TRAFFIC SOURCES

This type of call is of particular interest since for heavy data applications, the number of terminations per network loop could be relatively small due to high CCS per data line requirements. In order to reduce blocking, high traffic data lines and computer ports are not recommended to be in the same network loop (since an intra-loop call takes two time slots from the same loop) or different groups (to minimize junctor traffic). Therefore, most calls from loops with small traffic sources should utilize inter-loop intra-group connections. The reduction in the number of terminations permits the use of the Engset formula for finite sources in place of the Erlang loss formula for infinite sources.

The Engset formula, like Erlang B, is a loss-call-cleared model with a finite source assumption which is applicable when the number of traffic sources to channels ratio is small. The finite source model predicts a higher capacity since it includes the number of traffic sources as a parameter in the model. When a certain number of channels or time slots are occupied, the model will correspondingly reduce the number of idle sources which could potentially generate traffic to the channels. Therefore, the projected blocking is reduced and the allowed traffic would be greater for the finite Engset source model than that for the Erlang B model since the latter has a constant rate of service demand.

Utilization of the Engset model is appropriate for those Meridian SL-1 models that incorporate network enhancement and have a traffic source to channel ratio of approximately 4:1 or less. Therefore, it is appropriate for applications where a network loop of 30 traffic channels services up to 120 peripheral ports or traffic sources. For Meridian SL-1 applications, this is invariably the case because of the universal concept of the peripheral equipment shelf and its ability to accommodate any type of interface card.

With this in mind, significant traffic handling benefits arise in allocating a single PE shelf to a network loop. For the implementation of double density peripheral equipment, the capacity of the PE shelf is 80 terminations, attainable only by the provision of 8 port line cards in each of the ten card slots available. However, this rarely the case since a mix of card types is typically equipped. The varying card densities on the PE shelf combine to reduce the number of peripheral ports contending for the thirty available time slots on the supporting network loop. The fewer the PE terminations the higher the loop traffic and vice-versa. The universal allocation of peripheral cards on the PE shelf permits loop traffic to vary accordingly from 735 CCS (for 80 terminations) up to 1080 CCS (for a non-blocking matrix of 30 terminations). It is this complete flexibility of network and peripheral organization that allows Meridian SL-1 to meet any traffic requirement.

Service Loop Configuration

Since network enhancement doubled the number of loops within a group from 16 to 32, the impact on service loop provisioning was measured for typical applications. The requirements of service circuits in general are a function of call attempts seeking connections. If the average traffic per line is increased due to more traffic (longer holding time) rather than more call attempts, the increased traffic to service circuits is minimal. However, when the number of call attempts is doubled, the service circuit traffic is also approximately doubled. The object of network enhancement was to facilitate traffic handling capability rather than increase significantly the number of terminations.

In general, an equivalent number of call attempts, coupled with larger holding times for data connections, means that service circuit functions are not adversely impacted by the increase in traffic loops.

The tone and digit switch (TDS) provides dial tone, busy tone, overflow tone, ringing tone, audible ringback tone, DP or DTMF outpulsing, and miscellaneous tones. The service circuit requirements were estimated as a linear function of terminal loops at a specified traffic level.

The conference (CONF) loop provides connections for multi-party conference calls and its provisioning is largely dependent on customer needs. The Meridian SL-1 is flexible enough to provide additional CONF loops to meet specific application requirements, such as Music-On-Hold.

The recommended allocation of TDS, CONF, and traffic loops is provided in Table 7-2.

NETWORK GROUP	TRAFFIC LOOPS	TDS LOOPS	CONF LOOPS	TOTAL LOOPS
1	11 - 12	2 1	2 1	28 14
2	25-36 37 - 48	3 4	3 4	42 56
3	49-60 61-72	5 6	5 6	70 84
4	73 - a4 85-96	7	7 8	98 112
5	97 - 108 109 - 120	9 10	9 10	126 140

TABLE 7-2: RECOMMENDED ALLOCATION OF NETWORK RESOURCES

Thus, every additional twelve traffic loops adds a TDS and a CONF loop. With network enhancement, only the number of traffic loops is doubled on a network card. The TDS and CONF loops are single density circuit cards. Although, theoretically, the number of loops in a network group is doubled from 16 to 32, it is true only when they are all traffic loops. Any TDS or CONF loop takes the place of 2 traffic loops in the total 32 loops available. Therefore, in a fully equipped network group, the recommendation is 24 traffic, 2 TDS, and 2 CONF loops.

Traffic Curves

The traffic capacity of the Meridian SL-1 is basically a multiple of the capacity of the network loop. Under worst case conditions of 160 terminations, the loop capacity is estimated to be 660 CCS. However, any loop with less than a hundred percent line traffic will reduce the total number of equipped terminations. The loop capacity is related to line and trunk traffic and intercom ratio (R). This relationship is expanded upon in Chart 7- 1 (Meridian SL-1 Traffic Equations).

From the derived formula, the functional relationship between CCS per line and the number of lines per loop may be plotted as shown in Figure 7-3. Curve (A), defined as CCS per termination, is the upper limit of CCS per line since it does not include any trunk traffic. Thus for a maximum of 160 line terminations, the CCS per line is 4.12 for a total loop capacity of 660 CCS. However, as the line terminations decrease so the loop traffic capability increases such that for 50 sole line terminations the CCS per line is 13.2 CCS.

Curves (B) and (C) include intercom ratios of 0.75 and 0.5 respectively. Considering Curve (C), when the network loop is equipped with 100 lines, the CCS per line is 4.4; if the loop is equipped with only 60 lines, the CCS per line is approximately 7.33 CCS.

Note that the curves cut off at 50 lines since for a loop with sources less than that, it is not recommended to use the Erlang loss formula for capacity estimation. Instead the Engset formula for finite sources should be utilized as shown in Figure 7-4. From this it can be seen that the traffic handling capacity of the network loop varies from 735 CCS for 80 terminations (the capacity of a double density PE shelf) to 1080 CCS for 30 terminations (non-blocking applications at 36 CCS per termination). The curve of the Engset model will converge to Erlang model when the number of traffic sources is very large.

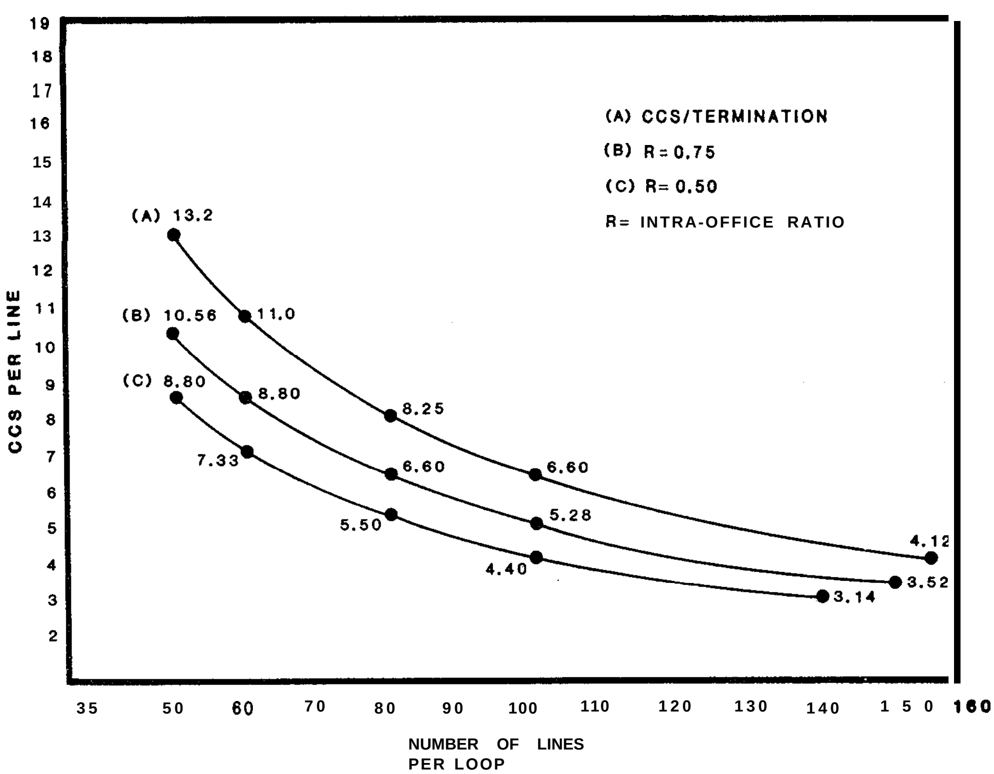


FIGURE 7-3: LINE CAPACITY FOR 30 TIME SLOT LOOP OFFERED 660 CCS

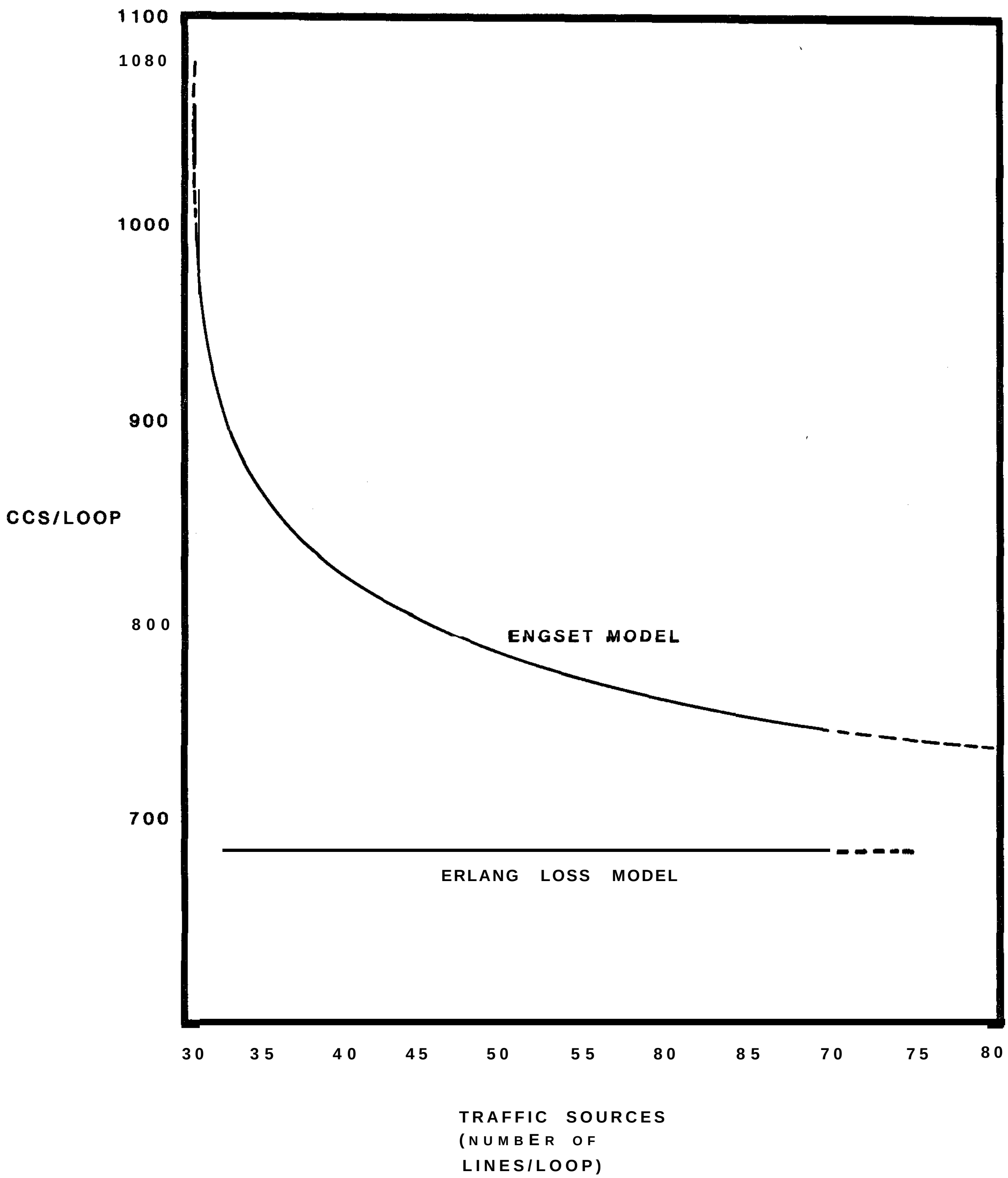


FIGURE 7-4: LOOP CAPACITY AS A FUNCTION OF TRAFFIC SOURCES

Non-Blocking Applications

The introduction of network enhancement permits the Meridian SL-1 to be configured for non-blocking applications. By definition, non-blocking infers that a peripheral device is always guaranteed access to network resources. Thus, by allocating thirty (30) or less terminations on both the originating and terminating loops, a non-blocking matrix can be effected between them. On a one-to-one correlation, each of the 30 PE devices is randomly assigned a timeslot out of the 30 available on the network loop. A single group system (Meridian SL-1N or NT) can provide a non-blocking matrix of 720 terminations after following the service provisioning recommendations of 2-TDS and 2-CONF loops. In the multi-group Meridian SL-1XN or XT, a full complement of the 32 network loops available within a group can be allocated totally to traffic if the service functions are assigned to a different network group. Thus a maximum of 960 terminations within a group can be configured for non-blocking by following this procedure. A network group can be allocated solely to voice ports, data ports, or service functions. Alternatively, one or more network loops within a group can be configured for non-blocking applications for any type of peripheral equipment. This complete flexibility in the assignment of terminal devices to network resources permits the switching matrix to be optimized on a custom basis to best meet the application.

In the practical sense, feasibility considerations should be reviewed before utilizing non-blocking capabilities. First of all, the latter applies only to the internal Meridian SL-1 switching matrix. Outgoing calls that leave the system are subject to external network facilities which, for economical and practical purposes, are provided on a contention basis. Similarly, data calls from terminals to computer ports utilize the Meridian SL-1 switching matrix for cost-effective, multiple access benefits, often via modem pooling arrangements which counter non-blocking capabilities. Secondly, the desired termination device must be free in order to complete the connection. Otherwise, despite the provision of a non-blocking matrix, the call cannot be completed and busy tone is returned to the caller. Finally, the basic question to be answered is how will one utilize a non-blocking matrix? With full availability and 36 CCS traffic capacity, each peripheral device would have to be in use continually and simultaneously to really justify the provision of non-blocking.

LOOP TRAFFIC = LINE TRAFFIC & TRUNK TRAFFIC

Let:

ORIG-OGT	=	TRAFFIC ORIGINATING FROM LINES OUTGOING TO TRUNKS
INC-TERMT	=	TRAFFIC INCOMING FROM TRUNKS TERMINATING ON LINES
INTRT	=	INTRA-OFFICE TRAFFIC ORIGINATING AND TERMINATING ON LINES
LOOPT	=	LOOP TRAFFIC (CCS) PER LOOP
LT	=	LINE TRAFFIC (CCS)
TT	=	TRUNK TRAFFIC (CCS)
R	=	INTRA-OFFICE OR INTERCOM RATIO
NL	=	NUMBER OF TRAFFIC LOOPS

BY DEFINITION:

$$R = \frac{\text{INTRA OFFICE TRAFFIC}}{\text{LINE TRAFFIC}} = \frac{2 \times \text{INTRT}}{\text{LT}}$$

$$\text{LT} = \text{ORIG-OGT} + \text{INC-TERMT} + 2\ \text{INTRT}$$

$$\text{TT} = \text{ORIG-OGT} + \text{INC-TERMT}$$

TOTALLOOPTRAFFIC

$$\begin{aligned}
\text{NL} \times \text{LOOPT} &= \text{LT} + \text{TT} \\
&= 2\ \text{ORIG-OGT} + 2\ \text{INC-TERMT} + 2\ \text{INTRT} \\
&= 2\ (\text{ORIG-OGT} + \text{INC-TERMT} + 2\ \text{INTRT}) - 2\ \text{INTRT} \\
&= (2 \times \text{LT}) - (\text{LT} \times \text{R}) \\
&= \text{LT}\ (2-\text{R})
\end{aligned}$$

$$\text{OR LT} = \frac{\text{LOOPT} \times \text{NL}}{2-\text{R}}$$

$$\begin{aligned}
\text{AND TT} &= (\text{LOOPT} \times \text{NL}) - \text{LT} \\
&= \text{LT}\ (2-\text{R}) - \text{LT} \\
&= \text{LT}\ (2-\text{R}-1) \\
&= \text{LT}(1-\text{R})
\end{aligned}$$

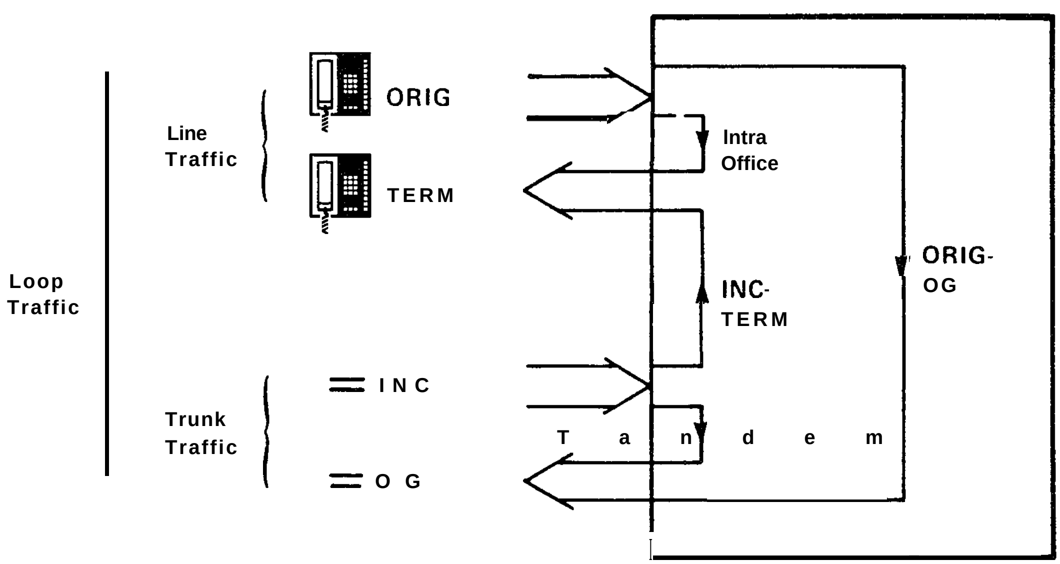


CHART 7-1: MERIDIAN SL-1 TRAFFIC EQUATIONS

CONTENTS

SECTION : 8 DATA PRODUCTS

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DESCRIPTION **PAGE**

LANSTAR DATA SERVICES

Introduction

The Meridian SL- 1 architectural design readily accommodates the rapidly expanding requirements for switching data as well as voice communications. Since its introduction, the Meridian SL-1 product line has evolved to include the widest portfolio of data switching capabilities. It offers more data switching and data connectivity than any other PBX or office controller in the marketplace today. Northern Telecom's commitment to OPEN World (Open Protocol Enhanced Networks) ensures the achievement of maximum functionality and compatibility in data processing and communications.

This section provides an overview of the LANSTAR data services. It details how each product connects to the Meridian SL-1, to data terminal equipment (DTE), and to data communications equipment (DCE).

In a single unified network, LANSTAR supports a huge variety and population of terminal users. User needs are accommodated with low speeds (up to 19.2 Kbps), medium speeds (up to 64 Kbps) and high speeds (up to 2.56 Mbps). The LANSTAR network, with its ability to support various speeds, allows businesses to design and incorporate more of their computer and terminal products with far greater flexibility than is possible with other local area network solutions.

Meridian SL-1 offers over 300 Mbps of circuit switched bandwidth and 40 Mbps of packetized bandwidth to create a high-speed media-independent local area network. This innovative architecture allows all communications to be handled in a single, integrated system. For example, voice communications and slower speed data are processed at 64 Kbps, while high speed file and data transfer between PC's and PC Servers is accomplished at much higher speeds. Meridian LANSTAR is a unique communications system for IBM and compatible PCs and Macintosh II computers. It provides high performance Local Area Networking for a wide range of needs - from simple resource sharing within small departmental workgroups to sophisticated communications requirements of very large personal computer installations distributed worldwide. The high speed communications requirements are instantaneously met via dynamic allocation of bandwidth and distribution speeds up to 2.56 Mbps.

The Meridian SL-1 star topology provides greater reliability than other LAN topologies. With the PBX for its hub, LANSTAR employs this "star" topology which means increased information throughout, greater network flexibility and expandability, and reliable connectivity for a wide variety of devices. The "star" architecture offers easier fault isolation and means no single node can bring down the entire network. LANSTAR Data Services are built upon the high reliability standards of the telephone industry.

LANSTAR Data Services can expand the realm of all users. For example, users can share access to IBM host computer domains via a choice of communications options; namely 3270 Protocol Converters and System 36/38 Gateways. Coaxial cabling costs associated with IBM environments can be reduced with the Coax Elimination and Switching System (CESS). Specific host computer domains can use the cost-effective Computer-to-PBX Interface (CPI) to communicate between a host processor and the Meridian SL- 1. Data call placement with Wide Area Networking products can easily be accomplished. These include the services of modem pools, X.25 Data Networks, and data access to other Meridian SL-1 systems via the Digital Trunk Interface (DTI).

Flexibility for Growth

Adding users to a LANSTAR network is easy, simplifying migration and growth. Because they share the same wiring, LANSTAR data products utilize the same RJ type jacks installed for telephone service. This association also makes departmental moves and changes easier because the availability of telephone connectors simplifies the movement of data equipment.

In addition, LANSTAR can reduce costs enormously through its cost-effective resource sharing capability. Personal computing costs can be kept under control with a choice of local area networking solutions which include Meridian LANSTAR, a high speed LAN on the Packet Transport, EasyLAN, which is a circuit-switched LAN, and LANSTAR AppleTalk. At the same time, Meridian LANSTAR and EasyLAN users have access to all LANSTAR Data Services, giving far greater functional capability than ever before.

The LANSTAR data products described in this section are outlined as follows:

A - LANSTAR TERMINAL ACCESS

- Digital Telephones
- Integrated Terminals
- Connection Options for Data Terminals

B - LANSTAR LOCAL AREA NETWORKING

- Meridian LANSTAR
- LANSTAR Appletalk
- EasyLAN
- Apple Macintosh Networking
- Access to Specialized LANs

C - LANSTAR HOST ACCESS

- Add-on Data Module (ADM)
- Asynchronous/Synchronous Interface Module (ASIM)
- Multi-Channel Data System (MCDS)
- Computer-to-PBX Interface (CPI)

D - STRATEGIC ALLIANCES PROGRAM

- Data General Corporation
- Digital Equipment Corporation
- Hewlett-Packard Company
- Prime Computers, Inc.
- Unisys
- Wang Laboratories, Inc.
- Apple Computer, Inc.

E - LANSTAR IBM ACCESS

- 3270 Protocol Converter
- System 36/38 Gateway
- Coax Elimination and Switching System (CESS)

F - LANSTAR WIDE AREA NETWORKING

Digital Trunk Interface (DTI)
Remote Peripheral Equipment (RPE)
X.25 Gateway
Modem Pooling
Electronic Switched Network (ESN)
Integrated Services Digital Netwok (ISDN)

G - INTERFACE CARDS

Integrated Services Digital Line Card (ISDLC)
Data Line Card (DLC)
4 Port Data Line Card (4PDLC)
Asynchronous Interface Line Card (AILC)
RS-232C Interface Line Card (RILC)
LANLINK Interface Assembly
500/2500 Line Card
Modem Pool Line Card (MPLC)

H - MISCELLANEOUS

LANSTAR Balun Family

The Meridian SL-1 LANSTAR Data Services network provides the following major benefits:

- **Domain Switching** - Terminal and personal computer (PC) users in a data-switched environment can access multiple computers (including IBM computers via protocol converters) as well as communications devices and networking services.
- **Port Contention** - Use of all computers and communications resources connected to the Meridian SL-1 can be shared by an increased number of users. Port contention provides increased terminal connectivity while minimizing the number of computer resource ports required. Multiple users sequentially access a single port to a computer or communications resource, expanding its use. Port contention, therefore, allows application programs to be shared by a larger number of users.
- **Increased Distance** - Terminal and PC users can be located almost 8000 feet (1.5 miles) from a host computer, eliminating RS-232 distance restrictions.
- **Easier Moves and Changes** - Since all Meridian SL-1 data devices use standard telephone wiring, which often is already in place, installation and on-going moves and changes are less costly and quickly accomplished.
- **Improved Data Call Handling** - Most Meridian SL-1 voice calling features are applicable to data. For instance, port hunting, call forwarding, ring again and traffic statistics provide easier data calling and measurement.

As part of a Meridian SL-1 data-switched environment, terminal and PC users can also access all other hosts, communications devices, or networking services that are part of their Meridian SL-1 data network. With Meridian SL-1 wide area networking services, this might include access to remotely located computers via a cost-effective modem pool arrangement, or shared use of X.25 services and high speed T-l communications links with Digital Trunk Interface (DTI) for networking Meridian SL-1 systems, communicating with central offices and other T-l facilities.

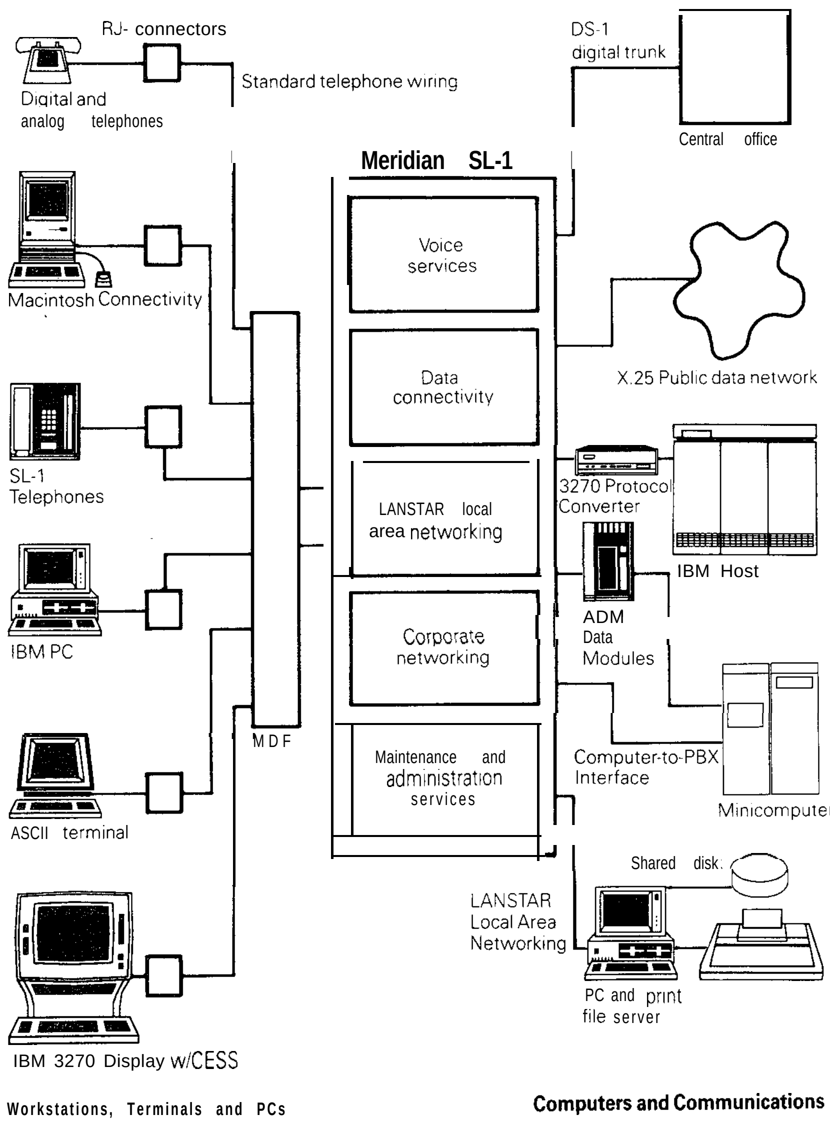


FIGURE 8- 1: LANSTAR DATA SERVICES

A - LANSTAR TERMINAL ACCESS

Introduction

LANSTAR provides a comprehensive set of data connectivity options for terminal users. The customer may achieve the complete integration of voice and data communications with Meridian Digital Telephones and Integrated Terminals.

For users who have SL- 1 electronic telephones, there is the Add-on Data Module. There are several types of stand-alone modules which may be used in conjunction with standard telephones or with no telephone at all.

For IBM personal computers, there is the Personal Computer Interface card which fits inside the PC, and for the Macintosh, an inexpensive cable provides connectivity with no extra hardware.

Macintosh II and IBM personal computers may also be networked with Meridian LANSTAR, which provides 2.56 Mbps distribution to each desktop and access to a 40 Mbps local area network. Meridian LANSTAR is supported by LANSTAR PC Interface Card and Macintosh II Interface Card.

Each of these products provides a simple, economical connection to the Meridian SL-1: the standard RJ-11 jack. With LANSTAR, installing the data interface can be as simple as plugging in a telephone.

Features

For the terminal or personal computer user, establishing a data connection through the Meridian SL- 1 is analogous to making a voice call. Data calling allows many convenience features normally associated with voice calling, as well as other features which are unique to the Meridian SL-1.

Keyboard Dialing may be used to make data calls from asynchronous terminals, where the user enters the destination number from the terminal keyboard instead of using a telephone keypad. The Meridian SL-1 provides prompts and menu choices to simplify the call setup.

Auto Dial allows one-step data calling to a frequently-called destination. The user hits a carriage return and the predetermined number is automatically dialed.

Speed Call provides abbreviated dialing (l-3 digits) to any of several destinations.

Hot Line is similar to auto dial, except that the terminal connects to the host computer automatically when the terminal is turned on. This feature is especially useful for synchronous terminal users. Hot Line may be configured with the Add-on Data Module and with the Coax Elimination and Switching System.

Autobaud is automatic speed adjustment between the terminal or host port and Meridian SL-1 without user intervention. For example, the Asynchronous Interface Line Card provides the autobaud function for asynchronous terminal users placing data calls via the AIM, PCI card, and direct RS422 connections.

Important data call processing features are also provided by Meridian SL- 1 software.

Ring Again allows the user to “queue” for a busy port or service. As soon as a port is available, the user is alerted and the data call completed after a one-key confirmation by the user.

user is alerted and the data call completed after a one-key confirmation by the user.
Data Port Hunting allows a Directory Number to be assigned to a group of data ports, so a data call will hunt to the first available port.

Digital Telephones

The Meridian M2000 Series and M3000 Digital Telephones provide a single solution to both voice and data communications. The Asynchronous Data Option is installed inside the digital set (also as a field upgrade). Digitized voice and asynchronous data are multiplexed at the telephone set and transmitted over a single twisted pair of wires to the Meridian SL- 1.

The Asynchronous Data Option supports asynchronous terminals and personal computers with the RS232 interface. It provides transmission speeds up to 19.2 Kbps; transmission speeds are automatically adjusted by the Autobaud feature. Power is provided to the Data Option by a wall mount power supply (the M3000 already has this required power supply).

The user may place data calls directly from the terminal keyboard. Meridian SL-1 provides prompts and menu choices to simplify data calling, and features autodialing, speed calling, and ring again. The M3000 Touchphone additionally has a touch-sensitive LCD display, with a built-in directory to place data calls.

Personal computer users with appropriate software may simplify data calling by creating automatic log-on script files (macros). In its Hayes Smartmodem compatible mode, the Asynchronous Data Option obeys the Smartmodem command for dialing (ATD).

The Digital Telephone Set connects to Meridian SL-lwith one twisted pair wire, and may be located up to 3000 feet from the PE cabinet. An RS232 cable is required to connect the asynchronous terminal or personal computer.

The Digital Telephone Set interfaces to the Integrated Services Digital Line Card (ISDLC), requiring one port to support both voice and data communications. The ISDLC supports 8 digital sets and resides in a Peripheral Equipment (PE) shelf of Meridian SL- 1.

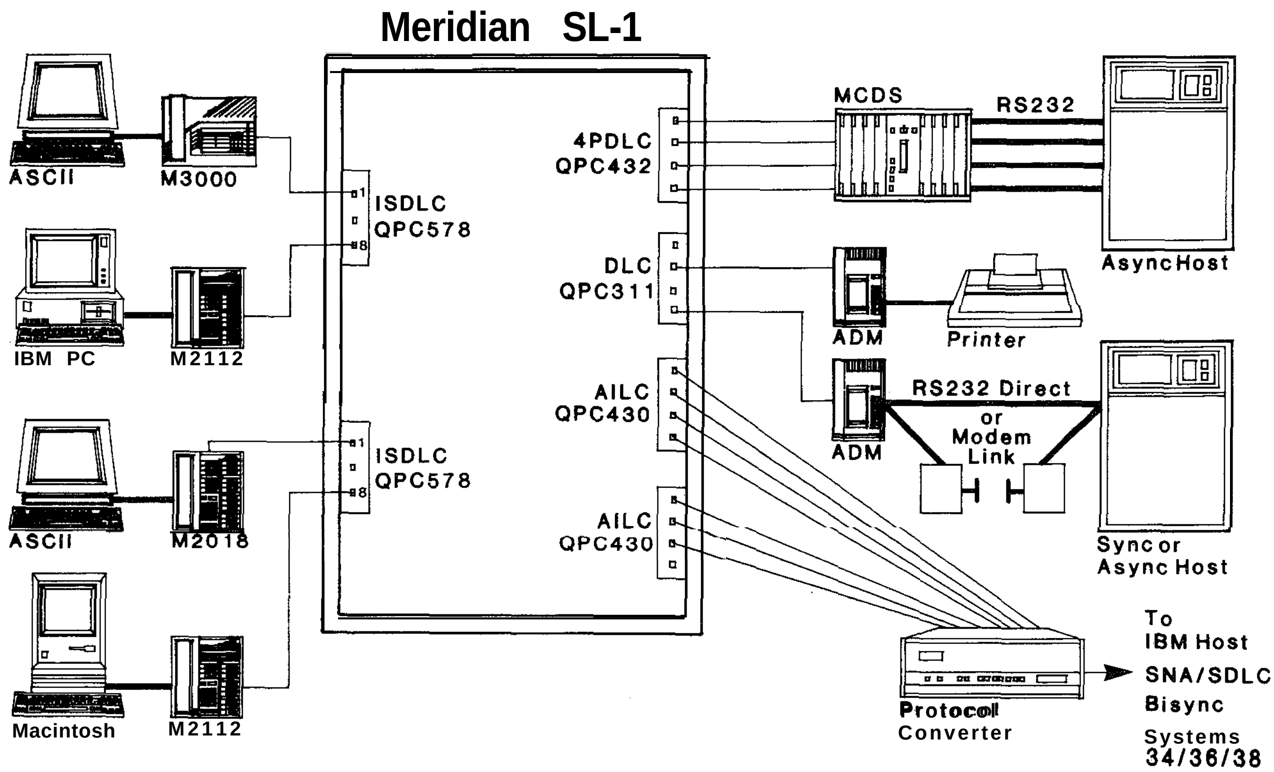


FIGURE 8-2: DIGITAL TELEPHONES WITH ASYNCHRONOUS DATA OPTION

Displayphone 220

The Displayphone 220 integrated voice and data terminal operates with virtually any central office switching system, Private Branch Exchange (PBX) or 1A2 key system. Essential Displayphone components, including screen, telephone, retractable standard keyboard, data modem and operating software, are housed in the compact desktop unit.

This Displayphone terminal offers a common set of data and voice communications features and provides separate features for specific needs. Common features include simultaneous data and voice communications. Two separate display modes provide access to data, telephones and other features on one mode, without disrupting service on the other mode.

An auto-answer modem with dial-up speeds of either 300 or 1,200 bits per second allows callers to place data calls. This modem also provides digital-to-analog conversion for accessing remote data bases. All Displayphone models offer both a serial port for direct connection to other devices, and a parallel printer port.

Two telephone lines and a personal directory for selection and automatic dialing of as many as 90 programmable numbers are among common voice communications features. Other features include Call Timer, Last Number Redial (LNR), Hold and Mute. The user also can store all log-on instructions for numbers used to access computer services.

Displayphone software provides option menus, screen-based prompts and soft keys. Soft keys (also called function keys or smart keys) can be assigned to a variety of functions whenever necessary. This ability increases flexibility when modifying or adding features, and makes operation easier.

The Displayphone 220 terminal emulates Digital Equipment Corporation's VT220, VT100 and VT52 data terminals. It has a nine-inch, tilt-swival amber display that displays 80 or 132 columns, a detachable standard keyboard and an optional internal modem.

Displayphone 220 ports are compatible with the IBM Personal Computer (PC) to allow customers to link their Displayphone terminals to the PC or PC-compatible and access its applications.The Displayphone 220 can access Meridian SL-1 data features through the standard RS-422 data ports.

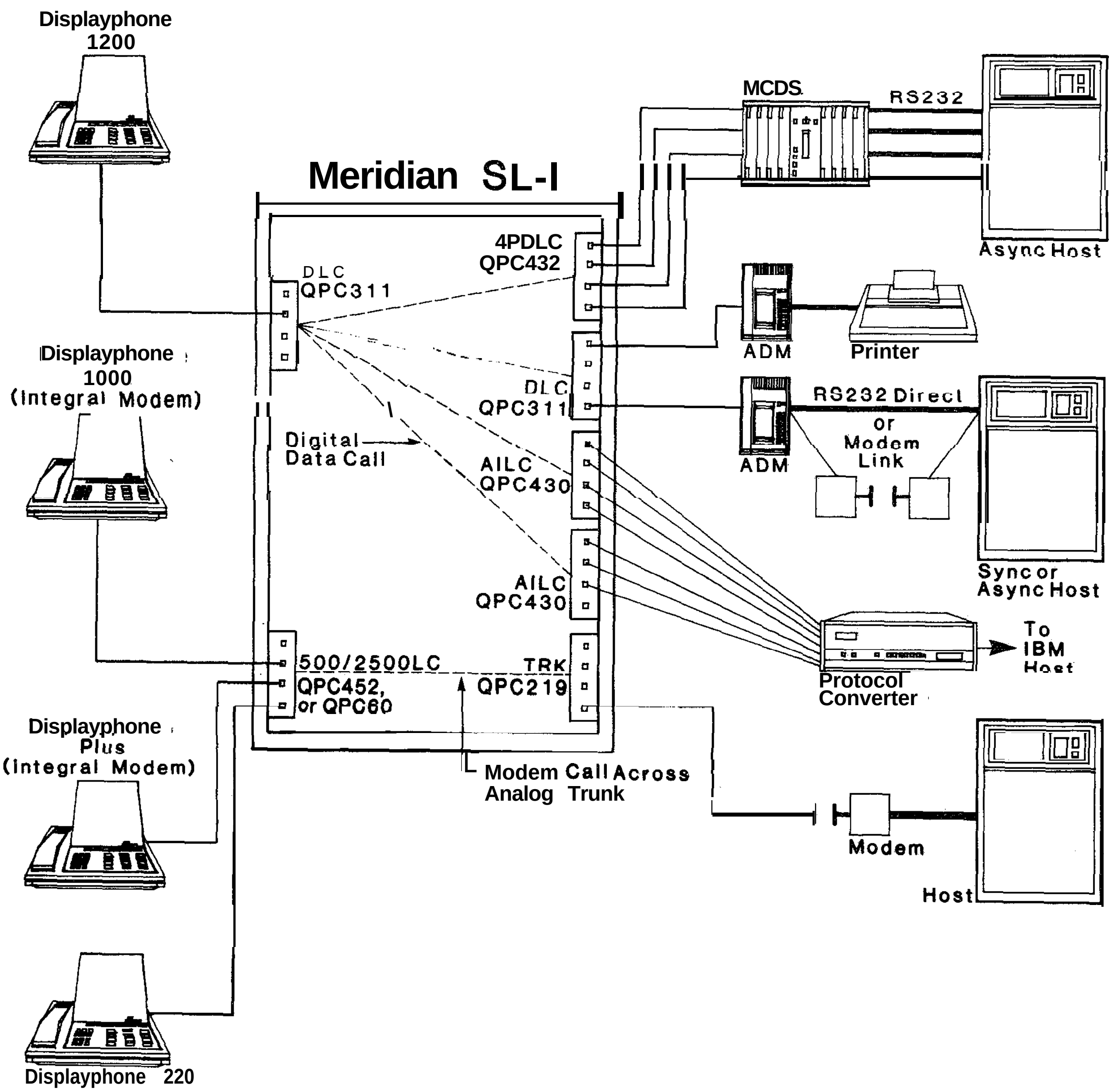


FIGURE 8-3: DISPLAYPHONES

Connection Options for Data Terminals

Add-On Data Module (ADM)
QMTS, QMT12

The Add-on Data Module may co-located with the SL-1 electronic set to provide integrated voice and data communications for synchronous or asynchronous terminals. It can also be used as a stand-alone interface to host computers, printers, and modems.

The ADM supports both asynchronous and synchronous communications: asynchronous up to 19.2 Kbps and synchronous to 56 Kbps.

It is available in two versions: QMT8 and QMT12. The QMT8 provides the RS232 interface and supports asynchronous transmission up to 19.2 Kbps and synchronous transmission up to 56 Kbps. However, the ADM must be set for the transmission type desired: asynchronous or synchronous. The QMT12 provides the V.35 interface and supports speeds up to 56 Kbps in the synchronous mode only.

The ADM interfaces to data terminal equipment (DTE) -- computers or terminals -- and to data communications equipment (DCE)--modems and some host computer ports. A switch setting determines the DTE/DCE functionality of the ADM.

A desktop unit similar in size to the SL-1 electronic set, the ADM includes a Data Speed Selector, a Data Option Switch (for choosing other parameters), and several indicator lamps.

The ADM user may set the desired transmission rate. In the ADM's asynchronous mode, the terminal keyboard may be used for placing data calls. Available features include auto dialing, speed calling, and ring again. In the co-located mode, the SL-1 telephone keypad may also be used to place data calls.

In the co-located mode, the ADM requires only the existing two twisted pair wiring of the SL-1 set to provide simultaneous voice and data communciations. In the stand-alone mode, the ADM requires one pair. An RS232 or V.35 cable is used to connect to the terminal, printer, host port, or modem (a switch must be set for use with a modem). The ADM may be located up to 4000 feet from the PE cabinet of Meridian SL- 1.

A co-located ADM interfaces to the Data Line Card (DLC) via the SL-1 set (using a voice port and a data port on the DLC). A stand-alone ADM interfaces to a data port on the Data Line Card or the 4-Port Data Line Card (4PDLC). Both line cards are located on a Peripheral Equipment (PE) shelf of Meridian SL-1.

l-alone module for RS232
nodels. Examples of such
4SIM may also be used to
be used in conjunction with
eries telephones, and other

chronous speeds up to 56

ose either asynchronous or

are supported by the ASIM

ne terminal keyboard. The
and the feature- keys of the

to 4000 feet from the PE
/ be used for connecting a
ne terminal, an RS232 cable

e data port on the Data Line
of Meridian SL-1.

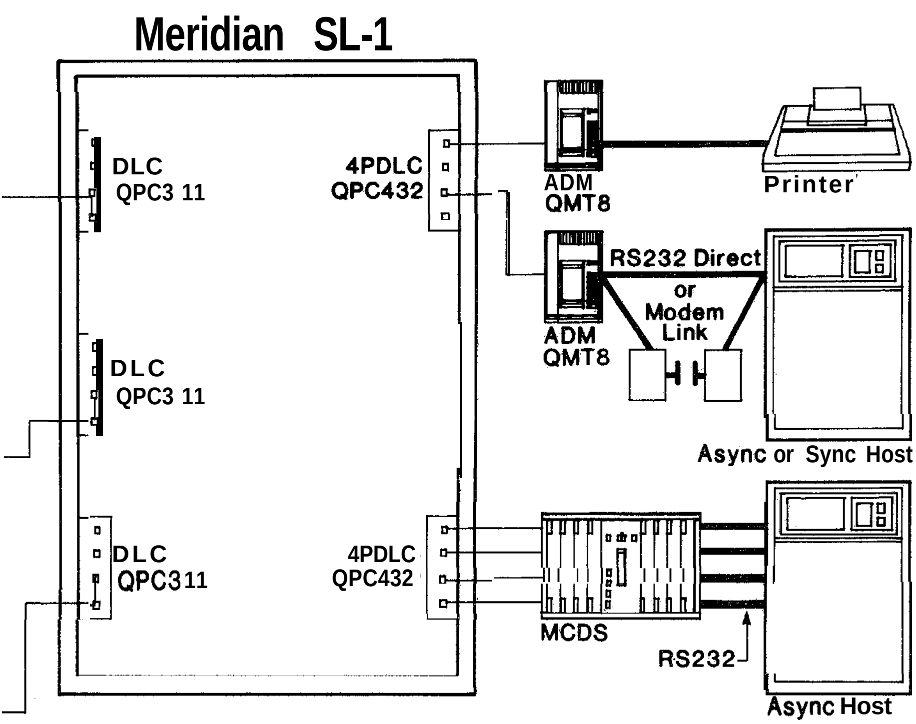
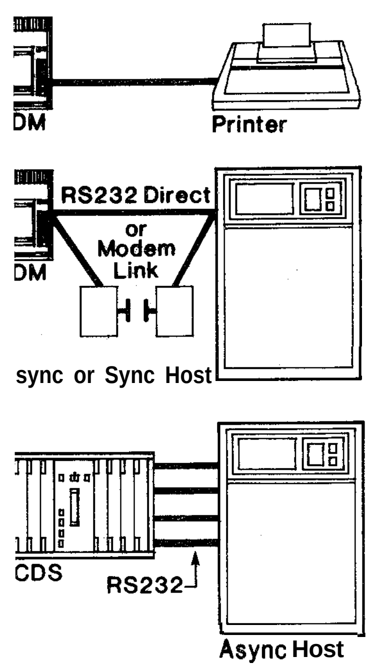


FIGURE 8-4: ADD-ON DATA MODULES



TERFACE MODULE

ILU)

ILU) is a low cost alternative to the Asynchronous tutes directly for the AIM on most data terminals that AIM will remain necessary for terminals that do not ır the link between the terminal and the SL-1 in a high

des a simple means of connecting a data terminal to the tal connection and does not require a data module or directly from the terminal's RS232C interface, thus allow users of standard EIA RS232C data terminals to ; up to 19.2 Kbps using 22 AWG PIC cable and having

l RS232C connector of the asynchronous data terminal ıck. The line terminates at the Asynchronous Interface ʼo twisted pair wire. A small circuit inside the RS232C d electrical conversions between RS232 and RS422 from the connected terminal. The signaling on these ard.

ata terminals, such as digital set data option, AIMs, ected via the AILU also has access to the convenience Dialing, Queuing, and Automatic Route Selection.

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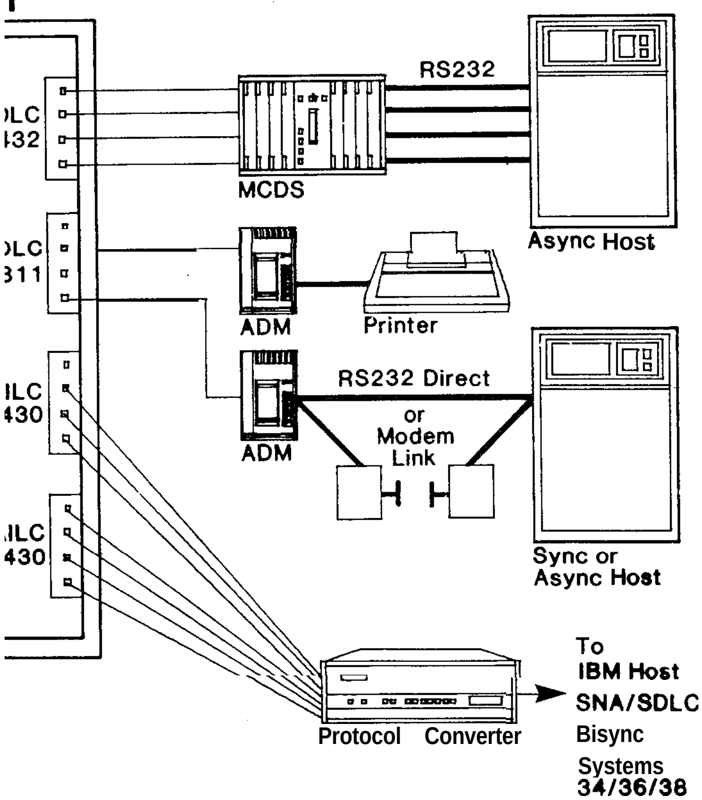


NOUS INTERFACE LINE UNIT

lone module for asynchronous RS232 ty series telephones, or other 500/2500

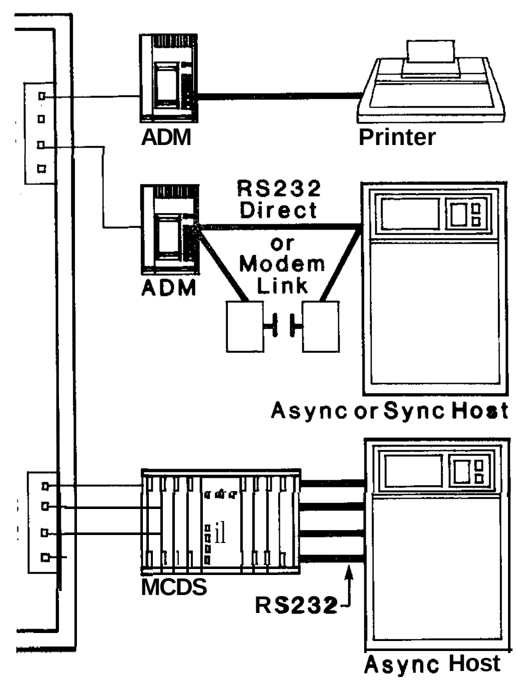
ıve the RS232 interface, and supports ; RS232 signals into RS422 signals for

)0 set on the desktop. AIM users have ·ed call, ring again, and autobaud. Data t the use of a telephone.

| up to 4000 feet from the PE cabinet of nnect a Unity series telephone or other asynchronous terminal, an RS232 cable

Card (AILC) located on a Peripheral tation set utilizes a port on a 500/2500 ions.

SL



ıOUS NTERFACE MODULE

Personal Computer Interface Card (PCI)

The Personal Computer Interface Card (QPC512) is installed directly inside the IBM personal computer to provide a RS422 communications interface to Meridian SL- 1.

If the PC has no slots available and it is equipped with a built-in RS232 serial port, the AIM or ADM may be used instead of the PCI Card.

The PCI Card supports asynchronous speeds up to 19.2 Kbps (however, the PC is typically limited to 9.6 Kbps). The PCI Card may be used to access asynchronous host computers, printers, and other personal computers.

The personal computer user may access an IBM host by making a data call through the appropriate 3270 Protocol Converter, 3270 Emulator, or System 34/36/38 Gateway. The PCI also allows access to Modem Pooling, the X.25 PAD, and X.25 Gateway, and may be used with IBM PC-compatible personal computers.

PCI requires a communications software package (such as Crosstalk XVI) to facilitate "keyboard dial" for data calls. File transfer from PC to PC and from PC to Macintosh at speeds up to 19.2 Kbps are also supported by the PCI.

The PCI uses standard two-pair wiring, and may be located up to 4000 feet from the PE cabinet of Meridian SL-1. One additional pair may be used to connect a Meridian Digital Telephone, a Unity series telephone or other 500/2500-type set.

The PCI Card interfaces directly to a port on the Asynchronous Interface Line Card (AILC). The AILC resides on a PE shelf of Meridian SL-1. The telephone set connected via the PCI card also requires a port on the appropriate line card.

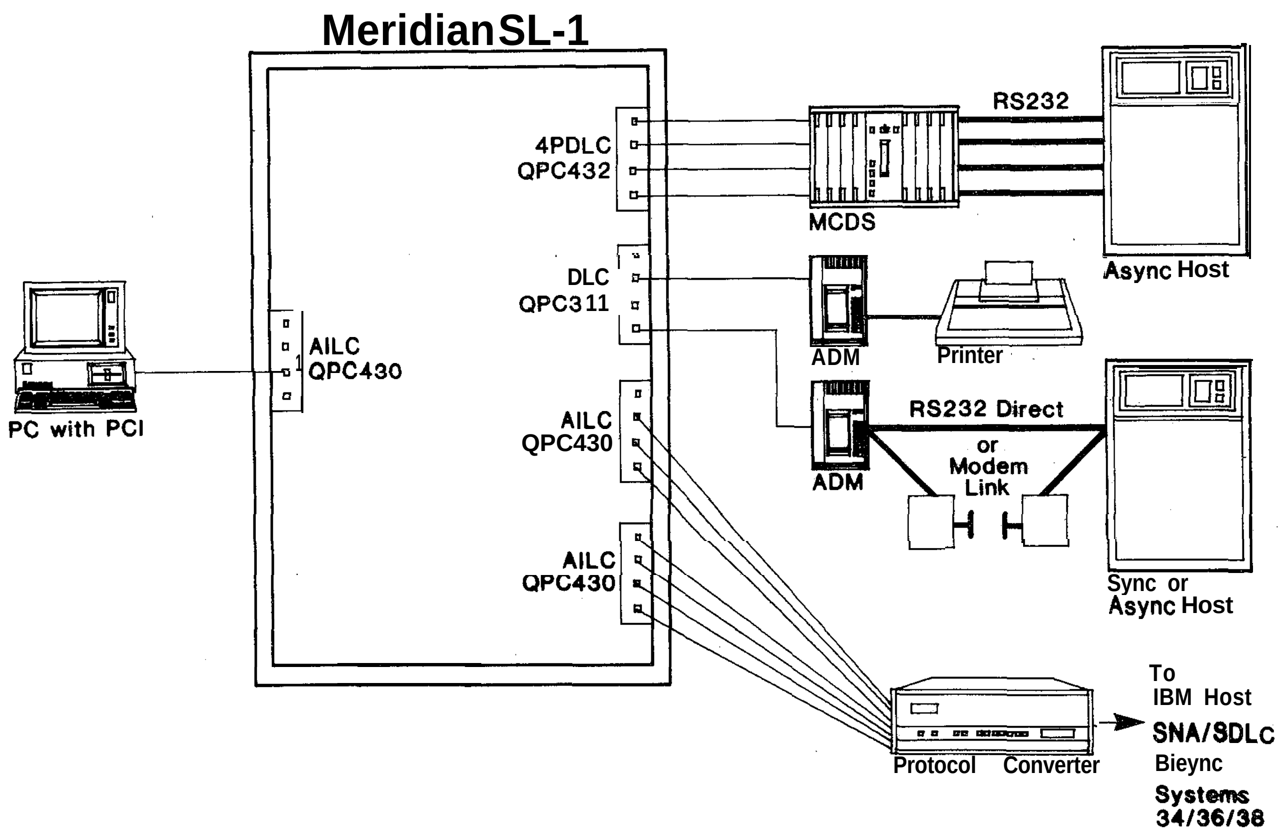


FIGURE 8-8: PERSONAL COMPUTER INTERFACE CARD.

Direct RS422 Connection

Asynchronous terminals providing the RS422 interface may be connected directly to Meridian SL- 1 without a data module.

The terminal must be connected via a cable which:

(1) terminates in a 6-pin RJ-11 plug,
(2) is approved by the terminal manufacturer and Northern Telecom, and
(3) interfaces to the Asynchronous Interface Line Card (AILC).

Two twisted pairs are required, and the RS422 terminal may be located up to 4000 feet from Meridian SL-1. The Apple Macintosh computer is an example of an RS422 terminal; specifics on the Macintosh direct connection follow.

Macintosh Connection

The Apple Macintosh provides the RS422 interface at both of its communication ports (printer and modem ports). With a simple cable, the Macintosh port may be connected directly to a port on the Asynchronous Interface Line Card.

Asynchronous transmission up to 19.2 Kbps is supported. The Macintosh may be used to access asynchronous hosts, IBM hosts (through the Protocol Converter), packet switching networks (through the X.25 PAD and Gateway), modem pooling, and other personal computers.

ASCII terminal emulation software (such as MacTerminal) must be used. The software should provide the "long break" function (1.6 seconds) for disconnecting data calls.

The following software is compatible with Meridian SL- 1 and Macintosh:

MacTerminal (Apple Computer)
Jazz (Lotus Development)
PC-to-Mac-and-Back (Dilithium Press)
ProCom-M (Prometheus).

File transfer from Mac to Mac and from Mac to PC can be performed at speeds up to 19.2 Kbps, with either ASCII transfer (using X-on/X-off flow control) or binary transfer (using the XModem protocol).

Auto Dial, Speed Call, and Ring Again are available to PC users, and data calls are placed using the Mac's keyboard and mouse.

Two twisted pair wiring is required, and the Macintosh may be located up to 4000 feet from the PE cabinet of Meridian SL-1. One additional pair of wires may be used to connect a Meridian Digital Telephone, Unity series telephone, or other 500/2500 set, via a duplex RJ-11 jack (one socket for the telephone, one for the RS422 connection).

A telephone line card with twisted copper wire may be used. The Macintosh end must be a male, 9-pin (DB-9) connector. The other end of the cable should have a RJ- 11 plug.

The Macintosh interfaces directly to the Asynchronous Interface Line Card (AILC). This card resides on a Peripheral Equipment (PE) shelf of Meridian SL-1. The telephone connected via the duplex RJ-11 jack also requires a port on the appropriate line card.

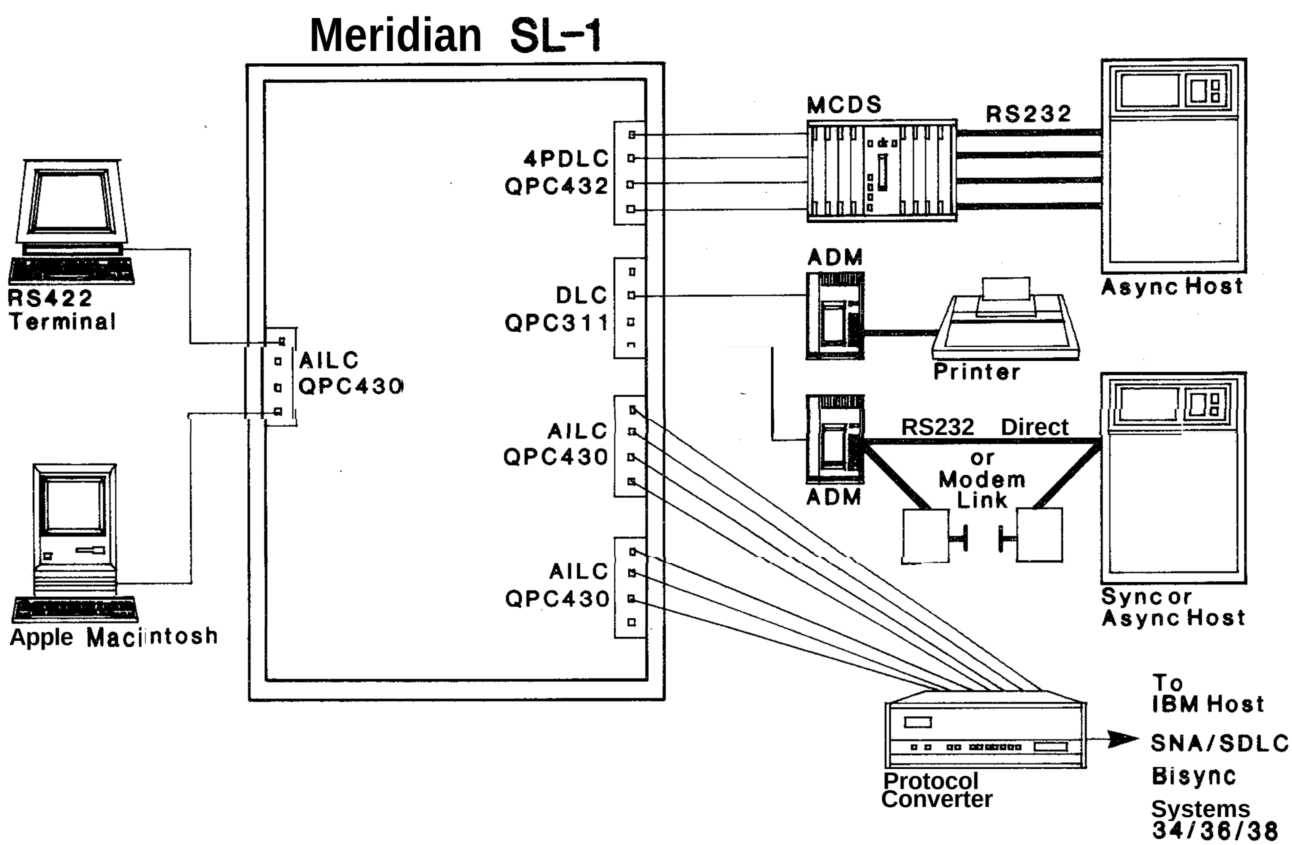


FIGURE 8-9: RS422 TERMINAL / MACINTOSH CONNECTION

B - LANSTAR LOCAL AREA NETWORKING

Meridian LANSTAR

Meridian LANSTAR is Northern Telecom's high speed local area network which connects IBM PC's, XTs, ATs (and many compatibles) and their shared peripherals. Meridian LANSTAR is also a high speed LAN for Macintosh II computers and provides file and print sharing capabilities with 2.56 Mbps of bandwidth delivered to each desk over twisted pair wiring.

Meridian LANSTAR enables users to share printers, hard disks, and back up tape units. Users can access files from a computer designated as a file server, and share expensive laser printers and plotters. Servers may be configured as departmental or central servers, with selectively restricted access.

PCs connected via Meridian LANSTAR also give access to:

- IBM hosts through the Protocol Converters and Emulator;
- packet networks through the X.25 Gateway and PAD;
- and dial-up data bases through Modem Pooling.

These devices are accessed by placing data calls through Meridian SL-1, using Meridian LANSTAR Terminal Emulator software.

Meridian LANSTAR uses the 2.56 Mbps full duplex LANLINK distribution over standard twisted pair wiring. A total of 40 Mbps transport bandwidth is available on demand from the Packet Transport.

Up to 16 PCs can access a single server simultaneously, though many more PCs can access a server on a shared basis. Five printers can be supported by a server, and an additional hard disk can be attached to the server (which already has an integral hard disk) to increase storage capacity. Over 1000 PCs can be networked on a single Meridian SL-1. The Packet Transport can be configured as a standalone unit supporting up to 1344 personal computers. A smaller Packet Transport cabinet is available to support up to 112 personal computers on a standalone basis.

With Meridian LANSTAR, various network software programs may be selected to best suit the application. The network program allows a PC to access disks and printers and other central resources attached elsewhere on the network as if they were local to the PC. Different programs provide different networking functions. Meridian LANSTAR's NETBIOS emulation allows one to choose from a number of leading network software programs, including Microsoft Networks. Communications programs that use NETBIOS can be added as needed to enhance the network.

Meridian LANSTAR also supports Banyan VINES network program, and together they form the most sophisticated PC LAN in the market today. With VINES, all networking needs are met in a single network program, including electronic mail and messaging, remote PC dial-in, multiple site networking, asynchronous and synchronous communications, and even the ability to interconnect LANs of different hardware types. With VINES a LAN can be designed that integrates all users and resources worldwide into one PC communications system.

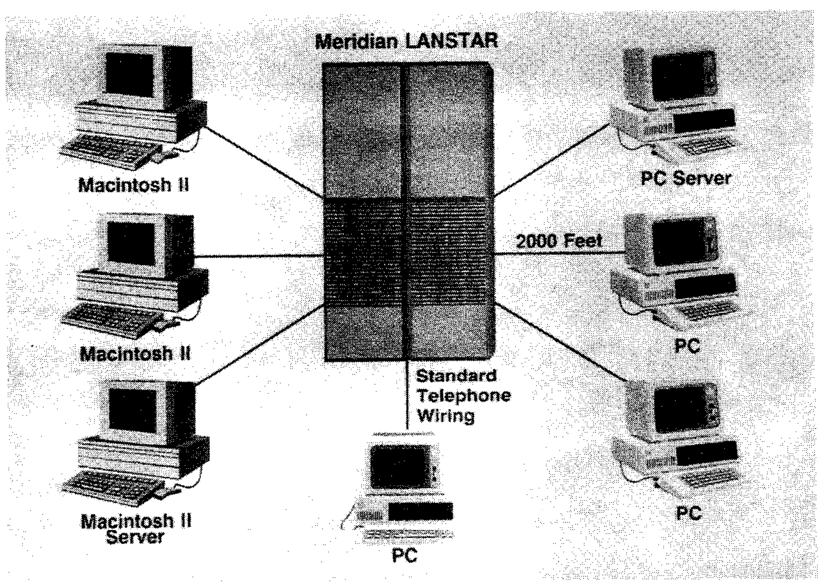
Meridian LANSTAR can be a standalone Local Area Network or a part of the Meridian SL-1 Integrated Services Network. The Meridian connection provides the ability to add Meridian Mail voice messaging, or the PC Terminal Emulator communications software to access the many other LANSTAR Data Services.

36/38 Gateways, Modem Pools, host access products, Wide Area Networks and X.25 to public and private packet data networks with just a few keystrokes. A Meridian SL-1 Integrated Services Network provides end-to-end digital networking for more reliable voice and data communications.

For data calls outside of the Meridian LANSTAR-networked devices (to Modem Pooling, X.25 Gateway, etc.), each PC must use Meridian LANSTAR Terminal Emulator software.

Each IBM PC requires a LANSTAR PC Interface Card (NT2R15AA) which occupies one slot in the PC's main board. The PC used as the server must have at least 512K of memory; a workstation on the network must have 256K of memory. Similarly, a Macintosh II Interface Card occupies a Nu-bus expansion slot in each networked computer.

Two twisted pair wiring is required to connect the LANSTAR PC and Macintosh II Interface Card to the LANLINK distribution. PCs, server PCs, disk drives, and printers can be located up to 2000 feet from the Packet Transport cabinet of Meridian SL- 1. One additional pair can be used to connect a Meridian Digital Telephone, Unity series telephone, or other 500/2500-type telephone set. The LANSTAR PC and Macintosh II Interface Card provides an extra jack for connecting the telephone set and interfaces to the LANLINK Assembly NT0R28AA. This Assembly consists of a pair of cards residing in the Packet Transport Cabinet of Meridian SL- 1. Each LANLINK Interface Assembly has 16 ports for Meridian LANSTAR devices. The telephone connected via the LANSTAR PC and Macintosh II Interface Card also requires a port on the appropriate line card.



The Meridian LANSTAR is a star configuration providing greater security and reliability than other network designs. The Meridian LANSTAR packet transport's 40 Mbps bandwidth combined with 2.56 Mbps full duplex dedicated to each personal computer provides superior performance and throughput to networked personal computers.

FIGURE 8- 10: MERIDIAN LANSTAR

LANSTAR AppleTalk

Meridian LANSTAR with LANSTAR AppleTalk is a high speed, high performance local area network for Macintosh II computers and takes advantage of existing twisted pair wiring. Each personal computer uses a Macintosh II Interface Card and LANSTAR AppleTalk software to connect to the packet transport cabinet for a dedicated 2.56 Mbps connection. Networked Macintosh II computers can be 2000 feet from the Meridian LANSTAR packet transport. With LANSTAR AppleTalk Bridge software you can also link Personal AppleTalk networks to LANSTAR AppleTalk.

LANSTAR AppleTalk runs any AppleTalk compatible network program to provide file sharing, print spooling, electronic mail, and other services at speeds so fast, the difference between local and remote access is transparent. All normal AppleTalk compatible applications will run on LANSTAR AppleTalk -- only faster. With Meridian LANSTAR up to 1344 users can be connected in a single network.

Meridian LANSTAR also provides high speed, high performance networking at an affordable cost because it takes advantage of existing telephone wiring. There is no need for expensive bridges to connect your LaserWriters with LANSTAR AppleTalk. Any LaserWriters connected to Macintosh II computers on Meridian LANSTAR can be accessed by anyone on the network for even more cost effective capabilities.

LANSTAR AppleTalk is completely compatible with AppleTalk and provides the capability to run any AppleTalk compatible software without the need for modification. For example, AppleShare, a file server for AppleTalk networks, runs on LANSTAR AppleTalk. It allows all network users, up to fifty simultaneously, to view and have access to the same folders, documents, applications and disk storage. AppleShare turns a dedicated Macintosh II computer with one or more hard disks, such as the Northern Telecom 485 MB Memorybank, into a sophisticated file server for the LANSTAR AppleTalk network. LaserShare, a print spooler, is another example of the network applications software available for LANSTAR AppleTalk. LaserShare allows the computer to be used for other projects while a document is printing on a LaserWriter. The LaserShare server receives files destined for the LaserWriter and the files are quickly stored on the disk of the Macintosh server, which can also be running AppleShare. When the LaserWriter becomes available, the files are printed. In the meantime, the computer is free to work on other tasks.

There are many other Macintosh network applications such as multi-user databases -- Helix, Omnis 3 Plus and 4th Dimension, allowing the user to create order entry and accounting systems on LANSTAR AppleTalk. There are electronic mail programs such as Intermail and InBox which permit messages, drawings and documents to be sent to anyone on the LANSTAR AppleTalk network.

There is a variety of communications software including Irma for IBM mainframe access, R-SERVER, MultiTalk and ComServe for remote access to LANSTAR AppleTalk and as gateways to asynchronous host computers. LANSTAR AppleTalk's full AppleTalk compatibility allows the user to choose a variety of network services that can be tailored to meet unique needs in the networking environment.

LANSTAR AppleTalk Bridge

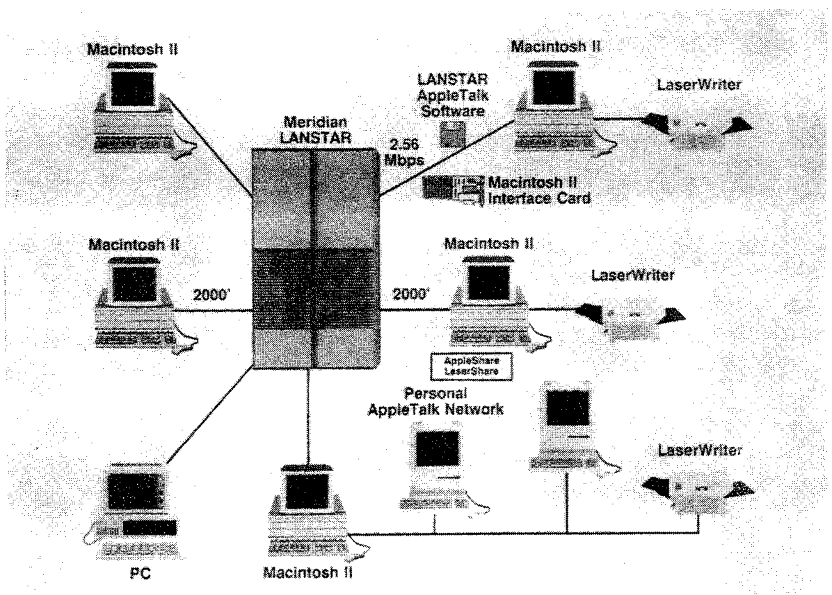
LANSTAR AppleTalk Bridge is a software package that enables LANSTAR AppleTalk and Personal AppleTalk networks to be linked together. LANSTAR AppleTalk Bridge ties together all Personal AppleTalk networks and brings all Macintosh II users into one network. If there are several Personal AppleTalk networks scattered throughout an organization, LANSTAR AppleTalk Bridge brings those networks together so that you can access even more resources.

LANSTAR AppleTalk Bridge is cost-effective because there is no additional hardware required. LANSTAR AppleTalk Bridge runs on a Macintosh II which is connected to both a Personal AppleTalk network and LANSTAR AppleTalk network. The bridge software runs as a background application, allowing the system to be used as a regular workstation or file server simultaneously. In addition, MS-DOS computers with the AppleTalk PC card can also be bridged into LANSTAR AppleTalk to access files, application programs, databases, electronic mail and spreadsheets.

Network Management

LANSTAR AppleTalk's Diagnostic Program is a software application package that makes network installation faster and easier, and simplifies troubleshooting of the network.

This software program is an excellent tool when installing the network as it gives the network administrator a way to verify proper installation. The administrator saves time and costs by quickly locating and fixing problems. The Diagnostic Program includes a workstation self-test mode that can be used bv individual users. The administrator level tests include the ability to test any designated node, network status, and fault identification and location. It even suggests how to fix problems. LANSTAR AppleTalk lets the administrator have centralized control of all the workstations on the network.



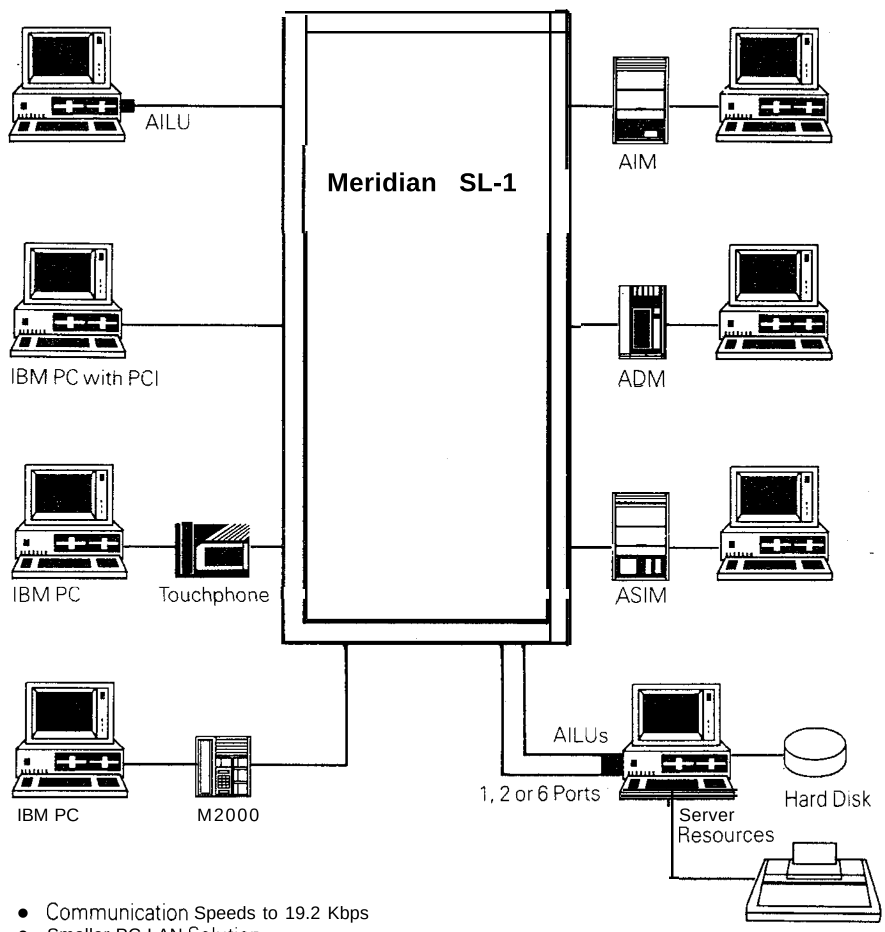
Meridian LANSTAR with LANSTAR AppleTalk is a high speed, high performance local area network for Macintosh II computers and takes advantage of existing twisted pair wiring. Each personal computer uses a Macintosh II Interface Card and LANSTAR AppleTalk software to connect to the packet transport cabinet for a dedicated 2.56 Mbps connection. Networked Macintosh II computers can be 2000 feet from the Meridian LANSTAR packet transport. With LANSTAR AppleTalk Bridge software, Personal AppleTalk networks can also be linked to LANSTAR AppleTalk.

FIGURE 8-l 1: LANSTAR APPLETALK

EasyLAN

EasyLAN is a low cost, circuit-switched solution to LAN requirements. It supports lower communications speeds, up to 19.2 Kbps. Personal computer users in small office environments, or limited member PC groups, will find the EasyLAN software meets two major LAN requirements: (1) resource sharing, such as printer sharing, and (2) movement of data files between PCs. EasyLAN is an office networking solution that costs approximately $100 per PC for software and cables.

The PCs are connected to the Meridian SL-1 via a PCI card or other LANSTAR data module (e.g., AILU, ADO, ADM, or ASIM) and line interface cards. As part of a Meridian SL-1 data switched environment, users have the advantages of port contention and line concentration. This results in an increased number of EasyLAN users sharing services of servers and other PCs, and switched access to multiple hosts and LANSTAR wide area networking services.



- Communication Speeds to 19.2 Kbps
- Smaller PC LAN Solution
  - -Shared resources
  - -Shared Data Files
- All LANSTAR data modules supported

FIGURE 8-12: EasyLAN LOCAL AREA NETWORKING

Access to Specialized LANs

Over the last several years, specialized LANs have been developed, each addressing specific user needs. Implementation of these specialized LANs may encounter complex wiring requirements. Users of terminals and workstations that are not part of these specialized LANs will find it difficult to communicate with LAN-attached devices.

LANSTAR Local Area Networking provides a basic solution to these types of problems. This can be accomplished by using an Add-on Data Module (ADM), in dial-up or hotline mode to access a terminal/server interface module, which is available from most LAN vendors.

C . LANSTAR HOST ACCESS

Introduction

LANSTAR allows a variety of connection options for host computer ports. Host ports may be synchronous or asynchronous, and may utilize RS232 (V.24), RS422, or V.35 standard connections.

Port contention is an inherent feature of Meridian SL-1, allowing scarce host ports to be shared by a much larger number of terminal users. Host ports may be configured in hunt groups under a single Directory Number, and terminal users may use the auto dial, hotline, and speed call features to quickly access the host. When all hosts are in use, the terminal user may use the ring again feature to queue for the next available port. Host computers may be located up to 4000 feet from Meridian SL-1 and up to 8000 feet away from LANSTAR-connected terminals.

Several of the Data Access Modules described in the previous section may be used to interface to host ports as well as user terminals. These products are included in this section, and following you will find a short summary of the usage information for each product. Please refer to the previous section on "Connection Options for Data Terminals" for more detail.

Add-on Data Module (ADM)

{See also "Connection Options for Data Terminals")

The ADM may be used for asynchronous or synchronous host ports. The stand-alone ADM may answer data calls. Transmission speeds supported are 19.2 Kbps asynchronous and 56 Kbps synchronous. Speed selection is manual for call origination, but automatic for call answering.

There are two versions of ADM: RS232 and V.35. The V.35 version is used for synchronous speeds from 20-56 Kbps. The ADM may be connected to either DTE or DCE type host ports, that is, terminal-type ports or modem-type ports (a switch option is set for DTE or DCE).

Asynchronous Synchronous Interface Module (ASIM)

(See also "Connection Options for Data Terminals")

The ASIM may be used for RS232 asynchronous and synchronous host ports. The ASIM may originate and answer data calls. Speeds supported are up to 19.2 Kbps asynchronous, and up to 56 Kbps synchronous.

The ASIM may be switched between asynchronous and synchronous operations, and has a telephone keypad for making data connections. These functions may be useful for hosts with both types of ports.

The ASIM interfaces to a DTE port only (it may not be used to interface to DCE ports or modems). If connection to a DCE host port or modem is required, the stand-alone ADM should be used.

Multi-Channel Data System (MCDS)

The MCDS is a rack-mounted Add-on Data Module system that allows the efficient connection of multiple computer ports. The MCDS consists of multiple Add-on Data Module equivalent circuit cards which are mounted together in a compact rack with a common power supply.

The MCDS provides an asynchronous answer-only interface between multiport computers and Meridian SL- 1 Data Line Cards. The host port cannot originate a data connection using the MCDS.

The physical configuration of the MCDS is as follows:

- Desk Mount (QCA77)
- Rack Mount (QCA76)
- Shelf (QSD67)
- MCDS-AC (QPC397)
- Power Supply (QSY27)

Each MCDS Asynchronous Card (MCDS-AC) consists of 4 Add-on Data Module equivalent ports for connections to 4 computer ports. Each MCDS shelf can accommodate up to 8 MCDS Asynchronous Cards, for a total of 32 ports.

Each shelf requires one power supply. A rack-mounted MCDS consists of 2 shelves offering a maximum of 64 ports. The rack-mounted MCDS requires 2 power supplies. The rack has additional room for optional diagnostic equipment.

The MCDS is designed to operate without operator intervention. Each of its ports can automatically adjust itself to the calling terminal's speed and can operate independently of the other ports. Each of the sixty-four (64) ports can interface to different host computers operating at different speeds and with different data formats. If desired, all the ports can serve a single host computer.

Each port of the MCDS is connected using one twisted pair wiring, and the MCDS equipment can be located up to 4000 feet from the PE cabinet of Meridian SL-1. Industry standard 25-pair telephone wires with Amphenol connectors are used to link the MCDS to the Main Distribution Frame of Meridian SL-1. RS232 cables are used to connect the host ports.

The MCDS interfaces to the 4-Port Data Line Card (4PDLC) or to spare data ports on the Data Line Card (DLC). These cards reside on a Peripheral Equipment (PE) shelf of Meridian SL-1.

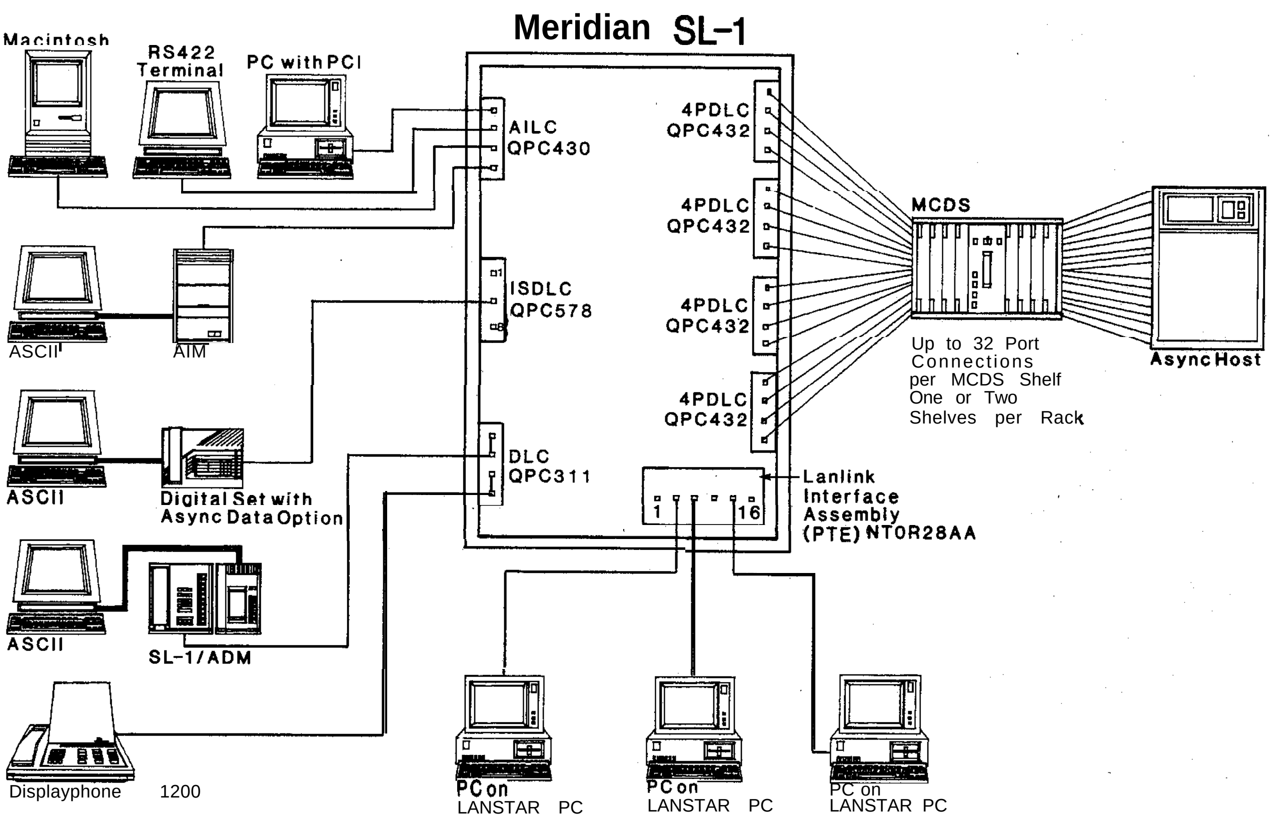


FIGURE 8-13: MULTI CHANNEL DATA SYSTEM

Computer-To-PBX Interface (CPI)

The CPI provides a multiplex interface and switched access between 24 terminals and a host computer via the Meridian SL-1 Integrated Services Network. The interface is based on standard North American T-Carrier specifications and permits economical switching over two-pair telephone wiring distribution. T-Carrier conforms to DS-1 signaling format and is the standard digital transmission rate adopted for the North American public telecommunications network.

The CPI supports 24 channels, each capable of up to 56 Kbps synchronous transmission, multiplexed to 1.544 Mbps over a bidirectional link between Meridian SL-1 and a local or remote host computer. The CPI supports synchronous communication up to 19.2 Kbps per channel. Fiber optics, microwave radio or any other transmission medium conforming to DS-1 can be used to facilitate communications between Meridian SL- 1 and a remote host computer.

Standard installation of a CPI link eliminates the need for alternate LANSTAR data products such as the data line card, data modules, Multi-Channel Data System (MCDS), and multiple host ports. Up to 24 terminals may be connected simultaneously, through a Meridian SL-1 equipped with a single CPI card, into a host computer. Where contention serves as an economical approach to computer access, more than 24 terminals may share the CPI link on a dial-up basis. Multiple CPI cards permit an operator to dial up multiple connected hosts from the same terminal utilizing the switched access capabilities of Meridian SL- 1.

Within Meridian SL-1, the CPI consists of the same QPC472 card utilized for the Digital Trunk Interface. However, a Digital Clock Controller (QPC471) is not required for CPI. An exception to this may be in applications to Digital Data Systems (DDS) where an external reference clock may be required for synchronization purposes. From a practical and economical point of view, the CPI is not offered on the Meridian SL- 1S.

Software Option 75 must be specified to support the CPI on applicable Meridian SL-1 system models.

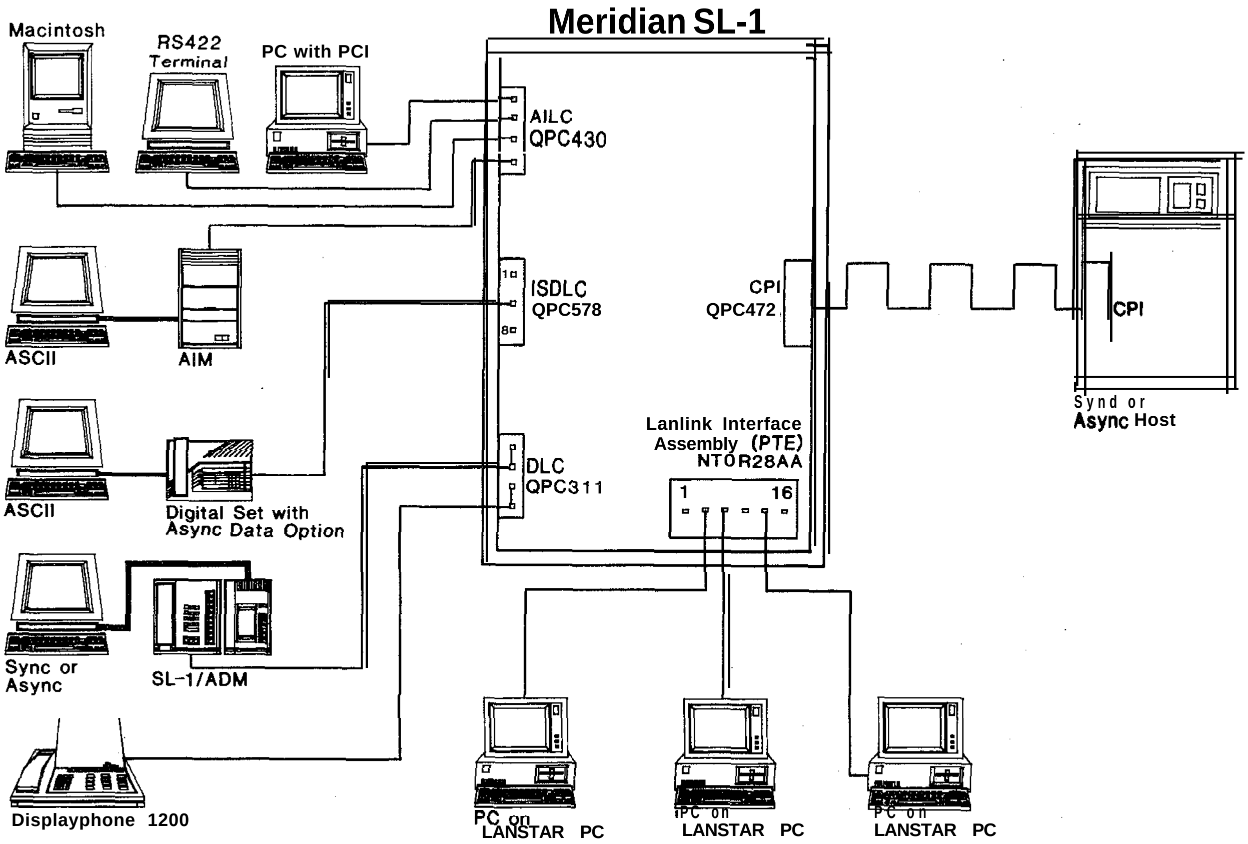


FIGURE 8-14: COMPUTER-TO-PBX INTERFACE

D - STRATEGIC ALLIANCES PROGRAM

Introduction

As part of the OPEN World commitment, Northern Telecom has worked closely with computer manufacturers to provide new cost-effective solutions for data communications. The importance of port contention, domain switching, and a unified wiring plan (using twisted pair telephone wiring) may be directly multiplied by the number of different computer systems in use. With each computer system, Meridian SL-1 allows the maximum utilization of host ports, ASCII terminals, personal computers, peripherals, and communications links. For each computer system, resource allocation, moves and changes may be managed in the most efficient manner when Meridian SL-1 is used as the central hub.

Perhaps the most significant outgrowth of the Strategic Alliances Program is the multi-vendor connectivity supported today by the Meridian SL-1. As most corporations have more than one computer system, they can reap the exceptional benefits provided from the integration of data processing/office automation equipment and Meridian SL- 1. Some of the areas in which customers benefit include:

- cost savings, a result of reducing the cost of terminals to computers interface products.
- productivity improvements resulting from simplification of terminal and host connectivity
- easier product installations and usage, a result of verified interconnectivity with data processing and office automation vendors.

Many LANSTAR data products have been tested with these data processing vendors making it easier and economical for users to employ integrated data processing, office automation and telecommunications in one cohesive, open architecture.

The following sections describe specific examples of proven Meridian SL- 1 connectivity with the products of vendors who are involved in the Strategic Alliances Program.

Data General Corporation

Data General's CPI/24 product is a compatible interface to Northern Telecom's CPI (Computer-to-PBX Interface) product. The 24 channels of CPI each support up to 19.2 Kbps asynchronous communications between Data General Dasher terminals and DG hosts.

Products supported:

> Data General host models: ECLIPSE MV/4000, MV/8000 II, and MV/10000
> DG Dasher terminal models: D200, D210, D211, D410, D450, and D460.

All applications on Data General's MV series products, including CEO (Data General's Comprehensive Electronic Office software) are supported.

The CPI/24 eliminates 24 individual port connections, 6 MCDS Cards (or 24 ADMs), as well as the individual cabling that would otherwise be required to connect to Meridian SL-1. Data General terminals may share host ports on a contention basis, reducing the number of host ports needed. In addition, DG terminals may access applications on multiple hosts, including public data networks.

Data General's CPI/24 product (module number 4398) is supported under Revision 6.0 or later of Data General's Advanced Operating System/Virtual Storage (ADS/VS). Model 4398 may be configured on the following Data General processors in the following quantities:

Processor	Quantity
Eclipse MV4000	3
Eclipse MV8000 II	6
Eclipse MV10000	8

Note: The MV4000SC and MV4000DC do not support CPI.

Data General Dasher terminals can be connected to Meridian SL-1 via the ADM, AIM, and/or ASIM.

If the customer has too few data connections to require CPI, then the host can also be connected to Meridian SL-1 via the ADM, ASIM, and/or MCDS.

The specific RS232 cable required between the DG terminal and the LANSTAR Data Module (model #10236) is supplied by Data General. Data General will supply a T-l cable (model #10177) also. The DG cable is terminated on a connecting block in the computer room. Twisted pair telephone wiring can then be run from this block up to 1500 feet from Meridian SL-1 (without repeating).

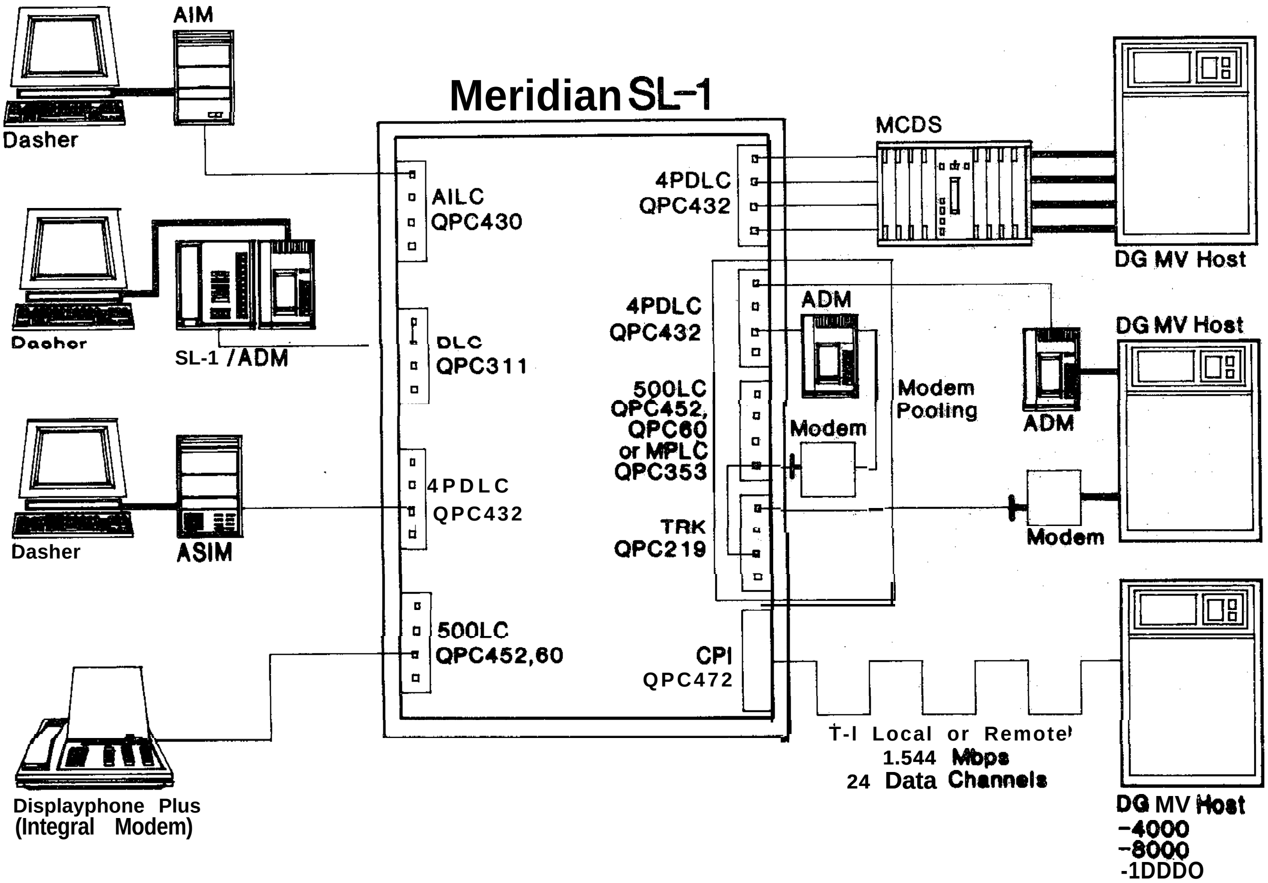


FIGURE 8-15: DATA GENERAL CORPORATION

Digital Equipment Corporation

Significant product integration and testing has been done by Northern Telecom and DEC. The result is very cost-effective and simplified terminal to host connectivity via the Meridian SL- 1. DEC integration and testing includes the following DEC products: the DEC VAX series of processors, the DECmate III, Rainbow 100, Professional 300 and the VT100 and VT200 terminals.

The popular Digital VT100 and VT200 terminals (as well as most compatibles) and DECmate II and III, Rainbow 100, Professional 300, and VAXmate personal computers can communicate with the Meridian SL-1 via several low-cost data modules, such as the Asynchronous Interface Line Unit (AILU), Asynchronous Data Option for Meridian Digital Sets, Add-on Data Module (ADM), Asynchronous Interface Module (AIM) and Asynchronous/Synchronous Interface Module (ASIM). With a data module connection, the user can now access any host or resource that is a part of the Meridian SL-1 network.

Products used to access DEC computers include the Add-on Data Module (ADM) for individual port connectivity. For situations requiring multiple port connections, a Multi-Channel Data System (MCDS) could be used. The MCDS supports up to 64 asynchronous data ports. These ports can be "shared" between multiple hosts or configured to access a protocol converter which is associated with an IBM computer.

The Computer-to-PBX Interface (CPI) provides 24 data channels between the Meridian SL-1 and a Digital VAX system. In the future, the CPI connection will be supported on DEC's new 8000 series BI-BUS VAX systems, utilizing a UNIBUS adapter from DEC. The CPI interface is based on T-l technology, is low cost, and provides a multiport interface.

The CPI specification, fostered by Northern Telecom's Strategic Alliances Program was jointly developed by Northern Telecom and Digital. DEC participated prominently in CPI development and was the first data processing vendor to implement the interface.

CPI is a T-l communciation link, 24 channels, supporting an aggregate speed of 1.544 Mbps. It is based on the North American Standard and uses a DS-1 framing format. When interfaced to a Digital VAX system, each channel of CPI could support speeds of 19.2 Kbps, although most Digital environments are only requiring 9.6 Kbps. The Meridian SL-1 can support multiple CPI links to both local or remote VAX systems.

Each of the 24 channels takes advantage of all Meridian SL-1 data-switching benefits, including port contention and simplified data call establishment.

CPI decreases the cost of Digital VAX system connectivity by significantly reducing hardware, cabling, and installation costs.

Recent testing done by a Meridian SL-1 and DEC customer has verified the ability to connect multiple ADMs and/or an MCDS to a DECserver 200 terminal server thus providing access to a DEC VAX Ethernet environment.

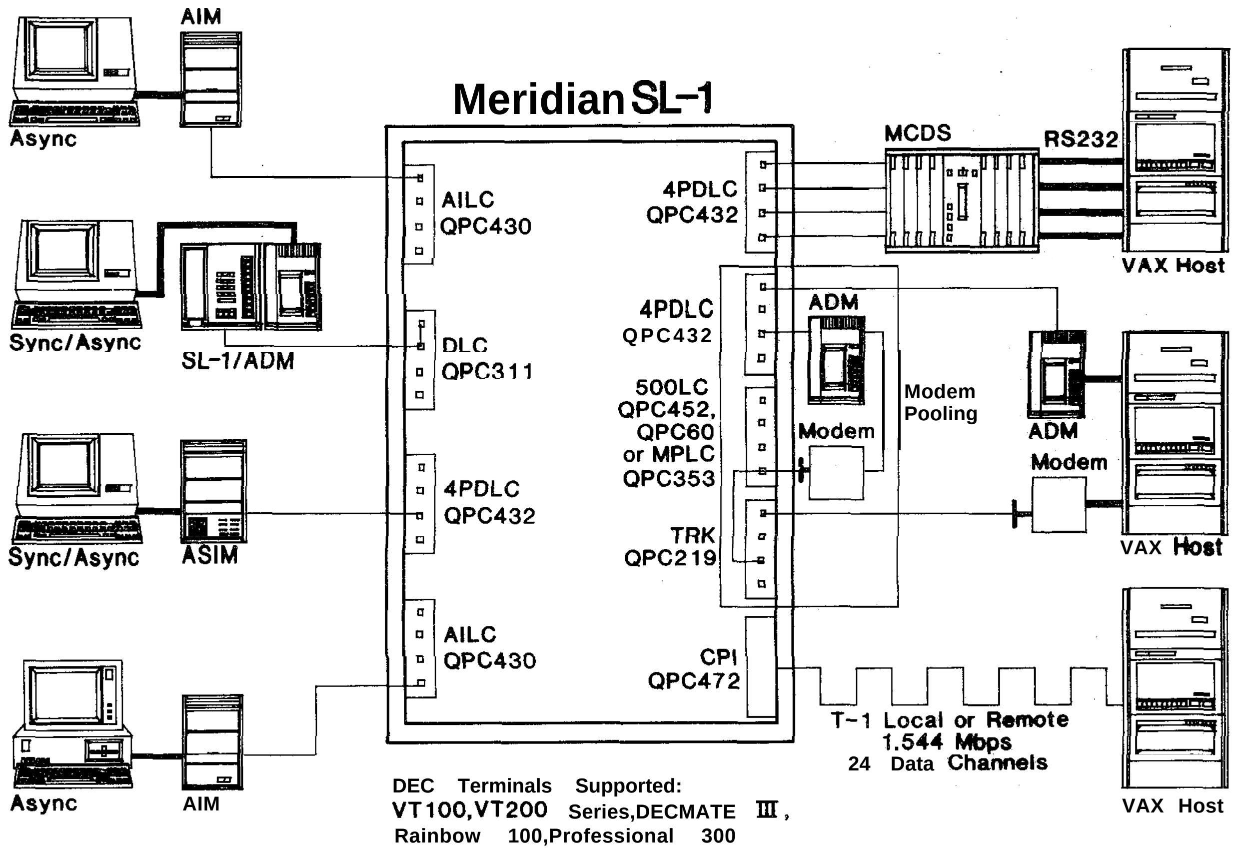


FIGURE 8-16: DIGITAL EQUIPMENT CORPORATION

Hewlett-Packard Company

Many Meridian SL-1 LANSTAR data products are supported in the HP environment. Customer investments in data products are protected with the ability to add new data connectivity products, in various configurations, accommodating user needs. For instance, terminals and personal computers can be connected to the Meridian SL-1 via data modules, such as the Add-on Data Module (ADM), Asynchronous Interface Module (AIM), Asynchronous/Synchronous Interface Module (ASIM), Asynchronous Interface Line Unit (AILU), the Personal Computer Interface (PCI) Card, and Meridian digital sets with Asynchronous Data Option. Many terminals with RS-422 interfaces can be directly connected to the Meridian SL-1, eliminating the need for a data module. The Meridian SL-1 supports many HP terminals that offer this connection, including the HP 2562X, HP264X and HP239X series.

The Strategic Alliances Program's cooperative efforts with HP have resulted in the planning and development of a more cost-effective, integrated solution for data connectivity. For instance, HP 3000 computer access products now include a low-cost RS-422 interface based on the use of standard cabling, a breakout box, and an "ATP for Meridian SL-1 Interface," which is purchased from HP.

The new HP 3000 computer interface dramatically reduces the cost of connectivity to an HP 3000 computer. Major components of this interface consists of:

- an Asynchronous Interface Line Card (AILC)
- a 25-pair cable
- a breakout box
- a 6-wire teladapt cable
- a new asynchronous terminal controller from HP called the "ATP for Meridian SL-1 Interface." This interface supports 12 ports and is supported on the HP 3000 Series 39,4X, 5X, 6X and 70.

In addition to the low-cost RS-422 interface to HP3000 computers, other LANSTAR host access products include the Add-on Data Module (ADM) and the Asynchronous/Synchronous Interface Module (ASIM) which are used for limited port connections. For multiple port connections, the Multi-Channel Data system (MCDS), which supports 64 ports, could also be used.

Prime Computers, Inc.

Certification testing is currently in process for connectivity between the Prime 50 Series processors and Meridian SL-1 LANSTAR data products. The Meridian M2000 Digital Telephones with Asynchronous Data Option (ADO) and Multi-Channel Data System (MCDS) have been installed on existing Meridian SL-1 systems to provide switched access to the Prime 50 Series processors.

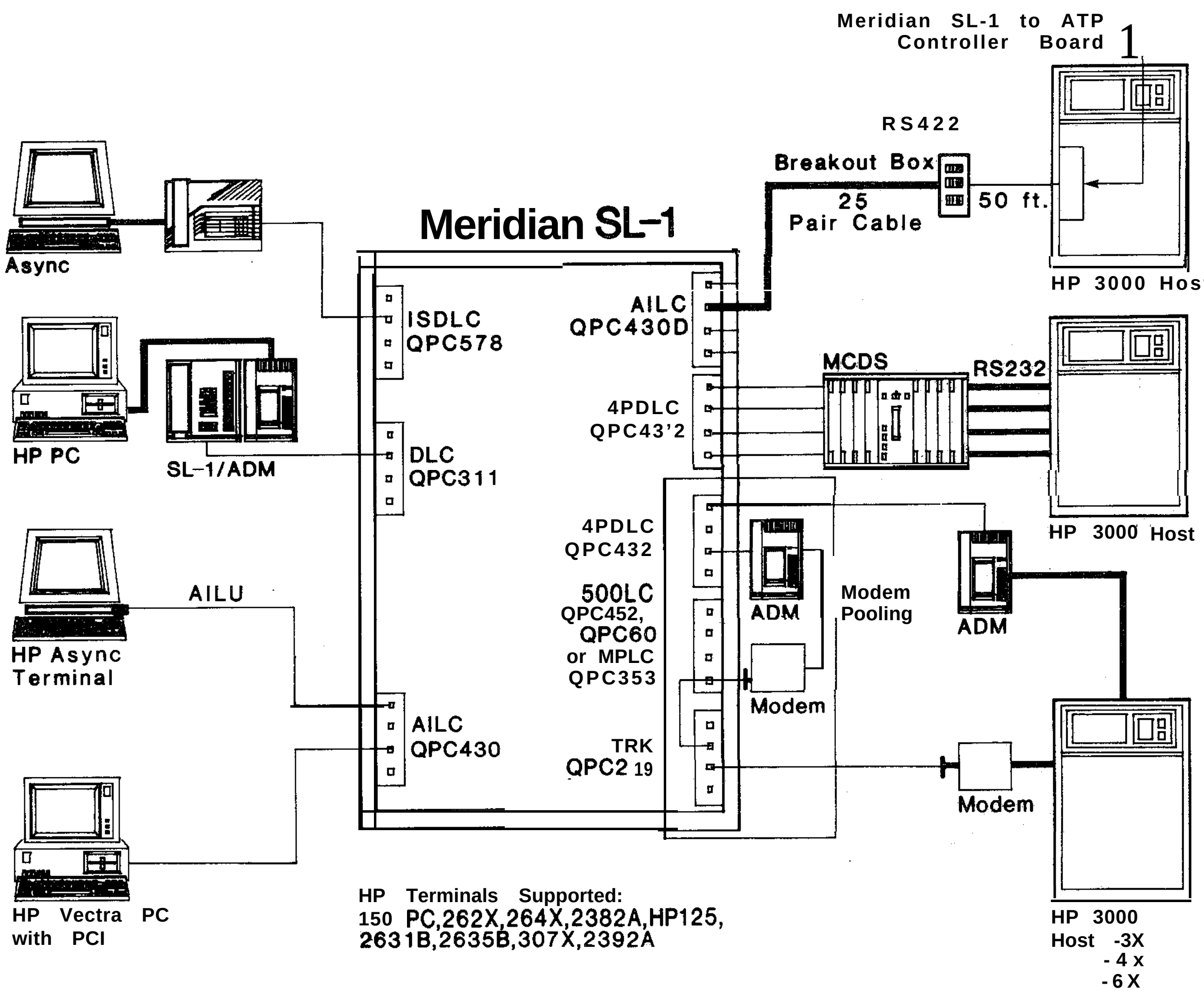


FIGURE 8-17: HEWLETT PACKARD COMPANY

Unisys

The integrated data capabilities of the Meridian SL-1 allow users to link a Unisys host computer with Sperrylink workstations. Models supported include Series 1100 mainframes, DOPS 10 and 20 file servers, Model 30 or 40 Desk Stations, and UTS 30 terminals.

Unisys Desk Stations may have switched access to the office automation applications of a DOPS (Distributed Office Processing Station ---a file and application server). The usual limitation of 15 users per DOPS is expanded to more users by contention through the Meridian SL- 1.

Mainframe users (with UTS 30 terminals) can gain switched access to both mainframe and DOPs applications. Since Mainframe users need only occasional access to DOPS applications, a few DOPS ports can serve many UTS 30 users. Similarly, DCP (Distributed Communications Processor) ports can be shared among Desk Station users on a contention basis.

The use of the twisted pair wiring of the Meridian SL-1 (rather than direct connect coaxial and RS-232 cables usually required) reduces wiring costs and efficiently allocates computing resources.

The Unisys host computer and Sperrylink workstations are connected to the Meridian SL-1 via the ADM operating in synchronous mode.

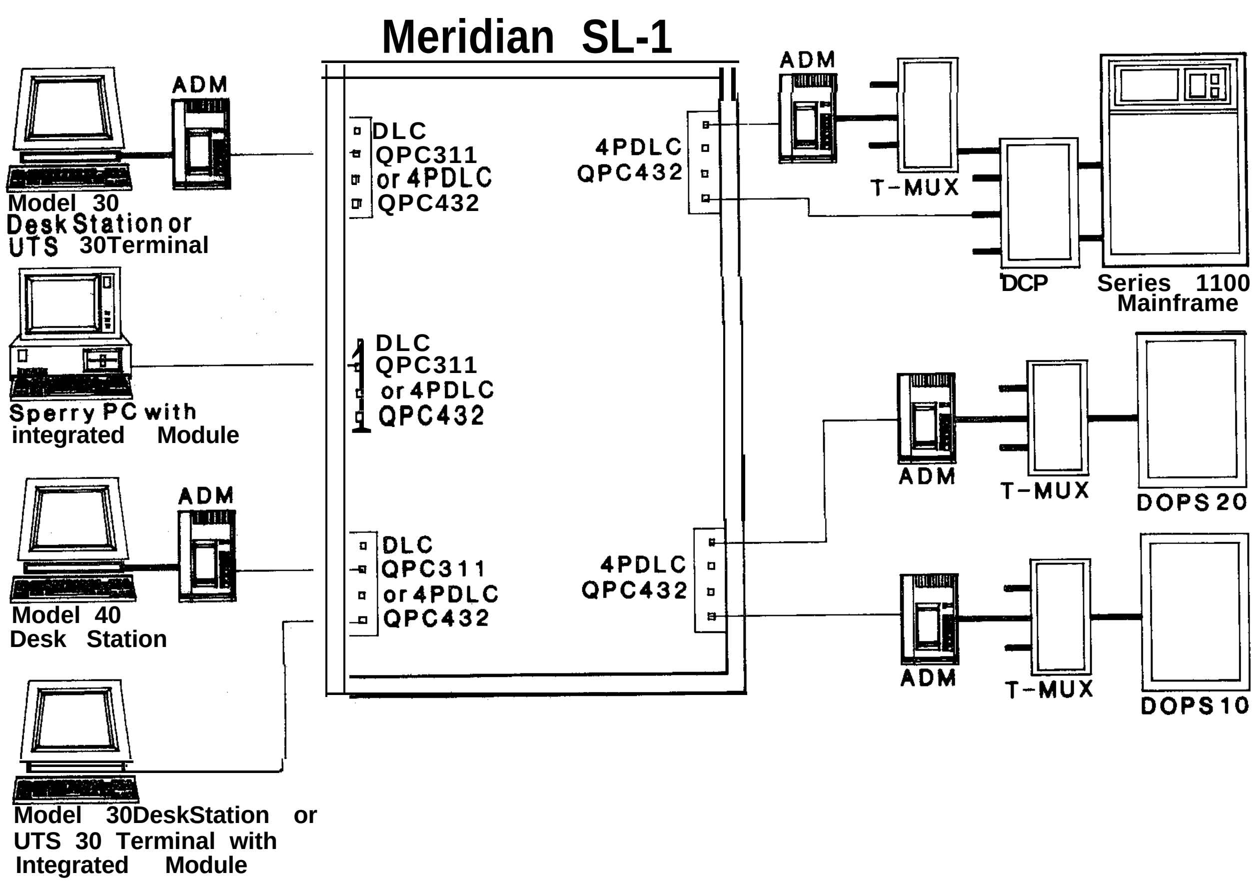


FIGURE 8-18: UNISYS

Wang Laboratories, Inc.

Northern Telecom Inc. and Wang Laboratories Inc. have successfully completed joint connectivity testing of the following equipment: Wang VS (Virtual Storage), OIS (Office Information Systems), 2200 product families, the Wang PC (Professional Computer) 2110 terminal, and access to the Wang DVX (Digital Voice Exchange).

Wang workstations may share host ports on a contention basis, reducing the number of host ports needed. In addition, workstations may access applications on multiple hosts, including public data networks. The use of twisted pair wiring within a single cable system allows reduced costs and efficient resource management. Until recently, certain Wang workstation applications were dependent on the dual coaxial links used for local connection to the Wang host: OIS or VS-based Word Processing, 3270 emulation and data entry functions. However, Wang has announced an Enhanced Asynchronous Device Controller (EADC) which now allows ASCII (X3.64) terminals to run VS-based dial-up Word Processing. Most applications that can be accessed by a workstation using a Remote WangNet or Telecommunications (TC) connection to the OIS, 2200, or VS can be accessed by a workstation through the Meridian SL-1.

The LANSTAR Data Modules ADM, AIM, ASIM are used to connect the various **Wang** terminals (which have the RS232 interface). At the host end, ADMs and ASIMs are used to connect **Wang** host ports.

Wang's Personal Computer can also provide full function (stand-alone) word processing along with terminal communication through the Meridian SL- 1 and Remote TC.

The Wang DVX voice messaging system has also been tested and integrated with the Meridian SL-1. Wang licensed the SL-1 interface and developed it for Meridian SL-1 customers. This integration results in improved telephone coverage and substantial cost savings.

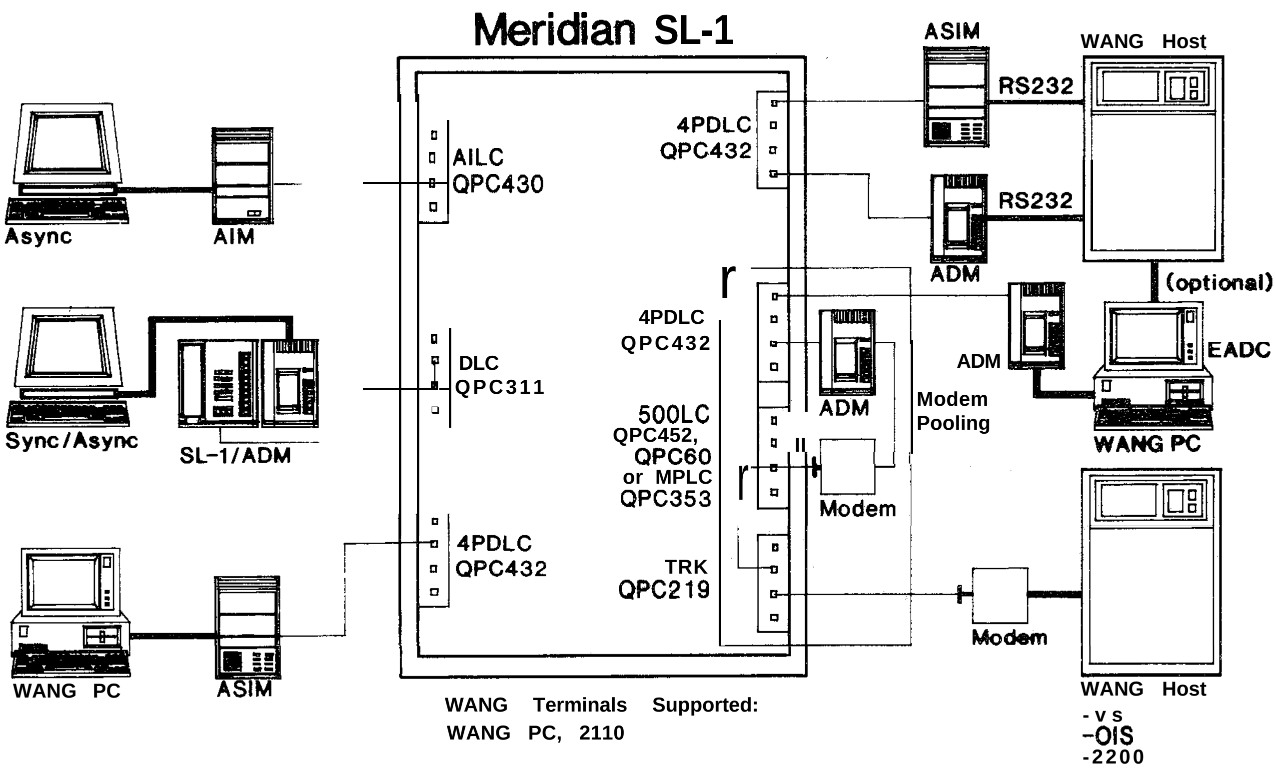


FIGURE 8-19: WANG LABORATORIES, INC.

Apple Computer, Inc.

The "strategic partnership" of Northern Telecom and Apple Computer is indicative of the rapid convergence of telecommunications and personal computing. Through a cooperative working agreement, both companies are committed to the testing and integration of Apple technology with the Meridian SL-1. Now, Macintosh personal computer users can be networked over intra-office and inter-office telephone lines, providing expanded communications capabilities for Macintosh users, increased use of Macintosh resources, easier computer access, and wide area networking through LANSTAR Networking Services.

This cooperative working agreement has resulted in certified connectivity, continued joint product development and improved networking solutions.

Use of the popular Macintosh and its many easy-to-use software programs appear unmodified by Meridian SL-1 enhancements. For instance, popular user programs include automated log-on sequences and utilization of soft key functions designed specifically for use with the Meridian SL-1.

Ongoing testing and verification of Macintosh products includes:

- The Macintosh personal computer can be directly connected to the Meridian SL-1 with an RS-422 interface cable. Other Meridian SL-1 data modules, such as the ADO on the Digital Sets, AILU, ADM, ASIM and AIM can also be used to connect the Macintosh PC. Macintosh to Meridian SL-1 call establishment is handled in the same manner regardless of which Meridian SL- 1 data module is being used.

  Once connected to the Meridian SL-1, the Macintosh user can communicate with computers, such as the DEC VAX or HP 3000, and IBM environments via LANSTAR's protocol converters.

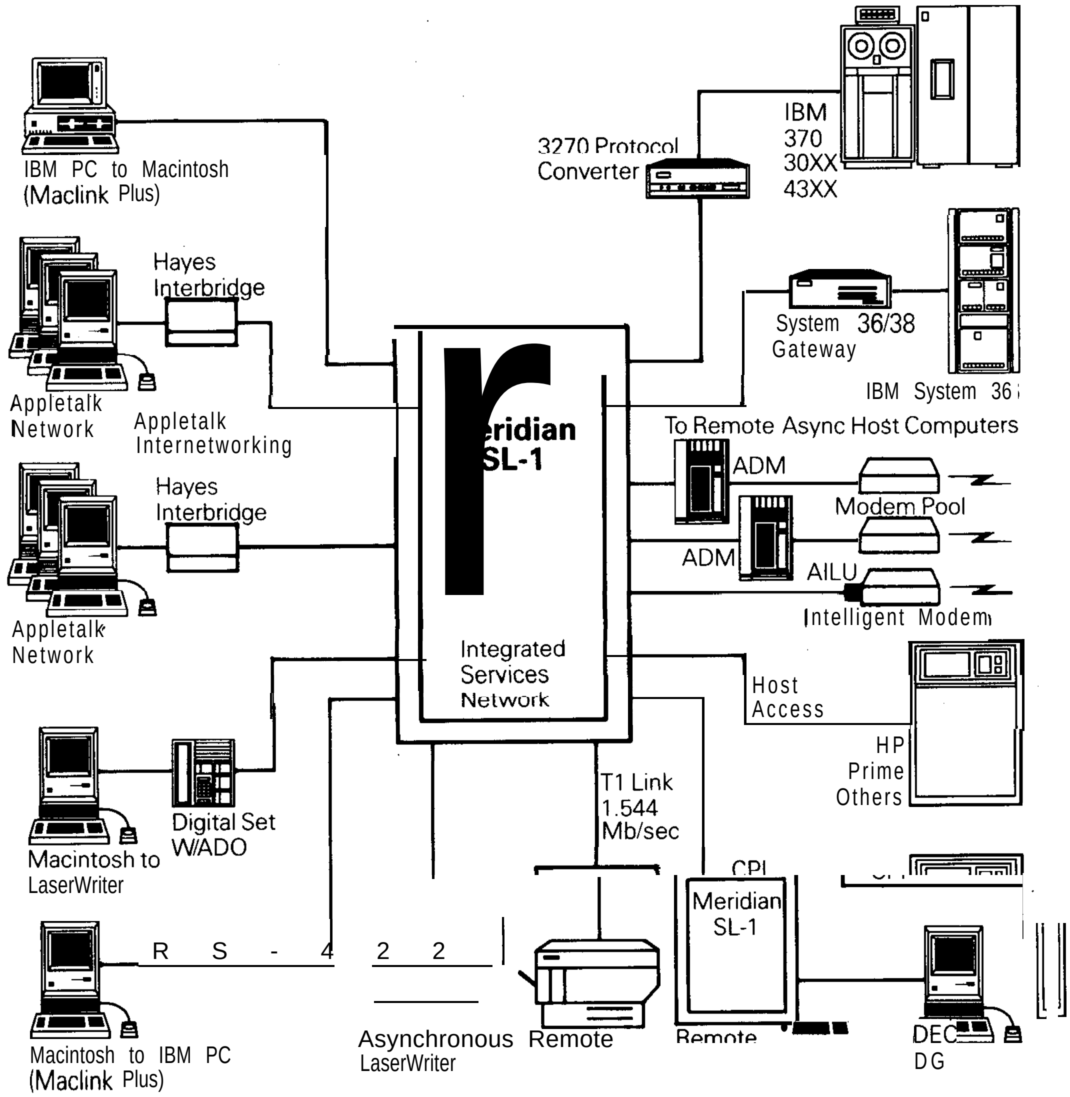
- Streamlining of call set up procedures for Meridian SL-1 Macintosh users is another benefit of this working agreement with Apple. The inTalk software package from Palantir Software, Inc., was tailored for Meridian SL-1 interface. The software is configurable for access to all services and devices to which the user wants to connect. The user then simply selects one of the eight configured "soft keys" to connect to the desired service.

- MacLink Plus has also been tested with the Meridian SL-1. It provides file transfer and translation between Macintosh and IBM PCs (and compatibles) connected to Meridian SL-1. Users can move word processing documents, spreadsheets, databases and other file types between PCs. This list of programs includes popular software packages like Lotus l-2-3, Excel and More. Macintosh users can share increased connectivity to numerous PCs.

- Resource sharing is increased for Asynchronous LaserWriters that are connected to the Meridian SL-1 with an easy to install Meridian LaserWriter software package, resulting in improved productivity, and increased usage for Macintosh users.

- Multiple AppleTalk Networks that are connected to the Meridian SL-1 via Hayes InterBridges can access and share resources and devices. For instance, users of different AppleTalk Networks or work groups can share information, electronic mail and file servers. Network sharing can include geographically dispersed locations, such as campus environments, through Meridian SL-l's distributed networking capabilities.

Continued product development, testing, and interface coordination will provide users with enhanced Macintosh capabilities.



Macintosh Networking with Meridian SL-1

FIGURE 8-20: APPLE COMPUTER, INC.

E - LANSTAR IBM ACCESS

Introduction

LANSTAR IBM Access products address the unique IBM host environment. These products are functionally divided into two groups: (1) products providing ASCII terminal access, and (2) products providing connectivity for IBM display terminals. IBM Access through Meridian SL-1 utilizes standard twisted pair telephone wiring rather than the more expensive coaxial cable traditionally used. The use of twisted pair wiring makes moves- and changes easier and less costly.

Protocol Converters on Meridian SL-1 allow ASCII terminal or personal computer users to access synchronous IBM host computers. These terminal users can still access asynchronous host computers and public data services. Since all users do not require dedicated terminal connections for each applications environment, significant savings can be achieved. ASCII terminals gain enhanced functionality, with greater flexibility in information access.

IBM terminal users can gain switched access to IBM controllers via the Coax Elimination and Switching System. IBM controller ports can serve many additional users through port contention, and users can access applications on multiple IBM hosts by placing data calls through different controllers.

3270 Protocol Converters

The 3270 Protocol Converters are stand-alone units which allow ASCII terminals and personal computers to access IBM host computers.

The 3270 Protocol Converters support ASCII CRTs, printers, and personal computers by emulating IBM 327 1, 3274, and 3276 cluster controllers. To the host, the ASCII devices appear as IBM 3270 display terminals and printers. The ASCII terminals may access the Protocol Converters via local data calling through Meridian SL- 1, or remotely through Inbound Modem Pooling.

The two versions include:

SNA/SDLC	-- Meridian SL- 1/74
Bisync	-- Meridian SL-1/71

The 3270 Protocol Converter allows seven (7) ASCII terminals simultaneous access to the IBM host computer. Multiple Protocol Converters may be used in Meridian SL- 1.

These seven terminals can share a common dynamic printer port if required, or each may have a local printer attached.

The 3270 Protocol Converter allows transmission of up to 9600 Kbps.

The 3270 Protocol Converter can connect directly (with a built-in modem eliminator) to the Front End Processor (FEP) or via a modem link. These connections can be full duplex or half duplex. The modem link may be a multidrop connection, supporting multiple 3270 Protocol Converters over a single leased line.

The 3270 Protocol Converter connects to the Main Distribution Frame of Meridian SL- 1 via 25 pair telephone cable with Amphenol connectors. Two twisted pair of wires are required for each port.

The ASCII devices or personal computers, as well as the Protocol Converter, may be located up to 4000 feet from the PE cabinet of Meridian SL-1.

To connect to the FEP or modem, a straight-through RS232 cable is required. An internal jumper plug specifies either the FEP or modem connection.

The 3270 Protocol Converters interface with the Asynchronous Interface Line Card (AILC) of Meridian SL-1. The Protocol Converters require two (2) AILCs (4 ports each) for full connectivity. The AILC resides on a Peripheral Equipment (PE) shelf of Meridian SL-1.

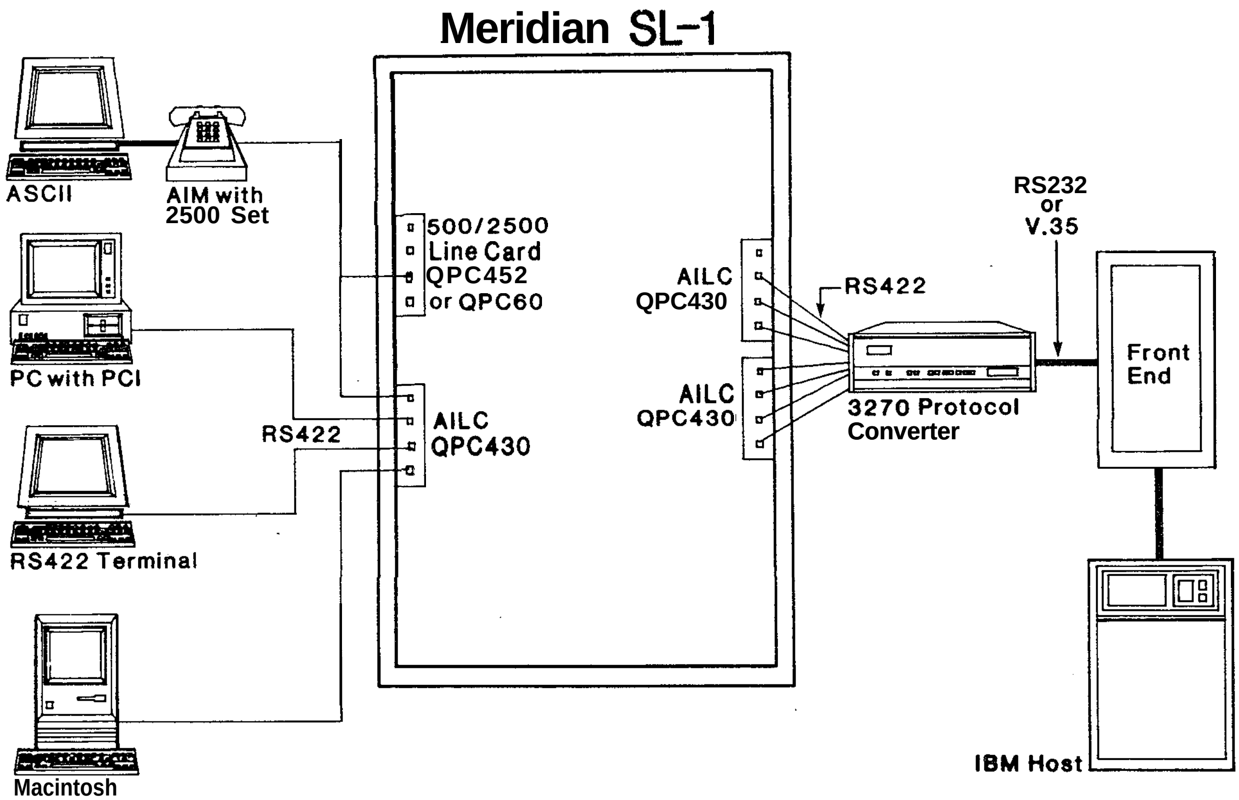


FIGURE 8-21: 3270 PROTOCOL CONVERTER

System 36/38 Gateway

The Meridian SL-1 System 36/38 Gateway allows a single ASCII terminal or ASCII compatible personal computer to access IBM System 36/38 computers in a common communications network. The Gateway eliminates the need for the IBM 5251 Model 12 Clusters, 5251 Model 11 CRT Display Terminals, and 5256 printers when communicating with IBM computers. Emulation of these functions is provided by the System 36/38 Gateway which additionally provides selective access capability to both synchronous (Digital Equipment Corporation, Hewlett Packard, Data General, or equivalent) host domains from a single workstation using an ASCII terminal or personal computer. Port contention and concentration, through dial up access, maximizes the use of the data port when communicating with an IBM (or equivalent) host.

The System 36/38 Gateway requires no special software and interfaces via 25 pair cable to the Meridian SL-1 using two QPC430 Asynchronous Interface Cards (AILC) for full connectivity. The Meridian SL-1 in turn communicates with the ASCII terminals or personal computers using any of the following LANSTAR data interface products: ADM, AIM, or PCI card.

The System 36/38 Gateway allows seven (7) ASCII terminals simultaneous access to the IBM Systems 36 and 38 computers, These seven (7) terminals can share a common dynamic printer port to print a hard copy when required. The System 36/38 Gateway supports up to 9.6 Kbps speed on asynchronous and synchronous links. The Gateway, the ASCII devices, and the personal computers can be located up to a maximum distance of 4000 feet from Meridian SL- 1.

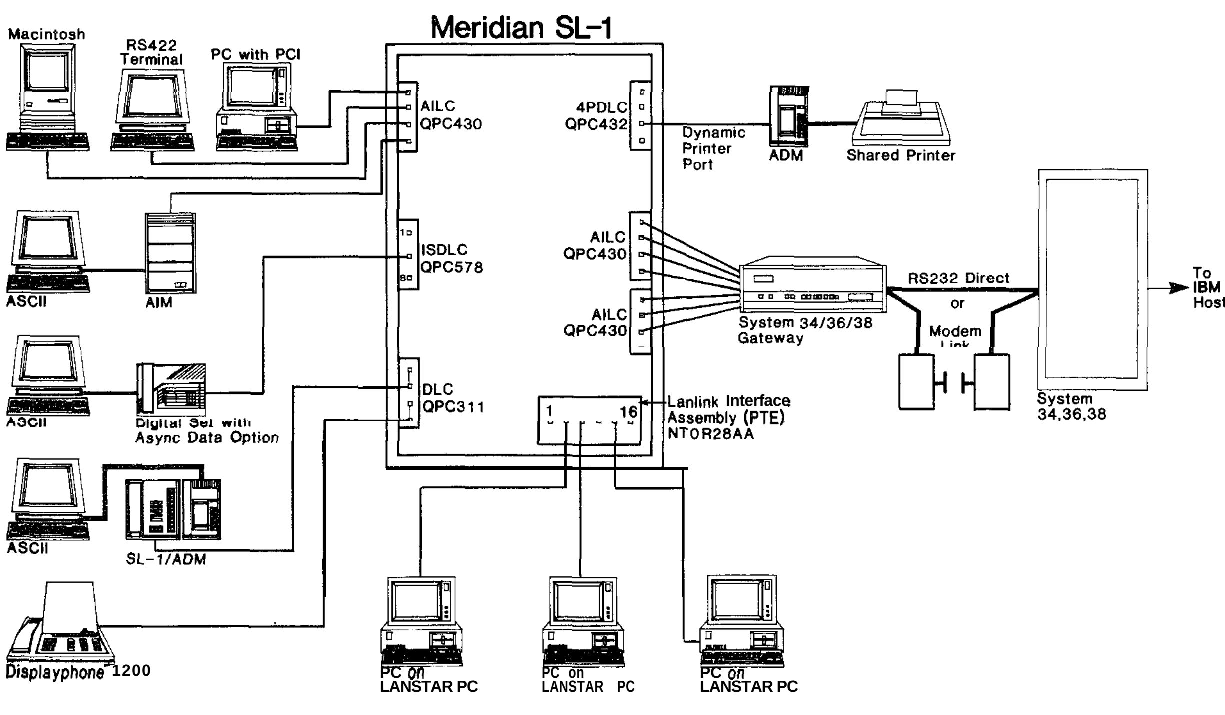


FIGURE 8-22: SYSTEM 36/38 GATEWAY

Coax Elimination and Switching System (CESS)

The Coax Elimination and Switching System (CESS) substantially eliminates the need for coaxial cable between the IBM display terminals and the IBM 3274 and 3276 controllers, replacing the coax with standard twisted pair wiring. IBM terminal users can have switched access to multiple controllers, and controller ports can be shared by many additional users through port contention.

The Coax Elimination and Switching System supports the following IBM terminals and personal computers:

- 3178
- 3278 (models 2-5)
- 3279 (without program symbols and Color Convergence)
- 3179 (in 3279 emulation mode)
- 3180 (in 3278 emulation mode)
- 3270-PC (in CUT mode, without file transfer or program symbols)
- IBM PC with IBM 3278/79 coax cards or with IRMA boards (operating in 3278 emulation mode, without file transfer or program symbols).

The Multi-Channel Coax System (MCCS) can be connected to multiple cluster controllers using the same or different protocols (SNA/SDLC, bisync, or local channel).

The CESS consists of individual Coax Interface Modules (CIMs) for connections to the display terminals and a Multi-Channel Coax System (MCCS) for connection to the communication controller. The MCCS consists of sixteen (16) Coax Interface Cards (CICs). Each CIC has two (2) ports, which enables the MCCS to accommodate a maximum of 32 ports.

The Coax Elimination and Switching System (CESS) allows IBM terminals switched access to communication controllers. A dedicated back-to-back mode may also be configured.

For the switched connection, the IBM 3178 or 3278 terminal is connected to the CIM via coaxial cable. The CIM is connected to Meridian SL-1 via one twisted pair of wires.

Additional wire pairs may be used to support a Meridian Digital Telephone, SL-1 electronic set, or a standard 500/2500 telephone.

The MCCS is connected to the cluster controller via coaxial cable. On the Meridian SE-1 side, the MCCS connects to the 4 Port Data Line Card (4PDLC) via twisted pair telephone wiring.

In the dedicated back-to-back mode (as in the switched mode), the IBM 3178 or 3278 terminal is connected to the CIM via coaxial cable. Twisted pair wiring leaving the CIM terminates directly on a port on the MCCS, completely bypassing Meridian SL-1. The MCCS is connected to the cluster controller via coaxial cable.

Both the CIM and the MCCS can be located up to 4000 feet from the PE cabinet of Meridian SL- 1.

Using Remote Peripheral Equipment (RPE), the IBM cluster controller may be located up to 70 miles from the host or from its terminals. (See LANSTAR Networking for more information on RPE).

CESS interfaces to the 4 Port Data Line Card (4PDLC) or to spare data ports on the Data Line Card (DLC). These cards reside on a Peripheral Equipment (PE) shelf of Meridian SL- 1.

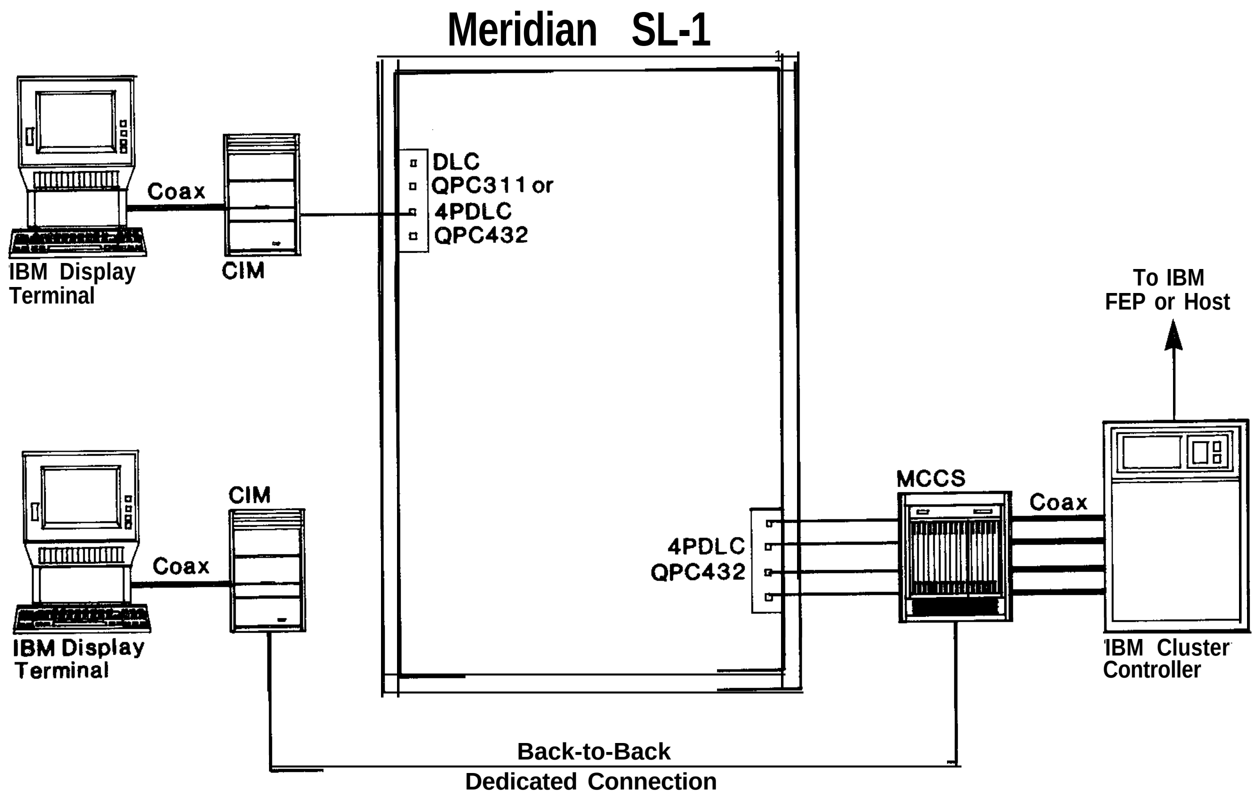


FIGURE 8-23: COAX ELIMINATION AND SWITCHING SYSTEM

F - LANSTAR WIDE AREA NETWORKING

Introduction

LANSTAR Networking services provides Wide Area Networking capabilities for all data communication applications. It includes LANSTAR products such as Digital Trunk Interface (DTI), Remote Peripheral Equipment (RPE), and the X.25 Gateway, along with various Modem Pooling arrangements. In addition, Electronic Switched Network (ESN) provides the necessary software to configure a private network based on Northern Telecom's digital switching system, plus compatibility and connectivity to other vendor's equipment and services. Further, the digital design of Meridian SL-1 ensures that the product is ideally positioned for the transition to the Integrated Services Digital Network (ISDN). This section gives an overview of the LANSTAR networking services available to terminals and personal computers connected to Meridian SL-1.

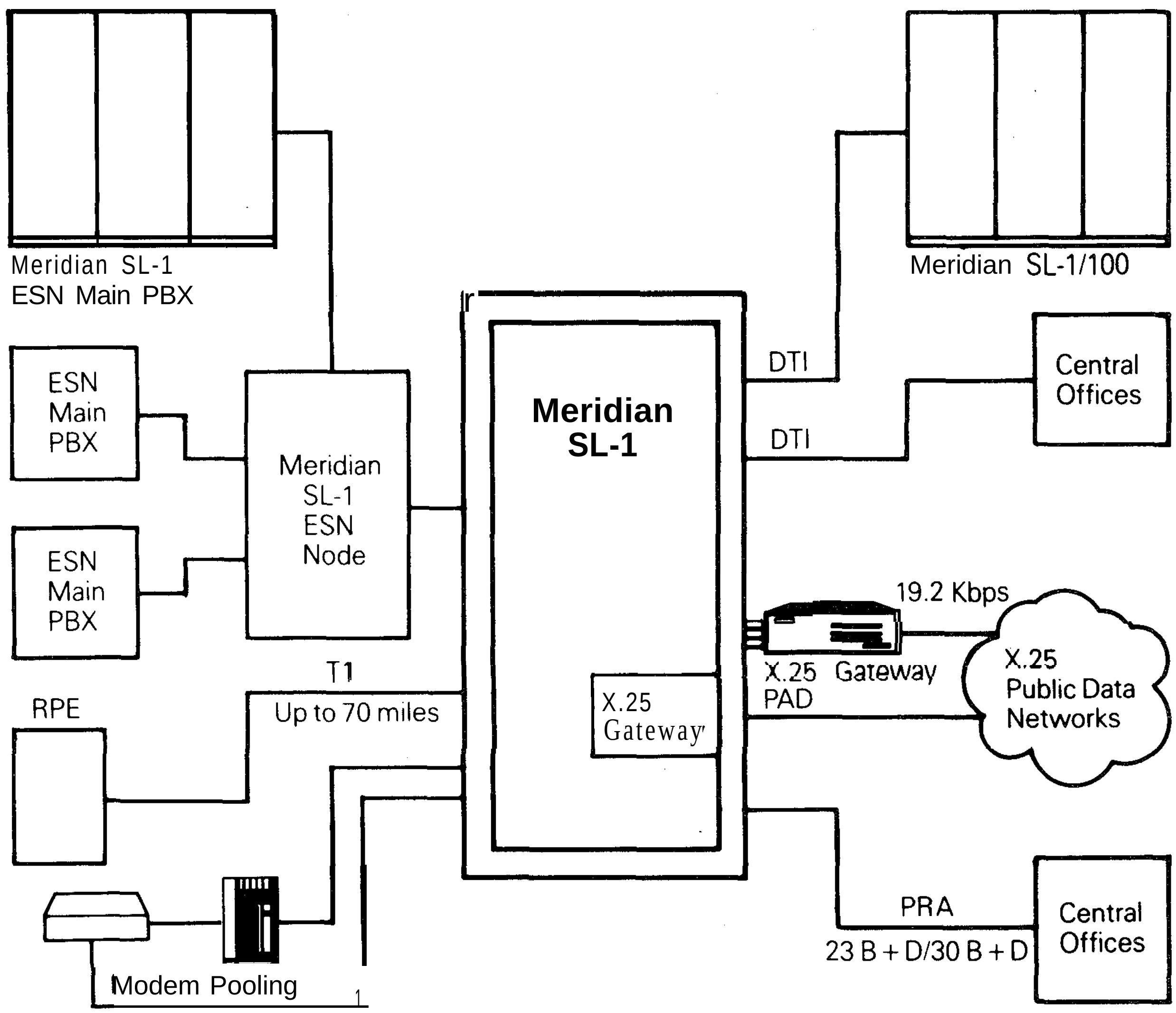


FIGURE 8-24: LANSTAR WIDE AREA NETWORKING

Digital Trunk Interface

The DTI is a trunk interface between the Meridian SL-1 digital network loop and an external DS-1 digital carrier termination. DTI provides 24 digital channels for both voice and data transmission between Meridian SL-1 digital systems and digital PBX or central offices. It emulates a channel bank on the carrier side and analog trunks on the Meridian SL-1 side. Calls over DTI may use cable, fiber optics, microwave radio, satellite links, or leased facilities conforming to the standard DS- 1 (1.544 Mbps) signaling format.

Within the DTI, the 24 individual channels can be used for both data and voice communications. These channels can digitally transmit data up to a speed of 56 Kbps synchronous and 19.2 Kbps asynchronous. They can be configured on a per channel basis so that each channel could be all voice or all data or shared voice and data. Each channel may also be programmed independently for various types of trunks, such as CO, FX, and Tie trunks.

A Clock Controller (QPC47 1) synchronizes the Meridian SL-1 network to an external source clock and generates and distributes the clock to the system. For this reason, DTI may be implemented on those Meridian SL-1 models that incorporate network enhancement (N, XN, ST, NT, RT, and XT). In addition, a design enhancement permits also the use of DTI on the Meridian SL-1MS system. The Clock Controller meets Bell System Stratum 3 synchronization criteria.

The QPC472 Digital Trunk Interface card provides an interface from any selected channel of the 32 channel 2.048 Mbps bit stream on the Meridian SL-1 network loop to a channel of the DS-1 24 channel 1.544 Mbps bipolar carrier terminal. Flexible mapping of the 30 Meridian SL-1 network loop time slots into the 24 DS-1 channels and vice versa is performed by the DTI. The QPC472 physically uses 2 card slots and is typically located on a network shelf. Where network shelf space is limited due to the use of network cards themselves, additional networks shelf(s) may be placed in the Common Equipment (CE) cabinet to accept the DTI cards. The DTI card is then connected to a network loop via cable to the faceplate connectors of each card.

Software Option 75 (PBX Interface) supports the DTI on applicable Meridian SL-1 system models.

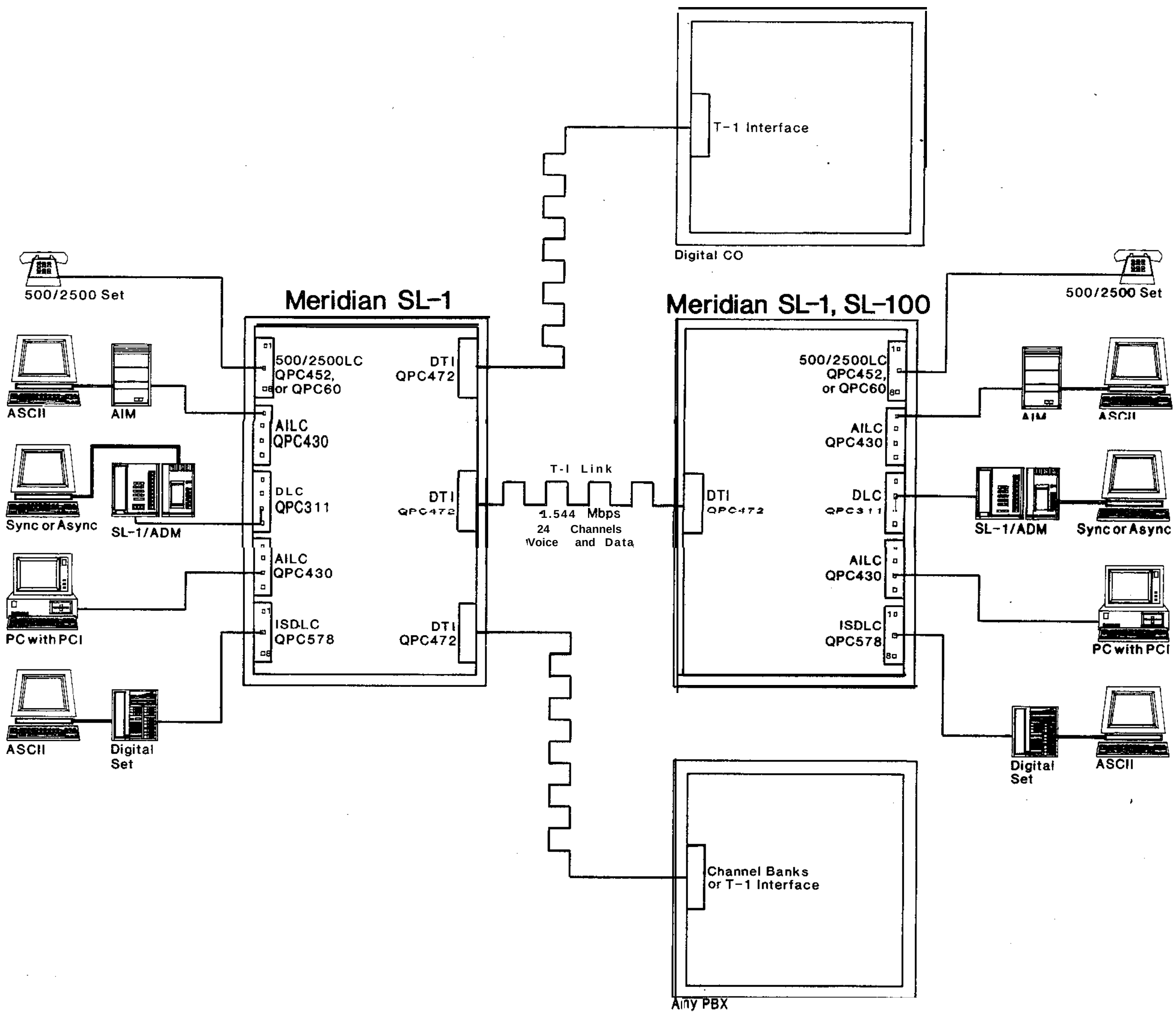


FIGURE 8-25: DIGITAL TRUNK INTERFACE

Remote Peripheral Equipment

Remote Peripheral Equipment (RPE) provides the capability to connect an equipment shelf (or shelves) up to 70 miles away from Meridian SL-1 via T- 1 carrier facilities. To Meridian SL-1, the RPE appears as any other shelf in a Peripheral Equipment cabinet. The data terminals, data modules, and telephones are connected via RPE function as if they were connected locally to Meridian SL- 1.

Two T-l carrier links are required to connect each RPE shelf to the assigned network loop of Meridian SL- 1.

Both a local RPE carrier shelf (at the main Meridian SL-1 location) and a remote RPE carrier shelf (at the remote facility) are required to accomplish RPE connectivity.

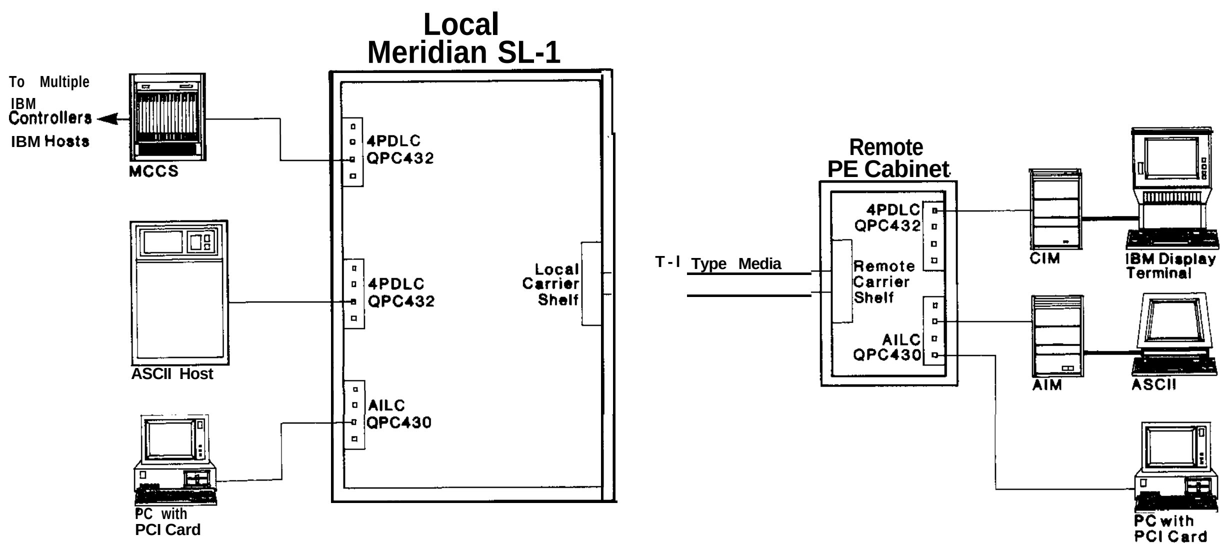


FIGURE 8-26: REMOTE PERIPHERAL EQUIPMENT

X.25 Gateway Pad

The X.25 Gateway PAD (Packet Assembler-Disassembler) is a stand-alone unit which allows asynchronous terminals and personal computers to communicate with remote host computers over public or private packet networks, using the worldwide X.25 data communications standard. Users may take advantage of direct X.25 links to Public Data Networks (PDNs) such as Telenet, Tymnet, Uninet, Datapac, etc. These PDN facilities may be used to access distant host computers as well as public services such as Dun & Bradstreet and Tymshare.

The X.25 Gateway PAD can be accessed by asynchronous workstations (ASCII terminals, personal computers, etc.) connected to Meridian Digital Telephones or LANSTAR data modules. Transmission up to 19.2 Kbps is supported. Remote terminals may also access the X.25 Gateway PAD through Inbound Modem Pooling.

The X.25 Gateway PAD can be connected to the public or private packet network via one or two synchronous modem links (each transmitting at up to 19.2 Kbps). The X.25 Gateway PAD has two RS232 (V.24) ports for connecting the modems.

The PAD supports 8 or 16 port configurations, and Meridian SL-1 can support multiple PADs.

The X.25 Gateway PAD can be rack-mounted or used as a stand-alone desktop unit and requires 2 twisted pair of wires per port. It is connected to the Main Distribution Frame of Meridian SL-1 via 25-pair telephone cable with Amphenol connectors. The X.25 Gateway PAD may be located up to 4000 feet from the PE cabinet of Meridian SL- 1, but it is typically located in the switchroom.

The X.25 Gateway PAD interfaces to the Asynchronous Interface Line Card (AILC), residing in a Peripheral Equipment (PE) shelf of Meridian SL- 1.

X.25 Gateway Software

The X.25 Gateway Software is an application which runs on the Packet Transport of Meridian SL-1. The X.25 Gateway is an alternative to the X.25 Gateway PAD. The X.25 Gateway PAD can also be used, but the Packet Transport Gateway Software provides additional capabilities.

The Software architecture includes four configurations:

X.25 S for 1-16 active logical channels on a single network link.
X.25 MS for 1-16 active logical channels on multiple network links.
X.25 L for l-64 active logical channels on a single network link.
X.25 LM for l-64 active logical channels on multiple network links.

Multiple Gateways may be configured if necessary.

Other devices on the Packet Transport which may access the X.25 Gateway include Meridian LANSTAR-connected IBM PCs, XTs, and ATs along with Macintosh II computers. ASCII terminals and personal computers connected via Meridian Digital Telephones or LANSTAR data modules (up to 19.2 Kbps) may also access the X.25 Gateway. Remote terminals access the Gateway through Inbound Modem Pooling.

The connection to the packet switched network is made via the Add-on Data Module (RS232 or V.35) or the Asynchronous Synchronous Interface Module (RS232) in synchronous mode. The connection can be local using RS232 or V.35 cables, or remote using modems.

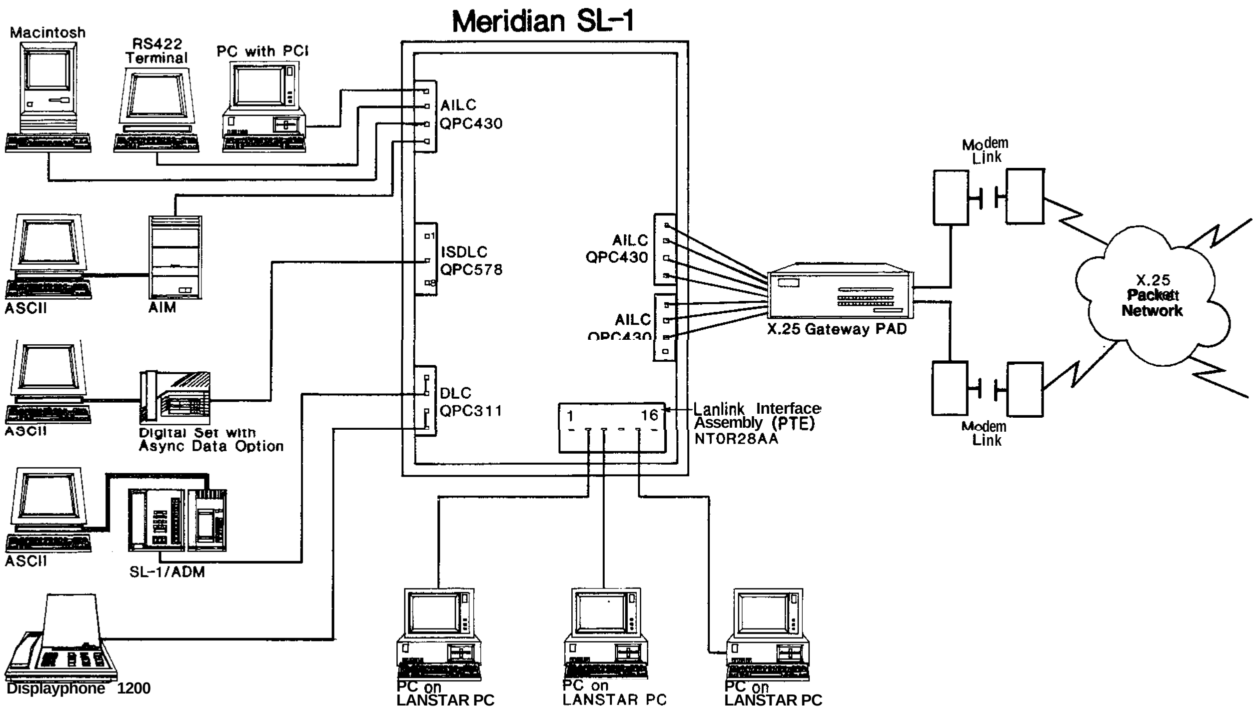


FIGURE 8-27: X.25 GATEWAY

Modem Pooling

Modems are required for data communication between remote devices over analog telephone lines. In Meridian SL-1, a modem may be used as either a stand-alone or as part of a modem pool.

Modem Pooling allows modems to be shared across all dial-up trunks (analog) as well as among all users. Since many users do not need a dedicated modem for full-time use. Modem Pooling can provide considerable cost savings, while making modem communications available to many more users.

The call accounting functions of Meridian SL-1 can be used to monitor data calling activity and to better manage system facilities. Users can also take advantage of Meridian SL-1 features such as hunting and ring again. Substantial cost savings may be achieved by using Automatic Route Selection for outbound modem calls.

The Modem Pools are organized according to modem type: modems of the same speed and transmission mode are placed together in the same pool.

Several Modem Pools may be configured according to the customer's requirements.

There are two types of Modem Pooling: Inbound Modem Pooling and Outbound Modem Pooling. The Inbound Modem Pool must be separate from the -Outbound Modem Pool.

Inbound Modem Pooling permits remote terminals to access local computer ports (or terminals). Both asynchronous and synchronous modems may be configured for dedicated (hotline) access to single hosts.

For asynchronous environments, Inbound Modem Pooling also provides the flexibility of keyboard dialing from the remote terminal (once the modem link is achieved) to connect to any one of several hosts.

Outbound Modem Pooling permits outgoing data calls to remote facilities, both asynchronous and synchronous. The user places a "Remote" data call, by keyboard dialing to the Modem Pool's DN (Directory Number). The Modem Pool reserves a modem for the call, the user is prompted for the telephone number and the modem call is dialed by Meridian SL-1.

Modem Pooling hardware consists of modems connected to ADMs. The ADMs interface to the Data Line Card (or 4 Port Data Line Card) via one twisted pair.

The modem telephone line interfaces are connected to "voice" line cards (500 set or Modem Pool Line Cards) so that calls may be placed or received from analog trunks.

Dial-up modems require one twisted pair of wires to connect to Meridian SL-1; private line modems are hard-wired to the 4-wire private telephone lines; modems which perform dial back-up for private line connections usually require two twisted pairs and two ports on a line card.

For Outbound Modem Pooling, a special RS232 cable (provided by Northern Telecom) must be used to connect the modem to the ADM. For Inbound Modem Pooling, a standard RS232 cable is used.

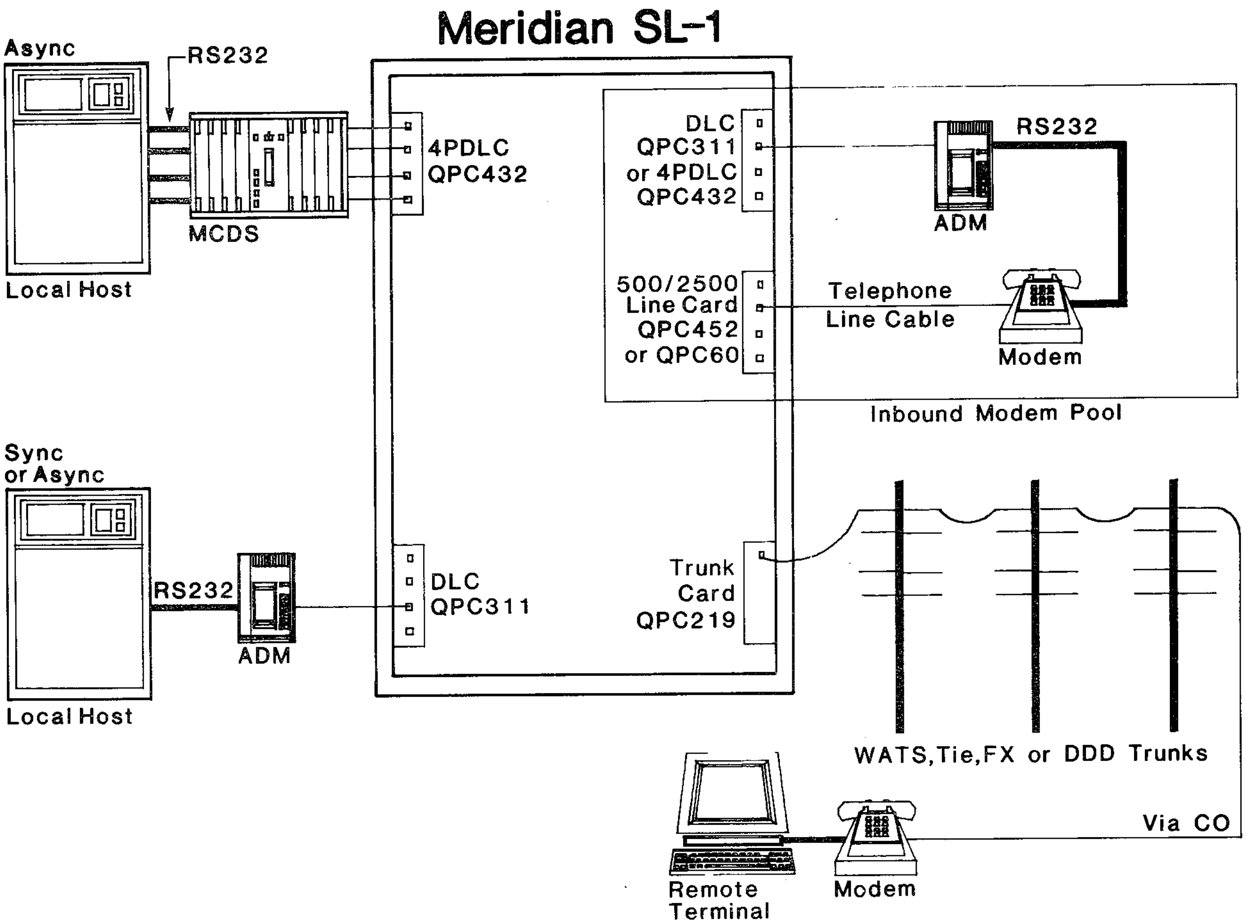


FIGURE 8-28: INBOUND MODEM POOLING

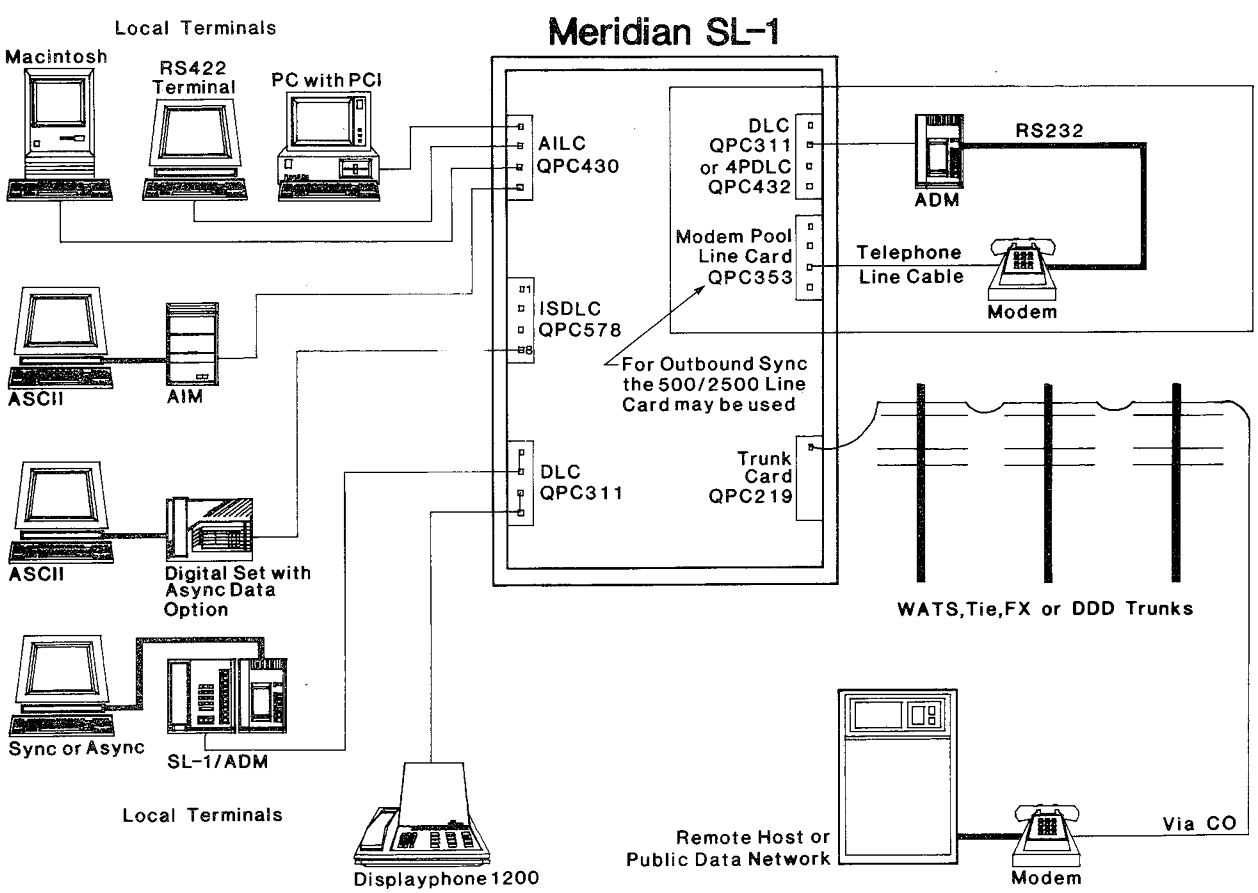


FIGURE 8-29: OUTBOUND MODEM POOLING

Smart Modems

Meridian SL-1 Modem Pooling arrangements can also be configured using intelligent modems, such as ProModem 1200 Intelligent 300/1200 Telephone Modems manufactured by Prometheus Products, Inc. The ProModem 1200 can be used in inbound and outbound modem pool arrangements, along with an ADM. The ProModem allows the user to customize call profiles through the use of macro call set-up, call progress and call termination.

The Meridian SL-1 also support Hayes and Hayes compatible modems (i.e., those using the Hayes modem commands). The ProModem is Hayes compatible.

The Bizcomp 1200 Baud Intelligent EXT Model 4120 NT from Bizcomp Corporation has firmware installed that allows for operation with the Meridian SL- 1. It has a null modem adapter that is configured to work in conjunction with the AILU. This is one of the most cost-effective means of installing a modem pool, since it eliminates the need for an ADM and provides flexibility in terms of combining previously separate modem pools.

Electronic Switched Network (ESN)

ESN features permit Meridian SL-1, Meridian SL-100 and DMS-100 systems with Meridian Business Services Software to provide a fully digital private network for voice and switched data communications.

With ESN, an existing network can be smoothly upgraded from analog to digital, using a phased migration plan with limited service interruptions.

Any or all of ESN's many features can be used in a custom design to meet company networking needs.

ESN Dialing Plans, such as Coordinated Dialing Plan (CDP) and Uniform Dialing Plan (UDP) provide simplified, unique dialing schemes which save time and make the network easier to use.

ESN can also help organizations reduce communications costs by as much as 30% through use of superior features such as ESN Routing, Time-of-Day Routing, Expensive Route Warning Tones, and authorization codes.

In addition, an ESN network consolidates various types of switching into one cohesive network; this gives improved network performance, simplified growth and expansion, and more control over network administration and management.

Integrated Services Digital Network (ISDN)

DTI and CPI were two of the first steps toward creating an all digital network as proposed by the future ISDN. The digital design of the Meridian SL-1 is ideally positioned to provide the capabilities required to support the ISDN, guaranteeing an “evolutionary” transition to the ISDN. The ISDN will bring with it standardization and definition of digital interfaces that will maximize the economies and benefits for both users and networking services.

G - INTERFACE CARDS

Introduction

There are various interface cards available to effect the comprehensive data connectivity capability of Meridian SL-1. This section gives a brief overview of each one and provides a compatibility matrix (Chart 8-l) of their application with the many LANSTAR data products.

Integrated Services Digital Line Card (ISDLC) QPC578

The Integrated Services Digital Line Card interfaces with the M2000 and M3000 series Digital Telephones.

It is located on a Peripheral Equipment shelf of Meridian SL-1.

The ISDLC has 8 ports, each of which supports both voice and data communications from the Digital Telephones.

One twisted pair of wires is required for both voice and data communications.

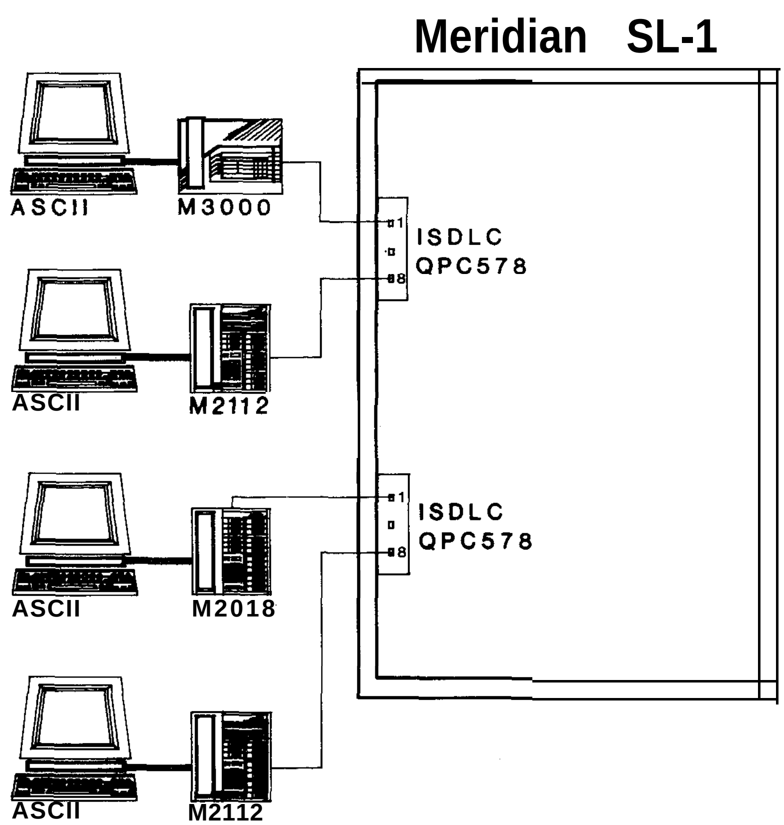


FIGURE 8-30: INTEGRATED SERVICES DIGITAL LINE CARD

Data Line Card (DLC)
QPC311

The Data Line Card interfaces with the SL-1 electronic set and the co-located SL-1 electronic set with Add-on Data Module. The DLC also interfaces with the Displayphone 1200 (SL-1 Displayphone). Spare data ports on the DLC may also be used for the stand-alone Add-on Data Module, the Asynchronous Synchronous Interface Module, the Coax Interface Module, and the Multi-Channel Data System.

The Data Line Card resides on a Peripheral Equipment shelf of Meridian SL- 1.

It is comprised of two circuit pairs. Each circuit pair consists of a voice port and a data port, so there are two voice ports and two data ports.

The even numbered voice ports interface with the SL-1 electronic telephone sets, while the odd numbered data ports interface with the Add-on Data Module, the Asynchronous Synchronous Interface Module, the Coax Interface Module, or the Multi-Channel Data System.

The SL-1 electronic set connects to the Data Line Card via 2 twisted pairs. The co-located SL-1 electronic set/ADM combination also requires 2 twisted pairs.

The Displayphone 1200 connects to the DLC via 2 twisted pairs.

The stand-alone ADM, ASIM, CIM, MCCS, or MCDS port connects to a spare data port on the DLC via one twisted pair.

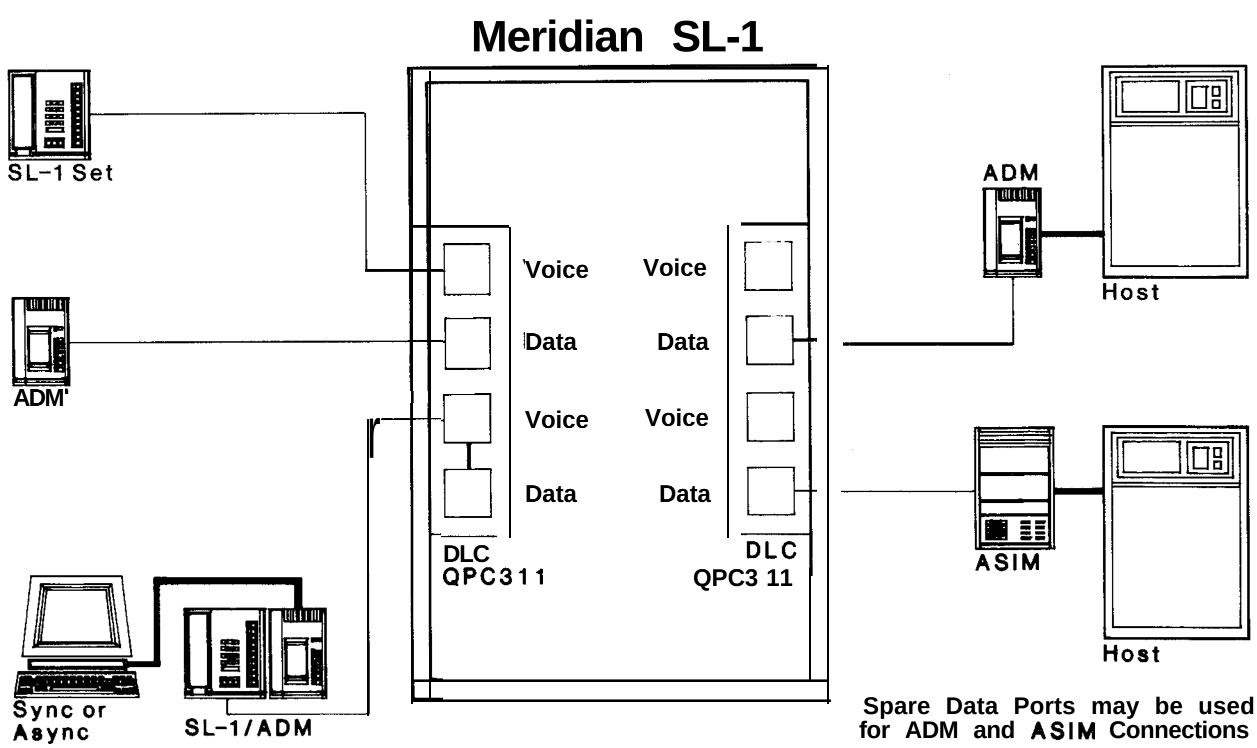


FIGURE 8-31: DATA LINE CARD

4-Port Data Line Card (4PDLC) QPC432

The 4-Port Data Line Card is a cost effective alternative to the Data Line Card.

The 4PDLC interfaces to the Multi-Channel Data System, the stand-alone Add-on Data Module, the Coax Interface Module, Multi-Channel Coax System and the Asynchronous Synchronous Interface Module.

It mounts on a Peripheral Equipment (PE) shelf of Meridian SL-1.

The 4PDLC provides 4 data ports for either asynchronous or synchronous operation and requires one twisted pair wiring for each port.

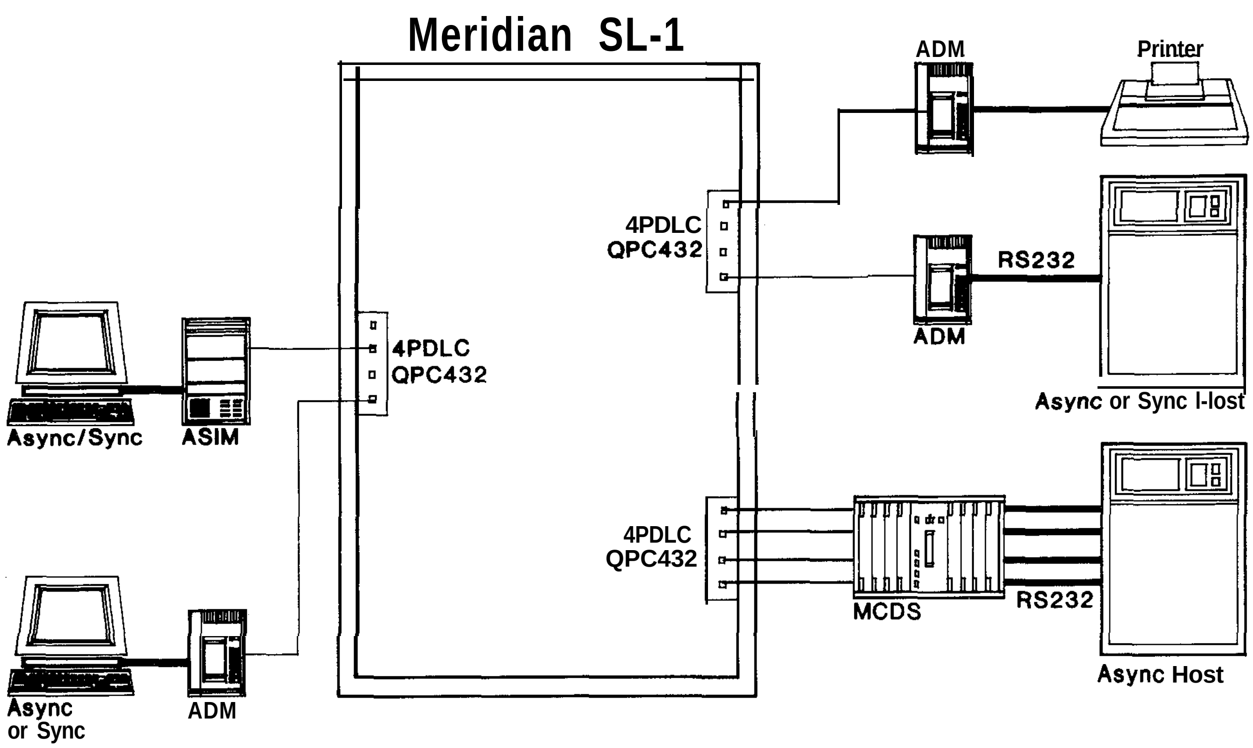


FIGURE 8-32: FOUR PORT DATA LINE CARD

Asynchronous Interface Line Card (AILC) QPC430

The Asynchronous Interface Line Card provides an industry standard RS422 interface.

Asynchronous data terminal equipment (DTE) that has the RS422 interface may be connected to the AILC directly without using the Asynchronous Interface Module (AIM). The Apple Macintosh, for example, only requires a simple cable to interface to the AILC.

Asynchronous data terminal equipment that has the RS232 interface may interface to the AILC via the Asynchronous Interface Module (AIM). IBM PCs may interface to the AILC via the Personal Computer Interface Card (PCI).

The QPC430E version of the AILC incorporates an enhancement that permits individual port configuration for "host" or "terminal" modes. The AILC configured in the "Host" mode may be directly connected to a host such as the HP 3000 equipped with the "ATP to Meridian SL-1 interface." Other direct connections to asynchronous equipment include 3270 BSC/SNA Protocol Converter and X.25 pads.

The AILC card resides on a Peripheral Equipment (PE) shelf of Meridian SL-1 and provides 4 asynchronous RS422 ports. Each port requires 2 twisted pair wiring.

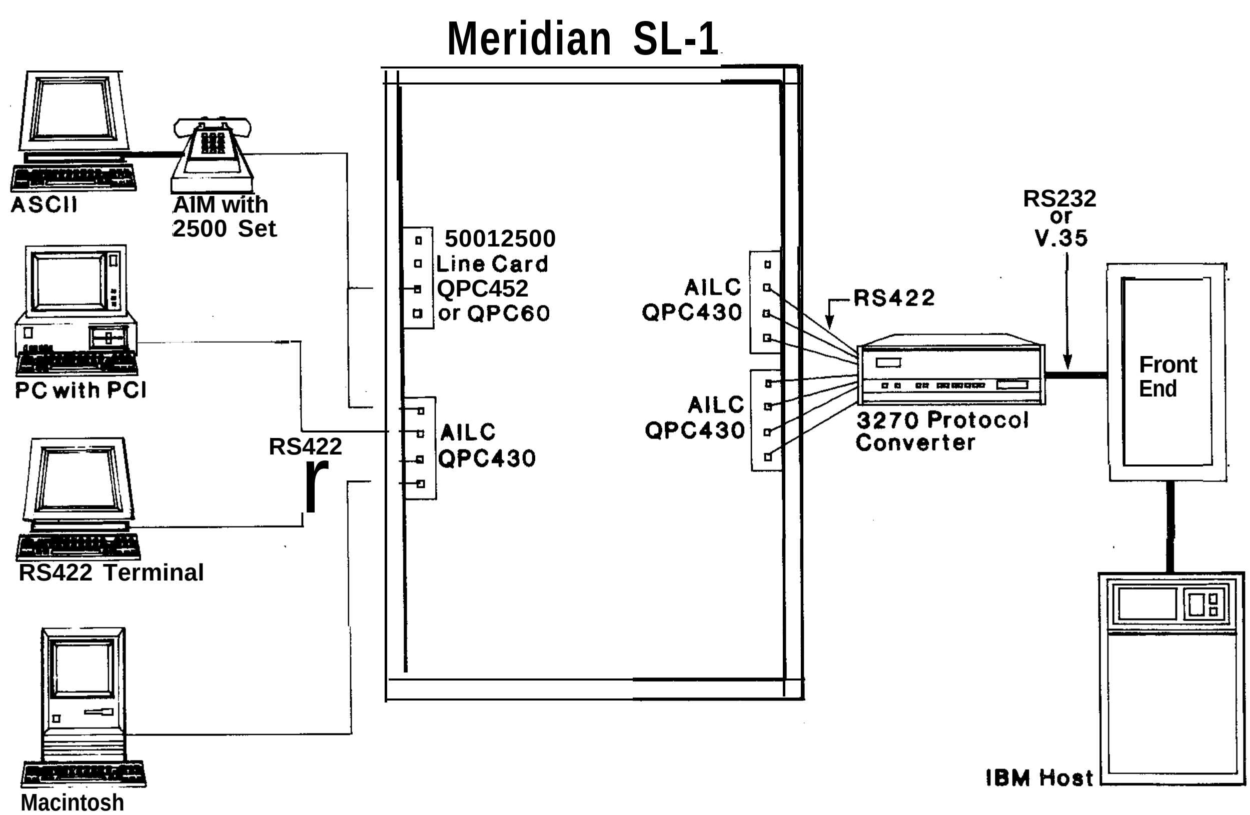


FIGURE 8-33: ASYNCHRONOUS INTERFACE LINE CARD

RS-232C Interface Line Card (RILC) QPC723

The RS-232C Interface Line Card provides a direct interface to RS-232C asynchronous ASCII computer equipment such as asynchronous hosts, modems, data PBXs, multiplexors, and standard off-the-shelf X.25 PADs and protocol conveters. Its provision eliminates the need for other LANSTAR data modules (asynchronous function) such as the ADM, ASIM, and MCDS. The RILC contains four ports, each of which may be independently configured to support various applications operating at data rates of 110 bps to 19200 bps. All features and functions associated with the ADM, ASIM, and MCDS are supported. The AILC operates at a maximum distance of fifty feet at 19,200 bps. However, greater distances may be achieved by employing low capacitance cable or operating at reduced speeds. The RILC resides on a Peripheral Equipment (PE) shelf of Meridian SL-1 and supports telephone twisted wiring connections by means of the following associated octopus cables:

- telecom 25 pair (50 pin) to 6 RS-232C (DB-25) male connectors
- telecom 25 pair (50 pin) to 6 RS-232C (DB-25) female connectors

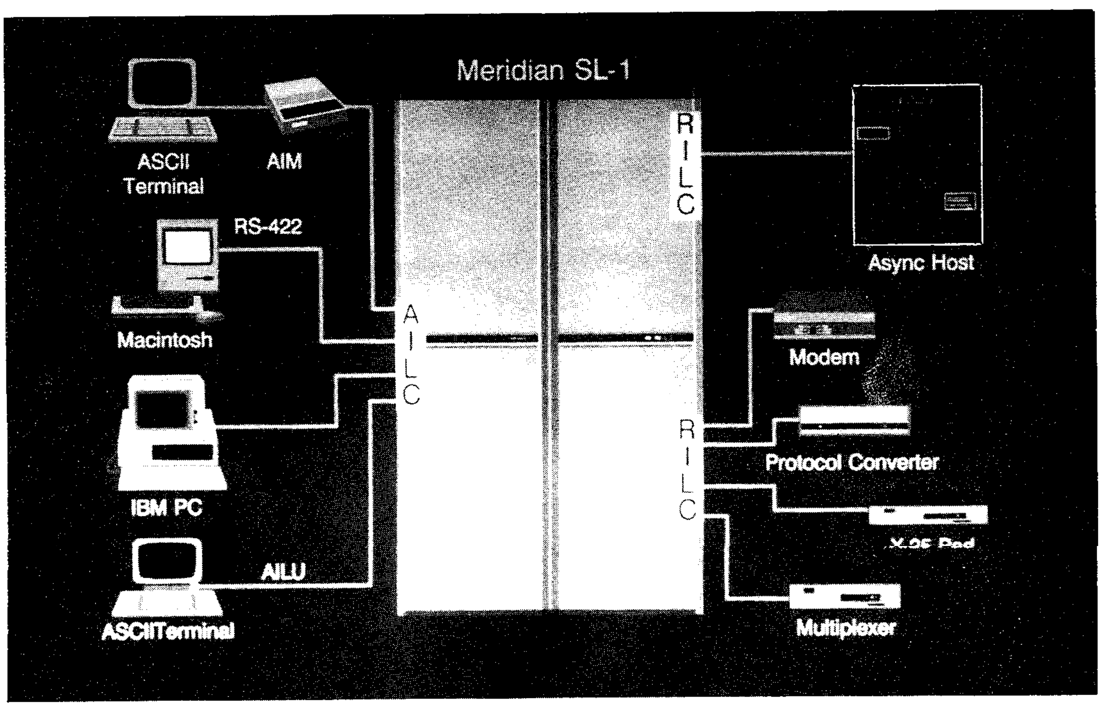
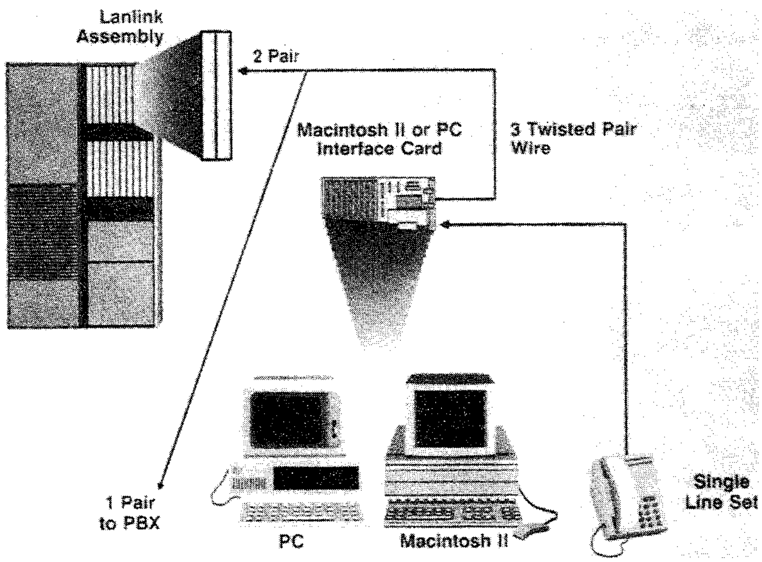


FIGURE S-34: RS-232C INTERFACE LINE CARD

LANLINK Interface Assembly NT0R28AA

The LANLINK Interface Assembly interfaces to the IBM personal computers (and compatibles) and Macintosh II computers equipped with the LANSTAR PC Interface Card and Macintosh II Interface Card.

The Assembly is located in the Packet Transport cabinet of Meridian SL-1. It is made up to a pair of cards, and it provides 16 ports for Meridian LANSTAR devices. The latter require two twisted pair of wires to connect to the LANLINK Assembly.



A LANSTAR PC or Macintosh II Interface Card is installed in each personal computer. A second RJ-11 jack is provided on the card to plug in a telephone. Standard telephone wiring connects the personal computer to the LANLINK Assembly residing in the Meridian LANSTAR packet transport.

FIGURE 8-35: LANLINK INTERFACE ASSEMBLY

Modem Pool Interfaces

The 500/2500 Line Card (QPC60, QPC452, QPC594) and the Modem Pooling Line Card (QPC353) are used in modem pool applications. Each of these cards connects 500/2500-type telephones or devices which emulate 500/2500 sets (such as modems, Unity telephones). The Modem Pooling Line Card is required for Outbound Asynchronous Modem Pooling (not required for Smartmodem Pools). The 500/2500 Line Card (single or double density) can be used for all other applications.

These cards are located on a Peripheral Equipment (PE) shelf of Meridian SL- 1.

The QPC60 500/2500 Line Card (single density) and Modem Pooling Line Card have 4 ports. The QPC452 double density 500/2500 Line Card has 8 ports and the QPC594 quad density version 16 ports. These cards are identical in function except that the Modem Pooling Line Card omits a ringing resistor. This modification prevents ringing voltage from being sent to the Outbound Modem Pool during call setup--ensuring that the modems will remain in originate mode.

The 500/2500 type devices require one twisted pair of wires to connect to these line cards which are utilized as follows:

	Modem Pool	
Protocol	Inbound	Outbound
Asynchronous	QPC60/452/594	QPC353
Synchronous	QPC60/452/594	QPC60/452/594

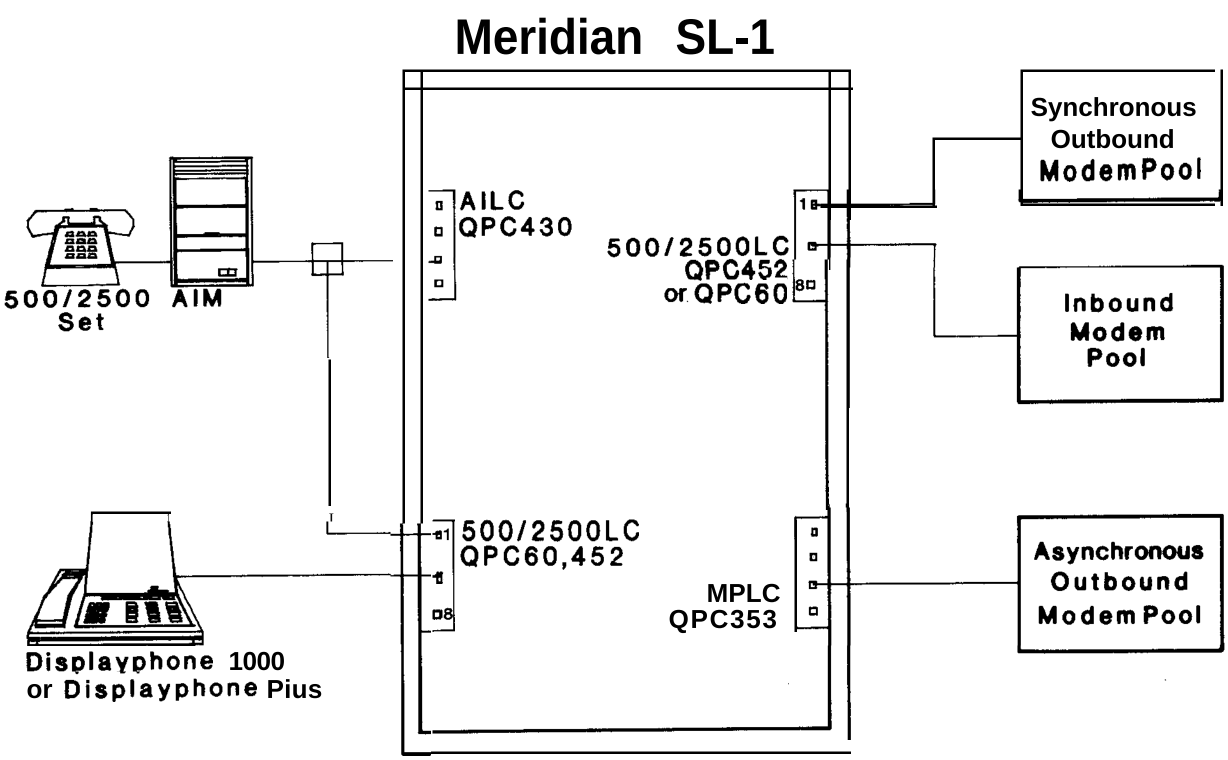


FIGURE 8-36: MODEM POOLING

	ISDLC QPC578	Lanlink NTOR28AA	500/2500LC QPC60/ 4521594	DLC QPC311	4PDLC QPC432	AILC QPC430	MPLC QPC353	RILC QPC723
Digital Sets	X							
Displayphone 1200				X				
Displayphone 220,1000 PLUS			X					
SL-1 Set w/ ADM				X				
ADM				X	X			
AIM						X		
ASIM				X	X			
PCI						x		
RS422 Direct						X		
LANSTAR PC		X						
MCDS					X			
3270 Protocol Converters						X		X
System 34/36/38 Gateway						X		X
Coax Elimination/Switching				X	X			
X.25 Gateway PAD						X		X
Modem Pooling (Sync)			X					
Modem Pooling (Inbound)			X					
Modem Pooling (Smartmodem)			X					X
Modem Pooling (Async, Outbound, Std.)								
Async Hosts								
Multiplexor								
Modem								X

CHART 8-1: LANSTAR DATA PRODUCT /INTERFACE CARD MATRIX

H - MISCELLANEOUS

LANSTAR Balun Family

A limited function alternative to the Coax Elimination and Switching System (CESS) is provided by devices within the LANSTAR Balun family (Figure S-37). Baluns are converters (BALanced-to-UNbalanced) that allow transmission over twisted pair medium for terminals that otherwise need special cable. The Baluns are designed for use in normal office data communications where point-to-point (non-switched) connections are required. Use of standard telephone wiring instead of special cable reduces cost of installation and relocation of data equipment. Each Balun has the special cable connector at one end and a modular RI-1 1 receptable on the other. A pair of Baluns is required for each connection link - one at the terminal and one at the controller.

There are three types of Baluns available:

- **CTP-1 for IBM 3270 Devices**
  The CTP-1 Balun is used to connect any IBM 3270 Coax A device, or any other manufacturer's device that supports the same signal characteristics as the Coax A signal, to 24 AWG twisted pair wire. The baluns are used in pairs. One balun is connected to the terminal and the other is connected to the cluster controller.

- **CTP-2 for IBM Systems 34/36/38 Terminals**
  The CTP-2 Baluns match the impedance from twinaxial cable to twisted pair cable. This allows signals from any of IBM's 536X or 538X System unit and connectable terminals and controllers to be transmitted over one pair of twisted pair cable instead of twinaxial cable.

- **CTP-3 for Wang Office Products**
  The CTP-3 Balun for Wang sytems provide a cost-effective alternative to standard dual coaxial cabling systems. The function of the CTP-3 is completely transparent and allows the host and terminal to communicate as they would over dual coaxial cable with no degradation in service or performance.

  A rack mounted unit is also available:

- **RACK 24 for IBM 3270 Devices**
  The Rack 24 coax wiring concentrator is a 24 channel rack-mountable impedance matching device. Up to 24 IBM 3270 type A coax controller ports can be attached to the 24 front panel mounted BNC connectors. It can also be used with the CTP-1 at the terminal.

The Baluns afford a direct terminal-to-controller connection at speeds for which the systems are designed. They reduce the operating costs of connecting a coax-based communication systems by easing the complexity of installation and equipment rearrangement.

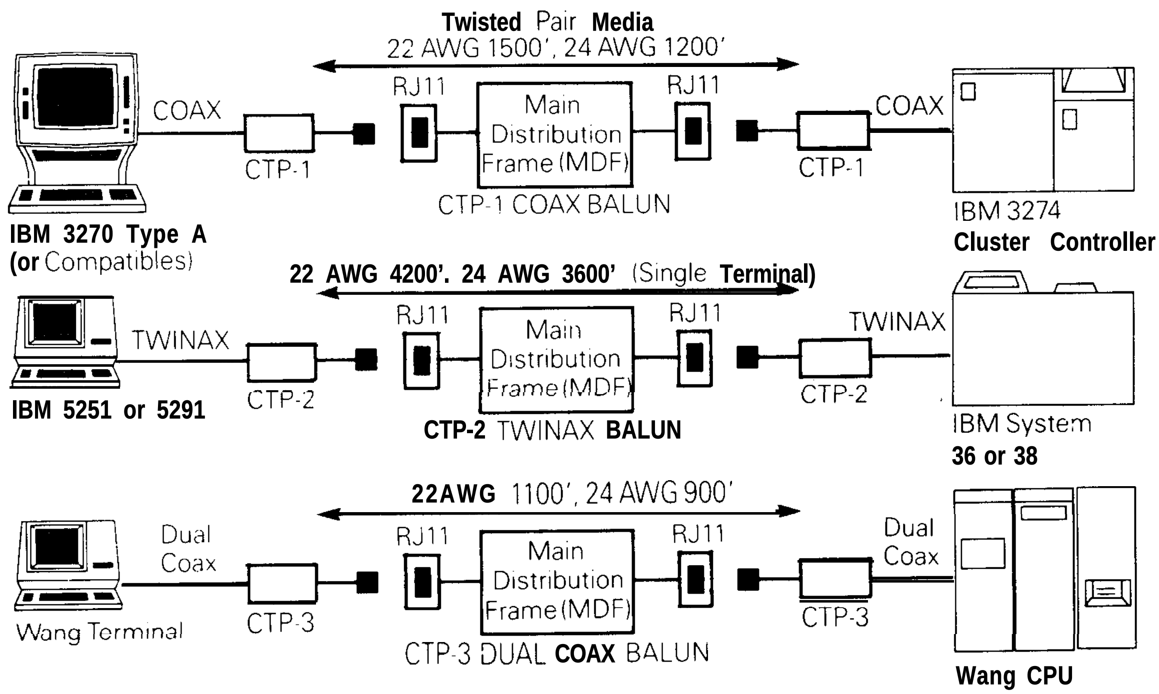


FIGURE 8-37: LANSTAR BALUN FAMILY

CONTENTS

SECTION : 9 SYSTEM CONFIGURATION

SYSTEMCONFIGURATION

Introduction

System configuration of the Meridian SL-1 involves determining the hardware and software necessary to meet the specific requirements of the installation. This determination is based upon parameters related to quantity and type of terminals, telephones, traffic, features, and services. An assessment of these requirements indicates which particular member of the Meridian SL- 1 family is best suited to address those particular needs.

Autoquote

The Autoquote mechanism readily provides a system configuration based upon specific input data pertaining to the required parameters. In addition to providing a listing of hardware and software and their associated ordering codes, reports may also be generated to denote traffic, memory, and real time estimations. Engineering rules determine equipment provisioning and the capability exists to specify requirements on an "equipped" and "wired for" basis to address future growth projections. Other services available include the capability to:

quote all available software generics and associated optional feature groups

quote all standard Meridian SL-1 hardware items

indicate which hardware and software items are on a controlled release basis

configure systems to support non-blocking and RPE applications

generate configurations for different Meridian SL-1 models using the same input data requirements

save and later retrieve input, data from one run and modify it for a subsequent run

specify the spare capacity available in terms of memory, real time, traffic, and hardware.

CONFIGURATION GUIDELINES,

To assist in the configuration aspects of Meridian SL-1, numerous aids are provided that relate to provisioning, compatibility, and capacity guidelines. These take the form of charts and tables for ready reference to the various aspects of hardware and software. The following information is provided in this type of format:

(A) CIRCUIT SWITCH

Reference	Description
SYSTEM	
CHART 9- 1	**Meridian SL-1 Configuration Matrix**
	A summary of the capabilities of each of the Meridian SL-1 family members. (Models S, MS, N, and XN)
CHART 9-2	**Meridian SL-1 Configuration Matrix**
	A summary of the capabilities of each of the Meridian SL-1 family members. (Models ST, RT, NT, and XT)
CHART 9-3	**Meridian SL-1 Family: Model/Software Compatibility**
	A matrix of product models and associated software generics.
CHART 9-4	**System Comparison**
	An overview of each system model in terms of its software generic, application, typical capacity parameters, configuration, and compatibility with major development programs
9-4A	Meridian SL-1: A, M, S, MS, and ST
9-4B	Meridian SL-1: L, LE, N, NT, and RT
9-4C	Meridian SL- 1: VL, VLE, XL, XN, and XT
CHART 9-5	**Telephones and Terminals**
	A matrix denoting the compatibility of the comprehensive portfolio of telephone and terminals with the various system models
CHART 9-6	**Data Compatibility**
	Groups LANSTAR data services in various categories and denotes compatibility with associated system models
CHART 9-7	**Optional Feature Packages**
	A compatibility matrix of system model and the most commonly used optional software feature groups

HARDWARE

TABLE 9-1 **Meridian SL-1 Hardware Compatibility**

A list of hardware by code and its compatibility to each of the Meridian SL-1 family members

TABLE 9-2 **Meridian SL-1 Hardware Provisioning**

A list of hardware by code and associated parameters in terms of purpose, compatibility, location, and provisioning

SOFTWARE

TABLE 9-3 **Software Generic Compatibility**

A list of feature option groups and their compatibility with the various software generics

TABLE 9-4 **Generic X11 Optional Feature Groups**

A list of the optional feature groups available on Generic Xl 1 Release 12 for business applications

TABLE 9-5 **Meridian SL-1 Software Provisioning**

A list of the available software option groups and associated parameters in terms of package number, mnemonic, purpose, ordering code and capability

TABLE 9-6 **Meridian SL-1 Software Compatibility**

A list of features and services and their compatibility to specific releases of the Xl 1 software generic

TABLE 9-7 **Meridian SL-1 Feature Parameters**

A list of features and associated application guidelines in terms of capability.

TABLE 9-8 **Meridian SL-1 Feature Package Dependencies**

A list of optional feature packages and their associated prerequisite software.

TABLE 9-9 **Meridian SL-1 Data Overlay Programs**

A list of the available administration overlay programs by their reference number and description.

CAPACITY

TABLE 9-10 **Simplified Real Time Per Call**

A matrix of typical CPU real time for processing calls from various set types to various call types for Meridian SL-1S, MS, N, XN, ST, RT, NT, and XT

TABLE 9-l 1 **Typical Calls Per Hour**

A matrix of typical calls per hour for various set types and intercom ratio for Meridian SL-1S, MS, N, XN, ST, RT, NT, and XT

TABLE 9-12 **Meridian SL-1 Memory Capacity**

A matrix of Program Store, Protected Data, and Unprotected Data capacities for the Meridian SL-1S, MS, ST, RT, N, and XN

TABLE 9-13 **Meridian SL-1 Memory Allocation**

A list of program store memory allocation for Generic Xl 1 Release 10 and associated optional feature groups

FIGURE 9-l **Meridian SL-1 Call Handling Capacity**

A diagram of Busy Hour Call (BHC) capacity for each Meridian SL-1 model

FIGURE 9-2 **Meridian SL-1 Memory Organization**

A diagram of memory allocation for Meridian SL-1RT, NT and XT

FIGURE 9-3 **Meridian SL-1 Memory Card Capacity**

A diagram of storage capability of associated random access memory cards for each Meridian SL-1 model

FIGURE 9-4 **Meridian SL-1 Random-Access Memory**

A diagram of the random access memory capacity for each Meridian SL-1 model

(B) PACKET TRANSPORT

TABLE 9-14 **Packet Transport Hardware Provisioning**

A list of hardware by code and associated parameters in terms of purpose and provisioning

TECHNOLOGY	DIGITAL SWITCHING - STORED PROGRAM CONTROL, 16 BIT PROCESSOR,								
NETWORK	SL-1 HIGH LEVEL LANGUAGE N.A. STANDARD Mu-LAW 255 COMPANDING								
	8 BIT PCM 8 KHZ SAMPLING RATE TIME DIVISION MULTIPLEXING, 64 KBPS								
	PER TIME SLOT, 2.048 MBPS PER LOOP.								
FCC REGISTRATION	AB-6982-14234-MFE: SERVICE CODE: 9.0F; RINGER EQUIV: 1.0A								
MODEL	S	MS		N		XN			
LINE SIZE (TYPICAL)	32-140	80-400		100-1500		800-5000			
MAX # CABINETS	1	2		5		-			
DIMENSIONS	HXWXD	HXWXD		HXWXD		HXWXD			
EQUIPMENT CABINET	56X32X16	72X52X29		72X59X29		72X52X29			
POWER CABINET	-	-		-		72X52X20			
TYPE	CE/PE	CE/PE		CE/PE		CE	CE/PE	PE	PWR
CODE	QCA60	QCA109	QCA74	QCA58	QCA74	QCA55	QCA108	QCA74	QCA13
WATTS	900	1700	1000	1700	1000	2400	1600	1000	1400
BTU	3070	5797	3410	5797	3410	8184	5456	3410	4174
CURRENT DRAIN @ 52V	15A	30A	30A	39A	30A	50A	45A	30A	
MAXIMUM QTY	1	1	1			1	1	A/R	3
WEIGHT (LB) EACH	300	1500		1500		1500	1500	1500	1300
FLOOR LOAD-LB/SQ FT	100	50		50		50	50	50	80
STORAGE	100	170		170		170	170	170	
BEARING - LB/SQ IN		80		80		80	80	80	70
POWER - MODE	DECENTRALIZED PER CABINET					CENTRALIZED			
AC INPUT VOLTAGE	115V AC	208V AC		208V AC		208V AC			
DC OUTPUT VOLTAGE	48V DC	48V DC		48V DC		48V DC			
DC CURRENT RATING	20A	40A		40A		50A			
MODEL CODE	QRF9	QRF8		QRF8		J2357D			
MAXIMUM QTY	1	2		5		10			
UL/CSA	YES	YES		YES		YES			
CONFIGURATION CPU	1	1		1 OR 2		2			
SOFTWARE GENERIC	711	711		811		911			
MINIMUM RELEASE	4	4		4		4		5	
CE ENHANCEMENT	CPU/MEM	CPU/MEM		CPU/MEM		MEMORY		MEM EXPN	
NETWORK ENHANCEMENT	NO	NO		YES		YES		YES	
PE ENHANCEMENT	YES	YES		YES		YES		YES	
MEMORY	ERROR CORRECTION/DETECT			FULLY REDUNDANT					
ADDRESS RANGE	256K	256K		320K		384K		768K	
PROGRAM	96K	160K		192K		128K		448K	
PDATA	64K	64K		64K		128K		192K	
UDATA	32K	32K		64K		128K		128K	
# MODULES	1X256K	2X128K		2X128K		4X192K			
(STANDARD)		2X192K		2X192K					
NETWORK	SINGLE GROUP (1)					MULTI GROUP (5)			
TOTAL LOOPS	4	14		32		160			
TYPICAL VOICE	2	12		24		120			
TYPICAL TDS	1	1		2		10			
TYPICAL CONF	1	1		2		10			
SIMULT CONV.	45	180		360		1500			
CCS/LOOP									
160 TERMS	600	600		660		660			
80 TERMS	-	-		735		735			
30 TERMS	-	-		1080		1080			
MAX # PORTS	224	1920		3840		19200			
TS SELECTION	MATCHED PAIRS			INDIVIDUAL					

CHART 9-1: MERIDIAN SL-1 CONFIGURATION MATRIX (S, MS, N, XN)

TECHNOLOGY	DIGITAL SWITCHING • STORED PROGRAM CONTROL, SL-1 HIGH LEVEL LANGUAGE			
NETWORK	NA. STANDARD Mu-LAW 255 COMPANDING 8 BIT PCM 8 KHZ SAMPLING RATE TIME DIVISION MULTIPLEXING, 64 KBPS PER TIME SLOT, 2048 MBPS PER LOOP 32 TIME SLOTS PER LOOP (30 TRAFFIC, 1-SIGNALING, 1-SPARE)			
FCC REGISTRATION	AB-6982-14234-MFE; SERVICE CODE: 9.0F; RINGER EQUIV: 1.0A			
MODEL	ST	RT	NT	XT
LINE SIZE (TYPICAL)	30-600	30-600	400-1500	1000-7000
MAX # CABINETS	2	3	5	-
DIMENSIONS (INCHES)	H (1st)(2nd)(3rd)xWxD	HXWXD	HXWXD	HXWXD
EQUIPMENT CABINET	(32)(48)(62)x32x21	62X32X21	72 X 52 X 29	72 X 52 X 29
POWER CABINET	-	-		72 X 52 X 20
TYPE	CE/PE PE	CE/PE PE	CE/PE PE	CE CE/PE PE PWR
CODE	QCA136 QCA137	QCA147 QCA137	QCA58 QCA74	QCA55 QCA108 QCA74 QCA13
WATTS	1500	1500	1700 1000	2400 1600 1000 1400
BTU	5115	5115	5797 3410	8184 5456 3410 4774
CURRENT DRAIN @ 52V	10A/17A/24A	30A	39A 28A	50A 45A 30A -
MAXIMUM QTY	1 1	1 2	1 4	1 1 - 3
WEIGHT (LB) EACH	(200) (300) (400)	400	1500 1500	1500 1500 1500 1300
FLOOR LOAD - LB/SQ FT	100	100	50 50	50 50 50 80
STORAGE		-	170 170	170 170 170
BEARING - LB/SQ IN		-	80 80	80 80 80 70
POWER - MODE	DECENTRALIZED	DECENTRALIZED	DECENTRALIZED	CENTRALIZED
AC INPUT VOLTAGE	208V AC	208V AC	208V AC	208V AC
DC OUTPUT VOLTAGE	48V DC	48V DC	48V DC	48V DC
DC CURRENT RATING	30A	30A	40A	50A
MODEL CODE	QRF12	QRF12	QRF8	NT5C03
MAXIMUM QTY	1	2	5	10
UL/CSA	YES	YES	YES	YES
CPU CONFIGURATION	1	2	2	2
PROCESSOR SIZE	16 BIT	24 BIT	24 BIT	24 BIT
SOFTWARE GENERIC	1011	1311	1111	1211
MINIMUM RELEASE	9	10	8	8
DIGITAL TRK I/F	YES	YES	YES	YES
COMPUTER - PBX I/F	YES	YES	YES	YES
DIGITAL TELEPHONES	YES	YES	YES	YES
PACKET TRANSPORT	YES	YES	YES	YES
CE ENHANCEMENTS	YES	YES	YES	YES
NETWORK ENHANCEMENT	YES	YES	YES	YES
PE ENHANCEMENT(DD/QD)	YES	YES	YES	YES
MEMORY	ERROR CORRECTION	FULLY REDUNDANT		
WORD LENGTH	16 BITS	24 BITS	24 BITS	24 BITS
SOFTWARE ADDRESSES	320K WORDS	16M WORDS	16M WORDS	16M WORDS
PHYSICAL MEMORY	320K WORDS	768K WORDS	768K WORDS	2304K WORDS
(SIZE)	(5,120,000 BITS)	(18,432,000 BITS)	(18,432,000 BITS)	(55,296,000 BITS)
ALLOCATION	64K PAGES	CONTIGUOUS BASIS UP TO 768K CARDS INSTALLED		
# MODULES (STD)	1X 512K CARD	2 X 768K CARDS	2 X 768K CARDS	2 X 768K CARDS
(MAXIMUM CAPACITY)	1X 512K CARD	2 X 768K CARDS	2 X 768K CARDS	6 X 768K CARDS
NETWORK	SINGLE GROUP (1/2)	SINGLE GROUP (1/2)	SINGLE GROUP	MULTIGROUP (5)
TOTAL LOOPS	16	16	32	160
TYPICAL VOICE/DATA	12	12	24	120
TYPICAL TDS	1	1	2	10
TYPICAL CONFERENCE	1	1	2	10
SIMULT CONNECTIONS	180	180	360	1800
TRAFFIC PER LOOP				
- 160 TERMINATIONS	660CCS	660 CCS	660 CCS	660 CCS
- 80 TERMINATIONS	735CCS	735 CCS	735 CCS	735 CCS
- 30 TERMINATIONS	1080CCS	1080 CCS	1080 CCS	1080 CCS
MAX # PORTS	1920	1920	3840	19200
TS SELECTION	INDIVIDUAL	INDIVIDUAL	INDIVIDUAL	INDIVIDUAL

CHART 9-2: MERIDIAN SL-1 CONFIGURATION MATRIX (ST, RT, NT, XT)

SYSTEM

S* 0 F T W A R E

		MODEL	L	VL	LE	VLE	A	XL	M	S	MS	N	XN	ST	NT	XT	RT
		GENERIC-b	1	2	3	4	5	6	7	7	7	8	9	10	11	12	13
BUSINESS		X01	(X)														
BUSINESS		X02	(X)	(X)													
BUSINESS		X03	(X)	(X)													
BUSINESS		X04	(X)	(X)	(X)	(X)	(X)										
BUSINESS		X05	(X)	(X)	(X)	(X)	(X)										
	H/M	X07			(X)	(X)	(X)		(X)								
	BUS.	X09			(X)	(X)		(X)									
	ESN	610						(X)									
	AUTOVON	X14		(X)	(X)	(X)											
	H/M	X37.1			(X)	(X)		(X)	(X)								
	H/M	X37.3			(X)	(X)		(X)	(X)	(X)	(X)						
	H/M	X37.4			(X)	(X)		(X)		(X)	(X)						
	H/M	X37.5 (6)			(X)	(X)		(X)		(X)	(X)						
BUSINESS		X11.1			(X)	(X)		(X)	(X)								
BUSINESS		X11.2			(X)	(X)		(X)	(X)								
BUSINESS		X11.3			(X)	(X)		(X)	(X)								
BUSINESS		X11.4			(X)	(X)		(X)	(X)	(X)	(X)	(X)	(X)				
BUSINESS		X11.5			(X)	(X)		(X)	(X)	(X)	(X)	(X)	(X)				
BUSINESS		X11.7			(X)	(X)		(X)	(X)	(X)	(X)	(X)	(X)				
BUSINESS		X11.8			(X)	(X)		(X)		(X)	(X)	(X)	(X)		(X)	(X)	
BUSINESS		X11.9			(X)	(X)		(X)		(X)	(X)	(X)	(X)	(X)	(X)	(X)	
BUSINESS		X11.10								(X)	(X)	(X)	(X)	(X)	(X)	(X)	(X)

CROSSPOINT (X) DENOTES COMPATIBILITY (EXAMPLE NT=GENERIC 1111 RLS 8)

* Contact Santa Clara Customer Service regarding availability status of software.

CHART 9-3: MERIDIAN SL-1 MODEL/SOFTWARE COMPATIBILITY

MODEL	A	M	S	MS	ST
GENERIC (INITIAL) RELEASE (LATEST)	504 505	711 RLS 1 711 RLS 7	711 RLS 4 711 RLS 10	711 RLS 4 711 RLS 10	1011 RLS 9 1011 RLS 10
LINES (TYPICAL)	300	400	140	400	600
CPU CALLS / HOUR	1 4500	1 4500	1 7000	1 7000	1 6500
MEMORY - PROGRAM PDATA - UDATA BACK-UP STRUCTURE PACKAGING	192K WORDS 64K WORDS 64K WORDS 64K WORDS SPARE CARD 64K PAGES 64K CARDS	176K WORDS 128K WORDS 32K WORDS 16K WORDS SMART 64K PAGES 64K CARDS	256K WORDS 160K WORDS 64K WORDS 32K WORDS ERROR DETECT 64K PAGES 256K CARD	256K WORDS 160K WORDS 64K WORDS 32K WORDS ERROR DETECT 64K PAGES 256K CARD	320K WORDS 192K WORDS 64K WORDS 64K WORDS ERROR DETECT 64K PAGES 512K CARD
NETWORK - TRAFFIC LOOPS - TDS - CONF NETENHANCEMENT	 6 1 1 NO	 12 1 1 NO	 3 1 1 NO	 12 1 1 NO	 12 1 1 YES
STORAGE	MAG TAPE	MAG TAPE	MAG TAPE/DISK	MAG TAPE/DISK	DISK
PE (DD/QD) PTE	NO NO	YES(CABINET) NO	YES NO	YES NO	YES YES

CHART 9-4A: MERIDIAN SL-1 SYSTEM COMPARISON (A, M, S, MS, ST)

MODEL	L	LE	N	NT	RT
GENERIC (INITIAL) RELEASE (LATEST)	101 105	304 311 RLS 9	811 RLS 4 811 RLS 10	1111 RLS 4 1111 RLS 10	1311 RLS 9 1311 RLS 10
LINES (TYPICAL)	1000	1000	1500	1500	600
CPU CALLS / HOUR	1 or 2 4000	1 or 2 4000	1 or 2 6000	2 28000	2 2800
MEMORY -PROGRAM -PDATA -UDATA BACK-UP STRUCTURE PACKAGING	192K WORDS 64K WORDS 64K WORDS 64K WORDS SPARE CARD 64K PAGES 4K CARDS	320K WORDS 192K WORDS 64K WORDS 64K WORDS DUPLICATE 64K PAGES 64K CARDS	320K WORDS 192K WORDS 64K WORDS 64K WORDS DUPLICATE 64K PAGES 128/192K CARDS	768K WORDS FLEXIBLE FLEXIBLE FLEXIBLE DUPLICATE CONTIGUOUS 768K CARD	768K WORDS FLEXIBLE FLEXIBLE FLEXIBLE DUPLICATE CONTIGUOUS 768K CARD
NETWORK - TRAFFIC LOOPS - TDS - CONF NET ENHANCEMENT	 12 2 2 NO	 12 2 2 NO	 24 2 2 YES	 24 2 2 YES	 16 1 1 YES
STORAGE PE (DD/QD) PTE	MAG TAPE NO NO	MAG TAPE/DISK YES (CABINET) NO	MAG TAPE/DISK YES YES	DISK YES YES	DISK YES YES

CHART 9-4B: MERIDIAN SL-1 SYSTEM COMPARISON (L, LE, N, NT, RT)

MODEL	VL	VLE	XL	XN	XT
GENERIC (INITIAL) RELEASE (LATEST)	202 205	404 411 RLS 9	609 611 RLS 9	911 RLS 4 911 RLS 10	1211 RLS 8 1211 RLS 10
LINES (TYPICAL)	2500	3000	4000	5000	7000
CPU CALLS / HOUR	2 8000	2 8000	2 19000	2 19000	2 28000
MEMORY - PROGRAM - PDATA - UDATA BACK-UP STRUCTURE PACKAGING	192K WORDS 64K WORDS 64K WORDS 64K WORDS SPARE CARD 64K PAGES 8K CARDS	320K WORDS 192K WORDS 64K WORDS 64K WORDS DUPLICATE 64K PAGES 64K CARDS	384K WORDS 128K WORDS 128K WORDS 128K WORDS DUPLICATE 64K PAGES 64K CARDS	768K WORDS 448K WORDS 192K WORDS 128K WORDS DUPLICATE 64K PAGES 192K CARDS	2304K WORDS FLEXIBLE FLEXIBLE FLEXIBLE DUPLICATE CONTIGUOUS 768K CARDS
NETWORK - TRAFFIC LOOPS - TDS - CONF NTWENHANCEMENT	 60 10 10 NO	 60 10 10 NO	 60 10 10 NO	 120 10 10 YES	 120 10 10 YES
STORAGE	MAG TAPE	MAG TAPE/DISK	MAG TAPE/DISK	MAG TAPE/DISK	DISK
PE (DD/QD) PACKET TRANSPORT	NO NO	YES (CABINET) NO	YES (CABINET) NO	YES YES	YES YES

CHART 9-4C: MERIDIAN SL-1 SYSTEM CONFIGURATION (VL, VLE, XL, XN, XT)

MODEL	L	VL	A	LE	VLE	XL	M	S	MS	N	XN	ST	NT	XT	RT
TELEPHONES															
ANALOG															
500 TYPE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
2500 TYPE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
ELECTRONIC															
SL-1 TELEPHONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
M1109 COMPACT	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
DIGITAL (options 88/89 or 91)															
M2000 SERIES				X	X	X	X	X	X	X	X	X	X	X	X
M3000 TOUCHPHONE				X	X	X	X	X	X	X	X	X	X	X	X
TERMINALS															
DISPLAYPHONE															
• 1000	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
• 1200 (SL-1)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
• PLUS	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
• 220	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

CHART 9-5: MERIDIAN SL-1 TELEPHONES & TERMINALS COMPATIBILITY

MODEL	L	VL	A	LE	VLE	XL	M	S	MS	N	XN	ST	NT	XT	RT
TERMINAL ACCESS															
ADM	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
AIM	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
ASIM	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
PCI	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
RS422 DIRECT	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
AILU	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
DIGITAL SET (Options 88/89 or 91)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
HOST ACCESS															
ADM	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
ASIM	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
CPI (Option 75)				X	X		X		X	X	X	X	X	X	X
MCDS	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
NETWORKING															
DTI (Option 75)									X	X	X	X	X	X	X
X.25 G/W	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IBM ENVIRONMENT															
CESS	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
3270 Converter	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
36/38 G/W	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Meridian LANSTAR (PTE)										X	X	X	X	X	X

CHART 9-6: MERIDIAN SL-1 DATA COMPATIBILITY

MODEL	L	VL	A	LE	VLE	XL	M	S	MS	N	XN	ST	NT	XT	RT
Generic	10*	20*	50*	3**	4**	6**	711	711	711	811	911	1011	1111	1211	1311
Release (Initial)	101	202	504	304	404	609	1	4	4	4	4	9	8	8	10
Release (Latest)	105	205	505	311	411	611	7	10	10	10	10	10	10	10	10
Attendent Admin.				X	X	X	X	X	X	X	X	X	X	X	X
Attendant Overflow				X	X	X	X	X	X	X	X	X	X	X	X
ACD Package															
- A	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
- B				X	X	X	X	X	X	X	X	X	X	X	X
- C				X	X	X	X	X	X	X	X	X	X	X	X
- D				X	X	X			X	X	X	X	X	X	X
Auto Route Selection (or BARS)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Auto Trunk Maintenance				X	X	X	X	X	X	X	X	X	X	X	X
Centralized Attend Service	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Call Detail Recording	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Call Park				X	X	X	X	X	X	X	X	X	X	X	X
Direct Inward System Access	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Digital Telephones				X	X	X	X	X	X	X	X	X	X	X	X
Digital Trunk Interface									X	X	X	X	X	X	X
Flexible Hotline				X	X	X	X	X	X	X	X	X	X	X	X
Last Number Redial				X	X	X	X	X	X	X	X	X	X	X	X
Electronic Switched Network				X	X	X	X	X	X	X	X	X	X	X	X
Music On Hold				X	X	X	X	X	X	X	X	X	X	X	X
Make Set Busy	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Message Waiting	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Office Data Administration	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Recorded Announcement	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Remote Peripheral Equipment	X	X	X	X	X	X	X		X	X	X	X	X	X	X
Packet Transport										X	X	X	X	X	X
Stored Number Redial				X	X	X	X	X	X	X	X	X	X	X	X
Set Relocation				X	X	X	X	X	X	X	X	X	X	X	X
System Speed Call				X	X	X	X	X	X	X	X	X	X	X	X
500 Set Features				X	X	X	X	X	X	X	X	X	X	X	X
2500 Set Features	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Supervisory Console				X	X	X		X	X	X	X	X	X	X	X
Multi-Tenant Service								X	X	X	X	X	X	X	X
Multi-Customer Service	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Call Party Name Display								X	X	X	X	X	X	X	X
Dialed Number I/D Service								X	X	X	X	X	X	X	X
Background Terminal								X	X	X	X	X	X	X	X
Room Status								X	X	X	X	X	X	X	X
Message Registration								X	X	X	X	X	X	X	X
Automatic Wake-up								X	X	X	X	X	X	X	X
Property Mgt System I/F								X	X	X	X	X	X	X	X
Internal CDR								X	X	X	X	X	X	X	X

CHART 9-7: MERIDIAN SL-1 OPTIONAL FEATURE COMPATIBILITY

(A) COMMON EQUIPMENT

CODE	DESCRIPTION	S	MS	N	XN	ST	NT	XT	RT
	CARDS								
QPA57	CPU - FUNCTION (911 RLSE 4)				X				
QPA58	CPU - INTERFACE (911 RLSE 4)				X				
QPA59	CPU - MISCELLANEOUS (911 RLSE 4)				X				
QPC33	TAPE INTERFACE	X	X	X	X				
QPC41M	CPU - MISCELLANEOUS	X	X	X					
QPC43P	PERIPHERAL SIGNALING	X	X	X	X		X	X	X
QPC139	SERIAL DATA INTERFACE (2 CIRCUITS)	X	X	X	X	X	X	X	X
QPC164-40	BUS TERMINATION UNIT				X				
QPC164-41	BUS TERMINATION UNIT				X				
QPC189	MULTI-FREQUENCY SENDER		X	X	X		X	X	X
QPC197	TONE & DIGIT SWITCH	X	X	X	X	X	X	X	X
QPC213	CONTROL MEMORY ARBITRATOR			X	X				
QPC215	SEGMENTED BUS EXTENDER	X	X		X			X	X
QPC251	FLEXIBLE TONE & DIGIT SWITCH	X	X	X	X	X	X	X	X
QPC268	CONTROL & INTERFACE				X				
QPC271	CONTROL & TIMING				X				
QPC362	CONFERENCE	X	X						
QPC376	NETWORK (2 CIRCUITS)	X	X						
QPC411	SYSTEM CLOCK GENERATOR				X			X	
QPC412	INTER GROUP SWITCH				X			X	
QPC414	NETWORK (2 CIRCUITS)			X	X	X	X	X	X
QPC417	JUNCTOR BOARD				X			X	
QPC422	TONE DETECTOR	X	X	X	X	X	X	X	X
QPC423	192K MEMORY (ERROR CORRECTION)	X	X						
QPC424	CENTRAL PROCESSING UNIT			X					
QPC425	CENTRAL PROCESSING UNIT	X	X						
QPC426	192K MEMORY			X	X				
QPC441	THREE PORT EXTENDER			X	X		X	X	X
QPC443	CPU - CONTROL & TIMING (911 RLSE 4)				X				
QPC444	CONFERENCE			X	X	X	X	X	X
QPC471	CLOCK CONTROLLER		X	X	X	X	X	X	X
QPC472	DIGITAL TRUNK INTERFACE		X	X	X	X	X	X	X
QPC472	COMPUTER - PBX INTERFACE		X	X	X	X	X	X	X
QPC477	BUS TERMINATION UNIT			X	X		X	X	X
QPC478	128K MEMORY (ERROR CORRECTION)	X	X						
QPC479	128K MEMORY			X					
QPC486	READ ONLY MEMORY	X	X						
QPC487	READ ONLY MEMORY			X			X		x
QPC496	BUS EXTENDER			X			X		
QPC513	ENHANCED SDI			X	X	X	X	X	X
QPC552	CONTROL & TIMING (911 RLSE 5)				X				
QPC553	FUNCTION (911 RLSE 5)				X				
QPC554	INTERFACE (911 RLSE 5)				X				
QPC555	MISCELLANEOUS (911 RLSE 5)				X				
QPC556	CONTROL MEMORY ARBITRATOR				X				
	(911 RLSE 5)								

TABLE 9-l: MERIDIAN SL-1 HARDWARE COMPATIBILITY

CODE	DESCRIPTION	S	MS	N	XN	ST	NT	XT	RT
	CARDS (cont.)								
QPC579	CPU FUNCTION						X	X	X
QPC580	CPU INTERFACE						X	X	X
QPC581	CONTROL MEMORY ARBITRATOR						X	X	X
QPC583	768K MEMORY						X	X	X
QPC584	MASS STORAGE INTERFACE	X	X	X	X	X	X	X	X
QPC602	CPU FUNCTION DAUGHTER BOARD						X	X	X
QPC609	FAST TONE & DIGIT SWITCH	X	X	X	X	X	X	X	X
QPC673	512K MEMORY					X			
QPC674	256K MEMORY	X	X						
QPC687	CENTRAL PROCESSING UNIT					X			
QPC691	5/12V CONVERTER						X	X	X
QPC709	MISC./PERIPHERAL SIGNALING					X			
QPC717	READ-ONLY MEMORY					X			
	CABINETS								
QCA55	COMMON EQUIPMENT				X			X	
QCA58	COMMON & PERIPHERAL EQUIPMENT			X			X		
QCA60	COMMON & PERIPHERAL EQUIPMENT	X							
QCA108	NETWORK & PERIPHERAL EQUIPMENT				X			X	
QCA109	COMMON & PERIPHERAL EQUIPMENT		X						
QCA136	COMMON & PERIPHERAL EQUIPMENT					X			
QCA147	COMMON & PERIPHERAL EQUIPMENT								X
	SHELVES								
QSD17	CPU				X				
QSD33	TAPE SHELF		X						
QSD39	NETWORK (LEFT)			X	X		X	X	
QSD40	NETWORK (RIGHT)			X	X		X	X	
QSD60	CPU / MEMORY						X		
QSD62	CPU / MEMORY							X	
QSD67	DISK DRIVE		X	X	X		X	X	
QSD73	CE/PE EXPANSION TIER					X			X
QSP39	COMMON EQUIPMENT		X						
QSP40	MEMORY				X				
QSP41	CPU / MEMORY			X					
QSP45	TAPE UNIT & SHELF			X	X				
	UNITS								
QUW9	TAPE	X	X						
	BACKPLANE								
QPC503	COMMON EQUIPMENT	X							
QPC699	COMMON EQUIPMENT	X				X			
QPC700	COMMON EQUIPMENT					X			
QPC587	COMMON EQUIPMENT								X

TABLE 9- 1: CONTINUED

(A) COMMON EQUIPMENT - continued

CODE	DESCRIPTION	S	MS	N	XN	ST	NT	XT	RT
	MASS STORAGE								
QMM38	MASS STORAGE UNIT ASSEMBLY		X	X	X		X	X	X
QMM43	MASS STORAGE UNIT ASSEMBLY	X				X			
QMT102	DISK DRIVE CONTROLLER		x	x	x		x	x	x
QMT103	WINCHESTER HARD DISK		x	x	x		x	x	x
QMT104	FLOPPY DRIVE ASSEMBLY	X	X	X	X		X	X	X
A0324084	FLOPPY DISKETTE	X	X	X	X	X	X	X	X
QPC585	DISK SHELF POWER CONVERTER		X	X	X		X	X	X
PO661194	BLANK FACEPLATE		X	X	X		X	X	

TABLE 9-1: CONTINUED

(B) PERIPHERAL EQUIPMENT

CODE	DESCRIPTION	S	MS	N	XN	ST	NT	XT	RT
	CABINET								
QCA74	PERIPHERAL EQUIPMENT		X	X	X		x	x	
QCA76	MULTI-CHANNEL DATA SYSTEM (RACK)	X	X	X	X	X	x	X	X
QCA77	MULTI-CHANNEL DATA SYSTEM (DESKTOP)	X	X	X	X	X	x	x	x
QCA137	PE EXPANSION CABINET					X			X
	SHELVES								
QSD27	MULTI-CHANNEL DATA SYSTEM	X	X	X	X	X	X	X	X
QSD64	PERIPHERAL (UNIVERSAL)		X	X	X		X	X	
QSD65	DUAL LOOP PE SHELF		X	X	X		X	X	
QSD66	PE EXPANSION TIER					X			X
	CARDS								
QPC60	500/2500 LINE (4 PORTS)	X	X	X	X	X	X	X	X
QPC61	SL-1 LINE (4 PORTS)	X	X	X	X	X	X	X	X
QPC61C	ATTENDANT LINE	X	X	X	X	X	X	X	X
QPC71	2 WIRE E &M /PAGE/DX TRUNK (2 PORTS)	X	X	X	X	X	X	X	X
QPC72	LOOP SIGNALING / DID TRUNK (2 PORTS)	X	X	X	X	X	X	X	X
QPC74	RECORDED ANNOUNCEMENT (4 PORTS)	X	X	X	X	X	X	X	X
QPC79	DIGITONE RECEIVER (1 PORT)	X	X	X	X	X	X	X	X
QPC192	500/2500 OPX LINE (4 PORTS)	X	X	X	X	X	X	X	X
QPC219	CO/FX/WATS TRUNK (2 PORTS)	x	x	x	x	X	X	X	X
QPC237	4 WIRE E & M TRUNK (2 PORTS)	X	X	X	X	X	X	X	X
QPC239	DIAL DICTATION ACCESS (2 PORTS)	X	X	X	X	X	X	X	X
QPC250	RELEASE LINK TRUNK (4 PORTS)	X	X	X	X	X	X	X	X
QPC267	500/2500 MESSAGE WAITING LINE (4 PORTS)	X	X	X	X	X	X	X	X
QPC297	SUPERVISOR CONSOLE	X	X	X	X	X	X	X	X
QPC311	DATA LINE (2 SL-1 + 2 DATA PORTS)	X	X	X	X	X	X	X	X
QPC353	MODEM POOL LINE (4 PORTS)	X	X	X	X	X	X	X	X
QPC397	MCDS ASYNCH (4 PORTS)	X	X	X	X	X	X	X	X
QPC430	ASYNCH INTERFACE LINE (4 PORTS)	X	X	X	X	X	X	X	X
QPC432	DATA LINE (4 PORTS)	X	X	X	X	X	X	X	X
QPC449	LOOP SIGNALING TRUNK (4 PORTS)	X	X	X	X	X	X	X	X
QPC450	CO/FX/WATS TRUNK (4 PORTS)	X	X	X	X	X	X	X	X
QPC451	SL-1 LINE (8 PORTS)	X	X	X	X	X	X	X	X
QPC452	500/2500 LINE (8 PORTS)	X	X	X	X	X	X	X	X
QPC464	PERIPHERAL BUFFER	X	X	X	X		X	X	X
QPC471	CLOCK CONTROLLER		X	X	X	X	X	X	X
QPC472	DIGITAL TRUNK INTERFACE		X	X	X	X	X	X	X
QPC472	COMPUTER TO PBX INTERFACE		X	X	X	X	X	X	X
QPC494	500/2500 MESSAGE WAITING (8 PORTS)	X	X	X	X	X	X	X	X
QPC512	PC INTERFACE (1 PORT)	X	X	X	X	X	X	X	X
QPC574	DIGITONE RECEIVER (2 PORTS)	X	X	X	X	X	X	X	X
QPC578	INTEGRATED SERVICES DIGITAL LINE	X	X	X	X	X	X	X	X
	(8 PORT VOICE / DATA)								
QPC594	500/2500 LINE CARD (16 PORTS)	X	X	X	X	X	X	X	X
QPC659	DUAL LOOP PERIPHERAL BUFFER		X	X	X	X	X	X	X
QPC710	DIGITONE RECEIVER (DAUGHTER BOARD)		X	X	X	X	X	X	X
QPC723	RS-232C INTERFACE (4 PORTS)	X	X	X	X	X	X	X	X

TABLE 9-l: CONTINUED

(B) PERIPHERAL EQUIPMENT

CODE	DESCRIPTION	S	MS	N	XN	ST	NT	XT	RT
	BACKPLANE								
QPC500	PERIPHERAL EQUIPMENT	X							
QPC501	PERIPHERAL EQUIPMENT (EXPANSION)	X							
QPC701	PERIPHERAL EQUIPMENT (BASIC TIER)					X			
QPC702	PERIPHERAL EQUIPMENT (2nd/3rd TIER)					X			
	REMOTE PERIPHERAL EQUIPMENT								
QCA144	RPE CABINET					X*			
QBL14	POWER DISTRIBUTION UNIT		x	x	x		x	x	
QPC62	1.5 MBAUD CONVERTER		X	X	X	X	X	X	X
QPC63	LOCAL CARRIER BUFFER		X	X	X	X	X	X	X
QPC65	REMOTE PERIPHERAL SWITCH		X	X	X	X	X	X	X
QPC66	2 MBAUD CONVERTER		X	X	X	X	X	X	X
QPC67	CARRIER MAINTENANCE		X	X	X	X	X	X	X
QPC85	5/12V CONVERTER		X	X	X		X	X	X
QPC99	CARRIER INTERFACE		X	X	X	X	X	X	X
QSD6	CARRIER SHELF (LEFT)		X	X	X		X	X	
QSD11	CARRIER SHELF (RIGHT)		X	X	X		X	X	
QSD69	RPE EXPANSION TIER					X			X

*MAY ALSO BE USED AT THE REMOTE SITE FOR OTHER SYSTEM MODELS

TABLE 9-l: CONTINUED

CODE	DESCRIPTION	S	MS	N	XN	ST	NT	XT	RT
A0310532	SL-1 DISPLAYPHONE	X	X	X	X	X	X	X	X
QCW4	ATTENDANT CONSOLE	X	X	X	X	X	X	X	X
QKK1	HANDSFREE INTERFACE KIT	X	X	X	X	X	X	X	X
QKK3	AUTO HANDSFREE INTERFACE KIT	X	X	X	X	X	X	X	X
QKK8	HANDSFREE ANSWERBACK KIT	X	X	X	X	X	X	X	X
QKM13	LIGHT PROBE KIT	X	X	X	X	X	X	X	X
QKN1	HEADSET KIT	X	X	X	X	X	X	X	X
QKT1	REMOTE POWERING UNIT	X	X	X	X	X	X	X	X
QMT1	10 BUTTON MODULE	X	X	X	X	X	X	X	X
QMT2	20 BUTTON MODULE	X	X	X	X	X	X	X	X
QMT3	LAMP FIELD ARRAY	X	X	X	X	X	X	X	X
QMT4	HANDSET MODULE	X	X	X	X	X	X	X	X
QMT8	SYNCH/ASYNCH DATA MODULE	X	X	X	X	X	X	X	X
QMT9	ASYNCH INTERFACE MODULE	X	X	X	X	X	X	X	X
QMT11	ASYNCH/SYNCH INTERFACE MODULE	X	X	X	X	X	X	X	X
QMT12	V.35 INTERFACE MODULE	X	X	X	X	X	X	X	X
QMT15	AMPLIFIED HANDSET MODULE	X	X	X	X	X	X	X	X
QSAM3	GROUP LISTENING SWITCH	X	X	X	X	X	X	X	X
QSR2F1	VENTURE 1 HEADSET (5 FT CORD)	X	X	X	X	X	X	X	X
QSR2G1	VENTURE 1 HEADSET (15 FT CORD)	X	X	X	X	X	X	X	X
QSU60CFM	SL-1 TELEPHONE (FULLY MODULAR)	X	X	X	X	X	X	X	X
QSU61CFM	SL-1 DIGIT DISPLAY SET (FULLY MODULAR)	X	X	X	X	X	X	X	X
QSU7	ACD AGENT TELEPHONE	X	X	X	X	X	X	X	X
QSU71C-35	MERIDIAN M1109 COMPACT TELEPHONE	X	X	X	X	X	X	X	X
	- CHAMELEON ASH								
QSU71C-93	MERIDIAN M1109 COMPACT TELEPHONE	X	X	X	X	X	X	X	X
	- DOLPHIN GRAY								
NT1F05AB-03	MERIDIAN M2009 DIGITAL TELEPHONE	X	X	X	X	X	X	X	X
	- BLACK (A0333928)								
NT1F05AB-35	MERIDIAN M2009 DIGITAL TELEPHONE	X	X	X	X	X	X	X	X
	- CHAMELEON ASH (A0332096)								
NT1F05AB-93	MERIDIAN M2009 DIGITAL TELEPHONE	X	X	X	X	X	X	X	X
	- DOLPHIN GRAY (A0332099)								
NTIF05BB-03	MERIDIAN M2009 DIGITAL TELEPHONE	X	X	X	X	X	X	X	X
	W/ ASYNCH DATA OPTION								
	- BLACK (A0334834)								
NT1F05BB-35	MERIDIAN M2009 DIGITAL TELEPHONE	X	X	X	X	X	X	X	X
	W/ ASYNCH DATA OPTION								
	- CHAMELEON ASH (A0332097)								
NT1F05BB-93	MERIDIAN M2009 DIGITAL TELEPHONE	X	X	X	X	X	X	X	X
	W/ ASYNCH DATA OPTION								
	- DOLPHIN GRAY (A0332100)								
NT1F06AB-03	MERIDIAN M2112 DIGITAL TELEPHONE	X	X	X	X	X	X	X	X
	- BLACK (A0333929)								
NT1F06AB-35	MERIDIAN M2112 DIGITAL TELEPHONE	X	X	X	X	X	X	X	X
	- CHAMELEON ASH (A0332096)								
NT1F06AB-93	MERIDIAN M2112 DIGITAL TELEPHONE	X	X	X	X	X	X	X	X
	- DOLPHIN GRAY (A0332099)								
NT1F06BB-03	MERIDIAN M2112 DIGITAL TELEPHONE	X	X	X	X	X	X	X	X
	W/ ASYNCH DATA OPTION								
	- BLACK (A0334839)								

CODE	DESCRIPTION	S	MS	N	XN	ST	NT	XT	RT
NT1F06BB-35	MERIDIAN M2112 DIGITAL TELEPHONE	X	X	X	X	X	X	X	X
	W/ ASYNCH DATA OPTION								
	- CHAMELEON ASH (A0332109)								
NT1F06BB-93	MERIDIAN M2112 DIGITAL TELEPHONE	X	X	X	X	X	X	X	X
	W/ ASYNCH DATA OPTION								
	- DOLPHIN GRAY (A0332112)								
NT1F07AA-03	MERIDIAN M2018 DIGITAL TELEPHONE	X	X	X	X	X	X	X	X
	-BLACK (A0333930)								
NT1F07AA-35	MERIDIAN M2018 DIGITAL TELEPHONE	X	X	X	X	X	X	X	X
	-CHAMELEON ASH (A0324267)								
NT1F07AA-93	MERIDIAN M2018 DIGITAL TELEPHONE	X	X	X	X	X	X	X	X
	-DOLPHIN GRAY (A0315570)								
NT1F07BA-03	MERIDIAN M2018 DIGITAL TELEPHONE	X	X	X	X	X	X	X	X
	W/ ASYNC DATA OPTION								
	-BLACK (A0334844)								
NT1F07BA-35	MERIDIAN M2018 DIGITAL TELEPHONE	X	X	X	X	X	X	X	X
	W/ ASYNCH DATA OPTION								
	-CHAMELEON ASH (A0324279)								
NT1F07BA-93	MERIDIAN M2108 DIGITAL TELEPHONE	X	X	X	X	X	X	X	X
	W/ ASYNCH DATA OPTION								
	-DOLPHIN GRAY (A0323604)								
NT1F09AA	MERIDIAN M2000 ASYNCHRONOUS DATA	X	X	X	X	X	X	X	X
	OPTION (FOR MERIDIAN M2000 DIGITAL								
	TELEPHONES) (A0315987)								
NT1F10AA	MERIDIAN M3000 ASYNCHRONOUS DATA	X	X	X	X	X	X	X	X
	OPTION (FOR MERIDIAN M3000								
	TOUCHPHONE) (A0315990)								
NT1F11AA-03	MERIDIAN M3000 TOUCHPHONE	X	X	X	X	X	X	X	X
	-BLACK (A0317359)								
NT1F11BA-03	MERIDIAN M3000 TOUCHPHONE	X	X	X	X	X	X	X	X
	W/ ASYNCH DATA OPTION								
	-BLACK (A0323608)								
NT1F21AA-03	MERIDIAN M2317 DIGITAL DISPLAY	X	X	X	X	X	X	X	X
	TELEPHONE - BLACK (A0333931)								
NT1F21AA-35	MERIDIAN M2317 DIGITAL DISPLAY	X	X	X	X	X	X	X	X
	TELEPHONE - CHAMELEON ASH								
	(A0324269)								
NT1F21AA-93	MERIDIAN M2317 DIGITAL DISPLAY	X	X	X	X	X	X	X	X
	TELEPHONE - DOLPHIN GRAY								
	(A0323187)								
NT1F21BA-03	MERIDIAN M2317 DIGITAL DISPLAY	X	X	X	X	X	X	X	X
	TELEPHONE W/ ASYNCH DATA								
	OPTION - BLACK (A0334846)								
NT1F21BA-35	MERIDIAN M2317 DIGITAL DISPLAY	X	X	X	X	X	X	X	X
	TELEPHONE W/ ASYNCH DATA								
	OPTION - CHAMELEON ASH (A0333610)								
NT1F21BA-93	MERIDIAN M2317 DIGITAL DISPLAY	X	X	X	X	X	X	X	X
	TELEPHONE W/ ASYNCH DATA								
	OPTION - DOLPHIN GRAY (A0333611)								

TABLE 9-1: CONTINUED

CODE	DESCRIPTION	S	MS	N	XN	ST	NT	XT	RT
	DATA PRODUCTS								
A0319032	X.25 GATEWAY 8 PORTS 110V (SLX25-108A)	X	X	X	X	X	X	X	X
A0319033	X.25 GATEWAY 16 PORTS 110V (SLX25-116A)	X	X	X	X	X	X	X	X
A0322433	PROTOCOL CONVERTER ASCII TO SNA/SDLC - 110V DESK MOUNT (SL1/74BD107)	X	X	X	X	X	X	X	X
A0322434	PROTOCOL CONVERTER ASCII TO SNA/SDLC - 110V RACK MOUNT (SL-1/74BR107)	X	X	X	X	X	X	X	X
A0322435	PROTOCOL CONVERTER ASCII TO SNA/SDLC - 220V DESK MOUNT (SL-1/74BD207)	X	X	X	X	X	X	X	X
A0322436	PROTOCOL CONVERTER ASCII TO SNA/SDLC - 220V RACK MOUNT (SL-1/74BR207)	X	X	X	X	X	X	X	X
A0322493	ASYNCHRONOUS INTERFACE LINE UNIT (AILU) - MALE	X	X	X	X	X	X	X	X
A0322496	ASYNCHRONOUS INTERFACE LINE UNIT (AILU) - FEMALE	X	X	X	X	X	X	X	X
A0326595	PROTOCOL CONVERTER ASCII TO BISYNC - 110V DESK MOUNT (SL-171BD107)	X	X	X	X	X	X	X	X
A0326596	PROTOCOL CONVERTER ASCII TO BISYNC - 110V RACK MOUNT (SL-171BR107)	X	X	X	X	X	X	X	X
A0326597	PROTOCOL CONVERTER ASCII TO BISYNC - 220V DESK MOUNT (SL-171BD207)	X	X	X	X	X	X	X	X
A0326598	PROTOCOL CONVERTER ASCII TO BISYNC - 220V RACK MOUNT (SL-171BR207)	X	X	X	X	X	X	X	X
A0326766	PROTOCOL CONVERTER (SYSTEM 36 GATEWAY) ASCII TO SNA/SDLC DESK MOUNT (SL-150BD107)	X	X	X	X	X	X	X	X
A0326767	PROTOCOL CONVERTER (SYSTEM 36 GATEWAY) ASCII TO SNA/SDLC RACK MOUNT (SL-150BR107)	X	X	X	X	X	X	X	X
A0326768	PROTOCOL CONVERTER (SYSTEM 36 GATEWAY) ASCII TO SNA/SDLC - 220V DESK MOUNT (SL-150BD207)	X	X	X	X	X	X	X	X
A0326769	PROTOCOL CONVERTER (SYSTEM 36 GATEWAY) ASCII TO SNA/SDLC - 220V RACK MOUNT (SL-150BR207)	X	X	X	X	X	X	X	X
A0329960	RACK 24 BALUN	X	X	X	X	X	X	X	X
MVC01243	DATA MODEM	X	X	X	X	X	X	X	X
MVC02031	COAX BALUN	X	X	X	X	X	X	X	X
MVC02032	TWINAX BALUN	X	X	X	X	X	X	X	X
MVC02033	DUAL COAX BALUN	X	X	X	X	X	X	X	X

(D) DATA PRODUCTS

CODE	DESCRIPTION	S	MS	N	XN	ST	NT	XT	RT
	DATA PRODUCTS (CONT.)								
NT9N01AA	MULTI -CHANNEL COAX SYSTEM (MCCS)	X	X	X	X	X	X	X	X
	1 POWER SUPPLY								
NT9N01BA	MULTI-CHANNEL COAX SYSTEM (MCCS)	X	X	X	X	X	X	X	X
	2 POWER SUPPLIES								
NT9N02	CLUSTER INTERFACE CARD (CIC)	X	X	X	X	X	X	X	X
NT9N03	BLANK FACEPLATE (MCCS)	X	X	X	X	X	X	X	X
NT9N07	MCCS - SECOND POWER SUPPLY	X	X	X	X	X	X	X	X
NT9N20	COAX INTERFACE MODULE (CIM)	X	X	X	X	X	X	X	X
NT9N30AA	COAX CABLE WITH BNC	X	X	X	X	X	X	X	X
	CONNECTORS (8 FT)								
NT9N30AB	COAX CABLE WITH BNC	X	X	X	X	X	X	X	X
	CONNECTORS (16 FT)								

TABLE 9-1: CONTINUED

(E) POWER EQUIPMENT

CODE	DESCRIPTION	S	MS	N	XN	ST	NT	XT	RT
	CABINET								
B0225152	CENTRALIZED POWER (QCA13)				X			X	
B0225153	SUPPLEMENTARY POWER (QCA13)				X			X	
	SHELVES								
QSP43	POWER CONVERTER		X	X	X		X	X	
QSP44	POWER CONVERTER		X	X	X		X	X	
	POWER SUPPLIES								
QPC509	MESSAGE WAITING	X							
QRF8	48V RECTIFIER - 40A		X	X			X		
QRF9	48V RECTIFIER - 20A	X							
QRF12	POWER RECTIFIER (30AMP 125/225V)					X			X
QSY22	150V MESSAGE WAITING		X	X	X		X	X	
QSY27	MULTI-CHANNEL DATA SYSTEM (MCDS)	X	X	X	X	X	X	X	X
QUT1	CENTRAL POWER UNIT	X	X	X	X	X	X	X	X
A0318211	M2000 SERIES - DATA OPTION	X	X	X	X	X	X	X	X
NT5C03	RECTIFIER				X			X	
NT9N07	MULTI-CHANNEL COAX SYSTEM (MCCS)	X	X	X	X		X	X	X
	UNITS								
QBL12	POWER DISTRIBUTION BOX				X			X	
QBL15	POWER DISTRIBUTION BOX		X	X		X	X		X
QBL21	POWER DISTRIBUTION BOX				X			X	
QBL24	BATTERY BACK-UP DISTRIBUTION BOX					X			X
QUA6	POWER FAIL TRANSFER UNIT (WALL					X			
	MOUNT)								
QUAA3	POWER					X			X
QUD5	COOLING				X				
QUD15	COOLING		X	X	X				
QUD20	COOLING						X	X	
QUD24	COOLING					X			X
QUX16	POWER DISTRIBUTION	X							
QUX19	POWER DISTRIBUTION					X			
QUX20	POWER DISTRIBUTION					X			
QUX21	POWER DISTRIBUTION (PE EXPN)					X			
	HARNESS								
QCAD111	POWER DISTRIBUTION		X	X	X		X	X	
QCAD112	POWER DISTRIBUTION				X			X	

TABLE 9-1: CONTINUED

(E) POWER EQUIPMENT

CODE	DESCRIPTION	S	MS	N	XN	ST	NT	XT	RT
	TRANSFORMERS								
A0297998	POWER TRANSFORMER - 5V/12V (QMT11)	X	X	X	X	X	X	X	X
P0547127	POWER TRANSFORMER - 24V	X	X	X	X	X	X	X	X
P0547128	POWER TRANSFORMER - 15V	X	X	X	X	X	X	X	X
P0593922	POWER TRANSFORMER - 24V (QMT8)	X	X	X	X	X	X	X	X
	CARDS								
B0206661	RECTIFIER				X			X	X
QAA47	ADAPTER				X			X	X
QPC80E	10V CONVERTER	X	X	X	X		X	X	X
QPC82C	30V CONVERTER	X	X	X	X		X	X	X
QPC84Q	POWER MONITOR	X	x	x	x		x	X	X
QPC163D	48V REGULATOR	X	X	X	X		X	X	X
QPC187D	RINGING GENERATOR	X	X	X	X		X	X	X
QPC173	POWER MONITOR				X			X	X
QPC188	BATTERY MONITOR		X	XI			X		
QPC190	5/12V CONVERTER	X	X	X	X		X	X	X
QPC691	5/12V CONVERTER						X	X	X
QPC703	POWER CONVERTER					X			
QPC704	POWER MONITOR					X			
QPC705	POWER CONVERTER (30V/150V)					X			
QPC706	POWER CONVERTER (ALL VOLTAGES)					X			
QPC711	POWER FAIL TRANSFER					X			
QPC714	POWER CONTROL					X			
QUA4	EMERGENCY TRANSFER		X	X	X		X	X	X
QUA5	EMERGE? ICY TRANSFER	X							
QUA6	EMERGE? ICY TRANSFER					X			X
	BACKPLANE								
QPC502	POWER CONTROL	X							

TABLE 9-1: CONTINUED

(F) CALL DETAIL RECORDING

CODE	DESCRIPTION	S	MS	N	XN	ST	NT	XT	RT
QCA11	CDR CABINET	X	X	X	X	X	X	X	X
QPA62	CDR MISCELLANEOUS	X	X	X	X	X	X	X	X
QPC31	8K MEMORY	X	X	X	X	X	X	X	X
QPC39	CDR TIMING	X	X	X	X	X	X	X	X
QPC45	SERIAL DATA INTERFACE	X	X	X	X	X	X	X	X
QPC130	CDR TAPE CONTROL	X	X	X	X	X	X	X	X
QPC131	CDR ROM 1	X	X	X	X	X	X	X	X
QPC132	CDR ROM 2	X	X	X	X	X	X	X	X
QPC301	CDR ROM	X	X	X	X	X	X	X	X
QSD1	CE SHELF	X	X	X	X	X	X	X	X
C0048650	MAGNETIC TAPE	X	X	X	X	X	X	X	X
C0046977	HP7970 CDR TAPE UNIT	X	X	X	X	X	X	X	X
C0046980	STATIC INVERTER	X	X	X	X	X	X	X	X

TABLE 9-l: CONTINUED

ORDER CODE	DESCRIPTION	PURPOSE	MODEL (LOCATION)	PROVISION
QAA47	POWER MONITOR ADAPTER	PROVIDES A RECEPT-ACLE FOR QPC173 POWER MONITOR & ALLOWS CONNECTION OF CABLES FROM CE LOCATIONS	XN (QSP45) XT (QSD67)	1 PER SYSTEM (ALWAYS REQUIRED)
QBL12	POWER DISTRIBUTION UNIT	PROVIDES SYSTEM INTERFACE WHEN CUSTOMER-PROVIDED POWER IS USED	XN, XT	1 PER SYSTEM (OPTIONAL BASIS)
QBL14	POWER DISTRIBUTION BOX (RPE)	DISTRIBUTES -48V TO RPE CARRIER SHELVES	MS N, NT XN, XT (EQUIPMENT CABINET)	1 PER 4 LOCAL CARRIER SHELVES 1 PER 4 REMOTE CARRIER SHELVES
QBL15	BATTERY DISTRIBUTION BOX	PROVIDES INTERFACE TO BATTERY BACKUP (MS, N, NT) AND WHEN MORE THAN 2 HOURS OF RESERVE POWER ARE REQUIRED (ST)	MS ST, RT N, NT (WALL MOUNTED)	1 PER SYSTEM (OPTIONAL BASIS)
QBL21	POWER DISTRIBUTION BOX	DISTRIBUTES POWER TO COMMON EQUIPMENT	XN, XT (QCA55)	1 PER SYSTEM (ALWAYS REQUIRED)
QBL24	BATTERY BACK-UP DISTRIBUTION BOX	PROVIDES INTERFACE TO BATTERY BACKUP WHEN 1-2 HOURS OF RESERVE POWER IS REQUIRED	ST, RT (WALL MOUNTED)	1 PER SYSTEM (OPTIONAL BASIS)

TABLE 9-2: MERIDIAN SL-1 HARDWARE PROVISIONING

ORDER CODE	DESCRIPTION	PURPOSE	MODEL (LOCATION)	PROVISION
QCA11	CDR CABINET	ACCOMMODATES 9 TRACK MAGNETIC TAPE DRIVE AND ASSOCIATED CDR CONTROL CIRCUITRY	ALL (EQUIPMENT ROOM)	1 PER SYSTEM
QCA13	CENTRALIZED POWER CABINET	PROVIDES -48V POWER PLANT ON INCREMENTAL CABINET BASIS UP TO MAXIMUM DISCHARGE CAPACITY OF 500A	XN, XT (EQUIPMENT ROOM)	UP TO 3 PER SYSTEM AS FOLLOWS: CAB 1-RECTIFIERS 1-4 CAB 2-RECTIFIERS 5-8 CAB 3-RECTIFIERS 9,10
QCA55	CECABINET (FRONT AND REAR ACCESS)	ACCOMMODATES 2 CPU SHELVES, 1 MEMORY SHELF, 1 MSU SHELF AND UP TO 6 NETWORK SHELVES	XN, XT (EQUIPMENT ROOM)	1 PER SYSTEM (ALWAYS REQUIRED)
QCA58	CE/PE CABINET (FRONT AND REAR ACCESS)	ACCOMMODATES 1 POWER CONTROL SHELF, 1 CPU/MEMORY SHELF, 1 -48V RECTIFIER, 2 NETWORKSHELVES AND 8 PE SHELVES	N. NT (EQUIPMENT ROOM)	1 PER SYSTEM (ALWAYS REQUIRED)
QCA60	CE/PE CABINET (FRONT ACCESS ONLY)	ACCOMMODATES SYSTEM POWER, STORAGE UNIT, CE SHELF, 2 - PE SHELVES, AND OPTIONAL CE OR PE SHELF	S (OFFICE OR EQUIPMENT ROOM)	1 PER SYSTEM (ALWAYS REQUIRED)
QCA74	PE EXPANSION CABINET (FRONT AND REAR ACCESS)	ACCOMMODATES 1 POWER CONTROL SHELF AND: (1) 14 PE SHELVES OR (2) 12 PE SHELVES AND ONE 48V RECTIFIER	MS N, NT XN, XT (EQUIPMENT ROOM)	1 PER 12 PE SHELVES (MS, N, NT) 1 PER 14 PE SHELVES (XN, XT)

TABLE 9-2: CONTINUED

ORDER CODE	DESCRIPTION	PURPOSE	MODEL (LOCATION)	PROVISION
QCA76	MCDS HOUSING (RACK MOUNT)	ACCOMMODATES TWO SHELVES, POWER SUPPLIES, AND FOUR PATCH PANELS FOR MULTI-CHANNEL DATA SYSTEM	ALL (EQUIPMENT ROOM)	1 PER 64 ASSOCIATED COMPUTER PORTS
QCA77	MCDS HOUSING (SHELF MOUNT)	ACCOMMODATES ONE SHELF AND ASSOCIATED POWER FOR MULTI-CHANNEL DATA SYSTEM	ALL (EQUIPMENT ROOM)	1 PER 32 ASSOCIATED COMPUTER PORTS
QCA108	NETWORK/PE CABINET (FRONT AND REAR ACCESS)	ACCOMMODATES 1 POWER CONTROL SHELF, 4 NETWORK SHELVES, AND 10 PE SHELVES	XN, XT (EQUIPMENT ROOM)	1 PER SYSTEM WHEN NETWORK GROUPS ARE GREATER THAN 3
QCA108	DTI/PE CABINET (FRONT AND REAR ACCESS)	ACCOMMODATES 1 POWER SHELF, 4 DTI SHELVES, 10 PE SHELVES, AND 1-48V RECTIFIER	N, NT (EQUIPMENT ROOM)	1 PER SYSTEM (SUPPORTS 22 DTI CARDS)
QCA109	CE/PE CABINET (FRONT AND REAR ACCESS)	ACCOMMODATES 1 POWER SHELF, 1 CE SHELF, 1 MSU SHELF, 1 -48V RECTIFIER, AND 10 PE SHELVES	MS (EQUIPMENT ROOM)	1 PER SYSTEM (ALWAYS REQUIRED)
QCA136	BASE CABINET	ACCOMMODATES SYSTEM POWER, CE SHELF, PE SHELF AND DISK STORAGE UNIT	ST (OFFICE OR EQUIPMENT ROOM)	1 PER SYSTEM (ALWAYS REQUIRED)

TABLE 9-2: CONTINUED

ORDER CODE	DESCRIPTION	PURPOSE	MODEL (LOCATION)	PROVISION
QCA137	PE EXPANSION CABINET	ACCOMMODATES PERIPHERAL EXPANSION TO QCA136 BASE CABINET	ST, RT (OFFICE OR EQUIPMENT ROOM)	1 PER SYSTEM (1 TO 3 TIERS AS REQUIRED)
QCA144	RPE CABINET	ACCOMMODATES PE AND LOCAL/REMOTE CARRIEREQUIPMENT FOR RPE APPLICATIONS	ST, RT (OFFICE OR EQUIPMENT ROOM)	1 PER 4 RPE LOOPS (MAY ALSO BE USED AT THE REMOTE SITE FOR OTHER MERIDIAN SL-1 SYSTEM MODELS)
QCA147	BASE CABINET	ACCOMMODATES SYSTEM POWER, CE SHELF, PE SHELF AND DISK STORAGE UNIT	RT (OFFICE OR EQUIPMENT ROOM)	1 PER SYSTEM (ALWAYS REQUIRED)
QCW4	ATTENDANT CONSOLE	PROVIDES MAIN ANSWERING POINT TO EXTEND CALLS INTO OR OUT OF MERIDIAN SL-1	ALL (CENTRAL ANSWERING POSITION)	MAXIMUM 63 PER CUSTOMER GROUP (32 CUSTOMER GROUPS PER SYSTEM)
QKK1	HANDSFREE INTERFACE KIT	MODIFIES SL-1 TELEPHONE FOR USE WITH LOGIC HANDSFREE UNIT	ALL (QSU60, QSU61)	1 PER SL-1 TELEPHONE (REQUIRES 24V AC LOCAL TRANSFORMER)
QKK3	AUTOMATIC HANDSFREE ANSWERING KIT	SIMILAR TO QKK1 BUT FOR AUTOMATIC ANSWER OF SL-1 TELEPHONES AFTER SINGLE RING	ALL (QSU60 QSU61)	1 PER SL-1 TELEPHONE (REQUIRES 24V AC LOCAL TRANSFORMER)
QKM13	LIGHT PROBE KIT	ENABLES SIGHT-IMPAIRED ATTENDANT TO USE LIGHT PROBE FOR CONSOLE OPERATION	ALL (QCW4)	1 PER ATTENDANT CONSOLE

TABLE 9-2: CONTINUED

ORDER CODE	DESCRIPTION	PURPOSE	MODEL (LOCATION)	PROVISION
QKN1	HEADSET KIT	MODIFIES SL-1 TELEPHONE TO ACCEPT AUXILIARY HEADSET	ALL (QSU60, QSU61)	1 PER SL-1 TELEPHONE
QMM38	MASS STORAGE UNIT	ACCOMMODATES TWO 5.25" FLOPPY DISKS, OPTIONAL HARD DISK, AND ASSOCIATED STORAGE COMPONENTS	MS (QSD33) N (QSD67) XN (QSD67) NT (QSD67 XT (QSD67) RT (QSD67)	1 PER SYSTEM
QMM42	DATA CARTRIDGE	CONTAINS SPECIFIC INFORMATION RELATIVE TO SYSTEM CONFIGURATION	S (QPC584) MS (QPC584) N (QPC584) XN (QPC584) NT (QPC584) XT (QPC584)	1 PER MASS STORAGE INTERFACE
QMM43	MASS STORAGE UNIT	ACCOMMODATES TWO 5.25" FLOPPY DISKS AND ASSOCIATED STORAGE COMPONENTS	S (QCA60) ST (QCA136)	1 PER SYSTEM
QMT1	10 BUTTON MODULE	PROVIDES SINGLE KEY/ LAMP STRIP TO EXTEND THE NUMBER OF PRO- GRAMMABLE KEYS OF SL-1 TELEPHONE SET OR ATTENDANT CONSOLE	ALL (QSU60, QSU61, QCW4)	SL-1 TELEPHONE OR ATTENDANT CONSOLE
QMT2	20 BUTTON MODULE	PROVIDES TWO KEY/ LAMP STRIPS TO EXTEND THE NUMBER OF PRO- GRAMMABLE KEYS OF SL- 1 TELEPHONE SET OR ATTENDANT CONSOLE	ALL (QSU60, QSU61, QCW4)	SL-1 TELEPHONE OR ATTENDANT CONSOLE

TABLE 9-2: CONTINUED

ORDER CODE	DESCRIPTION	PURPOSE	MODEL (LOCATION)	PROVISION
QMT3	LAMP FIELD ARRAY MODULE	DISPLAY IDLE/BUSY STATUS OF A MAXIMUM 150 CONSECUTIVE STATION DIRECTORY NUMBERS	ALL (QCW4)	1 PER ATTENDANT CONSOLE
QMT4	HANDSET MODULE	PROVIDES FREE STANDING MOUNTING OR ATTACHED TO LEFT SIDE OF CONSOLE FOR HOLDING HANDSET	ALL (QCW4)	1 PER ATTENDANT CONSOLE
QMT8	ADD-ON DATA MODULE	PROVIDES ASYNCH/SYNC DATA COMMUNICATIONS FOR CO-LOCATED SL-1 TELEPHONE	ALL (QSU60, QSU61)	1 PER SL-1 TELEPHONE MAY ALSO BE USED ON STANDALONE BASIS FOR INTERFACE TO HOST COMPUTER PORT
QMT9	ASYNCHRO-NOUS INTERFACE MODULE	PROVIDES ASYNC DATA TRANSMISSION FOR CO-LOCATED TERMINALS AT SPEEDS UP TO 19.2 Kbps	ALL (DESKTOP)	1 PER ASSOCIATED TERMINAL
QMT102	DISK DRIVE CONTROLLER	INTERFACES TO MSI AND PROVIDES ACCESS TO DISK DRIVES	MS (QMM38) N (QMM38) XN (QMM38) NT (QMM38) XT (QMM38) RT (QMM38)	1 PER SYSTEM
QMT103	WINCHESTER HARD DISK DRIVE	PROVIDES UP TO 10 MBYTES OF FORMATTED STORAGE CAPACITY. USED IN CONJUNCTION WITH FLOPPY DISKS.	MS (QMM38) N (QMM38) XN (QMM38) NT (QMM38) XT (QMM38) RT (QMM38)	1 PER SYSTEM (OPTIONAL BASIS)

TABLE 9-2: CONTINUED

ORDER CODE	DESCRIPTION	PURPOSE	MODEL (LOCATION)	PROVISION
QMT104	FLOPPY DISK DRIVE ASSEMBLY	ACCOMMODATES 5.25" FLOPPY DISKETTE. PROVIDED IN DUPLICATED ON SYSTEM BASIS	MS (QMM38) N (QMM38) XN (QMM38) NT (QMM38) XT (QMM38) RT (QMM38)	2 PER SYSTEM
QPA57	CPU FUNCTION CARD	CONTAINS ALU, AND ASSOCIATED LOGIC FOR CPU	XN (QSD17)	2 PER SYSTEM (ALWAYS REQUIRED) REPLACE WITH 2 - QPC553 FOR 9 11 RLSE 5 & LATER
QPA58	CPU INTERFACE CARD	INTERFACE CPU WITH EXTERNAL ADDRESS BUS. DETECTS, IDENTIFIES, ISOLATES BUS FAULTS	XN (QSD17)	2 PER SYSTEM (ALWAYS REQUIRED) REPLACE WITH 2 - QPC554 FOR 9 11 RLSE 5 & LATER
QPA59	CPU MISCELL-ANEOUS CARD	PROVIDES STORAGE REGISTERS FOR CPU. HAS 3 CHARACTER DISPLAY FOR MAINTENANCE	XN (QSD17)	2 PER SYSTEM (ALWAYS REQUIRED) REPLACE WITH 2 - QPC555 FOR 9 11 RLSE 5 & LATER
QPC33	TAPE UNIT INTERFACE CARD	PROVIDES INTERFACE BETWEEN TAPE UNIT AND CPU	S (QPC503) MS (QSP39) N (QSP41) XN (QSD17)	1 PER CPU (ALWAYS REQUIRED WHEN MAGNETIC TAPE IS MASS STORAGE MEDIA)
QPC41	CPU MISC	CONTAINS VARIOUS REGISTERS FOR HOLDING ADDRESS AND DATA INFORMATION	S (QPC503) MS (QSP39) N (QSP41)	1 PER CPU (ALWAYS REQUIRED)

TABLE 9-2: CONTINUED

ORDER CODE	DESCRIPTION	PURPOSE	MODEL (LOCATION)	PROVISION
QPC43	PERIPHERAL SIGNALING	PROVIDES SIGNALING INTERFACE BETWEEN CPU AND PE	ALL EXCEPT ST (CE SHELF)	1 OR 2 PER CE SHELF (S, MS) 1 PER NETWORK SHELF (N, XN, RT, NT, XT)
QPC60	500/2500 LINE CARD	PERIPHERAL INTERFACE WITH (1) ROTARY OR DIGITONE TELEPHONE SETS (2) TAFAS (NIGHT SERVICE)	ALL (PE SHELF)	(1) PER FOUR 500/2500 TYPE TELEPHONES (2) ONE PER TAFAS
QPC61	SL-1 LINE CARD	PERIPHERAL INTERFACE TO (1) SL- 1 TELEPHONE OR (2) ATTENDANT CONSOLE	ALL (PE SHELF)	(1) ONE PER FOUR SL- 1 TELEPHONES (2) ONE PER ATTENDANT CONSOLE
QPC62	1.5 MBAUD CONVERTER CARD	CONVERTS NETWORK LOOP (2.048 MBPS) TO TWO TI-TYPE LINKS (1.544 MBPS)	MS, ST, RT N, NT XN, XT (CARRIER SHELF)	ONE PER REMOTE LOOP (RPEFEATURE)
QPC63	LOCAL CARRIER BUFFER CARD	PROVIDES FOR THE GENERATION OF CLOCKS & DATA DECODING	MS, ST, RT N, NT XN, XT (CARRIER SHELF)	ONE PER REMOTE LOOP (RPE FEATURE)
QPC65	REMOTE PERIPHERAL SWITCH CARD	PROVIDES CYCLIC SCAN OF TERMINALS FOR INCOMING MESSAGES, MONITORS TIME SLOT 0 FOR OUTGOING MESSAGES FROM PS CARD	MS, ST, RT N, NT XN, XT (CARRIER SHELF)	ONE PER REMOTE LOOP (RPE FEATURE)

TABLE 9-2: CONTINUED

ORDER CODE	DESCRIPTION	PURPOSE	MODEL (LOCATION)	PROVISION
QPC66	2 MBAUD CONVERTER	CONVERTS TWO Tl-TYPE CARRIER LINKS (1.544 MBPS) INTO NETWORK LOOP (2.048 MBPS)	MS, ST, RT N, NT XN, XT (CARRIER SHELF)	ONE PER REMOTE LOOP (RPE FEATURE)
QPC67	CARRIER MAINTENANCE	PROVIDES FAULT LOCATING CAPABILITIES IN RPE APPLICATIONS	MS, ST, RT N, NT XN, XT (CARRIER SHELF)	ONE PER RPE CARRIER SHELF (RPE FEATURE)
QPC71	E&M/DX/PAGE TRUNK CARD	PERIPHERAL INTERFACE FOR: (1) 2 WIRE E&M TIE, (2) PAGE ACCESS, (3) 2 WIRE DX SIG	ALL (PE SHELF)	ONE PER TWO TRUNK CIRCUITS
QPC72	LOOP SIGNALING TRUNK CARD	PERIPHERAL INTERFACE FOR: (1) DID (2) ANI (3) CCSA ACCESS	ALL (PE SHELF)	ONE PER TWO TRUNK CIRCUITS
QPC74	RECORDED ANNOUNCE-MENT TRUNK CARD	PROVIDES INTERFACE TOANEXTERNAL RECORDED ANNOUNCE-MENT MACHINE	ALL (PE SHELF)	1 PER 4 RAN ACCESS PORTS
QPC79	DIGITONE RECEIVER CARD	PROVIDES DIGITONE (DTMF) INFORMATION FROM 2500 TELEPHONE OR DIGITONE TRUNK FOR CALL PROCESSING	ALL (PE SHELF)	TRAFFIC DEPENDENT

TABLE 9-2: CONTINUED

ORDER CODE	DESCRIPTION	PURPOSE	MODEL (LOCATION)	PROVISION
QPC80	10V CONVERTER CARD	CONVERTS -48V DC TO +10 & -10V DC SUPPLIES FOR PERIPHERAL EQUIPMENT	S (QPC502) MS N, NT XN, XT (QSP43, QSP44)	1 PER SYSTEM (S) 1 PER 5 PE SHELVES (MAXIMUM 3 PER CABINET)
QPC82	30V CONVERTER CARD	CONVERTS -48V DC TO +15 & -15V DC SUPPLIES FOR SL- 1 LINE CIRCUITS	S (QPC502) MS, N, NT, XN, XT (QSP43, QSP44)	1 PER SYSTEM (S) 1 PER 24 QPC451 SL-1 LINECARDS (MAXIMUM 3 PER CABINET)
QPC84	POWER MONITOR CARD	MONITORS SYSTEM VOLTAGE LEVELS, FUSE STATUS AND ALARMS	S (QPC502) MS, N, NT XN, XT (QSP43, QSP44)	1 PER POWER CONTROL SHELF
QPC99	CARRIER INTERFACE CARD	CONVERTS BIPOLAR SIGNALS INTO TTL LEVEL SIGNALS, MONITORS CARRIER SYSTEM	MS,N,NT,ST XN, XT, RT (CARRIER SHELF)	1 PER REMOTE NETWORK INTERFACE (LOCAL AND RPE SITE) (RPE FEATURE)
QPC139	SERIAL DATA INTERFACE CARD	PROVIDES INTERFACE BETWEEN CPU AND TTY OR DATA TERMINALS CONFORMING TO EIA RS232C	ALL (CE SHELF)	1 PER 2 RS232C PORTS
QPC163	48V REGULATOR CARD	REGULATES 48V DC OUTPUT FROM THE RECTIFIER ASSEMBLY FOR SYSTEM TALK BATTERY	S (QPC502) MS, N, NT XN, XT (QSP43 OR QSP44)	1 PER SYSTEM (S) MINIMUM 1 PER EACH CABINET SERVING PE (OPTIONAL 2)

TABLE 9-2: CONTINUED

ORDER CODE	DESCRIPTION	PURPOSE	MODEL (LOCATION)	PROVISION
QPC173	POWER MONITOR	MONITORS SYSTEM VOLTAGE LEVELS, FUSE STATUS, AND CABINET TEMPERATURE	XN, XT (QCA55)	1 PER SYSTEM
QPC187	RINGING GENERATOR CARD	GENERATES 86V, 20HZ & 105V, 20HZ RINGING SUPPLIES FOR 500/2500 TYPE TELEPHONE SETS	S (QPC502) MS, N, NT XN, XT (QSP43 OR QSP44)	1 PER SYSTEM (S) ONE PER EACH CABINET SERVING 500/2500 TYPE LINE CIRCUITS
QPC189	MF SENDER CARD	PROVIDES MULTI-FREQ. SIGNALING OF ANI DIGITS OVER CAMA TRUNKS TO TOLL OFFICE	MS (QSP39) N, NT XN, XT (QSD39 OR QSD40) RT & ST (CE SHELF)	1 PER SYSTEM WITH ANI
QPC190	5/12V CONVERTER	CONVERTS -48V DC TO +/- 5V & +/- 12V DC SUPPLIES FOR CE SHELVES	S (QPC503) MS (QSP39) N (QSP41) XN (QSP40) N, XN (QSD39 OR QSD40) RT & ST (CE SHELF)	1 PER CE SHELF (QSD17, QSP39, QSD39, QSD40, QPC503) 2 PER CE SHELF (QSP40, QSP41)
QPC192	500 OPX LINE CARD	INTERFACES WITH 500/ 2500 TYPE SETS TO EXTEND LOOP RANGE FROM PE TO STATION FROM 1000 OHMS TO 1400 OHMS	ALL (PE SHELF)	1 PER 4 OPX LINE CIRCUITS
QPC197	TONE & DIGIT SWITCH CARD	PROVIDES ALL TONES TONE RINGING, DIGIT OUTPULSING AND DIGITONE OUTPULSING FOR THE SYSTEM	ALL (CE/NET SHELF)	1 PER SYSTEM (S, ST) 1 PER SYSTEM (MS) 1 PER NETWORK SHELF (N, NT, XN, XT)

TABLE 9-2: CONTINUED

ORDER CODE	DESCRIPTION	PURPOSE	MODEL (LOCATION)	PROVISION
QPC213	CHANGEOVER AND MEMORY ARBITRATOR CARD	CONTROLS CPU ACCESS TO DUPLICATE MEMORY SYSTEM, DISABLES FAULTY MEMORY PACKS, CONTROLS ACTIVE CPU	N (QSP41) XN (QSP40)	2 PER SYSTEM (ALWAYS REQUIRED) REPLACE WITH 2 - QPC556 FOR 911 RLSE 5 OR LATER
QPC215	SEGMENTED BUS EXTENDER CARD	EXTENDS CPU CONTROL BUS FROM INITIAL CE SHELF IN SYSTEM	S (QPC503) MS (QSP39) XN (QSD17) XT (QSD62) RT (QSD76)	2 PER CE OPTION SHELF (S, MS) 2 PER NETWORK GROUP (XN, XT)
QPC219	CO/FX/WATS TRUNK CARD	INTERFACES TWO 600 OR 900 OHM CO/FX/WATS TRUNKS WITH SYSTEM IN U-LAW APPLICATION. DETECTS RINGING ON TIP OR RING LEADS.	ALL (PE SHELF)	1 PER TWO CO/FX/ WATS CIRCUITS
QPC237	4 WIRE E&M TRUNK CARD	PROVIDES 4 WIRE E&M TIE TRUNK WITHOUT GOING THROUGH 2 WIRE TO 4 WIRE CONVERSION	ALL (PE SHELF)	1 PER TWO 4 WIRE E&M CIRCUITS
QPC239	DICTATION ACCESS TRUNKCARD	PROVIDES PERIPHERAL INTERFACE TO EXTERNAL DICTATION MACHINE. INCLUDES DCKFEATURE	ALL (PE SHELF)	1 PER TWO DICTATION ACCESS CIRCUITS
QPC250	RELEASE LINK TRUNK CARD	USED TO INTERFACE REMOTE SL-1 CAS PBX WITH MAIN PBX WHERE CAS ATTENDANT IS LOCATED	ALL (PE SHELF)	1 PER TWO RLT CIRCUITS

TABLE 9-2 CONTINUED

ORDER CODE	DESCRIPTION	PURPOSE	MODEL (LOCATION)	PROVISION
QPC251	TONE & DIGIT SWITCH CARD	REPLACES QPC197 WHEN FLEXIBLE TONES FOR REMOTE CAS OPERATION, AUTOVON, OR DISTINCTIVE RINGING IS REQUIRED	ALL (CE SHELF)	1 PER SYSTEM (S, ST) 1 PER SYSTEM (MS) 1 PER NETWORK SHELF (N, XN, NT, XT)
QPC267	MESSAGE WAITING LINE CARD	INTERFACES WITH AND DISTRIBUTES 150V TO MESSAGE WAITING LAMP ON 500/2500 TELEPHONE SETS	ALL (PE SHELF)	1 PER FOUR 500/2500 TYPE TELEPHONES WITH MESSAGE WAITING LAMP
QPC297	SUPERVISOR CONSOLE CARD	INTERFACES TO ATTENDANT CONSOLE WHEN SUPERVISORY FEATURE IS REQUIRED	ALL (PE SHELF)	1 PER TWO CONSOLES (REPLACES QPC61C OR QPC451)
QPC311	DATA LINE CARD	PROVIDES 2 VOICE AND 2 DATA PORTS FOR INTERFACE TO SL-1 TELEPHONE, ADM OR SL-1 DISPLAYPHONE	ALL (PE SHELF)	1 PER 2 CO-LOCATED SL-1/ADM 1 PER 2 ADM PORTS 1 PER 2 SL-1 DISPLAYPHONES
QPC353	MODEM POOL LINE CARD	PROVIDES PERIPHERAL INTERFACE FOR ASYNC OUTBOUND MODEM POOL CONFIGURATION	ALL (PE SHELF)	1 PER FOUR MODEM POOL FORTS
QPC360	EQUALIZE SWITCH	MONITORING DEVICE TO KEEP BATTERIES AT PREDETERMINED CHARGE	MS, N, NT, RT (QBL15)	1 PER QBL15 BATTERY DISTRIBUTION BOX

TABLE 9-2: CONTINUED

ORDER CODE	DESCRIPTION	PURPOSE	MODEL (LOCATION)	PROVISION
QPC362	CONFERENCE CARD	CONTROLS UP TO 15 SIMULTANEOUS CONF PROVIDING TOTAL NUMBER OF CONFEREES DOES NOT EXCEED 30	S (QPC503) MS (QSP39)	1 PER SYSTEM (S) 1 FOR EACH 12 NETWORK LOOPS; OPTIONAL PROVISION FOR MUSIC-ON-HOLD
QPC376	NETWORK CARD	PROVIDES DIGITAL SPEECH PATH, SWITCHING, SIGNAL, AND CONTROL FOR TWO MULTIPLEX LOOPS	S (QPC503) MS (QSP39)	1 PER 2 NETWORK LOOPS; EACH LOOP INTERFACES 1 OR 2 PE SHELVES
QPC411	SYSTEM CLOCK GENERATOR CARD	PROVIDES SYSTEM CLOCK FOR ASSOCIATED NETWORK EQUIPMENT	XN (QSD 17) XT (QSD62)	1 PER SYSTEM (ALWAYS REQUIRED)
QPC412	INTER GROUP SWITCH CARD	PROVIDES SPACE SWITCHING BETWEEN NETWORK GROUPS IN MULTIGROUP SYSTEMS	XN, XT (QSD39, QSD40)	2 PER NETWORK SHELF (4 PER NETWORK GROUP) MINIMUM-4 MAXIMUM-20
QPC414	NETWORK CARD	PROVIDES DIGITAL SPEECH PATH, SWITCHING SIGNAL, AND CONTROL FOR TWO MULTIPLEX LOOPS	ST (QPC700) N, XN, NT, XT (QSD39/40) RT (QPC587)	1 PER 2 NETWORK LOOPS
QPC417	JUNCTOR BOARD	PROVIDES DISTRIBUTION POINT FOR MULTIGROUF CABLE ROUTING	XN, XT (QCA55)	1 PER SYSTEM (ALWAYS REQUIRED)

TABLE 9-2: CONTINUED

ORDER CODE	DESCRIPTION	PURPOSE	MODEL (LOCATION)	PROVISION
QPC422	TONE DETECTOR	DETECTS CALL PROGRESS TONES USED WITH AUTOMATIC TRUNK MAINTENANCE FEATURE	ALL (PE SHELF)	1 PER 2 TONE DETECTOR CIRCUITS
QPC423	192K MEMORY MODULE	PROVIDES 192K OF RAM WITH AUTOMATIC ERROR CORRECTION AND DETECTION CAPABILITY	S (QPC503) MS (QSP39)	MAXIMUM 2 PER SYSTEM
QPC424	CENTRAL PROCESSING UNIT (CPU)	PROVIDES ARITHMETIC/ LOGIC FUNCTIONS, INSTRUCTION DECODING/ MACHINE CODE TIMING	N (QSP41)	1 OR 2 PER SYSTEM (REQUIRES QPC487 ROM)
QPC425	CENTRAL PROCESSING UNIT (CPU)	PROVIDES ARITHMETIC/ LOGIC FUNCTIONS, INSTRUCTION DECODING/ MACHINE CODE TIMING AND SDI PORT	S (QPC503) MS (QSP39)	1 PER SYSTEM (REQUIRES QPC486 ROM)
QPC426	192K MEMORY MODULE	PROVIDES 192K OF RANDOM ACCESS MEMORY	N (QSP41) XN (QSP40)	2 PER SYSTEM (N) STANDARD (XN) 4 PER SYSTEM; 8 PER SYSTEM WITH MEMORY EXPANSION
QPC430	ASYNCH-RONOUS INTERFACE LINE CARD	PE INTERFACE FOR QMT9 AIM AND QPC512 PCI. PROVIDES RS422 INTERFACE	ALL (PE SHELF)	1 PER 4 DATA PORTS

TABLE 9-2: CONTINUED

ORDER CODE	DESCRIPTION	PURPOSE	MODEL (LOCATION)	PROVISION
QPC432	FOUR PORT DATA LINE CARD	DATA ONLY LINE CARD; EACH PORT PROVIDES RS232C INTERFACE	ALL (PE SHELF)	1 PER 4 DATA PORTS
QPC441	THREE PORT EXTENDER CARD	EXTENDS CPU DATA, ADDRESS & CONTROL SIGNALS BETWEEN ONE SEGMENTED NETWORK SHELF AND CPU	N, NT, XN, XT (QSD39 OR QSD40) RT (QSD76)	1 PER NETWORK SHELF (N, NT, RT) 2 PER NETWORK GROUP (XN, XT)
QPC443	CONTROL ANDTIMING CARD	PROVIDES ROM AND MACHINE CODE TIMING SIGNALS FOR THE CPU	XN (QSD17)	2 PER SYSTEM (REPLACE WITH 2 - QPC552 FOR 911 RLSE 5 OR LATER)
QPC444	CONFERENCE CARD	CONTROLS UP TO 15 SIMULTANEOUS CONF PROVIDING TOTAL NUMBER OF CONFEREES DOES NOT EXCEED 30	N & XN NT&XT (QSD39 OR QSD40) ST (QPC700) RT (QSD76)	1 PER 12 NETWORK LOOPS OPTIONAL PROVISION FOR MUSIC-ON-HOLD
QPC449	LOOP SIGNALING TRUNK CARD (4 PORT)	PERIPHERAL INTERFACE FOR: (1) DID (2) ANI (3) CCSA ACCESS	ALL (PE SHELF)	1 PER FOUR TRUNK CIRCUITS
QPC450	CO/FX/WATS TRUNK CARD (4 PORT)	INTERFACES FOUR 600 OR 900 OHM CO/FX/WATS TRUNKS WITH SYSTEM IN U-LAW APPLICATION. DETECTS RINGING ON TIE' OR RING LEADS.	ALL (PE SHELF)	1 PER FOUR TRUNK CIRCUITS

TABLE 9-2: CONTINUED

ORDER CODE	DESCRIPTION	PURPOSE	MODEL (LOCATION)	PROVISION
QPC451	SL-1 LINE CARD	PROVIDES PERIPHERAL INTERFACE FOR SL- 1 TELEPHONE	ALL (PE SHELF)	1 PER 8 SL-1 TELEPHONES
QPC452	500/2500 LINE CARD	PROVIDES PERIPHERAL INTERFACE TO 500/2500 TYPE TELEPHONE SETS	ALL (PE SHELF)	1 PER 8 500/2500 TELEPHONES
QPC464	PERIPHERAL BUFFER CARD	PROVIDES CONTROL BETWEEN MULTIPLEX LOOP AND PE BUS; REGULATES POWER TO PE CARDS	S (QPC500) QPC501) RT PE SHELF MS, N, NT, XN, XT (QSP35/36 or QSD64)	1 PER PE SHELF
QPC471	CLOCK CONTROLLER CARD	PROVIDES CLOCK SYNCHRONIZATION AND DISTRIBUTION FOR DIGITAL TRUNK INTERFACE	N, NT (QSD39, QSD40) MS, ST, RT (CE SHELF) XN (QSD17) XT (QSD17)	1 PER CPU/Xl 1 RELEASE 5 (OR LATER) 2 PER SYSTEM /X11 RELEASE 5 (OR LATER)
QPC472	DIGITAL TRUNK INTERFACE CARD	PROVIDES INTERFACE TO DIGITAL (DS- 1) TRANSMISSION LINK. SUPPORTS BOTH DTMF & DIAL PULSE SIGNALING	N,NT,XN,XT (QSD39 or QSD40) MS, ST, RT (CE SHELF)	1 PER 24 DS-1 CHANNELS X11 RELEASE 5 (OR LATER)
QPC477	BUS TERMINATING UNIT	REQUIRED TO CORRECTLY TERMINATE CE BUSSES	N, XN, NT, XT, RT (CE SHELF)	AS REQUIRED PER CE SHELF

TABLE 9-2: CONTINUED

ORDER CODE	DESCRIPTION	PURPOSE	MODEL (LOCATION)	PROVISION
QPC478	128K MEMORY MODULE	PROVIDES 128K OF RAM WITH AUTOMATIC ERROR CORRECTION AND DETECTION CAPABILITY	S (QPC503) MS (QSP39)	MAXIMUM 2 PER SYSTEM
QPC479	128K MEMORY MODULE	PROVIDES 128K OF RANDOM ACCESS MEMORY	N (QSP41)	MAXIMUM 2 PER SYSTEM
QPC486	READ-ONLY MEMORY	DAUGHTER BOARD ROM FOR CPU	S, MS (QPC425)	1 PER CPU
QPC487	READ-ONLY MEMORY	DAUGHTER BOARD ROM FOR CPU	N (QPC424) RT (QPC579) NT (QPC424)	1 PER CPU
QPC494	MESSAGE WAITING LINE CARD	INTERFACES WITH AND DISTRIBUTES 150V TO MESSAGE WAITNG LAMP ON 500/2500 TELEPHONE	ALL (PE SHELF)	1 PER 8 500/2500 TYPE TELEPHONES WITH MW LAMP
QPC496	BUS EXTENDER	EXTENDS CE BUS FOR FULL NETWORK GROUP OPERATION	N (QSP41) NT (QSD60)	1 PER SYSTEM

TABLE 9-2: CONTINUED

ORDER CODE	DESCRIPTION	PURPOSE	MODEL (LOCATION)	PROVISION
QPC512	PERSONAL COMPUTER INTERFACE CARD	CONNECTS IBM PC TO MERIDIAN SL-1 WITH STANDARD TWISTED PAIR WIRING	ALL (PERSONAL COMPUTER)	1 PER PC (REQUIRES 1 - PORT OF QPC430 AILC)
QPC513	ENHANCED SERIAL DATA INTERFACE	PROVIDES 2 - SDI PORTS FOR ASYNC / SYNCH COMMUNICATIONS	ALL (CE SHELF)	1 PER 2 RS232C PORTS
QPC574	DUAL PORT DIGITONE RECEIVER	PROVIDES DIGITONE (DTMF) INFORMATION FOR CALL PROCESSING	ALL (PE SHELF)	TRAFFIC DEPENDENT
QPC578	INTEGRATED SERVICES DIGITAL LINE CARD	INTERFACES TO MERIDIAN PORTFOLIO OF DIGITAL TELEPHONES	ALL (PE SHELF)	1 PER 8 DIGITAL TELEPHONES
QPC579	CPU FUNCTION CARD	ONE OF TWO CARDS THAT CONSTITUTE THE CPU FOR SYSTEM CONTROL	NT (QSD60) XT (QSD62) RT (QSD76)	2 PER SYSTEM
QPC580	CPU INTERFACE CARD	ONE OF TWO CARDS THAT CONSTITUTE THE CPU FOR SYSTEM CONTROL	NT (QSD60) XT (QSD62) RT (QSD76)	2 PER SYSTEM

TABLE 9-2: CONTTNUED

ORDER CODE	DESCRIPTION	PURPOSE	MODEL (LOCATION)	PROVISION
QPC581	CHANGEOVER AND MEMORY ARBITRATOR CARD	CONTROLS CPU ACCESS TO DUAL MEMORY BANK	NT (QSD60) XT (QSD62) RT (QSD76)	2 PER SYSTEM
QPC583	768K MEMORY MODULE	PROVIDES 768K 24 BIT WORDS OF RANDOM ACCESS MEMORY	NT (QSD60) XT (QSD62) RT (QDS76)	1 PER CPU 1, 2, OR 3 PER CPU
QPC584	MASS STORAGE INTERFACE CARD	PROVIDES INTERFACE BETWEEN CPU AND MASS STORAGE UNIT	RT (QSD76) S (QPC503) MS (QSP39) N (QSP41) XN (QSD17) NT (QSD60) XT (QSD62) ST (QPC700)	1 PER CPU
QPC585	DISK POWER CONVERTER CARD	CONVERTS -48V DC TO POWER LEVELS REQUIRED FOR MASS STORAGE DEVICES	MS (QMM38) N (QMM38) XN (QMM38) NT (QMM38) XT (QMM38) RT (QMM36)	1 PER CPU
QPC594	16 PORT 500/2500 LINE CARD	PROVIDES PERIPHERAL INTERFACE FOR SL- 1 TELEPHONE	ALL (PE SHELF)	1 PER 16 500/2500 TYPE
QPC609	FAST TONE & DIGIT SWITCH	REDUCES CALL SETUP TIME BY 50 PERCENT COMPAREDTO QPC197/QPC251	ALL (CE SHELF)	AS QPC 197/251 (REQUIRES SOFTWARE OPTION 87)
QPC659	DUAL LOOP PERIPHERAL BUFFER	PROVIDES CONTROL FOR 1 OR 2 MULTIPLEX LOOPS CONNECTED TO ASSOCIATED PE SHELF	ST(QPC701/2) MS (QSD65) N (QSD65) NT (QSD65) XN (QSD65) XT (QSD65) RT (QSD66)	1 PER PE SHELF

TABLE 9-2: CONTINUED

ORDER CODE	DESCRIPTION	PURPOSE	MODEL (LOCATION)	PROVISION
QPC673	MEMORY CARD	PROVIDES 320K WORDS OF RAM WITH AUTOMATIC ERROR CORRECTION AND DETECTION CAPABILITY	ST (QPC700)	1 PER SYSTEM
QPC687	CENTRAL PROCESSING UNIT	PROVIDES ARITHMETIC/ LOGIC FUNCTIONS, INSTRUCTION DECODING, MACHINE CODE TIMING, AND SDI PORT	ST (QPC700)	1 PER SYSTEM (REQUIRES QPC7 17 ROM)
QPC691	5/12V CONVERTER CARD	CONVERTS 48V DC TO POWER LEVELS REQUIRED FOR CPU/MEMORY	NT (QSD60) XT (QSD62) RT (QSD67)	2 PER CPU/M-EM SHF 1 PER CPU/MEM SHF
QPC699	COMMON EQUIPMENT BACKPLANE	ACCOMMODATES CE CIRCUIT CARDS (S) AND DTI (ST)	S (QCA60) ST (QCA136/7)	1 PER SYSTEM 1 PER 4 DTI
QPC700	COMMON EQUIPMENT BACKPLANE	ACCOMMODATES 13 CE CIRCUIT CARDS IN BASIC TIER CONFIGURATION	ST (QCA136)	1 PER SYSTEM (BASIC TIER)
QPC701	PERIPHERAL EQUIPMENT BACKPLANE (BASIC TIER)	ACCOMMODATES DUAL LOOP BUFFER, 10 PER CARDS, AND MDF CABLE CONNECTORS IN BASIC TIER CONFIG-URATION	ST (QCA136)	1 PER SYSTEM (BASIC TIER)

TABLE 9-2: CONTINUED

ORDER CODE	DESCRIPTION	PURPOSE	MODEL (LOCATION)	PROVISION
QPC702	PERIPHERAL EQUIPMENT BACKPLANE (2nd/3rd TIER)	ACCOMMODATES DUAL LOOP BUFFER, 8 PE CARDS, POWER CONVERTER, AND MDF CABLE CONNECTORS	ST (QCA136/7)	2 PER QSD66 SHELF
QPC705	POWER CONVERTER (30/150V)	PROVIDES +/- 15 / 150V TO QPC701 PE BACKPLANE IN BASIC TIER CONFIGURATION	ST (QCA136)	1 PER SYSTEM (BASIC TIER)
QPC706	POWER (ALL VOLTAGES)	CONVERTS -52V DC TO +/- 10V +/- 15V FOR PE ACCOMMODATED ON TIERS 1 AND 2	ST (QPC702) RT (QPC702)	1 PER QPC702 PE BACKPLANE
QPC709	MISC./ PERIPHERAL SIGNALING	PROVIDES MISCEL-LANEOUS CPU AND NETWORK PERIPHERALS SIGNALING FUNCTIONS	ST (QPC700)	1 PER SYSTEM
QPC710	DIGITONE RECEIVER	CONVERTS DUAL TONE MULTIFREQUENCY (DTMF) SIGNALS FOR CALL PROCESSING BY THE SYSTEM	ST (QPC659) MS (QPC659) N (QPC659) NT (QPC659) XN (QPC659) XT (QPC659) RT (QPC659)	OPTIONAL 1 PER DUAL LOOP MODE PE BUFFER
QPC717	READ-ONLY MEMORY	DAUGHTER BOARD ROM FOR CPU	ST (QPC687)	1 PER CPU

TABLE 9-2 CONTINUED

ORDER CODE	DESCRIPTION	PURPOSE	MODEL (LOCATION)	PROVISION
QPC723	RS232C INTERFACE LINE CARD	PROVIDES DIRECT INTERFACE TO RS232C ASYNC COMPUTER EQUIPMENT	ALL (PE SHELF)	1 PER 4 RS232C PORTS
QPC789	16 PORT 500/2500 MESSAGE WAITING LINE CARD	INTERFACES WITH AND DISTRIBUTES 150V TO MESSAGE WAITING LAMP ON 500/2500 TELEPHONE SETS.	ALL (PE SHELF)	1 PER 16 500/2500 TYPE TELEPHONES WITH MESSAGE WAITING LAMP
QRF8	48V RECTIFIER (40 AMPS)	CONVERTS COMMERCIAL 117,208 & 230V AC TO 48V DC FOR SYSTEM OPERATION	MS (QCA109, QCA74) N, NT (QCA58, QCA74 QCA108)	1 PER CABINET
QRF9	48V RECTIFIER (20 AMPS)	CONVERTS COMMERCIAL 117, 208 & 230V AC TO 48V DC FOR SYSTEM OPERATION	S (QCA60)	1 PER SYSTEM
QRF12	POWER RECTIFIER (30 AMP 125/225V)	CONVERTS COMMERCIAL 117 & 208V AC TO 48V DC FOR SYSTEM OPERATION	ST (QCA136) ST (QCA137) ST (QCA144) RT (QCA147)	1 PER CABINET
QSD6	RPE CARRIER SHELF (LEFT HAND MOUNT)	ACCOMMODATES CIRCUIT CARDS REQUIRED FOR IMPLE-MENTING REMOTE PERIPHERALEQUIPMENT OPTION	MS, N, NT, XN, XT (REQUIRES TWO PE SHELF LOCATIONS)	1 PER TWO REMOTE NETWORK INTERFACES
QSD11	RPE CARRIER SHELF (RIGHT HAND MOUNT)	ACCOMMODATES CIRCUIT CARDS REQUIRED FOR IMPLE-MENTINGREMOTE PERIPHERAL EQUIP-MENTOPTION	MS, N, NT, XN, XT (REQUIRES TWO PE SHELF LOCATIONS)	1 PER TWO REMOTE NETWORK INTERFACES

TABLE 9-2: CONTINUED

ORDER CODE	DESCRIPTION	PURPOSE	MODEL (LOCATION)	PROVISION
QSD17	CPU SHELF	ACCOMMODATES CPU AND COMMON PERIPHERAL EQUIPMENT CIRCUIT CARDS	XN (QCA55)	2 PER SYSTEM (ALWAYS REQUIRED)
QSD39	NETWORK SHELF (LEFT)	ACCOMMODATES NETWORK BUS CARDS (NTW, TDS, CONF), SDI, AND ASSOCIATED CE CARDS	N (QCA58) NT (QCA58) XN (QCA55, QCA108) XT (QCA55, QCA108)	1 PER SYSTEM (N) (NT) (ALWAYS REQUIRED) 1 PER NETWORK GROUP (XN) (XT)
QSD40	NETWORK SHELF (RIGHT)	ACCOMMODATES NETWORK BUS CARDS (NTW, TDS, CONF), SDI, AND ASSOCIATED CE CARDS	N (QCA58) NT (QCA58) XN (QCA55, QCA108) XT (QCA55, QCA108)	1 PER DUAL CPU SYSTEM (N) 1 PER SYSTEM (NT) 1 PER NETWORK GROUP (XN) (XT)
QSD60	CPU MEMORY SHELF (CANTILEVER MOUNT)	ACCOMMODATES CIRCUIT CARDS FOR DUAL CPU AND FULLY REDUNDANT MEMORY	NT (QCA58) CABINET	1 PER SYSTEM (ALWAYS REQUIRED)
QSD62	CPU MEMORY SHELF (CANTILEVER MOUNT)	ACCOMMODATES CIRCUIT CARDS FOR DUAL CPU AND FULLY REDUNDANT MEMORY	XT (QCA55 CABINET)	2 PER SYSTEM (ALWAYS REQUIRED)
QSD64	UNIVERSAL PE SHELF	ACCOMMODATES TEN PERIPHERAL CIRCUIT CARDS PLUS ONE PERIPHERAL BUFFER. TERMINATES 1 NETWORK LOOP	MS (QCA74/109) N, NT (QCA58/108/74) XN, XT (QCA74/108)	1 PER 10 PE CARDS (LEFT OR RIGHT MOUNT)

TABLE 9-2: CONTINUED

ORDER CODE	DESCRIPTION	PURPOSE	MODEL (LOCATION)	PROVISION
QSP40	MEMORY SHELF	ACCOMMODATES CIRCUIT CARDS FOR FULLY REDUNDANT MEMORY MODULES	XN (QCA55)	1 PER SYSTEM (ALWAYS REQUIRED)
QSP41	CPU/MEMORY SHELF	ACCOMMODATES CIRCUIT CARDS FOR CPU (1 OR 2) AND FULLY REDUNDANT MEMORY MODULES	N (QCA58)	1 PER SYSTEM
QSP43	POWER CONTROL SHELF	CONVERTS THE SYS -48V TO THE SECONDARY VOLT WHICH SUPPLY EQUIPMENT IN QCA58, QCA108, QCA109 CABINET	MS (QCA109) N (QCA58) NT (QCA58) XN (QCA108) XT (QCA108)	1 PER CABINET (ALWAYS REQUIRED)
QSP44	POWER CONTROL SHELF	CONVERTS -48V TO THE SECONDARY VOLTAGES WHICH SUPPLY THE QCA74 PE CABINET	MS, N, NT, XN, XT (QCA74)	1 PER PE CABINET (ALWAYS REQUIRED)
QSP45	TAPE SHELF	ACCOMMODATES QUW1 TAPE UNIT AND ASSOCI-ATED POWER CONTROL CARDS	N (QCA58) XN (QCA55)	1 PER SYSTEM (ALWAYS REQUIRED) IFMAGTAPEISTHE MASS STORAGE MEDIUM
QSY22	MESSAGE WAITING POWER SUPPLY	PROVIDES -150V FOR MESSAGE WAITING LAMPS	MS, N, XN, NT, XT, RT (PE CABINET)	1 PER CABINET CONTAINING MW PE CARDS (REQUIRES PE SHELF POSITION ON XN OR XT)

TABLE 9-2: CONTINUED

ORDER CODE	DESCRIPTION	PURPOSE	MODEL (LOCATION)	PROVISION
QSD65	DUAL LOOP PE SHELF	ACCOMMODATES TEN PERIPHERAL CIRCUIT CARDS PLUS ONE DUAL LOOP PERIPHERAL BUFFER (QPC659). TERMINATES 1 OR 2 NETWORK LOOPS	MS (QCA74/ 109) N(QCA58/74) NT(QCA58/74) XN(QCA74) XT(QCA74/ 108)	1 PER 10 PE CARDS (LEFT OR RIGHT MOUNT)
QSD66	PE EXPANSION SHELF	PROVIDES 2 - 8 PORT PE BACKPLANES (EACH QPC702) TO EXPAND BASIC TIER WITH 2nd AND 3rd TIERS	ST (QCA136) ST (QCA137) RT (QCA147)	2 PER CABINET (MAXIMUM)
QSD67	DISK STORAGE SHELF (CANTILEVER MOUNT)	ACCOMMODATES MASS STORAGE UNIT AND ASSOCIATED COMPONENTS	N (QCA58) XN (QCA55 NT (QCA58) XT (QCA55)	1 PER SYSTEM (ALWAYS REQUIRED)
QSD73	CE/PE EXPANSION TIER	ACCOMMODATES UP TO 4 - DTI AND 8 - PE PORTS WHEN EXPANDING BASIC TIER WITH 2nd OR 3rd TIERS	ST (QCA136) RT (QCA147)	1 PER SYSTEM
QSP35	PERIPHERAL SHELF (RIGHT)	ACCOMMODATES TEN PERIPHERAL CARDS OF ANY TYPE PLUS ONE PERIPHERAL BUFFER	MS (QCA74, QCA109) N (QCA58, QCA74) XN (QCA74, QCA108)	1 PER 10 PE CARDS
QSP36	PERIPHERAL SHELF (LEFT)	ACCOMMODATES TEN PERIPHERAL CARDS OF ANY TYPE PLUS ONE PERIPHERAL BUFFER	MS (QCA74, QCA109) N (QCA58, QCA74) XN (QCA74, QCA108)	1 PER 10 PE CARDS

TABLE 9-2: CONTINUED

ORDER CODE	DESCRIPTION	PURPOSE	MODEL (LOCATION)	PROVISION
QUA4	TRANSFER UNIT (POWER FAIL AND EMERGENCY)	CONNECTS PRE-SELECTED CO TRUNKS TO PRESELECTED 2500 SETS IN POWER FAIL SITUATION	MS, N, NT, XN, XT (POWER CONTROL OR PE SHELF [2 SLOTS])	1 PER 12 TRANSFER CIRCUITS (SERVES 2 CUSTOMERS)
QUA6	POWER FAIL TRANSFER UNIT (WALL MOUNT)	CONNECTS PRESELECTED CO TRUNKS TO PRESEL-ECTED 2500 SETS IN POWER FAIL SITUATION	ST, RT (WALL MOUNTED)	1 PER 5 TRANSFER CIRCUITS
QUAA3	POWER UNIT	PROVIDES STANDARD SECONDARY VOLTAGES FOR THE BASIC TIER CONFIGURATION PLUS SYSTEM RINGING GENERATOR	ST (QCA136)	1 PER SYSTEM
QUAA5	POWER UNIT	PROVIDES STANDARD SECONDARY VOLTAGES FOR THE 1st TIER PLUS SYSTEM GENERATOR	RT (QUA147)	1 PER SYSTEM
QUD15	COOLING UNIT	DISSIPATES HEAT GENERATED BY COMMON EQUIPMENT	MS (QCA109) N (QCA58) XN (QCA55) XN (QCA108)	AS REQUIRED FOR CE SHELVES
QUD20	COOLING UNIT	DISSIPATES HEAT GENERATED BY COMMON EQUIPMENT	NT (QCA58) XT (QCA55) XT (QCA108)	AS REQUIRED FOR CE SHELVES
QUD24	COOLING UNIT	PROVIDES HEAT DISSIPATION WHEN 3rd TIER IS CONFIGURED	ST (QCA136) ST (QCA137) RT (QCA147)	2 PER SYSTEM WHEN QSD66 IS USED AS 3rd TIER

TABLE 9-2: CONTINUED

ORDER CODE	DESCRIPTION	PURPOSE	MODEL (LOCATION)	PROVISION
QUT1	CENTRALIZED POWER UNIT	SUPPLIES ADD-ON MODULE POWER FOR UP TO 11 SL-1 TELEPHONES	ALL (EQUIPMENT ROOM OR POWER CLOSET)	1 PER 11 SL-1 TELEPHONES
QUW1	MAGNETIC TAPE UNIT	LOADS PROGRAMS AND OFFICE DATA INTO SYSTEM MEMORY. PROVIDES NON-VOLATILE STORE	N & XN (QSP45)	1 PER SYSTEM (ALWAYS REQUIRED) REPLACED BY MASS STORAGE UNIT
QUW9	MAGNETIC TAPE UNIT	LOADS PROGRAMS AND OFFICE DATA INTO SYSTEM MEMORY. PROVIDES NON-VOLATILE STORE	S (QCA60) MS (QSD33 TAPE SHELF)	1 PER SYSTEM (ALWAYS REQUIRED) REPLACED BY MASS STORAGE UNIT
QUX19	POWER DISTRTBUTION UNIT	PROVIDES POWER DISTRIBUTION TO THE COMMON AND PERIPHERAL EQUIPMENTLOCATED IN THE BASIC TIER	ST (QCA136)	1 PER SYSTEM
QUX20	POWER DISTRIBUTION UNIT	PROVIDES POWER DISTRIBUTION TO EQUIPMENTLOCATED IN THE 2nd AND 3rd EXPANSION TIERS	ST (QCA136)	1 PER SYSTEM IF QSD66 AND / OR QSD73 IS EQUIPPED
QUX22	POWER DISTRIBUTION UN-IT	PROVIDES POWER TO 2nd AND 3rd TIER	RT (QCA147)	1 PER SYSTEM
NT5C03	RECTIFIER	PROVIDES 48V DC FOR SYSTEM OPERATION. EACH UNIT IS RATED AT 50A OUTPUT	NT, XT (QCA13)	4 PER CABINET (MAXIMUM 10 PER SYSTEM)

TABLE 9-2: CONTINUED

ORDER CODE	DESCRIPTION	PURPOSE	MODEL (LOCATION)	PROVISION
J2412A-1L6	CENTRALIZED POWER (B0225 152)	MAIN CABINET ASSEMBLY WIRED FOR FOUR NT5C03 50A RECTIFIERS	NT, XT (EQUIPMENT ROOM)	1 PER SYSTEM (RECTIFIER 1-4)
J2412A-1L17	SUPPLEMEN-TARY POWER (B0225 153)	SUPPLEMENTARY CABINET WIRED FOR FOUR NT5C03 50A RECTIFIERS	NT, XT (EQUIPMENT ROOM)	AS REQUIRED (MAX 2) TO ACCOMMODATE RECTIFIERS 5-8 AND 9,10

TABLE 9-2: CONTINUED

PKG NO.	X01	X03	X04	X05	X07	X09	X11	X14	X37	PKG NO.
1	OPTE	OPTE	OPTE	OPTE	OPTE	OPTE	OPTE	OPTE	OPTE	1
2	CUST	CUST	CUST	CUST	CUST	CUST	CUST	CUST	CUST	2
3		AIOD	AIOD	AIOD	AIOD	AIOD	AIOD	AIOD	AIOD	3
4		CDR	CDR	CDR	CDR	CDR	CDR	CDR	CDR	4
5		CTY	CTY	CTY	CTY	CTY	CTY	CTY	CTY	5
6		CLNK	CLNK	CLNK	CLNK	CLNK	CLNK	CLNK	CLNK	6
7		RAN	RAN	RAN	RAN	RAN	RAN	RAN	RAN	7
8		TAD	TAD	TAD	TAD	TAD	TAD	TAD	TAD	8
9		DNDI	DNDI	DNDI	DNDI	DNDI	DNDI	DNDI	DNDI	9
10		EES	EES	EES	EES	EES	EES	EES	EES	10
11		INTR	INTR	INTR	INTR	INTR	INTR	INTR	INTR	11
12			ANI	ANI	ANI	ANI	ANI	ANI	ANI	12
13			ANIR	ANIR	ANIR	ANIR	ANIR	ANIR	ANIR	13
14			ARS	ARS	ARS	ARS	BRTE	ARS	ARS	14
15			RPE	RPE	RPE	RPE	RPE	RPE	RPE	15
16			DNDG	DNDG	DNDG	DNDG	DNDG	DNDG	DNDG	16
17			MSB	MSB	MSB	MSB	MSB	MSB	MSB	17
18			SS25	SS25		SS25	SS25	SS25	SS25	18
19				DDSP	DDSP				DDSP	19
20			ODAS	ODAS	ODAS	ODAS	ODAS		ODAS	20
21				DI		DI	DI		DI	21
22				DISA		DISA	DISA		DISA	22
23				CHG		CHG	CHG		CHG	23
24				CAB		CAB	CAB		CAB	24
25				AUTH		AUTH	BAUT		AUTH	25
26				CASM		CASM	CASM		CASM	26
27				CASR		CASR	CASR		CASR	27
28				ARSQ		ARSQ	BQUE		ARSW	28
29				ARST		ARST	NTRF		ARST	29
30							CMAC		PMSI	30
31							MCDR		MRB	31
32					MRB		NCOS		5DIG	32
33					MW		CPRK		CPRK	33
34					PARK		SSC		SUPV	34
35					SUPV		IMS			35
A35					MOH		UST			A35
B35							UMG			B35
36							ROA		ROA	36
37					ROA		NSIG		AWU	37
38					AWU		MCBQ		RMS	38
39					RMS		NSC		CDAS	39
40				BACD	*HIST*	BACD	BACD		BACD	40
41					(SL1M)	ACDB	ACDB		ACDB	41
42					(only)	ACDC	ACDC		ACDC	42
43						LMAN	LMAN		LMAN	43
44						MUS	MUS		MUS	44

TABLE 9-3: MERIDIAN SL-1 SOFTWARE GENERIC COMPATIBILITY

PKG NO.	X01	X03	X04	X05	X07	X09	X11	X14	X37	PKG NO.
45				ACDA		ACDA	ACDA		ACDA	45
46				MWC		MWC	MWC		MWC	46
47				AAB		AAB	AAB		AAB	47
48				GRP		GRP	GRP		GRP	48
49							NFCR		NFCR	49
50							LNK		LNK	50
51							ACDD		ACDD	51
52						FCA	FCA		FCA	52
53							SR		CCOS	53
54							AA		LSS	54
55							HIST		HIST	55
56							AOP		HOT	56
57							BARS			57
58							NARS			58
59							CDP			59
60							PQUE			60
61							FCBQ			61
62							OHQ			62
63							NAUT			63
64							SNR			64
65							TDET			65
66							SCC			66
67							NXFR			67
68							ATVN			68
69							ACDR			69
70							HOT			70
71							DHLD			71
72							LSEL			72
73							SS5			73
74							DRNG			74
75							PBXI			75
76							DLDN			76
77							CSL			77
78							AMP			78
79							OOD			79
80							SCI			80
81							CCOS			81
82							RSDB			82
83							CDRQ			83
84							ATM			84
85							CSLA			85
86							TENS			86
87							FTDS			87
88							DSET			88
89							TSET			89
90							LNR			90
91							DELTA2			91
92							PTRAN			92
93							SUPV			93
95							CPND			95

TABLE 9-3: CONTINUED

PKG NO.	X01	X03	X04	X05	X07	X09	X11	X14	X37	PKG NO.
96							SLST			96
98							DNIS			98
99							BGD			99
100							RMS			100
101							MR			101
102							AWU			102
103							PMSI			103
105							LLC			105
106							SLP			106
107							MCT			107
108							ICDR			108
109							APL			109
110							TVS			110
111							TOF			111
113							IDC			113
114							ACD-D			114
115							DCP			115
116							ACD			116
117							CBC			117
118							CLID IN CDR			118
119							EMUS			119
145							ISC			145
146							PRA			146
147							ISL			147
148							IAF			148
149							IEC			149

TABLE 9-3: CONTINUED

#		DESCRIPTION
1	OPTF	Extended PBX Features
2	CUST	Multi-Customer
4	CDR	Call Detail Recording
5	CTY	CDR - TTY
6	CLNK	CDR -Magnetic Tape
7	RAN	Recorded Announcements
8	TAD	Time and Date
9	DNDI	Do Not Disturb - Individual
10	EES	End-to-End Signaling
11	INTR	Intercept
12	ANI	Automatic Number Identification
13	ANIR	ANI Route Selection
14	BRTE	Basic Routing
15	RPE	Remote Peripheral Equipment
16	DNDG	Do-Not-Disturb - Group
17	MSB	Make Set Busy
18	SS25	2500 Set Features
19	DDSP	Digital Display (SL-1 Sets)
20	ODAS	Office Data Admin. System
21	D I	Dial Intercom Group
22	DISA	Dial Inward System Access
23	CHG	CDR Charge Account
24	CAB	Charge/Auth. Code Base
25	BAUT	Basic Authorization Code
26	CASM	Central Attn. Service Main
27	CASR	Central Attn. Service Remote
28	BQUE	Base Queuing
29	NTRF	Network Traffic
30	CMAC	Comm. Manage Admin. Control
31	MCDR	Mini CDR (M System only)
32	NCOS	Network Class of Service
33	CPARK	Call Park
34	s s c	System Speed Call
35	IMS	Integrated Message System
36	ROA	Recorded Overflow Announcement
37	NSIG	Network Control/Signal
38	MCBQ	Network Queuing - Main
39	NSC	Network Speed Call
40	BACD	Auto Call Distribution - Base
41	ACDB	ACD Package B
42	ACDC	ACD Package C1
43	LMAN	ACD Package C2
44	MUS	Music
45	ACDA	ACD Package A
46	MWC	Multiple Message Center
47	AAB	Automatic Answerback
48	GRP	Group Call
49	NFCR	New Flexible Code Restriction
50	LNK	Auxiliary Link (ACD-D)
51	ACDD	ACD Package D
52	FCA	Forced Charge Account
53	SR	Set Relocation
54	AA	Attendant Administration

#		DESCRIPTION
55	HIST	History File
56	AOP	Attendant Overflow Position
57	BARS	Basic Automatic Route Selection
58	NARS	Network Automatic Route Selection
59	CDP	Coordinated Dialing Plan
60	PQUE	Priority Queuing
61	FCBQ	Flexible Callback Queue
62	OHQ	Off-Hook Queuing
63	NAUT	Network Authorization Code
64	SNR	Stored Number Redial
65	TDET	Tone Detector
66	SCC	Special Common Carrier
67	NXFR	Network Transfer
68	ATVN	Autovon
69	ACDR	Autovon CDR
70	HOT	Hotline
71	DHLD	Deluxe Hold
72	LSEL	Line Selection
73	SS5	500 Set Dial Access
74	DRNG	Distinctive Ringing
75	PBXI	PBX Interface/Digital Trunk Interface
76	DLDN	Departmental LDN
77	CSL	Command Status Link
79	OOD	Optional Outpulsing Delay
80	SCI	Station Category Indication
81	CCOS	Controlled Class of Service
82	RESDB	Resident Debug
83	CDRQREC	CDR Queue Record
84	ATM	Automatic Trunk Maintenance
85	CSLA	Command and Status Link A
86	TENTANT	Multi-Tenant Service
87	FTDS	Fast Tone Digit Switch
88	DSET	Digital Set
89	TSET	M3000
90	LNR	Last Number Redial
91	DELTA 2	Digital Set
92	PRETRAN	Pretranslation
93	SUPV	Supervisory Console
95	CPND	Call Party Name Display
96	SLST	Meridian SL-1ST
98	DNIS	Dialed Number ID Service
99	BGD	Background Terminal
100	RMS	Room Status
101	MR	Message Registration
102	AWU	Automatic Wake-up
103	PMSI	Property Management Interface
105	LLC	Line Load Control
106	SLP	Station Loop Pre-emption
107	MCT	Malicious Call Trace
108	ICDR	Internal CDR
109	APL	Auxiliary Processor Link
110	TVS	Trunk Verification from Station
111	TOF	Timed Overflow

TABLE 9-4: GENERIX Xl 1 OPTIONAL FEATURE GROUPS

#	DESCRIPTION	
113	IDC	Incoming DID Digit Conversion
114	ACD-D	AUX Security
115	DCP	Direct Call Pickup
116	ACD	Priority Agent
117	CBC	Call by Call Service
118	CLID	Calling Line Identification in CDR
119	EMUS	Enhanced Music
145	ISDN	Signaling
146	PRA	Primary Rate Access
147	ISL	ISNN Signaling Link
148	IAF	ISDN Advanced Features
149	IEC	Inter Exchange Carrier

#	DESCRIPTION

TABLE 9-4: CONTINUED

PKG NO.	PKG NAME	PKG DESCRIPTION	PURPOSE	CODE	MODEL	GENERIC
0	BASIC	BASIC FEATURES	BASIC PBX FEATURES TRANSFER, RELEASE, CONFERENCE, CALL PICK-UP, SPECIAL DIAL TONE, HUNTING,SECRECY,TAFAS, SPECIAL FUNCTION PREFIX, ETC	545SL1-1 580SL1-1 S1011000 740SL1-1 740SL1-1 740SL1-1 745SL1-1 745SL1-1	S MS ST N NT RT XN XT	711 711 1011 811 1111 1311 911 1211
1	OPTF	ADVANCED FEATURES	PROVIDES: AUTODIAL, CALL FORWARD, OVERRIDE, SPEED CALL, RING-AGAIN, VOICE CALL TO SL-1 TELEPHONE & ATTENDANT CONSOLE	546SL1-1 550SL1-1 S1011001 602SL1-1 602SL1-1 602SL1-1 605SL1-1 605SL1-1	S MS ST N NT RT XN XT	711 711 1011 811 1111 1311 911 1211
2	MULTI	MULTI-CUSTOMER	PROVIDES: CAPABILITY TO SERVE 32 INDEPENDENT CUSTOMERS FROM THE SAME MERIDIAN SL-1	551SL1-1 551SL1-1 600SL1-1 600SL1-1 600SL1-1 604SL1-1 604SL1-1	S, MS ST NT NT RT XN XT	711 1011 811 1111 1311 911 1211
3	AIOD	AUTOMATIC IDENTIFICA-TION OF OUTGOING DIALING	USES QPC162 DATA LINK TO PROVIDE BILLING INFORMATION TO CENTRAL OFFICE FOR ORIGINATING CALLS OVER OUTGOING FACILITIES	DESIGNED TO INTERFACE TO AUXILIARY WE118A INTERFACE THAT IS NO LONGER MANUFACTURED OR SUPPORTED		
4	CDR	CALL DETAIL RECORDING	PROVIDES THE CAPABILITY TO RECORD INFORMATION ABOUT SELECTED CALLS FOR ACCOUNTING PURPOSES; REQUIRES SDI PORT	PART OF CDR PACKAGE ORDERED WITH OPTIONS 5 AND/OR 6, OR 30 OR 31. CANNOT BE ORDERED AS A STAND-ALONE FEATURE		

TABLE 9-5: MERIDIAN SL-1 SOFTWARE PROVISIONING

PKG NO.	PKG NAME	PKG DESCRIPTION	PURPOSE	CODE	MODEL	GENERIC
4 5	CTY	CALL DETAIL RECORDING TTY	ENABLES THE CDR INFORMATION TO BE OUTPUTTED IN ASCII SERIAL FORMAT SUITABLE FOR TELETYPE OR EQUIV-ALENT RS232C DEVICE; REQUIRES SDI PORT	432SL1-1 432SL1-1 552SL1-1 624SL1-1 624SL1-1 624SL1-1 625SL1-1 625SL1-1	S ST MS N NT RT XN XT	711 1011 711 811 1111 1311 911 1211
4 6	CDL LINK	CALL DETAIL RECORDING LINK	PROVIDES CDR INFOR-MATION OUTPUT IN BINARY ON MAGNETIC TAPE FOR DOWNSTREAM PROCESS. REQUIRES QCA11 CDR CABINET AND ASSOCIATED HARDWARE	553SL1-1 553SL1-1 607SL1-1 607SL1-1 607SL1-1 608SL1-1 608SL1-1	S, MS ST N NT RT XN XT	711 1011 811 1111 1311 911 1211
4 5 6		CDR COMBINED LIST & LINK	COMBINES CDR LIST AND MAG TAPE; REQUIRES SDI PORT	554SL1-1 554SL1-1 626SL1-1 626SL1-1 626SL1-1 627SL1-1 627SL1-1	S, MS ST N NT RT XN XT	711 1011 811 1111 1311 911 1211
4 30	ESN	COMM MGMT ADMIN CHANNEL	PROVIDES ESN NETWORK CDR DATA COLLECTION, TRAFFIC, AND REPORT CAPABILITY	944SL1-1 942SL1-1 942SL1-1 942SL1-1 943SL1-1 943SL1-1	MS N NT RT XN XT	711 811 1111 1311 911 1211
4 5 30	ESN	CDR LINK & COMMUNICA-TION MANAGE-MENTADMIN. CHANNEL	PROVIDES ESN NETWORK CDR DATA COLLECTION AND REPORT, IN ASCII SERIAL FORMAT; REQUIRES SDI PORT	461SL1-1 461SL1-1 964SL1-1 970SL1-1 970SL1-1 970SL1-1 975SL1-1 975SL1-1	S ST MS N NT RT XN XT	711 1011 711 811 1111 1311 911 1211

TABLE 9-5: CONTINUED

PKG NO.	PKG NAME	PKG DESCRIPTION	PURPOSE	CODE	MODEL	GENERIC
4 6 30	ESN	CDR LIST & LINK COMM MGMT ADMIN CHANNEL	PROVIDES ESN NETWORK CDR DATA COLLECTION AND REPORTS (LINE FORMAT)	462SL1-1 462SL1-1 965SL1-1 971SL1-1 971SL1-1 971SL1-1 976SL1-1 976SL1-1	S ST MS N NT RT XN XT	711 1011 711 811 1111 1311 911 1211
4 5 6 30	ESN	CDR LIST & LINK COMM MGMT ADMIN CHANNEL	COMBINES CDR LIST AND LINK ESN NETWORK CDR DATA COLLECTION INFOMATION; REQUIRES SDI PORT	463SL1-1 463SL1-1 966SL1-1 972SL1-1 972SL1-1 972SL1-1 977SL1-1 977SL1-1	S ST MS N NT RT XN XT	711 1011 711 811 1111 1311 911 1211
4 5 31		MINI CDR PLUS LIST	PROVIDES CDR WITH LIST FOR SMALL SYSTEMS. APPLICABLE TO MS ONLY. REQUIRES SDI PORT	452SL1-1	MS	711
4 5 30 31	ESN	CDR LIST & COMM MGMT ADMIN CHANNEL & MINI CDR	ESN NETWORK CDR COLLECTION FOR SMALL SYTEMS; APPLICABLE TO MS ONLY. REQUIRES SDI PORT	967SL1-1	MS	711
7	RAN	RECORDED ANNOUNCE-MENT	ALLOWS AUTOMATIC CONNECTION OF APPLICABLE CALLS TO RECORDED ANNOUNCEMENT MACHINE; REQUIRES QPC74 RAN ACCESS CARD	INCLUDED IN FEATURE PACKAGE I CANNOT BE ORDERED AS A STAND-ALONE OPTION		

TABLE 9-5: CONTINUED

PKG NO.	PKG NAME	PKG DESCRIPTION	PURPOSE	CODE	MODEL	GENERIC
8	TAD	TIME AND DATE	PROVIDES DIGITAL READ-OUT OF TIME AND DATE ON PROGRAMMED KEYS OF CONSOLE AND/OR DIGIT DISPLAY SL-1 TELEPHONE	INCLUDED IN FEATURE PACKAGE I CANNOT BE ORDERED AS A STAND-ALONE OPTION		
9	DNDI	DO NOT DISTURB INDIVIDUAL	ALLOWS ATTENDANT TO PLACE DN IN DO NOT DISTURB MODE; DN CAN STILL DIAL OUT	ORDERED WITH OPTION 16 DO NOT DISTURB GROUP, INCLUDED IN FEATURE PACKAGE II CANNOT BE ORDERED AS A STAND-ALONE OPTION		
10	EES	END-TO END SIGNALING	ENABLES STATION TO OUT PULSE DIGITS IN DTMF CODE SIGNALS OVER TRUNKS	INCLUDED IN FEATURE PACKAGE I CANNOT BE ORDERED AS A STAND-ALONE OPTION		
11	INTR	INTERCEPT	PROVIDES INTERCEPT TREATMENT TO CALLS THAT CANNOT BE COM-PLETED DUE TO DEFINED RESTRICTIONS OR DIALING ERRORS	INCLUDED IN FEATURE PACKAGE I CANNOT BE ORDERED AS A STAND-ALONE OPTION		
12	ANI	AUTOMATIC NUMBER IDENTIFI-CATION	AUTOMATICALLY IDENTI-FIES STATION ORIGINA-TING OUTGOING TOLL CALL AND DESTINATION PARTY; REQUIRES QPC189 MF SENDER	829SL1-1 829SL1-1 829SL1-1 611SL1-1 611SL1-1 611SL1-1 614SL1-1 614SL1-1	S MS ST N NT RT XN XT	711 711 1011 811 1111 1311 911 1211

TABLE 9-5: CONTINUED

PKG NO.	PKG NAME	PKG DESCRIPTION	PURPOSE	CODE	MODEL	GENERIC
13	ANIR	ANI WITH AUTOMATIC ROUTE SELECTION	USED TO ROUTE TOLL CALLS AUTOMATICALLY OVER SPECIFIED TRUNKS; REQUIRES ANI PACKAGE AND QPC189 MF SENDER	838SL1-1	S	711
				838SL1-1	MS	711
				838SL1-1	ST	1011
				630SL1-1	N	811
				630SL1-1	NT	1111
				630SL1-1	RT	1311
				631SL1-1	XN	911
				631SL1-1	XT	1211
15	RPE	REMOTE PERIPHERAL EQUIPMENT	ALLOWS RANGE OF MULTI-PLEX LOOP BETWEEN COMMON AND PERIPHERAL EQUIPMENT TO BE EXTENDED BEYOND 50 FT. LOCAL LIMIT. REQUIRES T1 TYPE MEDIUM	830SL1-1	S	711
				830SL1-1	MS	711
					ST	1011
				606SL1-1	N	811
				606SL1-1	NT	1111
				606SL1-1	RT	1311
				615SL1-1	XN	911
				615SL1-1	XT	1211
9 16	DNDG	DO NOT DISTURB GROUP	ALLOWS ATTENDANT TO PLACE PREDETERMINED GROUP IN DO NOT DISTURB MODE. UP TO 100 GROUPS, EACH GROUP UP TO 127 DNs NO PRIVATE LINES	827SL1-1	S	711
				827SL1-1	MS	711
				827SL1-1	ST	1011
				628SL1-1	N	811
				628SL1-1	NT	1111
				628SL1-1	RT	1311
				629SL1-1	XN	911
				629SL1-1	XT	1211
17	MSB	MAKE SET BUSY	ALLOWS SL-1 SET USER TO MAKE THE SET APPEAR TO BE BUSY TO INCOMING CALL. CAN ORIGINATE OUTGOING CALLS	INCLUDED IN FEATURE PACKAGE I CANNOT BE ORDERED AS A STAND-ALONE OPTION		
18	SS25	2500 SET FEATURES	PROVIDES: CALL FORWARD (ALL CALLS), SPEED CALL, PERMANENT HOLD	547SL1-1	S	711
				547SL1-1	ST	1011
				656SL1-1	MS	711
				683SL1-1	N	811
				683SL1-1	NT	1111
				683SL1-1	RT	1311
				657SL1-1	XN	911
				657SL1-1	XT	1211

TABLE 9-5: CONTINUED

PKG NO.	PKG NAME	PKG DESCRIPTION	PURPOSE	CODE	MODEL	GENERIC
19	DDSP	DIGIT DISPLAY (SL-1 SETS)	PROVIDES DISPLAY OF INFORMATION RELEVANT TO CALL PROCESSING AND FEATURE ACTIVATION ON SL- 1 DIGIT DISPLAY SETS; NEEDS 24V AC TRANSFORMER OR CENTRAL POWER	INCLUDED IN FEATURE PACKAGE I CANNOT BE ORDERED AS A STAND-ALONE OPTION		
20	ODAS	OFFICE DATA ADMINISTRATION SYSTEM	PROVIDES METHOD OF RETRIEVING INFORMATION STORED IN SYSTEM MEMORY: INCLUDES DNs, TNs, FEATURE ASSIGNMENT, HUNT DN, DESIGNATOR	674SL1-1	S	711
				674SL1-1	MS	711
				674SL1-1	ST	1011
				675SL1-1	N	811
				675SL1-1	NT	1111
				675SL1-1	RT	1311
				678SL1-1	XN	911
				678SL1-1	XT	1211
21	DI	DIAL INTERCOM GROUP	ALLOWS CUSTOMER TO ARRANGE STATIONS WITHIN SL- 1 NETWORK INTO SEPARATE DIAL INTERCOM GROUPS (225 GROUPS PER CUSTOMER 100 STATIONS PER GROUP)	832SL1-1	S	711
				832SL1-1	MS	711
				832SL1-1	ST	1011
				652SL1-1	N	811
				652SL1-1	NT	1111
				652SL1-1	RT	1311
				653SL1-1	XN	911
				653SL1-1	XT	1211
22	DISA	DIRECT INWARD SYSTEM ACCESS	ALLOWS DIGITONE TELEPHONE USERS TO ACCESS SL- 1 FROM PUBLIC NETWORK, CONNECT TO STATION OR TRUNKS, SECURE PASSWORD/CODE FOR ACCESS	433SL1-1	S	711
				433SL1-1	ST	1011
				556SL1-1	MS	711
				654SL1-1	N	811
				654SL1-1	NT	1111
				654SL1-1	RT	1311
				655SL1-1	XN	911
				655SL1-1	XT	1211
23	CHG	CDR CHARGE ACCOUNT	USED WITH CDR TO ALLOW DIRECT BILL OF CALLS TO SPECIFIED ACCOUNTS OR CHARGE NUMBERS RATHER THAN DNs	INCLUDED IN FEATURE PACKAGE I CANNOT BE ORDERED AS A STAND-ALONE OPTION		

TABLE 9-5: CONTINUED

PKG NO.	PKG NAME	PKG DESCRIPTION	PURPOSE	CODE	MODEL	GENERIC
23 24	CAB	BASE PKG FOR CHARGE AUTHORI-ZATION CODE	USED WITH CDR TO ALLOW DIRECT BILL OF CALLS TO SPECIFIED ACCOUNTS OR CHARGE NUMBERS RATHER THAN DNs	833SL1-1 833SL1-1 833SL1-1 666SL1-1 666SL1-1 666SL1-1 667SL1-1 667SL1-1	S MS ST N NT RT XN XT	711 711 1011 811 1111 1311 911 1211
24 25	AUTH	AUTHORI-ZATION CODE	ALLOWS SELECTED USERS TO OVERRIDE ACCESS RESTRICTION ASSIGNED TO TRUNK OR STATION BY DIALING THE AUTHORI-ZATION CODE	557SL1-1 557SL1-1 557SL1-1 650SL1-1 650SL1-1 650SL1-1 651SL1-1 651SL1-1	S MS ST N NT RT XN XT	711 711 1011 811 1111 1311 911 1211
26	CASM	CENTRALIZED ATTENDANT SERVICE - MAIN	ALLOWS CUSTOMERS WITH MULTIPLE LOCATIONS TO CENTRALIZE THEIR ATTENDANT SERVICES AT A SINGLE LOCATION; REQUIRES RLT INTERFACE	834SL1-1 834SL1-1 834SL1-1 660SL1-1 660SL1-1 660SL1-1 661SL1-1 661SL1-1	S MS ST N NT RT XN XT	711 711 1011 811 1111 1311 911 1211
27	CASR	CENTRALIZED ATTENDANT SERVICE - REMOTE	ALLOWS REMOTE LOCATION ATTENDANT TO CENTRALIZED ATTENDANT SERVICES; REQUIRES RLT INTERFACE	835SL1-1 835SL1-1 835SL1-1. 662SL1-1 662SL1-1 662SL1-1 663SL1-1 663SL1-1	S MS ST N NT RT XN XT	711 711 1011 811 1111 1311 911 1211
28	BQUE (ARSQ)	BASIC QUEUING (ARS QUEUING)	ALLOWS CALLING PARTY TO WAIT IN QUEUE UNTIL BUSY FACILITY BECOMES FREE	PART OF BASIC BARS/ NARS/ CDP PACKAGES CANNOT BE ORDERED AS A STAND-ALONE OPTION		

TABLE 9-5: CONTINUED

PKG NO.	PKG NAME	PKG DESCRIPTION	PURPOSE	CODE	MODEL	GENERIC
4 31	MINI CDR MCDR	MINI CALL DETAIL RECORDING	ALLOWS CDR FOR SMALLER SYSTEMS. ADDITIONAL TAPE UNIT IS INSTALLED FOR CDR COLLECTION. APPLICABLE TO MS ONLY	586SL1-1	MS	711
4, 5 31				452SL1-1	MS	711
32	NCOS	NETWORK CLASS OF SERVICE	CONTROLS ACCESS TO NETWORK FACILITIES, QUEUING ELIGIBILITY AND USER ELIGIBILITY TO RECEIVE ERWT & ACCESS SPEED CALL	PART OF BARS / NARS PACKAGES CANNOT BE ORDERED AS A STAND-ALONE OPTION		
33	PARK (CPARK)	CALL PARK	ALLOWS ATTENDANT OR STATION SET TO PLACE EXISTING CALL IN PARKED STATE FOR LATER RETRIEVAL BY ANY CONSOLE OR SET; UP TO 50 PARK DNs	430SL1-1 430SL1-1 440SL1-1	S ST MS	711 1011 711
				441SL1-1 441SL1-1 441SL1-1	N NT RT	811 1111 1311
				442SL1-1 442SL1-1	XN XT	911 1211
43	SSC	SYSTEM SPEED CALL	PROVIDES ABBREVIATED DIALING AND ALLOWS USER TO OVERRIDE CLASS OF SERVICE AND ACCESS RESTRICTION FOR CALLS USING SSC	431SL1-1 431SL1-1 431SL1-1	S ST MS	711 1011 711
				444SL1-1 444SL1-1 444SL1-1	N NT RT	811 1111 1311
				445SL1-1 445SL1-1	XN XT	911 1211
35	IMS	INTEGRATED MESSAGE SYSTEM	ALLOWS ELECTRONIC MESSAGING WHEN NT 585 AUXILIARY PROCESSOR IS CONNECTED. REQUIRES FULL-DUPLEX ASYNCH EIA RS232C DATA LINK; REQUIRES MWC AND ACD-A PACKAGE	350SL1-1 350SL1-1	S MS	711 711
				351SL1-1 351SL1-1 351SL1-1	N NT RT	811 1111 1311
				352SL1-1 352SL1-1	XN XT	911 1211

TABLE 9-5: CONTINUED

PKG NO.	PKG NAME	PKG DESCRIPTION	PURPOSE	CODE	MODEL	GENERIC
36	ROA	RECORDED OVERFLOW ANNOUNCE-MENT	ALLOWS FOR DELAYED CALLS TO ATTENDANT TO BE ROUTED TO A MESSAGE RECORDING DEVICE. REQUIRES QPC74 RAN ACCESS CARD	446SL1-1 446SL1-1 446SL1-1 447SL1-1 447SL1-1 447SL1-1 448SL1-1 448SL1-1	S ST MS N NT RT XN XT	711 1011 711 811 1111 1311 911 1211
32 37	ESN (NSIG)	NETWORK CONTROL SIGNALING	ALLOWS IMPLEMENTATION OF CERTAIN ESN FEATURES (CCBQ AND NCOS) WHERE SPECIAL SIGNALING IS REQUIRED BETWEEN ESN NODE AND ESN MAIN	467SL1-1 467SL1-1 958SL1-1 956SL1-1 956SL1-1 956SL1-1 957SL1-1 957SL1-1	S ST MS N NT RT XN XT	711 1011 711 811 1111 1311 911 1211
38	ESN (MCBQ)	NETWORK QUEUING - MAIN	ALLOWS ESN USER TO QUEUE FOR A BUSY FACILITY TO BECOME AVAILABLE, EITHER IN THE ON-HOOK OR OFF-HOOK STATE	468SL1-1 468SL1-1 955SL1-1 953SL1-1 953SL1-1 953SL1-1 954SL1-1 954SL1-1	S ST MS N NT RT XN XT	711 1011 711 811 1111 1311 911 1211
39	ESN (NSC)	NETWORK SPEED CALL	ALLOWS NETWORK CALLER TO OVERRIDE NCOS RESTRICTIONS AT A STATION BY ACCESSING NETWORK SPEED CALL LISTS	469SL1-1 469SL1-1 952SL1-1 950SL1-1 950SL1-1 950SL1-1 951SL1-1 951SL1-1	S ST MS N NT RT XN XT	711 1011 711 811 1111 1311 911 1211
40	BACD	BASIC AUTOMATIC CALL DISTRIBUTION	PROVIDES FOR EQUAL DISTRIBUTION OF INCOMING CALLS AMONG A NUMBER OF ANSWERING POSITIONS (AGENTS)	ORDER WITH MESSAGE CENTER, ACD PACKAGES, OR FEATURE PACKAGE I CANNOT BE ORDERED AS A STAND-ALONE OPTION		

TABLE 9-5: CONTINUED

PKG NO.	PKG NAME	PKG DESCRIPTION	PURPOSE	CODE	MODEL	GENERIC
7 17 40 45	ACDA	AUTOMATIC CALL DISTRIBUTION PACKAGE A	DESIGNED TO REPLACE CALL SEQUENCERS FOR SMALL GROUPS WITH BASIC QUEUING, DELAY ANNOUNCEMENT AND SUPERVISORY BASIC FEATURES.	436SL1-1 436SL1-1 559SL1-1 658SL1-1 658SL1-1 658SL1-1 659SL1-1 659SL1-1	S ST MS N NT RT XN XT	711 1011 711 811 1111 1311 911 1211
7 17 40 41 44 45	ACDB	AUTOMATIC CALL DISTRIBUTION PACKAGE B	INCLUDES ACD-A PACKAGE PLUS ADDITIONAL SUPER-VISORY FEATURES, QUEUING, OVERFLOW, CALL PROCESSING FEATURES. ADVANCED FEATURES.	437SL1-1 437SL1-1 534SL1-1 670SL1-1 670SL1-1 670SL1-1 671SL1-1 671SL1-1	S ST MS N NT RT XN XT	711 1011 711 811 1111 1311 911 1211
7 17 40 41 42 44 45	ACDC	AUTOMATIC CALL DISTRIBUTION PACKAGE Cl	INCLUDES ACD-B PACKAGE PLUS CAPABILITY FOR SUPERVISOR TO RECEIVE CRT DISPLAY & REPORTS ABOUT QUEUE, AGENT, AND TRUNKS. MANAGEMENT REPORTS.	438SL1-1 438SL1-1 535SL1-1 680SL1-1 680SL1-1 680SL1-1 681SL1-1 681SL1-1	S ST MS N NT RT XN XT	711 1011 711 811 1111 1311 911 1211
7 17 40 41 42 43 44 45	LMAN	AUTOMATIC CALL DISTRIBUTION PACKAGE C2, LOAD MANAGEMENT	INCLUDES ACD-Cl PLUS CAPABILITY FOR SUPERVISOR TO QUERY, SET, OR CHANGE THRESHOLDS, PARAMETERS. LOAD MANAGEMENT.	439SL1-1 439SL1-1 536SL1-1 687SL1-1 687SL1-1 687SL1-1 688SL1-1 688SL1-1	S ST MS N NT RT XN XT	711 1011 711 811 1111 1311 911 1211
7 17, 19 40, 41 42, 43 44, 45 50, 51	ACDD	AUTOMATIC CALL DISTRIBUTION PACKAGE D	INCLUDES ACD-C2 PLUS BASIC ACD-D APPLICATION SOFTWARE FOR SOPHISTI-CATED REPORTING AND LOAD MANAGEMENT FEATURES.	495SL1-1 495SL1-1 498SL1-1 498SL1-1 498SL1-1 499SL1-1 499SL1-1	MS ST N NT RT XN XT	711 1011 811 1111 1311 911 1211

TABLE 9-5: CONTINUED

PKG NO.	PKG NAME	PKG DESCRIPTION	PURPOSE	CODE	MODEL	GENERIC
44	MUS	MUSIC ON HOLD	PROVIDES MUSIC TO CALLER WHEN CALL IS PLACED IN HOLD MODE. REQUIRES QPC74 RAN ACCESS TO MUSIC SOURCE	537SL1-1 537SL1-1 537SL1-1 672SL1-1 672SL1-1 672SL1-1 673SL1-1 673SL1-1	S MS ST N NT RT XN XT	711 711 1011 811 1111 1311 911 1211
46	MWC	BASIC MESSAGE WAITING CENTER	ALLOWS INCOMING CALL TO BE ROUTED TO A MESSAGE CENTER CONSOLE OR SL-1 TELEPHONE ID NOT ANSWERED AT ORIGINAL DESTINATION	538SL1-1 538SL1-1 538SL1-1 532SL1-1 532SL1-1 532SL1-1 533SL1-1 533SL1-1	S MS ST N NT RT XN XT	711 711 1011 811 1111 1311 911 1211
40 46	MC	MESSAGE CENTER	ALLOWS INCOMING CALL TO BE ROUTED TO MESSAGE CENTER CONSOLE OR BACKUP SL-1 SET IF NOT ANSWERED AT ORIGINAL DESTINATION. QUEUING CAPABILITY.	836SL1-1 836SL1-1 690SL1-1 690SL1-1 690SL1-1 691SL1-1 691SL1-1	MS ST N NT RT XN XT	711 1011 811 1111 1311 911 1211
47	AAB	AUTOMATIC ANSWER BACK	ALLOWS INCOMING CALL TO SINGLE PRIME DIRECTORY NUMBER ON SL-1 SET TO BE ANSWERED AUTOMATICALLY AFTER ONE RING	632SL1-1 632SL1-1 632SL1-1 644SL1-1 644SL1-1 644SL1-1 676SL1-1 676SL1-1	S MS ST N NT RT XN XT	711 711 1011 811 1111 1311 911 1211
48	GRP	GROUP CALL	ALLOWS SL-1 SET USER TO ESTABLISH AUTOMATIC CONFERENCE CALL BETWEEN DESIGNATED GROUP OF STATIONS. UP TO 64 GROUPS; 10 STATIONS PER GROUP	633SL1-1 633SL1-1 633SL1-1 645SL1-1 645SL1-1 645SL1-1 677SL1-1 677SL1-1	S MS ST N NT RT XN XT	711 711 1011 811 1111 1311 911 1211

TABLE 9-5: CONTINUED

PKG NO.	PKG NAME	PKG DESCRIPTION	PURPOSE	CODE	MODEL	GENERIC
32 49	NFCR	NEW FLEXIBLE CODE RESTRICTION PACKAGE	ALLOWS ADDITIONAL LEVELS OF CONTROL OF USER ACCESS TO TRUNK ROUTES. REQUIRES NCOS PACKAGE	449SL1-1 449SL1-1 449SL1-1 450SL1-1 450SL1-1 450SL1-1 451SL1-1 451SL1-1	S MS ST N NT RT XN XT	711 711 1011 811 1111 1311 911 1211
51	AUX-LINK	ACD PACKAGE D AUXILIARY LINK PROCESSOR	INCLUDED IN ACD-D PKG. PROVIDES LINK TO AUXILIARY PDP 11 PROCESSOR.	ORDERED WITH ACD-D PKG CANNOT BE ORDERED A STAND-ALONE OPTION		
52	FCA	FORCED CHARGE ACCOUNT (REQUIRES ALSO CDR & CDR CHARGE ACCOUNT OPTIONS)	ALLOWS TLD USERS TO TEMPORARILY OVERRIDE CLASS OF SERVICE BY ENTERING A CODE BEFORE PLACING A TOLL CALL	539SL1-1 539SL1-1 539SL1-1 693SL1-1 693SL1-1 693SL1-1 694SL1-1 694SL1-1	S MS ST N NT RT XN XT	711 711 1011 811 1111 1311 911 1211
53	SR	AUTOMATIC SET RELOCATION	ALLOWS 2500/500/SL-1 SET USERS TO MOVE SET TO ANOTHER LOCATION BY DIALING ACCESS CODE. REQUIRES VACANT PORT ON ASSOCIATED LINE CARD	587SL1-1 587SL1-1 587SL1-1 588SL1-1 588SL1-1 588SL1-1 589SL1-1 589SL1-1	S MS ST N NT RT XN XT	711 711 1011 811 1111 1311 911 1211
54	ATTADM AA	ATTENDANT ADMINISTRA-TION	ALLOWS LIMITED SERVICE CHANGE ACTIVITY TO 2500/500/SL-1 SET DNs AND MOST FEATURES FROM ATTEN-DANT CONSOLE. CANNOT ADD OR MOVE SETS.	590SL1-1 590SL1-1 590SL1-1 591SL1-1 591SL1-1 591SL1-1 592SL1-1 592SL1-1	S MS ST N NT RT XN XT	711 711 1011 811 1111 1311 911 1211

TABLE 9-5: CONTINUED

PKG NO.	PKG NAME	PKG DESCRIPTION	PURPOSE	CODE	MODEL	GENERIC
55	I-LIST	HISTORY FILE	ALLOWS USER TO ALLOCATE AREA OF PROTECTED DATA STORE FOR SYSTEM MESSAGES: TRAFFIC, MAINTENANCE, SERVICE, S/W ERROR AND INITIALIZE	837SL1-1	S	711
				837SL1-1	MS	711
				837SL1-1	ST	1011
				593SL1-1	N	811
				593SL1-1	NT	1111
				593SL1-1	XN	911
				593SL1-1	XT	1211
56	AOP	ATTENDANT OVERFLOW POSITION	ALLOWS CALLS TO BE RE-ROUTED TO A SPECIFIED DN WHEN CONSOLE IS IN POSITION BUSY OR HAS EXCEEDED THE CALL WAITING THRESHOLD	594SL1-1	S	711
				594SL1-1	MS	711
				594SL1-1	ST	1011
				595SL1-1	N	811
				595SL1-1	NT	1111
				595SL1-1	RT	1311
				596SL1-1	XN	911
				596SL1-1	XT	1211
14 28 32 57 61	BARS	BASIC AUTOMATIC ROUTE SELECTION	ALLOWS OUTGOING CALL TO BE AUTOMATICALLY COMPLETED BY THE LEAST EXPENSIVE ROUTE AVAILABLE	434SL1-1	S	711
				434SL1-1	ST	1011
				597SL1-1	MS	711
				526SL1-1	N	811
				526SL1-1	NT	1111
				526SL1-1	RT	1311
				527SL1-1	XN	911
				527SL1-1	XT	1211
14 28 32 58 61	**NARS**	NETWORK AUTOMATIC ROUTE SELECTION	ESN FEATURE TO ALLOW CALLS TO BE AUTOMATICALLY COMPLETED BY THE MOST EFFICIENT ROUTE ACROSS THE NETWORK	465SL1-1	S	711
				465SL1-1	ST	1011
				932SL1-1	MS	711
				930SL1-1	N	811
				930SL1-1	NT	1111
				930SL1-1	RT	1311
				931SL1-1	XN	911
				931SL1-1	XT	1211
14 28 32 59 61	CDP	COORDINATED DIALING PLAN	ESN FEATURE ALLOWS CUSTOMER WITH AT LEAST ONE ESN NODE OR MAIN TO COORDINATE THE DIALING PLAN AMONG STATIONS AT THESE SWITCHES	466SL1-1	S	711
				466SL1-1	ST	1011
				935SL1-1	MS	711
				933SL1-1	N	811
				933SL1-1	NT	1111
				933SL1-1	RT	1311
				934SL1-1	XN	911
				934SL1-1	XT	1211

TABLE 9-5: CONTINUED

PKG NO.	PKG NAME	PKG DESCRIPTION	PURPOSE	CODE	MODEL	GENERIC
29 32 60	PQUE	PRIORITY QUEUING	ALLOWS SELECTED SETS/ USERS TO HAVE PRIORITY CALL-BACK WHEN PLACED IN QUEUE FOR AVAILABLE FACILITY	598SL1-1 598SL1-1 598SL1-1 528SL1-1 528SL1-1 528SL1-1 529SL1-1 529SL1-1	S MS ST N NT RT XN XT	711 711 1011 811 1111 1311 911 1211
61	FCBQ	FLEXIBLE CALL BACK QUEUING	ON BARS CALLS, ALLOWS CALLING PARTY TO HANG-UP AFTER ACTIVATING RING-AGAIN AND TO RECEIVE NOTIFI-CATION OF FACILITY AVAILABILITY	PART OF BARS/NARS/CDP PACKAGES CANNOT BE ORDERED AS A STAND-ALONE OPTION		
28 62	OHQ	OFF HOOK QUEUING	ON BARS/NARS CALLS, ALLOWS CALLING PARTY TO WAIT OFF-HOOK FOR AVAILABLE FACILITY. REQUIRES BARS OR NARS PACKAGE	464SL1-1 464SL1-1 938SL1-1 936SL1-1 936SL1-1 936SL1-1 937SL1-1 937SL1-1	S ST MS N NT RT XN XT	711 1011 711 811 1111 1311 911 1211
24 25 63	NAUT	NETWORK AUTHORI-ZATION CODE	ALLOWS SELECTED ESN USERS TO OVERRIDE ACCESS RESTRICTIONS TO A STATION OR TRUNK BY ENTERING AN AUTHORI-ZATION CODE. REQUIRES BARS/NARS/CDP	460SL1-1 460SL1-1 941SL1-1 939SL1-1 939SL1-1 939SL1-1 940SL1-1 940SL1-1	S ST MS N NT RT XN XT	711 1011 711 811 1111 1311 911 1211
64	SNR	STORED NUMBER REDIAL	PERMITS USERS WITH FEATURE KEY (OR CODE 500/2500) TO STORE A DIALED NUMBER FOR FUTURE USE (IE. LINE BUSY)	506SL1-1 506SL1-1 506SL1-1 507SL1-1 507SL1-1 507SL1-1 508SL1-1 508SL1-1	S MS ST N NT RT XN XT	711 711 1011 811 1111 1311 911 1211

TABLE 9-5: CONTINUED

PKG NO.	PKG NAME	PKG DESCRIPTION	PURPOSE	CODE	MODEL	GENERIC
67	ESN (NXFR)	NETWORK CALL TRANSFER	ALLOWS TRANSFER OF CALL TO THIRD PARTY, CAN TRANSFER BACK TO SWITCH IT CAME FROM WITHOUT USING TIE TRUNK AFTER TRANSFER IS COMPLETE	470SL1-1 470SL1-1 969SL1-1 974SL1-1 974SL1-1 974SL1-1 979SL1-1 979SL1-1	S ST MS N NT RT XN XT	711 1011 711 811 1111 1311 911 1211
32 68	ATVN	AUTOVON INTERFACE	MILITARY NETWORK ACCESS. SPECIAL TRUNK SIGNALING AND DIALING CONVENTIONS TO ALLOW PRECEDENCE CALLING AND CALL PRE-EMPTION	760SL1-1 760SL1-1 760SL1-1 761SL1-1 761SL1-1 761SL1-1 762SL1-1 762SL1-1	S MS ST N NT RT XN XT	711 711 1011 811 1111 1311 911 1211
69	ATVN-CDR	AUTOVON CALL DETAIL RECORDING	ENABLES A NEW FIELD TO APPEAR ON CDR RECORDS, AND A DIGIT DESCRIBING THE LEVEL IS APPENDED REQUIRES PACKAGE 4, 5, 32, 68 -ATVN	763SL1-1 763SL1-1 763SL1-1 764SL1-1 764SL1-1 764SL1-1 765SL1-1 765SL1-1	S MS ST N NT RT XN XT	711 711 1011 811 1111 1311 911 1211
70 70 34	HOT EHOT	FLEXIBLE HOTLINE ENHANCED HOTLINE	PROVIDES CAPABILITY TO ASSIGN ANY INTERNAL OR EXTERNAL DN TO BE RUNG ON MANUAL LINE SET (500/2500) AS ABOVE FOR SL-1, M2000, & M3000 SETS (X11 RELEASE 10)	766SL1-1 766SL1-1 766SL1-1 767SL1-1 767SL1-1 767SL1-1 768SL1-1 768SL1-1	S MS ST N NT RT XN XT	711 711 1011 811 1111 1311 911 1211
71	DXHD	DELUXE HOLD	IN MULTIPLE APPEARANCE DNs WITH CALL ON HOLD, VISUAL INDICATION AT HELD SET, EXCLUSIVE TO SET PLACING CALL ON HOLD	769SL1-1 769SL1-1 769SL1-1 770SL1-1 770SL1-1 770SL1-1 771SL1-1 771SL1-1	S MS ST N NT RT XN XT	711 711 1011 811 1111 1311 911 1211

TABLE 9-5: CONTINUED

PKG NO.	PKG NAME	PKG DESCRIPTION	PURPOSE	CODE	MODEL	GENERIC
72	LINE-SEL	AUTOMATIC LINE SELECTION	ALLOWS SL-1 SET USERS TO AUTOMATICALLY DETERMINE WHICH LINE IS SELECTED WHEN HAND-SET IS LIFTED. LINE PRE-FERENCE SPECIFIC ON PER SET BASIS	772SL1-1	S	711
				772SL1-1	MS	711
				772SL1-1	ST	1011
				773SL1-1	N	811
				773SL1-1	NT	1111
				773SL1-1	RT	1311
				774SL1-1	XN	911
				774SL1-1	XT	1211
73	SS500	500 SET FEATURES	PROVIDES: SPEED CALL, PERMANENT HOLD, CALL FORWARD. ON ROTARY DIAL SET REQUIRES OPTION 18 SPRE + ACCESS CODE	775SL1-1	S	711
				775SL1-1	MS	711
				775SL1-1	ST	1011
				776SL1-1	N	811
				776SL1-1	NT	1111
				776SL1-1	RT	1311
				777SL1-1	XN	911
				777SL1-1	XT	1211
74	DRING	DISTINCTIVE RING	SPECIFIED TRUNK ROUTES MAY BE ASSIGNED TO RING DISTICTIVELY AT STATIONS. REQUIRES QPC251 FLEXIBLE TONE & DIGIT SWITCH	435SL1-1	S	711
				435SL1-1	ST	1011
				778SL1-1	MS	711
				779SL1-1	N	811
				779SL1-1	NT	1111
				779SL1-1	RT	1311
				780SL1-1	XN	911
				780SL1-1	XT	1211
75	PBXI	DIGITAL TRUNK OR COMPUTER TO PBX INTERFACE	ALLOWS INTERFACE BETWEEN SL-1 DIGITAL NETWORK LOOP AND EXTERNAL DS- 1 DIGITAL CARRIER TERMINATION	305SL1-1	MS	711
				305SL1-1	ST	1011
				302SL1-1	N	811
				302SL1-1	NT	1111
				302SL1-1	RT	1311
				303SL1-1	XN	911
				303SL1-1	XT	1211
76	DLDN	DEPART-MENTAL LISTED DIRECTORY NUMBER	ALLOWS UP TO FOUR DEPARTMENTAL DNs WITHIN GROUP TO ALLOW DID CALLS TO BE DIRECTED TO SPECIFIC ATTENDANT	176SL1-1	S	711
				176SL1-1	MS	711
				176SL1-1	ST	1011
				177SL1-1	N	811
				177SL1-1	NT	1111
				177SL1-1	RT	1311
				178SL1-1	XN	911
				178SL1-1	XT	1211

TABLE 9-5: CONTINUED

PKG NO.	PKG NAME	PKG DESCRIPTION	PURPOSE	CODE	MODEL	GENERIC
80	SC1	STATION CATEGORY INDICATION	ALLOWS ATTENDANT TO SELECTIVELY ANSWER INTERNAL CALLS PER THEIR PRIORITY	416SL1-1 416SL1-1 416SL1-1 417SL1-1 417SL1-1 417SL1-1 418SL1-1 418SL1-1	S MS ST N NT RT XN XT	711 711 1011 811 1111 1311 911 1211
81	CCOS	CONTROLLED CLASS OF SERVICE	PERMITS STATION LEVEL OF ACCESS TO THE NETWORK TO BE CHANGED FROM ITS NORMAL ASSIGNMENT	413SL1-1 413SL1-1 413SL1-1 414SL1-1 414SL1-1 414SL1-1 415SL1-1 415SL1-1	S MS ST N NT RT XN XT	711 711 1011 811 1111 1311 911 1211
83	CDR-QREC	ACD/CDR QRECORD	PROVIDES INTEGRATED ACD/CDR CALL PROCESSING INTERFACE TO ESTABLISH CONNECTION RECORD. REQUIRES PACKAGE 4 PLUS ONE OF ACD PACKAGES.	196SL1-1 196SL1-1 196SL1-1 197SL1-1 197SL1-1 197SL1-1 198SL1-1 198SL1-1	S MS ST N NT RT XN XT	711 711 1011 811 1111 1311 911 1211
84 65	ATM	AUTOMATIC TRUNK MAINTENANCE	PROVIDES CAPABILITY TO PERIODICALLY TEST NETWORK FACILITIES. REQUIRES QPC422 TONE DETECTOR.	410SL1-1 410SL1-1 410SL1-1 411SL1-1 411SL1-1 411SL1-1 412SL1-1 412SL1-1	S MS ST N NT RT XN XT	711 711 1011 811 1111 1311 911 1211
86	TENS	MULTI-TENANT	PERMITS EXISTING 32 CUSTOMERS TO BE DIVIDED INTO 5 12 TENANTS. TENANT MAY OR MAY NOT SHARE ATTENDANT SERVICES. (X1 1 RELEASE 7)	132SL1-1 132SL1-1 132SL1-1 133SL1-1 133SL1-1 133SL1-1 134SL1-1 134SL1-1	S MS ST N NT RT XN XT	711 711 1011 811 1111 1311 911 1211

TABLE 9-5: CONTINUED

PKG NO.	PKG NAME	PKG DESCRIPTION	PURPOSE	CODE	MODEL	GENERIC
87	FTDS	FAST TDS	USES BUFFER MEMORY TO REDUCE CALL SETUP TIME. REQUIRES QPC609 FAST TDS CARD.	S7S11087	S	711
				S7S11087	MS	711
				S7S11087	ST	1011
				S8311087	N	811
				S8311087	NT	1111
				S8311087	RT	1311
				S9611087	XN	911
				S9611087	XT	1211
88	DSET	MERIDIAN DIGITAL TELEPHONES	PERMITS OPERATION OF M2000 SERIES DIGITAL TELEPHONES ON MERIDIAN SL- 1	105SL1-1	S	711
				105SL1-1	MS	711
				105SL1-1	ST	1011
				123SL1-1	N	811
				123SL1-1	NT	1111
				123SL1-1	RT	1311
				124SL1-1	XN	911
				124SL1-1	XT	1211
89	TSET	MERIDIAN M3000 TOUCHPHONE	PERMITS OPERATION OF M3000 TOUCHPHONE ON MERIDIAN SL- 1. (REQUIRES PACKAGE 88)	106SL1-1	S	711
				106SL1-1	MS	711
				106SL1-1	ST	1011
				125SL1-1	N	811
				125SL1-1	NT	1111
				125SL1-1	RT	1311
				126SL1-1	XN	911
				126SL1-1	XT	1211
90	LNR	LAST NUMBER REDIAL	PROVIDES CAPABILITY TO STORE AND ACCESS THE LAST NUMBER DIALED	471SL1-1	S	711
				471SL1-1	MS	711
				471SL1-1	ST	1011
				472SL1-1	N	811
				472SL1-1	NT	1111
				472SL1-1	RT	1311
				473SL1-1	XN	911
				473SL1-1	XT	1211
91	DELTA2	MERIDIAN DIGITAL DISPLAY TELEPHONE	PERMITS OPERATION OF M23 17 DIGITAL TELEPHONE ON MERIDIAN SL- 1 (REQUIRES PACKAGE 88)	S1011091	S	711
				S1011091	MT	711
				S1011091	ST	1011
				S1111091	N	811
				S1111091	NT	1171
				S1111091	RT	1311
				S1211091	XN	911
				S1211091	XT	1211

TABLE 9-5: CONTINUED

PKG NO.	PKG NAME	PKG DESCRIPTION	PURPOSE	CODE	MODEL	GENERIC
92	PRE-TRANS	PRETRANS-LATION	PROVIDES A FORM OF SCREENING OF CALLS BY MANIPULATING FIRST DIGIT DIALED	477SL1-1 477SL1-1 477SL1-1 478SL1-1 478SL1-1 478SL1-1 479SL1-1 479SL1-1	S MS ST N NT RT XN XT	711 711 1011 811 1111 1311 911 1211
93	SUPV	SUPERVISORY CONSOLE	ALLOWS ONE CONSOLE IN POSITION BUSY MODE TO FUNCTION IN A SUPERVI-SORY CAPACITY	474SL1-1 474SL1-1 474SL1-1 475SL1-1 475SL1-1 475SL1-1 476SL1-1 476SL1-1	S MS ST N NT RT XN XT	711 711 1011 811 1111 1311 911 1211
95 19 88 89 OR 91	CPND	CALL PARTY NAME DISPLAY	PROVIDES INTERNAL M2317 AND M3000 USERS WITH VISUAL INDICATION OF CALLING/CALLED PARTY DN PLUS ALPHA IDENTIFI-CATION FOR STATION AND TRUNKS	S0711095 S0711095 S1011095 S0811095 S1111095 S0911095 S1211095 S1311095	S MS ST N NT XN XT RT	711 711 1011 811 1111 911 1211 1311
96	SLST	MERIDIAN SL-1ST	REQUIRED FOR ALL APPLICATIONS OF MERIDIAN SL-1ST	N.A.	ST	1011
98	DNIS	DIALED NUMBER IDENTIFICATION SOURCE	SUPPORTS 800 SERVICE/ MEGACON FEATURE FROM A T & T WITH THE ABILITY TO DISPLAY THE LAST 3 OR 4 DIGITS OF THE DIALED NUMBER TO AN ACD AGENT	S0711098 S0711098 S1011098 S0811098 S1111098 S0911098 S1211098 S1311098	S MS ST N NT XN XT RT	711 711 1011 811 1111 811 1211 1311
99	BKG	BACKGROUND TERMINAL	PROVIDES HOTEL ADMINI-STRATION WITH THE CAPABILITY TO ENTER, RETRIEVE, OR MODIFY DATA ASSOCIATED WITH AUTOMATIC WAKEUP, ROOM STATUS, AND MESSAGE REGISTRATION	INCLUDED IN PKG 100, 101, 102, AND 103 ORDER CODES	S MS ST N NT XN XT	711 711 1011 811 1111 911 1211

TABLE 9-5: CONTINUED

PKG NO.	PKG NAME	PKG DESCRIPTION	PURPOSE	CODE	MODEL	GENERIC
100 81 99	RMS	ROOM STATUS	ALLOWS ADMINISTRATION PERSONNEL TO STORE AND RETRIEVE DATA PERTINENT TO THE OCCUPANCY AND CLEANING STATUS OF ASSOCIATED ROOM ACCOMMODATIONS	S0711100 SO71 1100 S 10 11100 SO811100 S1111100 S0911100 S1211100 S1311100	S MS ST N NT XN XT RT	711 711 1011 811 1111 911 1211 1311
101 81 99	MR	MESSAGE REGISTRATION	PROVIDES THE OPTION OF METERING COMPLETED LOCAL CALLS FOR BILLING AND/OR ADMINISTRATION PURPOSES	S0711101 S0711101 S1011101 SO811101 S1111101 S0911101 S1211101 S1311101	S MS ST N NT XN XT RT	711 711 1011 811 1111 911 1211 1311
102 81 99	AWU	AUTOMATIC WAKEUP	PROVIDES FLEXIBLY-DEFINED WAKEUP SERVICE VIA BACKGROUND TERMINAL FOR HOTEL ENVIRONMENT	SO711102 SO71 1102 S1011102 S0811102 S1111102 S0911102 S1211102 S1311102	S MS ST N NT XN XT RT	711 711 1011 811 1111 911 1211 1311
103 81 99 100	PMSI	PROPERTY MANAGEMENT SYSTEM INTERFACE	ALLOWS CUSTOMER-PROVIDED PMS TO INTER-FACE DIRECTLY TO A STANDARD RS 232-C SDI PORT IN THE MERIDIAN SL-1 FOR INFORMATION EXCHANGE	S0711103 S0711103 S1011103 S0811103 S1111103 S0911103 S1211103 S1311103	S MS ST N NT XN XT RT	711 711 1011 811 1111 911 1211 1311
105 68	LLC	LINE LOAD CONTROL	MANUALLY ACTIVATED ON A SYSTEM BASIS TO DENY A PERCENTAGE OF CALL ORIGINATIONS FROM PREVIOUSLY DEFINED STATIONS	S0711105 S0711105 S1011105 S0811105 S1111105 S0911105 S1211105 S1311105	S MS ST N NT XN XT RT	711 711 1011 811 1111 911 1211 1311

TABLE 9-5: CONTINUED

PKG NO.	PKG NAME	PKG DESCRIPTION	PURPOSE	CODE	MODEL	GENERIC
106 68	SLP	STATION LOOP PRE-EMPTION	ALLOWS INCOMING TRUNKS AND STATION-TO-STATION CALLS TO BE COMPLETED IN THE DEFENSE SWITCHED NETWORK (DSN) BY PRE-EMPTING A BUSY STATION OF LOWER PRECEDENCE	S0711106 S0711106 S1011106 S0811106 S1111106 S0911106 S1211106 S1311106	S MS ST N NT XN XT RT	711 711 1011 811 1111 911 1211 1311
107	MCT	MALICIOUS CALL TRACE	PERMITS SELECTED TELEPHONES OR ATTENDANT CONSOLES TO ACTIVATE A CALL TRACE PRINTED REPORT OF THE CALLING AND CALLED PARTIES INVOLVED IN A MALICIOUS CALL	S0711107 S0711107 S1011107 S0811107 S1111107 S0911107 S1211107 S1311107	S MS ST N NT XN XT RT	711 711 1011 811 1111 911 1211 1311
108 4	ICDR	STATION-TO-STATION CALL DETAIL RECORDING	ALLOWS CDR RECORDS TO BE GENERATED FOR INTERNAL STATION AND ATTENDANT CALLS	S0711108 S0711108 S1011108 S0811108 S1111108 S0911108 S1211108 S1311108	S MS ST N NT XN XT RT	711 711 1011 811 1111 911 1211 1311
109	APL	AUXILIARY PROCESSOR LINK	PROVIDES COMMUNICATIONS LINK TO CARRY ACD DNIS INFORMATION BETWEEN MERIDIAN SL-1 AND CUSTOMER-PROVIDED HOST COMPUTER	S0711109 S0711109 S1011109 SO811109 S1111109 S0911109 S1211109 S1311109	S MS ST N NT XN XT RT	711 711 1011 811 1111 911 1211 1311

TABLE 9-5: CONTINUED

PKG NO.	PKG NAME	PKG DESCRIPTION	PURPOSE	CODE	MODEL	GENERIC
7 8 10 17 19		FEATURE PACKAGE I	PROVIDES: RECORDED ANNOUNCEMENT, TIME AND DATE, END-TO-END SIGNALING, MAKE SET BUSY, DIGIT DISPLAY	548SL1-1 548SL1-1 730SL1-1 731SL1-1 731SL1-1 731SL1-1 732SL1-1 732SL1-1	S ST MS N NT RT XN XT	711 1011 711 811 1111 1311 911 1211
9 16 18 21 40 46 47 48		FEATURE PACKAGE II	PROVIDES: DO NOT DISTURB FOR GROUP & INDIVIDUAL, 2500 SET FEATURES, DIAL INTERCOM, MESSAGE CENTER, AUTO ANSWER BACK, GROUP CALL	735SL1-1 735SL1-1 735SL1-1 736SL1-1 736SL1-1 736SL1-1 737SL1-1 737SL1-1	S MS ST N NT RT XN XT	711 711 1011 811 1111 1311 911 1211
1, 4 5, 7 8, 9 10, 14 16, 17 18, 19 20, 21 22, 23 24, 25 28 32, 33 34, 36 40, 44 46, 47 48, 49 52, 53 54, 55 56, 57 61, 64 70, 71 72, 74 81, 88 89, 90		SPECIAL MERIDIAN SL-1S & ST PREPACKAGE SOFTWARE	PROVIDES: ADVANCED FEATURES, CDR LIST, RECORDED ANNOUNCEMENT, TIME & DATE, DO-NOT-DISTURB, END - TO-END SIGNALING, BARS, MAKE SET BUSY, 2500 SET FEATURES, DIGIT DISPLAY, ODAS, DIAL INTERCOM, DISA, CALL PARK, SYSTEM SPEED CALL, RECORDED OVERFLOW, MESSAGE CENTER, MUSIC, AUTO ANSWER BACK, GROUP CALL, AUTO SET RELOCATION, ATTENDANT ADM, HISTORY FILE, ATTENDANT OVERFLOW POSITION, STORED NUMBER REDIAL, DISTINCTIVE RINGING	252SL1-1 803SL1-1	S ST	711 1011

TABLE 9-5: CONTINUED

PKG NO.	PKG NAME	PKG DESCRIPTION	PURPOSE	CODE	MODEL	GENERIC
7, 9 16, 17 13, 36 40, 44 45, 46 49, 80 81, 92 99, 100 101 102		COMPLETE HOSPITALITY PACKAGE	PROVIDES: ACD-A, DO-NOT-DISTURB MESSAGE REGISTRATION, CALL PARK, SUPERVISORY CONSOLE, RECORDED OVERFLOW ANNOUNCE-MENT, CONTROLLED CLASS OF SERVICE, AUTOMATIC WAKEUP, ROOM STATUS, MUSIC-ON-HOLD, MESSAGE CENTER, FLEXIBLE CODE RESTRIC-TION, STATION CATEGORY INDICATION, PRETRANSLA-TION	S0711837 S0711837 S1011837 S0811837 S1111837 S0911837 S1211837 S1311837	S MS ST N NT XN XT RT	711 711 1011 811 1111 911 1211 1311
		SPECIAL MERIDIAN SL-1 S, MS, & ST SOFTWARE FEATURE PACKAGE I	PROVIDES ALL X11 FEATURE PACKAGES EXCEPT - ACD - CDP - ESN - H/M - IMS	150SL1-1 151SL1-1 800SL1-1	S MS ST	711 711 1011
		SPECIAL MERIDIAN SL-1 S, MS, & ST SOFTWARE FEATURE PACKAGE II	INCLUDES ALL OF SPECIAL FEATURE PACKAGE I PLUS CDP	171SL1-1 173SL1-1 801SL1-1	S MS ST	711 711 1011
		SPECIAL MERIDIAN SL-1 S, & ST SOFTWARE FEATURE PACKAGE III	INCLUDES ALL OF SPECIAL FEATURE PACKAGE II PLUS ACD-B	172SL1-1 174SL1-1 802SL1-1	S MS ST	711 711 1011

TABLE 9-5: CONTINUED

PKG NO.	PKG NAME	PKG DESCRIPTION	PURPOSE	CODE	MODEL	GENERIC
1, 4 5, 7 8, 9 10, 11 14, 16 17, 18 19, 20 21, 28 32, 40 46, 48 49, 55 57, 61 64, 73 74, 87 89, 90 91, 95 107 108		SL-1RT PREPACKAGE SOFTWARE	INCLUDES EVERYTHING IN FEATURE PACKAGE II (EXCEPT AUTOMATIC HANDSFREE CALLBACK) PLUS: INTERNAL CDR, MALICIOUS CALL TRACE, CALL PARTY NAME DISPLAY, BARS, FLEXIBLE CODE RESTRICTION, ADVANCED STATION FEATURES, STORED NUMBER REDIAL, RECORDED ANNOUNCE-MENT, MAKE SET BUSY, OFFICE DATA ADMINISTRA-TION SYSTEM, TIME AND DATE, FAST TDS, HISTORY FILE, CALL DETAIL RE-CORDING LIST, LAST NUMBER REDIAL	895SL1-1	RT	1311

TABLE 9-5: CONTINUED

I. STANDARD FEATURES	GENERIC X11 RELEASE NUMBER										
SYSTEM FEATURES	1	2	3	4	5	7	8	9	10	11	12
ACCESS TO PAGING	X	X	X	X	X	X	X	X	X	X	X
ACCESS TO RECORDED TELEPHONE DICTATION	X	X	X	X	X	X	X	X	X	X	X
ACCESS RESTRICTIONS	X	X	X	X	X	X	X	X	X	X	X
ADM TRUNK HUNTING					X	X	X	X	X	X	X
AUTOMATIC DAILY ROUTINES	X	X	X	X	X	X	X	X	X	X	X
AUXILIARY SIGNALING	X	X	X	X	X	X	X	X	X	X	X
BULK DATA LOAD		X	X	X	X	X	X	X	X	X	X
CALL FORWARD (NO ANSWER)	X	X	X	X	X	X	X	X	X	X	X
- VARIABLE TIMING	X	X	X	X	X	X	X	X	X	X	X
- BY CALL TYPE									X	X	X
CALLED PARTY DISCONNECT CONTROL			X	X	X	X	X	X	X	X	X
CCSA ACCESS	X	X	X	X	X	X	X	X	X	X	X
CLASS OF SERVICE RESTRICTIONS	X	X	X	X	X	X	X	X	X	X	X
CODE RESTRICTIONS	X	X	X	X	X	X	X	X	X	X	X
DATA CONVERSION	X	X	X	X	X	X	X	X	X	X	X
DATA TRANSMISSION	X	X	X	X	X	X	X	X	X	X	X
DIAL PULSE TO DTMF CONVERSION	X	X	X	X	X	X	X	X	X	X	X
DIRECT INWARD DIALING (DID)	X	X	X	X	X	X	X	X	X	X	X
DIRECT OUTWARD DIALING (DOD)	X	X	X	X	X	X	X	X	X	X	X
DTMF CALLING	X	X	X	X	X	X	X	X	X	X	X
DTMF TO DIAL PULSE CONVERSION	X	X	X	X	X	X	X	X	X	X	X
DUAL CENTRAL PROCESSING UNIT	X	X	X	X	X	X	X	X	X	X	X
EMERGENCY TRANSFER CONTROL	X	X	X	X	X	X	X	X	X	X	X
EPSCS INTERFACE					X	X	X	X	X	X	X
FLEXIBLE ATTENDANT DN	X	X	X	X	X	X	X	X	X	X	X
FLEXIBLE NUMBERING PLAN	X	X	X	X	X	X	X	X	X	X	X
FLEXIBLE OUTPULSING DELAY					X	X	X	X	X	X	X
HUNTING											
- CIRCULAR	X	X	X	X	X	X	X	X	X	X	X
- LINEAR	X	X	X	X	X	X	X	X	X	X	X
- SECRETARIAL	X	X	X	X	X	X	X	X	X	X	X
- SHORT	X	X	X	X	X	X	X	X	X	X	X
INTERCEPT	X	X	X	X	X	X	X	X	X	X	X
LINE LOCKOUT	X	X	X	X	X	X	X	X	X	X	X
MANUAL LINE SERVICE	X	X	X	X	X	X	X	X	X	X	X
MANUAL TRUNK SERVICE	X	X	X	X	X	X	X	X	X	X	X
MEMORY MANAGEMENT	X	X	X	X	X	X	X	X	X	X	X
MODEM TRUNKS		X	X	X	X	X	X	X	X	X	X
MULTIPLE LOOP DIRECTORY NUMBERS	X	X	X	X	X	X	X	X	X	X	X
NEAR IMMEDIATE RINGING	X	X	X	X	X	X	X	X	X	X	X
NIGHT SERVICE	X	X	X	X	X	X	X	X	X	X	X
OFF-PREMISE EXTENSION (OPX)	X	X	X	X	X	X	X	X	X	X	X
POWER FAILURE TRANSFER	X	X	X	X	X	X	X	X	X	X	X
PRIVATE LINE SERVICE	X	X	X	X	X	X	X	X	X	X	X
REMOTE ADMINISTRATION	X	X	X	X	X	X	X	X	X	X	X
RESERVE POWER	X	X	X	X	X	X	X	X	X	X	X
RINGING VALIDATION TIMING	X	X	X	X	X	X	X	X	X	X	X
SOFT MEMORY FAILURE		X	X	X	X	X	X	X	X	X	X
SPECIAL DIAL TONE	X	X	X	X	X	X	X	X	X	X	X
STATION TO STATION CALLING	X	X	X	X	X	X	X	X	X	X	X
TANDEM SWITCHING	X	X	X	X	X	X	X	X	X	X	X
TIE TRUNKS	X	X	X	X	X	X	X	X	X	X	X
TOLL RESTRICTIONS	X	X	X	X	X	X	X	X	X	X	X
TRAFFIC MEASUREMENT	X	X	X	X	X	X	X	X	X	X	X
TRUNK ANSWER FROM ANY STATION (TFAS)	X	X	X	X	X	X	X	X	X	X	X
TRUNK GROUP ACCESS RESTRICTION (TGAR)	X	X	X	X	X	X	X	X	X	X	X
UNINTERRUPTED LINE SERVICE	X	X	X	X	X	X	X	X	X	X	X
128 TRUNK GROUPS		X	X	X	X	X	X	X	X	X	X
2-WIRE E&M TRUNK	X	X	X	X	X	X	X	X	X	X	X
4-WIRE E&M TRUNK	X	X	X	X	X	X	X	X	X	X	X

TABLE 9-6: MERIDIAN SL-1 FEATURE COMPATIBILITY

I. STANDARD FEATURES	GENERIC X11 RELEASE NUMBER										
ATTENDANT FEATURES	1	2	3	4	5	7	8	9	10	11	12
ALARM LAMPS	X	X	X	X	X	X	X	X	X	X	X
ATTENDANT CONSOLE EXPANSION (ADD-ON MODULES)	X	X	X	X	X	X	X	X	X	X	X
ATTENDANT INTERPOSITIONAL CALLING	X	X	X	X	X	X	X	X	X	X	X
ATTENDANT INTERPOSITIONAL TRANSFER	X	X	X	X	X	X	X	X	X	X	X
AUTOMATIC DIALING	X	X	X	X	X	X	X	X	X	X	X
AUTOMATIC TIMED REMINDERS (RECALLS)	X	X	X	X	X	X	X	X	X	X	X
BARGE-IN	X	X	X	X	X	X	X	X	X	X	X
BUSY LAMP FIELD	X	X	X	X	X	X	X	X	X	X	X
BUSY VERIFY	X	X	X	X	X	X	X	X	X	X	X
CALL SELECTION	X	X	X	X	X	X	X	X	X	X	X
CALLS WAITING INDICATION	X	X	X	X	X	X	X	X	X	X	X
CAMP-ON (WITH INDICATION)	X	X	X	X	X	X	X	X	X	X	X
CONFERENCE 6	X	X	X	X	X	X	X	X	X	X	X
CONSOLE DIGIT DISPLAY	X	X	X	X	X	X	X	X	X	X	X
CONTROL OF TRUNK GROUP ACCESS	X	X	X	X	X	X	X	X	X	X	X
DISPLAY/CHANGE DATE	X	X	X	X	X	X	X	X	X	X	X
DISPLAY/CHANGE TIME	X	X	X	X	X	X	X	X	X	X	X
EMERGENCY TRANSFER CONTROL	X	X	X	X	X	X	X	X	X	X	X
HEADSET/HANDSET OPERATION	X	X	X	X	X	X	X	X	X	X	X
INCOMING CALL IDENTIFICATION (ICI)	X	X	X	X	X	X	X	X	X	X	X
KEY SENDING	X	X	X	X	X	X	X	X	X	X	X
LIGHT EMITTING DIODE (LED) INDICATORS	X	X	X	X	X	X	X	X	X	X	X
LOCKOUT	X	X	X	X	X	X	X	X	X	X	X
MULTIPLE CONSOLE OPERATION	X	X	X	X	X	X	X	X	X	X	X
MULTIPLE LISTED DIRECTORY NUMBERS	X	X	X	X	X	X	X	X	X	X	X
- INTERNAL CALL TYPE IDENTIFICATION	X	X	X	X	X	X	X	X	X	X	X
NIGHT SERVICE CONTROL	X	X	X	X	X	X	X	X	X	X	X
NON-DELAYED OPERATION	X	X	X	X	X	X	X	X	X	X	X
NON-LOCKING KEYS	X	X	X	X	X	X	X	X	X	X	X
POSITION BUSY	X	X	X	X	X	X	X	X	X	X	X
PUSHBUTTON DIALING	X	X	X	X	X	X	X	X	X	X	X
SECRECY	X	X	X	X	X	X	X	X	X	X	X
SPEED CALL	X	X	X	X	X	X	X	X	X	X	X
SPLITTING	X	X	X	X	X	X	X	X	X	X	X
SWITCHED LOOP TERMINATION	X	X	X	X	X	X	X	X	X	X	X
THROUGH DIALING	X	X	X	X	X	X	X	X	X	X	X
TRUNK GROUP BUSY INDICATION	X	X	X	X	X	X	X	X	X	X	X

TABLE 9-6: CONTINUED

I. STANDARD FEATURES	GENERIC X11 RELEASE NUMBER										
SL-1 ELECTRONIC TELEPHONE FEATURES	1	2	3	4	5	7	8	9	10	11	12
ATTENDANT RECALL	X	X	X	X	X	X	X	X	X	X	X
AUTOMATIC DIALING	X	X	X	X	X	X	X	X	X	X	X
AUTOMATIC PRESELECTION OF PRIME DN	X	X	X	X	X	X	X	X	X	X	X
BUSY LAMP FIELD	X	X	X	X	X	X	X	X	X	X	X
CALL FORWARD (ALL CALLS)	X	X	X	X	X	X	X	X	X	X	X
- SECRETARIAL FILTERING	X	X	X	X	X	X	X	X	X	X	X
CALL FORWARD (BUSY)	X	X	X	X	X	X	X	X	X	X	X
CALL FORWARD (NO ANSWER)		X	X	X	X	X	X	X	X	X	X
CALL FORWARD BY CALL TYPE									X	X	X
CALL PICKUP	X	X	X	X	X	X	X	X	X	X	X
CALL STATUS	X	X	X	X	X	X	X	X	X	X	X
CALL TRANSFER	X	X	X	X	X	X	X	X	X	X	X
CALL WAITING	X	X	X	X	X	X	X	X	X	X	X
COMMON AUDIBLE SIGNALING	X	X	X	X	X	X	X	X	X	X	X
CONFERENCE 3	X	X	X	X	X	X	X	X	X	X	X
CONFERENCE 6	X	X	X	X	X	X	X	X	X	X	X
HANDSFREE OPERATION	X	X	X	X	X	X	X	X	X	X	X
HEADSET OPERATION	X	X	X	X	X	X	X	X	X	X	X
HOLD	X	X	X	X	X	X	X	X	X	X	X
LIGHT EMITTING DIODE (LED) INDICATORS	X	X	X	X	X	X	X	X	X	X	X
LOUDSPEAKER/AMPLIFIER	X	X	X	X	X	X	X	X	X	X	X
MANUAL SIGNALING (BUZZ)	X	X	X	X	X	X	X	X	X	X	X
MULTIPLE APPEARANCE DIRECTORY NUMBERS	X	X	X	X	X	X	X	X	X	X	X
- MULTIPLE CALL ARRANGEMENT	X	X	X	X	X	X	X	X	X	X	X
- RINGING OR NON-RINGING	X	X	X	X	X	X	X	X	X	X	X
- SINGLE CALL ARRANGEMENT	X	X	X	X	X	X	X	X	X	X	X
NON-LOCKING KEYS	X	X	X	X	X	X	X	X	X	X	X
ON-HOOK DIALING	X	X	X	X	X	X	X	X	X	X	X
OVERRIDE	X	X	X	X	X	X	X	X	X	X	X
PRIME DIRECTORY NUMBER (PDN)	X	X	X	X	X	X	X	X	X	X	X
PRIVACY	X	X	X	X	X	X	X	X	X	X	X
PRIVACY OVERRIDE					X	X	X	X	X	X	X
PRIVACY RELEASE	X	X	X	X	X	X	X	X	X	X	X
PUSHBUTTON DIALING	X	X	X	X	X	X	X	X	X	X	X
RELEASE	X	X	X	X	X	X	X	X	X	X	X
RING AGAIN	X	X	X	X	X	X	X	X	X	X	X
SPEED CALL	X	X	X	X	X	X	X	X	X	X	X
STATION SET EXPANSION (ADD-ON MODULES)	X	X	X	X	X	X	X	X	X	X	X
TELADAPT CONNECTORIZATION	X	X	X	X	X	X	X	X	X	X	X
TONE BUZZING	X	X	X	X	X	X	X	X	X	X	X
TONE RINGING	X	X	X	X	X	X	X	X	X	X	X
VOICE CALL	X	X	X	X	X	X	X	X	X	X	X
VOLUME CONTROL	X	X	X	X	X	X	X	X	X	X	X

TABLE 9-6: CONTINUED

I. STANDARD FEATURES	GENERIC	X11 RELEASE	NUMBER								
500/2500 TELEPHONE SET FEATURES (cont.)	1	2	3	4	5	7	8	9	10	11	12
ATTENDANT RECALL	X	X	X	X	X	X	X	X	X	X	X
BRIDGING	X	X	X	X	X	X	X	X	X	X	X
CALL FORWARD (BUSY)	X	X	X	X	X	X	X	X	X	X	X
CALL FORWARD (NO ANSWER)		X	X	X	X	X	X	X	X	X	X
CALL FORWARD BY CALL TYPE									X	X	X
CALL PICKUP	X	X	X	X	X	X	X	X	X	X	X
CALL TRANSFER	X	X	X	X	X	X	X	X	X	X	X
CALL WAITING	X	X	X	X	X	X	X	X	X	X	X
CONFERENCE CONTROL		X	X	X	X	X	X	X	X	X	X
CONFERENCE 3	X	X	X	X	X	X	X	X	X	X	X
CONFERENCE 6									X	X	X
- CONFERENCE CONTROL									X	X	X
DIAL ACC[illegible]URES AND SERVICES	X	X	X	X	X	X	X	X	X	X	X
MANUAL LINE SER[illegible]	X	X	X	X	X	X	X	X	X	X	X
MULTIPLE APPEARANC[illegible]BERS	X	X	X	X	X	X	X	X	X	X	X
OFF-PREMISE EXTE[illegible]	X	X	X	X	X	X	X	X	X	X	X
RING AGAIN[illegible]	x	x	x	X	X	X	X	X	X	X	X
SWITCHHOOK FLASH	x	x	x	X	X	X	X	X	X	X	X

TABLE 9-6: CONTINUED

MERIDIAN 2000 TELEPHONE FEATURES	1	2	3	4	5	7	8	9	10	11	12
ATTENDANT RECALL						X	X	X	X	X	X
AUTOMATIC DIALING						X	X	X	X	X	X
AUTOMATIC PRESELECTION OF PRIME DN						X	X	X	X	X	X
CALL FORWARD (ALL CALLS)						X	X	X	X	X	X
- SECRETARIAL FILTERING						X	X	X	X	X	X
CALL FORWARD (BUSY)						X	X	X	X	X	X
CALL FORWARD (NO ANSWER)						X	X	X	X	X	X
CALL PICKUP						X	X	X	X	X	X
CALL STATUS INDICATION						X	X	X	X	X	X
CALL TRANSFER						X	X	X	X	X	X
CALL WAITING						X	X	X	X	X	X
COMMON AUDIBLE SIGNALING						X	X	X	X	X	X
CONFERENCE 3						X	X	X	X	X	X
CONFERENCE 6						X	X	X	X	X	X
DIGIT DISPLAY (M2317)								X	X	X	X
- SOFTKEY FEATURES								X	X	X	X
HOLD						X	X	X	X	X	X
LIQUID CRYSTAL DISPLAY (LCD) INDICATORS						X	X	X	X	X	X
LOUDSPEAKER/AMPLIFIER						X	X	X	X	X	X
MANUAL SIGNALING (BUZZ)						X	X	X	X	X	X
MULTIPLE APPEARANCE DIRECTORY NUMBERS						X	X	X	X	X	X
- MULTIPLE CALL ARRANGEMENT						X	X	X	X	X	X
- RINGING OR NON-RINGING						X	X	X	X	X	X
- SINGLE CALL ARRANGEMENT						X	X	X	X	X	X
NON-LOCKING KEYS						X	X	X	X	X	X
ON-HOOK DIALING						X	X	X	X	X	X
OVERRIDE						X	X	X	X	X	X
PRIME DIRECTORY NUMBER (PDN)						X	X	X	X	X	X
PRIVACY						X	X	X	X	X	X
PRIVACY OVERRIDE						X	X	X	X	X	X
PRIVACY RELEASE						X	X	X	X	X	X
PUSHBUTTON DIALING						X	X	X	X	X	X
RELEASE						X	X	X	X	X	X
RING AGAIN						X	X	X	X	X	X
SIX-WIRE LINE CORD						X	X	X	X	X	X
SPEED CALL						X	X	X	X	X	X
TONE BUZZING						X	X	X	X	X	X
TONE RINGING						X	X	X	X	X	X
VOICE CALL						X	X	X	X	X	X
VOLUME CONTROL						X	X	X	X	X	X
MERIDIAN M3000 TOUCHPHONE FEATURES											
ATTENDANT RECALL						X	X	X	X	X	X
AUTOMATIC DIALING						X	X	X	X	X	X
AUTOMATIC PRESELECTION OF PRIME DN						X	X	X	X	X	X
CALL FORWARD (ALL CALLS)						X	X	X	X	X	X
- SECRETARIAL FILTERING						X	X	X	X	X	X
CALL FORWARD (BUSY)						X	X	X	X	X	X
CALL FORWARD (NO ANSWER)						X	X	X	X	X	X
CALL PICKUP						X	X	X	X	X	X
CALL TRANSFER						X	X	X	X	X	X
CALL WAITING						X	X	X	X	X	X
CONFERENCE 3						X	X	X	X	X	X
CONFERENCE 6						X	X	X	X	X	X
HANDSFREE OPERATION						X	X	X	X	X	X
HANDSET OPERATION						X	X	X	X	X	X
HOLD						X	X	X	X	X	X
ICONS						~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	X

TABLE 9-6: CONTINUED

I. STANDARD FEATURES	GENERIC X11 RELEASE NUMBER										
MERIDIAN 3000 TOUCHPHONE FEATURES (cont'd)	**1**	**2**	**3**	**4**	**5**	**7**	**8**	**9**	**10**	**11**	**12**
LOUDSPEAKER/AMPLIFIER						X	X	X	X	X	X
DIAL ACCESS TO FEATURES AND SERVICES						X	X	X	X	X	X
MANUAL SIGNALING (BUZZ)						X	X	X	X	X	X
MULTIPLE APPEARANCE DIRECTORY NUMBERS						X	X	X	X	X	X
- MULTIPLE CALL ARRANGEMENT						X	X	X	X	X	X
- RINGING OR NON-RINGING						X	X	X	X	X	X
- SINGLE CALL ARRANGEMENT						X	X	X	X	X	X
TOUCH SENSITIVE KEYS						X	X	X	X	X	X
ON-HOOK DIALING						X	X	X	X	X	X
OVERRIDE						X	X	X	X	X	X
PRIME DIRECTORY NUMBER (PDN)						X	X	X	X	X	X
PRIVACY						X	X	X	X	X	X
PRIVACY OVERRIDE						X	X	X	X	X	X
PRIVACY RELEASE						X	X	X	X	X	X
TOUCH SENSITIVE DIALING						X	X	X	X	X	X
RELEASE						X	X	X	X	X	X
RING AGAIN						X	X	X	X	X	X
FOUR-WIRE LINE CORD						X	X	X	X	X	X
SPEED CALL						X	X	X	X	X	X
SYSTEM SPEED CALL						X	X	X	X	X	X
TONE BUZZING						X	X	X	X	X	X
TONE RINGING						X	X	X	X	X	X
VOLUME CONTROL						X	X	X	X	X	X
UNIQUE MERIDIAN M3000 TOUCHPHONE FEATURES											
CALL WAITING HELD						X	X	X	X	X	X
COMPLETE						X	X	X	X	X	X
CONSULT						X	X	X	X	X	X
CONTRAST						X	X	X	X	X	X
DATA CALL						X	X	X	X	X	X
DIRECTORY						X	X	X	X	X	X
HELD CONFERENCE						X	X	X	X	X	X
HELD TRANSFER						X	X	X	X	X	X
LAST NUMBER REDIAL						X	X	X	X	X	X
PREDIAL MODE						X	X	X	X	X	X
RETURN TO HELD PARTY						X	X	X	X	X	X
RING AGAIN READY						X	X	X	X	X	X
SAVE THE NUMBER						X	X	X	X	X	X
SERVICES						X	X	X	X	X	X
SET UP						X	X	X	X	X	X

TABLE 9-6: CONTINUED

II. OPTIONAL FEATURES	GENERIC X11 RELEASE NUMBER										
SYSTEM FEATURES	1	2	3	4	5	7	8	9	10	11	12
ATTENDANT ADMINISTRATION (AA)	X	X	X	X	X	X	X	X	X	X	X
ATTENDANT OVERFLOW (AOP)	X	X	X	X	X	X	X	X	X	X	X
ATTENDANT OVERFLOW POSITION BUSY	X	X	X	X	X	X	X	X	X	X	X
AUTHORIZATION CODE (BAUT)	X	X	X	X	X	X	X	X	X	X	X
AUTOMATIC IDENTIFICATION OF OUTWARD	X	X	X	X	X	X	X	X	X	X	X
DIALING (AIOD)											
AUTOMATIC CALL DISTRIBUTION (ACD)	X	X	X	X	X	X	X	X	X	X	X
- BASIC PACKAGE (ACDA)	X	X	X	X	X	X	X	X	X	X	X
- ADVANCED FEATURES OPTION (ACDB)	X	X	X	X	X	X	X	X	X	X	X
- AUX SECURITY (ACD-D)											X
- TIMED OVERFLOW									X	X	X
- MANAGEMENT REPORTS (ACDC)	X	X	X	X	X	X	X	X	X	X	X
- FIFTEEN MINUTE REPORTING OPTION			X	X	X	X	X	X	X	X	X
- LOAD MANAGEMENT (LMAN)	X	X	X	X	X	X	X	X	X	X	X
- AUXILIARY DATA SYSTEM (ACDD)		X	X	X	X	X	X	X	X	X	X
- DIRECTORY # ID SERVICE (DNIS)									X	X	X
- PRIORITY AGENT (ACD)											X
AUTOMATIC LINE SELECTION (LSEL)			X	X	X	X	X	X	X	X	X
AUTOMATIC NUMBER IDENTIFICATION (ANI)	X	X	X	X	X	X	X	X	X	X	X
- KP OPTION	X	X	X	X	X	X	X	X	X	X	X
- NUMBER OF DIGITS	X	X	X	X	X	X	X	X	X	X	X
- ROUTE SELECTION (ANIR)	X	X	X	X	X	X	X	X	X	X	X
- SUPER TRUNK GROUP SUPPORT	X	X	X	X	X	X	X	X	X	X	X
- TRUNK TEST	X	X	X	X	X	X	X	X	X	X	X
AUTOMATIC TRUNK MAINTENANCE						X	X	X	X	X	X
AUTOVON (ATVN)				X	X	X	X	X	X	X	X
- ATTENDANT PRECEDENCE CALLING				X	X	X	X	X	X	X	X
- AUTOVON INCOMING CALL INDICATIONS				X	X	X	X	X	X	X	X
- AUTOVON NIGHT SERVICE				X	X	X	X	X	X	X	X
- CDR ENHANCEMENT				X	X	X	X	X	X	X	X
- COMPLETION TO BUSY				X	X	X	X	X	X	X	X
- INCOMING PREEMPTION				X	X	X	X	X	X	X	X
- MUTUALLY EXCLUSIVE PACKAGING						X	X	X	X	X	X
- OUTGOING PREEMPTION				X	X	X	X	X	X	X	X
- PRECEDENCE DISTINCTIVE RINGING				X	X	X	X	X	X	X	X
- PRECEDENCE INTERCEPT				X	X	X	X	X	X	X	X
- STATION PRECEDENCE CALLING				X	X	X	X	X	X	X	X
- TRUNK INTERFACE				X	X	X	X	X	X	X	X
- AUTHCODE PRECEDENCE CALL PLACEMENT				X	X	X	X	X	X	X	X
- FLEXIBLE HOT LINE				X	X	X	X	X	X	X	X
- LINE PREFERENCE				X	X	X	X	X	X	X	X
- DELUXE HOLD				X	X	X	X	X	X	X	X
- STATION LOOP PRE-EMPTION									X	X	X
BASIC AUTHORIZATION CODE (BAUT)		X	X	X	X	X	X	X	X	X	X
BASIC AUTOMATIC ROUTE SELECTION (BARS)		X	X	X	X	X	X	X	X	X	X
- QUEUING (BQUE)		X	X	X	X	X	X	X	X	X	X
- TRAFFIC (NTRF)		X	X	X	X	X	X	X	X	X	X
- OFFNET NUMBER RECOGNITION					X	X	X	X	X	X	X
- INCOMING TRUNK GROUP EXCLUSION					X	X	X	X	X	X	X
CALL BY CALL SERVICE (CBC)											X
CALL DETAIL RECORDING (CDR)	X	X	X	X	X	X	X	X	X	X	X
- CALLING PARTY NUMBER (PCN)	X	X	X	X	X	X	X	X	X	X	X
- CDR - LINK	X	X	X	X	X	X	X	X	X	X	X
- CDR - TTY	X	X	X	X	X	X	X	X	X	X	X
- CHARGE ACCOUNT (CHG)	X	X	X	X	X	X	X	X	X	X	X
- ESN ENHANCEMENT	X	X	X	X	X	X	X	X	X	X	X
- FORCED CHARGE ACCOUNT (FCA)	X	X	X	X	X	X	X	X	X	X	X
- MINI-CDR	X	X	X	X	X	X	X	X	X	X	X
- OMNI-FACTS	X	X	X	X	X						
- PARALLEL PORTS	X	X	X	X	X	X	X	X	X	X	X

TABLE 9-6: CONTINUED

II. OPTIONAL FEATURES	GENERIC X11 RELEASE NUMBER										
SYSTEM FEATURES (cont'd)	1	2	3	4	5	7	8	9	10	11	12
CALL DETAIL RECORDING (CDR) (cont'd)											
- O OPTION		X	X	X	X	X	X	X	X	X	X
- 911 CDR IMPROVEMENT		X	X	X	X	X	X	X	X	X	X
- INTERNAL CDR		X	X	X	X	X	X	X	X	X	X
CALLING LINE IDENTIFICATION IN CDR (CLID IN CDR)											X
CENTRALIZED ATTENDANT SERVICE (CAS)	X	X	X	X	X	X	X	X	X	X	X
CMAC-A INTERFACE	X	X	X	X	X	X	X	X	X	X	X
COMMON EQUIPMENT MODIFICATION (CEM)				X	X	X	X	X	X	X	X
COMPUTER TO PBX INTERFACE (CPI)					X	X	X	X	X	X	X
COORDINATED DIALING PLAN (CDP)									X	X	X
DEPARTMENT LDN					X	X	X	X	X	X	X
DIGITAL TRUNK INTERFACE (DTI)					X	X	X	X	X	X	X
DIGITAL TRUNK INTERFACE (MERIDIAN SL-1MS)							X	X	X	X	X
DIRECT CALL PICKUP (DCP)											X
DIRECT INWARD SYSTEM ACCESS (DISA)	X	X	X	X	X	X	X	X	X	X	X
DISTINCTIVE RINGING					X	X	X	X	X	X	X
DUMP AT MIDNIGHT	X	X	X	X	X.	X	X	X	X	X	X
ENHANCED END-TO-END SIGNALING					X	X	X	X	X	X	X
ENHANCED MESSAGE WAITING INDICATION						X	X	X	X	X	X
ENHANCED MUSIC (EMUS)											X
EXCLUSIVE HOLD					X	X	X	X	X	X	X
FLEXIBLE HOT LINE				X	X	X	X	X	X	X	X
FLEXIBLE LINE LOCK OUT				X	X	X	X	X	X	X	X
HISTORY FILE	X	X	X	X	X	X	X	X	X	X	X
HOTEL/MOTEL									X	X	X
- PRETRANSLATION							X	X	X	X	X
- SUPERVISORY CONSOLE							X	X	X	X	X
- 63 CONSOLES							X	X	X	X	X
- AUTOMATIC WAKEUP									X	X	X
- BACKGROUND TERMINALS									X	X	X
- MESSAGE REGISTRATION									X	X	X
- ROOM STATUS									X	X	X
- PROPERTY MGT SYSTEM INTERFACE									X	X	X
INCOMING DID DIGIT CONVERSION (IDC)										X	X
INCOMING TRUNK GROUP EXCLUSION					X	X	X	X	X	X	X
INDIVIDUAL HOLD				X	X	X	X	X	X	X	X
INTEGRATED MESSAGING SERVICE (IMS)	x	x	X	X	X	X	X	X	X	X	X
ISDN ADVANCED FEATURES (IAF)											X
ISDN SIGNALING CORE (ISC)											X
ISDN SIGNALING LINK (ISL)											X
INTEGRATED VOICE/DATA SWITCHING VDS	x	x	X	X	X	X	X	X	X	X	X
INTEGRATED VOICE/MESSAGING SYSTEM (IVMS)				X	X	X	X	X	X	X	X
INTER-EXCHANGE CARRIER (JEC)											X
LINE LOAD CONTROL									X	X	X
LINE LOCKOUT TREATMENT ENHANCEMENT				X	X	X	X	X	X	X	X
LINE PREFERENCE				X	X	X	X	X	X	X	X
MALICIOUS CALL TRACE									X	X	X
MANUAL TRUNK MAINTENANCE	X	X	X	X	X	X	X	X	X	X	X
MNA RESTRICTION REMOVAL	X	X	X	X	X	X	X	X	X	X	X
MULTI-CUSTOMER OPERATION	X	X	X	X	X	X	X	X	X	X	X
MULTI-TENANT SERVICE						X	X	X	X	X	X
MULTIPLE DID OFFICE CODE SCREENING					X	X	X	X	X	X	X
MULTIPLE MESSAGE CENTER	x	x	X	X	X	X	X	X	X	X	X
MUSIC PACKAGE	x	x	X	X	X	X	X	X	X	X	X
OFFICE DATA ADMINISTRATION SYSTEM (ODAS)	X	X	X	X	X	X	X	X	X	X	X
OPTIONAL OUTPULSING DELAY									X	X	X
OUTGOING TRUNK HUNTING	X	X	X	X	X	X	X	X	X	X	X
- LINEAR	X	X	X	X	X	X	X	X	X	X	X
- ROUND-ROBIN	X	X	X	X	X	X	X	X	X	X	X

TABLE 9-6: CONTINUED

II. OPTIONAL FEATURES	**GENERIC XII RELEASE NUMBER**										
SYSTEM FEATURES (cont'd)	**1**	**2**	**3**	**4**	**5**	**7**	**8**	**9**	**10**	**11**	**12**
PERIPHERAL EQUIPMENT MODIFICATION (PEM)				X	X	X	X	X	X	X	X
PRE-TRANSLATION							X	X	X	X	X
PRIMARY RATE ACCESS (PRA)										X	X
RECORDED ANNOUNCEMENT (RAN)	X	X	X	X	X	X	X	X	X	X	X
REMOTE PERIPHERAL EQUIPMENT (RPE)	X	X	X	X	X	X	X	X	X	X	X
SATELLITE LINK CONTROL			X	X	X	X	X	X	X	X	X
SET RELOCATION	X	X	X	X	X	X	X	X	X	X	X
SMART	X	X	X	X	X	X	X	X	X	X	X
SUPPLEMENTAL DIGIT RESTRICTION	X	X	X	X	X	X	X	X	X	X	X
- RECOGNITION (SDDR)	X	X	X	X	X	X	X	X	X	X	X
TEST LINES	X	X	X	X	X	X	X	X	X	X	X
TRAFFIC MEASUREMENT (TRF)	X	X	X	X	X	X	X	X	X	X	X
TRUNK GROUP DISTINCTIVE RINGING				X	X	X	X	X	X	X	X
ATTENDANT FEATURES											
AUTOMATIC WAKEUP									X	X	X
CALL PARK/PAGE		X	X	X	X	X	X	X	X	X	X
CONSOLE FOR THE BLIND	X	X	X	X	X	X	X	X	X	X	X
DEPARTMENTAL LDN					X	X	X	X	X	X	X
DO NOT DISTURB (INDIVIDUAL/GROUP)	X	X	X	X	X	X	X	X	X	X	X
- DND INTERCEPT TREATMENT	X	X	X	X	X	X	X	X	X	X	X
MALICIOUS CALL TRACE									X	X	X
STATION CATEGORY INDICATION						X	X	X	X	X	X
STORED NUMBER REDIAL (SNR)			X	X	X	X	X	X	X	X	X
SYSTEM SPEED CALL (SSC)		X	X	X	X	X	X	X	X	X	X
SUPERVISORY CONSOLE							X	X	X	X	X

TABLE 9-6: CONTINUED

II. OPTIONAL FEATURES	GENERIC X11 RELEASE NUMBER										
SYSTEM FEATURES (cont'd)	**1**	**2**	**3**	**4**	**5**	**7**	**8**	**9**	**10**	**11**	**12**
QSU TELEPHONE SET FEATURES											
AUDIBLE MESSAGE WAITING		X	X	X	X	X	X	X	X	X	X
AUTOMATIC ANSWERBACK (AAB)		X	X	X	X	X	X	X	X	X	X
CALL FORWARD BY CALL TYPE									X	X	X
CALL FORWARD NO ANSWER TO ANY DN (CFNA)		X	X	X	X	X	X	X	X	X	X
CALL PARK/PAGE		X	X	X	X	X	X	X	X	X	X
CONTROLLED CLASS OF SERVICE						X	X	X	X	X	X
DIAL INTERCOM GROUP	X	X	X	X	X	X	X	X	X	X	X
DIGIT DISPLAY (DDSP)	X	X	X	X	X	X	X	X	X	X	X
GROUP CALL		X	X	X	X	X	X	X	X	X	X
MALICIOUS CALL TRACE									X	X	X
MAKE SET BUSY (MSB)			X	X	X	X	X	X	X	X	X
MESSAGE REGISTRATION									X	X	X
ROOM STATUS									X	X	X
STORED NUMBER REDIAL (SNR)			X	X	X	X	X	X	X	X	X
SYSTEM SPEED CALL (SSC)		X	X	X	X	X	X	X	X	X	X
TIME AND DATE (TAD)	X	X	X	X	X	X	X	X	X	X	X
2500 TELEPHONE SET FEATURES											
AUDIBLE MESSAGE WAITING		X	X	X	X	X	X	X	X	X	X
CALL FORWARD (ALL CALLS)	X	X	X	X	X	X	X	X	X	X	X
- SECRETARIAL FILTERING			X	X	X	X	X	X	X	X	X
CALL FORWARD NO ANSWER TO ANY DN (CFNA)		X	X	X	X	X	X	X	X	X	X
CALL PARK/PAGE		X	X	X	X	X	X	X	X	X	X
LAST NUMBER REDIAL							X	X	X	X	X
MALICIOUS CALL TRACE									X	X	X
PERMANENT HOLD	X	X	X	X	X	X	X	X	X	X	X
ROOM STATUS									X	X	X
SPEED CALL	X	X	X	X	X	X	X	X	X	X	X
STORED NUMBER REDIAL (SNR)			X	X	X	X	X	X	X	X	X
SYSTEM SPEED CALL (SSC)		X	X	X	X	X	X	X	X	X	X
500 TELEPHONE SET FEATURES											
AUDIBLE MESSAGE WAITING		X	X	X	X	X	X	X	X	X	X
CALL FORWARD (ALL CALLS)				X	X	X	X	X	X	X	X
- SECRETARIAL FILTERING				X	X	X	X	X	X	X	X
CALL FORWARD NO ANSWER TO ANY DN (CFNA)		X	X	X	X	X	X	X	X	X	X
CALL PARK/PAGE		X	X	X	X	X	X	X	X	X	X
LAST NUMBER REDIAL							X	X	X	X	X
MALICIOUS CALL TRACE									X	X	X
PERMANENT HOLD				X	X	X	X	X	X	X	X
ROOM STATUS									X	X	X
SPEED CALL				X	X	X	X	X	X	X	X
STORED NUMBER REDIAL (SNR)			X	X	X	X	X	X	X	X	X
SYSTEM SPEED CALL (SSC)		X	X	X	X	X	X	X	X	X	X

TABLE 9-6: CONTINUED

II. OPTIONAL FEATURES	GENERIC X11 RELEASE NUMBER										
SYSTEM FEATURES (cont'd)	1	2	3	4	5	7	8	9	10	11	12
MERIDIAN M2000 FEATURES											
ACD AGENT FEATURES (M2317)								X	X	X	X
AUDIBLE MESSAGE WAITING						X	X	X	X	X	X
AUTOMATIC ANSWERBACK (AAB)						X	X	X	X	X	X
CALL FORWARD NO ANSWER TO ANY DN (CFNA)						X	X	X	X	X	X
CALL PARTY NAME DISPLAY (M2317)									X	X	X
CONTROLLED CLASS OF SERVICE						x	X	X	X	X	X
DIAL INTERCOM GROUP						x	X	X	X	X	X
GROUP CALL						x	X	X	X	X	X
LAST NUMBER REDIAL						x	X	X	X	X	X
MAKE SET BUSY (MSB)							X	X	X	X	X
MALICIOUS CALL TRACE									X	X	X
STORED NUMBER REDIAL (SNR)						X	X	X	X	X	X
SYSTEM SPEED CALL (SSC)						X	X	X	X	X	X
TIME AND DATE (TAD)						X	X	X	X	X	X

TABLE 9-6: CONTINUED

II. OPTIONAL FEATURES	GENERIC X11 RELEASE NUMBER										
SYSTEM FEATURES (cont'd)	**1**	**2**	**3**	**4**	**5**	**7**	**8**	**9**	**10**	**11**	**12**
MERIDIAN M3000 TOUCHPHONE FEATURES											
AUDIBLE MESSAGE WAITING						X	X	X	X	X	X
AUTOMATIC ANSWERBACK (AAB)						X	X	X	X	X	X
CALL FORWARD NO ANSWER TO ANY DN (CFNA)						X	X	X	X	X	X
CALL PARK/PAGE						X	X	X	X	X	X
CALL PARTY NAME DISPLAY									X	X	X
DIAL INTERCOM GROUP						X	X	X	X	X	X
DIGIT DISPLAY						X	X	X	X	X	X
MAKE SET BUSY (MSB)						X	X	X	X	X	X
MALICIOUS CALL TRACE									X	X	X
SYSTEM SPEED CALL (SSC)						X	X	X	X	X	X
ESN FEATURES											
ELECTRONIC SWITCHING NETWORK	X	X	X	X	X	X	X	X	X	X	X
- BASIC AUTOMATIC ROUTE SELECTION (BARS)	X	X	X	X	X	X	X	X	X	X	X
- COORDINATED DIALING PLAN (CDP)	X	X	X	X	X	X	X	X	X	X	X
- ESN SIGNALING		X	X	X	X	X	X	X	X	X	X
- (999 LOC)				X	X	X	X	X	X	X	X
- FLEXIBLE CALL BACK QUEUING (FCBQ)	X	X	X	X	X	X	X	X	X	X	X
- FREE CALLING AREA SCREENING (FCAS)	X	X	X	X	X	X	X	X	X	X	X
- NETWORK AUTHORIZATION CODE (NAUT)	X	X	X	X	X	X	X	X	X	X	X
- NETWORK ALTERNATE ROUTE SELECTION (NARS)	X	X	X	X	X	X	X	X	X	X	X
- NETWORK CONTROL (NCOS, TCOS)		X	X	X	X	X	X	X	X	X	X
- NETWORK ROUTING CONTROLS		X	X	X	X	X	X	X	X	X	X
- NETWORK SPEED CALL (NSC)		X	X	X	X	X	X	X	X	X	X
- NETWORK TRANSFER/CONFERENCE 3			X	X	X	X	X	X	X	X	X
- OFFHOOK QUEUE (OHQ)	X	X	X	X	X	X	X	X	X	X	X
- OFFNET NUMBER RECOGNITION					X	X	X	X	X	X	X
- PRIORITY QUEUING (PQUE)	X	X	X	X	X	X	X	X	X	X	X
- QUEUING (MAIN CBQ, CCBQ)		X	X	X	X	X	X	X	X	X	X
- SCC ACCESS			X	X	X	X	X	X	X	X	X
- TONE DETECTION			X	X	X	X	X	X	X	X	X
- 1+DIALING				X	X	X	X	X	X	X	X
- 11 DIGIT TRANSLATION							X	X	X	X	X

TABLE 9-6: CONTINUED

FEATURE	PARAMETERS
Auto Dial	SL-1 Telephone, Console, or Meridian Digital Telephones. Single programmable DN of 4, 8, 12, 16, 20, or 23 digits
Barge-in	Attendant Console only; key/lamp 1 assignment of flexible features keystrip; operates on trunks with "Warning Tone Allowed" COS; when active, provides 256 ms tone burst every six seconds
Basic Authorization Code (BAUT)	Provides up to 4096 authorization codes; 1-14 digits per code; activated by dialing SPRE+6+BAUT; length of code specified on a customer basis
Bridging	Permits up to 5 C4A ringers per 500/2500 parallel connection
Busy Verification	Attendant Console only; key/lamp 0 assignment of flexible features keystrip; operates on stations with "Warning Tone Allowed" COS; when active, provides 256 ms tone burst every six seconds
Call Forward - All Calls	Assigned on a per telephone basis; programmable l-23 digits; 4, 8, 16, 20, or 23 digits in length
Call Forward - No Answer	Second level CFNA enhancements (Xl 1 Release 10) permits calls to be forwarded two steps
CFNA/Hunt by Call Type	Permits different destinations to be defined for internal and external calls (requires Xl 1 Release 10)
Call Party Name Display	Used with M23 17 or M3000 Telephones: Permits alpha identification of up to 27 characters to be defined for display in addition to called or calling party's DN (requires X11 Release 10 software)
Camp-On	Applies to DID or attendant extended calls only; optional alerting tone via warning tone allow or deny COS
CDR Change Account	Provides fixed length account identification numbers of 1 to 23 digits
Code Restriction	Operative for stations and trunks with Toll Restricted COS; NPA/NXX codes within 200-999 range only; code restriction block built for each trunk route (maximum 128)
Dial Intercom	1 digit (O-9) or 2 digit (00-99) access per group; 10 or 100 DN's per group; 255 groups per customer
Do-Not-Disturb (Group)	Activated by attendant; 100 groups per customer (00-99); 127 entries per group

TABLE 9-7: MERIDIAN SL-1 FEATURE PARAMETERS

FEATURE	PARAMETERS
Enhanced Hotline	Extends existing Flexible Hotline call capability from a designated 500/2500 set to the SL-1, M2000, and M3000 telephone. Permits call to predetermined DN (31 digits maximum) by simply lifting the handset (requires X11 Release 10 software)
Group Call	Permits placement of call to 10 DN; 64 groups per customer; 10 members per group; group members DN must have Warning Tone Allowed COS
Flexible Attendant DN	Used as alternative to digit 0; flexible assignment from any DN in numbering plan; one attendant DN per customer; all attendants must have same DN assignment within customer group
Flexible Hot Line	500/2500 Sets only; allows designated single line stations to place call directly to predetermined destination (3 1 digits in length); requires manual (MNL) COS
Hunting - Data Ports	Provides single access code for up to 126 data ports in a group; can continue hunting between groups of the same type
Hunting - Routes	Permits one step hunting from one trunk route to another of the same type
Hunting - Stations	Circular, linear, hunting - 18 steps per group (Meridian SL-1 S, ST, RT, MS, N, NT); 30 steps per group (Meridian SL-1 XN, XT); short hunt (SL-1 Sets) - 7 steps over consecutive DN keys
Incoming Call Identification (ICI)	Maximum 20 ICI lamps per attendant console; consoles within customer group have same ICI assignment
Lamp Field Array	Displays busy/idle status of any 150 consecutive DN's; Maximum 2 LFA modules per console; displays same DN's for multiple consoles within customer group
Last Number Redial	Maximum 3 1 digits stored (default 16)
Listed Directory	Maximum 4 LDN's per customer Number (LDN)
Multi-Customer	Maximum 32 Customers per system
Multiple Appearance	Maximum 16 appearances of same DN
Multiple Console Operation	Maximum 63 consoles per Customer Group

TABLE 9-7: CONTINUED

FEATURE	PARAMETERS
Multi-Tenant	Maximum 5 12 Tenants per Customer Group
New Flexible Code Restriction (NFCR)	Requires Network Class-of-Service; maximum 255 NFCR trees per customers; maximum 8 NFCR trees per trunk route; maximum 50 digits per NFCR tree
Private Line Service	Assigned to trunk route 31 with DN assigned to each PL member; maximum 126 private lines per customer
Ring Again	Limited to DN with maximum of 16 digits
Ringing Number Pick-Up	Maximum 255 pick-up groups per customer; may pick-up unlimited members within pick-up group
Speed Call (SCL)	Maximum 255 Speed Call lists per customer; 31 digits maximum per entry; maximum 1000 entries per SCL (0 to 9; 00-99; 000-999)
System Speed Call	Maximum 255 SSC lists per system (reduced (SSC) by number of defined SCL lists); maximum 1000 entries per list (0 to 9; 00-99; 000-999); 31 digit length per entry
Stored Number Redial	Maximum 31 digits stored; limited to one previously dialed number
Trunk Groups	Maximum 128 routes per customer; Private Line Route must be Route 3 1; maximum 126 members per trunk route

TABLE 9-7: CONTINUED

FEATURE PACKAGE DEPENDENCIES

FEATURE PACKAGE	MNEMONIC	DEPENDENCY
Advanced Features	OPTF	
Automatic Call Distribution - Base	BACD	
- ACD Basic	ACDA	BACD
- ACD Advanced	ACDB	ACDA,BACD
- ACD Management Reports	ACDC	ACDB, ACDA, BACD
- ACD Package D	ACDD	LNK, ACDC, ACDB, ACDA, BACD
- ACD Auxiliary Data System	LMAN	ACDC, ACDB, ACDA, BACD
- ACD/CDR Q Record	CDRQ	CDR
Automatic Wakeup	AWU	BGD, CCOS
Attendant Administration	AA	
Attendant Overflow Position	AOP	*
Automated Modem Pooling	AMP	
Automatic Answerback	AAB	
Automatic Identification of Outward Dial	AIOD	
Automatic Number Identification	AN1	
Automatic Trunk Maintenance	ATM	TDET
AN1 Route Selection	ANIR	ANI
AUTOVON	ATVN	NCOS
- AUTOVON CDR	ACDR	ATVN, CDR & CTY or CLNK
Auxiliary Processor Link	LNK	
Background Terminal	BKG	
Basic Authorization Code	BAUT	CAB
Basic Automatic Route Selection	BARS	BRTE, NCOS
Basic Queuing	BQUE	
Basic Routing	BRTE	NCOS
Call Detail Recording	CDR	
- CDR with Charge Account	CHG	CAB, CDR
- CDR Magnetic Tape	CLNK	CDR
- CDR TTY	CTY	CDR
- Mini-CDR	MCDR	CDR
- Q Record	CDRQREC	CDR
- Internal CDR	ICDR	CDR
Call Park	CPRK	
Call Party Name Display	CPND	DDSP, DSET, TSET or DLT2 (ODAS)
CDR Enhancement for AUTOVON	ACDR	ATVN, CDR
Centralized Attendant Service	CAS	
- CAS Main	CASM	*
- CAS Remote	CASR	*
Charge/Authorization Base Package	CAB	
Command & Status Link	CSL	
Coordinated Call-Back Queuing	CCBQ	

*AOP and CASM/CASR are mutually exclusive

TABLE 9-8: MERIDIAN SL-1 FEATURE PACKAGE DEPENDENCIES

FEATURE PACKAGE	MNEMONIC	DEPENDENCY
Coordinated Call-Back Queuing to Conventional Mains	CCBQCM	NSIG, FCBQ
Coordinated Dialing Plan	CDP	BRTE, NCOS, FCBQ
Controlled Class of Service	CCOS	
Deluxe Hold	DHLD	
Departmental LDN	DLDN	
Dial Intercom	DI	
Dialed Number ID Service	DNIS	
Digital Trunk Interface	EPBX	
Digit Display SL-1 Set	DDSP	
Direct Inward System Access	DISA	
Distinctive Ringing	DRNG	
Do Not Disturb	DND	
- DND Individual	DNDI	
- DND Group	DNDG	DNDI
End-to-ENd Signaling	EES	
Enhanced Hotline	EHOT	SSC
ESN Communication Management Center	CMAC	CDR
Flexible Call-Back Queuing	FCBQ	BARS, NARS, CDP, BQUE
Flexible Hot Line	HOT	
Forced Charge Account	FCA	CHG, CAB, CDR
Group Call	GRP	
History File	HIST	
Integrated Messaging System	IMS	MWC, APL, BACD & ACDA or ACDB
Integrated Voice Messaging System	IVMS	IMS
Intercept	INTR	
Last Number Redial	LNR	
Line Load Control	LLC	ATVN
Line Selection	LSEL	
Make Set Busy	MSB	
Malicious Call Trace	MCT	
Meridian Digital Telephones	DSET	
Meridian Digital Digit Display Telephones	DLT2	DSET
Meridian M3000 Touchphone	TSET	DSET
Message Center	MWC	
Message Registration	MRB	BGD, CCOS
Multi-Customer	CUST	
Multi-Tenant	TENANT	
Music on Delay	MOD	RAN
Music on Hold	MOH	RAN
Music on Hold/Camp-on	MUS	RAN
New Flexible Code Restriction	NFCR	NCOS
Network Authorization Code	NAUT	BAUT, CAB, NARS, BARS, CDP
Network Automatic Route Selection	NARS	BRTE, NCOS
Network Class-of-Service	NCOS	

TABLE 9-8: CONTINUED

FEATURE PACKAGE	MNEMONIC	DEPENDENCY
Network Queuing - Main	MCBQ	NARS, BARS, CDP, NSIG, FCBQ, NCOS
Network Signaling	NSIG	NCOS
Network Speed Calling	NSC	SSC, NCOS, NARS, BARS
Network Traffic	NTRF	BARS, NARS, CDP, PQUE, FCBQ, OHQ
Network Transfer	NXFR	NSIG, NCOS
Office Data Administration System	ODAS	
Off-hook Queuing	OHQ	BQUE, BARS, NARS
Other Common Carriers	OCC	
Pretranslation	PRETRAN	
Priority Queuing	PQUE	NCOS
Property Mgt System Interface	PMSI	BGD, CCOS, RMS
Recorded Announcement	RAN	INTR
Recorded Attendant Overflow Announcement	ROA	RAN
Remote Peripheral Equipment (1.5 Mbps)	RPE	
Room Status	RMS	BGD, CCOS
Set Relocation	SR	
Special Common Carrier	SCC	BRTE, TDET
Station Loop Pre-emption	SLP	ATVN
Stored Number Redial	SNR	
System Speed Call	ssc	
Time and Date	TAD	
Tone Detector	TDET	
User Status	UST	IMS
User-to-User Telset Messaging	UMG	IMS
2500-Set Features	SS25	
500 Set Access to 2500 Set Features	ss5	SS25

TABLE 9-8: CONTINUED

OVERLAY	DESCRIPTION
10	500/2500 SET
11	SL-1 SET
12	ATTENDANT CONSOLE
13	DIGITONE RECEIVER
14	TRUNK
15	CUSTOMER
16	TRUNK ROUTE
17	CONFIGURATION
18	SPEED CALL GROUP CALL CALL TRACE
19	CODE RESTRICTION
20	PRINT ROUTINE 1
21	PRINT ROUTINE 2
22	PRINT ROUTINE 3
23	AUTOMATIC CALL DISTRIBUTION MESSAGE CENTER
24	DIRECT INWARD SYSTEM ACCESS
25	MOVE DATA
26	GROUP DO NOT DISTURB
27	AUTOMATIC ROUTE SELECTION
28	ROUTE SELECTION FOR ANI
29	MEMORY MANAGEMENT
49	NEW FLEXIBLE CODE RESTRICTION
50	CALL PARK
56	FLEXIBLE TONE AND CADENCE
73	DIGITAL TRUNK INTERFACE
79	CUSTOMER NUMBERING PLAN
81	FEATUREPRINT
82	PRINT MULTIPLE APPEARANCE/HUNT
83	DESIGNATOR SORT PRINT
84	500/2500 DESIGNATOR ENTRY
85	SL-1 SET DESIGNATOR ENTRY
86	ESN OVERLAY I - ESN DATA - DIGIT MANIPULATION - ROUTE LIST - SPECIAL COMMON CARRIER
87	ESN OVERLAY II - NETWORK CONTROL - CALL SCREEN - COORDINATED DIALINGPLAN
88	AUTHORIZATION CODE
90	ESN OVERLAY III - NETWORK TRANSLATION
93	MULTI-TENANT SERVICE
99	FEATUREPRINT

TABLE: 9-9 MERIDIAN SL-1 DATA ADMINISTRATION OVERLAY PROGRAMS

CAPACITY

The capacity of the Meridian SL-1 is governed by a number of independent factors:

1. CPU Real Time
2. Traffic Capacity
3. Network Terminations
4. Memory

In a particular application, one or more of these factors determine the ultimate size of the system.

1. Real Time Capacity

The real time capacity is the measure of the system's ability to process calls. It is expressed as the number of seconds out of the 3600 seconds within an hour that are available for call processing.

Parameters that affect call processing capacity include:

- Software Generic
  The real time capacity can and does vary with the generic version and to some extent also with the particular issue of a given version.

- Terminal Usage
  It takes longer to process a call from a 500 type rotary dial telephone than from a 2500 Digitone or SL-1 Electronic telephone, or Meridian Digital telephone

- Traffic Ratio
  The mix of incoming, outgoing, and intra calls has an impact on real time capacity.

- Signaling Type
  Dial pulse signaling involves more CPU activity as opposed to the DTMF signaling used for Digitone.

- Holding Time
  In essence the shorter the holding time of a connection the bigger the impact on real time capacity since assumably more calls will be processed by the CPU. Thus data connections with long holding times will not impact CPU real time capacity as much as an ACD application for Directory Assistance.

- System Features
  The utilization of features for call modifications contributes to CPU real time activity.

The real time capacity of Meridian SL-1 is stated in terms of calls/hour under the following assumptions:

1. Assumed North America grade of service:

   - during the Average Busy Season Busy Hour (ABSBH) only 1.5% of originating traffic will receive a dial tone delay of 3 seconds or greater.

   - during High Day traffic only 20% of originating traffic will receive a dial tone delay of 3 seconds or greater.

2. Occupancy Assumption:

   - The proportion of real time used for total attempt processing during the ABSBH is 70% (2500 seconds):

   - Total attempts = completed calls + unsuccessful attempts

   - High Day traffic is assumed to be 1.3 X ABSBH traffic

   - High Day grade of service will be handled at 9 1% occupancy

3. Call Assumption:

   Unsuccessful attempts represents an additional 20 load on the CPU. Unsuccessful attempts are defined as partial dial or abandoned calls. The definition of a call encompasses blocked, busy/no answer, and answered calls. The proportion of time available for call processing during ABSBH is 58.3 % (2100 seconds).

A summary of the real time parameters for each model of Meridian SL-1 is provided in Tables 9-10 and 9-l 1. Figure 9-l shows the call handling capacity for each of the various Meridian SL-1 systems.

CALL: / SET	IN	OUT	INTRA	MERIDIAN SL-1 MODEL
500	310	382	201	S, MS
	430	545	284	N, ST
	125	180	90	XN
	79	91	68	RT, NT, XT
2500	310	327	180	S, MS
	430	456	244	N, ST
	125	132	82	XN
	79	85	75	RT, NT, XT
SL-1 (or Digital)	412	265	257	S, MS
	491	376	312	N, ST
	160	114	93	XN
	98	70	80	RT, NT, XT

TABLE 9-10: SIMPLIFIED REAL TIME PER CALL (MSEC) - GENERIC Xl 1 RELEASE 11

[redacted]	INTERCOM RATIO									[redacted]
SET	.1	.2	.3	.4	.5	.6	.7	.8	.9	MODEL
500	6206	6366	6554	6780	7055	7398	7838	8422	9236	S, MS
	4413	4526	4659	4818	5012	5254	5563	5974	6545	N, ST
	14074	14427	14844	15342	15949	16704	17670	18947	20717	XN
	25210	25735	26282	26854	27450	28074	28727	29411	30129	NT,XT,RT
2500	6748	6928	7141	7398	7711	8104	8609	9285	10235	S, MS
	4855	4989	5149	5340	5575	5871	6253	6767	7495	N, ST
	16660	17027	17457	17968	18584	19342	20297	21538	23216	XN
	25830	26054	26282	26515	26751	26992	27237	27486	27741	NT,XT,RT
SL-1 (or Digital)	6283	6374	6479	6601	6745	6918	7128	7390	7725	S, MS
	4917	5000	5096	5209	5344	5505	5705	5957	6286	N, ST
	15592	15895	16249	16667	17166	17775	18534	19505	20792	XN
	25119	25240	25362	25485	25609	25735	25862	25990	26119	NT, XT,RT

TABLE 9-l 1: TYPICAL CALLS PER HOUR - GENERIC Xl 1 RELEASE 11

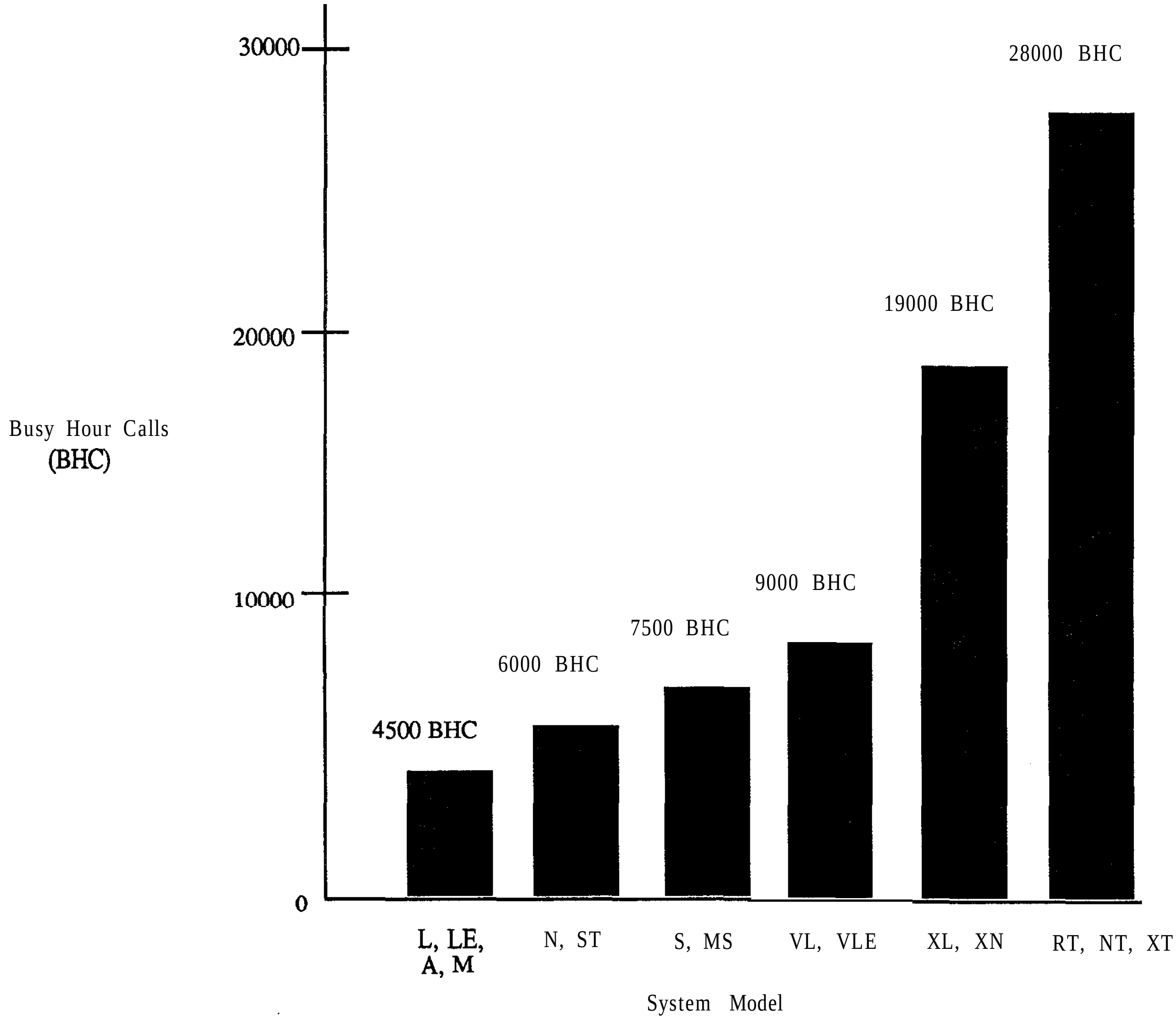


FIGURE 9-l: MERIDIAN SL-1 CALL HANDLING CAPACITY

2. Traffic Capacity

Each of the multiplexed loops in the switching network is capable of carrying varying amounts of traffic depending upon the allocation of associated peripheral terminations (traffic sources). A network loop can support a maximum of 160 terminations. However, in the practical sense, the universal peripheral bus structure permits the flexible assignment of different PE cards on the associated equipment shelves. In addition, peripheral card types vary in density so that contention to the available 30 time slots of the network loop may be controlled on a flexible basis. The fewer terminations, the higher the loop traffic capacity, and vice versa. Since RT, ST, NT, and XT inherit network enhancements, individual time slot selection permits non-blocking to be effected on a network loop basis (for allocations of 30 terminations or less: 36 CCS per device).

A summary of traffic handling capability is as follows:

PERIPHERAL TERMINATIONS PER LOOP (TRAFFIC SOURCES)	MERIDIAN SL- 1 TRAFFIC PER LOOP (MODELS ST, RT, NT, XT)
30 80 160	1080 CCS 735 ccs 660 ccs

Utilizing the foregoing criteria, system capacity is given by:

Meridian SL-1	Typical Traffic Loops	Terminations per Loop	Traffic per Loop	Total Traffic
ST	12	(30 or less)	1080 CCS	12,960 CCS
	12	(80)	735 CCS	8,820 CCS
	12	(160)	660 CCS	7,920 CCS
RT	12	(30 or less)	1080 CCS	25,920 CCS
	12	(80)	735 CCS	17,640 CCS
	12	(160)	660 CCS	15,840 CCS
NT	24	(30 or less)	1080 CCS	25,920 ccs
	24	(80)	735 ccs	17,640 CCS
	24	(160)	660 ccs	15,840 CCS
XT	120	(30 or less)	1080 CCS	129,6000 CCS
	120	(80)	735 ccs	88,200 CCS
	120	(160)	660 ccs	79,200 ccs

The figures above are given for guideline purposes and assume a fixed number of terminations per each loop. The actual traffic capacity for Meridian SL- 1 depends upon the allocation of terminations to network resources and will vary in accordance with system configuration.

3. **Network Terminations**

A peripheral equipment shelf can accommodate up to ten PE cards. A network loop can interface to a maximum of one, two, or four PE shelves, depending upon whether the associated card density is quad, double, or single, respectively. The actual number of peripheral equipment terminations to the network loop varies depending upon PE card quantity, type, and density. In each case, the network loop can support a maximum of 160 PE terminations. For example, in the double density (DD) peripheral environment, this equates to:

2 PE shelves x 10 cards x 8 ports/card = 160 terminations

For a specific Meridian SL-1 model, the maximum number of PE ports that can be supported from a network connectivity point of view is dependent upon the recommended quantity of network loops allocated for traffic handling purposes. For example, the various PE interface cards that can be assigned to a network loop varies from 2 to 8 ports for double density as follows:

MODEL	TYPICAL TRAFFIC LOOPS	MAXIMUM PE CARDS/LOOP (2 PE SHELVES)	PHYSICAL PE TERMINATIONS/MODEL (2 PORT)	(8 PORT)
MS	12	20	480	1920
N	12	20	480	1920
ST	12	20	480	1920
RT	12	20	480	1920
NT	24	20	960	3840
XT	120	20	4800 (A)	19200 (B)

Since the PE shelf utilizes a universal concept that permits accommodation of any mix of card types of different densities, the physical number of terminations is some arbitrary figure between the range of columns (A) and (B) above. In the practical sense, network terminations will not be a limiting factor that governs Meridian SL-1 capacity since other parameters such as real time or traffic capacity will be reached first. An exception to this, however, is the Meridian SL-1S where in fact system capacity is limited to the provision of a maximum of 28 PE cards. This then equates to:

MAXIMUM PE CARDS	MAXIMUM PE TERMINATIONS (2 PORT)	(8 PORT)
28	56 (A)	224 (B)

Again, the physical number of network terminations will be a figure between the range of (A) and (B) depending upon allocation of PE card types.

4 - Memory

(i) MERIDIAN SL-1S, MS, ST, N, AND XN

The Meridian SL-1 memory capacity is dependent upon system type. A number of random access memory cards may be combined to provide storage up to the maximum addressable RAM via physical memory pages, each ranging from 0 - 64K. These memory pages are provided by 64K RAM chips located on the associated memory modules. The addressable memory range is segregated into the following functional segments:

(1) Pages 0 and 4 - Transient Data Store

This unprotected store is used to hold transient call processing information such as the network paths in use, digits dialed, etc.

(2) Page 1 - Office Data Store

This protected store holds all the office data including class-of-service, key feature assignments, etc.

(3) Pages 2 and 6 - Program Store

(a) Firmware. The first module (8k words) of program store is non volatile ROM used for storage of all system firmware, including trap sequence.

(b) Overlay. This portion of memory may be loaded with various nonresident programs as required during automatic diagnosis, service order change, traffic measurement or maintenance. Such programs held on magnetic tape are referred to as ‘overlay’ programs because the previous program is ‘overlaid with the current program.

(c) Software. The remainder of this memory page is reserved for the storage of all system call processing software.

(4) Page 5

In the Meridian SL-1S, MS, ST, and N, this page is used for Program Store, and in the Meridian SL-1 XN, it is used for Protected Data Store.

(5) Pages 3 and 7 - I/O Addresses.

There are no RAM modules loaded in these pages.

Table 9-12 denotes the allocation of memory pages to the various SL-1 models. Program store requirements vary with the features provided as detailed in Table 9-13. The capability exists to overflow from one memory card to another within the confines specified by the footnotes.

The data store requirements have a fixed portion and a variable portion of memory. The variable portion varies directly in accordance with the number of peripheral (lines, trunks, etc.) and common equipment units (network loops, conference, TDS, etc.).

MODEL	S, MS			ST		N	XN					
GENERIC	711			1011		811	911					
RELEASE	4 & LATER			9 & LATER		4 & LATER	4			5 & LATER		
PAGE	UDATA	PDATA	PS	UKDATA	PDATA	PS	UDATA	PDATA	PS	UDATA	PDATA	PS
0	32K			64K			64K			64K		
1		64K			64K			64K [3]			64K	
2			32K			64K*			64K*			64K*
4							64K			64K		
5			64K			64K		64K [2]			64K [8]	
6			64K			64K			64K [1]		64K [7]	
8												64K [1]
9												64K [2]
10												64K [3]
12												64K [4]
13												64K [5]
14												64K [6]
TOTAL	32K	64K	160K	64K	64K	192K	128K	128K	128K	128K	192K	448K
RANGE	256K			320K			384K			768K		

NOTES: UDATA = Unprotected Data Store PDATA = Protected Data Store PS = Program Store
[ ] Figures in parentheses denote sequence of Program Store overflow from Page 2
* includes 8K from ROM firmware

TABLE 9-12: MERIDIAN SL-1 MEMORY CAPACITY (S, MS ST, N, XN)

(ii) MERIDIAN SL-1RT, NT and XT

(a) Structure

The random-access memory capacity of the RT, NT and XT systems is dependent upon the number of physical memory cards that can be accommodated on the associated common equipment shelf. Specifically, this equates to one 768K memory card on the RT and NT (for 768K words of storage) and up to three such cards on the XT (for 2304K words of storage). The memory cards are provisioned in duplicate for added reliability. Memory utilization within the available range is dependent upon the selected system features and the number of terminations being served. The addressable memory range is partitioned into the following functional segments:

- Unprotected Data Store (UDS)

  This segment holds the transient or unprotected data that is required during call processing. Included are timing queues and call registers.

- Protected Data Store (PDS)

  This segment holds the office data specific to each individual installation.

- Program Store (PS)

  This segment holds:

Firmware:	non-volatile Read-only Memory (ROM) used for storage of system fiiware
Overlay:	this portion of memory may be loaded with non-resident programs as required during automatic diagnostic routines, service change, traffic measurement, and administration
Software:	the remainder of the program store is reserved for the system software required for call processing and the optional feature groups selected.

- Input/Output (I/O) Addresses

  This segment is reserved for I/O device addresses and does not utilize any of the storage capability provided by the physical 768K memory card(s) equipped.

A significant enhancement incorporated in the memory organization for the RT, NT and XT is the allocation of physical memory on a contiguous basis. Each of the functional segments - UDS, PDS, and PS - has no rigid boundary but instead is separated by "soft" segmentation. The size of these segments is completely variable and is allocated in 4K word increments. Thus, the actual usable memory is limited only by the number of physical cards equipped.

(b) Organization

With the RT, NT and XT CPU, the concept of logical pages is retained only with respect to the memory types UDS, PDS, PS, and I/O (Figure 9-2). Input/Output addresses are assigned to the upper 4 M words of memory. The remaining 12 M words of addressable memory is divided among UDS, PDS, PS, and unequipped memory as required for the system configuration. Except for the physical limits of memory and the PS requirements (Table 9-13), there is no limit on the size or relative proportions of PDS and UDS.

The first 2K words are fast RAM mainly used for stacks. Below the Lower Write Protected Boundary, which is preset to 32K, are the unprotected global variables and part of the unprotected data store. Between 32K and 64K are the protected global variables and part of the protected data store. From 64K to 68K is reserved for the 4K bootstrap ROM.

The PDS and PS areas, starting from 68K, are defined during SYSLOAD as they are read into memory. That is, the boundary (Upper Write Protected Boundary) between the protected and unprotected memory is set based on the quantity of PDS and PS (in 4K increments). The memory between the Lower Write Protected Boundary and Upper Write Protected Boundary is write protected when Write Protect is enabled. The UDS region thus covers what remains of physical memory, assigned unprotected data, and any unassigned memory. Unassigned memory will form a boundary region between PDS (which will expand upward) and UDS (expanding downward).

As new data is added in service change, the boundary between protected and unprotected memory will be changed (in 4K increments) to cover the expanded PDS. If a service change would cause UDS and PDS to overlap, error messages will be printed, and the change will not be allowed. When a new memory card is added to the system, it is assigned in the configuration record and the system is reloaded. During SYSLOAD the new memory capacity is added to the UDS region as unassigned memory, which can be used for both protected and unprotected data growth.

Figure 9-3 shows the evolution of memory card packaging throughout the life cycle of Meridian SL-1 and Figure 9-4 denotes the resulting storage capacity for each system model.

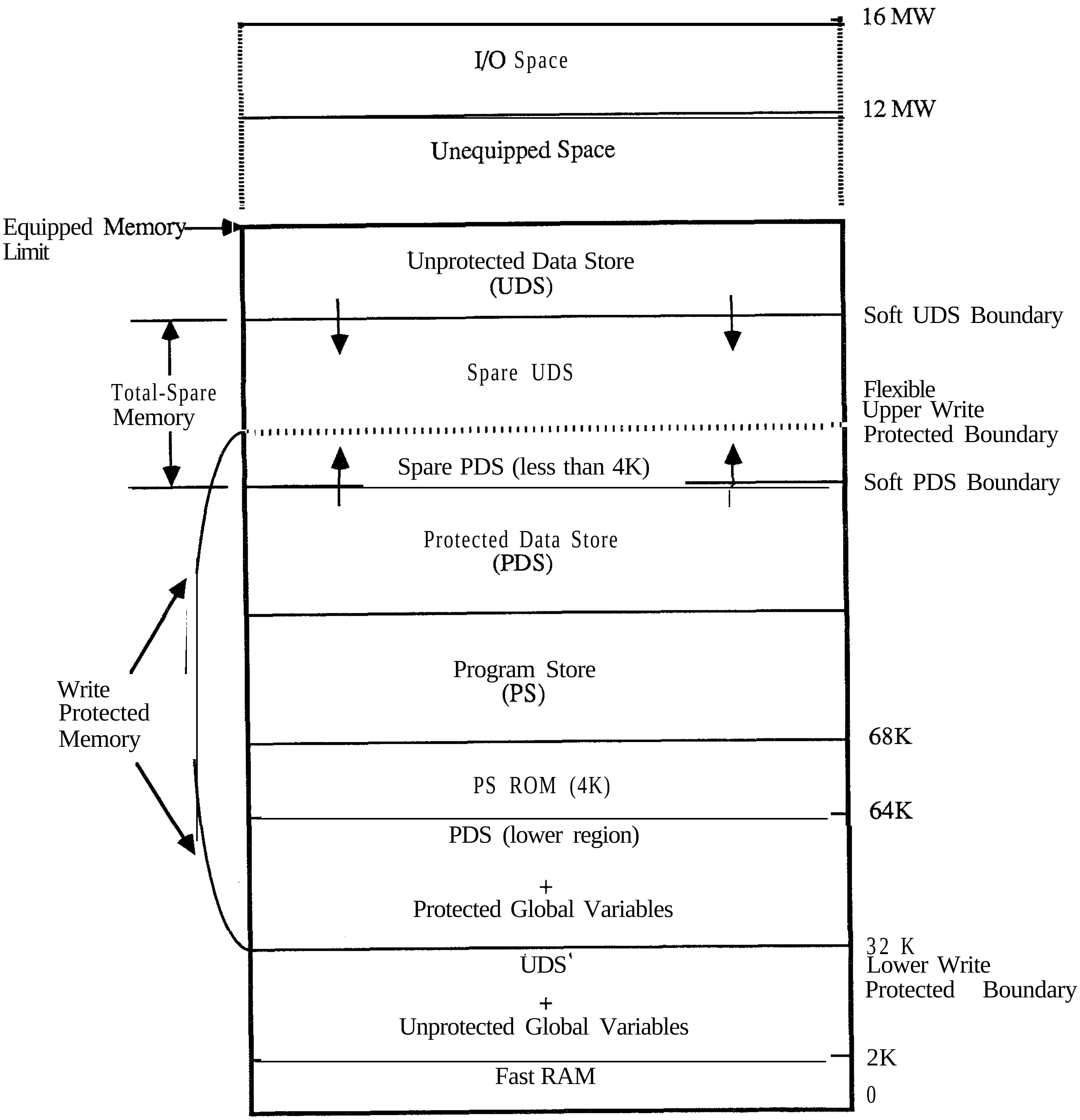


FIGURE 9-2: MERIDIAN SL- 1 MEMORY ORGANIZATION (RT, NT & XT)

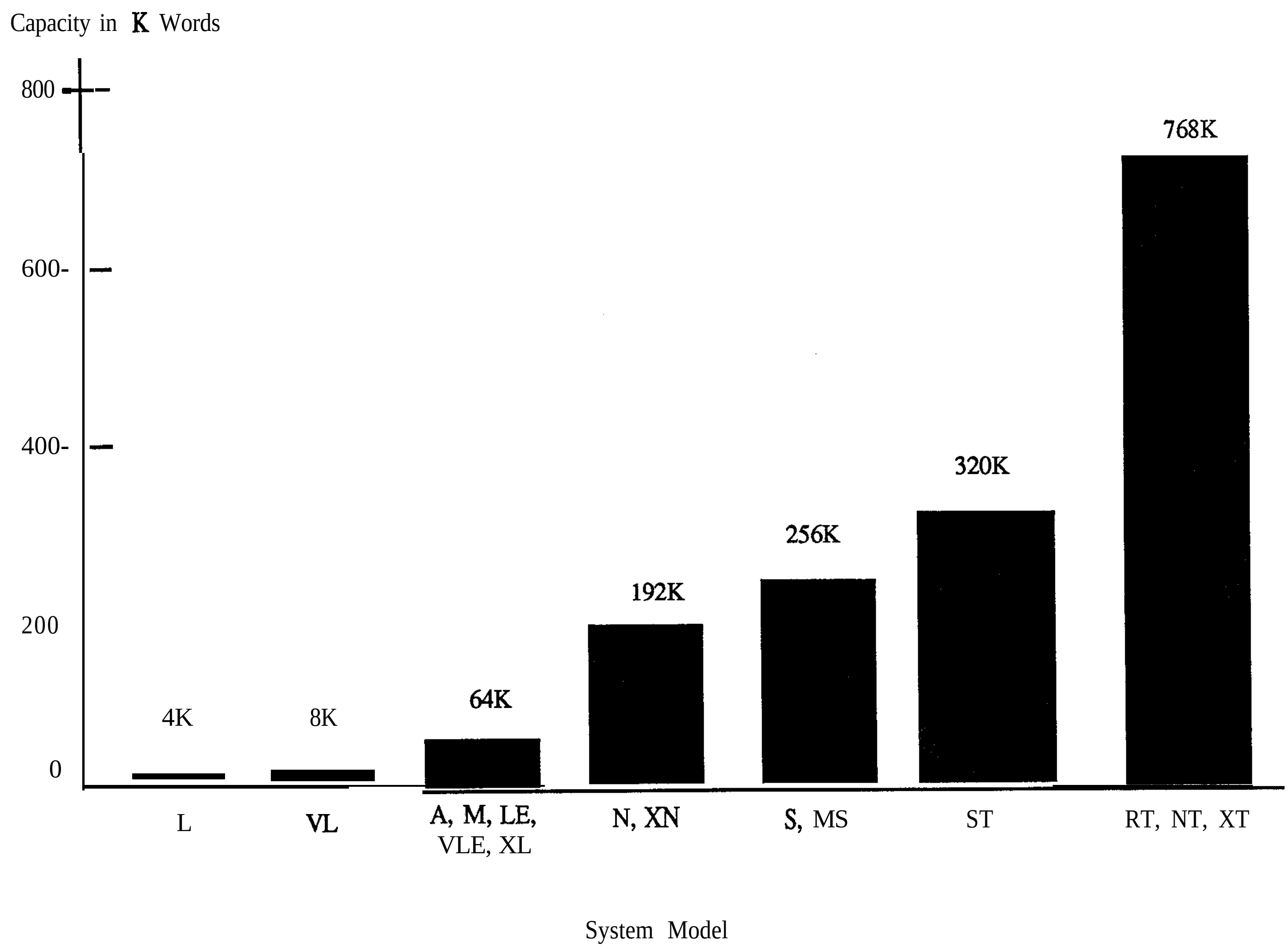


FIGURE 9-3: MERIDIAN SL-1 MEMORY CARD CAPACITY

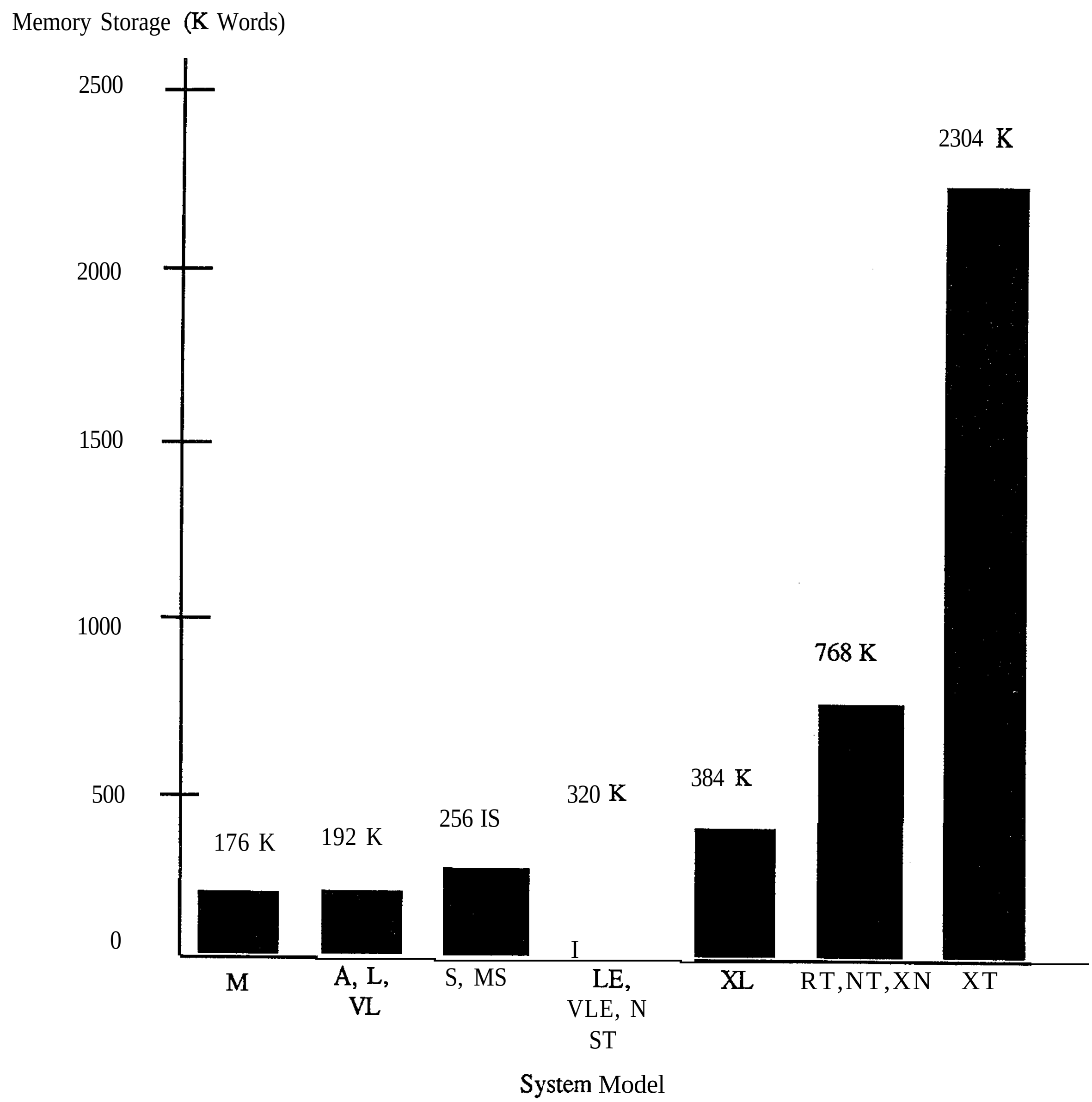


FIGURE 9-4: MERIDIAN SL-1 RANDOM-ACCESS MEMORY

OP #	DESCRIPTION MODEL	S, MS	ST/N	XN	NT/XT/RT
	GENERIC	711	1011/811	911	1111/1211/1311
	RELEASE	10	10	10	10
	Resident Programs	95.56	100.31	95.45	72.36
	Read/Write Firmware	0.34	0.4	0.96	0.74
	Overlay Area	16.96	17.42	17.42	26.15
1	OPTF Extended PBX Features	0	0	0	0
2	CUST Multi-Customer	0	0	0	0
3	AIOD Auto Ident. of Out Dial	0.88	0.88	0.87	0.65
4	CDR Call Detail Recording	2.23	2.23	2.2	1.69
5	CTY CDR - TTY	0.99	0.99	0.98	0.76
6	CLNK CDR - Magnetic Tape	0.66	0.66	0.66	0.51
7	RAN Recorded Announcements	1.49	1.49	1.47	1.13
8	TAD Time and Date	0.72	0.72	0.73	0.54
9	DNDI Do Not Disturb - Individual	0.4	0.4	0.39	0.29
10	EES End-to-End Signaling	0.83	0.85	0.84	0.69
11	INTR Intercept	0	0	0	0
12	ANI Automatic Number Identification	1.56	1.55	1.53	1.19
13	ANIR ANI Route Selection	0.2	0.2	0.19	0.16
14	BRTE Basic Routing	6.44	6.44	6.34	5.01
15	RPE Remote Peripheral Equipment	1	1.01	1	0.78
16	DNDG Do-Not-Disturb - Group	0.47	0.47	0.46	0.36
17	MSB Make Set Busy	0.1	0.1	0.1	0.07
18	SS25 2500 Set Features	0.64	0.64	0.63	0.5
19	DDSP Digit Display (SL-1 Sets)	3.63	3.63	3.3	2.56
20	ODAS Office Data Administration System	1.21	1.21	1.21	0.94
21	DI Dial Intercom Group	0.65	0.65	0.64	0.48
22	DISA Dial Inward System Access	0.31	0.31	0.31	0.23
23	CHG CDR Charge Account	0.35	0.35	0.34	0.26
24	CAB Charge/Auth Code Base	1.14	1.14	1.13	0.85
25	BAUT Basic Authorization Code	0.3	0.3	0.29	0.22
26	CASM Central Attn. Service Main	0.15	0.15	0.15	0.11
27	CASR Central Attn. Service Remt.	6.65	6.69	6.64	5.22
28	BQUE Base Queuing	2.46	2.47	2.43	1.89
29	NTRF Network Traffic	0.54	0.54	0.53	0.46
30	CMAC Comm Manage Admin Change	0.83	0.83	0.83	0.7
31	MCDR Mini CDR (M system only)	1.2	-	-	-
32	NCOS Network Class of Service	0.1	0.1	0.1	0.08
33	CPRK Call Park	3.59	3.58	3.53	2.64
34	SSC System Speed Call	0.1	0.1	0.1	0.08
35	IMS Integrated Message System	2.8	2.8	2.75	2.12
36	ROA Recorded Overflow Announcement	0.38	0.38	0.1	0.08
37	NSIG Network Control/Signal	2.32	2.32	2.27	1.83
38	MCBQ Network Queuing - Main	2.68	2.7	2.65	2.09
39	NSC Network Speed Call	0	0	0	0
40	BACD Auto Call Distribution - Base	12.99	13.02	13.16	10.38
41	ACDB ACD Package B	0.05	0.05	0.05	0.04
42	ACDC ACD Package C1	15.76	15.76	15.6	12.45
43	LMAN ACD Package C2 - Load Management	0	0	0	0
44	MUS Music	1.05	1.05	1.03	0.82
45	ACDA ACD Package A	0	0	0	0
46	MWC Multiple Message Center	1.33	1.33	1.3	0.99
47	AAB Automatic Answerback	0.11	0.11	0.11	0.09
48	GRP Group Call	2.26	2.25	2.22	1.68

TABLE! 9- 13: MERIDIAN SL-1 PROGRAM STORE REQUIREMENTS

OP #	DESCRIPTION MODEL	S. MS	ST/N	XN	NT/XT/RT
	GENERIC	-711	1011/811	911	1111/1211/1311
	RELEASE	10	10	10	10
49	NFCR New Flexible Code Restriction	0.46	0.46	0.45	0.35
50	LNK Auxiliary Link (ACD-D)	0.15	0.15	0.15	0.12
51	ACDD ACD Package D	2.53	2.53	2.5	2.1
52	FCA Forced Charge Account	0	0	0	0
53	SR Set Relocation	5.51	5.51	5.44	4.22
54	AA Attendant Administration	0.65	0.65	0.64	0.47
55	HIST History File	0.04	0.04	0.04	0.03
56	AOP Attendant Overflow Position	0.63	0.63	0.61	0.45
57	BARS Basic Automatic Route Selection	0	0	0	0
58	NARS Network Automatic Route Selection	0	0	0	0
59	CDP Coordinated Dialing Plan	0.07	0.07	0.07	0.05
60	PQUE Priority Queuing	0	0	0	0
61	FCBQ Flexible Callback Queue	0.02	0.02	0.02	0.02
62	OHQ Off-Hook Queuing	0.12	0.12	0.11	0.09
63	NAUT Network Authorization Code	0.5	0.5	0.49	0.37
64	SNR Stored Number Redial	0.84	0.84	0.83	0.59
65	TDET Tone Detector	0.39	0.38	0.38	0.3
66	SCC Special Common Carrier	0	0	0	0
67	NXFR Network Transfer	0.65	0.65	0.64	0.53
68	ATVN Autovon	5.121	5.11	5.1	4.01
69	ACDR Autovon CDR	0	0	0	0
70	HOT Hotline	0.24	0.24	0.24	0.18
71	DHLD Deluxe Hold	0.58	0.58	0.57	0.46
72	LSEL Line Selection	0.17	0.17	0.17	0.12
73	SS5 500 Set Dial Access	0.01	0.01	0.01	0.01
74	DRNG Distinctive Ringing	0.68	0.7	0.69	0.55
75	PBXI PBX Interface/Digital Trunk Interface	5.78	5.85	5.78	4.56
76	DLDN Departmental LDN	0.09	0.09	0.09	0.06
77	CSL Command Status Link	15.08	15.08	14.67	11.49
78	AMP Auto Modem Pooling	1.47	1.47	1.46	1.12
79	OOD Optional Outpulsing Delay	0	0	0	0
80	SCI Station Category Indication	0	0	0	0
81	CCOS Controlled Class of Service	0.25	0.25	0.24	0.19
82	RESDB Resident Debug	4.03	4.13	4.36	4.8
83	CDRQREC CDR Queue Recordl	0	0	0	0
84	ATM Automatic Trunk Maintenance	0	0	0	0
85	CSLA	0	0	0	0
86	TENANT Multi-Tenant Service	0.44	0.44	0.44	0.34
87	FTDS Fast Tone Digit Switch	0	0	0	0
88	DSET Digital Set	8.92	8.92	8.79	6.83
89	TSET M3000 Touchphone	0	0	0	0
90	LNR Last Number Redial	0.28	0.28	0.28	0.22
91	DLT2 Digital Digit Display Set	0	0	0	0
92	PRETRAN Pretranslation	0.35	0.35	0.34	0.25
93	SUPV Supervisory Console	0.88	0.88	0.86	0.71
95	CPND Call Party Name Display	0.8	0.8	0.78	0.63
96	SLST Meridian SL-1ST (Note 5)	0	0	0	0
98	DNIS Dialed Number ID Service	0	0	0	0
99	BGD Background Terminal	11.21	11.21	11.09	8.9
100	RMS Room Status	1.58	1.58	1.58	1.58
101	MR Message Registration	0.86	0.86	0.84	0.65
102	AWU Automatic Wakeup	4.5	4.49	4.44	3.36
103	PMSI Property Management I/F	0.05	0.05	0.05	0.04

TABLE 9- 13: CONTINUED

OP #	DESCRIPTION MODEL	S, MS	ST/N	XN	NT/XT/RT
	GENERIC	711	1011/811	911	1111/1211/1311
	RELEASE	10	10	10	10
105	LLC Line Load Control	0.08	0.08	0.08	0.06
106	SLP Station Loop Pre-emption	1.17	1.17	1.16	0.92
107	MCT Malicious Call Trace	0.34	0.34	0.34	0.28
108	ICDR Internal CDR	0	0	0	0
109	APL Auxiliary Processor Link	4.76	4.76	4.69	3.8
110	TVS Trunk Verification from Station	-	-	-	-
111	TOF Timed Overflow	1	1	1	1
	TOTAL (base = resident + overlay area + firmware)	117.12	122.81	118.11	102.76
	Number of R/W Modules (base)	1 (56K)	1 (56K)	1 (56K)	
		NOTE 1	NOTE 1	NOTE 1	
	Overflow (base)	61.12	66.81	62.11	46.76
		NOTE 2	NOTE 2	NOTE 2	
	Total of All Optional Packages	165.86	178.75	183.08	140.22
	Overflow base + all optional packages	226.98	245.56	245.19	186.98
		NOTE 3	NOTE 3	NOTE 4	
	ROM	8	8	8	8
NOTE 1:	Only 56K of the first program store is available.				
NOTE 2:	Overflow into Protected Data Store or Page 6.				
NOTE 3:	Program is first loaded into Page 2, then overflows into pages (if equipped) in the following sequence:				
	Page 6, Page 5, Page 1.				
NOTE 4:	Program is first loaded into Page 2, then overflows into pages (if equipped) in the following sequence:				
	Page 6, Page 5, Page 1.				
	or Page 8, 9, 10, 12, 13, 14, 6, 5, 1 if Memory Enhancement (768K store) exisits				
NOTE 5:	Generic 1011 Software must have package SLST activated to support Meridian SL-1ST.				

TABLE 9-13: CONTINUED

CODE	DESCRIPTION	PURPOSE	PROVISION
NT0R03AA	TRANSPORT TERMINATOR	TERMINATES THE TRANSPORT SIGNALS ON EACH DIGITAL SHELF	1 PER DIGITAL SHELF WHENREDUNDANT TRANSPORT OPTION IS CHOSEN
NT0R04AA	TONE DETECTOR	PROVIDES 16 CHANNEL INTERFACE TO THE TRANSPORT	DEPENDENT UPON APPLICATION
NT0R08AA	2 MBYTE MEMORY	CONTAINS 2 MB OF RANDOM ACCESS MEMORY (RAM) FOR ACCESS BY ASSOCIATED PROCESSOR VIA P-BUS	UP TO 4 MEMORY CARDS PER PROCESSOR DEPENDING UPON APPLICATION
NT0R09AA	PROCESSOR	PROVIDES PROCESSING CAPABILITY FOR PTE AND ADDRESSES UP TO 8 MB OF MEMORY VIA ASSOCIATED P-BUS	ACCORDING TO APPLICATION REQUIREMENTS
NT0R12AA	SYNCHRONOUS DATA FORMATTER (SDF)	PERFORMS BUFFERING AND FRAMING TASKS ON SYNCHRONOUS DATA DESTINED FOR THE PTE PROCESSORS	1 PER PROCESSOR HANDLING SYNCHRONOUS DATA
NT0R20AA	TRANSPORT REPEATER	PROVIDES REPEATER CIRCUITRY FOR 12 DIGITAL SHELVES. REQUIRED WHEN MORE THAN 4 DIGITAL SHELVES ARE EQUIF'PED	1 PER TRANSPORT CONTROLLER WHEN BASIC MODULE HAS MORE THAN 2 SEGMENTS
NT0R24AA	TRANSPORT CONTROLLER	RESPONSIBLE FOR THE ORDERLY FLOW OF DATA ON THE TRANSPORT	1 PER BASIC MODULE. 2 IF REDUNDANT TRANSPORT OPTION IS CHOSEN
NT0R26AA (NT0R10) (NT0R14)	DS-1 INTERFACE (2 CARD ASSEMBLY)	PROVIDES ONE 24-CHANNEL DS-1 INTERFACE FOR CONNECTING TO THE CIRCUIT SWITCH EQUIP-MENT (CSE) OF MERIDIAN SL-1	1 PER 24 CHANNELS REQUIRED BETWEEN PTE AND CSE

TABLE 9-14: PACKET TRANSPORT HARDWARE PROVISIONING

CODE	DESCRIPTION	PURPOSE	PROVISION
NT0R27AA (NT0R58) (NT0R36)	VOICE COMPRESSOR (2 CARD ASSEMBLY)	PROVIDES 4 CHANNELS WHICH ALLOW 4 SIMULT-ANEOUS VOICE STORE OR RETRIEVAL OPERATIONS	1 PER 4 SIMULTANEOUS ACTIVE VOICE MESS AGING USERS
NT0R28AA (NT0R23) (NT0R25)	LANLINK INTERFACE (2 CARD ASSEMBLY)	ALLOWS CONNECTION OF 16 COMPUTERS (MACINTOSH II, IBM PC AND COMPATIBLES) TO THE PACKET TRANSPORT	1 PER 16 COMPUTERS
NT0R30AA (NT0R07) (NT0R29)	MASS STORAGE INTERFACE (2 CARD ASSEMBLY)	PROVIDES INTERFACE TO THE TRANSPORT FOR ONE DISK/TAPE SHELF	1 PER DISK/TAPE SHELF
NTORSOAA	POWERMONITOR	MONITORS CABINET POWER AND PROVIDES PROTECTION BY REMOVING POWER UNDER HIGH TEMPERATURE CONDITIONS	1 PER CABINET
NT0R52AA	DIGITAL POWER UNIT	CONVERTS -48V DC TO +5V/+15V/-15V FOR USE BY DIGITAL SHELF CARDS	DEPENDENT UPON DIGITAL SHELF CONFIGURATION
NT0R53AA	DISK/TAPE POWER UNIT	CONVERTS -48V DC TO +5V/-5V/- 12V/+24V FOR USE BY MASS STORAGE DEVICES LOCATED IN THE DISK/TAPE SHELVES.	1 PER DISK/TAPE SHELF
NT2R02AA	PACKET TRANSPORT BASIC CABINET	ACCOMMODATES UP TO 3 DIGITAL OR DISK/TAPE SHELVES IN ANY COMBINATION AND AN OPTIONAL 48V RECTIFIER	UP TO 15 PER BASIC MODULE
NT2R05AA	POWER MONITOR SHELF	ACCOMMODATES THE POWER MONITOR CARD	1 PER CABINET

TABLE 9-14: CONTINUED

CODE	DESCRIPTION	PURPOSE	PROVISION
NT2R07AA	DIGITAL SHELF	PROVIDES SLOTS FOR 2 DIGITAL POWER UNITS AND 18 DIGITAL CARDS (16 ADDRESSABLE PLUS 2 NON-ADDRESSABLE)	UP TO 12 PER BASIC MODULE
NT2R15AA	LANSTAR PC INTERFACE	PROVIDES INTERFACE FOR IBM PCs TO CONNECT TO TRANSPORT VIA LANLINK INTERFACE	1 PER IBM PC/XT/AT OR COMPATIBLE
NT2R19AA	PTE CABINET EXPANSION KIT	PROVIDES NECESSARY HARDWARE COMPONENTS TO JOIN CABINETS TOGETHER IN A MULTI-CABINET CONFIGURATION	1 PER CABINET FOR EVERY CABINET ADDED
NT2R23AA	BLOWER UNIT	PROVIDES COOLING FOR ALL DIGITAL SHELVES IN A CABINET	1 PER CABINET EQUIF'PED WITH DIGITAL SHELVES
NT2R24AA	DISK/TAPE SHELF	HOUSES 1 TAPE UNIT, 2 DISK UNITS, DISK TAPE CONTROLLERCARDAND DISK/TAPE POWER UNIT	DETERMINED BY DISK STORAGE REQUIREMENTS
NT2R25AA NT2R26AA NT2R27AA NT2R28A.A	P-BUS 5 SEGMENT P-BUS 4 SEGMENT P-BUS 3 SEGMENT P-BUS 2 SEGMENT	PROVIDES A PRIVATE BUS FOR COMMUNICATION BETWEEN 2 MB MEMORY CARDS, SYNC DATA FOR-MATTER AND ASSOCIATED PROCESSOR	1 PER PROCESS OR
NT0R60AA	MACINTOSH II INTERFACE	PROVIDES INTERFACE FOR MACINTOSH II TO CONNECT TO TRANSPORT VIA LANLINK INTERFACE	1 PER MACINTOSH II COMPUTER

TABLE 9-14 CONTINUED

CONTENTS

SECTION : 10 ORDERING INFORMATION

DESCRIPTION **PAGE**

ORDERING INFORMATION

Introduction

Ordering the Meridian SL-1 is a straightforward process. Due to its modularity and flexibility, each system is individually configured to suit specific applications. The necessary equipment and associated quantity depends upon the system requirements which essentially fall into each of the following categories:

A. Hardware

- Number and Type of Terminals (500/2500 type, SL-1, digital sets, etc.)
- Number and Type of Trunks (CO, FX, TIE, DID, etc.)
- Number and Type of Data Units (ADM, AIM, etc.)
- Traffic requirements for the various Peripheral Equipment ports

B. Software

- Basic Generic Program required to support the requested features
- Optional Software Groups applicable to the required features

From these requirements, the corresponding system elements outlined in Chart 10-l and their respective quantities are calculated.

Autoquote

The Autoquote mechanism is generally utilized as a base for order input. System requirements provide input for the automatic generation of associated Hardware and Software data. Although the Autoquote system contains many engineering rules, it does not perform an exhaustive and complete configuration for every potential system requirement. The user should always review the reports produced by the system to ensure that all requirements are met. Because of this, the price quoted by the Autoquote system applies only to the hardware and software items listed. It is conceivable, in some instances, that manual adjustments may have to be made to accommodate any special engineering or system requirement.

The following reports are available from the Autoquote:

Print Option	Description
0	Quote Profile Report
1	Summary Price Report
2	Expanded Price Report
3	Equipment Breakout Report
4	Engineering Summary Report
5	Equipment Summary Report
6	Input Data Listing
7	RPE Summary
9	Equipment Breakout/Pricing

A PTE Autoqoute model is also available for quoting the Packet Transport applications of Meridian Mail and Meridian LANSTAR.

Common Equipment

- CE Cabinets
- CE Shelves (CPU/Memory and Network)
- Mass Storage Unit
- Central Processing Unit
- Memory Modules
- Network Circuit Cards
- Peripheral Signaling Cards
- Tone and Digit Switches
- Conference Cards
- Teletypewriters
- Segmented Bus Extenders
- Multigroup Extenders
- 3-Port Extenders
- 5/12V Converters
- Serial Data Interfaces
- Dummy Faceplates

Peripheral Equipment

- PE Cabinets
- PE Shelves
- PE Buffers
- Line Interface Cards
- Trunk Interface Cards
- Digitone Receivers
- Data Interface Cards
- Digital Trunk Interface
- Computer to PBX Interface

Packet Transport

- Meridian Mail
- Meridian LANSTAR

Terminal Equipment

- SL- 1 Electronic Telephones
- 500/2500 type Telephones
- Attendant Consoles
- Key/Lamp Add-on Modules
- Handsfree & Headset Modules
- Displayphones
- Data Access Units
- Digital Telephones

Power Equipment

- 48V Rectifiers
- Power Converters
- Transfer Units
- Reserve Power Supply
- Supplementary Power Supplies
- Converters and Inverters
- Ringing Generators
- Regulators
- Power Monitors
- Cooling Units
- Distribution Units

Software (RTU Fee)

- Basic Program
- Feature Option Groups

Cables & Auxiliary Equipment

- Interconnection Termination Cables
- MDF & Cross-Connect Terminal Blocks
- Designation Material

CHART 10-l: MERIDIAN SL-1 ORDERING ELEMENTS

PACKAGE CONCEPT

Pre-packaged Hardware

To simplify the ordering process and reduce the number of orderable items, pre-packaged hardware is available for each system type. The packages form the basis for all system applications and are identified as follows:

CHART	TABLES	DESCRIPTION
10-2	10-l and 10-2	Meridian SL- 1 S
10-3	10-3 and 10-4	Meridian SL-1MS
10-4	10-5 to 10-8	Meridian SL-1N
10-5	10-9 to 10- 11	Meridian SL-1ST
10-A1	10-A1 to 10-A2	Meridian SL-1RT
10-6	10-12 to 10-14	Meridian SL- 1 NT
10-7	10-15 to 10-17	Meridian SL-1XT
--	10-18 and 10-19	Remote Peripheral Equipment
10-8 and 10-9	10-20 and 10-22	Packet Transport

Note that the information contained in the above Charts and Tables is subject to change. Please consult the Meridian SL-1 Price Manual to verify the availability of product packages and their contents.

Where applicable, systems are not offered below the basic package complement. To serve applications under the package capability, unused hardware is either reallocated or retained for use as spares.

Peripheral substitutions by circuit type on a like-for-like basis (lines for lines and trunks for trunks) are permitted for certain packages to provide flexibility in system application.

For each system type, the basic package can be expanded up to the full capacity of the system by adding the appropriate complement of equipment. Various sub-packages are available that group together required elements, thus eliminating the possibility of overlooking certain necessary equipment. Single apparatus items are specified by their individual ordering code.

Software

The Basic Software Generic Program is always required in addition to the package hardware. Optional software features are individually specified by their appropriate ordering code corresponding to the required group numbers.

MERIDIAN SL-IS

The Meridian SL-1S is packaged in a self-contained cabinet that accommodates all the equipment necessary for total system capacity. To facilitate ordering requirements, various pre-packaged systems are available to meet different applications. The packages differ only in the provisioning of peripheral equipment as detailed in Tables 10- 1 and 10-2. In each case, an optional CE or PE shelf may be specified to expand the system capability. Additional circuit cards beyond the complement specified in each pre-packaged system may be ordered on an individual basis up to system capacity.

ORDER CODE	DESCRIPTION	PROVISION
169SL1-1	Pre-Packaged System comprising: 56 Lines, 12 Trunks, 1 Console, Digitone Single CPU, 256K Memory, (Error Correction/Detection), 2 NET loops, 1 TDS, 1 CONF Cabinet (Front Access) Equipped with: 1 - CPU/ MEM/ NETWORK Shelf 1 - Mass Storage Unit 1 - Power Backplane 1 - 48V Rectifier 2 - PE Backplanes	One per system (Always required) Expansion capability for: 1 CE or PE Option Shelf

TABLE 10-l: MERIDIAN SL-1S 12x 56 PRE-PACKAGED BUSINESS SYSTEM

ORDER CODE	DESCRIPTION	PROVISION
193SL1-1	8 X 32 Pre-Packaged System (Digital) comprising: 32 Lines, 8 Trunks, Digitone Single CPU, 256K Memory (Error Correction/Detection), 2 NET loops, 1 TDS, 1 CONF 24 - Digital Telephones Cabinet (Front Access) Equipped with: 1 - CPU/ MEM/ NETWORK Backplane 1 - Mass Storage Unit 1 - Power Backplane 1 - 48V Rectifier 2 - PE Backplanes MDF & Castors	One per system (Always required) Expansion capability for: 1 CE or PE Option Shelf
194SL1-1	8 X 32 Pre-Packaged System (SL- 1) comprising: 32 Lines, 8 Trunks, Digitone Single CPU, 256K Memory (Error Correction/Detection), 2 NET loops, 1 TDS, 1 CONF 24 SL- 1 Telephones Cabinet (Front Access) Equipped with: 1 - CPU/ MEM/ NETWORK Backplane 1 - Mass Storage Unit 1 - Power Backplane 1 - 48V Rectifier 2 - PE Backplanes MDF & Castors	One per system (Always required) Expansion capability for: 1 CE or PE Option Shelf

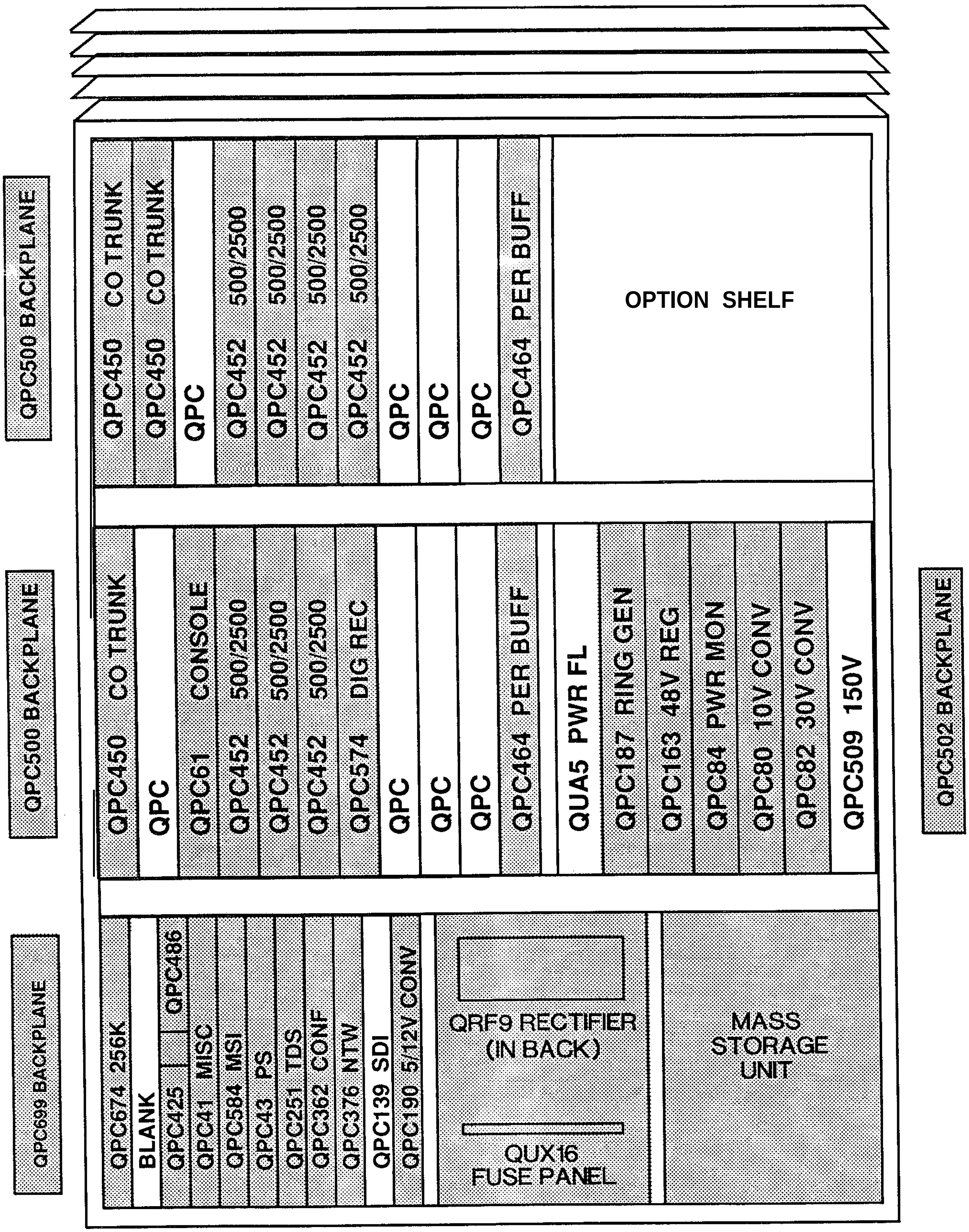
TABLE 10-2: MERIDIAN SL-1S 8 x 32 PRE-PACKAGED BUSINESS SYSTEMS

CODE	DESCRIPTION	NOTE
169SL1-1	Pre-packaged S System	
	56 Lines, 12 Trunks, 1 Console	
193SL1-1	8X32 Digital Prepackage	
	8 Trunks, 24 Digital Lines	
194SL1-1	8X32 SL-1 Prepackage	
	8 Trunks, 24 SL-1 Lines	

QUANTITY			CODE	DESCRIPTION	NOTE
1	1	1	A0297366	Filter Connector (25 Cond.)	
6	6	6	A0324084	Diskettes, 5.25" Floppy	
-	1	1	NT1F07AA	M2018 Digital Telephone	
-	23	1	NT1F05AA	M2009 Digital Telephone	
1	1	1	P0552536	Fuse Kit	
1	1	1	P0661194	Blank Faceplate	
1	1	1	P0677315	Bracket Assembly (QMM43)	
1	1	1	QCA60	CE/PE Cabinet (with MDF & castors)	
1	1	1	QCAD36	Cable (Serial Data Interface)	
1	1	1	QCAD123B	Cable Assembly	
2	1	1	QCAD124	Cable (Network/P.E. Loop)	
1	1	1	QCAD137	Intra-Cabinet Cable	
1	1	1	QCAD285	Cable Assembly	
1	-	-	QCW4	Digit Display Console	
1	1	1	QMM43	Mass Storage Unit	
1	-	-	QMT4	Handset Module	
1	1	1	QPC41(M)	CPU Miscellaneous	
1	1	1	QPC43(P)	Peripheral Signaling	1
1	-	-	QPC61(C)	Console Card	1
1	1	1	QPC80(D)	10V Converter	1
1	1	1	QPC82(C)	30V Converter	1
1	1	1	QPC84(Q)	Power Monitor	1
1	1	1	QPC163(D)	48V Regulator	1
1	1	1	QPC187	Ringing Generator	
1	1	1	QPC362	Conference	
1	1	1	QPC376	Network	
1	1	1	QPC425	CPU (with QPC486 ROM)	
3	2	2	QPC450	CO Trunk	
-	-	3	QPC451	SL-1 Agent Line	
7	-	-	QPC451/452	SL-1/2500 Line	2
-	1	1	QPC452	500/2500 Line	
2	1	1	QPC464(B)	Peripheral Buffer	1
2	2	2	QPC500	Peripheral Backplane	
1	1	1	QPC502	Power Backplane	
1	1	1	QPC574	Digitone Receiver	
-	3	-	QPC578	Integrated Services Digital Line Card	
1	1	1	QPC584	Mass Storage Interface	
1	1	1	QPC609/251	Tone & Digit Switch	
1	1	1	QPC674	256K Memory	
1	1	1	QPC691/190	5/12V Converter	
1	1	1	QPC699	CE Backplane	
1	1	1	QRF9	48V Rectifier	
-	-	23	QSU60CFM	SL-1 Telephone	
-	-	1	QSU61CFM	SL-1 Digit Display Telephone	
1	1	1	QUX16	Distribution Unit	
1	1	1	SET	Intra-Cabinet Cables	
1	1	1	SET	NTP's	

NOTE: 1. Minimum vintage specified for code.
2. Mix of line card type as required.

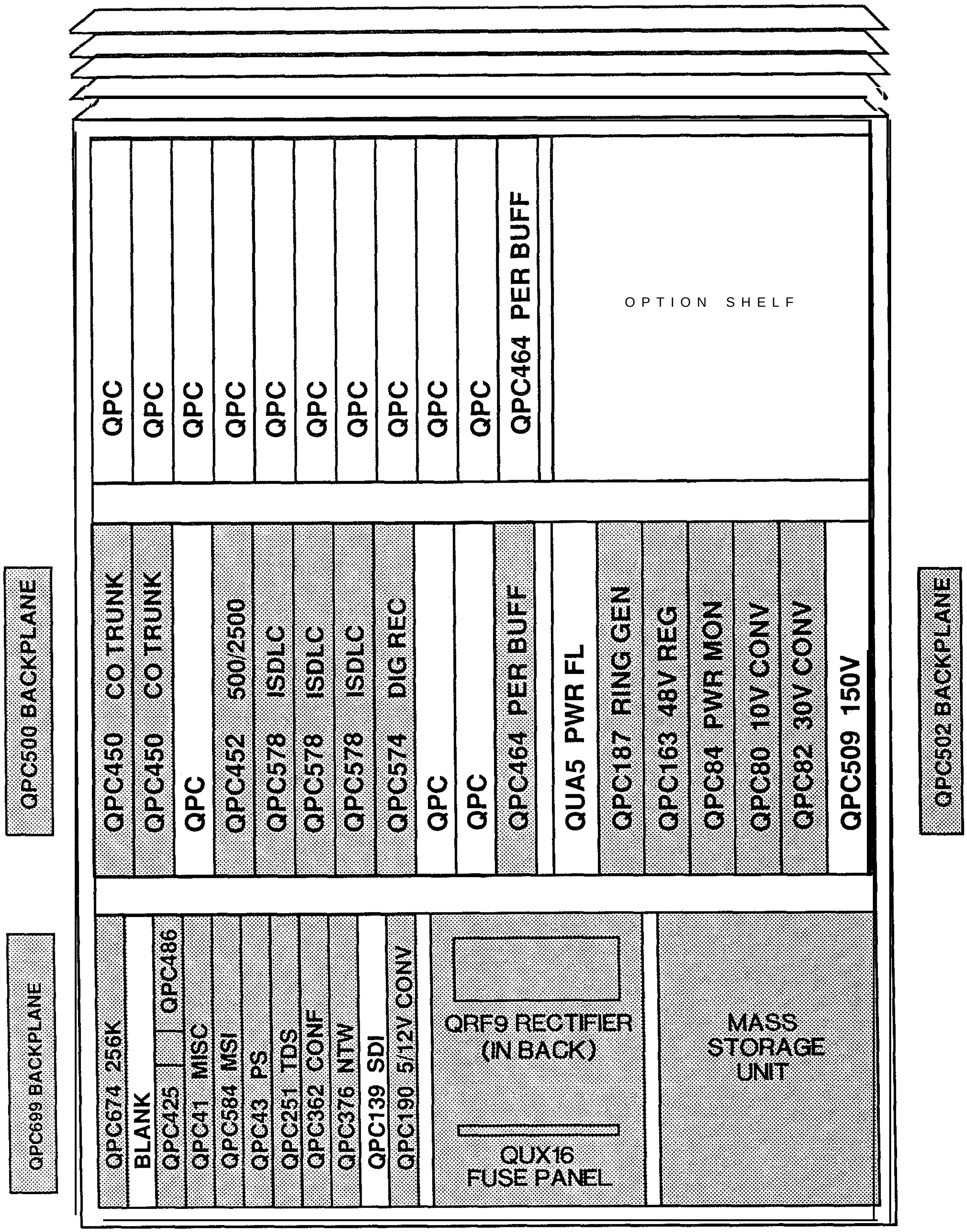
CHART 10-2: MERIDIAN SL-1S PACKAGES



QCA60

▒ Identifies hardware contained in Order Code 169SL1-1

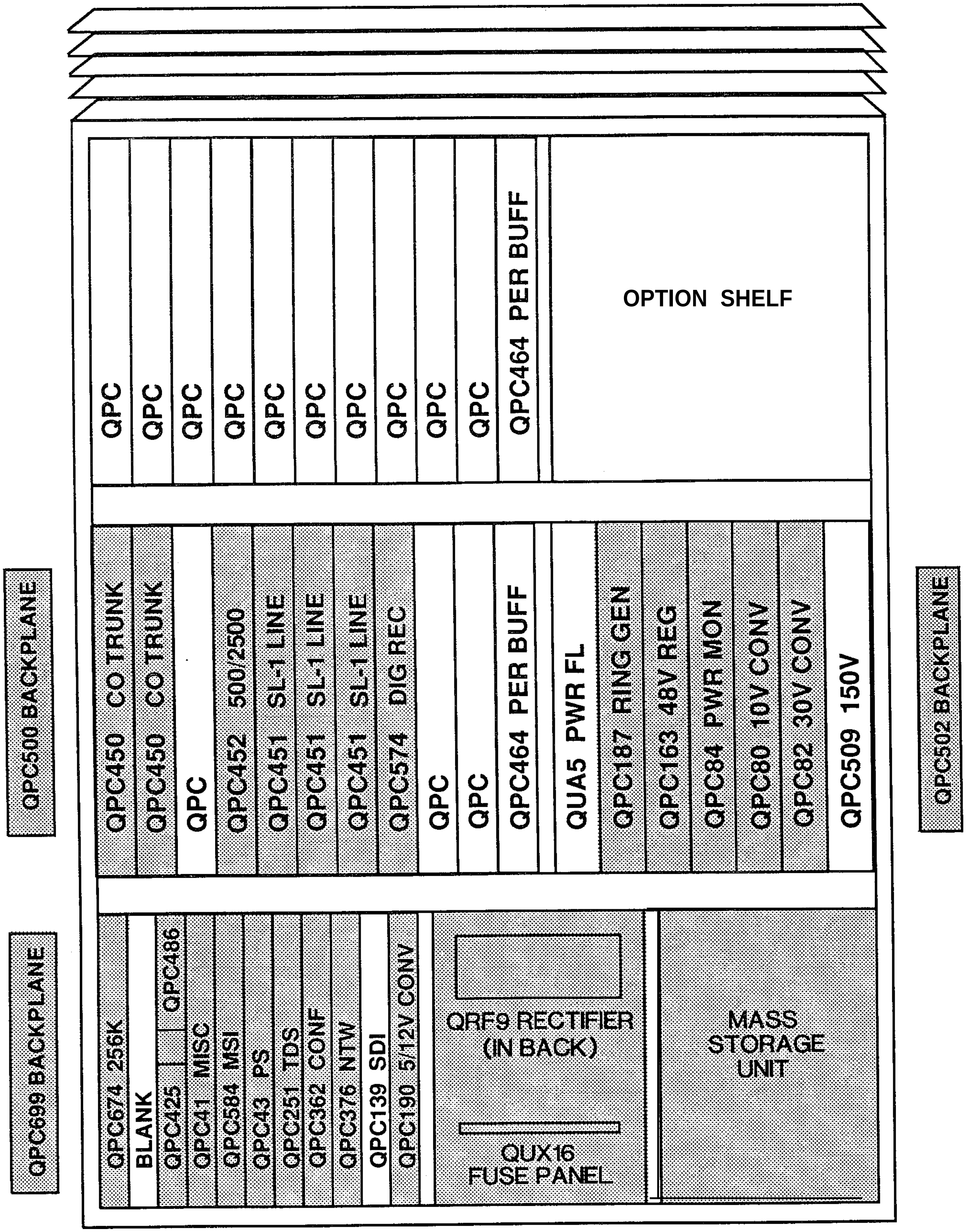
FIGURE 10-l: MERIDIAN SL- 1 S PRE-PACKAGED SYSTEM
(56 LINE/12 TRUNK)



QCA60

Identifies hardware contained in Order Code 193SL1-1

FIGURE 10-2: MERIDIAN SL-1S PRE-PACKAGED SYSTEM
(32 LINE/8 TRUNK)



QCA60

Identifies hardware contained in Order Code 194SL1- 1

FIGURE 10-3: MERIDIAN SL-1S PRE-PACKAGED SYSTEM
(32 LINE/8 TRUNK)

MERIDIAN SL-1MS

A pre-packaged assembly is available to form the foundation for ordering the Meridian SL-1MS. The single package (order code 166SL1-1) provides the basis for all business applications of the system (Table 10-3).

In general, the equipment cabinet contained in the pre-packaged system is capable of supporting all system applications. Peripheral Shelf assemblies (301SL1-1 or 344SL1-1) are specified accordingly up to the the cabinet capacity. Peripheral Cabinet Assembly (205SL1-1) may be added for expansion beyond the initial cabinet capacity. Table 10-4 lists expansion packages applicable to Meridian SL-1MS.

ORDER CODE	DESCRIPTION	PROVISION
166SL1-1	Pre-Packaged System comprising: 80 Lines, 16 Trunks, 1 Console, 4 Digitone Receivers Single CPU, 256K Memory, (Error Correction/Detection), 2 NET loops, 1 TDS, 1 CONF Cabinet (Double Bay - Front and Rear Access) Equipped with: 1 - CE Shelf 1 - Mass Storage Unit 1 - Power Control Shelf 1 - 48V Rectifier 2 - PE Shelves	One per system (Always required) Expansion capability for: 8 Additional PE Shelves

TABLE 10-3: MERIDIAN SL-1MS 16 X 80 PRE-PACKAGED BUSINESS SYSTEM

ORDER CODE	DESCRIPTION	PROVISION
205SL1-1	PE Cabinet Assembly comprising: Cabinet (Double Bay - Front and Rear Access) Equipped with: 1 - Power Converter Shelf 1 - 48V Rectifier SET - Power Converter Cards	One per 12 PE Shelves Expansion capability for: 12 PE Shelves
301SL1-1	PE Shelf Assembly (Single Loop) comprising: 1 - PE Shelf 1 - PE Buffer Capability of accommodating 10 PE Cards and 1 Network Loop (specified on an individual basis to meet system requirements)	One per 10 PE Cards
344SL1-1	PE Shelf Assembly (Dual Loop) comprising: 1 - PE Shelf 1 - PE Buffer Capability of accommodating 10 PE Cards and 2 Network Loops (specified on an individual basis to meet system requirements)	One per 10 PE Cards

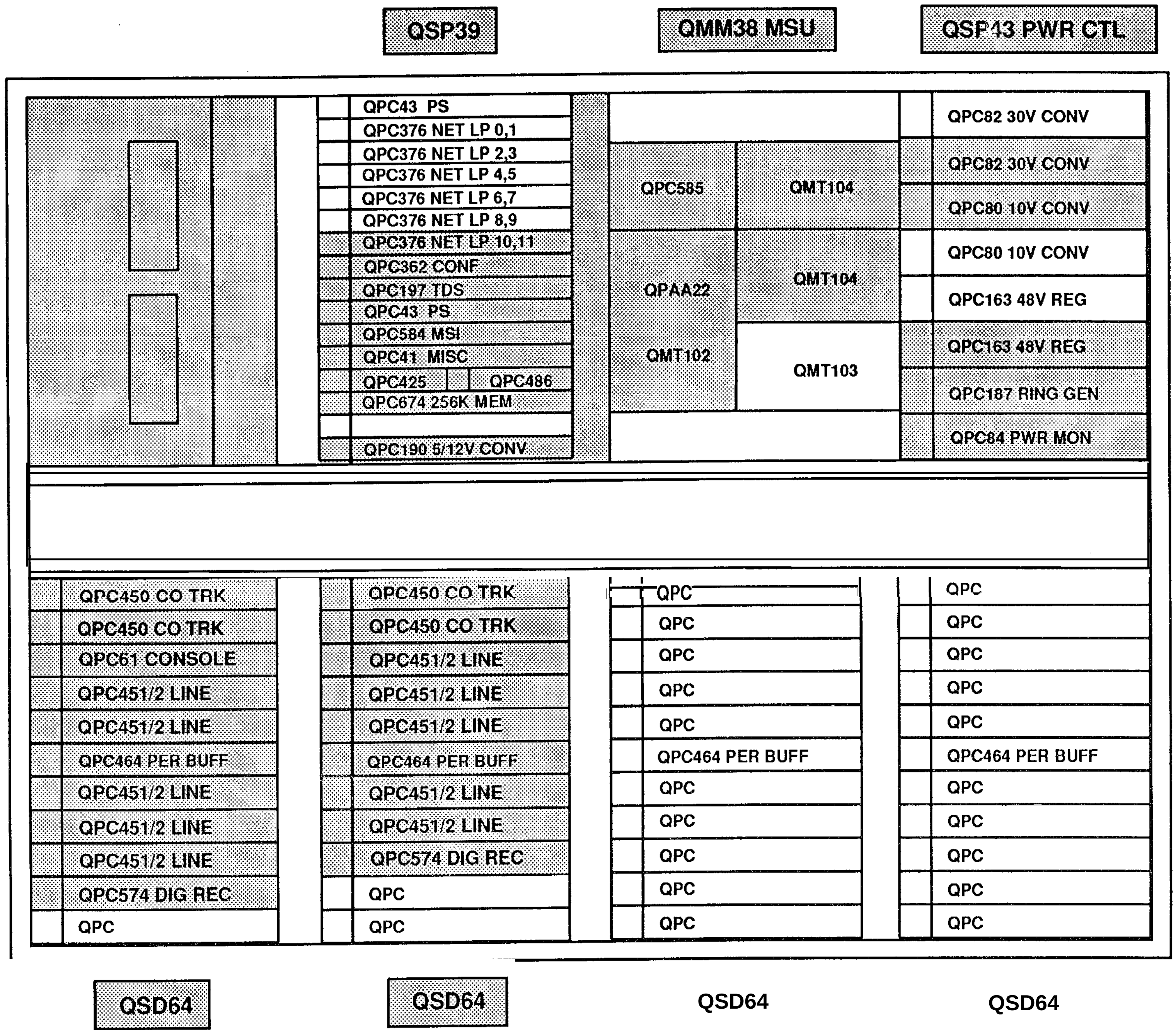
TABLE 10-4: MERIDIAN SL-1MS PE EXPANSION PACKAGES

CODE	DESCRIPTION	NOTE
165SL1-1	Basic MS System	1
	No Lines, Trunks, Digitone, or Rectifier	
166SL1-1	Pre-Packaged MS System	
	80 Lines, 16 Trunks, 1 Console	
	Single CPU, Digitone	
168SL1-1	Pre-Packaged MS ACD System	1
	16 Agent Lines, 20 ACD Trunks,	
	Single CPU, 16 Agent Terminals	

QUANTITY			CODE	DESCRIPTION	NOTE
1	1	1	A0297366	Filter Connector (25 Cond.)	
6	6	6	A0324084	Diskettes, 5.25" Floppy	
14	14	7	MVC01421	Filter Connector (50 Cond.)	
1	1	1	NE25MQ2	Cable 16 ft. (Serial Data Interface)	
1	1	1	P0552536	Fuse Kit	
1	1	1	P0661194	Blank Faceplate	
1	1	1	QCA109	C.E./P.E. Cabinet	
1	1	1	QCAD111	Cable Harness	
1	1	1	QCAD123	Cable (MSI)	
2	2	2	QCAD124	Cable (Network/P.E. Loop)	
	14	14	QCAD137	Intra-Cabinet Cable	
	-	1	QCAD176	Power Adapter Cable	
	2	2	QCAD240A	Cable	
1	1	-	QCW4	Digit Display Console	
1	1	1	QMT102	Disk Controller	
2	2	2	QMT104	Floppy Disk Drive Assembly	
1	1	-	QMT4	Handset Module	
1	1	1	QPC41(M)	CPU Miscellaneous	
1	1	1	QPC43(P)	Peripheral Signaling	2
1	1	-	QPC61(C)	Console Card	2
1	1	1	QPC80(F)	10V Converter	2
1	1	1	QPC82(C)	30V Converter	2
1	1	1	QPC84(P)	Power Monitor	2
1	1	1	QPC163(D)	48V Regulator	2
1	1	-	QPC187	Ringing Generator	
1	1	1	QPC362	Conference	
1	1	1	QPC376	Network	
1	1	1	QPC425	CPU (with QPC486 ROM)	
-	4	5	QPC450	CO Trunk	
-	-	2	QPC451	SL-1 Agent Line	
-	10	-	QPC451/452	SL-1/2500 Line	3
2	2	1	QPC464(B)	Peripheral Buffer	2
-	2	-	QPC574	Digitone Receiver	
1	1	1	QPC584	Mass Storage Interface	
1	1	1	QPC585	Disk Power Converter	
1	1	1	QPC609/251/197	Tone & Digit Switch	
1	1	1	QPC674	256K Memory	
1	1	1	QPC691/190	5/12V Converter	
-	1	1	QRF8	48V Rectifier	
2	2	1	QSD64	Peripheral Shelf	
1	1	1	QSD33	Disk Shelf (with QMM38 MSU)	
1	1	1	QSP39	CPU/Memory/Network Shelf	
1	1	1	QSP43	Power Converter Shelf	
1	1	1	QUD20	Cooling Unit	
1	1	1	SET	Cabinet Panels	
1	1	1	SET	Dummy Faceplates	
1	1	1	SET	Intra-Cabinet Cables	
1	1	1	SET	NTP's	

NOTE: 1. Included for reference purposes only. Package no longer available.
2. Minimum vintage specified for code.
3. Mix of line card type as required.

CHART 10-3: MERIDIAN SL-1MS PACKAGES



QCA109

Identifies hardware contained in order Code 166SL1

FIGURE 10-4: MERIDIAN SL-1MS PRE-PACKAGED SYSTEM (80 LINE/16 TRUNK)

(1) Business System

A basic pre-packaged configuration (Single CPU / Half Network Group) forms the foundation for all Meridian SL-1N business applications as outlined in Table 10-5.

ORDER CODE	DESCRIPTION	PROVISION
140SL1-1	Pre-Packaged System (Single CPU) comprising:	One per system (Always required for single CPU application)
	104 Lines, 12 Trunks, 1 Console	
	Single CPU, Fully Redundant Memory, Half Network Group Capability (equipped with 2 NET loops, 1 TDS, 1 CONF)	Expansion capability for:
	Cabinet (Double Bay - Front and Rear Access) Equipped with:	7 Additional PE Shelves
	1 - CPU/ MEM Shelf 1 - Network Shelf 1 - Mass Storage Shelf 1 - Power Control Shelf 1 - 48V Rectifier 2 - PE Shelves	

TABLE 10-5: MERIDIAN SL-1N PRE-PACKAGED BUSINESS SYSTEM

(2) ACD System

A variation of the foregoing pre-packaged system is available to address Automatic Call Distribution (ACD) applications as follows:

ORDER CODE	DESCRIPTION	PROVISION
142SL1-1	Pre-Packaged ACD System (Single CPU) comprising: 32 Agent Lines, 40 Trunks, 4 RAN Access Trunks Single CPU, Fully Redundant Memory, Half Network Group Capability (equipped with 4 NET loops, 1 TDS, 1 CONF) Cabinet (Double Bay - Front and Rear Access) Equipped with: 1 - CPU/MEM Shelf 1 - Network Shelf 1 - Mass Storage Shelf 1 - Power Control Shelf 1 - 48V Rectifier 2 - PE Shelves	One per system Expansion capability for: 7 additional PE shelves

TABLE 10-6: MERIDIAN SL-1N PRE-PACKAGED ACD SYSTEM

(3) Tandem System

Table 10-7 denotes the capabilities of a pre-packaged single CPU Meridian SL-1N configured as a base for tandem switching applications.

ORDER CODE	DESCRIPTION	PROVISION
144SL1-1	Pre-Packaged Tandem System (Single CPU) comprising: 8 Lines, 30 Trunks (4W E&M) Single CPU, Fully Redundant Memory, Half Network Group Capability (equipped with 2 NET loops, 1 TDS, 1 CONF) Cabinet (Double Bay - Front and Rear Access) Equipped with: 1 - CPU/ MEM Shelf 1 - Network Shelf 1 - Mass Storage Shelf 1 - Power Control Shelf 1 - 48V Rectifier 2 - PE Shelves	One per system (Always required) Expansion capability for: 7 Additional PE Shelves

TABLE 10-7: MERIDIAN SL-1N PRE-PACKAGED TANDEM SYSTEM

(4) System Expansion

A CE expansion package (148SL1-1) is available to convert the Single CPU / Half Network Group to the Dual CPU / Full Network Group. Peripheral equipment expansion beyond the capability of the intial CE/PE Cabinet is provided by additional PE cabinets, each capable of accommodating 12 peripheral shelves. Both the PE cabinet (Code 205SL1-1), and associated equipment shelves (Codes 301SL1-1 and 344 SL1-1) are separately packaged and provisioned to meet system requirements. Table 10-8 outlines the capabilities of these expansion packages

A combined DTI/PE Cabinet Assembly (Code 985 SL1-1) is also available to accommodate up to 4 DTI shelves and 8 PE shelves in its maximum configurations (Figure 10-14).

ORDER CODE	DESCRIPTION	PROVISION
148SL1-1	CE Expansion Package comprising: 1 - Network Shelf 1 - CPU 1 - TDS 1 - Conference and.associated CE cards	One per system when upgrading from 1 CPU to 2 CPUs or Half Network Group to Full Network Group
205SL1-1	PE Cabinet Assembly comprising: Cabinet (Double Bay - Front and Rear Access) Equipped with: 1 - Power Converter Shelf 1 - 48V Rectifier SET - Power Converter Cards	One per 12 PE Shelves Expansion capability for: 12 PE Shelves
301SL1-1	PE Shelf Assembly (Single Loop) comprising: 1 - PE Shelf 1 - PE Buffer Capability of accommodating 10 PE Cards and 1 Network Loop (specified on an individual basis to meet system requirements)	One per 10 PE Cards
344SL1-1	PE Shelf Assembly (Dual Loop) comprising: 1 - PE Shelf 2 - PE Buffer Capability of accommodating 10 PE Cards and 2 Network Loops (specified on an individual basis to meet system requirements)	One per 10 PE Cards

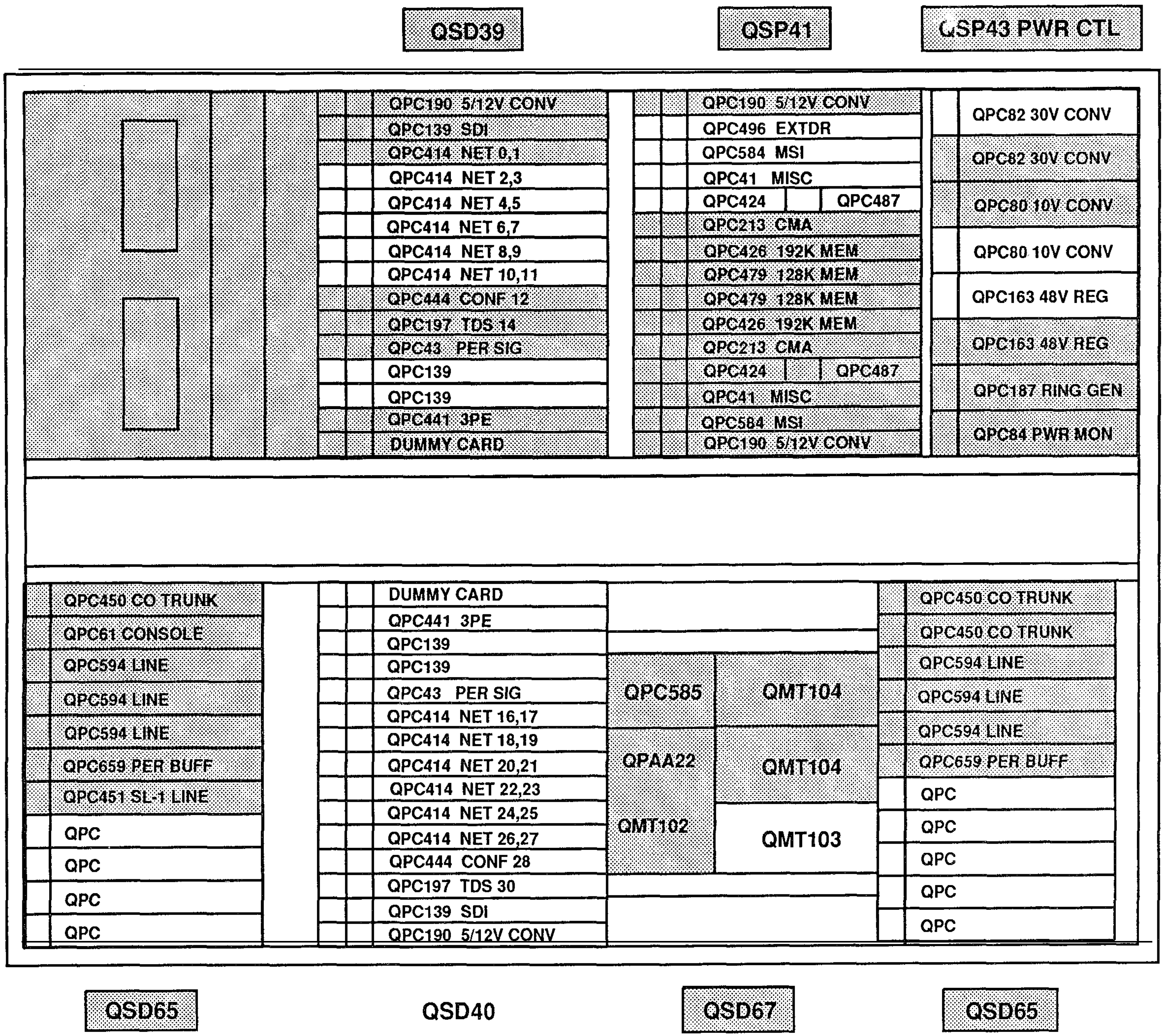
TABLE 10-8: MERIDIAN SL-1N EXPANSION PACKAGES

CODE	DESCRIPTION	NOTE
140SL1-1	Pre-Packaged N System	
	104 Lines, 12 Trunks, 1 Console	
	Single CPU, Half Network Group	
142SL1-1	Pre-Packaged N ACD System	
	32 Agent Lines, 40 ACD Trunks,	
	Single CPU, Half Network Group	
148SL1-1	N CE Expansion Package	
	Single CPU, Half Network Group to	
	Dual CPU, Full Network Group	

QUANTITY			CODE	DESCRIPTION	NOTE
2	2	-	A0297366	Filter Connector (25 Cond.)	
6	6	-	A0324084	Diskettes, 5.25" Floppy	
1	1	-	MVC01243	Data Madem	
14	14	-	MVC01421	Filter Connector (50 Cond.)	
3	3	2	NE-A18QA	Cable (C.E. Shelf Connect)	
-	-	3	NE-A18QA	Cable (Extender/Network)	
2	2	-	NEA25MQ2	Cable 16 ft. (Serial Data Interface)	
1	1	-	P0552536	Fuse Kit	
1	1	-	P0661194	Blank Faceplate	
1	1	-	QCA58	C.E./P.E. Cabinet	
1	1	-	QCAD111	Cable Harnes	
2	2	-	QCAD123	Cable (CMA Connect)	
-	-	2	QCAD123	Cable (3 Port Ext/ 3 Port Ext)	
1	1	1	QCAD123	Cable (MSI)	
2	2		QCAD124	Cable (Network/P.E. Loop)	
14	14		QCAD137	Intra-Cabinet Cable	
-	1	-	QCAD176	Power Adapter Cable	
2	2	-	QCAD240A	Cable	
1	-	-	QCW4	Digit Display Console	
1	1	-	QMT102	*Disk Controller*	
2	2	-	QMT104	Floppy Disk Drive Assembly	
1	-	-	QMT4	Handset Module	
1	1	1	QPC41(M)	CPU Miscellaneous	
1	1	1	QPC43(P)	Peripheral Signaling	1
1	-	-	QPC61(C)	Console Card	1
	1		QPC74	Recorded Announcement Trunk	
1	1	-	QPC80(F)	10V Converter	1
1	1	-	QPC82(C)	30V Converter	1
1	1	-	QPC84(Q)	Power Monitor	1
1	1	-	QPC139	Serial Data Interface (Dual)	
1	1	-	QPC163(D)	48V Regulator	1
1	1	-	QPC187	Ringing Generator	
2	2	-	QPC213	Changeover & Memory Arbitrator	
1	7		QPC414	Network	
1	1	1	QPC424	CPU (with QPC487 ROM)	
2	2	-	QPC426	192K Memory	
1	1	1	QPC441	3 Port Extender	
1	1	1	QPC444	Conference	
3	10	-	QPC450	CO Trunk	
1	4	-	QPC451	SL-1 Line	
6			QPC591	2500 Line	2
2	2		QPC659	Peripheral Buffer	
6	6	2	QPC477	Bus Terminating Unit	
2	2	-	QPC479	128K Memory	
-	-	1	QPC496	Bus Extender	
1	1	1	QPC584	Mass Storage Interface	
1	1	-	QPC585	Disk Power Converter	
1	1	1	QPC609/251/197	Tone & Digit Switch	
3	3	1	QPC691/190	5/12V Converter	
1	1	-	QRF8	48V Rectifier	
1	1	-	QSD39	Network Shelf	
-	-	1	QSD40	Network Shelf	
2	2	-	QSD65	Peripheral Shelf	
1	1	-	QSD67	Disk Shelf (with QMM38 MSU)	
1	1	-	QSP41	CPU/Memory Shelf	
1	1	-	QSP43	Power Converter Shelf	
1	1	1	QUD20	Cooling Unit	
1	1	1	SET	Cabinet Panels	
1	1	1	SET	Dummy Faceplates	
1	1	1	SET	Intra-Cabinet Cables	
1	1	1	SET	NTP's	

NOTE: 1. Minimum vintage specified for code.
2. Mix of line card type as required.

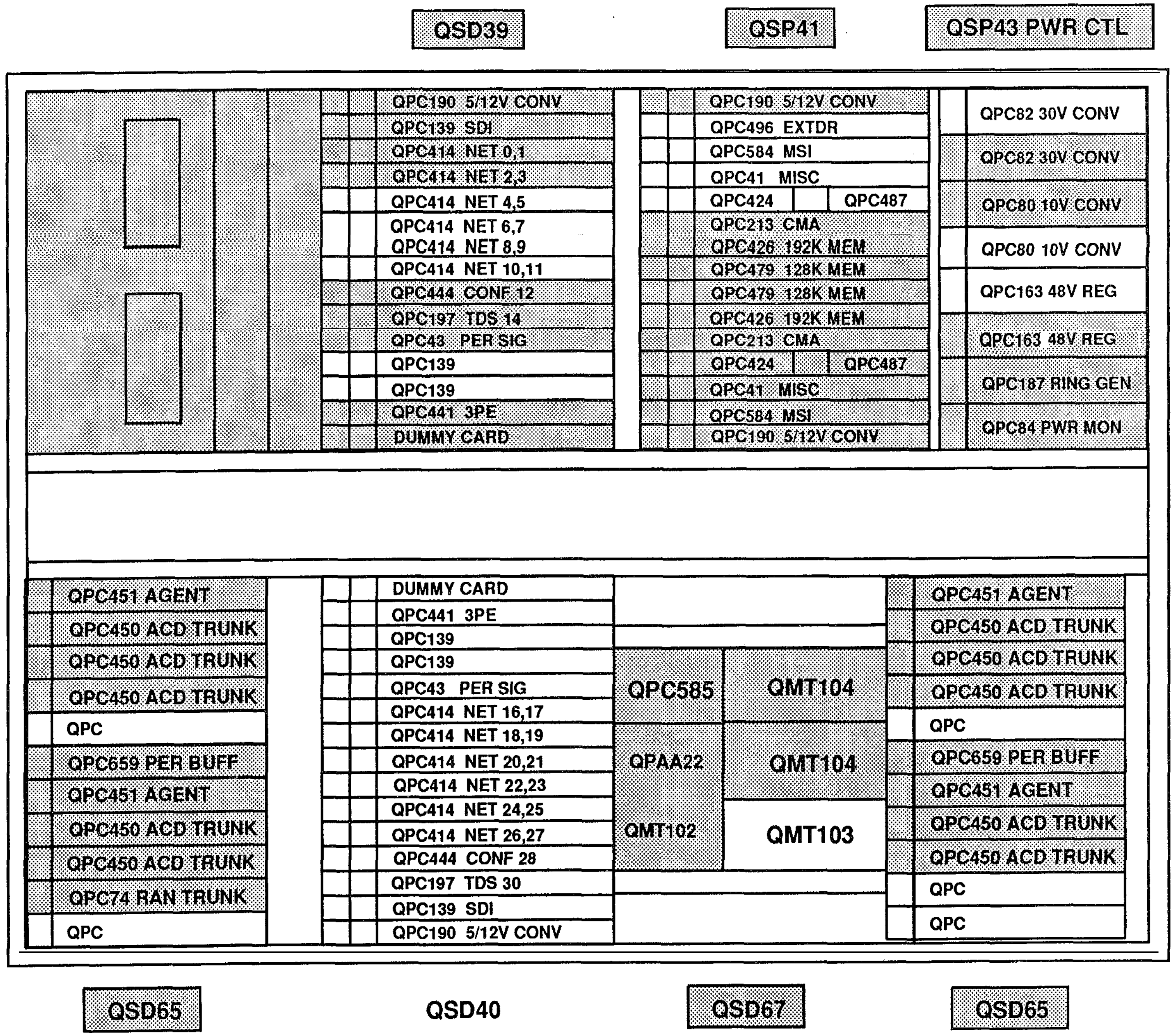
CHART 10-4: MERIDIAN SL-1N PACKAGES



QCA58

Identifies hardware contained in Order Code 140SL1-1

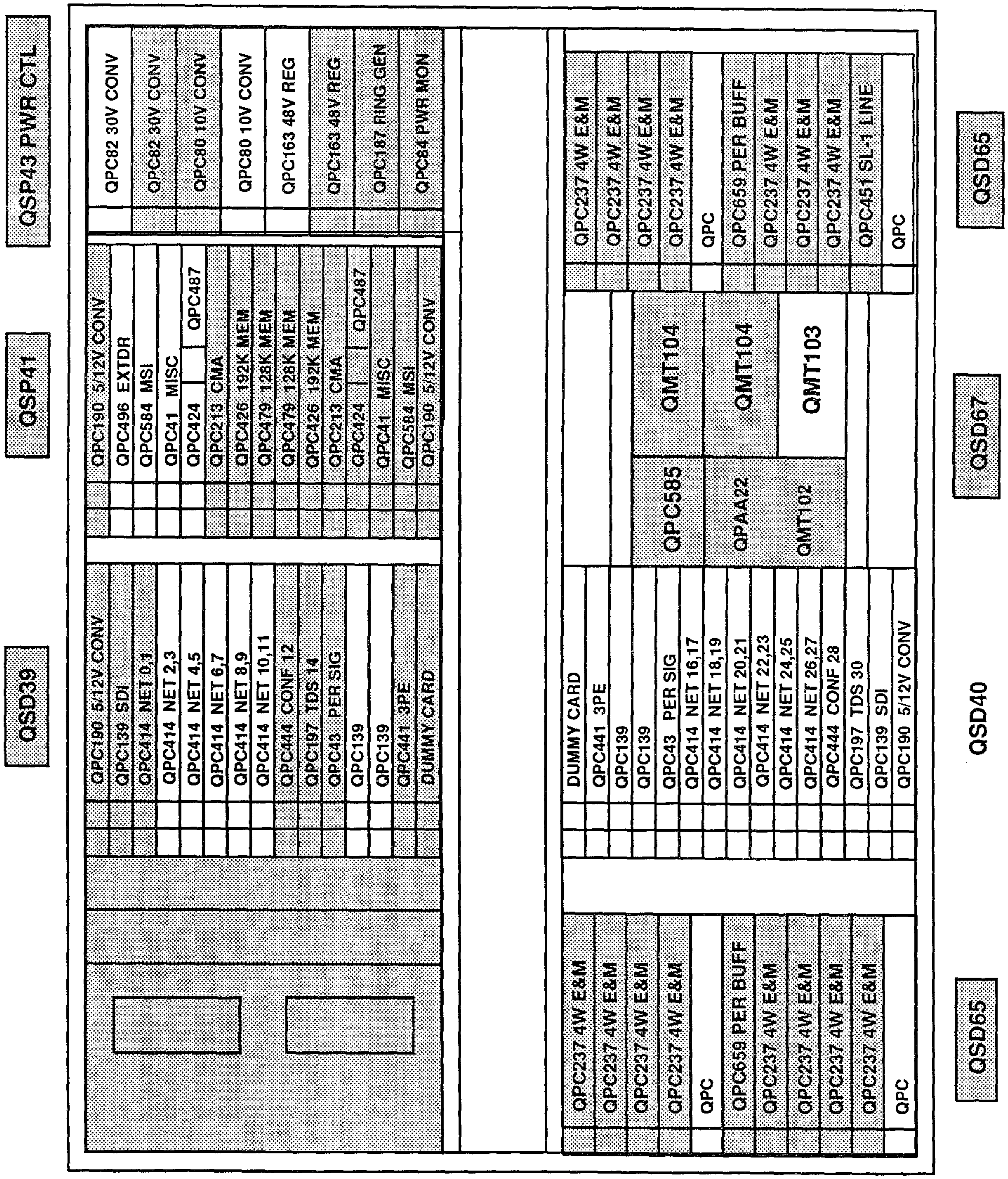
FIGURE 10-5: MERIDIAN SL-1N PRE-PACKAGED SYSTEM
(SINGLE CPU)



QCA58

Identifies hardware contained in Order Code 142SL1-1

FIGURE 10-6: MERIDIAN SL-1N PRE-PACKAGED ACD SYSTEM
(SINGLE CPU)



QCA58

Identifies hardware contained in Order Code 144SL1-1

FIGURE 10-7: MERIDIAN SL-1N PRE-PACKAGED TANDEM SYSTEM (SINGLE CPU)

MERIDIAN SL-1ST

Three pre-packaged assemblies are available to address Meridian SL-1ST business applications. The minimum system configuration consists of eight trunks and thirty-two lines with a choice of including either 24 digital telephones or 24 SL- 1 telephones respectively. For larger applications, a twelve trunk by fifty-two line (12 x 52) package may be specified as the system foundation (Table 10-9). Table 10-10 highlights the capabilities of each of the two 8 x 32 prepackages.

Additional equipment beyond that included in the above configurations may be specified up to system capacity. Table 10- 11 indicates the various sub-assemblies that are applicable to Meridian SL- 1ST.

An Expansion Cabinet Assembly, identical in appearance to the initial CE/PE Cabinet, permits peripheral expansion beyond the capacity of the first cabinet. Also available is a Remote Peripheral Equipment (RPE) Cabinet Assembly which may be used at both the local and remote locations for RPE applications.

An extensive feature complement can be added to the system pre-packages by selecting one of three available software packages (order codes 800SL1-1, 801SL1-1, or 802SL1-1 respectively). In addition, a pre-packaged software data base may be specified by ordering code 803SL1-1.

ORDER CODE	DESCRIPTION	PROVISION
863SL1-1	Pre-Packaged System comprising: 52 Lines, 12 Trunks, 1 Console, 2 Digitone Receivers Single CPU, 320K Memory, (Error Correction/Detection), 2 NET loops, 1 TDS, 1 CONF Cabinet (Front Access) Single Base Tier Equipped with: 1 - CE Backplane 1 - Mass Storage Unit 1 - Power Distribution 1 - 48V Rectifier 1 - PE Backplane	One per system (Always required) Expansion capability for: 5 Additional Tiers with an additional cabinet

TABLE 10-9: MERIDIAN SL-1ST 12 X 52 PRE-PACKAGED BUSINESS SYSTEM

ORDER CODE	DESCRIPTION	PROVISION
861SL1-1	8 X 32 Pre-Packaged System (Digital) comprising: 32 Lines, 8 Trunks, Digitone Single CPU, 320K Memory (Error Correction/Detection), 2 NET loops, 1 TDS, 1 CONF 24 - Digital Telephones Cabinet (Front Access) Single Base Tier Equipped with: 1 - CPU/ MEM/ NETWORK Backplane 1 - Mass Storage Unit 1 - Power Distribution 1 - 48V Rectifier 1 - PE Backplane MDF & Castors	One per system (Always required) Expansion capability for: 2 Additional Tiers
862SL1-1	8 X 32 Pre-Packaged System (SL-1) comprising: 32 Lines, 8 Trunks, Digitone Single CPU, 320K Memory (Error Correction/Detection), 2 NET loops, 1 TDS, 1 CONF 24 SL- 1 Telephones Cabinet (Front Access) Single Base Tier Equipped with: 1 - CPU/ MEM/ NETWORK Backplane 1 - Mass Storage Unit 1 - Power Distribution 1 - 48V Rectifier 1 - PE Backplane MDF & Castors	One per system (Always required) Expansion capability for: 2 Additional Tiers

TABLE 10-10: MERIDIAN SL-1ST 8 x 32 PRE-PACKAGED BUSINESS SYSTEMS

ORDER CODE	DESCRIPTION	PROVISION
201SL1-1	PE Expansion Assembly (less MDF) comprising: 1 - PE Shelf equipped with 2 - PE Backplanes 1 - Dual Loop PE Buffer 1 - PE Power Converter	One per 8 PE Cards May be specified to expand PE capability of associated cabinet up to capacity.
204SL1-1	PE Expansion Assembly (with MDF) comprising: 1 - PE Shelf equipped with 2 - PE Backplanes 1 - Dual Loop PE Buffer 1 - PE Power Converter Built-in MDF Assembly	One per 8 PE Cards May be specified to expand PE capability of associated cabinet up to capacity.
278SL1-1	PE Expansion Assembly (less MDF) comprising: 1 - PE Shelf equipped with 2 PE Backplanes 1 - Dual Loop PE Buffer 1 - PE Power Converter	One per 16 PE Cards. May be used only as first tier to expand 863SL1-1 assembly if total equippped lines ports do not exceed 130 ports for the system.
866SL1-1	PE Expansion Assembly (less MDF) comprising: 1 - PE Shelf equipped with 2 PE Backplanes 2 - Dual Loop Buffers 2 - PE Power Converters	One per 16 PE Cards. May be specified to expand PE capability of associated cabinet up to capacity.
867SL1-1	PE Expansion Assembly (with MDF) comprising: 1 - PE Shelf equipped with 2 PE Backplanes 2 - Dual Loop Buffers 2 - PE Power Converters Built-in MDF Assembly	One per 16 PE Cards. May be specified to expand PE capability of associated cabinet up to capacity.
869SL1-1	Cooling Unit Assembly comprising: 2 - Cooling Units 2 - Top Cover Louvers Set - Cables / Plugs	One if second (top) tier is equipped in system cabinet.

FIGURE 10- 11 MERIDIAN SL- 1 ST EXPANSION PACKAGES

ORDER CODE	DESCRIPTION	PROVISION
871SL1-1	CE/PE Expansion Assembly (less MDF) comprising: 1 - PE Shelf equipped with 1 - CE Shelf and 1 - PE Backplane 1 - Dual Loop PE Buffer 1 - PE Power Converter 1 - Power Connector Cable	Accommodates 8 - PE Cards plus DTI and MSU on CE Backplane. If provisioned as last expansion module of system, only DTI can be provisioned on CE Backplane.
872SL1-1	CE/PE Expansion Assembly (with MDF) comprising: 1 - CE/PE Shelf equipped with 1 - CE and 1 - PE Backplane 1 - Dual Loop PE Buffer 1 - PE Power Converter 1 - Power Connector Cable Built-in MDF Assembly	Accommodates 8 - PE Cards plus DTI and MSU on CE Backplane. If provisioned as last expansion module of system, only DTI can be provisioned on CE Backplane.
882SL1-1	Expansion Cabinet Assembly comprising: 1 - PE Shelf equipped with 8 - PE Card Slots 1 - Dual Loop PE Buffer 1 - PE Power Converter 1 - 48V Rectifier	One per 8 PE Cards. Used to expand the capacity of the ST System beyond the initial cabinet capacity.
883SL1-1	Expansion Cabinet Assembly comprising: 2 - PE Shelves equipped with 16 PE Card Slots 2 - Dual Loop PE Buffers 2 - PE Power Converters 1 - 48V Rectifier	One per 16 PE Cards. Used to expand the capacity of the ST System beyond the initial cabinet capacity.
884SL1-1	ST RPE Cabinet Assembly (less MDF) comprising: 1 - Carrier Shelf 1 - PE Shelf with 10 Card Slots 1 - Dual Loop PE Buffer 1 - Power Converter 1 - 48V Rectifier 1 - RPE Maintenance Card Power Distribution	Accommodates one or two RPE loops and 10 PE Cards.

TABLE 10- 11: CONTINUED

ORDER CODE	DESCRIPTION	PROVISION
885SL1-1	ST/RPE Cabinet Assembly (with MDF) comprising: 1 - Carrier Shelf 1 - PE Shelf with 10 Card Slots 1 - Dual Loop PE Buffer 1 - Power Converter 1 - 48V Rectifier 1 - RPE Maintenance Card Power Distribution Built-in MDF Assembly	Accommodates one or two RPE loops and 10 PE Cards.
886SL1-1	RPE Expansion Tier (less MDF) comprising: 1 - Carrier Shelf 1 - PE Shelf equipped with 8 Card Slots 1 - Dual Loop PE Buffer 1 - PE Power Converter 1 - RPE Maintenance Card	Accommodates one or two RPE loops and 8 PE Cards (local or remote sites)
887SL1-1	RPE Expansion Tier (with MDF) comprising: 1 - Carrier Shelf 1 - PE Shelf equipped with 8 Card Slots 1 - Dual Loop PE Buffer 1 - PE Power Converter 1 - RPE Maintenance Card Built-in MDF Assembly	Accommodates one or two RPE loops and 8 PE Cards (local or remote sites)

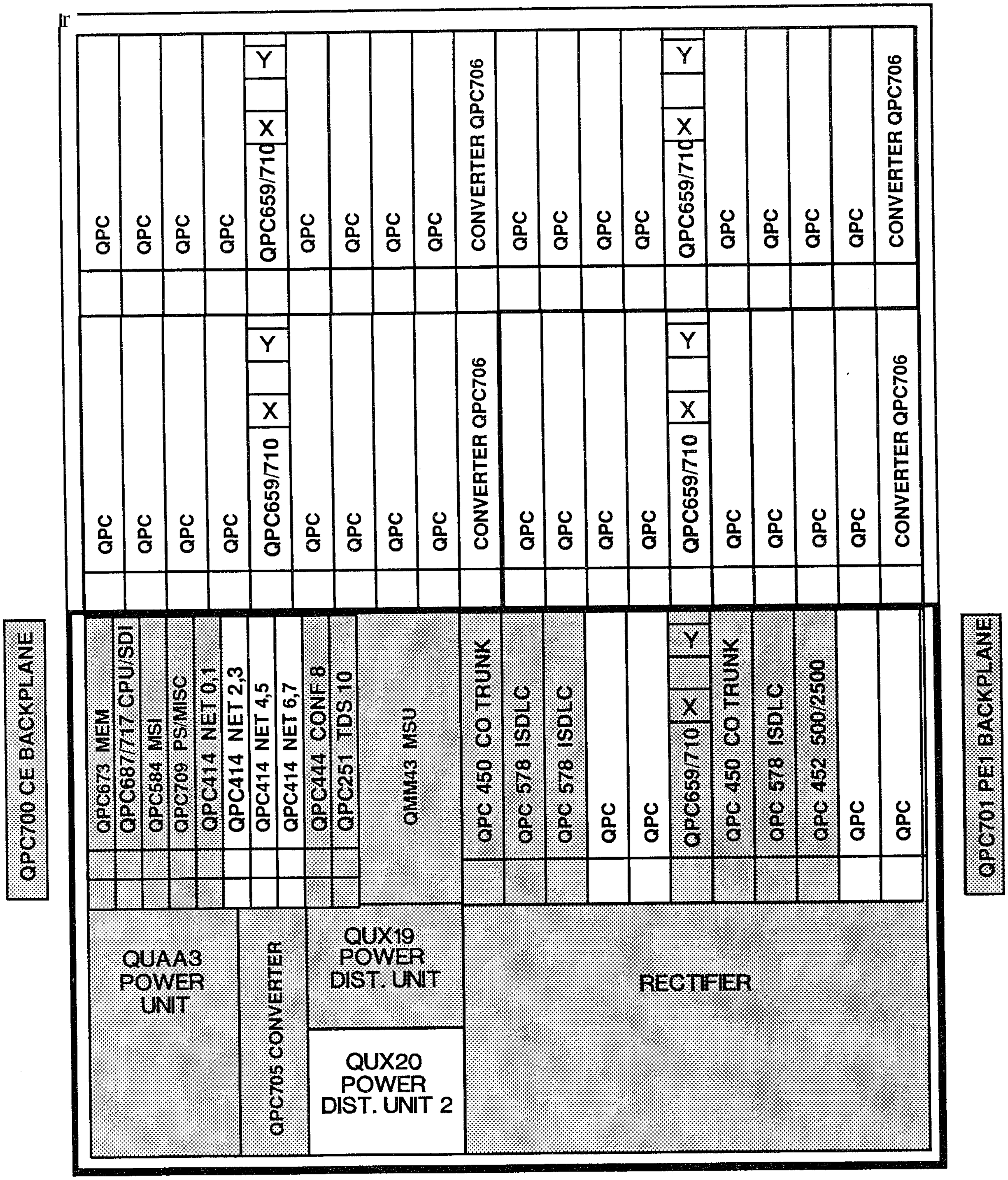
TABLE 10- 11: CONTINUED

CODE	MERIDIAN DESCRIPTION	NOTE
861SL1-1	Pre-Packaged Meridian SL-1ST 8x32 System with 24 Digital Sets	1
862SL1-1	Pre-Packaged SL-1ST 8x32 System with 24 SL-1 Sets	1
863SL1-1	Pm-Packaged Meridian SL-1ST System 52 Lines, 12 Trunks, Digitone, Console	2
865SL1-1	Pre-Packaged SL-1ST ACD System 16 Terminal Lines, 20 ACD Trunks, 16 Agent Sets	3

QUANTITY				CODE	DESCRIPTION	NOTE
5	5	5	5	A0324084	Floppy Disks - 5 1/4"	
23	-	-	-	NTIF05AA	Meridian M2009 Digital Phone	
1	-	-	-	NTIF07AA	Meridian M2018 Digital Phone	
1	1	1	1	P0552536	Fuse Kit	
1	1	1	1	QCA136	CE/PE Cabinet	
1	1	1	1	QCAD36	SDI Cable	
1	1	1	1	QCAD123	Disk Drive Interface Cable	
2	2	2	2	QCAD124	Cable, Conn.	
1	1	1	1	QCAD279	Disk Drive Cable	
1	1	1	1	QCAD273/4	Rectifier Cord	
-	-	1	-	QCW4	Digit Display Console	
1	1	1	1	QMM43	Mass Storage Assembly	
-	-	1	-	QMT4	Handset	
1	1	1	1	QPC251	Tone & Digit Switch	
1	1	1	1	QPC414	Network Card	
1	1	1	1	QPC444	Conference Card	
2	2	3	5	QPC450	CO Trunk Card	
-	3	1	2	QPC451	SL-1 Line Card	
1	1	-	-	QPC452	500/2500 Line Card	
3	-	-	-	QPC578	ISDLC	
1	1	1	1	QPC584	Mass Storage Interface	
-	-	3	-	QPC594	500/2500 Line Card (16 port)	
1	1	1	1	QPC659	Dual Loop Peripheral Buffer	
1	1	1	1	QPC673	512K RAM Memory	
1	1	1	1	QPC687	Central Processing Unit (CPU)	
1	1	1	1	QPC705	30/150V PE Power Converter (All Voltages)	
1	1	1	1	QPC709	Misc/Peripheral Signaling	
1	1	1	1	QPC710	Dual Digitone Receiver (Daughter Board)	
1	1	1	1	QPC717	ROM Card	
1	1	1	1	QRF12	48V Rectifier (125V AC)	
-	23	-	-	QSU60CFM	SL-1 Telephone	
-	1	-	-	QSU61CFM	SL-1 Digital Display Telephone	
-	-	-	16	QSU7	ACD Telephone	
1	1	1	1	QUAA3	Power Unit	
1	1	1	1	QUX19	Power Distribution Unit	
1	1	1	1	SET	NTP's Vol. 1-5	
1	1	-	-	SET	Built-in Main Distribution Frame Assembly	

NOTE: 1. Software Package 803SL1-1 must be ordered separately.
2. One (1) 278SL1-1 may be ordered as the first additional PE shelf/tier with 863SL1-1 if the total equipped line ports do not exceed 130 ports for the system. Otherwise, the 201SL1-01 assembly must be ordered.
3. Included for reference purposes only. Package no longer available.

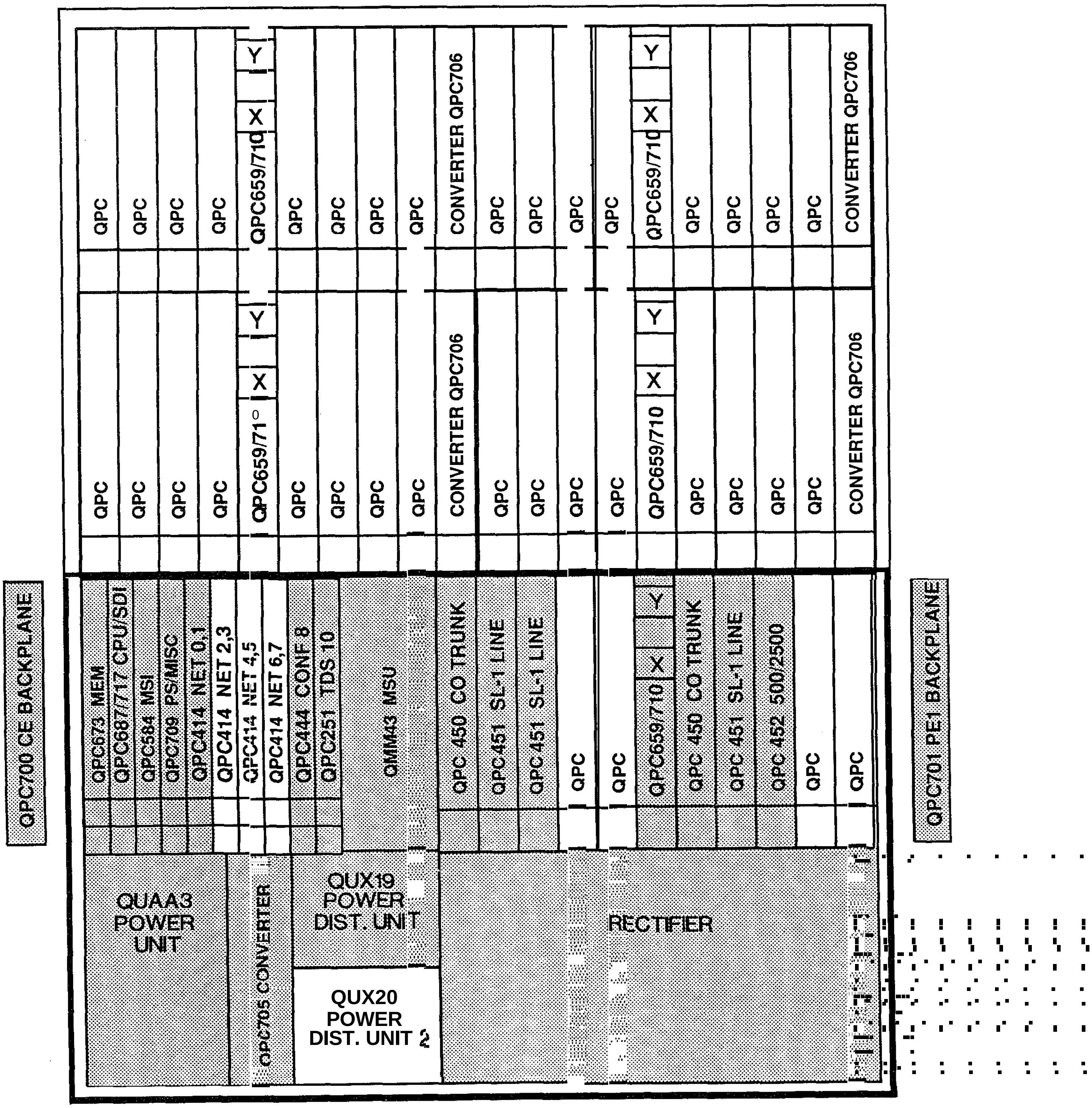
CHART 10-5: MERIDIAN SL- 1 ST PACKAGES



QCA136

Identifies hardware contained in Order Code 861 SL1-1

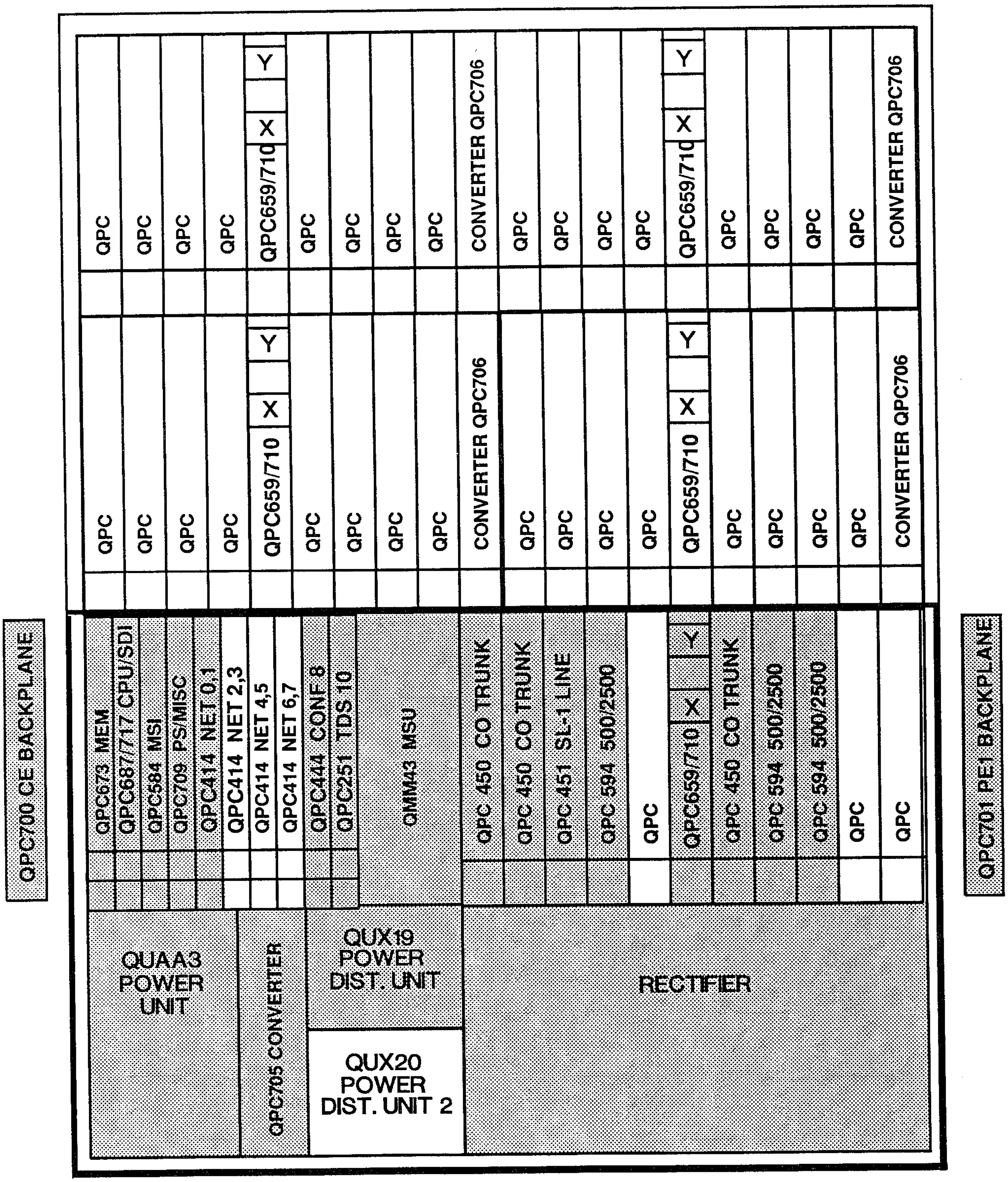
FIGURE 10-8: MERIDIAN SL-1ST Pm-PACKAGED SYSTEM
(8 X 32 DIGITAL)



QCA136

Identifies hardware contained in Order Code 862SL1-1

FIGURE 10-9: MERIDIAN SL-1ST PRE-PACKAGED SYSTEM
(8 X 32SL-1)



QCA136

Identifies hardware contained in Order Code 863SL1-1

FIGURE 10-10: MERIDIAN SL-1ST PRE-PACKAGED SYSTEM
(12 X 52)

MERIDIAN SL-1RT

The basic Meridian SL-1RT pre-package system configuration consists of 12 trunks and 52 lines. This system can be expanded using the same Expansion Cabinet Assembly that is used to upgrade the Meridian SL-1ST. Table 10-A1 outlines the basic pre-packaged configuration and Table 10-A2 indicates the pre-packaged Expansion Cabinet Assembly.

ORDER CODE	DESCRIPTION	PROVISION
894SL1-1	Pre-Packaged System (Dual CPU) Comprising: 52 Lines, 12 Trunks, 1 Console, 1 - CPU/MEM Shelf 1 - Network Shelf 1 - Mass Storage Shelf 1 - Power Control Shelf 1 - Power Rectifier (125V) 1 - PE Shelf	One Per System Expansion Capacity: 6 tiers (with 2 additional cabinets)

TABLE 10-A1: MERIDIAN SL-1RT PRE-PACKAGE BUSINESS SYSTEM

ORDER CODE	DESCRIPTION	PROVISION
201SL1-1	PE Expansion Assembly (less MDF) comprising: 1 - PE Shelf equipped with 2 - PE Backplanes 1 - Dual Loop PE Buffer 1 - PE Power Converter	One per 8 PE Cards May be specified to expand PE capability of associated cabinet up to capacity.
866SL1-1	PE Expansion Assembly (less MDF) comprising: 1 - PE Shelf equipped with 2 PE Backplanes 2 - Dual Loop Buffers 2 - PE Power Converters	One per 16 PE Cards. May be specified to expand PE capability of associated cabinet up to capacity.
882SL1-1	Expansion Cabinet Assembly comprising: 1 - PE Shelf equipped with 8 - PE Card Slots 1 - Dual Loop PE Buffer 1 - PE Power Converter 1 - 48V Rectifier	One per 8 PE Cards. Used to expand the capacity of the ST System beyond the initial cabinet capacity.
883SL1-1	Expansion Cabinet Assembly comprising: 2 - PE Shelves equipped with 16 PE Card Slots 2 - Dual Loop PE Buffers 2 - PE Power Converters 1 - 48V Rectifier	One per 8 PE Cards. Used to expand the capacity of the ST Systen beyond the initial cabinet capacity.

TABLE 10-A2: MERIDIAN SL1-1RT EXPANSION PACKAGES

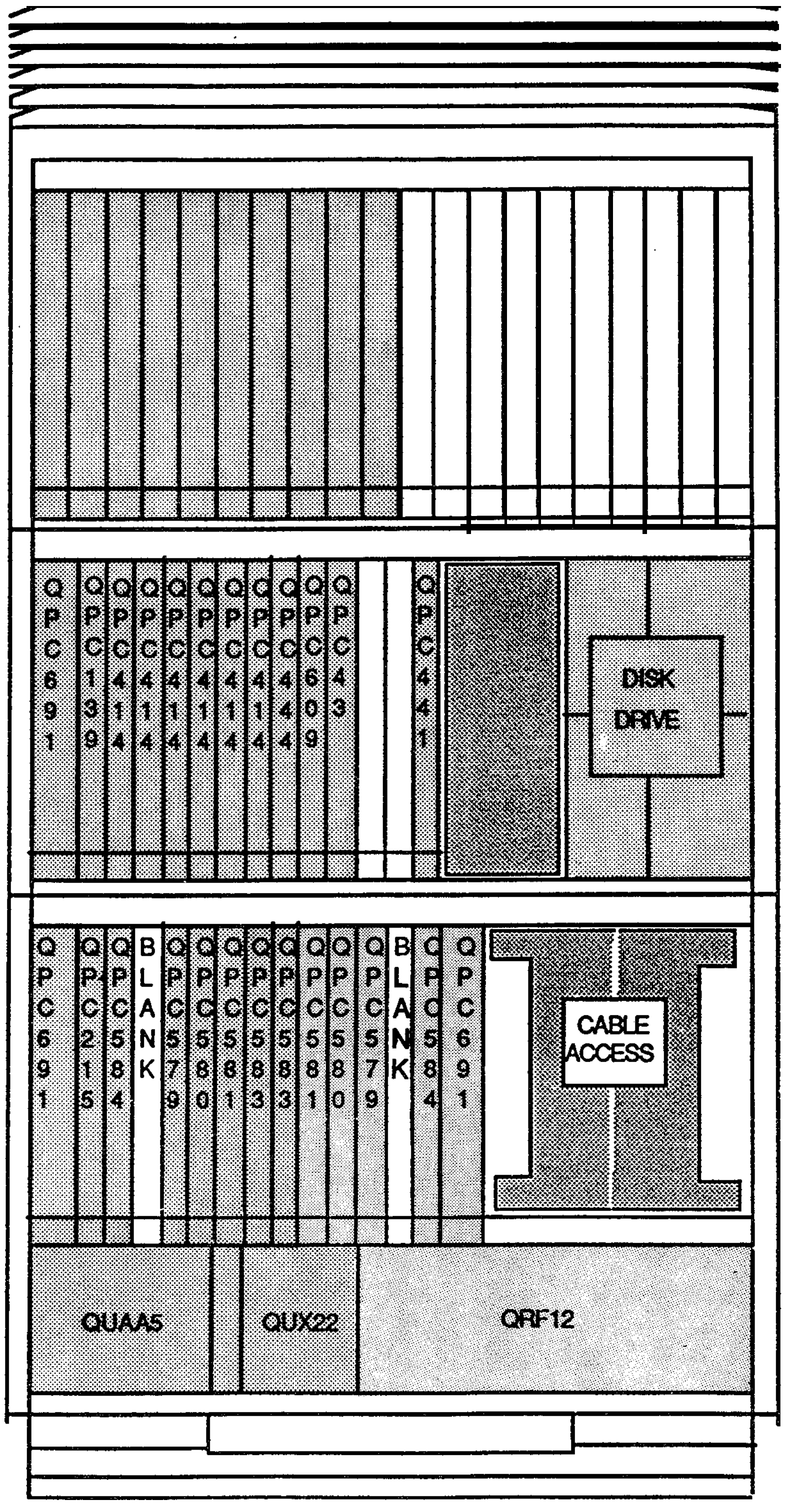
ORDER CODE	DESCRIPTION	PROVISION
886SL1-1	RPE Expansion Tier (less MDF) comprising: 1 - Carrier Shelf 1 - PE Shelf equipped with 8 Card Slots 1 - Dual Loop PE Buffer 1 - PE Power Converter 1 - RPE Maintenance Card	Accommodates one or two RPE loops and 8 PE Cards (local or remote sites)

TABLE 10-A2: CONTINUED

	CODE	MERIDIAN DESCRIPTION
	894SL1-1	Pre-Packaged Meridian SL-1RT System
		52 Lines, 12 Trunks

QUANTITY	CODE	DESCRIPTION
5	A0324084	Floppy Disks - 5 1/4"
1	P0552536	Fuse Kit
1	QCA147	CE/PE Cabinet (Includes QPC4 and QPC587 Backplane)
1	201SL1-1**	SL-1ST PE Expansion Tier
1	QRF12	Power Rectifier (125V)
1	QUX22	Power Distribution Unit
1	QUAA5	Power Unit
1	QUD24	Cooling Unit with Fan Kit
1	QSD67	Disk Shelf
1	QCAD274	Rectifier Cord
1	QCAD36	SDI Interface Cable (16 ft.)
2	QCAD124	Cable Assembly
1	QCADXXX	SDI Triple Cable (Intercabinet)
3	NEA18QA	Cable 4 ft. CPU to Network Shelf
2	QCAD240	Cable CPU Faceplate Ribbon
2	QCAD123A	Cable 3 ft. (CMA)
2	QCAD123D	Cable 6 ft. (MSI)
2	QCAD123D	Cable 6 ft. (SDE)
1	QMM38	Mass Storage Unit
1	QPC477A9	BTU
1	QPC477A12	BTU
2	QPC477A22	BTU
1	QPC609	Tone & Digit Switch Card
1	QPC414	Dual Network Card
1	QPC444	Conference Card
1	QPC710	Digitone Receiver Card
3	QPC450	CO/TX/WATS Trunk Card
1	QPC451	SL-1 Line Card
2	QPC579	CPU Pack with QPC602
2	QPC580	CPU Interface
2	QPC581	Changeover Memory Arbitrator
2	QPC583	768K RAM Memory
2	QPC584	Mass Storage Interface
1	QPC585	Disk Power Converter
3	QPC69 1	5/12V Converter
1	QPC215	Segmented Bus Extender
1	QPC44 1	3 Port Extender
1	QPC43	Peripheral Signaling Card
1	QPC139	Serial Data Interface Card
3	QPC594	500/2500 Line Card (16 port)
2	QMM42	MSI Data Cartridge
1	QCW4	SL-1 Digit Display Console
1	QMT4	Handset Module
1	SET	Northern Telecom Practices (NTPs)

CHART 10-A1: PREPACKAGE ASSEMBLY CONTENT



QCA 147

Identifies hardware contained in Order Code 894SL1-1

FIGURE 10-A1: MERIDIAN SL-1RT CABINET ASSEMBLY

MERIDIAN SL-1NT

A basic pre-packaged configuration (Dual CPU/Full Network Group) forms the foundation for all Meridian SL-1NT business applications as outlined in Table 10- 12.

A variation of the foregoing pre-packaged system is available to address Automatic Call Distribution (ACD) applications (Table 10- 13).

Note that the Dual CPU configuration necessitates provisioning of the Full Network Group to ensure that the full reliability of two network shelves and associated common cards is provided.

Peripheral equipment expansion beyond the capability of the initial CE/PE Cabinet is provided by additional PE Cabinets each capable of accommodating 12 peripheral shelves. Both the PE cabinet (Code 205SL1-1) and associated equipment shelves (Codes 301SL1-1 and 344SL1-1) are separately packaged and provisioned to meet system requirements. Table 10-14 outlines the capabilities of these expansion packages.

A combined DTI/PTE Cabinet Assembly (Code 985 SL1-1) is also available to accommodate up to 4 DTI shelves plus 8 PE shelves in its maximum configuration.

ORDER CODE	DESCRIPTION	PROVISION
146SL1-1	Pre-Packaged System (Dual CPU) comprising: 104 Lines, 12 Trunks, 1 Console Dual CPU, Fully Redundant Memory, Full Network Group Capability (equipped with 2 NET loops, 2 TDS, 2 CONF) Cabinet (Double Bay - Front and Rear Access) Equipped with: 1 - CPU/ MEM Shelf 2 - Network Shelf 1 - Mass Storage Shelf 1 - Power Control Shelf 1 - 48V Rectifier 2 - PE Shelves	One per system (Always required) Expansion capability for: 6 Additional PE Shelves

TABLE 10-12: MERIDIAN SL-1NT PRE-PACKAGED BUSINESS SYSTEM

ORDER CODE	DESCRIPTION	PROVISION
147SL1-1	Pre-Packaged ACD System (Dual CPU) comprising: 32 Agent Lines, 40 Trunks, 4 RAN Access Trunks Dual CPU, Fully Redundant Memory, Full Network Group Capability (equipped with 4 NET loops, 2 TDS, 2 CONF) Cabinet (Double Bay - Front and Rear Access) Equipped with: 1 - CPU/MEM Shelf 2 - Network Shelf 1 - Mass Storage Shelf 1 - Power Control Shelf 1 - 48V Rectifier 2 - PE Shelves	One per system Expansion capability for: 6 additional PE shelves

TABLE 10-13: MERIDIAN SL-1NT PRE-PACKAGED ACD SYSTEM

ORDER CODE	DESCRIPTION	PROVISION
205SL1-1	PE Cabinet Assembly comprising: Cabinet (Double Bay - Front and Rear Access) Equipped with: 1 - Power Converter Shelf 1 - 48V Rectifier SET - Power Converter Cards	One per 12 PE Shelves Expansion capability for: 12 PE Shelves
985SL1-1	DTI/PE Cabinet Assembly comprising: Cabinet (Double Bay - Front and Rear Access) Equipped with: 1 - Power Converter Shelf 1 - 48V Rectifier 1 - Power Monitor	Accommodates up to 4 DTI shelves plus 8 PE shelves
301SL1-1	PE Shelf Assembly (Single Loop) comprising: 1 - PE Shelf 1 - PE Buffer Capability of accommodating 10 PE Cards and 1 Network Loop (specified on an individual basis to meet system requirements)	One per 10 PE Cards
344SL1-1	PE Shelf Assembly (Dual Loop) comprising: 1 - PE Shelf 1 - Dual Loop PE Buffer Capability of accommodating 10 PE Cards and 2 Network Loops (specified on an individual basis to meet system requirements)	One per 10 PE Cards

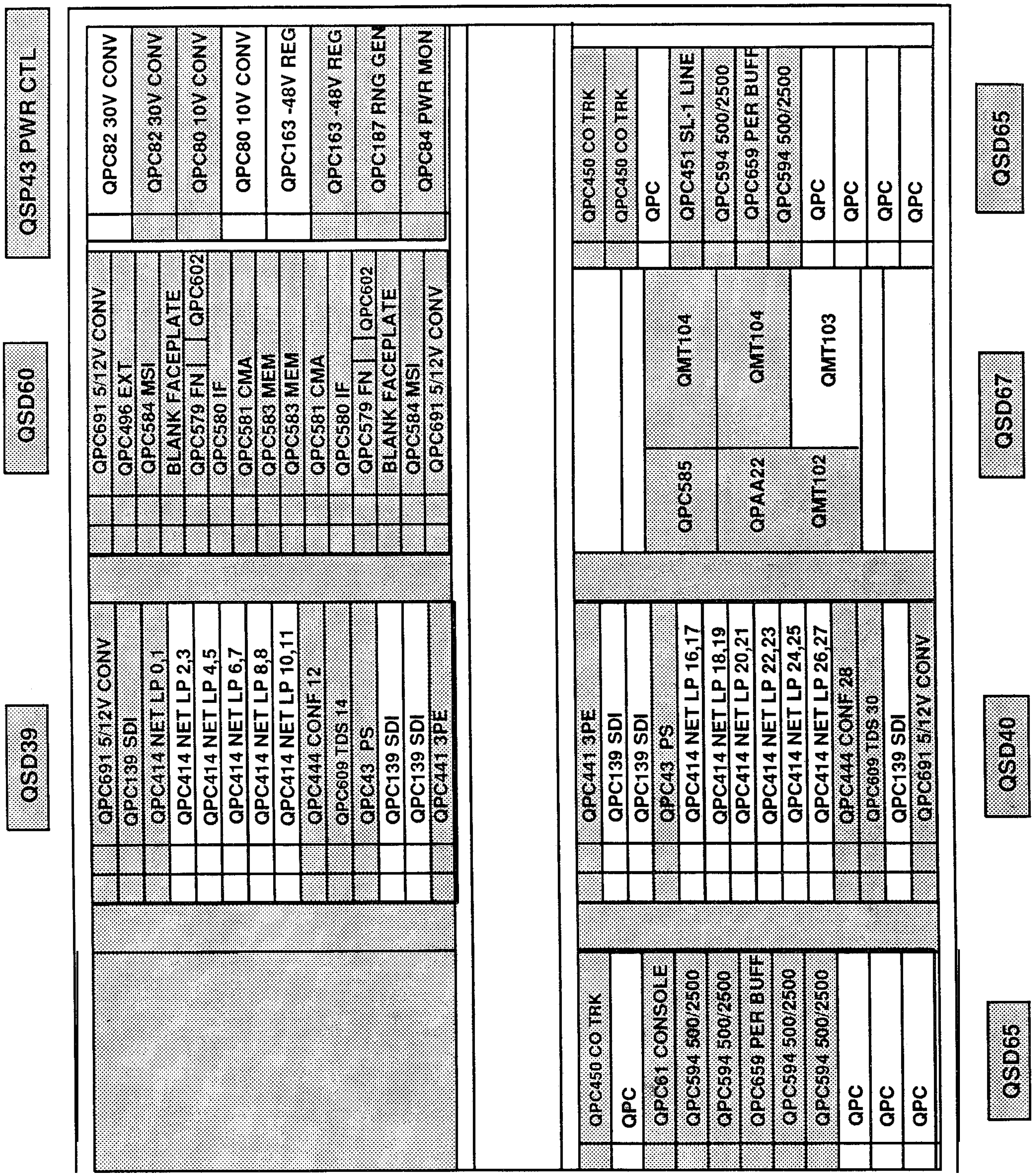
TABLE 10-14: MERIDIAN SL-1NT PE EXPANSION PACKAGES

CODE	DESCRIPTION	NOTE
146SL1-1	Pre-Packaged NT System	
	104 Lines, 12 Trunks, 1 Console	
	Dual CPU, Full Network Group	
147SL1-1	Pre-Packaged NT ACD System	
	32 Agent Lines, 40 ACD Trunks,	
	Dual CPU, Full Network Group	

QUANTITY		CODE	DESCRIPTION	NOTE
2	2	A0297366	Filter Connector (25 Cond.)	
6	6	A0324084	Diskettes, 5.25" Floppy	
1	1	MVC01243	Data Modem	
14	14	MVC01421	Filter Connector (50 Cond.)	
5	5	NE-A18QA	Cable (C.E. Shelf Connect)	
3	3	NE-A18QA	Cable (Extender/Network)	
2	2	NEA25MQ2	Cable 16 ft. (Serial Data Interface)	
1	1	P0552536	Fuse Kit	
1	1	P0661194	Blank Faceplate	
1	1	QCA58	C.E./P.E. Cabinet	
1	1	QCAD111	Cable Harness	
2	2	QCAD117	Intra-Cabinet Cable	
2	2	QCAD123A	Cable (CMA Connect)	
2	2	QCAD123D	Cable (3 Port Ext/ 3 Port Ext)	
2	2	QCAD124	Cable (Network/P.E. Loop)	
2	2	QCAD124A	Cable (CMA Connect)	
14	14	QCAD137	Intra-Cabinet Cable	
	1	QCAD176	Power Adapter Cable	
2	2	QCAD240A	Cable	
1	-	QCW4	Digit Display Console	
1	1	QMT102	Disk Controller	
2	2	QMT104	Floppy Disk Drive Assembly	
1	-	QMT4	Handset Module	
2	2	QPC43(P)	Peripheral Signaling	1
1	-	QPC61(C)	Console Card	1
-	1	QPC74	Recorded Announcement Trunk	
1	1	QPC80(F)	10V Converter	1
1	1	QPC82(C)	30V Converter	1
1	1	QPC84(Q)	Power Monitor	1
1	1	QPC139	Serial Data Interface (Dual)	
1	1	QPC163(D)	48V Regulator	1
1	1	QPC187	Ringing Generator	
1	2	QPC414	Network	
2	2	QPC441	3 Port Extender	
2	2	QPC444	Conference	
3	10	QPC450	CO Trunk	
1	4	QPC451	SL-1 Line	
6	-	QPC594	2500 Line	
2	2	QPC659	Peripheral Buffer	
6	6	QPC477	Bus Terminating Unit	
1	1	QPC496	Bus Extender	
2	2	QPC579	CPU Function (with QPC602 ROM)	
2	2	QPC580	CPU Interface	
2	2	QPC581	Changeover & Memory Arbitrator	
2	2	QPC583	768K Memory	
2	2	QPC584	Mass Storage Interface	
1	1	QPC585	Disk Power Converter	
2	2	QPC609	Tone & Digit Switch	
4	4	QPC691	5/12V convener	
1	1	QRF8	48V Rectifier	
1	1	QSD39	Network Shelf	
1	1	QSD40	Network Shelf	
1	1	QSD60	CPU/Memory Shelf	
2	2	QSD65	Peripheral Shelf (Dual Loop)	
1	1	QSD67	Disk Shelf (with QMM38 MSU)	
1	1	QSP43	Power Converter Shelf	
2	2	QUD20	Cooling Unit	
		SET	Cabinet Panels	
1	1	SET	Dummy Faceplates	
2	2	SET	(1) Intra-Cabinet Cable (50 Cond.)	
1	1	SET	(2) Intra-Cabinet Cable (25 Cond.)	
1	1	SET	NTP's	

NOTE: 1. Minimum vintage specified for code.

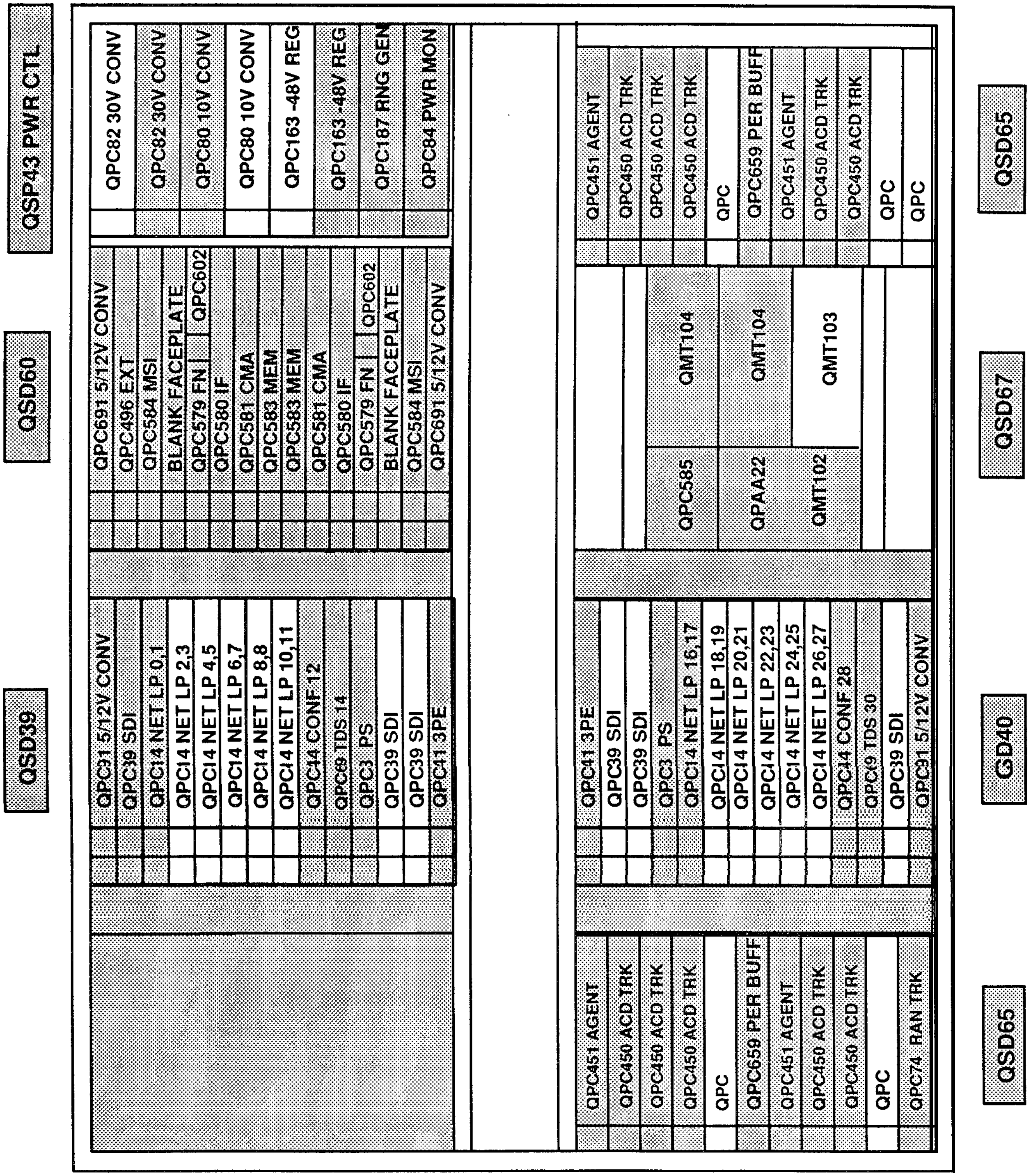
CHART 10-6: MERIDIAN SL-1NT PACKAGES



QCA58

Identifies hardware contained in Order Code 146SL1-1

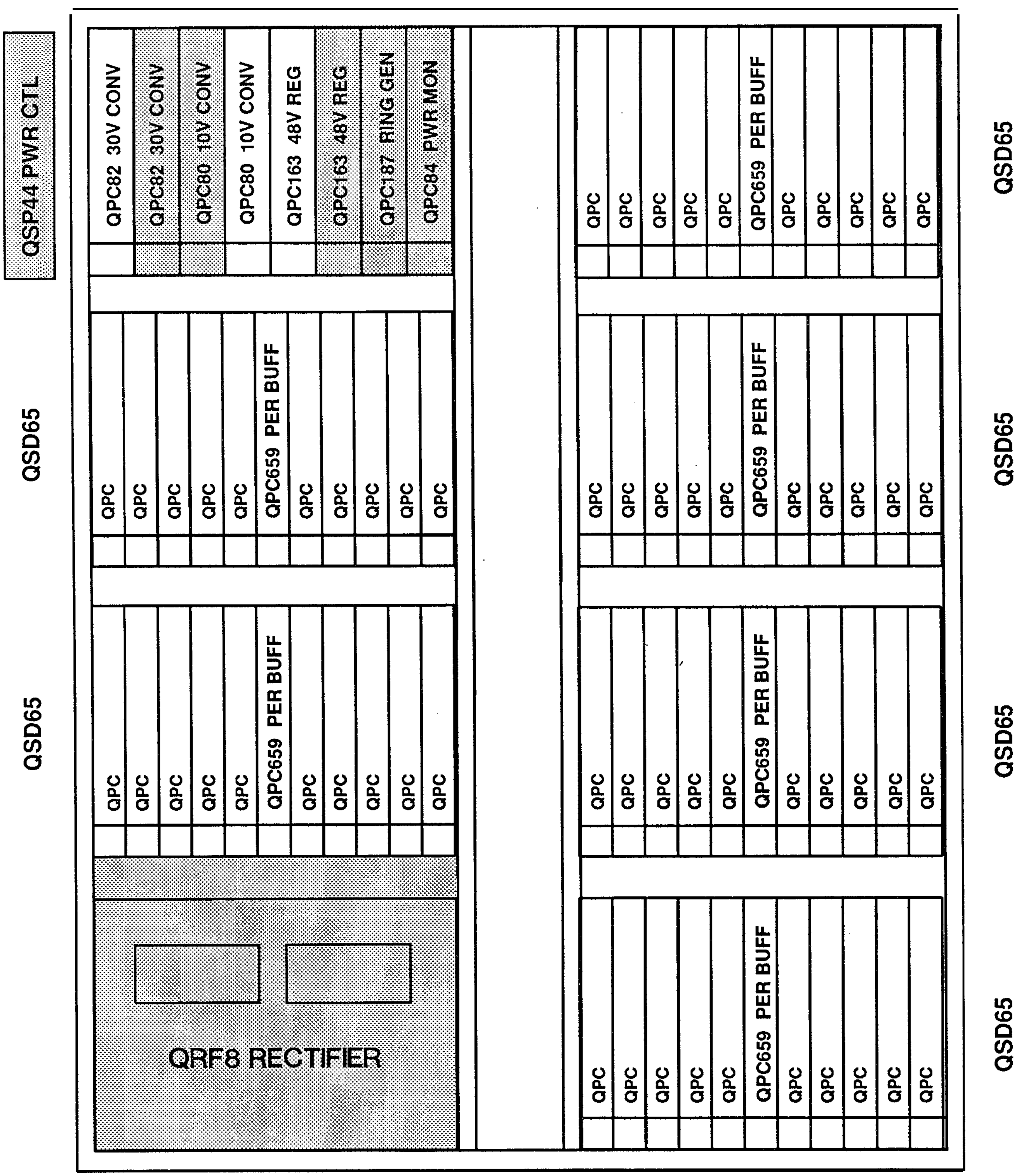
FIGURE 10-l 1: MERIDIAN SL-1NT PRE-PACKAGED SYSTEM
(DUAL CPU)



QCA58

Identifies hardware contained in Order Code 147SL1-1

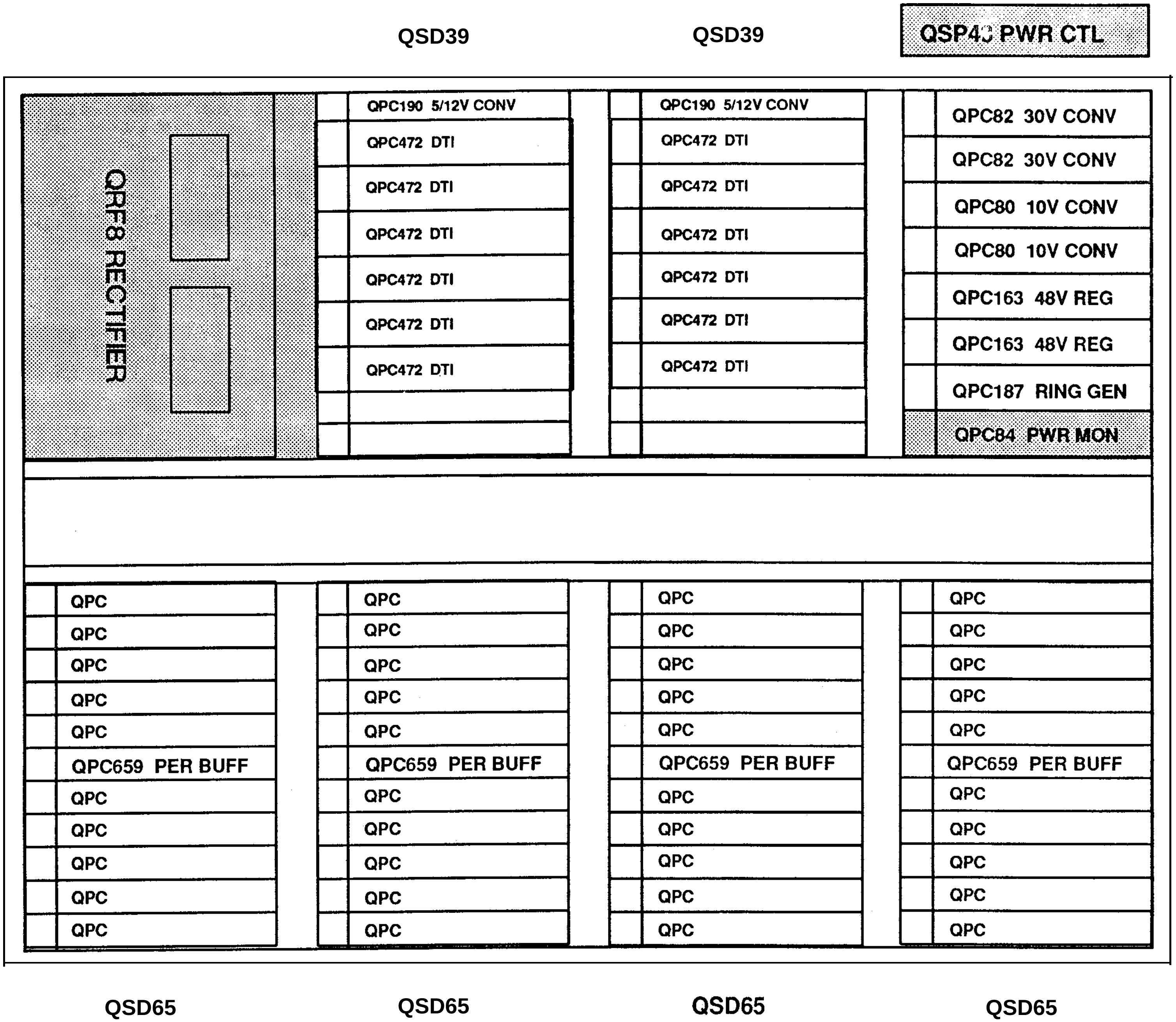
FIGURE 10-12: MERIDIAN SL-1NT PRE-PACKAGED ACD SYSTEM
(DUAL CPU)



QCA74

Identifies hardware contained in Order Code 205SL1-1

FIGURE 10-13: PERIPHERAL CABINET ASSEMBLY (MS, N, NT)



QCA108

Identifies hardware contained in Order Code 985SL1-1

FIGURE 10-14: DTI/PE CABINET ASSEMBLY (N,NT)

MERIDIAN SL-1XT

The Meridian SL-1XT packaging enables common equipment, peripheral equipment, and power equipment to be ordered as packaged assemblies. The minimum system comprises one CE Cabinet Assembly (980SL1-1) equipped with one 961 SL1-1 Network Group Assembly interfaced to the 206SL1-1 PE Cabinet Assembly equipped with a complement of 344SL1-1 PE Shelves. When traffic requirements dictate that more than three 961 SL1-1 assemblies are required, the 963SL1- 1 Network/PE Cabinet Assembly is specified to provide expansion capability to five Network Groups.

Refer to Table 10-15, Table 10- 16, and Chart 10-7 for packaging guidelines for CE and PE equipment.

A Centralized Power Plant (Table 10-17), comprising one or more cabinets containing a quantity of 50A Rectifiers to meet system requirements, may also be specified.

ORDER CODE	DESCRIPTION	PROVISION
980SL1-1	Common Equipment Assembly comprising: Dual CPU Fully Redundant Memory Centralized Power Plant Consists of: 1 - Cabinet (Double Bay - Front and Rear Access) Equipped with: 2 - CPU/Memory Shelves, 1 - Disk Shelf (with MSU) 1- Power Cabinet (Single Bay - Front Access) Equipped with: 1 - 50A Rectifier	One per system (always required; accommodates up to 3 Network Groups) Expansion capability for: 6 NET Shelves (3 NET Groups) Expansion capability for: 3 - 50A Rectifiers
961SL1-1	Network Group Assembly comprising: 2 - NET Shelves, SET - Common Cards NOTE: Network Bus Cards (NET, TDS, CONF, MFS) are specified on an individual basis to meet configuration requirements.	One per 16 Network bus cards comprised typically of 12 NETWORK (dual circuit - 24 network loops), 2 CONFERENCE, and 2 TDS cards. Maximum 5 Network Groups per XT system.
963SL1-1	NET/PE Expansion Cabinet Assembly comprising: 1 - Cabinet (Double Bay - Front and Rear Access) 1 - Power Converter Shelf	One per system when more than 3 NETWORK Groups are required. Expansion capability for: 4 NET Shelves (2 NET Groups) 10 PE Shelves

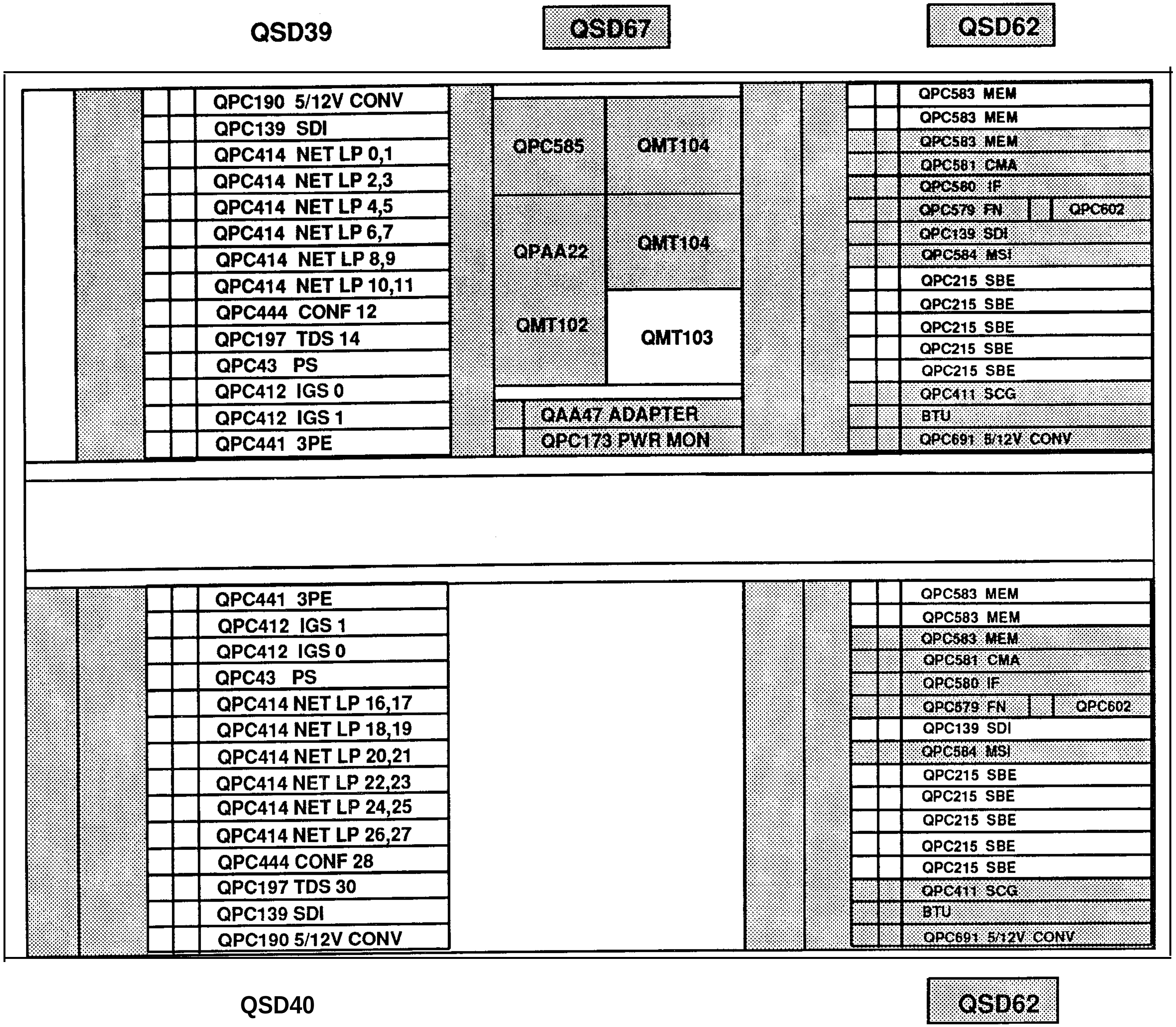
TABLE 10-15: MERIDIAN SL-1XT PACKAGE ASSEMBLIES

CODE	DESCRIPTION	NOTE
980SL1-1	SL-1XT CE CABINET ASSEMBLY	
961SL1-1	SL-1XT NETWORK GROUP ASSEMBLY	
963SL1-1	NETWORK/PE CABINET ASSEMBLY	

CODE	BREAKDOWN	QUANTITY	CODE	DESCRIPTION	NOTE
2			A0297366	Filter Connector (25 Cond.)	
6			A0324084	Diskettes, 5.25" Floppy	
1			B0225152	Power Cabinet	
1			MVC01243	Data Modem GDC103JM	
1			MVC01421	Filter Connector (50 Cond.)	
2			NE-A18QA	Cable 4 ft	
2			NE-25MQ2A	SDI Cable	
1			NT5C03	Rectifier 50 Amp.	
1			P0552536	Fuse Kit	
1			P0572335/6	Set Dummy Faceplates	
2			P0575529	Filter Unit Assembly	
1			P0639986	Bracket for QPC417	
1			P0661194	Blank Faceplate (No Hard Disk)	
1			QAA47	Adapter	
1			QBL21	Power Distribution Box	
1			QCA55	CE Cabinet	
		1	QCA108	Network/PE Cabinet	
2			QCAD110B	Cable Connector 10 ft	
		1	QCAD111	Cable Harness	
1			QCAD112	Cable Harness	
1			QCAD117	Intra-Cabinet Cable (25 Cond.)	
1			QCAD123C	Cable Connector 4 ft (CMA)	
2			QCAD123D	MSI Connect Cable	
1			QCAD124B	Cable Connector 4 ft (CMA)	
2			QCAD240A	Cable	
2			QCAD254	Power Adapter Cable	
1			QMT102	Disk Converter	
2			QMT104	Floppy Disk Drive Assembly	
	2		QPC43(P)	Peripheral Signaling	1
		1	QPC84(P)	Power Monitor	1
1			QPC139	Serial Data Interface (SDI)	
1			QPC173	Power Monitor	
		1	QPC187	Ringing Generator	
	2		QPC215	Segmented Bus Extender	
2			QPC411	System Clock Generator	
	4		QPC412	Intergroup Switch	
1			QPC417	Junctor Board	
	2		QPC441	Three Port Extender	
2	4		QPC477	Bus Termination Unit	
2			QPC579	CPU Function (with QPC602 ROM)	
2			QPC580	CPU Interface	
2			QPC581	Changeover & Memory Arbitrator	
2			QPC583	768K Memory	
2			QPC584	Mass Storage Interface	
1			QPC585	Disk Power Converter	
2	2		QPC691	5/12V Converter	
	1		QSD39	Network Shelf (LH Mount)	
	1		QSD40	Network Shelf (RH Mount)	
2			QSD62	CPU/Memory Shelf	
1			QSD67	Disk Shelf (with QMM38 MSU)	
		1	QSF43	Power Converter Shelf	
6		2	QUD20	Cooling Unit	
1	1		SET	CE Inter/Intra Cabinet Cables	
1			SET	Cabinet Panels	
1			SET	(2) Intra-Cabinet Cable (25 Cond.)	
1			SET	NTP's	

NOTE: 1. Minimum vintage specified for code.

CHART 10-7: MERIDIAN SL-1XT PACKAGES



QCA55

Identifies hardware contained in Order Code 980SL1-1

FIGURE 10-15: MERIDIAN SL-1XT CE CABINET ASSEMBLY
(FRONT VIEW)

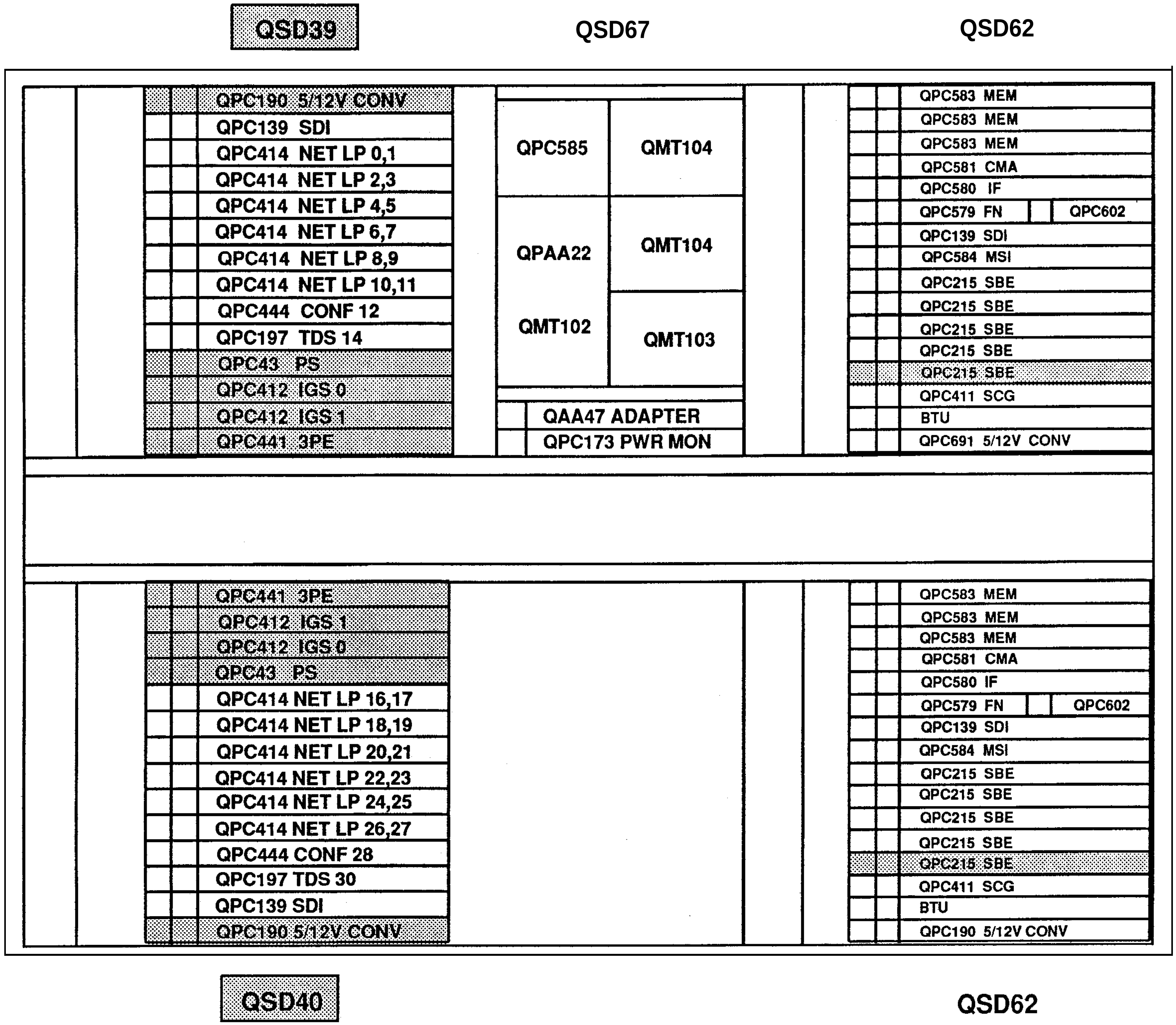
QSD39	QSD39
QPC190 5/12V CONV	QPC190 5/12V CONV
QPC139 SDI	QPC139 SDI
QPC414 NET LP 32,33	QPC414 NET LP 64,65
QPC414 NET LP 34,35	QPC414 NET LP 66,67
QPC414 NET LP 36,37	QPC414 NET LP 68,69
QPC414 NET LP 38,39	QPC414 NET LP 70,71
QPC414 NET LP 40,41	QPC414 NET LP 72,73
QPC414 NET LP 42,43	QPC414 NET LP 74,75
QPC444 CONF 44	QPC444 CONF 76
QPC197 TDS 46	QPC197 TDS 78
QPC43 PS	QPC43 PS
QPC412 IGS 0	QPC412 IGS 0
QPC412 IGS 1	QPC412 IGS 1
QPC441 3PE	QPC441 3PE

QSD40	QSD40
QPC441 3PE	QPC441 3PE
QPC412 IGS 1	QPC412 IGS 1
QPC412 IGS 0	QPC412 IGS 0
QPC43 PS	QPC43 PS
QPC414 NET LP 48,49	QPC414 NET LP 80,81
QPC414 NET LP 50,51	QPC414 NET LP 82,83
QPC414 NET LP 52,53	QPC414 NET LP 84,85
QPC414 NET LP 54,55	QPC414 NET LP 86,87
QPC414 NET LP 56,57	QPC414 NET LP 88,89
QPC414 NET LP 58,59	QPC414 NET LP 90,91
QPC444 CONF 60	QPC444 CONF 92
QPC197 TDS 62	QPC197 TDS 94
QPC139 SDI	QPC139 SDI
QPC190 5/12V CONV	QPC190 5/12V CONV

QCA55

Identifies hardware contained in Order Code 980SL1-1

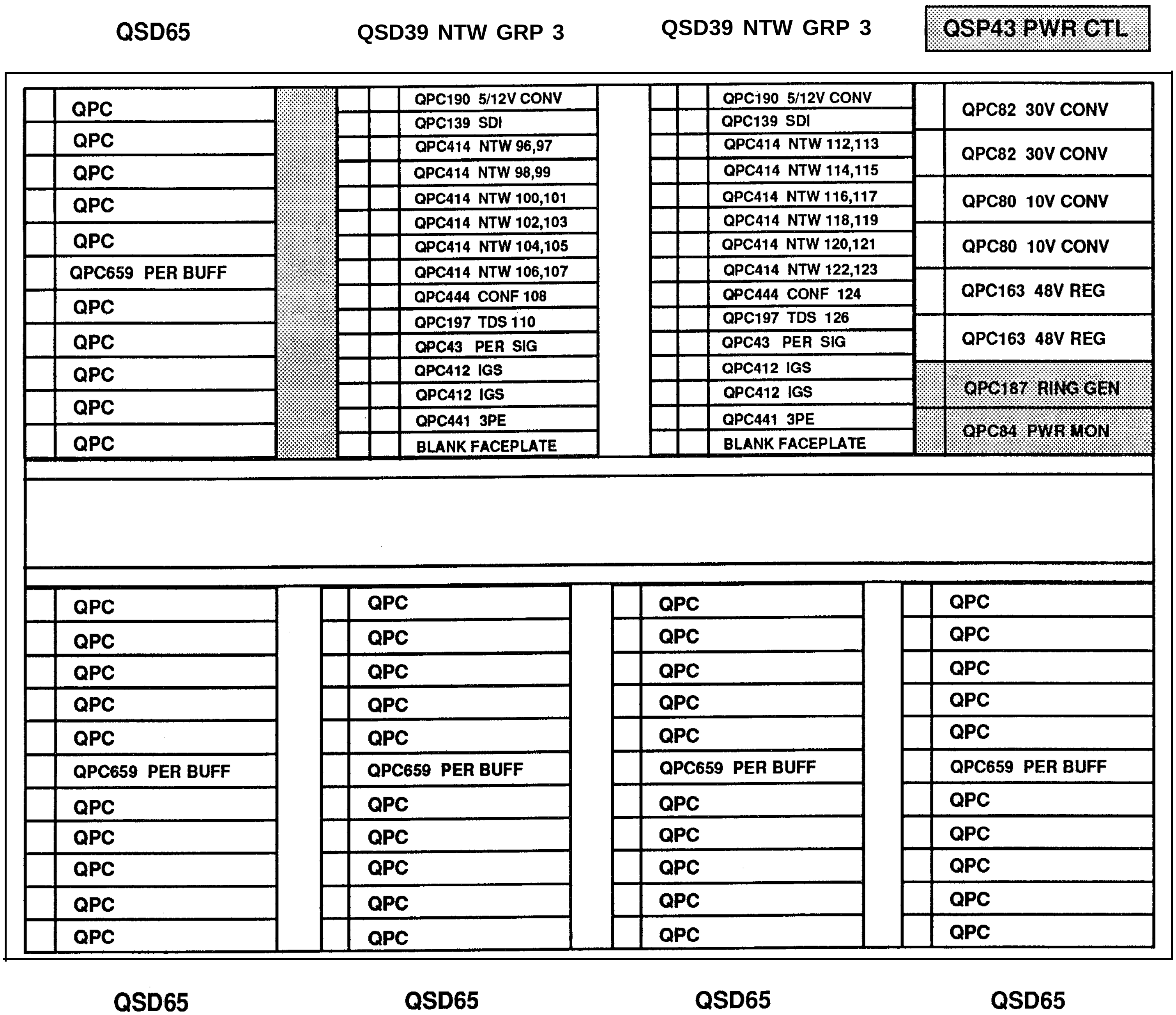
FIGURE 10-16: MERIDIAN SL-1XT CE CABINET ASSEMBLY (REAR VIEW)



QCA55

Identifies hardware contained in Order Code 961SL1-1

FIGURE 10-17: MERIDIAN SL-1XT NETWORK GROUP ASSEMBLY



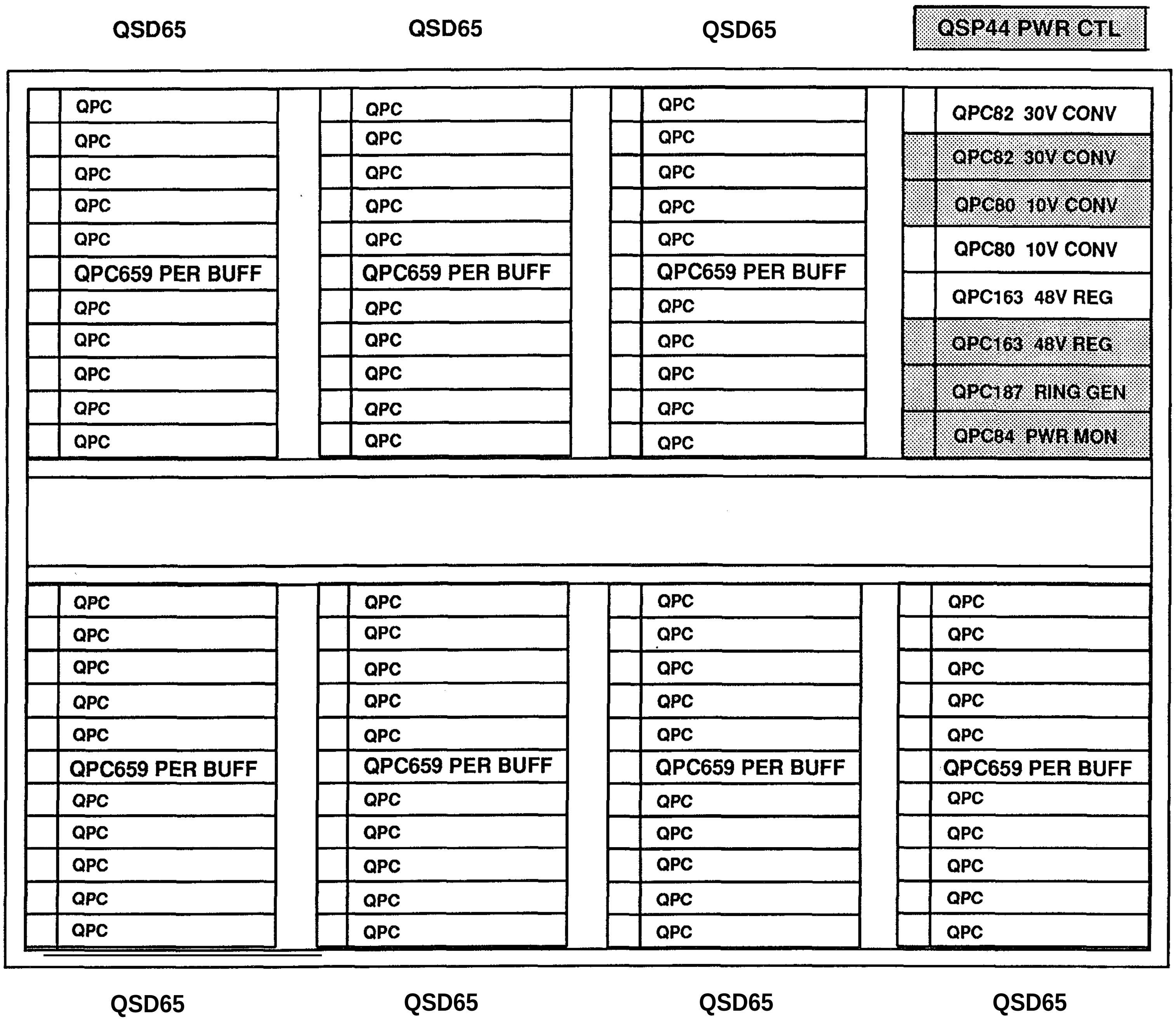
Identifies hardware contained 5' Order Code 963SL1-1

QCA108

FIGURE 10-18: MERIDIAN SL-1XT NET/PE EXPANSION CABINET ASSEMBLY

ORDER CODE	DESCRIPTION	PROVISION
206SL1-1	PE Cabinet Assembly comprising: Cabinet (Double Bay - Front and Rear Access) equipped with: 1 - Power Converter Shelf SET - Power Converter Cards	One per 14 PE Shelves Expansion capability for: 14 PE Shelves
301SL1-1	PE Shelf Assembly (Single Loop) comprising: 1 - PE Shelf 1 - PE Buffer Capability of accommodating 10 PE Cards and 1 Network Loop (specified on an individual basis to meet system requirements).	One per 10 PE Cards
344SL1-1	PE Shelf Assembly (Dual Loop) comprising: 1 - PE Shelf 1 - Dual Loop PE Buffer Capability of accommodating 10 PE Cards and 2 Network Loops (specified on an individual basis to meet system requirements)	One per 10 PE Cards

TABLE 10-16: MERIDIAN SL-1XT PE EXPANSION PACKAGES



QCA74

Identifies hardware contained in Order Code 206SL1-1

FIGURE 10-19: MERIDIAN SL-1XT PE CABINET ASSEMBLY

ORDER CODE	LIST	DESCRIPTION (POWER EQUIPMENT J2412A-1)	PROVISION
B0225152	L6	Main Cabinet Assembly wired for four rectifiers comprising: Control Panel, Charge Panel, Circuit Breaker Panel, 600A Meter and Shunt	One per system (500A Plant Capacity) Accommodates Rectifiers 1 - 4
	L18	Fuse and Discharge Panel	
	L27	Meridian Style Framework	
	L28	Monitor Control Card	
B0225153	L17	Supplementary Cabinet Assembly wired for four rectifiers comprising: Circuit Breaker Panel	As required to accommodate rectifiers 5 - 8, 9, 10 in Supplementary Bays (1) and (2) respectively.
	L19	Fuse and Discharge Panel	
	L27	Meridian Style Framework	
	L28	Monitor Control Card	
NT5C03BJ	L29	Switched Mode 48V 50A Rectifier	As required (Maximum 10)

NOTE: One each of B0225 152 and NT5C03B J is included in Order Code 980SL1- 1 (XT Common Equipment Assembly).

TABLE 10-17: MERIDIAN SL-1XT CENTRALIZED POWER PLANT

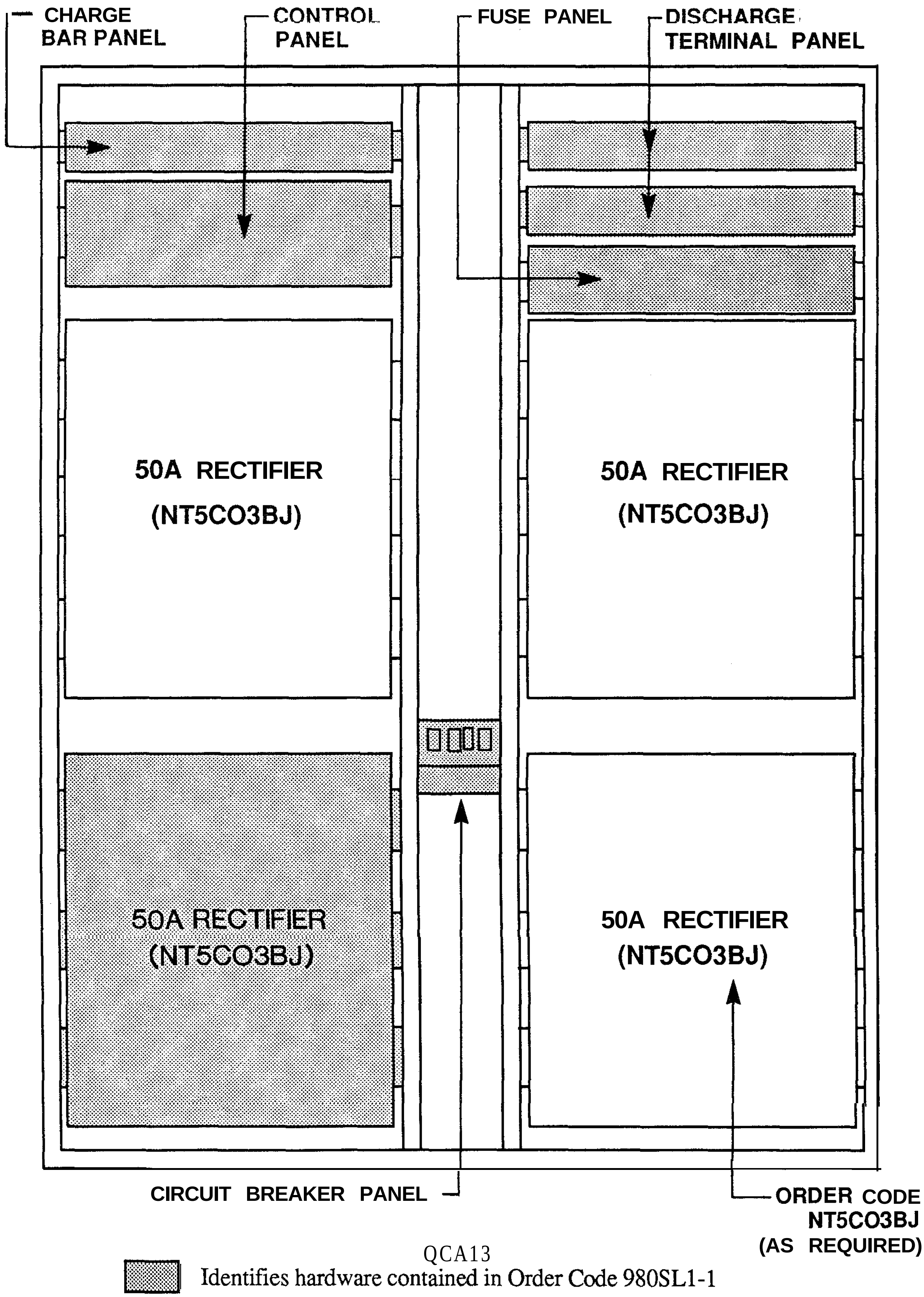
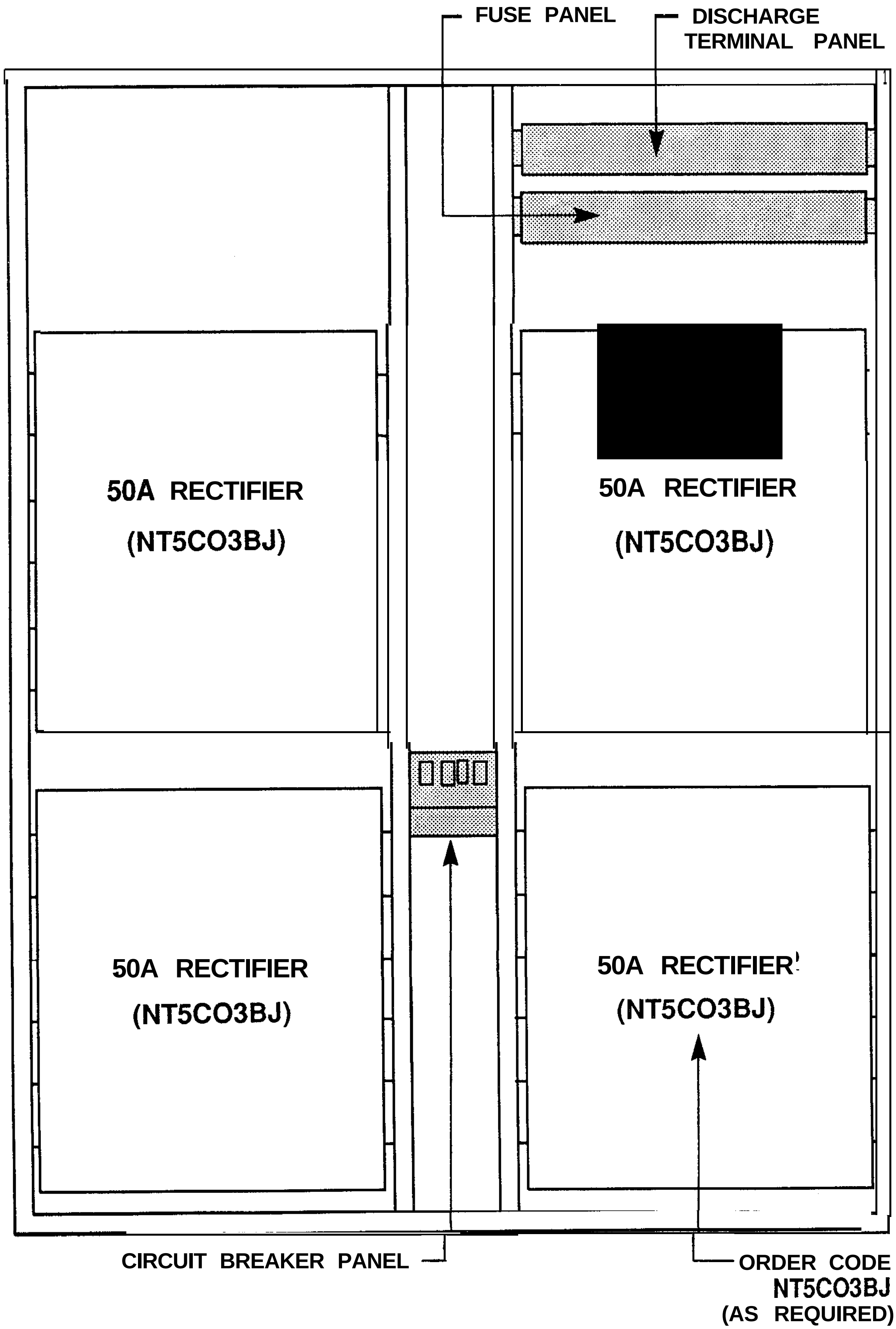


FIGURE 10-20: MERIDIAN SL-1XT MAIN POWER CABINET ASSEMBLY



QCA13

Identifies hardware contained in Order Code B0225 153

FIGURE 10-21: MERIDIAN SL-1XT SUPPLEMENTARY POWER CABINET ASSEMBLY

Remote Peripheral Equipment

Remote Peripheral Equipment (RPE) is an optional feature that is applicable to MS, N, ST, RT, NT and XT systems. It is used to increase the fifty foot range of the multiplexed loop between the network card and the peripheral equipment shelves to approximately 70 miles over T1 type transmission media. This enables the peripheral equipment (lines, trunks, consoles, data interface cards) to be placed in closer proximity to the telephones and terminals it serves and effectively increases the serving area of the system.

RPE ordering format is based upon the system packaging concept and requires Option Group 15 to be included in the Software. Tables 10-18 and 10-19 provide a breakdown of the ordering information associated with RPE.

The Local and Remote Carrier Shelf (QSD6 or QSD11) is a central mount type and as such, its provision in the double bay (front and rear access) cabinet is done so at the expense of the two back-to-back cantilever type PE shelves (QSD64 or QSD65).

The cabinet hardware arrangements utilized with the introduction of the Meridian SL-1ST may also be applied at the remote location of RPE sites for other system models. Figure 10-22 shows a typical RPE cabinet arrangement which may be specified with or without a built-in MDF assembly (Codes 885SL1-1 and 884SL1-1 respectively). Similarly, associated RPE/PE Expansion Assemblies (Codes 887SL1-1 or 886SL1-1) may also be specified as required for accommodation in the RPE cabinet. Table 10- 11 outlines the capabilities of these RPE hardware packages.

ORDER CODE	DESCRIPTION	PROVISION
706SL1-1	Local Network Interface comprising: 1 - QPC62 1.5 MBAUD Converter 1 - QPC63 Local Carrier Buffer 1 - QPC66 2 MBAUD Converter 1 - QPC99 Carrier Interface	One per remote network loop
707SL1-1	Remote Network Interface comprising: 1 - QPC62 1.5 MBAUD Converter 1 - QPC65 Remote Periph Switch 1 - QPC66 2 MBAUD Converter 1 - QPC99 Carrier Interface	One per remote network loop
710SL1-1	Local Carrier Shelf Assembly comprising: 1 - QSD6 (or QSD11) Shelf 1 - QPC85 (or QPC109) 5/12V Converter 1 - QPC67 Carrier Maintenance	One per two remote network loops
711SL1-1	Remote Carrier Shelf Assembly comprising: 1 - QSD6 (or QSD1 l)Shelf 1 - QPC85 (or QPC190) 5/12V Converter 1 - QPC67 Carrier Maintenance	One per two remote network loops

TABLE 10-18: MERIDIAN SL-1 RPE PACKAGED ASSEMBLIES

ORDER CODE	DESCRIPTION	PROVISION
QBL14	Power Distribution Unit (local and remote sites)	One per four 710 or 711SL1-1

TABLE 10-19: MERIDIAN SL-1 RPE UNITS

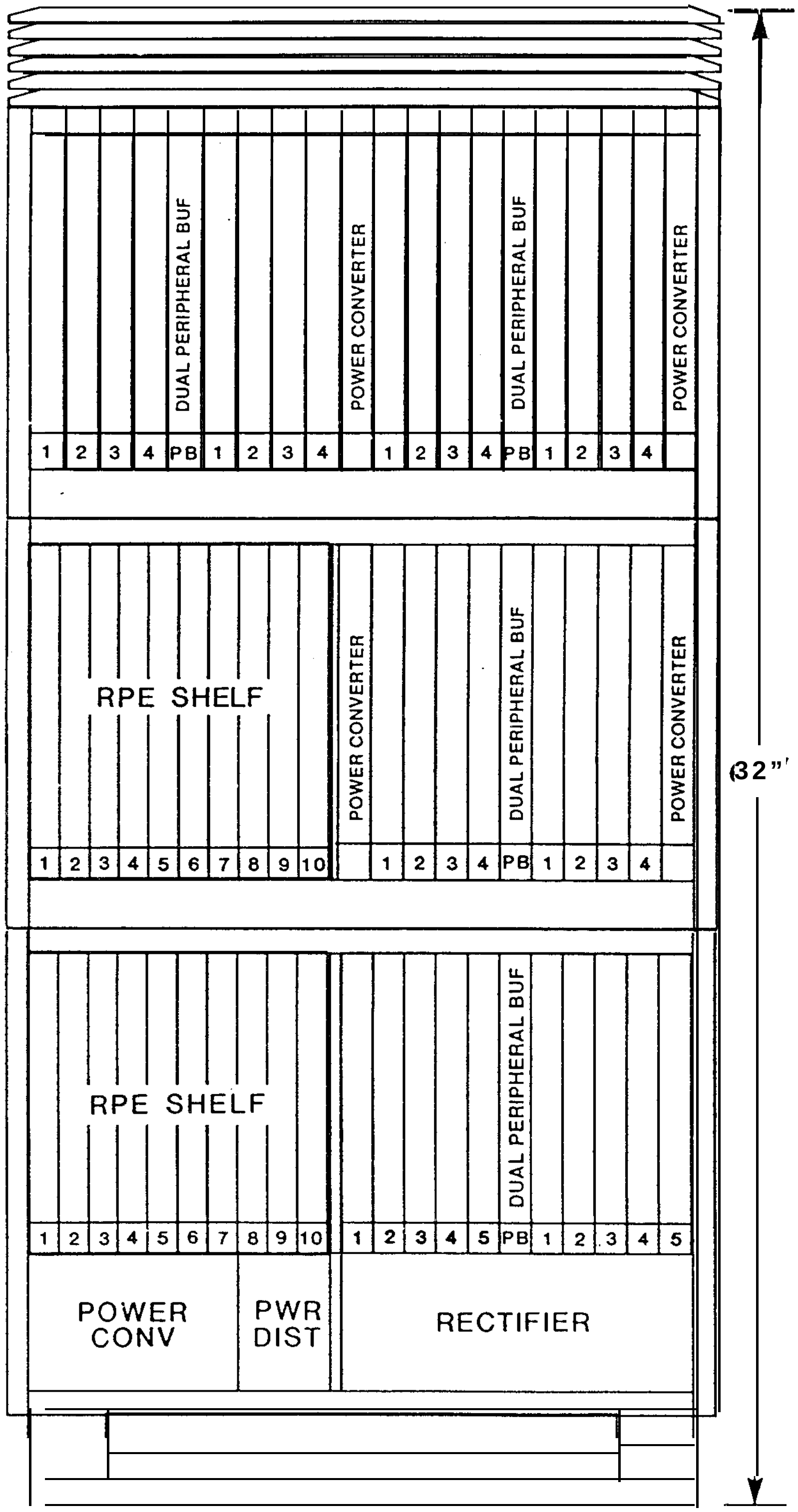


FIGURE 10-22: MERIDIAN SL-1 RPE CABINET

CODE	DESCRIPTION	PURPOSE
NTZR04AV	LSPC NETWORK PACKAGE	CONTAINS A PC LANLINK CARD, A MERIDIAN LANSTAR OWNERS MANUAL, MICROSOFT NETWORKS PROGRAM, A CABLE, AND A CARD GUIDE.
NTZR15AA	LSPC CABINET PACKAGE	CONTAINS A PTE CABINET, A DIGITAL SHELF ASSEMBLY, A -48V RECTIFIER (QRF8), AND A TRANSPORT CONTROLLER FOR USE AS THE BASE FOR A MERIDIAN LANSTAR ONLY APPLICATION.
NTZR16AA	PTE-S CABINET - SINGLE POWER	SUPPORTS MERIDIAN LANSTAR ONLY SYSTEMS FOR UP TO 76 PC AND SERVER CONNECTIONS. THIS CABINET HAS ONLY ONE POWER SUPPLY.
NTZR17AA	PTE-S CABINET - DUAL POWER	SUPPORTS MERIDIAN LANSTAR ONLY SYSTEMS FOR UP TO 112 PC AND SERVER CONNECTIONS. TI-IIS CABINET HAS TWO POWER SUPPLIES FOR' INCREASED CAPACITY.
NTZR18AA	PTE CABINET ASSEMBLY WITHOUT RECTIFIER	SUPPORTS ANY MIXTURE OF UP TO 3 DISK/TAPE AND DIGITAL SHELVES. IT CONTAINS THE PTE CABINET WITH THE POWER MONITOR AND POWER DISTRIBUTION SYSTEM, DOORS, FAN ASSEMBLY, I/O PANEL, AND NO IN-CABINET RECTIFIER.
NTZR19AA	-48 VDC RECTIFIER PACKAGE (QRF8)	CONTAINS THE -48 VOLT RECTIFIER (QRF8) AND THE INPUT CABLE.
NTZR20AA	POWER SUPPLY - PTE-S CABINET	CONTAINS A POWER SUPPLY AND CABLING NECESSARY TO ADD A SECOND POWER SUPPLY TO THE PTE-S SINGLE POWER CABINET.
NTZR22AA	DIGITAL SHELF ASSEMBLY	SUPPORTS UP TO 18 DIGITAL CARDS, 16 ARE 'NETWORK" ADDRESSABLE. IT ALSO SUPPORTS UP TO 2 DIGITAL POWER UNITS. IT CONTAINS THE SHELF, TWO TRANSPORT TERMINATORS AND A BLANK FACEPLATE.

TABLE 10-20: MERIDIAN SL-1 PACKET TRANSPORT HARDWARE

CODE	DESCRIPTION	PURPOSE
NTZR23AA	MASS STORAGE 234 PACKAGE	PROVIDES A MASS STORAGE SUBSYSTEM COMPOSED OF A DISK/TAPE SHELF WITH THE 234 MEGABYTE DISK, A STREAMING TAPE, AND THE MASS STORAGE INTERFACE, MASI
NTZR24AA	DS-1 SYNC/ASYNC ASSEMBLY (3 CARDS)	PROVIDES A 24 CHANNEL DS-1 INTERFACE AND AN INFOLINK CARD. EACH CHANNEL MAY BE USED FOR SYNCHRONOUS (DATA OR VOICE) OR ASYNCHRONOUS DATA. ASYNCHRONOUS DATA FROM THE MERIDIAN SL-1 CE IS CONVERTED TO THE PACKET FORMAT BY THE INFOLINK CARD. A CABLE TO THE I/O PANEL IS ALSO INCLUDED.
NTZR25AA	DS-1 SYNC ASSEMBLY (2 CARDS)	PROVIDES A 24 CHANNEL DS-1 INTERFACE. EACH CHANNEL MAY CARRY SYNCHRONOUS DATA OR VOICE. A CABLE TO THE I/O PANEL IS ALSO INCLUDED.
NTZR26AA	PROCESSOR 2M ASSEMBLY (2 CARDS)	PROVIDES A 68000 PROCESSOR, A 2 MBYTE MEMORY CARD, AND A 2 SEGMENT P-BUS.
NTZR27AA	PROCESSOR 4M ASSEMBLY (3 CARDS)	PROVIDES A 68000 PROCESSOR, TWO 2 MBYTE MEMORY CARDS, AND A 3 SEGMENT P-BUS.
NTZR28AA	PROCESSOR 6M ASSEMBLLY (4 CARDS)	PROVIDES A 68000 PROCESSOR, THREE 2 MBYTE MEMORY CARDS, AND A 4 SEGMENT P-BUS.
NTZR29AA	PROCESSOR 2MS ASSEMBLY (3 CARDS)	PROVIDES A 68000 PROCESSOR, A 2 MBYTE MEMORY CARD, A SYNCHRONOUS DATA FORMATTER, AND A 3 SEGMENT P-BUS.
NTZR30AA	PROCESSOR 4MS ASSEMBLY (4 CARDS)	PROVIDES A 68000 PROCESSOR, TWO 2 MBYTE MEMORY CARDS, A SYNCHRONOUS DATA FORMATTER, AND A 4 SEGMENT P-BUS.
NTZR31AA	PROCESSOR 6MS ASSEMBLY (5 CARDS)	PROVIDES A 68000 PROCESSOR, THREE 2 MBYTE MEMORY CARDS, A SYNCHRONOUS DATA FORMATTER, AND A 5 SEGMENT P-BUS

TABLE 10-20: CONTINUED

CODE	DESCRIPTION	PURPOSE
NTZR37AA	MERIDIAN MAIL PACKAGE (4)	CONTAINS THE BASE CSE AND PTE ASSEMBLIES REQUIRED TO SUPPORT A 4 CHANNEL, 9 HOUR MERIDIAN MALL SYSTEM.
NTZR38AA	MERIDIAN MAIL PACKAGE (20)	CONTAINS THE BASE CSE AND PTE ASSEMBLIES REQUIRED TO SUPPORT A 20 CHANNEL, 27 HOUR MERIDIAN MAIL SYSTEM.
NTZR39AA	MERIDIANMAIL PACKAGE (24)	CONTAINS THE BASE CSE AND PTE ASSEMBLIES REQUIRED TO SUPPORT A 24 CHANNEL, 27 HOUR MERIDIAN MALL SYSTEM.
NTZR41AA	PTE SERVICE PRINTER PACKAGE	CONTAINS MATRIX PRINTER, ASSOCIATED STAND, AND CATCH TRAY FOR USE AS A PTE SYSTEM PRINTER.
NTZR42AA	PTE ASCII TERMINAL PACKAGE	CONTAINS AN NT220 TERMINAL AND ASYNCHRONOUS LINE INTERFACE UNIT (MALE) FOR USE AS A PTE SYSTEM TERMINAL.
NTZR43AA	LANLINK ASSEMBLY (2 CARDS)	CONTAINS ONE 16 CIRCUIT LANLINK INTERFACE CARD SET, AND THE 2 I/O CABLES.
NTZR44AA	LSPC HARDWARE PACKAGE (1 PER PC OR SERVER	CONTAINS A PC LANLINK CARD, A LANSTAR PC INSTALLATION MANUAL, A NETWORK DIAGNOSTIC PROGRAM, A CABLE, AND A CARD GUIDE.

TABLE 10-20: CONTINUED

CODE	SYSTEM	OPTION GROUP	DESCRIPTION
57601	ST	77, 85	INTEGRATED COMMUNICATIONS PACKAGE PROVIDES THE CAPABILITY TO INTEGRATE THE PACKET TRANSPORT EQUIPMENT WITH A MERIDIAN SL-1ST. (GROUP 1 S/W)
58601	N/NT/RT	77, 85	INTEGRATED COMMUNICATIONS PACKAGE PROVIDES THE CAPABILITY TO INTEGRATE THE PACKET TRANSPORT EQUIPMENT WITH A MERIDIAN SL-1N, NT. (GROUP 1 S/W)
59601	XN/XT	77, 85	INTEGRATED COMMUNICATIONS PACKAGE PROVIDES THE CAPABILITY TO INTEGRATE THE PACKET TRANSPORT EQUIPMENT WITH A MERIDIAN SL-1XN, XT. (GROUP 1 S/W)
302SL1-1	N/NT/RT	75	DTI (GROUP 1 S/W)
303SL1-1	XN/XT	75	DTI (GROUP 1 S/W)
305SL1-1	ST	75	DTI (GROUP 1 S/W)
350SL1-1	ST	35	IVMS, IMS SOFTWARE (GROUP 1 S/W)
351SL1-1	N/NT/RT	35	IVMS, IMS SOFTWARE (GROUP 1 S/W)
352SL1-1	XN/NT/RT	35	IVMS, IMS SOFTWARE (GROUP 1 S/W)
532SL1-1	N/NT/RT	46	MWC, BASIC MESSAGE CENTER (GROUP 1 S/W)
533SL1-1	XN/XT	46	MWC, BASIC MESSAGE CENTER (GROUP 1 S/W)
538SL1-1	ST	46	MWC, BASIC MESSAGE CENTER (GROUP 2 S/W)
559SL1-1	ST	7, 17, 40 & 45	ACD PACKAGE A (GROUP 1 S/W)
658SL1-1	N/NT/RT	7, 17, 40 & 45	ACD PACKAGE A (GROUP 1 S/W)
659SL1-1	XN/XT	7, 17, 40 & 45	ACD PACKAGE A (GROUP 1 S/W)

TABLE 10-21: CSE SOFTWARE FOR PTE APPLICATION

NTZR15AA	LSPC CABINET
NTZR16AA	PTE-S PACKAGE (HALF-SHELF)
NTZR17AA	PTE-S PACKAGE (FULL-SHELF)
NTZR18AA	PTE CABINET ASSEMBLY WITHOUT RECTIFIER

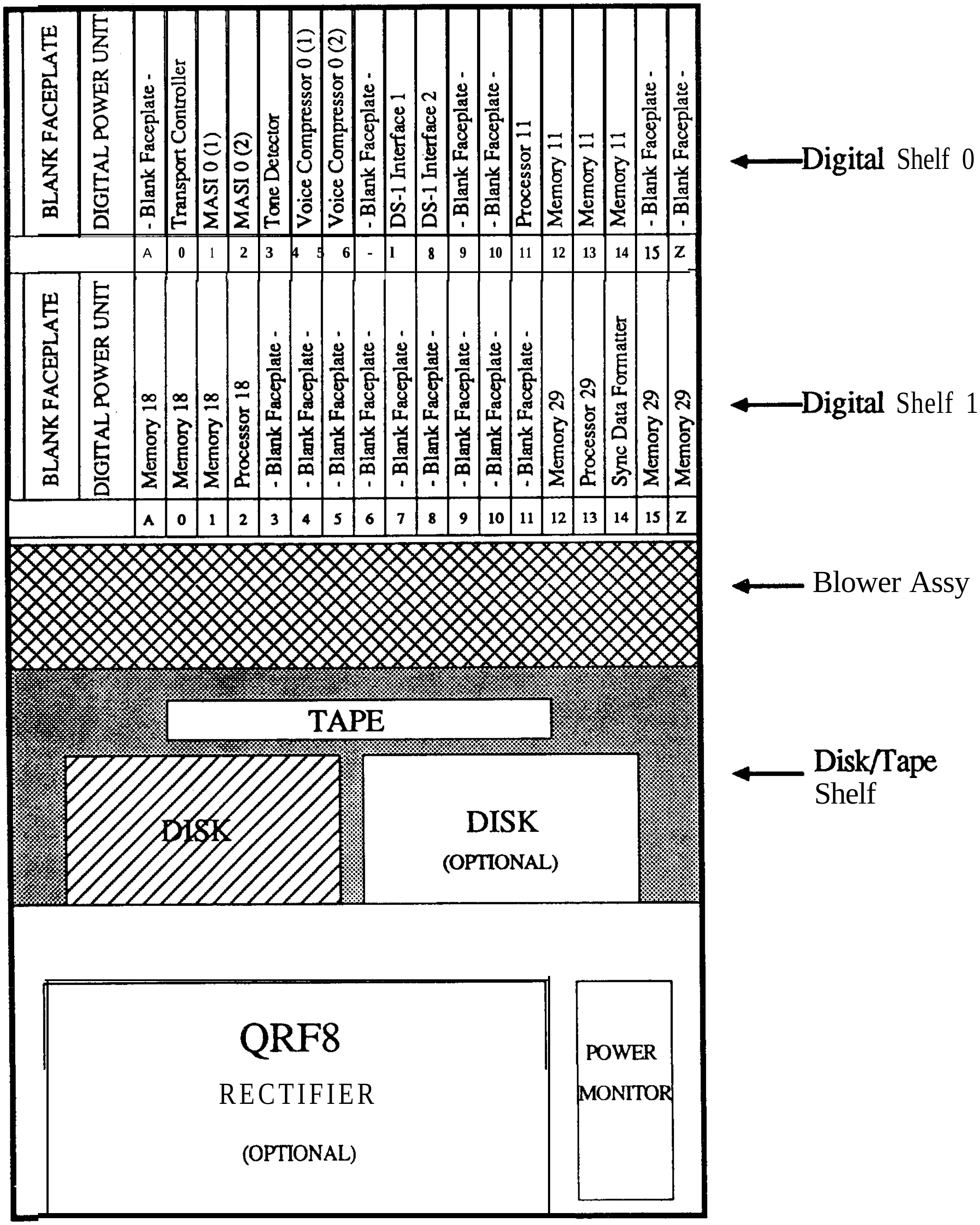
QUANTITY				CODE	DESCRIPTION
2				NT0R03AA	TRANSPORT TERMINATOR
1				NT0R24AA	TRANSPORT CONTROLLER
1			1	NT0R50AA	POWER MONITOR PCB
1				NT0R52AA	DIGITAL POWER UNIT
1			1	NT2R02AA	PTE BASIC CABINET
1			1	NT2R03AA	POWER DISTRIBUTION UNIT
1			1	NT2R05AA	POWER MONITOR SHELF ASSEMBLY
1				NT2R07AA	DIGITAL SHELF
1				NT2R08AD	RECTIFIER INPUT CABLE
1			1	NT2R08AK	POWER MONITOR COMM CABLE
1				NT2R16AA	BLANK FACEPLATE (1.75)
2			1	NT2R17AA	BLANK FACEPLATE (2.625)
			1	NT2R19AA	CABINET EXPANSION KIT
1			1	NT2R21AA	DC POWER PANEL ASSEMBLY
1			1	NT2R23AA	BLOWER UNIT
	1	1		NT5R01AA	PTE-S CABINET
	1	1		NT5R02AA	DIGITAL SHELF ASSEMBLY, PTE-S
	1	1		NT5R03AA	AIR INTAKE, PTE-S
	1	1		NT5R04AA	AIR EXHAUST, PTE-S
	1	[illegible]		[illegible]	[illegible]
	1	1		NT5R07AA	POWER SUPPLY
	2	3		NT5R09AA	I/O CABLE 33"
	2	4		NT5R09AB	I/O CABLE 42"
	2	3		NT5R09AE	I/O CABLE 31"
	2	4		NT5R09AF	I/O CABLE 40"
	1	1		NT5R10AA	FRONT DOOR, PTE-S
	1	1		P0688033	PTE-S INSTALLATION & MAINT. MANUAL
	1	1		P0688034	PTE-S REFERENCE MANUAL
1				P0689118	NTP PTE LANSTAR REF MANUAL
1				QRF8	-48V DC RECTIFIER

CHART 10-8: PTE CABINET PACKAGES

CODE	DESCRIPTION	NOTES
NTZR37AA	MERIDIAN MAIL PACKAGE 4	
NTZR38AA	MERIDIAN MAIL PACKAGE 20	
NTZR39AA	MERIDIAN MAIL PACKAGE 24	

QUANTITY			CODE	DESCRIPTION	
4	6	6	NT0R03AA	TRANSPORT TERMINATOR	
1	2	2	NT0R04AA	TONE DETECTOR	
9	12	12	NT0R08AA	MEMORY 2M	
3	4	4	NT0R09AA	PROCESSOR 68000	
1	1	1	NT0R12AA	SYNCHRONOUS DATA FORMATTER	
1	1	1	NT0R24AA	TRANSPORT CONTROLLER	
1	1	2	NT0R26AA	DS-1 INTERFACE	
1	5	6	NT0R27AA	VOICE COMPRESSOR ASSM	
1	2	2	NT0R30AA	MASI ASSEMBLY	
1	2	2	NT0R50AA	POWER MONITOR PCBA	
2	4	4	NT0R52AA	DIGITAL POWER UNIT	
1	2	2	NT0R53AA	DISK/TAPE POWER UNIT	
1	1	1	NT0R67AA	INFOLINK INTERFACE	
1	2	2	NT2R02AA	PTE BASIC CABINET	
1	2	2	NT2R03AA	POWER DISTRIBUTION UNIT	
1	2	2	NT2R05AA	POWER MONITOR SHELF ASSY	
2	3	3	NT2R07AA	DIGITAL SHELF	
1	1	-	NT2R08AC	PCB LINKING CABLE	
1	1	2	NT2R08AG	DS-1 CABLE	
2	4	4	NT2R08AJ	SINGLE TRANSPORT CABLE	
1	2	2	NT2R08AK	POWER MON. COMM CABLE	
3	3	3	NT2R08AR	PTE PROCESSOR CABLE	
1	1	1	NT2R08AS	DTI CROSSCABLE	
2	2	2	NT2R16AA	BLANK FACEPLATE (1.75)	
1	1	1	NT2R17AA	BLANK FACEPLATE (2.625)	
15	18	16	NT2R18AA	BLANK FACEPLATE (0.875)	
-	1	1	NT2R19AA	CABINET EXPANSION KIT	
1	2	2	NT2R21AA	DC POWER PANEL ASSY	
1	2	2	NT2R23AA	BLOWER UNIT	
1	2	2	NT2R24AA	DISK/TAPE SHELF ASSEMBLY	
1	1	1	NT2R25AA	P-BUS 5 SEGMENT	
2	3	3	NT2R26AA	P-BUS 4 SEGMENT	
-	-	-	NT2R27AA	P-BUS 3 SEGMENT	
1	2	2	NT2R50AA	50M STREAMING TAPE	
1	2	2	NT2R70AA	234M DISK	
1	1	1	NT2R08AT	SEER CABLE	
1	1	1	NE-25MQ2A	RS232 CABLE (16 ft)	
1	1	1	A0297366	RS232 FILTER I/O EMI	
-	1	1	P0641615	FILLER PANEL SHELF	
1	1	1	QMT8	SADM	
1	1	1	QPC430	AILC	
6	6	6	A0326745	TAPE CARTRIDGES - MODEL 2 (9)	
1	1	1	A0329748	DATARACE 2 MODEM	
1	1	1	A0329944	INMAC NULL MODEL	
1	1	1	PO593922	ADM TRANSFORMER	
1	1	1	PO643763	EMI FILTER (T1)	
3	3	3	PO649968	RS232 CABLE ASSEMBLY	
1	1	1	PO664706	NTP PTE DESCRIP & ENGIN	
1	1	1	PO664707	NTPE PTE INSTALLATION	
1	1	1	PO664708	NTP PTE SOFTWARE	
1	1	1	PO664709	NTP PTE HARDWARE	
100	100	100	PO677571	MERIDIAN MAIL START GUIDES	
1	1	1	PO680127	SL-1 CSE NTP UPDATE KIT	
1	1	1	PO686466	SEER MANUAL	
1	1	1	QCAD124	CABLE COMM. (20 ft.)	
1	1	1	QCAD128	CABLE COMM. (7 ft.)	
1	1	1	QCAD133	CABLE COMM. (50 ft.)	
1	1	1	QCAD42	CABLE QPC513, I/O	
1	1	1	QMT11	ASIM	
1	1	2	QPC472	DTI / CPI NETWORK CARRIER I/F	
1	1	1	QPC513	ESDI	

CHART 10-9: MERIDIAN MAIL PACKAGES



CABINET 0

- Expandable to 16-Voice Compressor channels
- Additional disk expands to 27 hours of storage
- Optional disk cabinet allows expansion to 96 hours of voice storage

FIGURE 10-23: MERIDIAN MAIL PACKAGE 4 ASSEMBLY

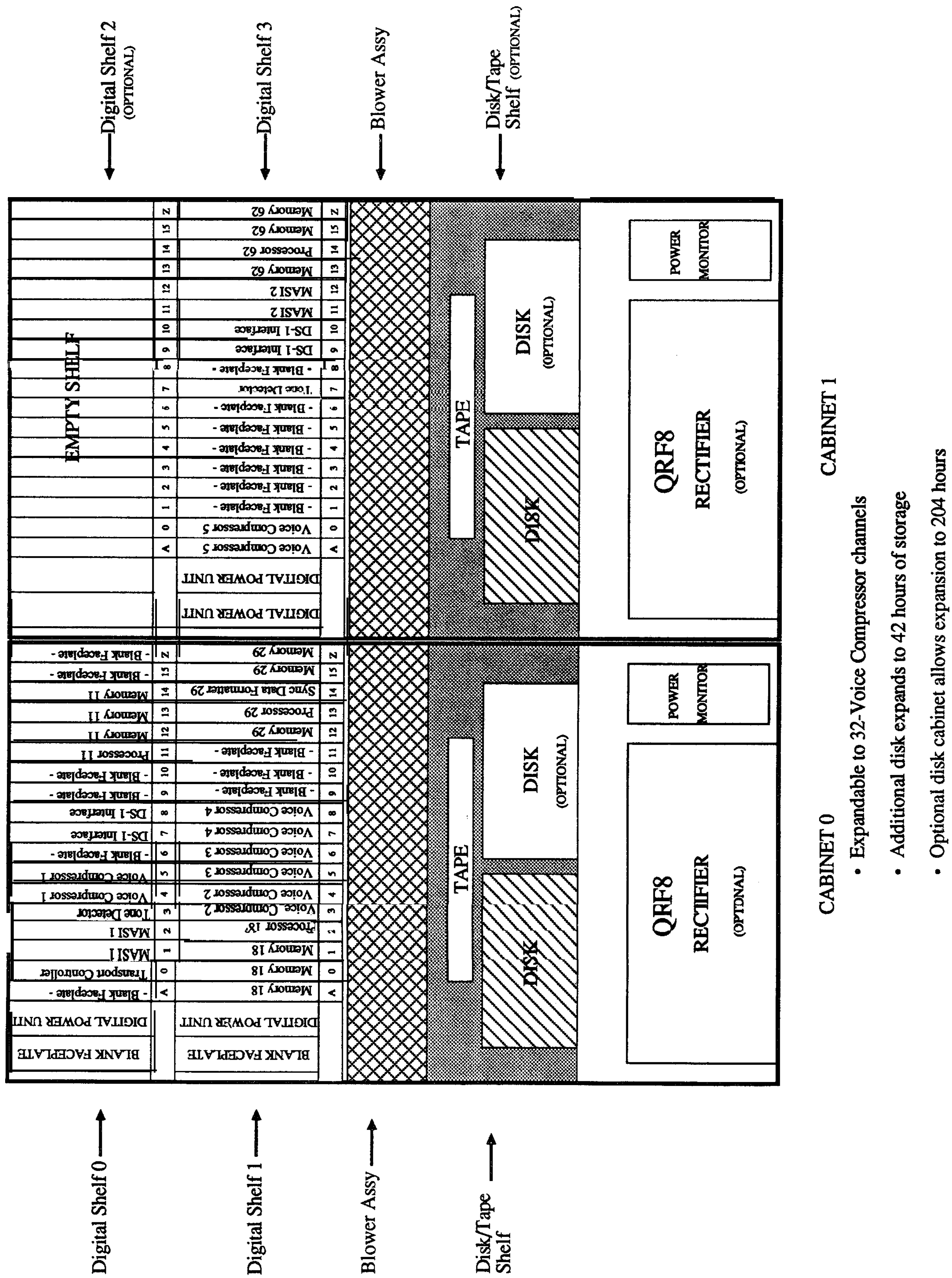


FIGURE 10-24: MERIDIAN MAIL PACKAGE 20 ASSEMBLY

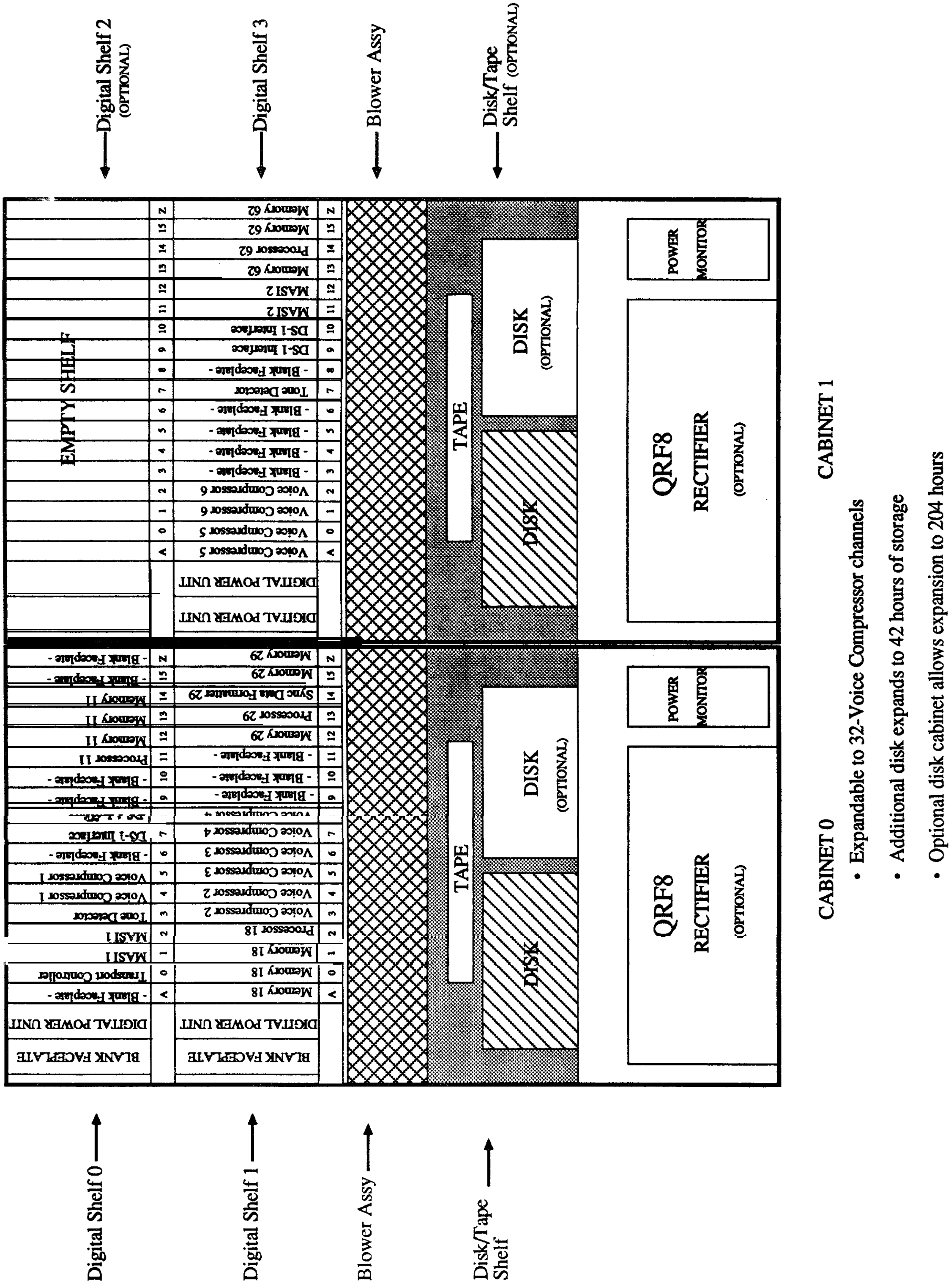


FIGURE 10-25: MERIDIAN MAIL PACKAGE 24 ASSEMBLY

CONTENTS

SECTION : 11 **GLOSSARY**

DESCRIPTION **PAGE**

GLOSSARY OF DIGITAL TERMINOLOGY

ACCESS TIME - The time required to retrieve information from or store information into a computer's memory.

ACOUSTIC COUPLER - A data set which converts electrical signals into audio signals suitable for transmission over telephone circuits. The telephone handset is placed into a cradle device that acoustically couples the transmitter and receiver in order to send or receive the modulated signal.

ADDRESS - A number designating a location in memory.

ADJACENT CHANNEL - The channel closest to the channel being used for transmission, either in physical proximity or in electronic characteristics.

A-LAW - The companding law used in PCM systems in the European countries is the A-Law, which is defined as follows:

$$y = \frac{1 + \ln x}{1 + \ln A} \qquad \frac{1}{A} < x < 1$$

where x is the input signal
y is the compressed output signal
A is a constant
ln is the natural logarithm

The constant A is set to 87.6.

ALGORITHM - A set of processes in a computer program used to solve a particular problem in a finite number of steps.

ANALOG SIGNAL - Any voltage or current that varies smoothly and continuously.

ANALOG-TO-DIGITAL (A/D) CONVERTER - Circuitry which changes an analog signal into digital data.

ANSI - American National Standards Institute - The principal standards organization in the USA, formed in 1918, and run as a non-profit, non-government body supported by private industry and professional organizations. Its role is to coordinate voluntary standards activities.

ASCII CODE (AMERICAN STANDARD CODE FOR INFORMATION INTERCHANGE) - A binary code used to exchange information between computers.

ASSEMBLY LANGUAGE - A programming language in which each statement corresponds to a machine language instruction. Codes are less close to everyday language than those of high level languages, therefore mnemonic devices are included.

ASYNCHRONOUS - Characteristic of any operation that is independent of a master clock or timing signals.

ASYNCHRONOUS TRANSMISSION - Data transmission in which the characters may be transmitted at varying intervals or in blocks, and which uses start and stop elements at the beginning and end of each character, instead of synchronizing the whole message block.

AUTOMATIC CALL DISTRIBUTOR (ACD) - A switching system which automatically distributes incoming calls to a centralized group without going through a switchboard operator. If no answering positions are available, the calls will be automatically held until one becomes free. Used in catalog ordering, airline information, and credit-card authorization centers of larger businesses.

AUTOMATIC NUMBER IDENTIFICATION (ANI) - The automatic line identification of outward dialed long distance calls which permits call completion and billing without the telephone company's operator intervention.

B CHANNEL - The 64-Kbps channel of a digital subscriber link (DSL) (where there are two) or an extended DSL (where there are 23) that is circuit switched and can carry either voice or data.

BALANCING NETWORK - Electronic circuitry used to match two-wire to four-wire toll facilities in order to maximize power transfer and minimize echo.

BASIC LANGUAGE - Beginner's All-purpose Symbolic Instruction Code - A simplified computer programming language based upon common English language terms.

BASIC RATE ACCESS - Two 64-Kbps B channels and one 16-Kbps D channel (2B+D) over a single digital subscriber line.

BAUD - A unit of signaling speed which measures the number of signal changes per second. If each signal element or state change represents one bit, then the baud rate equals the bit rate; otherwise, the two differ.

BELL 103 - A North American Bell System modem standard which provides asynchronous data transmission at speeds up to 300 bps.

BELL 113 - As Bell 103, but provides either originate or answer capability only.

BELL 201 - A North American Bell System modem standard which provides synchronous data transmission at 2400 bps.

BELL 202 - A North American Bell System modem standard which provides asynchronous data transmission at 1800 bps. Requires four-wire line for full duplex operation.

BELL 208 - A North American Bell System modem standard which provides synchronous data transmission at 4800 bps.

BELL 209 - A North American Bell System modem standard which provides synchronous data transmission at 9600 bps.

BELL 212 - A North American Bell System modem standard which provides full-duplex asynchronous or synchronous data transmission at 1200 bps on the dial network.

BINARY - A system of numbers or codes involving only two states, typically 1 or 0.

BINARY CODED DECIMAL (BCD) - A coding scheme in which four bits are used to represent numbers and six bits to represent letters and special symbols.

BINARY SYNCHRONOUS COMMUNICATIONS (BSC, "BISYNC") - An IBM byte-controlled protocol using a defined set of control characters and sequences for synchronous binary coded data transmission.

BINARY WORD - A group of bits that represent one piece of information. In PCM systems, an eight bit binary word is used to represent the magnitude of an analog signal at a particular instant in time.

BIPOLAR - Refers to two polarities, positive and negative. Digital information is normally transmitted in alternating bipolar pulses.

BISYNC - Short for "Binary Synchronous Communications," a half-duplex, character-oriented protocol developed by IBM.

BIT - A contraction of the term "binary digit" which represents a single character in a group, either 1 oro.

BIT INTERLEAVED - This refers to the format of the resulting higher rate bit stream in a TDM system where the higher rate bit stream is generated by taking single bits from each of the lower rate bit streams in turn.

BIT RATE - The speed at which bit positions are transmitted, normally expressed in bits per second.

BIT STREAM - A continuous string of bit positions occurring serially in time.

BIT STREAM FORMAT - In some bit streams the bit positions, or groups of bit positions, have specific uses. The way in which the bit stream is subdivided is the format of the bit stream. In order to locate the position of the format within the bit stream a recurring alignment signal is required either internal or external to the bit stream.

BLACK BOX - A term used to describe a device which handles known input and produces known output, but whose mechanism is hypothetical or unknown.

BLOCKING - (1) A switching system condition in which no circuits are available to complete a call, and a busy signal is returned to the caller. (2) The creation of blocks from individual records in a computer memory file.

BOOTSTRAP ROUTINE - A computer technique of inputting data before loading a program and thereby initiating the loading of the program.

BUBBLE MEMORY - A high capacity RAM memory in which a bit of information is recorded as a bubble on a thin film of magnetic silicate, and read by an electronic reading head.

BUFFER - A temporary storage facility used as an interface between system elements whose data rates are different.

BUS - A major electrical path used to transfer information between two or more electrical circuits.

BUSY HOUR - The peak hour of communications traffic in a carrier facility.

BYTE - The smallest number of binary digits which is acted upon as if it were a single entity. In most present-day systems, a byte is equivalent to 8 bits.

BYTE INTERLEAVED - This refers to the format of the resulting higher rate bit stream in a TDM system where the higher rate bitstream is generated by taking groups of bits (ie bytes) from each of the lower rate bit streams in turn.

CABLE, COAXIAL - A cable containing a central conductor insulated from a surrounding conductor, or several such pairs. An efficient carrier of high frequency signals, and capable of being multiplexed.

CALL PROCESSING PROGRAMS - Software that controls the switching network in an electronic switching system.

CARRIER SYSTEM - A means of producing several channels from one communications link by combining signals at the originating end, transmitting them in a wideband or high speed signal, and separating them at the receiver.

CARRIER WAVE - A signal of a certain frequency and amplitude which can be modulated with respect to amplitude, frequency and phase, and transmitted as a data signal.

CCITT - Comite Consultatif International Telegraphique et Telephonique. An international committee that sets telephone, telegraph, and data communications standards.

CCITT #7 SIGNALING - The standard for signaling within telecommunications networks being developed by CCITT. It will eventually replace the CCIS6 network in the U.S.

CCITT V.21 - Standards for modems operating asynchronously at 200-300 bps, full-duplex, on the dial network (similar to Bell 103).

CCITT V.22 - Standards for synchronous half-duplex modems operating on the dial network at 1200 bps (similar to Bell 212A).

CCITT V.23 - Standards for asynchronous half-duplex modems on the dial network, and full-duplex on a leased four-wire line, operating at 600 or 1200 bps.

CCITT V.24 **-** Recommendation for interchange circuits between data communications equipment and terminals (similar to RS-232C).

CCITT V.25 - Recommendation defining a packet switching network protocol.

CCITT V.26 - Standards for modems operating at 2400/1200 bps, half-duplex on the dial network, and full-duplex on a leased four-wire line (similar to Bell 201).

CCITT V.27 - As V.26, but at 4800 bps on leased telephone-type circuits (similar to Bell 208).

CCITT V.28 - Recommendation for the electrical characteristics for unbalanced double-current interchange circuits operating at data signaling rates below the limit of 20,000 bps (Geneva 1972).

CCITT V.29 - Standards for synchronous modems operating at 96000 bps on a leased four-wire line (similar to Bell 209).

CCITT X.25 **-** Recommendation defining a packet switching networks protocol.

CCS **-** A communications unit of traffic measurement equivalent to 100 call-seconds, so that there are 36 CCS in one hour.

CENTRAL PROCESSING UNIT (CPU) - The portion of a computer which controls its operation and manipulates the data being processed.

CENTREX - A private exchange service permitting incoming calls to be dialed direct to extensions, without operator intervention. Usually provided from the telephone company's central office facilities.

CHANNEL - A signal pathway in a communications system between two or more points, furnished by a wire, radio, light fibers, satellite or a combination thereof.

CHANNEL BANK - An electronic device used to digitally encode analog signals and time division multiplex the resultant digital signals and also demultiplex and decode these digital signals.

CHARACTER - An actual or coded representation of a letter, number or symbol.

CHIP - A small (1-5 cm) integrated circuit of several elements with external connections to other electronic circuits.

CIRCUIT - A complete transmission path to and from two points in a communications system.

CIRCUIT SWITCHING - A method of communications in which individual circuits are connected to establish a continuous connection for the use of stations on the circuit until it is disconnected.

CLASS OF SERVICE - The type of service in use by a subscriber of a communications system, including the type of telephone equipment, and the calling privileges or restrictions.

CLEAR-TO-SEND DELAY - The time required for a data set to inform a terminal that it is ready to send or reply. (Also called modem turnaround)

CLOCK - A device that generates periodic signals used for system synchronization.

CLUSTER - A group of terminals connected to a communications facility by a cluster controller so that they may operate together.

COBOL - COmmon Business Oriented Language - A high level programming language used for business data manipulation.

CODE - The representation of an alphanumeric character or symbol in machine language.

CODE CONVERSION - The translation from one code to another (e.g., ASCII to Baudot), so that machines using different codes may communicate with each other.

CODEC (CODER/DECODER) - A device used to convert analog voltage samples into binary coded digital data and vice versa. A codec encodes analog signals into 8 bit, u = 255, PCM. It also performs the reverse function of decoding PCM signals into analog signals.

COMMON CHANNEL SIGNALING - A technique in which signaling information relating to several circuits is conveyed by addressed messages over a single signaling channel.

COMMON CHANNEL INTEROFFICE SIGNALING (CCIS) - A method where all signaling data is sent over a dedicated connection between the processors of two switching systems. Signaling and transmission are completely segregated and handled over separate facilities.

COMMON CONTROL - Equipment which receives and stores subscriber-dialed information for subsequent processing.

COMMUNICATIONS TERMINAL - Any device which produces tones or electrical signals which can be transmitted over a communications facility.

COMPANDING - The process of compressing quantizing levels at low speech amplitudes at the transmitting end of a system and expanding these levels at the receiving end, thus reducing quantizing distortion.

COMPANDING LAW - Many different algorithms (i.e. companding laws) could be used to obtain companding effects. Two companding laws in widespread use in PCM systems are the "MU-Law" and the "A-Law". The MU-Law is used in North America and the A-Law is used in European countries.

COMPILER - A computer program used to convert symbols meaningful to a human operator to codes meaningful to a specific computer.

CONCENTRATOR - A device used in data communications which can subdivide a channel into a larger system of data routes to permit the transfer of more data than would otherwise be possible. Low speed buffered asynchronous channels are fed into a high speed synchronous channel via a concentrator, which creates several channels of lower speed.

CONDITIONING - The improvement of standards of a data transmission line in order to increase the data rate and decrease the error rate.

CONTENTION - A method of communications line control in which users compete for transmission time on a first-come, first-served basis, and must wait until a channel is free.

CONTINUITY CHECK - A check made of a communications link to ensure that a proper data connection exists.

CONTROL CHARACTER - A character included with a data communications signal to control and facilitate transmission. Examples are CR (carriage return), EOT (end of text), ACK (acknowledgment), STX (start of text).

CONVERSATION MODE - An on-line dialogue between a terminal and a computer in which each responds to data presented by the other on a character-by-character basis.

CONVERSATION TIME - The portion of time used in a call devoted to actual data or speech transmission as opposed to that used for call connection and coordination.

CONVERTER - A peripheral device which converts data from one medium or mode to another; e.g., paper tape to magnetic disc.

CPE--CUSTOMER PREMISES EQUIPMENT - The generalized term for any equipment that resides on the end user's side of the network interface boundary.

CROSSTALK - Interference on a "disturbed" circuit caused by the transfer of energy from a nearby "disturbing" circuit.

CRT - Cathode Ray Tube - An electronic display screen similar to a television picture tube.

CSA - Canadian Standard Association - A Standards Council of Canada body which sets electric and electronic standards including those applicable to data communications.

CURSOR - An illuminated marker on a visual display unit which shows the position of the next character to be generated, and which can be moved about the screen to perform text control operations.

CYCLE TIME - The shortest period of time necessary to complete one computer instruction.

D CHANNEL - The packet-switched channel on a DSL (where it is 16 Kbps) or an EDSL (where it is 64 Kbps) that carries signaling messages and packet-switched user data.

DATA - Any set of characters which can represent a meaningful message and which can be transmitted electronically.

DATA BASE - (1) Specific information pertaining to a particular office such as subscriber directory numbers, trunk routes, etc. This information is utilized by the generic program (2) A set of data which can be stored for computer access.

DATA COMMUNICATIONS - The transmission of data over electronic communications channels, often involving two-way data exchange over long distances.

DATA COMPRESSION - The use of special coding devices to reduce the size of data elements in order to reduce the storage space, increase channel bandwidth, or reduce cost and time required to transmit data.

DATA COUPLER - A device which allows a subscriber's data set to interface with the telephone network by controlling signaling functions and limiting the power applied to the line.

DATA LINK - The hardware in a data terminal which establishes protocols and a data link with another data terminal.

DATAPAC NETWORK - A common user packet switched commercial network which links TELENET in the USA with the Trans-Canada Telephone Network in Canada.

DATA SET - (1) A device which interfaces a data terminal and a data communications facility, and which may modulate or demodulate the signal (see modem), and perform control functions. (2) A collection of related data records stored in a computer.

DATA STATION - The hardware making up a data station, including the data terminal and circuit terminating equipment.

DATA TERMINAL EQUIPMENT (DTE) - Any equipment defining the beginning or end of a data link, and which usually comprises the data source and data sink.

DC SIGNALING - Transmission of data over physical wires using DC pulses at speeds below 150 baud.

DECIBEL (db) - A unit of signal strength relative to a standard (usually 1 milliwatt). In acoustics, a measure of sound intensity: 1 db is the smallest amplitude difference the human ear can detect.

DECODE - To convert received PCM code words into pulse amplitude modulated pulses which are the same as the quantized samples at the transmitting end.

DEDICATED ACCESS - A direct connection between a terminal and either a service, network, or a computer.

DEDICATED DATA CHANNEL - A communications channel assigned for a subscriber's exclusive use.

DEFAULT OPTION - An assumption which a computer system is programmed to make unless an alternate instruction is given it by a user.

DEGRADATION - The deterioration of the qualities of a signal or system.

DELAY, ABSOLUTE - The time taken for a signal to travel a certain distance in a communication system, dependent on the frequency, distance, and physical medium of transmission.

DELAY DISTORTION - Distortion of a signal produced by the unequal transmission speeds of different frequencies of that signal in a communications medium.

DELTA MODULATION - A method of digitally encoding an analog waveform that looks at the difference in magnitude between successive analog signal samples. Only one quantizing level is available so only one bit is needed to record whether the signal went up or down. This system is simple to implement but requires a faster sampling than the Nyquist Frequency.

DEMODULATION - The process of retrieving an original signal from a modulated carrier wave.

DIAGNOSTIC - Relating to test programs used for error and fault detection in the functioning of hardware or software.

DIGITAL MULTIPLEX SWITCHING SYSTEM (DMS) - Switching systems which permit digital switched transmission circuits for voice and data. They use pulse code modulation and time division multiplexing to allow direct switching of PCM signals without modulation into an analog form.

DIGITAL PAD - A device that introduces loss in an analog signal that is digitally encoded.

DIGITAL SIGNAL - A series of pulses or rapidly changing voltage levels that vary in discrete steps or increments.

DIGITAL-TO-ANALOG (D/A) CONVERTER - Circuitry which changes digitally encoded data into an analog signal.

DIGITAL TRANSMISSION SYSTEM - The transmission of data in digital pulses which can be regenerated along the line, as opposed to analog transmission, in which waveform signals are transmitted via amplifiers in the line.

DIGITIZE - The conversion of a continuous analog signal to digital form.

DISC (DISK), MAGNETIC - A high capacity circular plate of varying size with a magnetic surface divided into addressable sectors used for Random Access Memory storage. Read/write heads enter and access data on each sector, permitting rapid access to data. Disc technology is rapidly producing discs of different types (including the mini-floppy, floppy, flippy and hard), with increasing memory capacity.

DISPLAY UNIT - A terminal device which produces a visual display of data. Usually a CRT display, but may be liquid crystal or other electronic medium (as opposed to hard copy printouts of data).

DISTORTION - The undesirable change of signal characteristics during transmission due to distance effects, noise, or interference.

DOWN-LINE LOAD - The loading of software programs into a computer from a remote device or computer using a communications channel.

DOWNTIME - The time period during which a device or system is not functioning properly.

DRIVE - A device which accepts a magnetic storage medium and transfers its contents upon request to the terminal.

DROP - The external wire between a subscriber's premises and the telephone distribution cable.

DSO - The common terminology for a single, 64-Kbps voice channel.

DS1 - The common terminology for a T-carrier that multiplexes 24 channels into a single, 1.544-Megabit bit stream.

DSL--DIGITAL SUBSCRIBER LINE - The ISDN DSL combines two B channels and one D channel on a single line. Also called the basic access rate.

DUMB TERMINAL - A keyboard and display unit with no processing capability of memory storage of its own, until connected to a computer.

DUMP - The process of copying the data contents of an internal storage device into an external device.

ECHO - The reflection of a signal from the terminating end back along the line, causing interference in voice signals. It can be suppressed for voice transmission, but is normally non-distorting of data signals.

EDSL--EXTENDED DIGITAL SUBSCRIBER LINE - The ISDN EDSL combines 23 B channels and one D channel on a single line. Also called the primary access rate.

EIA - Electronic Industries Association - a US manufacturers' group which sets electronic equipment standards.

ELECTRONIC SWITCHING SYSTEMS (ESS) - A digital switching system controlled by computer, able to provide custom services such as three way calling, speed dialing, and call transfer.

EMULATOR - Hardware and/or software which allows a system or device to operate as if it had properties which it does not have, and thus interface with devices having those properties. For example, an 8-bit microprocessor may emulate the features of a 16-bit processor, and thus be able to accept 16-bit data from a true 16-bit device.

ENCODE - To convert quantized samples into PCM words.

ENCRYPTION - The security coding of a message to prevent unauthorized interception during transmission.

EPROM - Erasable Programmable Read Only Memory - ROM which can be programmed, erased, and reprogrammed.

EQUILIZATION - An electronic technique used in telecommunications to compensate for distortion present on a channel, causing uneven frequency response.

ERROR DETECTION AND CORRECTION - Methods used in data transmission to allow the receiver to detect errors in data received, to request retransmission, or, in some cases, to correct it at the receiving end.

ERROR RATE - The frequency of errors in data transmission. The rate depends on several variables, including the type of circuit, channel, or switching network the data passes through.

EXCLUSION - The ability of a user on some telephone systems to exclude all other users from a line or channel.

FACILITY - A transmission link between two or more points without either terminating or signaling equipment. A link with such equipment would be either a channel, central office, or trunk.

FACSIMILE - A representation of an image transmitted over a telecommunications link. An electro-mechanical scanning device converts the image (photo, document, graph) into an electrical signal which is transmitted over either an analog or digital facility and reconstituted by the receiving equipment as an image on paper on film.

FAILURE RATE - The number of failures which occur during a given period of time.

FEEDBACK - The return of part of a machine's output to its input. It is used to control the output by comparison with the input, or for re-entry into another phase of processing.

FEP--FRONT-END PROCESSOR - An FEP sits between a host computer and the terminals (or cluster controllers) to which it is connected. It performs the multiplexing function that allows many data communication lines to access a single host computer port

FIBER OPTICS TRANSMISSION SYSTEMS (FOTS) - A transmission system in which light from lasers or LEDs is modulated and transmitted over very thin glass fibers and read by photodiodes in the receiver. FOTS is capable of data rates a thousand times that of copper wire, with very low interference effects.

FIELD EFFECT TRANSISTOR (FET) - A small, low-power, high input impedance semiconductor used to replace vacuum tubes in most applications, especially small circuitry.

FILE - Any organization collection of data, itemized, structured and stored for convenient access.

FILTER - An electronic circuit used in telecommunications which blocks frequencies above and below a specified bandwidth ("band-pass") but lets other frequencies pass undisturbed.

FIRMWARE - A program written into a non-erasable computer storage location (ROM) to prevent accidental loss, and to avoid the necessity of repeated loading of the program into RAM.

FLOPPY DISK - A thin, flexible, flat circular plate used to store information.

FORTRAN - FORmula TRANslation - A high level computer programming language used for mathematical and scientific applications.

FRAME - (1) A string of bits running across the width of paper or magnetic tape, representing one character. (2) In Videotex, a 24-line, 40 character screen full of data. (3) In telecommunications, an information identification structure used by receivers. A group of digits is framed so as to be treated as one information unit.

FRAMING BIT - A bit which signals the beginning and/or end of a data unit in data communications, and allows the terminals to synchronize transmission and reception of data bits.

FRAMING PATTERN - A particular arrangement of framing bits.

FREQUENCY DIVISION MULTIPLEXING (FDM) - The division of a channel bandwidth into several smaller bandwidths, each of which becomes a separate data channel.

FREQUENCY MODULATION - The modification of a single frequency carrier wave so that changes in its frequency correspond to variations of an information signal.

FREQUENCY SHIFT KEYING (FSK) - A form of frequency modulation in which frequency values are assigned to represent a "0" and a "1", and in which the carrier wave shifts frequency between these values according to the data.

FRONT END - An input device to a computer or other system which is used to enter data and control codes.

FUNCTION KEYS - Special keys on a computer keyboard which initiate system or control commands, rather than text input.

GAIN - The increase in strength of a signal (in db) when it is amplified.

GATE - An electronic switch, basic to computers, which recognizes only two possible states, and will pass a signal into one of them ("off' or "on", "0" or "1").

GATEWAY - (1) Equipment which allows terminals on one communications network to access terminals or data on another network. (2) A Videotex software package which allows Viewdata users to access data on external networks.

GENERIC PROGRAM - The computer program that controls the overall machine operation.

GLOBAL - A term used in computer software to indicate a complete application of a routine to data available. Thus "global search" indicates that a search routine will go through all relevant data in storage.

GRADE OF SERVICE - A measure of the circuits available for calls in a communications service at the peak hour. Calculated in calls blocked or average delay.

GRAPHIC DISPLAY TERMINAL (GDT) - A visual computer display capable of presenting graphic material such as charts, diagrams or line drawings.

HANDSHAKING - Initial signaling between two data sets on a data communications link which sets up communication between them.

HARD COPY - Any system information printed in some permanent form.

HARDWARE - The mechanical parts of a computer or business machine, including the electronic wiring and storage components, but excluding the software programs (see firmware).

HDLC - High-level Data Link Control - An International Standards Organization bit-oriented communications protocol which includes frame error checking sequences, start-up and shut-down procedures.

HEAD - A device which reads and writes data on a storage unit.

HEADER - The initial string of codes in some data communication systems which informs the receiver of the type of data to follow and its address.

HIGH-LEVEL LANGUAGE - A computer program language whose statements are translated into more than one machine instruction. Examples include BASIC, FORTRAN, PASCAL, ALGOL, and SL-1.

HIGH SPEED - (1) Data communication rates over 9600 bps (the limit of most voice grade channels). (2) A printer which runs fast enough to print as data becomes available to the computer.

HIGH SPEED MULTIPLEX LINK - A transmission circuit between two multiplexers or a terminal and a multiplexer, capable of carrying several user signals which can be separated at the receiving end.

HIGHWAY - A transmission path capable of carrying multiplexed data.

HOST - A large, centralized computer holding a database to which access can be supplied to users on a subscription basis.

HYBRID CIRCUIT - A complex circuit built up on film using integrated circuitry, transistors, resistors and capacitors.

IMPEDANCE - The opposition of a circuit to the flow of electricity. The sum of resistance and reactance (a resistance effect caused by inductance).

IMPULSE NOISE - Short-lived, high-amplitude interference bursts on a communications channel caused by lightning, sparking machinery or switch contacts.

INFORMATION - Data which has been processed according to accepted conventions so that it is meaningful to a user.

INFORMATION BIT - A bit which carries text information, generated by the data source, and not used for transmission control purposes.

IN-HOUSE SYSTEM - A data communications network operated by one organization for its own needs, usually on its own premises, and without the use of common carrier facilities.

INSTRUCTION - A written statement, or the equivalent computer-acceptable code, that tells the computer to execute a specified single operation.

INTEGRATED CIRCUIT - A functional circuit whose components and interconnecting "leads" are formed on a single chip of semiconductor material.

INTEGRATED SERVICES DIGITAL NETWORK (ISDN) - A network, generally evolving from the existing telephony digital network, that provides end-to-end digital connectivity to support a wide range of voice and non-voice services to which users have access via a set of standard multipurpose user to network interfaces.

INTELLIGENT TERMINAL - A terminal containing internal storage and a CPU, capable of performing operations on data without connection to an external computer.

INTERACTIVE - A system in which input elicits a response from a computer in real time, and in which the computer may ask for further input from the user.

INTERFACE - The connection between two systems. Usually, the hardware and software connecting a computer terminal with peripherals such as data sets, printers, etc.

INTERFERENCE - Loss of clarity of a communications signal caused by unwanted noise signals.

INTERRUPT - The pause of a computer operation initiated either by commands in the program it is using, or by conditions which arise in the hardware ("priority interrupt"). Some specified operation must be performed during the interrupt before the original operation may be resumed.

I/O BUFFER (INPUT/OUTPUT) - A short-term storage for computer input and output.

I/O DEVICE (INPUT/OUTPUT) - An interface between a computer or switching system and the outside world.

I-SERIES RECOMMENDATIONS - CCITT recommendations on standards for ISDN services, ISDN networks, user-network interfaces, and internetwork and maintenance principles.

IS0 - International Standards Organization - A body concerned with international computer and communications standards.

JITTER - The phase shift effect on a digital signal caused by transmission facility delays

KEY SYSTEM (TELEPHONE) - A multi-key telephone system on subscriber premises permitting several users to place calls on several lines.

LAN--LOCAL AREA NETWORK - A high-volume data transmission facility interconnecting a number of data devices, generally within a building or campus.

LANGUAGE - The set of symbols, rules and conventions used to convey information, either at the human level or the computer level.

LARGE SCALE INTEGRATION (LSI) - Large functional circuits made up of hundreds of gate circuits which form a complete system or instrument. Examples are memories, computers and certain instruments.

LASER COMMUNICATIONS - The use of a coherent, single-frequency, high-energy beam of light which can be modulated to transmit information.

LCD - Liquid Crystal Display - A form of visual data display using liquid crystals which can be electronically changed from a transparent to an opaque state.

LEASED LINE - An unswitched telecommunications channel linking two or more points inside the same exchange, leased to subscribers for their exclusive use.

LED - Light Emitting Diode - An electrical switching device which emits light when current is applied, and is used for some visual displays.

LEVEL - (1) The amplitude of a signal. (2) The number of bits required by a code to represent one character. (3) The number of discrete signal elements in a modulation system. (4) A procedure set in a communications protocol which enables higher-level signaling.

LIMITED DISTANCE DATA SET (LDDS) - A data set used for transmission over short distances (30 miles).

LINE - A communications link, channel, circuit, trunk or facility. Usually refers to a telephone link between the local switching equipment and the network.

LINE SPEED - The rate at which data signals may be passed over a particular channel, measured in baud or bits per second.

LINK - (1) A circuit or path joining two communications channels in a network. (2) A line connector in a common control telephone switching system.

LOADING, CABLE - The addition of inductance through load coils along a cable to reduce amplitude distortion and improve frequency response. The loading restores capacitance balance to cable conductors, but is not used for high speed data channels.

LOGIC CIRCUIT - An electronic element which takes a series of inputs and produces outputs according to the specific function the element is designed to perform.

LOOPBACK TEST - A circuit fault-testing procedure in which a signal is sent from a point on the line to a data set and back to the test point.

LOW SPEED - Data communications below 2400 bps.

LSI - Large Scale Integration - An LSI circuit is a complex electronic circuit (thousands of transistors) reproduced on a silicon chip.

MACHINE LANGUAGE - Coded information consisting of binary digits that can be accepted and utilized by the computer.

MAIN DISTRIBUTING FRAME - The cable rack used to terminate all distribution and trunk cables in a central office or PBX.

MAINFRAME - A large computer with peripherals, software and database maintained by large corporations for internal use and subscriber access.

MATRIX - An orderly array of elements used to switch calls from one part of the system to another.

MATRIX PRINTER - An impact printer for hard copy output which uses an array of steel pins to create the shape of a character in dots.

MEAN TIME BETWEEN FAILURES (MTBF) - The average trouble-free working period for a system or device, calculated statistically over time.

MEAN TIME TO REPAIR (MTTR) - The average time elapsed between the discovery of a fault and its correction.

MEDIUM SCALE INTEGRATION (MSI) - Functional circuitry consisting of 12 or more gates which form a complete functional operating unit such as a decoder, counter or multiplexer.

MEDIUM SPEED - Data communications generally between the rates of 2400 and 9600 bps on a voice grade channel.

MEMORY - An organized collection of storage elements into which units of information consisting of binary digits can be stored and from which this information can be later retrieved.

MESSAGE - A communication prepared for telecommunications consisting of control signals, header, start and end of text indicators, and text.

MESSAGE SWITCHING - A method of "Store-and-Forward" switching in telecommunications. A message is received somewhere in the network, stored, and retransmitted down the line when a suitable channel is free.

METAL OXIDE SEMICONDUCTOR (MOS) - A type of small, field-effect transistor.

MICRO - A Greek prefix used to mean "very small", as in microcomputer, or "one-millionth of a unit" as in microsecond.

MICROCOMPUTER - An electronic device consisting of a microprocessor, program memory, data memory, and input-output circuitry capable of accepting, storing and arithmetically manipulating data.

MICRO PROCESS OR - An electronic circuit contained on a single chip of silicon which performs the arithmetic logic and control operations of a digital microcomputer.

MICROWAVE - A high-capacity, low interference transmission network using high-frequency radio bandwidths transmitted via relay towers.

MINICOMPUTER - An intermediate-sized computer usually capable of multi-terminal networking.

MNEMONIC - An abbreviation or arrangement of symbols which stands for a particular instruction or process.

MNEMONIC CODING - Any coding system using parts of the vernacular spoken language to aid understanding and recall of its codes. E.g., ED for edit, EXT for end of text, DV for divide, etc.

MODEM - A MOdulator-DEModulator: a data set which can convert analog signals to digital or vice-versa.

MODEM POOLING - The pooling of modems so that there need not be a one-to-one correspondence with "casual" terminal users, thereby reducing data service costs.

MODULATION - The process by which some characteristic of a high frequency carrier signal, such as frequency, phase or amplitude, is varied by a low frequency information signal,

MULTIDROP LINE - A single communications link connecting several terminals, and which supports polling and selecting operations.

MULTIPLEXER - A device which enables the passage of several signals along one path, either through time or frequency division of the signals.

NARROWBAND - A communications bandwidth less than that of a voice grade circuit (normally less than 300 Hz) used for communication at 300 bps or less.

NETWORK CHANNEL TERMINATING EQUIPMENT (NCTE) - Generic name for equipment that provides line transmission termination from a network to the customer's premises.

NETWORK - A set of communications points interconnected by communications channels.

NETWORK TERMINATION 1 (NT1) - The CCITT name for ISDN NCTE. Provides the functions of line transmission termination and layer-l maintenance and multiplexing, terminating a two-wire U interface.

NETWORK TERMINATION 1, 2 **(NT12) -** A single piece of equipment that provides the combined functions of NT1 and NT2.

NETWORK TERMINATION 2 **(NT2) -** Terminates the four-wire T interface. Examples are a PBX, LAN, and terminal controller.

NODE - A convergent point in a communications network where lines from many sources meet, and may be switched. In Datapac, a node is a packet switch location.

NON-VOLATILE MEMORY - A storage element whose contents are not destroyed if power is lost.

NYQUIST FREQUENCY - In order to adequately reproduce an analog waveform a sampling frequency of at least twice the maximum analog waveform frequency must be used. The minimum acceptable sampling frequency (ie. twice highest waveform frequency) is termed the Nyquist Frequency.

OFF-LINE - Referring to circuitry or devices not under direct control of the operating systems.

ON-LINE - Referring to circuitry or devices in direct connection to, or under direct control of, the operating system.

OPEN SYSTEMS INTERCONNECTION REFERENCE MODEL (OSI) - Established by the International Standards Organization (ISO), the model describes seven functional layers that define how interconnected telecommunications systems should interface. The seven layers are: 1) physical, 2) data link, 3) network, 4) transport, 5) session, 6) presentation, and 7) application.

OPERATING SYSTEM (OS) - Computer software which permits the control and use of all particular programs fed into the computer, coordinates storage and recall functions, and supervises remote terminal interaction.

OVERLOAD LEVEL - The highest amplitude of an analog signal for which a PCM code word exists.

PACKET - A data block with its own address and control signals transmitted as a unit through a telecommunications system.

PACKET ASSEMBLER/DISASSEMBLER (PAD) - Devices which provide packet assembly and disassembly capability to non-packet-mode terminals.

PACKET SWITCHED DATA TRANSMISSION SERVICE - A service which transmits data in packets, including packet assembly and disassembly, if required.

PACKET SWITCHING - The routing of message packets through a network as channels are available. Each channel is busy for the duration of only one packet, then becomes free for another packet. Packets of one message take different routes, determined by the network itself, and are rejoined and resequenced at the destination.

PACKET TERMINAL - A terminal which can communicate with a packet network, such as x.25.

PARALLEL TRANSMISSION - The simultaneous transmission of bits of one data character using several links, or multiplexed channels in one link.

PARITY BIT - A binary digit 1 added to an information word to make the total number of 1 bits either always odd or always even. This permits checking the accuracy of information transfers.

PASSWORD - A set of characters which must be input to a system before the security program will allow access to data and operations.

PCM WORD - An 8-bit code group representing a specific quantized level.

PORT - An access to a switching system.

PORT CONCENTRATOR - A device which permits several terminals to share a single port.

PRIMARY RATE ACCESS - Twenty-three 64-Kbps B channels and one 64-Kbps D channel (23B+D) over an extended digital subscriber line.

PROGRAM - Step-by-step instructions that tell a computer what operations to perform.

PROGRAM MEMORY - The data storage area of a computer which contains the instructions that tell the computer what operations to perform.

PROM - Programmable Read-Only Memory - A permanent data storage system which holds information which can be repeatedly read but altered only through a programming operation.

PROTOCOL CONVERTER - A device which can convert one communications protocol into another.

PUBLIC DATA NETWORK - A data transmission network operated by a private telecommunications administration specifically for public subscription and use.

PULSE - A very short-lived electric current. Usually, a DC signal burst used for digital data transmission.

PULSE AMPLITUDE MODULATION (PAM) - A time division modulation technique in which signal intelligence is represented by a pulse whose amplitude represents the amplitude of the modulating wave at a specific instant of time.

PULSE CODE MODULATION - The most common technique used to digitize analog voice signals. Individually sampled segments of a voice signal are coded into eight-bit digital words for transmission.

PULSE MODULATION - The modulation of the amplitude (PAM), duration (PDM) or position (PPM) of pulses to create a digital data signal. Pulse Code Modulation (PCM) samples analog signals at short intervals and converts this information into a digitized information signal.

QUANTIZING - In a PCM system, a finite number of bits are available for encoding each PAM sample. This establishes the number of different magnitudes, or levels, that can be encoded. For example, 8 bit PCM has 256 possible codes, each code representing a specific signal level. Each PAM sample is assigned the encoded value of the nearest level to it. This “rounding off’ to the nearest level is termed quantizing.

RAM - Random Access Memory - A volatile storage system in which any storage location can be read from or written to, independent of the last storage location accessed.

ROM - Read Only Memory - A permanent storage system manufactured with predetermined data content, to be read but not altered during computer operation,

REAL TIME - The actual time in which a process or event takes place. In computer processing, the running of an input/process/output cycle during the time in which an external event is occurring, and in time to influence that event.

REPEATER - A bidirectional digital signal regenerator.

REQUEST-TO-SEND (RTS) - RS-232C defined signal to a modem indicating that the attached DTE would like to send.

RF CHANNEL - A radio frequency channel nominally 36, 54, and 72 MHz bandwidth through a satellite.

ROUTING - The path selection made for a given telecommunications signal through the network to its destination.

RS232, 232C - Technical specifications established by the Electronic Industries Association (EIA) that define electrical and mechanical interfaces between terminals, modems, computers and communications lines.

SAMPLING - The taking of measurements or specimens from representative elements of a body under investigation in order to project truths about the body as a whole from this data.

SDLC - Synchronous Data Link Control - An IBM communications protocol using synchronous data transfer techniques.

SEMICONDUCTOR - An electronic device made of silicon or germanium which will pass a high voltage, but block a low one. Examples are transistors, diodes and integrated circuits.

SERIAL TRANSMISSION - A transmission method in which data bits are sent sequentially along the same channel (see parallel transmission).

SF - Single Frequency signaling - The use of single tone frequencies for control functions on a circuit, e.g., “disconnect” on Direct Distance Dialing.

SIGNAL (ANALOG) - An electrical signal which has continuous waveform, the amplitude, frequency or phase of which can be modified to represent data.

SIGNAL (DIGITAL) - A discontinuous sequence of pulses representing combinations of binary digits.

SIMULATION - The fabrication of a mathematical or physical model of a process or event for the purpose of testing, training or experimentation.

SOFTWARE - The instructions, programs and procedures which direct the operation of a computer system.

SOLID STATE DEVICE - An electronic device which does not use vacuum tubes but which duplicates their function.

SPACE MATRIX - An array of crosspoints separated in space. In many modern systems every inlet has access to every outlet by means of separate paths.

SPAN LINES - Digital transmission media between central offices and between host and remote units.

START/STOP - A data transmission system in which each character is preceded by a start bit and followed by a stop bit which set and reset the receiver for data reception. Also known as synchronizing bits.

STORE AND FORWARD - A message handling routine used in a message switching system.

STORED PROGRAM CONTROL - A network switching system using programs stored in memory which are used during the switching operations, and which can be changed as the need arises.

STORED PROGRAM COMPUTER - A computer controlled by an internally stored set of instructions.

SUBROUTINE - A small, self-contained part of a computer program which can be called into operation when required, with control returned to the main program after its use.

SW **ITCHING -** The temporary, controllable connection of two or more points in a communications network.

SYNCHRONOUS - Any operation where a series of events takes place under the control of a clocking device; the same operations taking place in different systems, or different parts of the same system, at exactly the same time.

SYNCHRONOUS DATA NETWORK - A data network in which all components are synchronized by a single timing control.

SYNCHRONOUS TRANSMISSION - A transmission system in which bits are sequenced according to fixed time intervals, and which may not have start and stop bits framing each character.

SYSTEM NETWORK ARCHITECTURE (SNA) - An IBM communications system design which includes structure, formats, protocols and operating sequences.

T INTERFACE - The four-wire, physical interface between an NT1 and either an NT2 or ISDN terminal. This interface can only be about one kilometer long.

T1 - A digital transmission standard that in North America carries traffic at the DS 1 rate of 1 .544 Mbps.

TANDEM SWITCHING - An intermediate switching office which handles traffic between two switching offices in the same exchange.

TELECOMMUNICATIONS - A general term for the transmission and reception of intelligent signals via physical, electronic, optical or other means.

TELEGRAPHY - A communications facility for telegraph key generated signals.

TELEMETRY - The transmission of measurement readings over distance, usually by electronic means.

TELEPHONY - A communication facility for the transmission of voice and data over voice-grade circuits.

TELETYPEWRITER - A typewriter-like device connected to a telegraphic circuit for the transmission and reception of alphanumeric data.

TELEPROCESSING - Data processing carried out by computers using data communications facilities.

TERMINAL - A point of data entry or exit in a communications network, or the device which performs entry and exit functions.

TERMINAL ADAPTORS (TA) - ISDN TAs provide protocol conversion from standard non-ISDN interfaces (e.g. X.25, RS232) to ISDN interfaces.

TERMINAL EQUIPMENT TYPE 1 (TE1) - Refers to devices that support the standard ISDN interface. Examples are digital telephones, IVD terminals, and other digital equipment.

TERMINAL EQUIPMENT TYPE 2 (TE2) - Encompasses the existing non-ISDN equipment that requires a Terminal Adaptor (TA) to connect to an ISDN interface. Examples are RS-232, RS-422, and V.35.

TEXT - Information usable by human beings, expressed in symbols, words, numbers and diagrams, but not including control data which may accompany it during transmission.

TEXT MESSAGING - The use of a computer-based network of terminals to store and transmit alphanumeric messages among users. An electronic mail service.

THROUGHPUT - The amount of data input, processed, and output in a given period by a machine or system.

TIE LINE, TIE TRUNK - A private communications link leased from a common carrier connecting two or more private branch exchanges.

TIME COMPRESSION MULTIPLEXING (TCM) - A digital transmission technique that permits full-duplex data transmission by sending compressed bursts of data in a “ping pong” fashion.

TIME DIVISION MULTIPLEX (TDM) - The merging of several bit streams into a composite signal for transmission over a single communication channel.

TIME MATRIX - A series of memory devices used to rearrange the order of channels in a time division multiplexed bit stream, thus switching the channels in time.

TIME-SHARING - Shared access to a central computer by several users, all of whom use it over a given real-time period, but who do not notice each others' presence due to the high processing speed of the computer.

TIME SLOT - A group of one or more bit positions which recurs at a constant interval and can be uniquely identified.

TIME SLOT INTERCHANGE - The functional element of a digital system which performs the switching of digital voice data. Provides the path by which information is passed between the calling line and the called line.

TRACKING - A measure of how accurately a reconstructed analog waveform compares to the original analog signal that was digitally encoded.

TRANSCEIVER - A device which has both transmit and receive modes.

TRANSMISSION SYSTEM - Physical transmission medium used to transfer data from one point to another.

TRANSPARENT - A transmission procedure in which control signals pass unseen by the transmission facility so that no control actions are taken.

TRUNK - A communications channel between two switching centers, provided with signaling and terminating equipment.

MU-LAW - The companding law used in PCM systems in North America is the MU-Law which is defined as follows:

$$y = \frac{\ln(1 + u x)}{\ln(1 + u)} \qquad -1 < x < +1$$

where x is the input signal
y is the compressed output signal
u is a constant
ln is the natural logarithm

The value of u used in North America is 255.

U INTERFACE - The two-wire, physical interface between the network (i.e., switch) and an NT1.

UNIPOLAR - Refers to one polarity. In digital systems, unipolar pulses are generated and used within the equipment, but are seldom transmitted over cables or other transmission media.

USER PROFILE - The set of needs and specifications provided by a subscriber which define the type of service which will be supplied by the facility.

VALUE-ADDED TELECOMMUNICATIONS SERVICE - A service which uses a common carrier's network, but which offers its own services based on computer's software and hardware, e.g., message forwarding, data pooling, etc.

VIRTUAL CIRCUIT - A link between two DTEs in a network permitting message exchange according to protocol, but which uses network bandwidth only during actual data exchange.

VOICE MESSAGING - An electronic system which uses a telephone, computer, or other devices to send, store and access voice messages between senders and recipients.

VOLATILE MEMORY - A storage element whose contents are destroyed when power is removed.

WATCHDOG TIMER - A programmed timing circuit which can be set to interrupt a program after a set number of seconds as a safeguard against an endless loop caused by a programming error, or anticipated problems due to hardware breakdown.

WIDEBAND - A channel bandwidth greater than voice grade, capable of data transmission at rates of 50,000 bps.

X.25 - A standard for packet switching communications established by CCITT.

X.75 - The standard for internetwork gateways between data networks.