50 SERIES
CONFIGURATION GUIDE

Prime

PREFACE

This document provides comprehensive and accurate configuration
information regarding all of Prime's current systems. It is a
companion document to the Prime Hardware and Software U.S. Price
Book (SOU-2102-009), which includes additional information regarding
Product Numbers, Pricing, Prerequisites and Descriptions.

Note that configuration information for all communications hardware
and software products has been incorporated into a separate section.
(Section 4).   IT IS MANDATORY THAT THIS SECTION BE REFERENCED FOR
PROPER CONFIGURATION INFORMATION.

Comments and suggestions aimed at correcting and improving the
Configuration Guide are solicited.
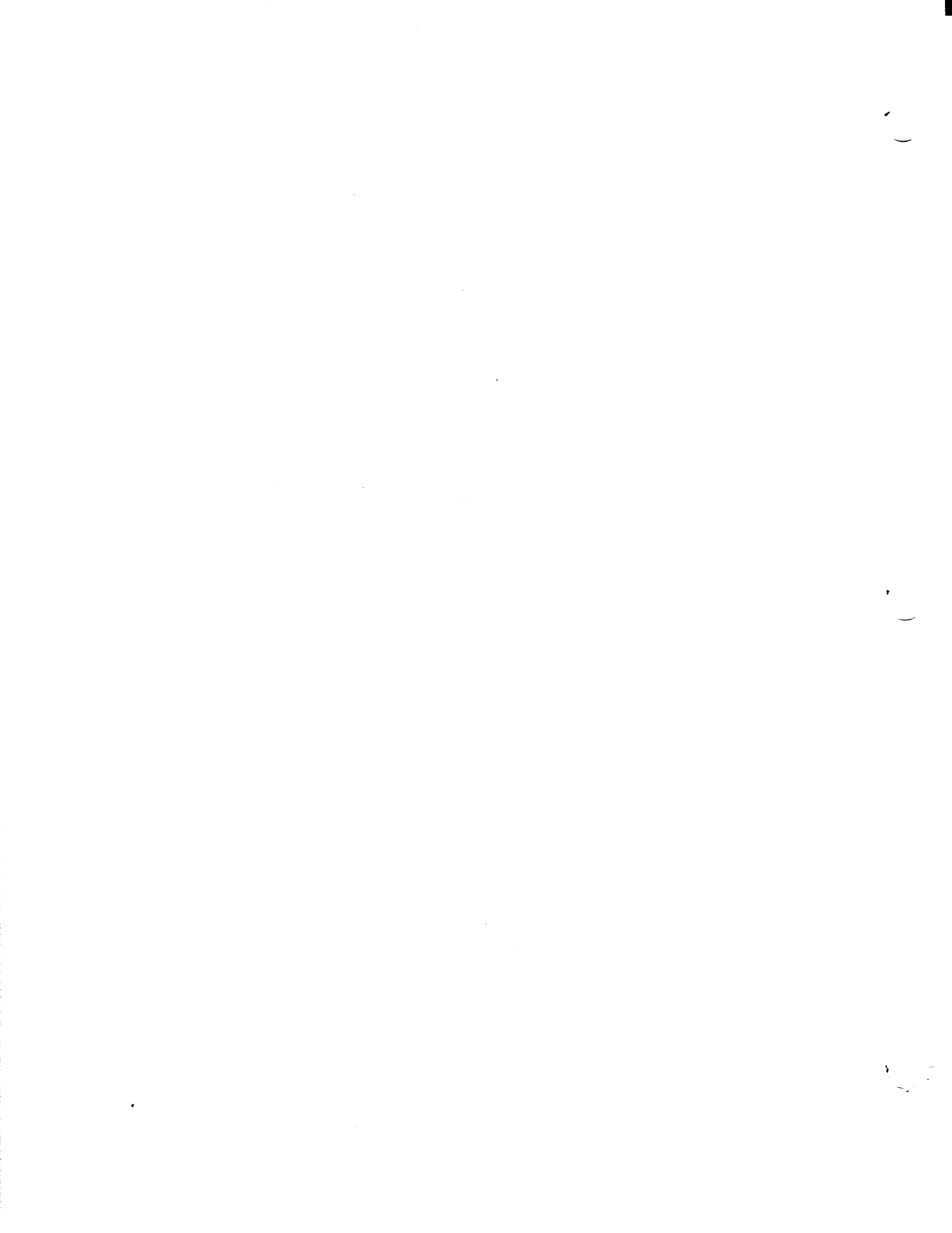
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SECTION 3:   SOFTWARE CONFIGURATION REQUIREMENTS

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COMMONLY USED ABBREVIATIONS

AC	Alternating Current
AMLC	Asynchronous Multi-Line Controller
amp	Amperes
BPI	Bits per inch
BTU	British Thermal Units
C	Centigrade
CMD	Cartridge module disk
cm	Centimeters
CPS	Characters per second
CPU	Central processing unit
CRT	Cathode ray tube
DDS	Digital data service
DPTX	Distributed Processing Terminal Executive
DSC	Data stream editor
EIA	Electronic Industries Association
ECC	Error correcting
EDP	Electronic data processing
F	Fahrenheit
FCC	Federal Communications Commission
FED	FORMS Editor
FTS	File Transfer Service
ft	Feet
FMD	Fixed media disk
GCR	Group coded recording
HDLC	High Level Data Link Control
HDX	Half duplex
HSSDMLC	High Speed Synchronous Multi-Line Controller
Hz	Hertz
ICS1	Intelligent Communications Subsystem, Model I
ICS2	Intelligent Communications Subsystem, Model II
I/O	Input/output
in	Inches
IPS	Inches per second
IPCF	Inter-program Communications Facility
KB	Kilobytes
KVA	Kilovolt amps
lbs	Pounds
LED	Light emitting diode
LPM	Lines per minute
LP	Line printer
ma	milliampere
MB	Megabytes
MDLC	Multi-Line Data Link Controller
MTT	Magnetic Tape Transport
MOS	Metallic oxide semiconductor
msec	Millisecond

PMN	Prime Marketing Notice
PNC	PRIMENET Node Controller
PPA	Prime Product Announcement
PROM	Programmable read only memory
RAM	Random access memory
RJE	Remote job entry
ROM	Read only memory
sec	Seconds
SMD	Storage module disk
SSU	Stream synchronization unit
TCF	Transparent connect facility
TSF	Terminal support facility
URC	Unit record controller
V	Volts
VAC	Volts Alternating Current
VCP	Virtual Control Panel

SECTION 1

CENTRAL SYSTEMS

2250 SYSTEM

There are several system packages for the 2250. Each contains the
2250 CPU; however, they differ in their memory, disk and tape
configurations. All 2250 systems include one ICS1 communications
controller. For proper configuration information on all hardware and
software communications products, please refer to Section 4.

Hardware and Software Supplied

Standard system hardware components included in all basic 2250 systems
are as follows:

- 2250 Central Processor
- PRIMOS Operating System (Rev. 19.1 or greater)
- Memory Boards (1/2MB, 1MB or 2MB)
- Diagnostic Processor with Cable
- ICS1 Communications Controller, supporting eight asynchronous
  lines and one synchronous line
- Intelligent Disk/Tape Controller, capable of supporting up to
  four disk drives and two cartridge tape drives, or 4005 support
  for up to two 315MB disk drives
- One 68MB, 158MB or 315MB Winchester Disk
- 15MB Cartridge Tape Drive or Streaming Magnetic Tape Drive
- 120 amp Power Supply
- 2250 System Cabinet, Chassis, Fans, Control Panel and Power
  Distribution Unit

Optional Hardware and Software

Optional hardware on the 2250 system includes communications sub-
systems, disk subsystems, tape subsystems, unit record controller,
peripherals and add-on MOS memory. Any Prime standard software may
also be ordered.

Communications Subsystem Options

One ICS1 communications controller is supplied with the basic 2250,
allowing the capability of eight asynchronous lines and one
synchronous line. This capability is expandable to a maximum
configuration of up to 32 asynchronous and two synchronous lines,
using two ICS1 controllers and one 16-line AMLC or the ICS2/3. The
ICS1 is required on 2250 systems because it contains the hardware
logic for I/O bus parity checking. An ICS3 Model 5725 is available
for 2250 users requiring PRIME/SNA. Refer to Section 4 for detailed
communication configuration information.

Disk Subsystem Options

The 2250 has two types of Winchester disk controllers: one for the
68MB/158MB disk drives (unformatted) and the other for the 315MB disk
drives (unformatted). A 2250 system supports up to four of the 68MB/
158MB drives in any mix, and without any additional controllers. A
single 2250 package system (Model 2250-019) will support up to two
315MB (unformatted) disk drives. This package will not support the
cartridge tape drive or the 68MB/158MB disk drives.

Magnetic Tape Subsystem Options

All 2250 packages include either a 15MB cartridge tape or streaming
magnetic tape drive. The cartridge drives are mounted in the 2250
system cabinet. Streaming tape drives are mounted in a separate
cabinet.

Unit Record Subsystem Options

Unit Record Subsystems support up to two line printers and a card
reader. The 2250 can support up to two Unit Record Subsystems. More
information concerning Unit Record Subsystems is found in Section 2.

Main Memory

Three basic memory configurations of 1/2MB, 1MB and 2MB are packaged
with the system. Additional memory may be added, to a maximumof 4MB.
The following memory types are possible in legal 2250 configurations:
MMW1-HMB (1/2MB E7), MMW1-1MB (1MB E8), MMW1-E9 (1MB E9),
MMW1-2MB (2MB), and MMW1-4MB (4MB).

Additional Options

The 2250 is available with a desktop, providing a work surface for the
operator/user.

A power conditioning unit may also be ordered for the 2250. This
unit, which acts as an AC line filter for the system, is useful where
the power is subject to transient noise.

System Specifications

Please refer to Appendix A for 2250 system specifications.

Configuration Limitations

The 2250 has one 10-slot chassis and a 120 amp power supply. Unlike
other systems, the limitation is slots, not power. The two-board CPU
uses a total of three slots, because one slot between the CPU boards
must remain open to allow for adequate airflow/cooling. Memory boards
also have specific slot requirements, which are detailed later in this
section.

The boards listed below must be ordered on a 2250 configuration:

Board Name	# of Slots
CPU	3
1/2MB OR	2 (1 slot open - see explanation below)
2-Board Memory Packages OR	2
1MB E9 Memory Board	1
Disk/Tape Controller	1
Systems with Streaming Tape	1
ICS1 Communications Controller	1

1MB 2250 system packages currently ship with E9 memory boards only.
Special attention must be paid when configuring memory on a 2250.

The 1/2MB board on the 2250 must be configured in pairs, or when
configured with one board, the slot next to it must remain open
(except as noted below). The necessity of the pairs or an open slot
lies in the present design of the 2250 memory boards up through E8;
a board will always seek its pair or an open slot next to it in order
to operate. All add-on memory boards for the 2250 include either the
MMW1-E9, MMW1-2MB or MMW1-4MB, with self-interleaving capability.

There are 10 chassis slots in the 2250 system. To determine the
number of chassis slots available for expansion, subtract the number
of slots consumed by your system configuration according to the chart
above. The Diagnostic Processor on the 2250 does not require a
chassis slot.

2350 SYSTEM

There are three base system packages for the 2350. One model (Product
Number 2350-011) contains a 60MB Winchester disk subsystem. The other
models (Product Numbers 2350-021 and 2350-031) contain a 120MB
Winchester disk subsystem. These models also differ, in that they
contain a 4MB memory board in the base system, instead of a 2MB board.

For detailed configuration information on all hardware and software
communications products, please refer to Section 4.

Hardware and Software Supplied

Standard system hardware components included in the base 2350-011
system are as follows:

   • 2350 Central Processor
   • PT200 System Console
   • PRIMOS Operating System (Execute-Only, Rev. 20.0 or greater)
   • Memory Board (Single 2MB EE board)
   • Diagnostic Processor with Cable
   • ICS1 Communications Controller, supporting eight asynchronous
     lines and one synchronous line
   • Combined Disk/Tape Controller
   • One 60MB Winchester Disk Drive
   • 60MB Cartridge Tape Drive
   • 130 amp Power Supply
   • 2350 System Cabinet, Chassis, Fan, Integral Modem (60Hz units),
     Control Panel and Power Distribution Unit

Standard system hardware components included in the base 2350-021
system are as follows:

   • 2350 Central Processor
   • PT200 System Console
   • PRIMOS Operating System (Execute-Only, Rev. 20.0 or greater)
   • Memory Board (Single 4MB EE board)
   • Diagnostic Processor with Cable
   • AMLC Communications Controller, supporting 16 asynchronous
     lines
   • Combined Disk/Tape Controller
   • One 120MB Winchester Disk Drive
   • 60MB Cartridge Tape Drive
   • 130 amp Power Supply
   • 2350 System Cabinet, Chassis, Fan, Integral Modem (60Hz units),
     Control Panel and Power Distribution Unit

Standard system hardware components included in the base <u>2350-031</u> system are as follows:

- 2350 Central Processor
- PT200 System Console
- PRIMOS Operating System (Execute-Only, Rev. 20.1 or greater)
- Memory Board (Single EE 4MB board)
- Diagnostic Processor with Cable
- ICS3 Communications Controller, Supporting 4 asynchronous lines
- Combined Disk/Tape Controller
- One 120MB Winchester Disk Drive
- 60MB Cartridge Tape Drive
- 130 amp Power Supply
- 2350 System Cabinet, Chassis, Fan, Integral Modem (60Hz units), Control Panel and Power Distribution Unit.

NOTE: The international versions of the 2350 system packages <u>do not</u> contain PT200 system consoles. 50Hz versions do not include power cords. The 2350 international packages can be ordered under the following model numbers:

<u>Model Number</u>	<u>Description</u>
2350-010	2350-011 System Components, 60Hz Countries
2350-010-A	2350-011 System Components, 50Hz Countries
2350-020	2350-021 System Components, 60Hz Countries
2350-020-A	2350-021 System Components, 50Hz Countries
2350-030	2350-031 System Components, 60Hz Countries
2350-030-A	2350-031 System Components, 50Hz Countries

<u>Optional Hardware and Software</u>

All allowed optional hardware and software is listed below:

- ICS1
- ICS3
- 2MB EE Memory
- 4MB EE Memory
- 60MB Disk Drive
- 120MB Winchester Disk Drive
- PRIMENET Node Controller II (PNC II)
- Streaming Magnetic Tape Drive with peripheral cabinet
- Multi Data Link Controller with Protocol options
- Power Conditioning Unit
- Blank Cartridges for the 60MB Cartridge Tape Drive
- Peripherals (printers, terminals, etc.) that can attach to the 2350 communications lines
- Any Prime standard software may also be ordered

Communications Subsystem Options

The 2350 system can be configured with up to 32 async lines and up to
4 sync lines. The 32 async line maximum can be reached only through
the following option combinations:

- ICS3 with (8) CLAC304s
- ICS3 with (6) CLAC304s and (1) ICS1
- ICS3 with (6) CLAC304s and (1) AMLC, with up to 8 lines on the
  AMLC connected
- (1) AMLC and (1) ICS1

The 4 sync line maximum can be reached only through the following
option combinations:

- (2) MDLCs
- ICS3 with (2) CLAC602 or (2) CLAC622s

Refer to Section 4 for detailed information on Communications
Subsystems configurations.

Disk Subsystem Options

The 2350-011 system has one 60MB disk drive imbedded in its system
cabinet, and can support up to a total of two disk drives. A second
60MB disk drive or a 120MB disk drive may be added into the system
cabinet without any additional controllers.

The 2350-021 and 2350-031 systems each have one 120MB disk drive
imbedded in their system cabinets, and can support up to a total of
two disk drives. A second 120MB disk drive or a 60MB disk drive may
be added into the system cabinet without any additional controllers.

Magnetic Tape Subsystem Options

All 2350 systems include a 60MB, 5.25-inch Cartridge Tape Drive. A
Streaming Magnetic Tape Drive (Model Number 4660T) may be added as an
option to this base system. This requires the installation of an
additional controller, and entails the use of a separate peripheral
cabinet where the Streamer is mounted.

Main Memory

The base 2350-011 system includes 2MB of memory on a single board.
The base 2350-021 and 2350-031 systems include 4MB of memory on a
single board. Additional memory may be added to a limit of 8MB. The
following memory boards are supported: MMW1-2MT (2MB) or MMW1-4MT
(4MB).

Additional Options

The 2350 is available with a power conditioning unit. This unit acts
as an AC line filter for the system, and is useful where the power is
subject to transient noise.

System Specifications

Please refer to Appendix A for 2350 system specifications.

Configuration Limitations

The 2350 has one 9-slot chassis and a 130 amp power supply. Unlike
other Prime systems, the limitation is in slots, not power. The two-
board CPU uses a total of three slots, because one slot between the
CPU boards must remain open to allow for adequate airflow/cooling.
Memory boards also have specific slot requirements, which are detailed
later in this section.

The boards listed below come standard with every 2350:

Board Name	# of Slots
CPU	3
Diagnostic Processor	1
2MB or 4MB Memory Board	1
Disk/Tape Controller	1
ICS1 or AMLC Communications Controller	1
Total	7

This configuration leaves two slots which may be configured with any
supported controller or memory. The 2MB and 4MB boards may be placed
in these two available option slots, as long as total system memory
does not exceed 8MB. In cases where a system becomes slot constrained,
the 2MB memory board that comes standard with the 2350-011 system may
be replaced with a 4MB memory board. 2MB memory, residing in one of
the option slots, may also be replaced with 4MB memory boards, as long
as the user is slot constrained, and the total system memory does not
exceed 8MB. Refer to the U.S. Price Book (SOU-2102-009) for memory
trade-in policies.

2450 SYSTEM

There are three system packages for the 2450. One model (Product
Number 2450-011) contains a 60MB Winchester disk subsystem. The other
models (Product Numbers 2450-021 and 2450-031) contain a 120MB
Winchester disk subsystem. These models are also different in that
they contain a 4MB memory board in the base system, instead of a 2MB
board.

For detailed configuration information on all hardware and software
communications products, please refer to Section 4.

Hardware and Software Supplied

Standard system hardware components included in the base 2450-011
system are as follows:

- 2450 Central Processor
- PT200 System Console
- PRIMOS Operating System (Execute-Only, Rev. 20.0 or greater)
- Memory Board (Single 2MB EE board)
- Diagnostic Processor with Cable
- AMLC Communications Controller, supporting 16 asynchronous
  lines
- Combined Disk/Tape Controller
- One 60MB Winchester Disk Drive
- 60MB Cartridge Tape Drive
- 130 amp Power Supply
- 2450 System Cabinet, Chassis, Fans, Integral Modem (60Hz
  units), Control Panel and Power Distribution Unit

NOTE: The 2450-011 system package has been removed from the price
       book and is no longer available.

Standard system hardware components included in the base 2450-021
system are as follows:

- 2450 Central Processor
- PT200 System Console
- PRIMOS Operating System (Execute-Only, Rev. 20.0 or greater)
- Memory Board (Single 4MB EE board)
- Diagnostic Processor with Cable
- AMLC Communications Controller, supporting 16 asynchronous
  lines
- Combined Disk/Tape Controller
- One 120MB Winchester Disk Drive
- 60MB Cartridge Tape Drive
- 130 amp Power Supply
- 2450 System Cabinet, Chassis, Fans, Integral Model (60Hz
  units), Control Panel and Power Distribution Unit

Standard system hardware components included in the base <u>2450-031</u>
system are as follows:

- 2450 Central Processor
- PT200 System Console
- PRIMOS Operating System (Execute-Only, Rev. 20.1 or greater)
- Memory Board (Single 4MB board)
- Diagnostic Processor with Cable
- ICS3 Communications Controller, supporting 4 asynchronous lines
- Combined Disk/Tape Controller
- One 120MB Winchester Disk Drive
- 60MB Cartridge Tape Drive
- 130 amp Power Supply
- 2450 System Cabinet, Chassis, Fan, Integral Modem (60Hz units),
  Control Panel and Power Distribution Unit

NOTE: The international versions of the 2450 system packages <u>do not</u>
        contain PT200 system consoles. 50Hz versions do not include
        power cords. The 2450 international packages can be ordered
        under the following model numbers:

Model Number	Description
2450-010*	2450-011 System Components, 60Hz Countries
2450-010-A*	2450-011 System Components, 50Hz Countries
2450-020	2450-021 System Components, 60Hz Countries
2450-020-A	2450-021 System Components, 50Hz Countries
2450-030	2450-031 System Components, 60Hz Countries
2450-030-A	2450-031 System Components, 50Hz Countries

* The 2450-010 system packages have been removed from the price book
  and are no longer available.

<u>Optional Hardware and Software</u>

The following is a list of all allowed optional hardware and software:

- ICS1
- ICS3
- 2MB EE Memory
- 4MB EE Memory
- 60MB Disk Drive
- 120MB Winchester Disk Drive
- PRIMENET Node Controller II (PNC II)
- Streaming Magnetic Tape Drive with Peripheral Cabinet
- Multi Data Link Controller with Protocols
- Power Conditioning Unit
- Blank Cartridges for the 60MB Cartridge Tape Drive
- Peripherals (printers, terminals, etc.) that can attach to the
  2450 communications lines
- Any Prime standard software may also be ordered

Communications Subsystem Options

The 2450 System can be configured with up to 40 async lines and up to
four sync lines. The 40 async line maximum can be reached only
through the following option combinations:

- ICS3 with (8) CLAC304s and (1) ICS1
- ICS3 with (8) CLAC304s and (1) AMLC, with up to 8 lines on the
  AMLC connected

The four sync line maximum can be reached only through the followign
option combinations:

- (2) MDLCs
- ICS3 with (2) CLAC602s or (2) CLAC622s

Refer to Section 4 for detailed information on Communications
Subsystem configurations.

Disk Subsystem Options

The 2450-011 system has one 60MB disk drive imbedded in its system
cabinet, and can support up to a total of two disk drives. A second
60MB disk drive or a 120MB disk drive may be added into the system
cabinet without any additional controllers.

The 2450-021 and 2450-031 systems each have one 120MB disk drive
imbedded in their system cabinets, and can support up to a total of
two disk drives. A second 120MB disk drive or a 60MB disk drive may
be added into the system cabinet without any additional controllers.

Magnetic Tape Subsystem Options

All 2450 systems include a 60MB, 5.25-inch cartridge tape drive. A
Streaming Magnetic Tape Drive (Model Number 4660T) may be added as an
option to this base system. This requires the installation of an
additional controller and entails the use of a separate peripheral
cabinet where the Streamer is mounted.

Main Memory

The base 2450-021 and 2450-031 systems include 4MB of memory on a
single board. Additional memory may be added to a limit of 8MB. The
following memory boards are supported: MMW1-2MT (2MB) or MMW1-4MT
(4MB).

Additional Options

The 2450 is available with a power conditioning unit. This unit acts
as an AC line filter for the system, and is useful where the power is
subject to transient noise.

System Specifications

Please refer to Appendix A for 2450 system specifications.

Configuration Limitations

The 2450 has one 9-slot chassis and a 130 amp power supply. Unlike
other Prime systems, the configuration limitation is in slots, not
power. The two-board CPU uses a total of three slots, because one
slot between the CPU boards must remain open to allow for adequate
airflow/cooling. Memory boards also have specific slot requirements,
which are detailed later in this section.

The boards listed below come standard with every 2450 system:

Board Name	# of Slots
CPU	3
Diagnostic Processor	1
2MB or 4MB Memory Board	1
Disk/Tape Controller	1
AMLC Communications Controller	1
Total:	7

This configuration leaves two open slots which may be configured with
any supported controller or memory. The 2MB and 4MB memory boards may
be placed in these two available option slots, as long as total system
memory does not exceed 8MB. In cases where a system becomes slot
constrained, the 2MB memory board that comes standard with the
2450-011 system may be replaced with a 4MB memory board. 2MB memory
residing in one of the option slots may also be replaced with 4MB
memory boards, as long as the user is slot constrained and total
system memory does not exceed 8MB. Refer to the U.S. Price Book
(SOU-2102-009) for memory trade-in policies.

2655 SYSTEM

There are several system packages for the 2655. Each contains the
2655 CPU; however, they differ in their memory, disk and tape
configurations.

For proper configuration information on all hardware and software
communications products, please refer to Section 4.

Hardware and Software Supplied

Standard system components that are included in all of the basic 2655
systems are as follows:

- 2655 Central Processor
- PRIMOS Operating System (Rev. 19.4.3 or greater)
- Memory Boards (One 4MB board)
- Diagnostic Processor with Cable and Modem (60Hz only)
- 130 amp Power Supply
- Office Systems Cabinet, Chassis, Fans, Control Panel and Power
  Distribution Unit

Optional Hardware and Software

Optional hardware on the 2655 includes communications subsystems, disk
subsystems, tape subsystems, unit record controllers, peripherals and
add-on MOS memory. Any Prime standard software may also be ordered.

Communications Subsystem Options

Included with the 2655 system is bulkhead support for 32 asynchronous
and four synchronous lines. A maximum of 64 asynchronous lines may be
connected; however, additional communications hardware must be
configured. For proper configuration information, please refer to
Section 4.

Disk Subsystem Options

The 2655 supports the 315MB FMD and the 496MB FMD in the 2655 office
peripheral cabinet, as well as the full range of disk subsystems Prime
offers for the computer room. A maximum of two disk subsystems, or a
total of six drives, is allowed.

Magnetic Tape Subsystem Options

Some 2655 system packages include a Magnetic Tape Subsystem. All of
Prime's tape subsystems are supported by the 2655. The 2655 can
support one streaming tape controller and two tape drives per
subsystem. The system will only support one cartridge tape subsystem
and one cartridge tape drive per subsystem in the office environment.

Unit Record Subsystem Options

Unit Record Subsystems support a maximum of two line printers and a
card reader. The 2655 supports a maximum of two unit record sub-
systems. Refer to Section 2 for additional information.

Main Memory

The 2655 comes with 4MB of main memory in the form of a single 4MB
board. A maximum of 8MB of main memory is supported.

Additional Options

An optional power conditioning unit is available for the 2655. (Order
Product Number 7562L for the system cabinet and 7563L for the office
peripheral cabinet.) This unit, which acts as an AC line filter, is
useful where the power is subject to transient noise.

NOTE: The 2655 is not available with a desktop.

System Specifications

Please refer to Appendix A for 2655 system specifications.

Configuration Limitations

The 2655 has one 16-slot chassis, powered by a single 130 amp power
supply, with a maximum of 8MB of allowable memory. The chassis houses
the 2655 CPU, memory and I/O controllers. The amperage draw for the
system CPU, memory boards and I/O controllers may not exceed 130 amps;
thus, the TOTAL amperager draw must be considered when configuring the
available seven (7) slots for I/O controllers.

BOARD	ESTIMATED AMPERAGE
Standard System:	
CPU (A + B boards)	44.3
Options:	
1024KB memory (MMW1-E9)	5.7
2048KB memory (MMW1-2MB)	5.5
4096KB memory (MMW1-4MB)	6.4
MDLC - 2 lines	11.1
MDLC - 4 lines	11.5
Tape Controller (4520F/4522F)	19.3
Streamer Controller	6.9
Unit Record Controller	10.3
Systems Options Controller	7.8
PRIMENET Node Controller II (PNC II)	12.7
AMLC	8.6
ICS1	6.7
ICS2	12.8
ICS3	12.8
Disk Controller (4005)	10.2
Disk Controller (6580)	13.0
Cartridge Tape Controller	
Disk/Tape	13.8
Tape Only	4.2

9655 SYSTEM

There are several system packages for the 9655. Each contains the
9655 CPU; however, they differ in their memory, disk and tape
configurations.

For proper configuration information on all hardware and software
communications products, please refer to Section 4.

Hardware and Software Supplied

Standard system components included in all basic 9655 systems are as
follows:

- 9655 Central Processor
- PRIMOS Operating System (Rev. 19.4.3 or greater)
- Memory Boards (One 4MB memory board is included with
  each system)
- Diagnostic Processor with Cables and Modem (60Hz only)
- Single-Bay Computer Room Cabinet and Chassis
- One 130 amp Power Supply for CPU and Memory Chassis
- One 130 amp Power Supply for I/O Chassis
- Disk Subsystem (300MB, 315MB, 496MB or 675MB)

Optional Hardware and Software

Optional hardware available with the 9655 system includes communica-
tions subsystems, disk subsystems, tape subsystems, unit record sub-
systems, peripherals and add-on memory boards. Any Prime standard
software may also be ordered with the 9655 system.

Communications Subsystem Options

The 9655 includes bulkhead support for 64 asynchronous and eight
syncronous lines. A maximum of 128 asyncronous lines may be connected;
however, additional communications hardware must be configured. For
the proper configuration of all communications capabilities, please
refer to Section 4.

Disk Subsystem Options

Any Prime disk subsystem, except the 60MB (used with the 2350 and 2450
systems) and the 68MB/158MB (used with the 2250), may be installed
with the 9655. The first packaged disk subsystem includes a
controller, cable and disk. A peripheral cabinet is also included
with rack-mounted devices. Each controller supports a maximum of four
disk drives of any variety. The 9655 system supports a maximum of
four disk controllers, for a total of 16 drives with PRIMOS Rev.
19.4.3 or greater. See Section 2 for more information about disk
subsystems.

Magnetic Tape Subsystem

Some packaged 9655 systems include a magnetic tape subsystem. All of
Prime's tape subsystems may be used with the 9655. Support for a
maximum of two tape subsystems and four tape drives per subsystem, or
a total of eight drives, is provided.

Unit Record Subsystem Options

Unit Record Subsystems support a maximum of two line printers and a
card reader. The 9655 supports a maximum of two unit record sub-
systems. More information on unit record subsystems is found in
Section 2.

Main Memory

The minimum memory of 4MB is supplied on one 4MB board. Main memory
can be expanded to a maximum of 8MB.

System Specifications

Please refer to Appendix A for 9655 system specifications.

Configuration Limitations

The 9655 CPU and memory use their own chassis and power supply and
allow a maximum of 8MB of memory. The 9655 I/O chassis has one 130
amp power supply; thus the TOTAL amperage draw for CPU, memory boards
and I/O controllers must be considered when configuring the available
10 chassis slots for I/O controllers.

BOARD	ESTIMATED AMPERAGE
MDLC - 2 lines	11.1
MDLC - 4 lines	11.5
Tape Controller (4502F/4522F)	19.3
GCR Tape Controller (4550/4590)	14.0
Streamer Controller	6.9
Unit Record Controller	10.3
Systems Options Controller	7.8
PRIMENET Node Controller II (PNC II)	12.7
AMLC	8.6
ICS1	6.7
ICS2	12.8
ICS3	12.8
Disk Controller (4005)	10.2
Disk Controller (6580)	13.0
Cartridge Tape Controller	
Disk/Tape	13.8
Tape Only	4.2

9755 SYSTEM

There are several system packages for the 9755. Each contains the
9755 CPU; however, they differ in memory, disk and tape
configurations. For proper configuration information on all hardware
and software communications products, please refer to Section 4.

Hardware and Software Supplied

Standard system components included in all basic 9755 systems are as
follows:

- 9755 Central Processor
- PRIMOS Operating System (Execute-Only, Rev. 19.4.9)
- One 4MB Memory Board
- Diagnostic Processor with Cables and Modem (60Hz only)
- Twin-bay Computer Room Cabinet and Chassis
- One 130 amp Power Supply for the Memory Chassis
- One 130 amp Power Supply for the I/O Chassis
- CPU Chassis and Power Supply
- Disk Subsystem (300MB, 315MB, 496MB or 675MB)

Optional Hardware and Software

Optional hardware available with the 9755 includes communications
subsystems, disk subsystems, tape subsystems, unit record subsystems,
peripherals and add-on memory boards. Any Prime standard software may
also be ordered with the 9755.

Communications Subsystem Options

Bulkhead support for 64 asynchronous and eight synchronous lines is
included with the 9755. A maximum of 192 asynchronous lines may be
connected; however, additional communications hardware must be
configured. For the proper configuration of all communications
products, please refer to Section 4.

Disk Subsystem Options

Any Prime disk subsystem, except the 60MB and 120MB (used with the
2350 and 2450 systems), and the 68MB/158MB (used with the 2250), may
be installed with the 9755. The first packaged disk subsystem
includes a controller, cable and disk. A peripheral cabinet is also
included with rack-mounted devices. Each controller supports a
maximum of four disk drives of any variety. Up to four disk
controllers can be supported by each 9755, for a total of 16 disk
drives. See Section 2 for more information concerning disk
subsystems.

Magnetic Tape Subsystem Options

Some packaged 9755s include a magnetic tape subsystem. All of Prime's
tape subsystems may be used with the 9755. A maximum of two tape sub-
systems and four tape drives per subsystem are supported, for a total
of eight tape drives.

Unit Record Subsystem Options

The 9755 supports a maximum of two unit record subsystems, each
supporting a maximum of two line printers and a card reader. More
information on unit record subsystems is found in Section 2.

Main Memory

Minimum memory of 8MB is supplied by two 4MB boards. Memory can be
expanded in 2MB, 4MB or 8MB increments, to a maximum of 16MB of main
memory. The ECL memory boards are self-interleaved; i.e., there is no
performance advantage utilizing pairs of boards.

System Specifications

Cabinet dimensions and configuration guidelines are covered in greater
detail in Section 5 - Cabinet Configuration Requirements. Please
refer to Appendix A for 9755 system specifications.

Configuration Limitations

The 9755 CPU and memory use their own chassis and power supplies, and
allow a maximum of 16MB or memory. The 9755 I/O chassis has one 130
amp power supply; thus, the TOTAL amperage draw for the CPU, memory
boards and I/O controllers must be considered when configuring the
available 10 chassis slots for I/O controllers.

BOARD	ESTIMATED AMPERAGE
MDLC - 2 lines	11.1
MDLC - 4 lines	11.5
Tape Controller (4520F/4522F)	19.3
GCR Tape Controller (4550/4590)	14.0
Streamer Controller	6.9
Unit Record Controller	10.3
Systems Options Controller	7.8
PRIMENET Node Controller II (PNC II)	12.7
AMLC	8.6
ICS1	6.7
ICS2	12.8
ICS3	12.8
Disk Controller (4005)	10.2
Disk Controller (6580)	13.0
Cartridge Tape Controller	
Disk Tape	13.8
Tape Only	4.2

9955 II SYSTEM

There are several system packages for the 9955 II. Each contains the
9955 II CPU; however, they differ in memory, disk and tape configura-
tions. For proper configuration information on all hardware and
software communications products, please refer to Section 4.

Hardware and Software Supplied

The standard hardware and software components included in all 9955 II
systems are:

- 9955 II Central Processor
- PRIMOS Operating System (Execute-Only, Rev. 20.0.2 or greater)
- Diagnostic Processor, System Console, Cable and Modem (60Hz
  only)
- Twin-Bay Computer Room Cabinet and Chassis
- Two 130 amp Power Supplies for I/O Chassis
- Memory Boards (One or Two 8MB board)
- Memory Power Supply
- Disk Subsystem (300MB, 315MB, 496MB or 675MB)

Note: Packaged systems do not include communications hardware.

Optional Hardware and Software

Optional hardware and software available with the 9955 II includes
communications subsystems, disk subsystems, tape subsystems, unit
record subsystems, memory and software products.

Communications Subsystem Options

The 9955 II bulkhead supports 64 asynchronous and eight synchronous
lines. A maximum of 254 asynchronous lines may be connected; however,
additional communications hardware must be configured. For the proper
configuration of all communications capabilities, please refer to
Section 4.

Disk Subsystem Options

Any Prime disk subsystem, except the 60MB and 120MB (used with the
2350 and 2450 systems), and the 68MB/158MB (used with the 2250), may
be installed with the 9955 II. The first packaged disk subsystem
includes a controller, cable and disk. A peripheral cabinet is also
included with rack-mounted devices. Each controller supports a
maximum of four disk drives of any variety. Up to four disk
controllers can be supported by each 9955 II, for a total of 16 disk
drives. See Section 2 for more information concerning disk
subsystems.

Magnetic Tape Subsystem Options

Some packaged 9955 II systems include a magnetic tape subsystem. All
of Prime's 50 Series tape subsystems may be used with the 9955 II. A
maximum of two tape subsystems and four tape drives per subsystem can
be supported, for a total of eight drives.

Unit Record Subsystem Options

Unit record subsystems support up to two line printers and a card
reader. The 9955 II supports up to two unit record subsystems. More
information concerning unit record controllers is found in Section 2.

Main Memory

Minimum memory of 16MB is available in two 8MB boards. Memory can be
expanded in 4MB or 8MB increments, to a maximum of 32MB of main
memory. 9955 II memory boards are self-interleaved; i.e., there is no
performance advantage utilizing pairs of boards.

System Specifications

Please refer to Appendix A for 9955 II system specifications.

Cabinet dimensions and configuration guidelines are covered in greater
detail in Section 5.

Configuration Limitations

The 9955 II CPU and memory use their own chassis and power supplies,
and allow a maximum of 32MB of memory. The 9955 II I/O chassis has
two 130 amp power supplies; thus, the number of chassis slots (up to
14), rather than the amperage draw, must be considered. The limit of
14 chassis slots for I/O is due to the electrical characteristics of
the I/O bus. The I/O boards which can be included in a 9955 II system
are:

```
    AMLC
    ICS1
    ICS2 Controller
    ICS3 Controller
    MDLC (2 or 4 - line versions)
    Tape Controller (4550F)
  * Tape Controller (4520F/4522F)
    Systems Option Controller
    PRIMENET Node Controller II (PNC II)
    Disk Controllers
    Unit Record Controller
    Streamer Controller (4560F)
    Cartridge Tape (4581F)
```

*   The Tape Controller for devices 4520F and 4522F is two boards, but
    counts as one of the 14 loads on the I/O bus.

NOTE: The 9955 II Diagnostic Processor does not reside on the system
       I/O bus, and therefore does not count as an I/O bus load.

SECTION 2

CONFIGURATION REQUIREMENTS

Section 2 describes the following components used by the 2250, 2350, 2450, 2655, 9655, 9755 and 9955 II systems:

- Diagnostic Processors

- Memory Requirements

- Communications Hardware Requirements

- Disk Subsystems

- Streaming Magnetic Tape Subsystems

- Unit Record Subsystems (including printers and other I/O devices)

- Serial Interface Devices

- Paper Tape Device Cable Requirements

2250 DIAGNOSTIC PROCESSOR

The 2250 Diagnostic Processor performs a variety of system integrity
and administrative functions. It allows the system console to be used
as a user terminal, as well as a control panel. Note that the VCP
function is performed by the diagnostics. The diagnostic processor
performs an auto-boot to PRIMOS.

Some of the more significant features of the 2250 diagnostic processor
include:

- Requires no I/O slot; it interfaces directly into the CPU.

- Does not provide a serial printer port.

- Allows the system console to be used as a user terminal.

- Has jumper-selectable default baud rates.

2350 AND 2450 DIAGNOSTIC PROCESSOR

The new VCP4 Diagnostic Processor, like its predecessor the VCP3, is a
Z80 microprocessor-based board, which includes the capability of
operating as the system operator terminal, a user terminal, a remote
terminal (modem connection or remote servicing), and a VCP interface.
The VCP4 also supports the loadable control store, CPU ID prom, system
identification prom, battery backed-up time-of-day clock, environ-
mental sensors, and the optional use of an Uninterruptible Power
Source. Unlike the VCP3, the VCP4 plugs directly into the backplane.
This feature allows the VCP4 to perform voltage margining and failure
detection. Other features include a built-in modem (60Hz units only),
and the ability to use an E-PROM cartridge to load microcode.

2655 DIAGNOSTIC PROCESSOR

The 2655 diagnostic processor performs a variety of system integrity
and administrative functions. Two diskette drives, used for opera-
tional and diagnostic microcode loading, are under control of the
diagnostic processor.

The 2655 has an automatic system start-up feature, invoked when the
operator presses the System Power Switch on the status panel. This
start-up condition to multi-user PRIMOS is controlled by the
diagnostic processor. Time-of-day and date are fed to PRIMOS at the
appropriate point from a battery-operated clock on the diagnostic
processor. The VCP function is also performed by the diagnostic
processor.

The diagnostic processor also controls the operator´s console. A
technical specialist can locally or remotely control any 2655 system
to provide fast, effective trouble-shooting for identifying a hardware
problem, and for performing comprehensive system software diagnostics.

9655, 9755 AND 9955 II DIAGNOSTIC PROCESSORS

The diagnostic processor for the 9655, 9755 and 9955 II performs a
variety of system integrity, administration and monitoring functions.
Two diskette drives, used for operational and diagnostic microcode
loading, are under control of the diagnostic processor. The system
status panel, with operator switches and indicators, interfaces to the
diagnostic processor. Another function of the diagnostic processor is
environmental sensing, which monitors the system airflow and tempera-
ture sensors. At a predetermined temperature, the system notifies
PRIMOS, which sends a warning to the operator´s console. At a second
predetermined temperature level, the system automatically powers-down.

The system has an automatic system start-up feature, invoked when the
operator presses the System Power Switch on the status panel. This
start-up condition to multi-user PRIMOS is controlled by the
diagnostic processor. Time-of-day and date are fed to PRIMOS at the
appropriate point from a battery-operated clock on the diagnostic
processor. The VCP function is performed by the diagnostic processor
subsystem, therefore no VCP is required on the system.

An operator´s console, either a PT200 video terminal or a hard-copy
terminal, is controlled by the diagnostic processor. A technical
specialist can locally or remotely control any system to provide
fast, effective trouble-shooting for identifying a hardware problem,
and for performing comprehensive system software diagnostics. The
remote system administrator, when in control mode, can completely run
the system from a remote terminal, including tasks such as bootloading
and on-line operations.

MEMORY REQUIREMENTS

Configuration rules for the following memory types will be outlined in this section:

MMW1-HMB – 512KB board (E7), can be used only on the 2250, 2550, 9650 and 9655. It supports only wide-word operation in pairs for the 2550, 2655, 9650 and 9655. The 2250 does not support wide-word operation, and can make use of non-paired configurations.

MMW1-1MB – 1024KB board (E8), can be used only on the 2250, 2550, 2655, 9650 and 9655. It supports only wide-word operation in pairs for the 2550, 2655, 9650 and 9655. The 2250 does not support wide-word option, and can make use of non-paired configurations.

MMW1-E9 – 1024KB board (E9), can be used only on the 2250, 2550, 2655, 9650 and 9655. It supports only wide-word operation in pairs for the 2550, 2655, 9650 and 9655. The 2250 does not support wide-word operation, and can make use of non-paired configurations. This board also supports self-interleaving for improved performance in non-paired configurations on the 2250.

* MMW1-2MB – 2048KB board (2MB TTL), wide-word, self-interleaving, can be used on any processor, except the 9750, 9755, 9950, 9955 and 9955 II.

* MMW1-4MB – 4096KB board (4MB TTL), wide-word, self-interleaving, can be used on any processor except the 9750, 9755, 9950, 9955 and 9955 II.

MMW2-2MB – 2048KB board (2MB ECL), wide-word, self-interleaving, can be ordered only for use on the 9750, 9755, 9950 and 9955 systems. It cannot be used on any TTL system or the 9955 II.

MMW2-4MB – 4096KB board (4MB ECL), wide-word, self-interleaving, can be ordered only for use on a 9650, 9755, 9950, 9955 or 9955 II system. It cannot be used on any TTL system.

MMW2-8MB – 8192KB board (8MB ECL), wide-word, self-interleaving, can be used only on the 9750, 9755, 9950, 9955 and 9955 II systems.

*   The MMW1-2MB and MMW1-4MB memory boards are the same as the MMW1-2MT and MMW1-4MT memory boards, respectively. The 2MT and 4MT memory boards may only be ordered for 2350 and 2450 systems.

TABLE 2-1. MAIN MEMORY CONFIGURATION INFORMATION							
System	Minimum Memory	Maximum Memory	Available Slots	MMW1-2MB MMW1-4MB MMW1-2MT MMW1-4MT	MMW1-E9	MMW2-4MB MMW2-8MB	MMW2-2MB
2250	.5MB	4MB	4	Yes	Yes	No	No
2350	2MB	8MB	3	Yes	No	No	No
2450	2MB	8MB	3	Yes	No	No	No
2550	2MB	8MB	8	Yes	Yes	No	No
2655	4MB	8MB	4	Yes	Yes	No	No
9650	2MB	8MB	8	Yes	Yes	No	No
9655	4MB	8MB	8	Yes	Yes	No	No
9750	4MB	12MB	6	No	No	Yes	Yes
9755	8MB	16MB	8	No	No	Yes	Yes
9950	4MB	16MB	8	No	No	Yes	Yes
9955	4MB	16MB	8	No	No	Yes	Yes
9955 II	16MB	32MB	8	No	No	Yes	No

System Memory Board Configurations - 2250

2250 configuration rules are given below:

0.5MB	1MB	1MB	1.5MB	2MB
512KB	512KB	1MB	512KB	512KB
	512KB		512KB	512KB
			512KB	512KB
				512KB

2MB	2MB	2MB	3MB	3MB
1MB	1MB	2MB	1MB	2MB
1MB			1MB	
	512KB		1MB	1MB
	512KB			

4MB	4MB	4MB	4MB
1MB	2MB	4MB	2MB
1MB	2MB		
1MB			1MB
1MB			1MB
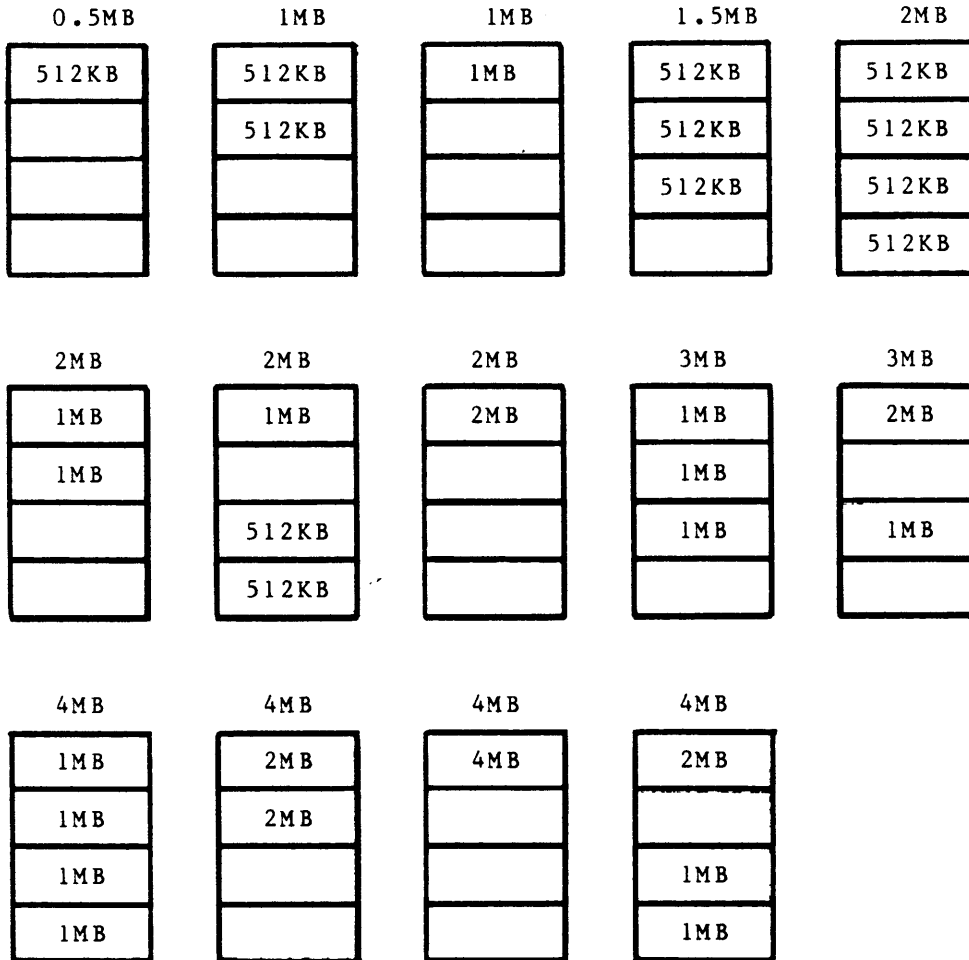
NOTE: The 2250-019 system will only support up to 3-slot memory
        configurations.

        The order of placement of the boards in the chassis will
        be determined by Customer Service when the memory is
        installed. Any open spaces between the memory boards
        indicated above (and on the previous page) must remain
        unfilled.

        E8 1MB memory in non-paired configurations must have an
        open slot next to it in order to operate.

System Memory Board Configurations - 2350 and 2450

2350 and 2450 configuration rules are illustrated below:
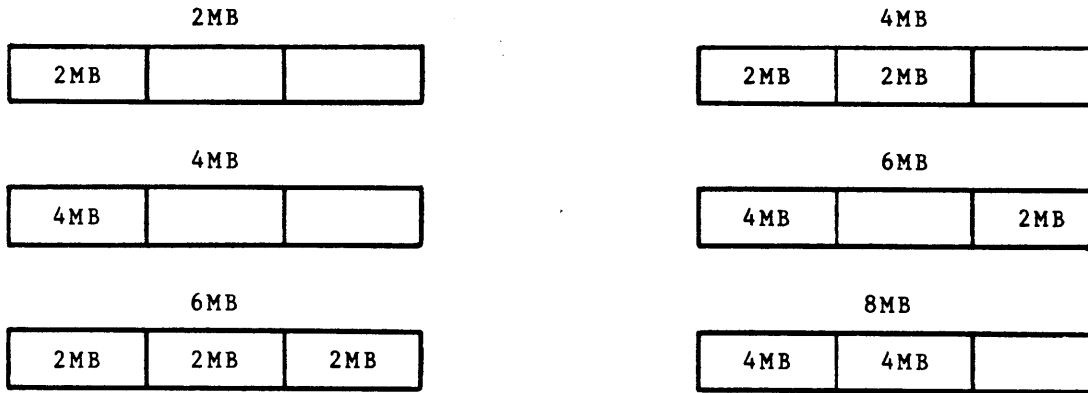
2MB		
2MB		

4MB		
2MB	2MB	

4MB		
4MB		

6MB		
4MB		2MB

6MB		
2MB	2MB	2MB

8MB		
4MB	4MB	

NOTE: The order of placement of the boards in the chassis will be
        determined by Customer Service when the memory is installed.
        Any open spaces between the memory boards indicated above
        must remain unfilled.

System Memory Board Configurations - 2550

Configuration rules for the 2550 are illustrated below:
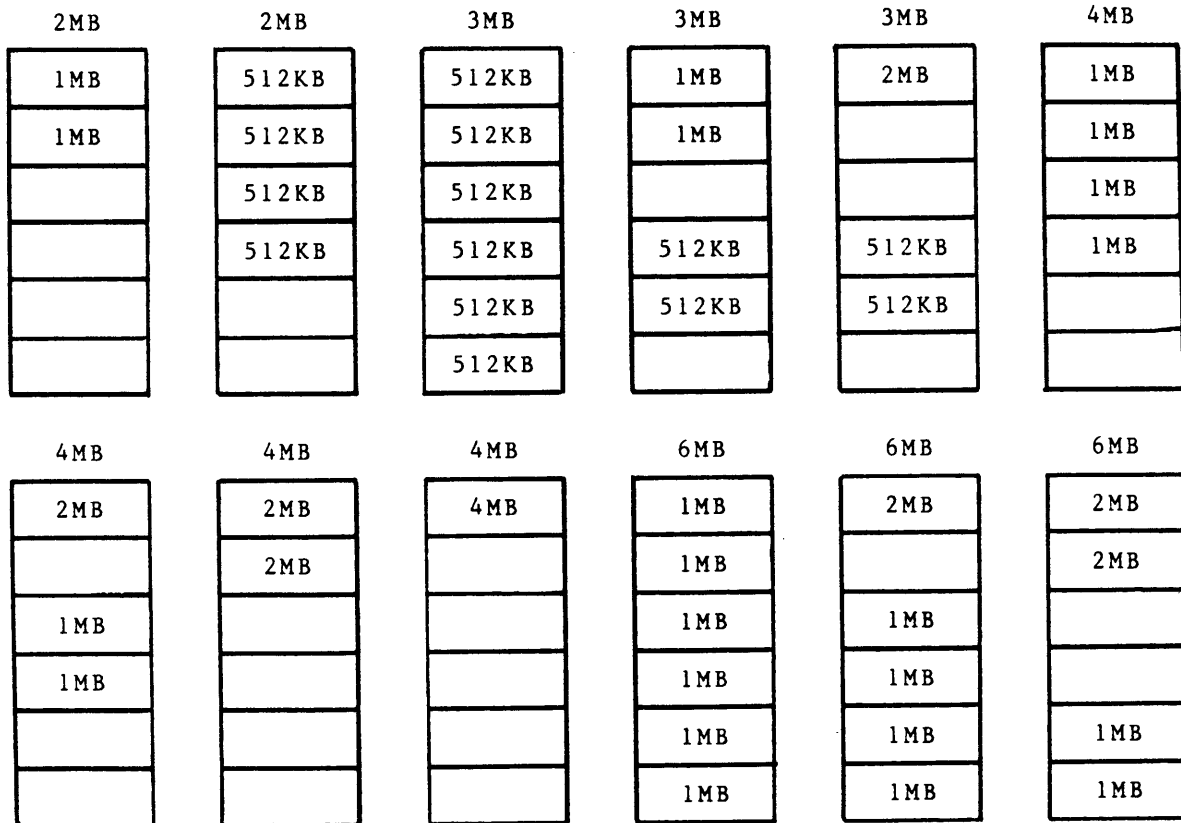
2MB	2MB	3MB	3MB	3MB	4MB
1MB	512KB	512KB	1MB	2MB	1MB
1MB	512KB	512KB	1MB		1MB
	512KB	512KB			1MB
	512KB	512KB	512KB	512KB	1MB
		512KB	512KB	512KB	
		512KB			

4MB	4MB	4MB	6MB	6MB	6MB
2MB	2MB	4MB	1MB	2MB	2MB
	2MB		1MB		2MB
1MB			1MB	1MB	
1MB			1MB	1MB	
			1MB	1MB	1MB
			1MB	1MB	1MB

NOTE: The order of placement of the boards in the chassis will be
determined by Customer Service when the memory is installed.

Any open spaces between the memory boards indicated above
must remain unfilled.

System Memory Board Configurations - 2550 (continued)

Configuration rules for the 2550 are illustrated below:
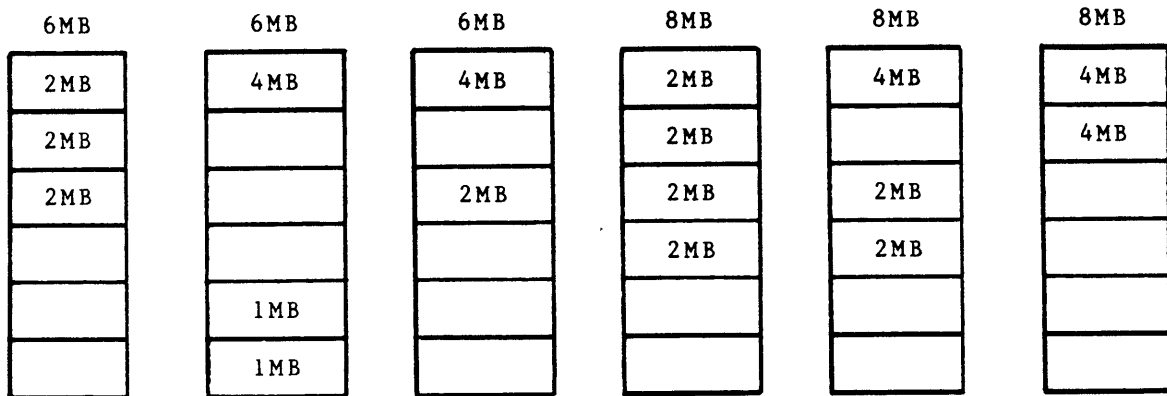
6MB	6MB	6MB	8MB	8MB	8MB
2MB	4MB	4MB	2MB	4MB	4MB
2MB			2MB		4MB
2MB		2MB	2MB	2MB	
			2MB	2MB	
	1MB				
	1MB				

NOTE: The order of placement of the boards in the chassis will be
       determined by Customer Service when the memory is installed.

       Any open spaces between the memory boards indicated above
       must remain unfilled.

System Memory Board Configurations - 2655

Configuration rules for the 2655 are illustrated below:
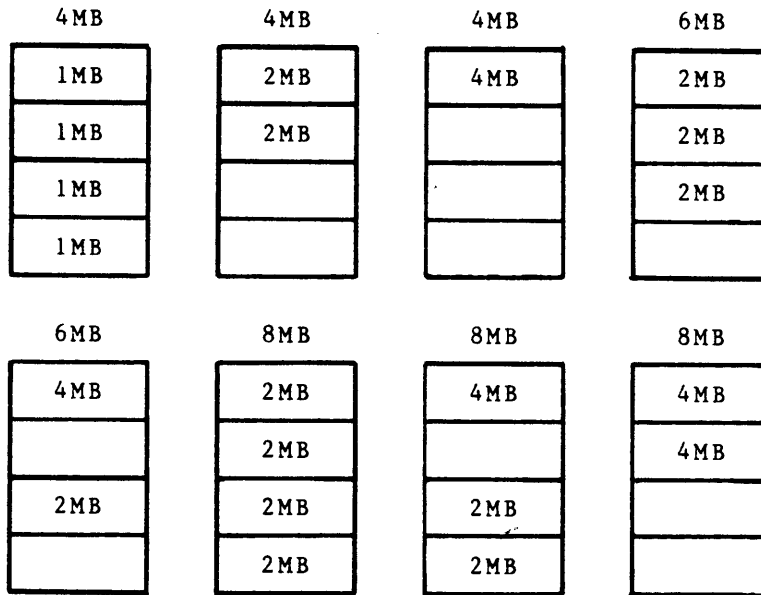
4MB	4MB	4MB	6MB
1MB	2MB	4MB	2MB
1MB	2MB		2MB
1MB			2MB
1MB			

6MB	8MB	8MB	8MB
4MB	2MB	4MB	4MB
	2MB		4MB
2MB	2MB	2MB	
	2MB	2MB	

NOTE: The order of placement of the boards in the chassis will be
       determined by Customer Service when the memory is installed.

       Any open spaces between the memory boards indicated above
       must remain unfilled.

System Memory Board Configurations - 9655

Configuration rules for the 9655 are illustrated below:
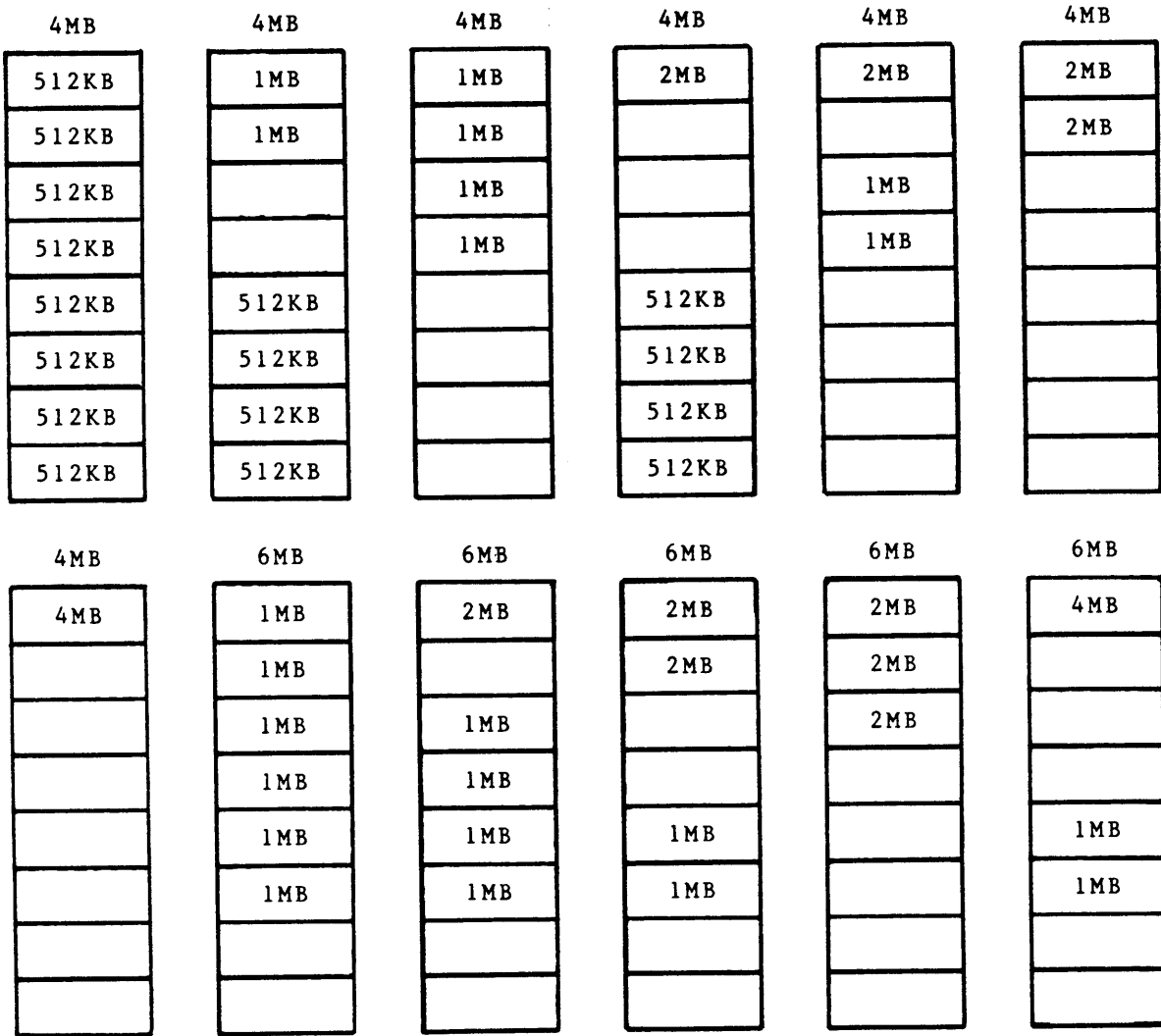
4MB	4MB	4MB	4MB	4MB	4MB
512KB	1MB	1MB	2MB	2MB	2MB
512KB	1MB	1MB			2MB
512KB		1MB		1MB	
512KB		1MB		1MB	
512KB	512KB		512KB		
512KB	512KB		512KB		
512KB	512KB		512KB		
512KB	512KB		512KB		

4MB	6MB	6MB	6MB	6MB	6MB
4MB	1MB	2MB	2MB	2MB	4MB
	1MB		2MB	2MB	
	1MB	1MB		2MB	
	1MB	1MB			
	1MB	1MB	1MB		1MB
	1MB	1MB	1MB		1MB

NOTE: The order of placement of the boards in the chassis will be
determined by Customer Service when the memory is installed.

Any open spaces between the memory boards indicated above
must remain unfilled.

System Memory Board Configurations - 9655 (continued)
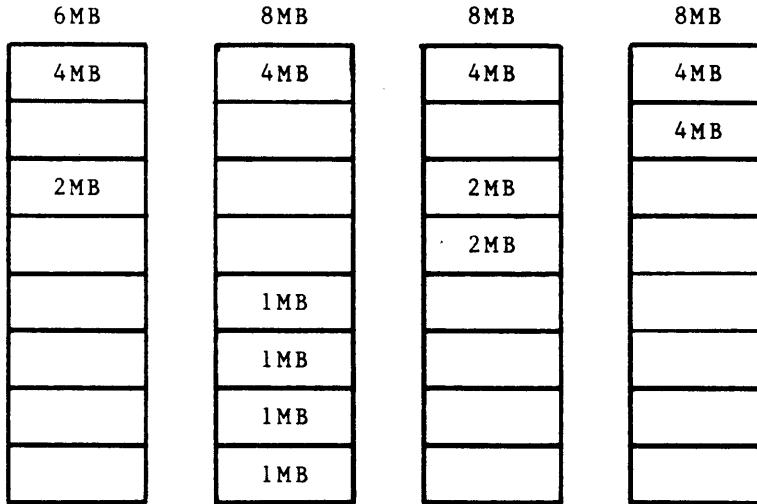
6MB	8MB	8MB	8MB
4MB	4MB	4MB	4MB
			4MB
2MB		2MB	
		2MB	
	1MB		
	1MB		
	1MB		
	1MB		

NOTE: The order of placement of the boards in the chassis will be
        determined by Customer Service when the memory is installed.

        Any open spaces between the memory boards indicated above
        must remain unfilled.

System Memory Board Configurations - 9750, 9755, 9950 and 9955

Memory configuration and slot availability for the 9750, 9755, 9950 and 9955 are illustrated below. Any configurations which exceed 12MB of total memory, or exceed six chassis slots, are not valid for the 9750.

4MB	4MB	6MB	6MB	8MB	8MB
2MB	4MB	2MB	4MB	2MB	4MB
2MB		2MB		2MB	4MB
		2MB	2MB	2MB	
				2MB	

8MB	10MB	10MB	10MB	12MB	12MB
8MB	2MB	4MB	8MB	2MB	4MB
	2MB	4MB		2MB	4MB
	2MB			2MB	
	2MB			2MB	
	2MB	2MB	2MB	2MB	2MB
				2MB	2MB

NOTE: The order of placement of the boards in the chassis will be determined by Customer Service when the memory is installed.

Any open spaces between the memory boards indicated above must remain unfilled.

System Memory Board Configurations - 9750, 9755, 9950 and 9955 (continued)

12MB	12MB	12MB	14MB	14MB	14MB
4MB	8MB	8MB	2MB	4MB	4MB
4MB			2MB		4MB
			2MB	2MB	
			2MB	2MB	
4MB	2MB	4MB	2MB	2MB	2MB
	2MB		2MB	2MB	2MB
			2MB	2MB	2MB

14MB	14MB	14MB	16MB	16MB
4MB	8MB	8MB	2MB	4MB
4MB			2MB	
			2MB	2MB
			2MB	2MB
4MB	4MB	2MB	2MB	2MB
		2MB	2MB	2MB
2MB	2MB	2MB	2MB	2MB
			2MB	2MB

NOTE: The order of placement of the boards in the chassis will be determined by Customer Service when the memory is installed.

Any open spaces between the memory boards indicated above must remain unfilled.

System Memory Board Configurations - 9750, 9755, 9950 and 9955 (continued)

16MB	16MB	16MB	16MB	16MB	16MB
4MB	4MB	8MB	8MB	8MB	8MB
4MB	4MB				
2MB	4MB	2MB	4MB	4MB	8MB
2MB	4MB	2MB		4MB	
2MB		2MB	2MB		
2MB		2MB	2MB		

NOTE: The order of placement of the boards in the chassis will be
determined by Customer Service when the memory is installed.

Any open spaces between the memory boards indicated above
must remain unfilled.

System Memory Board Configurations - 9955 II

Memory configuration and slot availability for the 9955 II is illustrated below.

```
    16MB          16MB          16MB          20MB
 ┌────────┐    ┌────────┐    ┌────────┐    ┌────────┐
 │  4MB   │    │  8MB   │    │  8MB   │    │  4MB   │
 ├────────┤    ├────────┤    ├────────┤    ├────────┤
 │  4MB   │    │        │    │        │    │  4MB   │
 ├────────┤    ├────────┤    ├────────┤    ├────────┤
 │        │    │        │    │        │    │  4MB   │
 ├────────┤    ├────────┤    ├────────┤    ├────────┤
 │        │    │        │    │        │    │        │
 ├────────┤    ├────────┤    ├────────┤    ├────────┤
 │  4MB   │    │  4MB   │    │  8MB   │    │  4MB   │
 ├────────┤    ├────────┤    ├────────┤    ├────────┤
 │  4MB   │    │  4MB   │    │        │    │  4MB   │
 ├────────┤    ├────────┤    ├────────┤    ├────────┤
 │        │    │        │    │        │    │        │
 ├────────┤    ├────────┤    ├────────┤    ├────────┤
 │        │    │        │    │        │    │        │
 └────────┘    └────────┘    └────────┘    └────────┘

    20MB          20MB          20MB
 ┌────────┐    ┌────────┐    ┌────────┐
 │  8MB   │    │  8MB   │    │  8MB   │
 ├────────┤    ├────────┤    ├────────┤
 │        │    │        │    │        │
 ├────────┤    ├────────┤    ├────────┤
 │  4MB   │    │  4MB   │    │  4MB   │
 ├────────┤    ├────────┤    ├────────┤
 │  4MB   │    │        │    │        │
 ├────────┤    ├────────┤    ├────────┤
 │  4MB   │    │  4MB   │    │  8MB   │
 ├────────┤    ├────────┤    ├────────┤
 │        │    │  4MB   │    │        │
 ├────────┤    ├────────┤    ├────────┤
 │        │    │        │    │        │
 ├────────┤    ├────────┤    ├────────┤
 │        │    │        │    │        │
 └────────┘    └────────┘    └────────┘
```

NOTE: The order of placement of the boards in the chassis will be
        determined by Customer Service when the memory is installed.

        Any open slots between the memory boards indicated above
        must remain unfilled.

System Memory Board Configurations - 9955 II (continued)

24MB	24MB	24MB	24MB
4MB	8MB	8MB	8MB
4MB			
4MB	4MB	8MB	8MB
4MB	4MB		
4MB	4MB	4MB	8MB
4MB	4MB	4MB	

28MB	28MB	28MB	28MB
4MB	8MB	8MB	8MB
4MB			
4MB	4MB	8MB	8MB
4MB	4MB		
4MB	4MB	4MB	8MB
4MB	4MB	4MB	
4MB	4MB	4MB	4MB

NOTE: The order of placement of the boards in the chassis will be
        determined by Customer Service when the memory is installed.

        Any open slots between the memory boards indicated above
        must remain unfilled.

System Memory Board Configurations - 9955 II (continued)

32MB	32MB	32MB	32MB	32MB
4MB	8MB	8MB	8MB	8MB
4MB				
4MB	4MB	8MB	8MB	8MB
4MB	4MB			
4MB	4MB	4MB	8MB	8MB
4MB	4MB	4MB		
4MB	4MB	4MB	4MB	8MB
4MB	4MB	4MB	4MB	

NOTE: The order of placement of the boards in the chassis will be
determined by Customer Service when the memory is installed.

Any open slots between the memory boards indicated above
must remain unfilled.

Memory Interleaving

Like pairs of boards are needed to achieve interleaving with the following memories on 50 Series systems (except the 9750 and 9955): E7 (two .5MB boards provide 1MB of interleaving), E8 and E9.

When using E7, E8 or E9 memories with the 2550, 2655, 9650 or 9655, like pairs must always be used.

The following memories are self-interleaving, requiring only a single board. They are: MMW1-2MB, MMW1-2MT, MMW1-4MB, MMW1-4MT, MMW2-2MB, MMW2-4MB, MMW2-8MB.

The E9 board (MMW1-E9) is self-interleaving on the 2250 system.

TERMINALS

Both hardcopy and CRT display terminals are used with the 50 Series
systems. The terminals are further classified as system terminals and
user terminals, depending on how they are used and how they are
interfaced to the system (i.e., via the Diagnostic Processor, AMLC,
ICS1 or ICS2).

System Terminals

System terminals are configured as direct-connect devices or as remote
terminals (via asynchronous modems) to the Virtual Control Panel (VCP)
or Diagnostic Processor (described previously in this section).
Because the 2350 and 2450 systems (domestic units, U.S. and Canada)
have an imbedded modem, only one additional modem (Bell type number
103J, 103A3, 103F or 113 or equivalent) is required for remote
operation when communicating via the VCP (or diagnostic processor).
Two asynchronous Bell modems are required for all other 50 Series
processors.

User Terminals

User terminals are configured as direct-connect or remote devices (via
modems), and interface to the system via an AMLC, ICS1 or ICS2. For
local operation, the terminal may be connected directly to the
communications controller. Remote configurations require two
asynchronous Bell (Type Number 103J, 103A3, 103F or 113) or equivalent
modems, and an AMLC, ICS1 or ICS2 line. For cable configuration
information, please refer to Section 4. Specifications are provided
in Tables 2-4 and 2-5.

Prime's own user terminal, the PERFORMER (PT200), as well as the color
version (PT200M-C1 or C2), is compatible with all 50 Series CPUs
offered worldwide. The PT200 can be upgraded with a graphics option
(Model Number PT200A-GM); this option can be installed in the standard
monochromatic unit, as well as the color version. For information on
the installation of this option, please refer to the PT200 Graphics
Option Installation Instructions (FDR8717-1LA).

The proper procedure for connecting a PT200 to a 50 Series system is
the same as for any of the above-mentioned configurations. The PT200
does not come with any cables; therefore, be sure the appropriate
cables are ordered when ordering a terminal for new installation.
Because requirements vary, some customers using modems might need to
order two cables (one for CPU-to-modem and another for terminal-to
modem). Other users with terminals located close to the CPU will need
only one cable to connect the terminal directly.

A choice of several cables is available when installing or adding to
a terminal site, depending on the configuration. Some of the
alternatives are defined and illustrated on the following pages
(Figure 2-1, 2-2).

<u>User Terminals</u>   (continued)

A choice of several cables is available when installing or adding to a
terminal site, depending on the configuration. Some of the
alternatives are defined and illustrated on the following pages (see
Figures 2-1 and 2-2). Refer to Table 2-2 for terminal-to-host
connector specifications. This table describes the PT200 Terminal
Serial Main Connector Pin configurations. The signal names are given
with respect to the terminal.
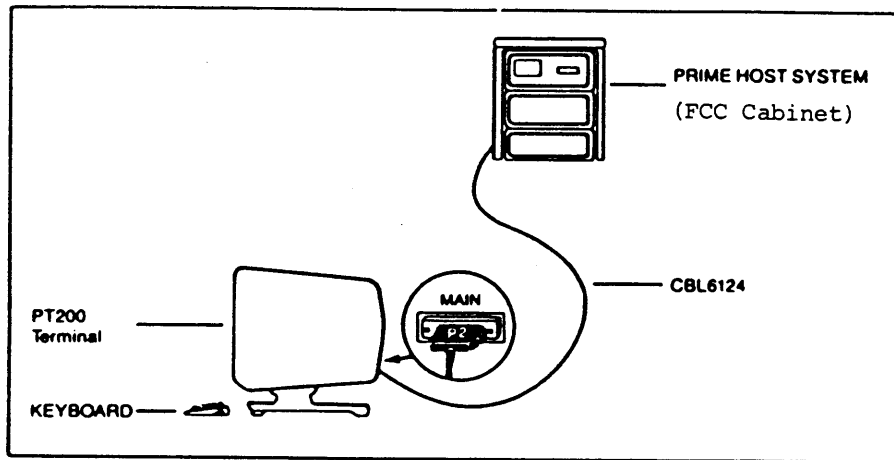
Figure 2-1. FCC Host Systems
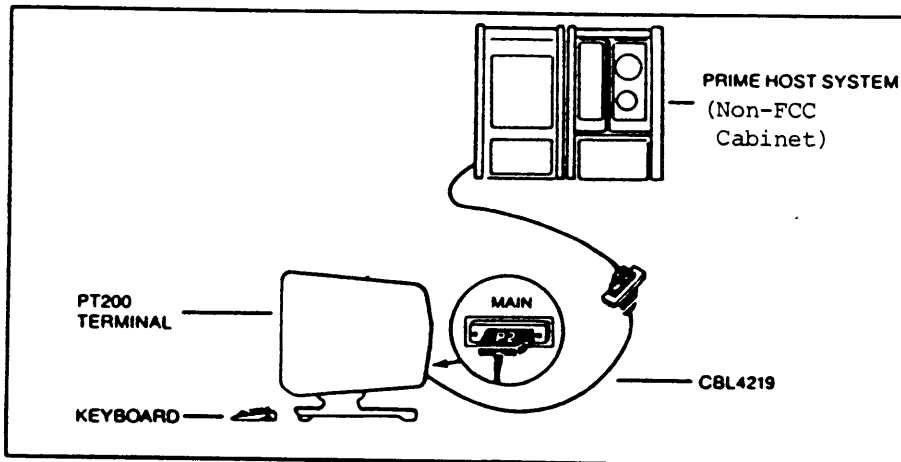
Figure 2-2. Non-FCC Host Systems

Printer-to-Terminal Cables

When connecting a printer, with a serial interface port, to the PT200
terminal, use a 9-pin D-type connector (male) with pin assignments
consistent with RS232C specifications. Prime's cable CBL6124 is
suitable for this use. The 9-pin end of this cable connects to the
terminal and the 25-pin end connects to the printer.
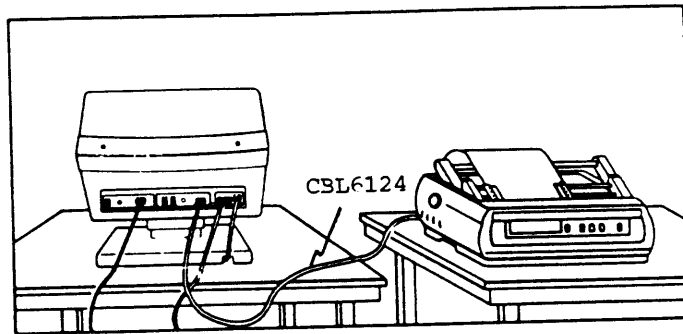
Figure 2-3. Printer-to-Terminal Cable

NOTE: Table 2-3 provides the specifications for a printer connector
        required for attachment to the PT200 terminal.

TABLE 2-2. TERMINAL SERIAL MAIN CONNECTOR PIN CONFIGURATION		
Pin Number	Description	Notes
J1-1	Protective Ground	
J1-2	Transmitted Data (negative)	TX
J1-3	Received Data (negative)	RX
J1-4	Request to Send (negative)	TX
J1-5	Clear to Send	RX
J1-6	Data Set Ready	RX
J1-7	Signal Ground (Common Return)	
J1-8	Received Line Signal Detector (DCD)	RX
J1-9	Transmitted Data (positive)	
J1-10	----	
J1-11	Request to Send (positive)	
J1-12	Data Terminal Ready (positive)	
J1-13	Received Data (positive)	
J1-14	Clear to Send (positive)	
J1-15	Transmission Signal Element Timing	RX
J1-16	DCD (positive)	
J1-17	Receive Signal Element Timing	RX
J1-18	----	
J1-19	----	
J1-20	Data Terminal Ready (negative)	TX
J1-21	Data Set Ready (positive)	
J1-22	----	
J1-23	----	
J1-24	Transmission Signal Element Timing	TX
J1-25	----	

TABLE 2-3. PT200 TERMINAL SERIAL PRINTER CONNECTOR PIN CONFIGURATION		
Pin Number	Description	Notes
J2-1	Protective Ground	
J2-2	Transmitted Data (negative)	TX
J2-3	Received Data (negative)	RX
J2-4	----	
J2-6	----	
J2-7	Signal Ground (common return)	
J2-8	----	
J2-9	----	

```
┌─────────────────────────────────────────────────────────────────┐
│        TABLE 2-4.  MODEL 3115F HARDCOPY TERMINAL SPECIFICATIONS    │
├──────────────────────────┬────────────────────────────────────────┤
│                          │                                        │
│ Data Transmission:       │                                        │
│     Code                 │ US ASCII                               │
│     Interface            │ EIA standard RS-232-C, asynchronous    │
│     Transmission Rate    │ Keyboard selectable at 110/300/1200 baud│
│     Mode of Operation    │ Full- or half-duplex                   │
│                          │                                        │
│ Functional Details:      │                                        │
│     Print Speed          │ 30 CPS (60 CPS catch-up mode)          │
│     Copies               │ Original and 2 copies                  │
│     Character Spacing    │ 10, 13.2, 15.6                         │
│     Line Spacing         │ 2, 3, 4, 6, 8 and 12 lines/inch        │
│     Line Length          │ 13.2 inches                            │
│     Character Set        │ 96 character set with upper and lower case│
│     Character Style      │ 9 x 7 dot matrix                       │
│     Ribbon               │ Cartridge                              │
│                          │                                        │
└──────────────────────────┴────────────────────────────────────────┘
```

TABLE 2-5. PT200 TERMINAL SPECIFICATIONS	
Monitor:	
Control:	Microprocessor
Type:	CRT
Screen Size:	355mm (14 in.) diagonal
Phosphur:	P31 (green) standard, P4 (white) optional, PC-124 (yellow) optional
Display Formats:	24 lines 80 characters/line 25th status line OR ... 27 lines 132 characters/line 28th status line
Display Memory:	1 or 2 pages (3840 characters maximum)
Character Size:	7 x 9 matrix (lower case w/descenders)
Character Set/Attributes:	
Character Set:	256 ASCII
Visual:	Normal, decreased intensity, underlining, blinking, blanking, reverse video, strike through
Cursor:	Underlining, blinking underline, or reverse video block
Communications:	
Line Interface:	EIA RS-232-C (CCITT V.24) No current loop
Transmission Mode:	Full/Half Duplex Block mode
Protocol:	XON/XOFF
Speed:	50 to 19.2K Bps
Operating Modes:	Character interactive or block mode
Keyboard:	Selectric layout, detached, 40 user programmable function keys, 15 key numeric keypad, cursor control keys, auto repeat
Printer Interface:	
Printer Port:	
Standard:	Rev. E or later
Interface:	Serial
Speeds:	Up to 19.2K Bps
Modes:	Screen drawing, pass through, transparent pass through
Printer Specifications:	XON/XOFF

PERFORMER PC Option

The PT200 terminal can be enhanced to include personal computer
functionality, with the optional PERFORMER PC Upgrade. To order the
dual diskette option, order Model Number PC200; the Winchester option
is PC210. Either of these can be added to the PT200 terminal, as a
direct connect local device. The interface between the PC Option and
the PT200 terminal consists of two circuit boards (which are installed
inside the PT200 chassis), two ribbon cables to connect the circuit
boards, and a daisy chain power cable. All of these required devices
are supplied with the PC upgrade option package; no additional cables
are required. For more information on the PERFORMER PC Option, please
refer to the PERFORMER PC Installation Guide (DOC 9714-1LA).

Cables for the PERFORMER PC Option

Printers can be connected to either the PT200 terminal, or to the
PERFORMER PC Multifunction board (which resides in one of the
PERFORMER PC chassis slots). A description of the physical connection
to either the terminal or the PERFORMER PC is detailed below.

   Printer-to-Terminal Cables

   When connecting a printer with a serial interface port to a PT200
   terminal, the 9-pin, D-type connector (male) supplied with the
   PC option must be used. This connector is consistent with the pin
   assignments for a PT200 Terminal Serial Printer Connector, shown
   in Figure 2-1 and described in Table 2-3. Refer to the
   accompanying Table 2-6 for printer configurations.

   Printer-to-PERFORMER PC Option Cables

   When connecting a printer to a PC200 or PC210, the PC option must
   first be upgraded with an expansion board to provide the necessary
   parallel interface port. The PERFORMER PC Multifunction Board
   (Model Number PC200A) has such a parallel interface port. A
   printer connector cable, consistent with the Centronics Parallel
   Configuration, is required. There parallel printer cables can be
   obtained from most personal computer vendors. Refer to Table 2-7
   for specifications. This table describes the Parallel I/O
   Connector Pin Assignments for the Prime Multifunction Board on the
   PERFORMER PC, with respect to the expansion board. For more
   information on the PC Multifunction Board, please refer to the
   PERFORMER PC Multifunction Board Installation Guide
   DOC 10074-1LA).

   Other third party-developed expansion boards may also be used for
   parallel printer connection, provided they have a similarly
   configured I/O port. Users should refer to Table 2-6 for printer
   compatibility.

Printer-to-PERFORMER PC Option Cables (continued)

Any serial printers would normally be connected to the terminal
with the cable supplied with the PC Option (please see previous
section entitled "Printer-to-Terminal Cables"). The Multifunction
Board also has a serial port. These serial printer cables can
also be obtained from most personal computer vendors. Keep in
mind that the version of DOS that is supplied with the PERFORMER
PC only supports a maximum of two serial ports. This means that
users cannot connect serial cables to the two serial ports on the
terminal and the serial port on the MULTIFUNCTION BOARD.

TABLE 2-6. PRINTER CONFIGURATIONS		
	PC MODE PRINTING	TERMINAL MODE PRINTING
Serial Printers	Epson or compatible; Must support CTS	Epson or compatible; must support CTS
Serial Cable	Supplied with PERFORMER PC Option	Same cable used for PC mode XON/XOFF
Parallel Printers	Epson/NEC or any IBM printer w/Centronics compatible connector	N/A
Parallel Cable	Available from local computer dealers	N/A
BOTH PC AND TERMINAL MODE PRINTING		
Serial Printers	Epson or compatible; must support simultaneous CTS and XON/OFF	
Serial Cable	Supplied with PERFORMER PC Option	
Parallel Printers	N/A	
Parallel Cable	N/A	

1. Serial printer port located at the back of the PT200.
2. Parallel printer port is included in the Memory Expansion Board sold by Prime.
3. CTS (Clear to Send) and XON/XOFF are printer protocols.

TABLE 2-7. PC EXPANSION BOARD PARALLEL PORT WIRING	
Pin Number	Description
Pin 1	Strobe
Pin 2	Data 0
Pin 3	Data 1
Pin 4	Data 2
Pin 5	Data 3
Pin 6	Data 4
Pin 7	Data 5
Pin 8	Data 6
Pin 9	Data 7
Pin 10	ACK
Pin 11	Busy
Pin 12	P. End
Pin 13	Select
Pin 14	Auto Feed
Pin 15	Error
Pin 16	Initialize
Pin 17	Select Input
Pin 18	Ground
Pin 19	Ground
Pin 20	Ground
Pin 21	Ground
Pin 22	Ground
Pin 23	Ground
Pin 24	Ground
Pin 25	Ground

DISK SUBSYSTEMS FOR THE 2250

Each 2250 system supports two types of fixed-media disk subsystems.
The first subsystem supports a maximum of one controller (Model 4004),
which can be configured with up to four devices. Four compatible
Winchester devices, with capacities of 68 and 158MB storage, can be
mixed on a single controller board. This controller has a micro-
processor with built-in self-check tests to insure system integrity.

The second subsystem supports a maximum of one controller (Model
4005), which can be configured with up to two Winchester 315MB drives.

2250 Disk Subsystems

All 2250 central system models with 68/158MB include a disk subsystem
with one drive. The first drive is mounted in the top section of the
2250 central system cabinet; the second drive is mounted in the middle
partition of the cabinet. Third and fourth drives are mounted in a
2250 expansion cabinet, which can be placed adjacent to the 2250
central system cabinet. The expansion cabinet is included with a
third drive. Systems with the 315MB disk mount the disk and tape in a
peripheral cabinet. The peripheral cabinet is included with the
initial system (Model Number 2250-019(-A)). A second 315MB disk
requires a second peripheral cabinet. The upper disk is removable
from either cabinet by taking the top off the cabinet and lifting the
drive unit out. The middle drive is removed by sliding it out the
rear of the cabinet.

Peripheral devices cannot be mounted in the main cabinet of the 2250
when 315MB disk drives are configured.

See Tables 2-8 and 2-9 for configuration information on the 2250 disk
subsystems. See Appendix A for the specifications for Product Numbers
4640, 4650 and 4475 disk subsystems.

NOTE 1:   158MB disk drives delivery was discontinued on 1/7/86.

NOTE 2:   See Appendix A for disk specifications.

CATEGORY I

TABLE 2-8. 2250 DISK SUBSYSTEM CONFIGURATION INFORMATION		
Device/Capability	Selectable Product Number	Device Description
Controller, first disk drive and cable	-	68MB or 158MB; included with 2250 central system.
Second drive and cable	4642-2250	68MB
Third drive, cabinet and cable	4643-2250	68MB
Fourth drive and cable	4644-2250	68MB
Second drive and cable	4652-2250	158MB*
Third drive, cabinet and cable	4653-2250	158MB*
Fourth drive and cable	4654-2250	158MB*
Also note that -A must be appended to the product number for 220 VAC, 50Hz operation.		

CATEGORY II

TABLE 2-9. 2250 DISK SUBSYSTEM CONFIGURATION INFORMATION		
Device/Capability	Selectable Product Number	Device Description
Controller, first disk drive, peripheral cabinet, and cable	-	315MB; included with 2250 central system.
Second drive and cable; requires second peripheral cabinet	4476L 7653L	315MB Peripheral Cabinet
* Discontinued products. Also note that -A must be appended to the product number for 220 VAC, 50Hz operation.		

DISK SUBSYSTEMS FOR THE 2350 AND 2450

Each 2350 and 2450 system supports two different types of Winchester
Disk drives (a 60MB device and a 120MB device). The first disk drive
is imbedded in each system. The second device is optional, and
connects to the same disk controller that supports the imbedded drive.
In addition, this disk controller supports the operation of a 60MB
device and a 120MB device concurrently, so that users can mix and
match drives to meet their needs.

2350 and 2450 Disk Subsystems

All 2350 and 2450 central systems include a disk subsystem with one
drive. The first drive is mounted directly inside the system cabinet;
the second drive is also mounted inside the system cabinet, next to
the first drive. There is no need for an expansion cabinet to support
these disk drives. These devices cannot be supported inside the
peripheral cabinet that houses the Streaming Magnetic Tape Drive
option.

The selectable product number for the second 60MB disk drive is 4711.
The selectable product number for the second 120MB disk drive is 4715.

DISK SUBSYSTEMS FOR 50 SERIES SYSTEMS (EXCEPT 2250, 2350 and 2450)

Each Prime 50 Series system supports a maximum of two disk subsystems; each subsystem can support a maximum of four drives. This means that a system can have a total of two disk controllers and eight drives. The FCC-compliant system cabinet has a bulkheading restriction of up to 64 AMLC lines with two disk controllers, or up to 32 AMLC lines with three or four disk controllers. ICS2 lines are required if these limits are exceeded.

At PRIMOS Rev. 19.3, 50 Series systems (refer to Section 1) will support a maximum of four subsystems and 16 drives. Two physical types of disk drives are available on Prime 50 Series systems:

- Free-standing

  Storage Module Disk (SMD):   80, 300MB
  Fixed-Media Disk (FMD):   675MB

- Cabinet-mounted (also called rack-mounted)

  Cartridge Module Disk (CMD):   32*, 64*, 96MB*
  Fixed-Media Disk (FMD):   160MB*, 315MB
  Fixed-Media Disk (FMD):   496MB

Both cabinet-mounted and free-standing drives can be part of the same subsystem. All of the above described disk drives are SMD interface, except the 496MB, which is SMD-E interface.

Burst-Mode

Product Number 4005 disk controllers have burst-mode capability; however, it should be noted that burst-mode I/O is an operating characteristic of the central processor, not of the disk subsystems. Burst-mode enables 64-bit data transfer, otherwise data is transferred in 16-bit packets. The 4005 disk controller supports all free-standing and cabinet-mounted disk drives listed above, except the 496MB fixed-media disk drive.

The 6580 disk controllers have burst-mode compatibility and are required to support the high data rates of the 496MB disk drives. The 6580 uses standard controller address options, and supports up to four drives using either an SMD or SMD-E interface. The 6580 supports a mix of SMD and SMD-E interfaced disk drives, concurrently. The 6580 controller does not require a controller upgrade for drives 2-4.

* Indicates discontinued products

Free-Standing Disk Drive Subsystems

The free-standing disk subsystems (available in 80MB, 300MB and 675MB
sizes) are shipped from the factory in separate containers and require
on-site installation. Refer to the Site Preparation Guide, (IDR5029)
for installation guidelines. See Table 2-10 for configuration
information. Specifications for free-standing drives are summarized
in Appendix A.

These subsystems are free-standing peripheral devices and are supplied
with their own cabinet(s) and necessary cables. Be sure to use the
appropriate type number when ordering. Equipment included as part of
the basic free-standing subsystem is the disk controller, selectable
type of disk drive, controller drive capability, required cables, disk
pack and cabinet.

TABLE 2-10. FREE-STANDING DISK SUBSYSTEM CONFIGURATION INFORMATION		
Device/Capability	Selectable Product Number	Device Description
Burst mode controller, first drive capability, first disk drive and cables	4461F 4471F 4491F	80MB SMD 300MB SMD 675MB FMD
Second drive capability, second drive*, cable	4462F 4472F 4492F	80MB SMD 300MB SMD 675MB FMD
Third drive capability, third drive*, cable	4463F 4473F 4493F	80MB SMD 300MB SMD 675MB FMD
Fourth drive capability, fourth drive*, cable	4464F 4474F 4494F	80MB SMD 300MB SMD 675MB FMD
Disk Packs (one supplied with removable media drives)	4246 4247	80MB SMD 300MB SMD
* Note: CMDs, 160MB* and 315MB FMDs may be added as the second, third and fourth devices. Also note that -A must be appended to the Product Number for 220 VAC, 50Hz operation.		

* Indicates discontinued product

Dual-Port Option "A Special"

The dual-port option allows two 50 Series systems to be physically
connected to one 80, 300, 315, 496 or 675MB device, as shown below:

```
  ┌─────────────────┐                        ┌─────────────────┐
  │    System A     │                        │    System B     │
  └─────────────────┘                        └─────────────────┘
             \                                      /
              \                                    /
               \                                  /
            ┌──────────────────────────────────────┐
            │              Dual-Ported              │
            │      80, 300, 315, 496 or 675MB       │
            └──────────────────────────────────────┘
```
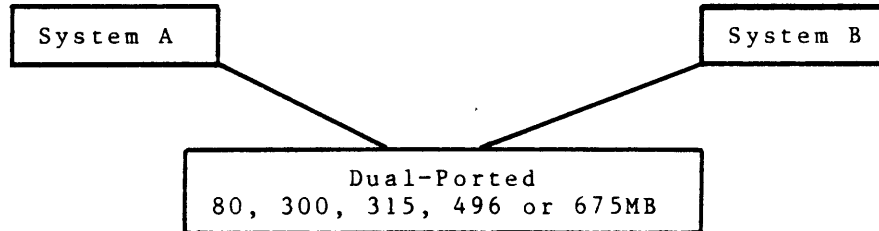
The dual-port capability is a hardware-only capability; PRIMOS does
not support true dual-porting. This option simply allows two systems
to be cabled to one storage module device; however, only one of the
systems can access the disk at a time.

Note that the dual-port option is quoted and configured as a special
only. Contact your Regional Systems Manager or the Custom Systems
Group at (617)-626-1700 for configuration, pricing and delivery
information.

Cabinet-Mounted Disk Drive Subsystems (CMDs* and FMDs)

Cabinet-mounted disk drives (CMDs and FMDs) are installed at the
factory and require no on-site installation. Add-ons to systems in
the field will require installation, unless ordered with a peripheral
cabinet. The 315MB FMD subsystem can also be mounted in the 2550 and
2655 office peripheral cabinet. These subsystems may be used
on all Prime 50 Series processors. The 496MB system is installable on
50 Series computer room systems only. Specifications are summarized
in Appendix A.

Equipment included as part of the basic system-packaged, cabinet-
mounted subsystem is the controller, selectable type of disk drive,
controller drive capability, required cables, disk pack (where
applicable) and peripheral cabinet. Add-on drives include controller
upgrade (if the 4005 disk controller is used), but no cabinet.

* CMDs are discontinued products

Configuring Cabinet-Mounted Disks (See Section 5 for more details)

When ordering as an add-on to a packaged system, cabinet-mounted disks
must be accompanied in one of the following ways:

- One CMD or 315MB FMD unit, or two 615MB FMD units can be
  mounted in each magnetic tape drive cabinet below the tape
  drive unit (except Product Numbers 4550F or 4551F).

- The 315MB FMD is the only disk subsystem supported on the
  2550/2655 in the office environment cabinet.

- If sufficient space is not available in existing peripheral
  cabinets, an additional peripheral cabinet must be ordered.

Expansion Rack-Mounted Disk Cabling

Additional cables are sometimes required when adding a second, third
or fourth rack-mounted expansion disk to a 4005 or 6580 controller
disk subsystem. This includes expansion disks added to new system
orders in the field (as well as existing systems), both FCC and
non-FCC configurations.

Expansion rack-mounted disks (315MB FMD, 496MB FMD, 160MB FMD,
32MB CMD, 64MB CMD and 96MB CMD) include a non-FCC cable with the
limited capability of being used only inside the disk peripheral
cabinet for connection to another rack-mounted disk in the same
cabinet. Becaue the daisy chain cable must connect to the previous
drive on the subsystem, this cable cannot be used when the previous
drive is not in the same cabinet.

Additional cables are needed when the rack-mounted expansion disk is
to be the first disk in a cabinet (computer room or office
environment, FCC or non-FCC) which requires connecting the daisy chain
cable to another disk outside the cabinet.

TABLE 2-11. CABINET-MOUNTED DISK SUBSYSTEM CONFIGURATION INFORMATION		
Device/Capability	Selectable Product Number	Device Description
Controller, first drive capability, first disk drive, disk cartridge pack (CMD) and cable	4421F +	32MB CMD
	4431F +	64MB CMD
	4441F +	96MB CMD
	4481F +	160MB FMD
	4475F	315MB FMD
	4475L **	315MB FMD
	4475S ***	315MB FMD
Second drive capability, second drive*, disk cartridge pack (CMD) and cable	4422F +	32MB CMD
	4432F +	64MB CMD
	4442F +	96MB CMD
	4482F +	160MB FMD
	4476F +	315MB FMD
	4476L **	315MB FMD
	4476S ***	315MB FMD
Third drive capability, third drive*, disk cartridge pack (CMD) and cable	4423F +	32MB CMD
	4433F +	64MB CMD
	4443F +	96MB CMD
	4483F +	160MB FMD
	4477F	315MB FMD
	4477L **	315MB FMD
	4477S ***	315MB FMD
Fourth drive capability, fourth drive*, disk cartridge pack (CMD) and cable	4424F +	32MB CMD
	4434F +	64MB CMD
	4444F +	96MB CMD
	4484F +	160MB FMD
	4478F	315MB FMD
	4478L **	315MB FMD
	4478S ***	315MB FMD
Removable Disk Cartridge for CMDs	4325	16MB

NOTES: * Storage Module Drives (SMDs) and 675MB FMDs may be added
          to the cabinet-mounted subsystem as the second, third and
          fourth devices.

          When part of a standard package, cabinet or cabinet-
          mounting is included.

       ** Note that the 315MB FMD mounts in the 7653L office
          peripheral cabinet, designated with -L suffix.

      *** Note that the 315MB FMD mounts in the 7654S peripheral
          cabinet, designated with -S suffix.

          Also note that -A must be appended to the product number
          for 220 VAC, 50Hz operation.

        + Discontinued products.

TABLE 2-12. 496MB FMD CABINET-MOUNTED DISK SUBSYSTEM CONFIGURATION INFORMATION	
Device/Capability	Selectable Product Number
Controller*, Left Disk Drive, Full Rack-Mounting Hardware, Cable	4735 (A, B, C)
Controller*, Right Disk Drive	4736 (A, B, C)
Left Disk Drive, Full Rack-Mounting Hardware	4737 (A, B, C)
Right Disk Drive	4738 (A, B, C)

*   496MB FMD requires the 6580 disk controller. The 6580 requires no controller upgrade for Drive 2-4.

A: Append Product Number with "S" for installation in 7564S peripheral cabinets, "F" for installation in FCC peripheral cabinets.

B: One controller and a maximum of two drives; one right, one left can be mounted in a FCC peripheral cabinet.

C: Append Product Number with "L" for installation in 7653L office peripheral cabinet.

NOTE: -A must be appended to the Product Number for 50Hz operation.

TABLE 2-13.   SUBSYSTEM SPECIFICATIONS

SPECIFICATIONS	32MB Product Number 442X	64MB Product Number 443X	96MB Product Number 444X
Operating Characteristics			
Bytes per Drive (formatted)	30.8MB	61.6MB	92.4MB
Bytes per Sector	2080	2080	2080
Sectors per Track	9	9	9
Tracks per Drive	1646	3292	4938
Cylinders per Drive	823	823	823
Avg. Latency Time (msec)	8.3	8.3	8.3
Minimum Seek Time (msec)	6	6	6
Average Seek Time (msec)	30	30	30
Maximum Seek Time (msec)	55	55	55
Transfer Rate (bytes/sec)	1.2MB	1.2MB	1.2MB

SPECIFICATIONS	160MB Product Number 448X	315MB Product Number 4475	496MB Product Number 4735
Operating Characteristics			
Bytes per Drive (formatted)	151MB	292.7MB	496MB
Bytes per Sector	2080	2080	2080
Sectors per Track	9	9	14
Tracks per Drive	8210	15367	17064
Cylinders per Drive	821	823	711
Avg. Latency Time (msec)	8.3	8.3	8.33
Minimum Seek Time (msec)	10	6	<5
Average Seek Time (msec)	30	25	20
Maximum Seek Time (msec)	55	50	45
Transfer Rate (bytes/sec)	1.2MB	1.2MB	1.8MB

NOTE: The "dual port" option is not available with the CMD or 160MB FMD devices.

MAGNETIC TAPE SUBSYSTEMS

Prime's 50 Series systems (except the 2350 and 2450) support the
magnetic tape transports shown in Table 2-14.

Type of Drive	Tracks	Speed (IPS)	Format	Density	Controller Slots	Model Number
NRZI/PE/ GCR	9	50	NRZI/PE/GCR ANSI	800/1600/ 6250	1	4590S
NRZI/PE	9	75	NRZI/PE, ANSI	800/1600	2	4522S
NRZI/PE	9	45	NRZI/PE, ANSI	800/1600	2	4520F*
NRZI	9	45	NRZI, ANSI	800/556	1	4512F*
NRZI	7	45	NRZI, ANSI	800/556	1	4510F*
Streamer	9 9 9	100 50 25	PE, ANSI PE, Non-Std. PE, ANSI	1600 3200 1600	1	4560F 4560L 4660S 4560-2250 (Note 2)
Cartridge	4	30	MFM	6400	1	4581F 4581L (Note 1)
Cartridge	9	90	QIC-24	8000	1	4585F

TABLE 2-14. MAGNETIC TAPE SUBSYSTEMS

Note 1: Subsystem available in packaged systems only on 2250 systems.

Note 2: Three speeds/two densities standard with device, and included in each model number.

*   Note that these tape products have been discontinued.

Configuring New Systems

The following rules should be noted when configuring tape subsystems:

1. A maximum of two tape subsystems may be configured on one CPU
   system. The subsystems may be identical or different.

2. Table 2-16 shows a complete list of possible combinations;
   other combinations will not function because of different
   formatter and cable requirements. (The streamer is not
   included in this table due to lack of space.)

3. The additional transport Product Numbers include all cables
   and hardware necessary to install a tape transport. Cartridge
   and streamer transport types require cabinet space; other
   transports include a cabinet.

TABLE 2-15. ADD-ON MODEL NUMBERS		
Transport Type	Product Number	Prerequisite
NRZI/PE	4529S	4520, 4520F, 4522, 4522F
NRZI/PE	4530S	4520F, 4522F, 4522S
NRZI/PE/GCR	4591S	4590, 4590F, 4590S, 4591, 4591F, 4591S
Cartridge Cartridge Cartridge	4582F 4583F 4584F	4581 or 4581F 4582 or 4582F 4583 or 4583F
Streamer Streamer Streamer Streamer	4561F 4561L 4661-2250 4661S	4560F/4561F 4560L 4660-2250 4660S
Also note that -A must be appended to the product number for 220 VAC, 50Hz operation.		

TABLE 2-16. POSSIBLE ADD-ON COMBINATIONS				
	SUBSYSTEMS			
ADD-ON	NRZI/PE 4520, 4520F 4520S, 4522, 4522F 4522S	GCR 4590F 4590S 4550F	Cartridge 4581 4581F	Streamer 4561F 4660S
75 IPS, 9 Track NRZI/PE	4529S 4530S	No	No	No
GCR	No No	4591S 4551S	No	No
Cartridge	No No	No	4582F 4583F 4584F	No
Streamer	No No	No	No	4561F 4661S

Configuring Additional Drives on Existing Systems

The key to successfully configuring additional drives on an existing system is to understand what the customer currently has installed.

The add-on package differs, depending on what is already installed in the existing system. Ordering a package which is close, but not exactly correct, will result in installation delays due to improper cabling, missing adapters and other similar problems. This section provides information which ensures that the proper add-on package is ordered. Table 2-17 lists the set of Product Numbers which may be used to add-on to a system containing a 41XX tape subsystem. If the CPU contains a 45XX tape subsystem, additional transports are ordered using one of the models listed in Tables 2-15 and 2-17. The following points are worth noting about Table 2-17:

1. Additional transports for subsystems 4170, 4171 and 4180 do not require specification of which transport is being ordered (second, third or fourth).

2. Additional transports to a 4190 subsystem must specify which transport is being added (second, third or fourth).

TABLE 2-17. ADD-ON NUMBERS FOR OLD PRODUCTS						
Product Number	Tracks	Speed	Format	Density	Comment	Prerequisite Subsystem ID
4521S	9	75	NRZI/PE	800/1600		4180
4542S	9	75	NRZI/PE	800/1600	2nd Drive	4190

Table 2-18 illustrates an add-on option, and can be used to select the correct Product Number for any customer.

TABLE 2-18. ADD-ON OPTIONS				
Add-On \ Installed Subsystem	7 Track 4170	NRZI Only 9 Track 4171	45 IPS NRZI/PE 4180	75 IPS NRZI/PE 4190
9-Track NRZI/PE 75 IPS	No	No	4521S	4542S

Ordering Examples

Example A:

   Customer "X" requires two 75 IPS NRZI/PE drives on a system being
   ordered.

Configuration:

   One 4522S subsystem and a 4530S add-on package (refer to Tables
   2-14 and 2-15).

Example B:

   Customer "Y" wants to add a second 75 IPS NRZI/PE drive to an
   existing 550 system (delivered before December 1980).

Configuration:

   Since the customer has a 75 IPS NRZI/PE drive installed before
   December 1980, it must be a 4190 tape subsystem. The correct
   add-on in this case, found in Tables 2-15 and 2-16, is a 4542S.

Example C:

   Customer "Z" has a 750 system delivered in Q1 of 1981, but doesn't
   know what type of 75 IPS NRZI/PE subsystem is installed, and wants
   a second 75 IPS NRZI/PE transport.

Configuration:

   Check shipping documentation and work with Customer Services to
   determine whether the customer has a 4190 or 4522 installed.
   Order accordingly (Table 2-14 or 2-15).

CARTRIDGE TAPE SUBSYSTEMS

2250

The 2250 system supports up to two cartridge tape subsystems. This
maximum configuration is only supported when the 4651-2250 subsystem
and the 4585F subsystem are both installed. No more than one of each
of these two cartridge tape subsystems may be configured. The
4651-2250 subsystem supports a maximum of two cartridge drives, and
the 4585F subsystem supports a maximum of one cartridge drive. The
4585F subsystem requires PRIMOS Rev. 20. or later.

Configuration Rules

Note the following rules when configuring cartridge tapes on a 2250
system:

   1. A maximum of two subsystems and three drives is allowed on a
       2250 system as noted above.

   2. The disk/tape controller is standard equipment on all 2250
       systems with 68MB/158MB disk drives, but is not standard
       equipment on Model 2250-019. Certain 2250 models are packaged
       with the first cartridge drive. The 4585F subsystem requires
       a separate unique controller which takes up an additional
       chassis slot.

   3. The 2250 central cabinet houses up to two drives. The 4585F
       subsystem comes with its own cabinet.

   4. Table 2-19 shows basic specifications and Product Numbers.

TABLE 2-19. 2250 CARTRIDGE TAPE SUBSYSTEM SPECIFICATIONS						
Product Number	Device	Speed (IPS)	Format	Density (BPI)	Controller Slots	Prerequisite
*	First	30	MFM	6400	1	2250
4651-2250	Add-On	30	MFM	6400	-	2250
4585F	Add-On	90	QIC-24	8000	1	2250

* 2250 systems include a dual-function disk/tape controller that
  supports up to two cartridge drives. If a cartridge tape is
  required, it should be ordered with the original system.

2350 and 2450

Each Prime 2350 and 2450 system supports one cartridge tape subsystem. This subsystem is housed in the central system cabinet. No additional cartridge tape drives may be added to this initial configuration.

2655

The 2655 system supports up to two cartridge tape subsystems. This maximum configuration is only supported when the 4581L subsystem and the 4585F subsystem are both installed. No more than one of each of these two cartridge tape subsystems may be configured. The 4581L and the 4585F subsystems support a maximum of one cartridge drive. The 4585F subsystem requires PRIMOS Rev. 20 or later.

Configuration Rules:

The following rules should be noted when configuring cartridge tape drives for 2655 systems.

1. A maximum of two subsystems and two drives is allowed on a 2655 system as noted above.

2. The 4581 cartridge tape subsystem is housed in the 2655 office peripheral cabinet, and the 4585F subsystem comes with its own cabinet.

3. The controller requires one slot in the I/O backplane.

4. The controller, device and cables are packaged as Prime Model Numbers 4581L and 4585F. Cabinet space must be provided for the 4581L device.

All Other Prime 50 Series Systems (not 2X50)

1. Up to two cartridge tape subsystems are permitted, with up to four devices on the 4581 subsystem controller, and one device on the 4585F subsystem controller. No more than one 4581 or 4585F subsystem controller may be configured. The 4585F subsystem requires PRIMOS Rev. 20 or later.

2. The controller requires one slot in the I/O backplane.

3. The 4581F subsystem controller, first device and cables are packaged as Prime Model Number 4581F. Cabinet space must be provided for the device. The 4585 subsystem controller, device, cables and cabinet are packaged as Prime Model Number 4585F.

4. Second, third and fourth 4581 add-on devices are, respectively, 4582F, 4583F and 4584F. Cables are supplied, but cabinet space must be provided for the devices.

STREAMING MAGNETIC TAPE SUBSYSTEM

The Prime Streaming Magnetic Tape Subsystem can be configured on any
50 Series machine running PRIMOS at Rev. 19.2 or later. This
requirement may be further restricted by system guidelines. Refer to
Section 1 for each system´s PRIMOS requirements.

2250

Models 4660-2250 and 4661-2250 are designed specifically for the Prime
2250. Model 4660-2250 subsystem includes a Prime 2250-style cabinet,
single-board streaming controller, device and cable. The second
device, Model 4661-2250, is mounted in the first device cabinet. Each
Prime 2250 system can support one streaming tape subsystem. The sub-
system supports a maximum of two streaming drives. 2250 disk drives
and streaming tapes cannot be mixed in the same 2250 cabinet.

Configuration Rules:

    1. 2250 systems may have a maximum of one streaming tape
        controller.

    2. The single-board controller is included on a 2250 system
        packaged with streaming tape.

    3. The 2250 streaming tape cabinet houses up to two drives.

2350 and 2450

The Streaming Magnetic Tape Subsystem may be ordered as an option to
any 2350 or 2450. The product selection number for this option is
4660T. This device comes with its own peripheral bay cabinet and
controller, which means that one of the central system option slots
must be used to support this tape drive. Only one optional device is
supported.

2655

The device is rack-mounted on the 2655. The subsystem consists of a
single-board streaming controller, device and cables. Note that the
subsystem does not include a cabinet. A maximum of one streaming tape
controller and two streaming devices are supported on the 2655. Order
Model 4560L for the subsystem and 4561L for the add-on device.

Configuration Rules:

  1. If no cabinet is available, cabinet Model 7653L must be
      ordered separately.

  2. The 2655 system may have a maximum of one streaming tape
      controller and two streaming tape drives.

  3. The single-board controller is included on a 2655 packaged
      with streaming tape.

  4. The 2655 office peripherals cabinet houses up to two drives.

50 Series Systems (except 2250, 2350, 2450 and 2655)

This device is rack-mounted in a 50 Series Option Cabinet. The Model
4560F and 4660S subsystem includes the drive and controller, but no
cabinet. Up to three drives can be configured per controller, with a
maximum of two controllers per 50 Series system. Up to three drives
can be mounted in the 7561F option cabinet, up to four in the 7564S.
One streaming tape drive may be mounted below a 75 IPS or Model
4590/91/51 GCR magnetic tape device. Streaming tape drives cannot be
mounted below a Model 4550 GCR magnetic tape devicee.

Configuration Rules:

  1. The subsystem does not include a cabinet.

  2. Up to three drives can be configured on a single controller.
      Non-2250/2550 systems support a maximum of two tape
      controllers of any combination (GCR, PE/NRZI, streamer, etc.).

  3. A maximum of three drives can be mounted in the 7651F
      peripheral cabinet, four in the 7564S cabinet. One streaming
      drive may be mounted below a 75/45 PE/NRZI tape drive.

  4. Streaming tape drives cannot be mounted below Model 4550 GCR
      tape drives.

TABLE 2-20. STREAMING MAGNETIC TAPE SUBSYSTEM			
Speed (IPS)		**Density (BPI)**	**Format**
25 50 100		1600 3200 1600	PE, ANSI PE PE, ANSI
Product Number	**Device**	**Controller Slots**	**Prerequisites**
4560F	First	1	50 Series system, (exc. 2250-2655), 7561F cabinet space
4560L	First	1	2655 system, cabinet space
4660S	First	1	50 Series system, (exc. 2250-2655), 7564S cabinet space
4660-2250	First	1	2250 system
4660T	First	1	2350 and 2450 systems
4561F	Add-on		4560F, FCC cabinet space
4561L	Add-on	-	4560L, cabinet space
4560S	Add-on	-	4560S, cabinet space
4661-2250	Add-on	-	4660-2250
Also note that -A must be appended to the product number for 220 VAC, 50Hz operation.			

PE/NRZI TAPE SUBSYSTEM

All 50 Series Systems (not for 2350 and 2450)

1. There are two controllers available: a two-board controller for
    PE/NRZI transports and a single-board controller for NRZI-only
    transports.

2. The maximum number of tape controllers per CPU system is two.

3. PE/NRZI transports are available at 75 or 45 ips speeds.

4. NRZI transports are available in 7-track or 9-track.

5. The first device includes controller, transport, cables and
    cabinet.

6. Add-on devices, to a maximum of four total devices per controller,
    include cables and cabinet.

7. There is space available in the cabinets for one additional
    peripheral.

8. Examine "prerequisites" column in the price book carefully to make
    sure the correct add-on tape transport is being ordered.

PE/GCR TAPE SUBSYSTEM

2250/2350/2450

The high-performance PE/GCR tape subsystem is not available on this
system, nor is GCR available for the 2350/2450 systems.

Other 50 Series Systems (including the 2655)

1. First device (4590S) includes controller, formatter, tranport,
    cables and cabinet. Extra space is provided in the cabinet for
    mounting additional peripherals.

2. Three additional add-on devices (4591S) are permitted, each
    supplied with cables and a cabinet. Space below the add-on drives
    is provided for mounting peripherals.

3. The maximum number of tape controllers per CPU system is two (of
    any type).

4. The PE/GCR tape controller cannot be used with PE/NRZI transports,
    streamers or cartridges.

5. For earlier (4550F) GCR subsystems, up to three add-on devices
    (4551S) are permitted, each supplied with cables and· a cabinet.
    There is space below the add-on drives for mounting peripherals.

UNIT RECORD SUBSYSTEMS

Unit record subsystems can be configured on any of the 50 Series
systems, except for the 2350 and 2450 systems (URC devices are not
supported by these systems), and can support a variety of line
printers and a 300 card-per-minute (CPM) card reader. Some of the
line printers supported include 200 LPM up to 1,000 LPM, with 64- or
96-character sets.

Each unit record subsystem is capable of supporting up to two line
printers and one card reader. No more than two line printers can be
supported by each subsystem, and there can be no more than two unit
record subsystems with any of the 50 Series systems.

More detailed information is provided in Table 2-21, and in the 50
Series systems description in Section 1. Specifications are provided
in Tables 2-22, 2-23 and 2-24.

TABLE 2-21. UNIT RECORD SUBSYSTEM CONFIGURATION INFORMATION

Device/ Capability	Selectable Product Number	Description
Controller and First Device	3320-2250, 3320F 3330-2250, 3330F 3166F 3324-2250, 3324F 3173-2250, 3173F 3334-2250, 3334F 3167F	300 LPM, 64 character, band 600 LPM, 64 character, band 1,000 LPM, 64 character, chain 200 LPM, 96 character, band 300 LPM, 96 character, matrix 450 LPM, 96 character, band 750 LPM, 96 character, chain
Second or Third Device*	3322-2250, 3322F 3332-2250, 3332F 3168F 3326-2250, 3326F 3174-2250, 3174F 3336-2250, 3336F 3172F 3159F	300 LPM, 64 character, band 600 LPM, 64 character, band 1,000 LPM, 64 character, chain 200 LPM, 96 character, band 300 LPM, 96 character, matrix 450 LPM, 96 character, band 750 LPM, 96 character, chain 300 CPM, card reader, 80 column

* NOTE: The three devices supported by the Unit Record Subsystem
         may only consist of two printers and one card reader.

NOTE: A -A must be appended to the type number for 220 VAC, 50Hz
       operation.

TABLE 2-22. CHAIN PRINTER SPECIFICATIONS		
First Device (Product Number) Second Device (Product Number)	3166F 3168F	3167F 3172F

Operating Characteristics:
  Operating Speed
  Printing Technique
  Character Set (ASCII)
  Paper Advance (Slew Rate)
  Form Feed Method
  Horizontal Character
  Spacing (char/inch)
  Form Widths (inches)
  Characters/line (max.)
  Lines/inch, vertical
	
	1,000 LPM
	Chain
	64
	40 IPS
	Tractors
	
	10
	3.5 - 19.5
	132
	6 or 8
		
		750 LPM
		Chain
		96
		40 IPS
		Tractors
		
		10
		3.5 - 19.5
		132
		6 or 8

TABLE 2-23.   BAND PRINTER SPECIFICATIONS

Operating Characteristics Character Set	Product Number			
	3320F/3320F 3320-2250 3322-2250 64 char.	3324F/3326F 3324-2250 3326-2350 96 char.	3330F/3332F 3330-2250 3332-2250 64 char.	3334F/3336F 3334-2250 3336-2250 96 char.
Print Rate (lines/min)	300	200	600	450
Print Columns	132	same	same	same
Horizontal Spacing	10 char/in	same	same	same
Vertical Line Spacing (switch selectable)	6-8 lines/in	same	same	same
Line Advance Time	25 msec	same	same	same
Paper Slew Speed	15 in/sec	same	same	same
Form Width	3 to 16 in 7.6 to 40.6 cm)	same	same	same
Format Control	electronic, 12 channel VFU	same	same	same
Paper Type	continuous fanfold, edge hole punched	same	same	same
Min. Paper Weight	15 lb bond	same	same	same
Multipart Forms	up to 6 parts 12 lb bond, single-shot 8 lb carbons	same same	same same	same same
Ribbon System length width	cont. loop 50 yds (15 m) 1 in (2.6 cm)	same	same	same
Band Life (impacts per character)	30 million (NOTE 1)	same	same	same
Ribbon Life (in characters)	20 million (NOTE 2)	same	same	same

NOTE 1:   Based on all characters and printing done with standard
          15 lb paper.
NOTE 2:   The number 20 million characters roughly equates to 15,000
          pages of typical EDP-type printing.

TABLE 2-24. CARD READER SPECIFICATIONS (3159F)	
Specifications	Description

Operating Characteristics:
  Number of Columns
  Reading Speed
  Hopper/Stacker Capacity
	
	80
	300 CPM, maximum
	550 cards of 7 mil thickness

SERIAL INTERFACE DEVICES

Printers requiring serial interfaces to connect to the VCP, AMLC, or ICS1/2/3 are not part of unit record subsystems. Table 2-25 provides information on serial interface devices.

TABLE 2-25. SERIAL INTERFACE DEVICES		
Product Number	Requirements	Description
3115F	VCP, AMLC, or ICS1 or ICS2/3	30-60, serial matrix, keyboard
3126F	AMLC, ICS1/2/3	300 LPM/96 char, matrix LP/plotter
3350F	AMLC, ICS1/2/3	200 CPS (bidirectional), receive-only, serial matrix
3351F	AMLC, ICS1/2/3	200 CPS (bidirectional), keyboard send/receive, serial matrix
3185	AMLC, ICS1/2/3	55 CPS (bidirectional), 96 char, letter quality printer

PAPER TAPE DEVICE CABLE REQUIREMENTS (Not available with FCC-compliant systems)

Cables for the Paper Tape Reader and Paper Tape Reader/Punch devices are not supplied with the devices and must be ordered as a separate line item. The Product Number 3006 controller is required for the Paper Tape devices, and must be ordered separately.

TABLE 2-26. PAPER DEVICE CABLE REQUIREMENTS	
Device	Cables(s) Required
Paper Tape Reader (Product No. 3121)	CBL1451
Paper Tape Reader/Punch (Product No. 3122)	CBL1432 and CBL1451
Paper Tape Reader/Punch (Product No. 3123)	CBL1432 and CBL1451

SECTION 3

SOFTWARE CONFIGURATION REQUIREMENTS

All 50 Series systems offer a complete set of sophisticated software development tools. A number of industry-standard language compilers, text editors, utilities, data management and data communications software products are available.

OPERATING SYSTEM

PRIMOS is required to operate any 50 Series, P350, P400 or P500 CPU. A minimum of 1/2MB of physical memory is required. The license to use PRIMOS (executable) is included in the purchase price of any Prime CPU. See "PRIMOS Licensing" below for specific details on PRIMOS licensing.

PRIMIX is available for those users requiring UNIX functionality on Prime hardware. PRIMIX is co-resident with PRIMOS, and thus allows a synergetic relationship between the two operating systems. PRIMIX requires PRIMOS Rev. 19.4.5 or later. For more information on PRIMIX, please refer to the PRIMIX Sales Guide (SOU-7113-000).

PRIMOS Licensing

The price of all system packages includes an execute-only license to PRIMOS. Older system packages also included a source license bundled with the system. Upgrades to the 2350, 2450, 9655, 9755 and 9955 II will NOT include the cost of re-licensing PRIMOS Source Code. Because of this, customers upgrading to these systems will not be receiving PRIMOS Source Code in their upgrade packages. If a requirement exists for PRIMOS Source Code, or PRIMOS Utilities Source Code, it must be purchased as a separate line item (order model numbers 8503A-P or 8503B-P).

Customers who have previously purchased PRIMOS Source Code as a separate line item (NOT bundled with the system), will be relicensed when they upgrade to a new system, at no extra charge.

Please refer to PPA 320 for additional information on ordering PRIMOS Source Code and Source Code maintenance charges.

LANGUAGES & PROGRAMMING AIDS

Prime currently supports PRIMOS Revisions 19.4 and 20.0. All of the
following languages and programming aids are supported on these
revisions.

A number of high-level language compilers and program development
products may be ordered with any 50 Series system. These include
FORTRAN-77, FORTRAN-66, BASIC/VM, PL/I, PL/I Subset G, Pascal,
COBOL-74, C and RPG II. Program and system development aids include
the Source Level Debugger, the Forms Management System (FORMS) and the
EMACS Programmable Full Screen Editor.

FORTRAN-77 (F77) - ANS X3.9-1978

FORTRAN-77 supports compilation and execution of programs on any
properly configured 50 Series system.

FORTRAN-66 (FTN)

FORTRAN-66 supports compilation and execution of programs on any
properly configured 50 Series system.

BASIC/VM (BASICV) - ANS X3.60-1978

BASIC/VM supports compilation and execution of programs on any
properly configured 50 Series system.

PL/I - ANS X3.53-1976

PL/I supports compilation and execution of programs on any properly
configured 50 Series system.

PL/I Subset G (PLIG)

PL/I Subset G supports compilation and execution of programs on any
properly configured 50 Series system.

COBOL-74 (CBL) ANS X3.23-1974

COBOL-74 supports compilation and execution of programs on any
properly configured 50 Series system.

RPG II

RPG II supports compilation and execution of programs on any properly
configured 50 Series system.

Pascal - ANSI/IEEE 770X3.97-1983

Pascal supports compilation and execution of programs on any properly
configured 50 Series system.

LANGUAGES & PROGRAMMING AIDS (continued)

C

C supports compilation and execution of programs on any properly
configured 50 Series system.

Source Level Debugger (DBG)

The Source Level Debugger is a language-independent debugging tool.
It will operate on any properly configured 50 Series system. The
Source Level Debugger can be used with C, COBOL-74 (CBL), FORTRAN-66,
FORTRAN-77, Pascal, PL/I, PL/I Subset G, and the RPG II Compiler.

Prime EMACS

Prime EMACS is a, full screen display editor, useful for both text
entry and programming. It will operate on any properly configured 50
Series system and has special FORTRAN, COBOL and RPG modes.

Prime EMACS is compatible with all Prime terminals (in character-mode)
and with many other terminals.

CORE DATA MANAGEMENT PRODUCTS

Core Data Management products available with the 50 Series systems
include the data managers: MIDASPLUS, PRISAM, Prime ORACLE and Prime
DBMS. Supporting query and reporting products include: DISCOVER and
PRIME/POWER+. For forms creation and management, FORMS and FORMS with
FED, complete Prime's Core Data Management product offerings.

MIDASPLUS (Multiple Index Data Access System)

MIDASPLUS is a data management software system that will operate on
any properly configured 50 Series system. It allows the creation of
and access to multi-key files, either directly or through program
interface.

MIDASPLUS requires Rev. 18.3 or later of PRIMOS. MIDASPLUS files are
accessible to application programs written in FORTRAN 66, FORTRAN 77,
COBOL, COBOL 74, BASIC/VM, PL1/G (with single-key support), Pascal, C,
RPG II Interpreter and the RPG II V-Mode Compiler. MIDASPLUS data
can also be accessed through the PRIME/POWER+ query product. It
requires .75MB of memory, plus 1MB per 24 active users using program
interface.

When properly positioned, MIDASPLUS offers the best performance of all
Prime's data management products. It is highly competitive with other
vendor's similar ISAM offerings.

PRISAM (Prime's Recoverable Index Sequential Access Method)

The PRISAM product is a recovery-based, simple ISAM data modeler. It
has been designed for the application that requires all the benefits
of a transaction-oriented data manager, without the complexity of a
DBMS. It utilizes the same Recovery-Oriented Access Method (ROAM) to
manage recovery and concurrency contral as Prime DBMS.

A good guideline for configuring PRISAM is .75MB of main memory, plus
1MB of memory for each 8-10 users. PRISAM supports indexed,
sequential and relative files. Access to these files is provided
through COBOL using high-level COBOL statements, through a call-level
interface to any Prime language that supports calls, and through the
DISCOVER query and report writer.

PRISAM runs on any properly configured 50 Series system, and requires
Rev. 19.2.7 or later of PRIMOS.

CORE DATA MANAGEMENT PRODUCTS (continued)

Prime ORACLE

Prime ORACLE is Prime's new fully relational database management
system, based on IBM's SQL language syntax. When properly configured,
Prime ORACLE runs on all 50 Series systems, as well as on the
PERFORMER PC Option, and IBM PC/XT and PC/ATs.

The English-like, non-procedural and multi-function SQL language
provides layers of increasing complexity, thus supporting both simple
end-user database queries, and providing a basis for production
application development. All SQL functions can be used interactively
from the terminal, or imbedded in programming languages such as
FORTRAN, COBOL or C.

Prime ORACLE for the 50 Series requires PRIMOS Rev. 19.4 or later.
Initial experiences suggest that Prime ORACLE users should allow up to
.75MB of main memory for the kernal, plus an additional .2MB per user
beyond normal requirments for the operating system and other software.

Prime ORACLE for the PC requires MS-DOS/PC-DOS Rev. 2.1 or higher,
with 512KB of main memory and 5MB of hard disk storage.

For additional information regarding Prime ORACLE, please refer to the
Prime ORACLE Sales Guide (SOU-7304-000), the 50 Series Announcement
(PPA 309R), the PC Announcement (PPA 314) and the Configuration/
Performance Marketing Notice (PMN 310).

Prime DBMS (Database Management Systems)

Prime DBMS runs on any properly configured 50 Series system and
requires Rev. 15 or later of PRIMOS. It uses the Recovery-Oriented
Access Method (ROAM) to manage recovery and concurrency control.
Prime DBMS with ROAM runs only at Rev. 19.2.7 and later of PRIMOS.

A rule of thumb for Prime DBMS configuration is that it requires 1MB
of main memory, plus approximately 100KB per user. Performance of
Prime DBMS applications tends to be sensitive to changes in CPU model.

The 2350 and 2450 systems must be configured with the Streaming
Magnetic Tape Drive option in order to take full advantage of the ROAM
facility, and to maximize performance. DBMS will not be supported by
the cartridge tape drive embedded in the 2350 and 2450.

Prime DBMS is compatible with the Prime host languages FORTRAN and
COBOL.

PRIME/POWER+

PRIME/POWER+ is a user-oriented data query and reporting language that runs on any properly configured 50 Series system. It is based on an English language command system designed for on-line data management, and is designed as an end-user tool for ad hoc queries and non-production reporting.

PRIME/POWER+ requires Rev. 16 or later of PRIMOS. It will support MIDAS, MIDASPLUS, SAM and DAM file types. It requires a minimum of .75MB of main memory, plus 1MB of memory per 20 PRIME/POWER+ users.

PRIME/POWER+ is memory and CPU performance sensitive; therefore, be sure that adequate CPU and memory are available for customers who plan to use it. In addition, PRIME/POWER+ users may tend to use more disk storage than initially anticipated. Be sure that the user orders an adequate number of disk devices.

FORMS and FORMS FED (Forms Management System)

The Forms Management System (FORMS) supports compilation and execution of programs on any properly configured 50 Series system with the appropriate terminals. FORMS applications can be developed for PT200s, OWL 1200s, PT45s, IBM 3277s or other terminals. FORMS requires Rev. 15 or later of PRIMOS.

FORMS can communicate with applications written in any of the standard Prime languages, including FORTRAN 66, FORTRAN 77, COBOL, COBOL 74, RPG II, PLI/G and Macro Assembler.

FORMS Editor (FED) is a forms creation facility. It can be used with the PT45 and PRIMOS Rev. 18.2. or later. FED is also available for use with the PT200 and PRIMOS Rev. 19.4 or later. For additional information on Data Management products, please refer to the Data Management Comprehensive Sales guide (SOU-7301-000).

PRIMEWAY Transaction Development and Management System

The PRIMEWAY Transaction Development and Management System provides
the data processing departments of large companies with the tools
necessary to build, run and maintain online transaction processing
applications. Integrated with PRIMEWAY are COBOL, Prime DBMS, PRISAM
and PRIMENET, as well as many very powerful tools for the development
and maintenance of online transaction systems (especially Distributed
Transaction Processing Applications).

By providing prototyping, data management, forms handling, networking,
code generation, automated librarian and documentation, a transaction
processing monitor, administrative tools, extensive security, and
built-in recovery among its many features, PRIMEWAY helps the customer
to achieve significant programmer and processing productivity. The
Integrated Development Environment of PRIMEWAY allows the customer to
better control their development; cut the length of the development
cycle, and produce a better system. This environment also provides
the control, documentation and tools to reduce the time and effort of
maintaining these systems. The distributed transaction processing
capabilitites of PRIMEWAY not only significantly increase the
productivity of developing such systems, but also the facilities to
run the application in a distributed, recoverable fashion.

For traditional transaction processing applications, PRIMEWAY provides
a very competitive solution for companies with revenue in excess of
$100 million, as well as Federal, State and large city government.

For additional marketing information on PRIMEWAY, please refer to the
Data Management Comprehensive Sales Guide (SOU-7301-000) and the
PRIMEWAY Sales Guide (SOU-5204-000). The Introduction to PRIMEWAY
Manual (DOC 8973-1PA) is an excellent reference, as well as sales,
tool. Further assistance may also be obtained by calling the PRIMEWAY
Marketing Group in Prime Park.

Prime INFORMATION

Prime INFORMATION is a fourth-generation, relationally-based, fully-distributed data management product. It offers a highly-productive environment, designed to aid the end-user and application developer alike. It also provides a structured data entry facility, a powerful English-like query language, an integrated data dictionary, a user-defined vocabulary, a powerful high-level programming language (INFO/BASIC) and an extensive on-line help facility. The file structure features hashed keyed access to data records, support for single-valued and multi-valued fields, and variable length data storage at all levels.

SIMPLE and CONNECTION are complementary products to Prime INFORMATION. SIMPLE is an application development and prototyping tool with sophisticated functions, such as cross-reference file creation and maintenance, formatted data entry screens, local and remote database update and backout, customized reports up to 132 columns and automated documentation.

CONNECTION is a decision support system that contains word processing, spreadsheet and graphics modules, all fully-integrated among them-selves and with Prime INFORMATION.

Prime INFORMATION runs with PRIMOS on the entire 50 Series family. The 2350, 2450, 2655 and 9655 also offer microcode that improves its performance. New functionlity on Release 6.0 includes the ability to call subroutines written in languages other than INFO/BASIC, a MIDASPLUS interface, new internationalized date and monetary formats, support for the PT200 terminal and recovery assist. PRIMOS Rev. 19.1, 19.2 and 19.3 require Release 5.4 of Prime INFORMATION. The minimum configuration would consist of a Prime 2350 with 2MB memory and two 60MB disk drives. The 9955 can be configured with 8-16MB memory and 4-8MB disk drives (at least two disk controllers), with support for between 64 and 200 users.

In the U.S., Prime INFORMATION is sold through our direct sales force and indirect sales channels. Outside the U.S., it is sold directly through our subsidiaries and international Distributors.

A wide variety of off-the-shelf application software is available from third party vendors for virtually any vertical market or horizontal application.

For additional information about Prime INFORMATION, please refer to the Prime INFORMATION Sales Guide (SOU-5101-000).

OAS (Office Automation System)

Prime's Office Automation System (OAS) addresses the broad-range of tasks that are an essential part of most offices. It combines electronic mail, appointment scheduling, word processing, and electronic filing and retrieval in one integrated software package.

OAS is composed of three menu-driven modules: Management Communications and Support (MCS), Word Processing (WP) and Advanced Text Management (ATM). MCS helps office workers distribute documents and notes, arrange schedules, make appointments and produce a variety of reports. WP is designed for creating or modifying documents of any size, and ATM provides further word processing capabilities, including proofreading and automatic hyphenation.

Other features of OAS include a powerful import/export capability, allowing text and data to be easily moved between office automation and data processing environments. It provides access to Prime Timer, which displays a three-month calendar and 24-hour clock, and scans the intray notifying users of new mail. The Timer can also send alarms and "ticklers" to remind users of important events or upcoming meetings.

OAS is also integrated with other products. Prime INFORMATION data can be directly incorporated into an OAS document, taking advantage of OAS list processing facilities. OAS documents can also be transferred in an editable format to the PERFORMER workstation for word processing.

OAS will run on any properly configured 50 Series system. The following terminals and workstations support OAS: PT200, PST100, PT65 and PT45 terminals, and the PERFORMER and PRODUCER workstations. All are designed to increase the flexibility and ease-of-use of Prime OAS, provide access to such facilities as communications and data processing, and act as a window into the 50 Series computer systems.

SECTION 4

COMMUNICATIONS HARDWARE, CABLES AND SOFTWARE

This section includes information related to communications hardware,
cables and software. Information on Terminals is found in Section 2.
For your convenience, a description of each product and its functions
are included. Revision dependencies are listed, along with configura-
tion information for related products.

COMMUNICATIONS HARDWARE SUBSYSTEMS

Prime offers several different communications hardware subsystems for
the 50 Series which can be configured in a variety of ways. Generally,
the use of one communications hardware subsystem does not preclude the
addition of another or more advanced subsystems in the future. This
compatibility protects the customer's investment and allows an easy
upgrade path to state-of-the-art communications capabilities. Table
4-1 shows the communications hardware subsystems currently available:

TABLE 4-1. COMMUNICATIONS HARDWARE SUBSYSTEMS	
SUBSYSTEM	COMMUNICATIONS TYPE *
Intelligent Communications Subsystem/3 (ICS3)	sync, async
Intelligent Communications Subsystem Model/2 (ICS2)	sync, async
Intelligent Communications Subsystem Model/1 (ICS1)	sync, async
Asynchronous Multi-Line Controller (AMLC)	async
Multi-Line Data Link Controller (MDLC)	sync
PRIMENET Node Controller (PNC)	RINGNET

* sync   - synchronous communication
   async   - asynchronous communication
   RINGNET - Provides RINGNET Local Area Network support	

This section covers the following aspects of hardware communications
subsystems:

    1.   Features and Functions

    2.   Configuration Information

    3.   Housing Information

Features and Functions

Briefly review the information contained in Table 4-2, as the material
is referenced frequently throughout the remainder of this section.

Please note the keys in Table 4-2 (i.e., al, bl, and d3). These keys
reference, later in this section, which controllers support different
communications products, CPUs, protocols and line speeds.

TABLE 4-2. COMMUNICATIONS CONTROLLERS		
INTELLIGENT COMMUNICATIONS SUBSYSTEM CONTROLLERS		
Product Number	Key	Provides:
5181 5181FP 5181F 5181L 5181-2250 5181T	a1 a1 a1 a1 a1 a1	ICS1: Support for (8) V.24/RS232 async and (1) V.24/RS232 sync line. Requires PRIMOS Rev. 19.1 or later. PRIMOS Rev. 19.1 (2780/3780/HASP); PRIMOS Rev. 19.3 (X.25 full-duplex HDLC PRIMENET).
5242 5242F 5242L 5242S	b1 b1 b1	ICS2: Async-only version. Basic configuration supports (16) V.24/RS-232 async lines; can be expanded to support 64 async lines. Requires PRIMOS Rev. 19.2 or later. Not available for 2350 or 2450.
5725 5725L 5725F 5725FP 5725-2250	f1 f1 f1 f1 f1	ICS3: ICS3 model with ICS2-style card cage. Order async and sync CLAC204/502/522s to make operational. Requires PRIMOS Rev. 20.1. Not for use in 2350/2450 systems or 7564S peripheral cabinets.
5730T	f2	8-slot version that mounts in 2350 and 2450 system cabinets. Use CLAC304/602/ or 622s to make operational. Requires PRIMOS Rev. 20.1.
5735S	f3	16-slot version that mounts directly on the 7564S peripheral cabinet. Use CLAC304/602 or 622s to make operational.
PRIMENET NODE CONTROLLER II (PNC II)		
7042 7042F 7042L 7042-2250 7042T	c1 c1 c1 c1 c1	PRIMENET Node Controller (PNC) for use in creating a RINGNET network. Allows a PRIMENET system to connect with up to 128 other PRIMENET systems over a 10m bps LAN, using token pass control. Includes internal cabling and standard RINGNET junction box. RINGNET twin-ax cable for interconnecting each system must be ordered separately.
-continued on next page-		

TABLE 4-2. COMMUNICATIONS CONTROLLERS (continued)		
AMLC CONTROLLERS		
5154 5154F 5154-2250 5154L 5154FP 5154T	d1 d1 d1 d1 d1 d1	(16) V.24/RS-232 high-performance async lines. Speeds up to 19,200 bps with standard data set control. Suitable for connecting full-duplex modems, terminals and serial printers. Requires PRIMOS Rev. 15 or later.
5174 5174F 5174-2550 5174L 5174FP	d2 d2 d2 d2 d2	(16) 20-milliamp (ma) current-loop async lines. Speeds up to 19,200 bps. Suitable for connecting terminals (tty-type) and serial printers. Requires PRIMOS Rev. 15 or later.
5175 5175F 5175-2250 5175L 5175FP	d3 d3 d3 d3 d3	(8) V.24/RS232 and (8) 20ma current-loop async lines. Combination of AMLC 5154 and AMLC 5174 interfaces. Requires PRIMOS Rev. 15 or later.
MDLC Controllers		
5602 5602F 5602-2250 5602L 5602T	e1 e1 e1 e1	(2) V.24/RS232 sync lines. Speeds up to 19,200 bps. Used to interface to most synchonrous modems and devices. One firmware option kit must be ordered for each MDLC. Requires PRIMOS Rev. 16.4 or later.
5622 5622F 5622L 5622T	e2 e2 e2	(2) V.35/DDS sync lines. Speeds up to 64,000 bps. Interfaces with high-speed data adapter units, devices and satellite networks. Order one firmware protocol option kit with each MDLC. Requires PRIMOS Rev. 16.4 or later.
MDLC SUBSYSTEM OPTIONS		
5604	e3	2-line expansion kit for 5602 or 5622. Provides two additional VS.24/RS232C lines. Must be factory installed when 5622 or 5602 is ordered. Not available on the 2350 or 2450.
5624	e4	2-line expansion kit for 5602 or 5622. Provides two additional V.35/DDS lines. Must be factory installed when 5622 or 5602 is ordered. Not available on a 2250, 2350 or 2450.
- continued on next page -		

TABLE 4-2. COMMUNICATIONS CONTROLLERS (continued)		
MDLC SUBSYSTEM OPTIONS		
The following options provide on-board firmware support for protocol mixes. The protocols are installed at the factory and must be ordered with the MDLC. See the Communications Software section for information regarding firmware options for each product.		
5646	e5	Bisync (2780/3780/HASP; DPTX; Half-duplex PRIMENET) and HDLC protocols
5650	e6	Bisync and 200UT and Univac 1004 and ICL 7020 and XBM and T$SLC protocols.
5651	e7	HDLC and 200UT and Univac 1004 and ICL 7020 and XBM protocols
5654	e8	Bisync and GRTS protocol
NOTE: Model numbers are explained on following page		

One or more suffixes appended to the model number indicates the style
of the cabinet and its electrical requirements. It is important to
use the correct suffix to indicate the type of cabinet a subsystem
will be housed in; this assures that the correct internal cables and
mounting hardware are shipped with the system.

Valid first and second suffixes are:

First Suffixes

There are now seven first suffixes for communication controller
Product Numbers. These are described below, where XXXX depicts
the base four-digit Product Number. Note that the correct suffix
ensures that the proper internal cabling and I/O bulkhead
connection are supplied.

1) XXXX

No suffix: Used when ordering communications controllers for
systems in non-FCC compliant cabinets. Systems for which this
Product Number should be used are limited to all non-FCC compliant
systems. All systems shipped before July 12, 1983 were non-FCC
compliant.

2) XXXXF

"F" suffix: Used when ordering communications controllers for
systems in FCC-compliant cabinets (except 2250, 2550 and 2655)
which DO NOT support modular panels. Systems shipped between
July 12, 1983 and January, 1985 do not support modular panels.
More information on cabling is provided later in this section.

3) XXXXFP

"FP" suffix: Used when ordering certain communications
controllers for systems in the second version of FCC-compliant
cabinets. These were available after January 1, 1985 and before
April 22, 1986.) This is not for use on 2250, 2550 or 2655
cabinets, which DO support modular panels. More information
on cabling is provided later in this section.

4) XXXXL

"L" suffix: Used when ordering communications controllers for
2550 and 2655 systems.

5) XXXX-2250

"-2250" suffix: Used when ordering communications controllers
for 2250 systems.

6)   XXXXT

"T" suffix: Used when ordering communications controllers for
the 2350 or 2450.

7)   XXXXS

"S" suffix: Used when ordering ICS2s and ICS3s for 9X5X systems
in FCC- compliant cabinets shipped AFTER April 28, 1986 in Model
7564S peripheral cabinets.

Valid second suffixes are:

1)   XXXX-A

     System is for 50Hz/220V electrical current only. Three
     communications products require this second suffix: the ICS2
     starter kit (5242), ICS3 5725/5735 and the ICS2 capacity
     expansion kit (CLAC808).

Example: 5154L

16-line AMLC (V.24/RS-232) for use with system in a lowboy,
FCC-compliant cabinet, such as the 2655.

Example: 5725L-A

ICS3 for use with a 2655 system with modular bulkheads in a lowboy
cabinet. The subsystem uses 50Hz/220V current.

Example: 5735S-A

ICS3 for use with a 9X5X system in a 7564S peripheral cabinet. The
subsystem uses 50Hz/220V current.

INTELLIGENT COMMUNICATIONS SUBSYSTEM CONTROLLER/1 (ICS1)

The ICS1 is a single-board controller that supports eight asynchronous lines and one synchronous communications line. It is fully compatible with all other line controllers. PRIMOS supports a maximum of four ICS1 controllers per system.

Like the older AMLC, each of the asynchronous lines on the ICS1 provide V.24/RS232 interfaces used to attach terminals, serial printers and modems to a Prime system. The maximum speed of these lines is 9600 bits per second (bps). Bits per second is used in this document as a synonymn for baud.

The ICS1 synchronous V.24/RS232 line supports the following:

    1.   PRIMENET full-duplex HDLC connections

    2.   EMX80 for IBM 2780/3780 protocols

    3.   EMHASP for IBM HASP protocols

When used with RJE, the ICS1 supports full- and half-duplex data links at speeds up to 4800 bps. When half-duplex (also known as dial-up or switched) RJE is used, the ICS1 requires that the modem provides a minimum Request-to-Send to Clear-to-Send (RTS/CTS) delay of 8.5 milliseconds (ms).

When used with PRIMENET, the ICS1 supports full-duplex connections to packet-switched data networks (PSDNs) and to other PRIMENET systems. ICS1 PRIMENET connections are HDLC-framed only and can operate at data link speeds up to 9600 bps. The ICS1 does not support half-duplex PRIMENET connections.

PRIMOS Rev. 19.1 and later support ICS1 async and RJE communications; PRIMOS Rev. 19.3 and later support full-duplex PRIMENET communications on the ICS1.

+---+
| SPECIAL 2250 NOTE |
+---+
| The 2250 system requires ICS1 hardware to perform I/O |
| bus parity checking. For reasons of internal system |
| integrity, the ICS1 cannot be removed or substituted |
| for in a 2250 system. |
+---+

INTELLIGENT COMMUNICATIONS SUBSYSTEM CONTROLLER/2 (ICS2)

The ICS2 is an intelligent communications subsystem. It is a flexible
and powerful communications processor for use in all 50 Series systems
except the 2350 and 2450. The ICS2 provides asynchronous line support
like the AMLC and ICS1, and is a cost-effective replacement for
systems with more than 40 asynchronous lines. One ICS2 controller
supports up to 64 asynchronous lines (as explained below).

Figure 4-1 illustrates the ICS2 subsystem. An ICS2 subsystem consists
of three separate modules -- the controller, card cage and two types
of communications line adapter cards (CLACs):

1. ICS2 Controller

    This features an on-board 16-bit microprocessor, 128KB (async-
    only version) of RAM, PROM-resident diagnostics, and an
    event-driven operating system. The ICS2 is down-line loadable
    by PRIMOS at system start-up.

2. ICS2 Card Cage

    The ICS2 (5242) includes the following: a card cage that
    supplies space for 16 CLACs, one power supply, one buffer card
    and four CLAC204s. If a customer requires more than eight
    ICS2 CLACs (sync or async) in an ICS2 card cage, order a
    capacity expansion kit (CLAC808). The capacity expansion kit
    includes an additional power supply (110V/60Hz or 220V/50Hz)
    and a buffer card to support eight more CLACs. The ICS2 card
    cage is connected to the ICS2 controller by a 50-wire cable 20
    feet in length (maximum allowed); the ICS2 card cable must be
    housed in a Prime peripheral cabinet. (See the discussion on
    housing the ICS2 later in this section.)

3. ICS2 CLAC204

    CLAC204s provide asynchronous communications interfaces and
    are installed in the ICS2 card cage. Each CLAC204 supports
    four async lines, allowing the base ICS2 card cage to support
    32 lines. An ICS2 with a CLAC808 expansion kit can support
    up to 64 lines. If a customer plans to install a CLAC204 in
    a 9XXX system with modular bulkheads (shipped after May 6,
    1985), use the -FP or -S suffix when ordering each CLAC.
    CLAC204s installed on 2550s and 2655s should bear a -L suffix.

4. CLAC502s and CLAS522s

    CLAC502s and CLAC522s are installed in the ICS2 card cage to
    provide synchronous support for PRIME/SNA, full-duplex
    PRIMENET and BSC RJE. Each CLAC502 supports two V.24/RS232
    sync lines, at speeds from 1,200 to 19,200 bps. Each CLAC522
    supports two V.35/DDS lines at speeds up to 64,000 bps. Both
    async and sync CLACs can share the same ICS2 card cage and
    operate simultaneously. If a customer plans to install
    a CLAC502 or CLAC522 in a 9X5X system with modular bulkheads,
    (shipped after May 6, 1985), use the -FP suffix when
    ordering each CLAC. CLAC5X2s installed on 2550s and 2655s
    should bear a -L suffix. CLAC502s and CLAC522s should be used
    with the ICS3 Model 5725. This model has an ICS2-style card
    cage.

The maximum configuration on a Prime system is four ICS2s (with four
CLAC808 expansion kits). With 64 CLAC204s, (16 per ICS2) this
configuration will support a total of 256 asynchronous lines.

Like the ICS1 and AMLC, the ICS2 offers full-duplex asynchronous
communications lines with programmable characteristics. These features
simplify the task of configuring sites with a variety of RS232
equipment. The user can select one of 16 asynchronous baud rates from
50 bps to 19,200 bps. These asynchronous lines can be used to connect
terminals, printers and modems (such as Bell 212A, 113 and 103 data
sets, or their equivalents).

NOTE: Bulkhead space limits the number of asynchronous lines that a
       9XXX Series CPU (such as the 9655, 9750 and 9955) can house in
       its system cabinet. If the system cabinet contains no more
       than two disk controllers, the customer can use AMLC or ICS1
       controllers to house 64 asynchronous lines. If the system
       cabinet contains three or more disk controllers, only 32
       asynchronous lines can be housed in the system cabinet. If the
       customer requires more asynchronous lines, an ICS2 or an ICS3
       and a peripheral cabinet are required. For more details, see
       the discussion of housing for the AMLC and ICS2 later in this
       section.

       Also note that 2550 and 2655 customers requiring more than 32
       lines must use an ICS2.

Terminated Buffer Board
(ESA5238-901)

Power Supply
(PWR6167-001)

LAC Cage Assembly
(MSA6099-901)

Without Bulkhead
Use: CBL4848-901
With Bulkhead
Use: CBL6268-901

CE
CE
CA   CD
CD
CC
CB   CC

ICS2
Controller Board

Power Supply
(PWR6167-001)

Terminated Buffer Board
(ESA5238-901)

C1 On CBL4848-901
J1 On CBL6268-901

C2 On CBL4848-901
C1 On CBL6268-901
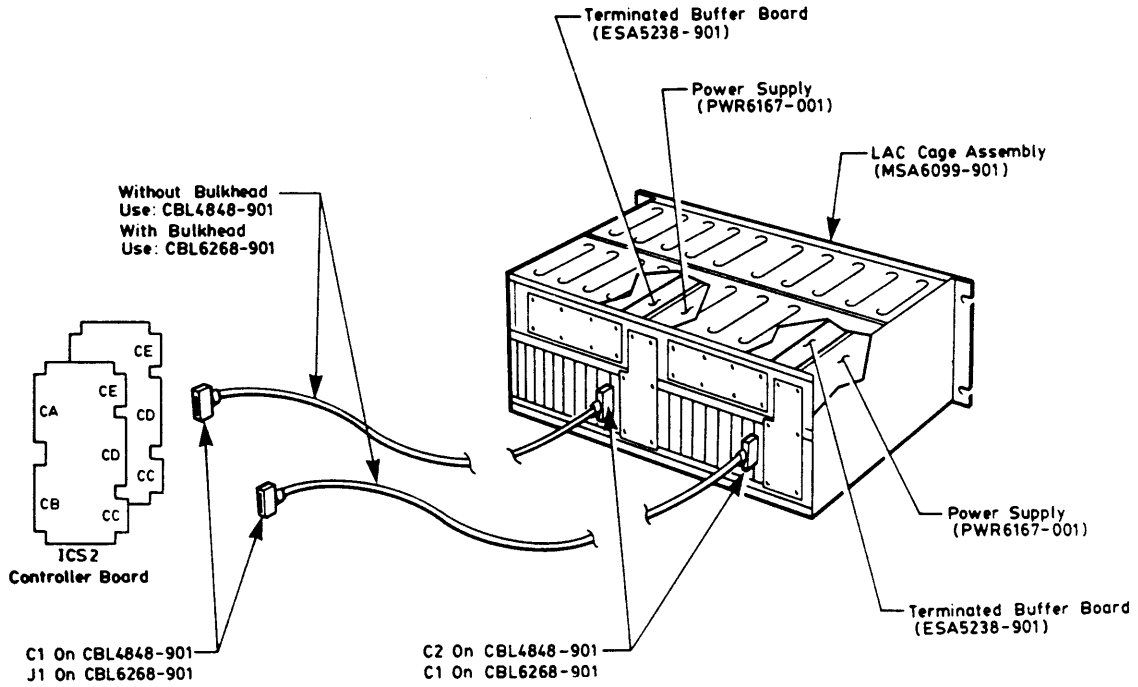
Figure 4-1a.   ICS2 Subsystem

INTELLIGENT COMMUNICATIONS SUBSYSTEM/3 (ICS3)

The new ICS3 communications controller allows customers to address
nearly all their asynchronous and synchronous communications needs
with a single controller and board slot. This controller covers a
wide range of system requirements and is available on all new systems
and most earlier CPU types. The ICS3 is not available on the Prime
150, 300, 400 or 500 systems. All models require PRIMOS Rev. 20.1.

All models of the ICS3 use the same main controller board with a
16-bit microprocessor and 512K bytes of down-line loadable RAM. The
various models of the ICS3 are distinguished by the types of
communications card cages attached to the main controller board. All
ICS3 models have similar operational characteristics, regardless of
the card cages they employ. At this date, there are three card cages
for the ICS3:

   ● 5725: a 16-slot card cage (the same one found in the ICS2)
      that mounts in all systems served by the ICS2. The card cage
      and Communications Line Adapter Cards (CLACs) are mounted
      inside peripheral cabinets. A CLAC808 expansion kit is
      required when more than eight ICS2-type CLACs are added to a
      subsystem.

   ● 5730: an 8-slot card cage that draws current from the CPU
      power supply and has a new style of ICS3 CLACs that mount
      directly on the 2350 or 2450 system bulkhead. (See PPA 364 for
      more details.)

   ● 5735: a new 16-slot card cage for 9X5X series computer room
      systems; uses a single power supply and mounts directly on the
      bulkhead of the 7564S peripheral cabinet. The 5735 uses the
      same ICS3 CLACs found on 5730.

Main Controller Board

The main controller board of the ICS3 resides in the system backplane
and processes synchronous and asynchronous protocols.

With 512K bytes of memory, the ICS3 can support the following
protocols concurrently:

   ● PRIME/SNA SDLC

   ● Full-duplex PRIMENET (HDLC and bisync-framed X.25)

   ● IBM Binary Synchronous Communications (BSC) RJE (2780, 3780,
      and HASP)

   ● ICS Reverse Flow Control asynchronous communications

Main Controller Board   (continued)

The ICS3 supports all the enhancements to the ICS2 announced at PRIMOS
Rev. 20.1 (see PPA 364). Please note that the ICS3 does not support
the following MDLC protocols:

●   Half-duplex PRIMENET

●   BSC 3270/DPTX (IBM)

●   GRTS (Honeywell)

●   200UT (Control Data)

●   Univac 1004 (Sperry)

●   7020 and XBM (ICL)

No commitments should be made that state or imply ICS3 support of
half-duplex PRIMENET. Also note that there are no current plans for
the ICS3 to support the BSC 3270/DPTX, GRTS, 200UT, 1004, 7020 or XBM
protocols.

Card Cages and CLACs

ICS3 Model 5725: Because the ICS3 Model 5725 uses the ICS2 card cage
and CLACs, it provides backward compatibility to customers who do not
own the new 7564S peripheral cabinet. Despite the differences in card
cages and CLACs, there are no functional differences between the
various members of the ICS3 product line except card cage capacity and
power supplies. All async and sync protocols operate the same on all
models. Table 4-2 shows suffixes that are valid for the 5725.

NOTES:

1.   All of the hardware configuration rules that exist for the ICS2
     Model 5242 also exist for the ICS3 Model 5725 with regard to the
     number of CLACs and 50/60Hz power supplies (-A suffix).

2.   The ICS3 Model 5725 includes a main controller board, card cage,
     first CLAC808 power supply/buffer card kit, and internal cables.
     At least one CLAC204/502/522 must be installed to make this ICS3
     subsystem operational.

3.   Use only CLAC204s, 502s, 522s and 808s with the ICS3 Model 5725.
     ICS3 CLACs are not compatible with the Model 5725.

4.   Existing ICS2 subsystems (Models 5242, 5720 and 5722) can be
     upgraded to an ICS3 Model 5725.

5.   The ICS3 5725 uses the same external cables as those created for
     the ICS2. Figure 4-1b illustrates the ICS3 Model 5725 card cage
     and CLACs.

2-line sync CLAC502/522

Mounts inside
are-7564S
peripheral cabinets

CLAC808 Power
Supply and Buffer
Card Extender Kit

16-slot
card cage

4-line async CLAC204
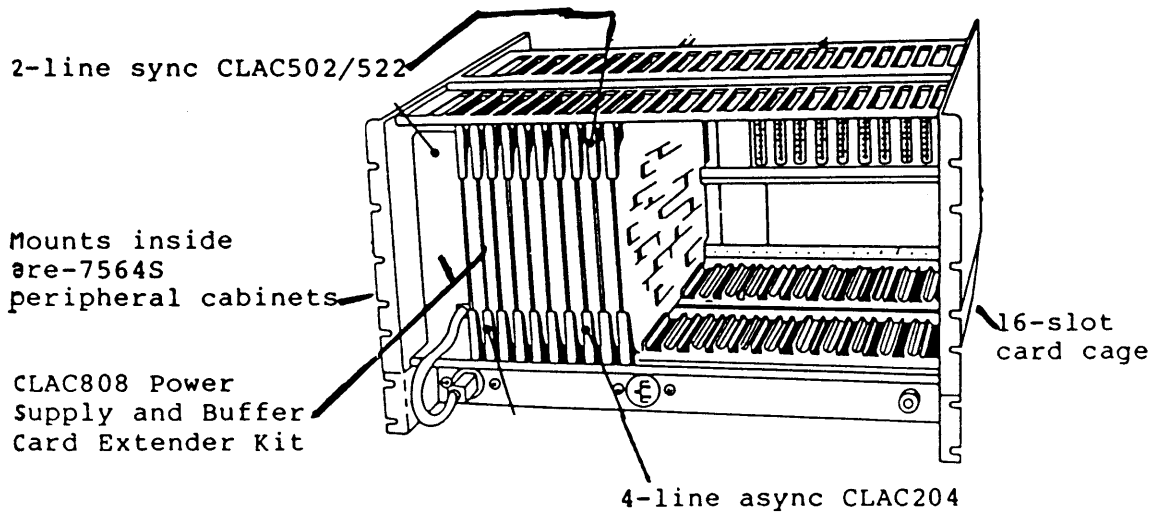
Figure 4-1b. ICS3 Model 5725 Card Cage and CLACs

Card Cages and CLACs   (continued)

ICS3 Model 5730:   The ICS3 5730 is designed for the 2350 and 2450
systems. New CLACs and an 8-slot card cage require less space than
their ICS2 predecessor, and mount directly on the bulkhead of these
low-end systems. The 5730 draws current from the CPU power supply and
requires no separate peripheral cabinet or internal bulkhead cables.

Because the ICS3 Model 5730 does not contain CLACs, customers must
order the necessary type and number of ICS3 CLACs they need to make
this subsystem operational.

The functionality of the three ICS3 CLACs is summarized as follows:

* CLAC304: Supports 4 asynchronous V.24/RS-232C lines at speeds
  ranging from 50 to 19,200 bps.

* CLAC602: Supports 2 synchronous V.24/RS-232C lines at speeds
  ranging from 50 to 19,200 bps.

* CLAC622: Supports 2 synchronous V.35/DDS lines at speeds up to
  64,000 bps.

NOTES:

1. ICS2 CLACs are not compatible with the new ICS3 card cage. Order
    ICS3 CLACs with the 5730 and 5735 ICS3 subsystems. Likewise, the
    new ICS3 CLACs are not compatible with the older ICS2 card cage.

2. The ICS3 5730 uses the same external cables as those on the ICS2.

Figure 4-1c illustrates the ICS3 Model 5730 card cage and CLACs.

2-line sync CLAC602/622

Mounts directly
on 2350 or 2450 —
system bulkhead

8-slot
card cage

4-line async CLAC304
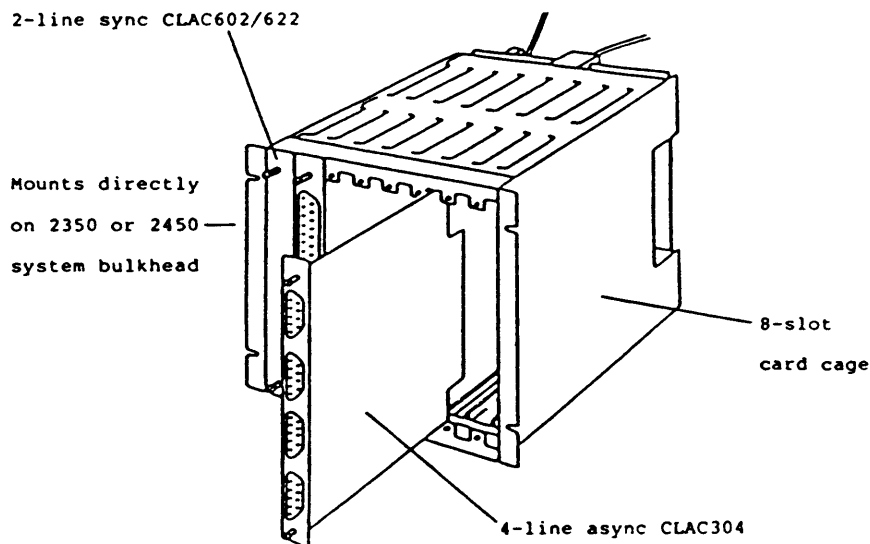
Figure 4-1c.   ICS3 Model 5730 Card Cage and CLACs

Card Cages and CLACs (continued)

ICS3 Model 5735:   The ICS3 Model 5735, a space-reduced version of the
Model 5725, is designed for bulkhead mounting in the 7564S peripheral
cabinet found on 9X5X computer room systems. The Model 5735 has a
16-slot card cage and an integral power supply that operates at
120V/60Hz or 240V/50Hz (use -A suffix). No additional extender CLACs
are needed to bring the 5735 up to its full complement of 16 CLACs.

Because the ICS3 Model 5735 does not contain CLACs, customers must
order the necessary type and number of ICS3 CLACs they need to make
this ICS3 subsystem operational.

NOTES:

1.   ICS2 CLACs are not compatible with the new ICS3 card cage. Order
     ICS3 CLACs with the 5730 and 5735 ICS3 subsystems. Likewise, the
     new ICS3 CLACs are not compatible with the older ICS2 card cage.
     Use ICS3 CLAC304s, 602s and 622s with the ICS3 5735.

2.   The ICS3 5735 uses the same external cables as the ICS2.

3.   A maximum of two 5735S subsystems can mount in a 7564S peripheral
     cabinet. The only two versions of the 5735 are the 5735S and
     5735S-A.

4.   The ICS3 Model 5735 requires PRIMOS Rev. 20.1.

Figure 4-1d illustrates the ICS3 Model 5735 card cage and CLACs.
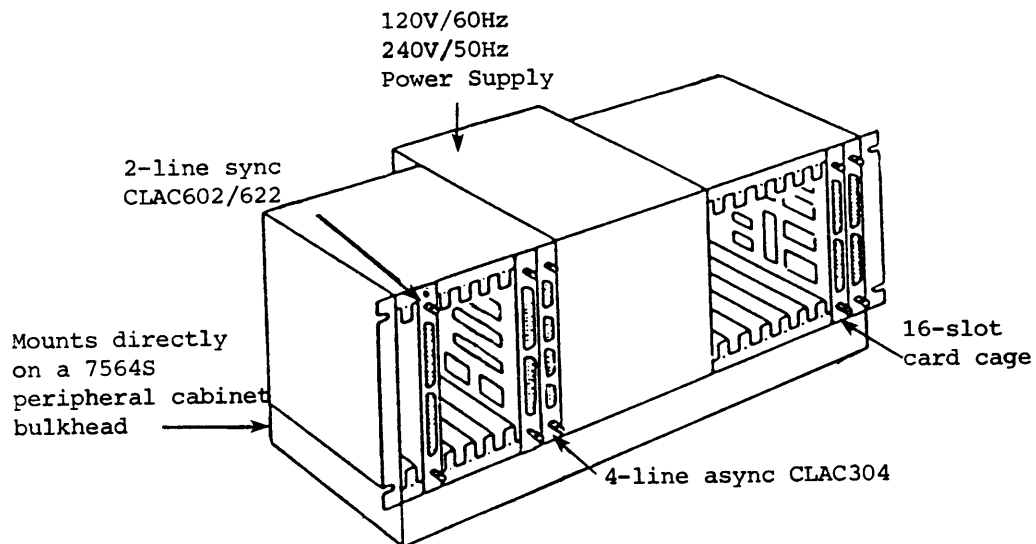
Figure 4-1d.   ICS3 Model 5735 Card Cage and CLACs

PRIMENET NODE CONTROLLER II FOR RINGNET

The PRIMENET Node Controller allows customers to connect Prime systems
in a RINGNET local area network (LAN) that uses a token-passing
control method. Data travels around the RINGNET at 10m bits/second.
After allowing for the encoding scheme, RINGNET provides an effective
network speed of 8mbits/sec. In actual use, data transfers over the
network will be at a slower rate, with the rate determined by CPU
sizes, system loads and the number of nodes on a network.

The PRIMENET RINGNET is a network, not a CPU-to-CPU bus. It is also a
peer-to-peer network, and as such, does not require a master node.
The PRIMENET Node Controller (PNC) contains switching circuits that
allow a faulty PNC to be automatically or manually disconnected from
the RINGNET network. This fail-soft feature requires that active
PRIMENET nodes be separated by no more than 750 feet of twin-axial
cable. Figure 4-2 provides an example with three systems. Assuming
node B fails, if the distance between nodes A and C (d1 + d2) does not
exceed 750 feet, the network will remain operable. If a customer
needs to cover a distance greater than 750 feet between system nodes,
the Custom Systems Group offers a RINGNET Repeater. A RINGNET
Repeater can be inserted between nodes to extend distances beyond 230
meters (750 feet). For more information on the PNCII, see PPA 347.

Each system connected to the RINGNET Repeater requires a PNC, PRIMENET
license and RINGNET cables. The fiber-optic version of the RINGNET
Repeater permits customers to create fiber-optic cable segments of
RINGNET and also to interface electrical twin-axial cables with
optical fibers. Fiber-optic segments of RINGNET require two RINGNET
Repeaters and can be up to one kilometer (3280 feet). For more
configuration availability and pricing information, please refer to
PB-1536 or contact the Custom Systems Group directly.
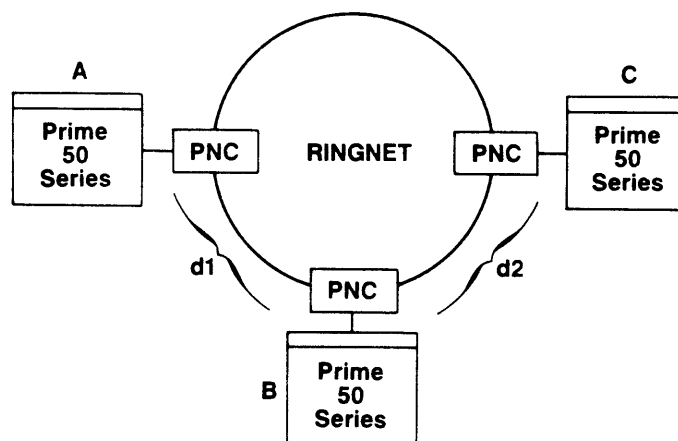
Figure 4-2. PNC Recovery Limits

ASYNCHRONOUS MULTI-LINE CONTROLLER

The AMLC provides connections for 16 asynchronous communication lines.
It uses the Direct Memory Queue (DMQ) mode of operation that relies on
central processor microcode for fast, efficient buffering of all
output data.

The AMLC provides full-duplex communications support and a number of
programmable line characteristics. These simplify configuring sites
with mixed equipment. Customers can set each AMLC line to one of
eight software-configurable clock speeds, ranging from 50 to 19,200
bps. AMLC lines connect CCITT V.24/RS232C or 20ma current-loop
compatible terminals and peripheral devices, as well as Bell 103, 113
and 212 data sets.

MULTI-LINE DATA LINK CONTROLLER

The MDLC allows Prime 50 Series systems to support multiple
synchronous communications lines simultaneously. With Direct Memory
Access (DMA), full on-board character buffering and a micro-programmed
architecture, the MDLC supports high-speed operations. The MDLC
architecture allows on-board microcode to be used for the majority of
protocol support operations. This frees up the central processor for
other operations, and also provides efficient support for a wide-range
of synchronous protocols. Some of these include the communications
software RJE emulators (see Communications Software section) and High-
Level Data Link Control (HDLC) protocol for connection to CCITT X.25-
compliant packet-switching networks using PRIMENET.

The MDLC supports full-duplex synchronous point-to-point PRIMENET
connections to Prime 50 Series systems using the HDLC link-level
protocol. Half-duplex synchronous point-to-point PRIMENET connections
to Prime 50 Series systems use the bisync link-level protocol.

Basic MDLCs provide two lines, but the number of lines can be doubled
with an expansion option (see Table 4-2). An MDLC firmware option
package for protocols must be ordered for each MDLC. When ordering
more than one MDLC, indicate that the firmware package goes with each
MDLC. If the MDLC order is for an existing system which already has
one MDLC, indicate this on the order so that the factory will assign
the correct device address to the expansion MDLC. The MDLC, ICS1 and
ICS2 synchronous lines support the Bell 201, 203, 208, 209 and 2096
data sets.

CONFIGURATION INFORMATION

The following configurartion information is divided into three parts:

- General Information

- Configuring Synchronous Lines

- Configuration Tables

General Information

These general guidelines help ensure proper configuration of the
communications hardware subsystems. Consult the previous Features
and Functions section for details.

1. Cabling

All cabling from the system or peripheral cabinet bulkhead to
customers' equipment must be ordered as a separate line item.
Each subsystem comes with all internal cabling and mounting
hardware.

2. Configuration Limits

Keep these three configuration questions in mind:

a. How many communications subsystems of each type can a 50
Series system support?

b. What is the maximum number of each type of communication line?

c. What is the maximum number of communications lines each
software product can support?

3. Subsystem Housing

Often a CPU system cabinet will house a subsystem, but some
subsystems (such as the ICS2) may require space in a peripheral
cabinet.

Configuring Synchronous Lines

PRIMOS currently supports a maximum of two controllers providing
synchronous line support. These controllers can be either MDLC
controllers providing up to four lines each; two ICS1 subsystems
providing one line each; two ICS3 subsystems supporting multiple
synchronous lines; or a combination of two out of these three
controllers. These physical line limitations are based on the
available CPU power to drive each line supplied by each 50 Series
system.

While each Prime system can support a certain number of physical synchronous communications lines, there are also limits on how many lines each communications product (such as PRIMENET) can support. The number of lines supported by each communications product is a subset of the number of physical lines supported by each system type.

EXAMPLE: A 550-II can be configured with up to four synchronous lines, but PRIMENET supports a maximum of three. The fourth line could be used with RJE or DPTX.

Configuration Tables

There are three limitations which you must not exceed when configuring a system with communications subsystems. Tables 4-3 and 4-4 firmly represent those limits. Note that the subsystem key of Table 4-4 references the key in Table 4-2. Remember also that the number of lines physically configured on a system can differ from the number of lines a communications software product supports. The number of lines supported by each communications software product is discussed in the communications software section.

NOTE FOR 2350 AND 2450:

Four is the maximum number of synchronous lines on a 2350 or 2450. In situations where an ICS1 and two 2-line MDLCs are installed, the synchronous line on the ICS1 must be disabled. In situations where two ICS1s and an MDLC are installed, one of the synchronous lines on the ICS1s must be disabled.

TABLE 4-3. COMMUNICATIONS HARDWARE SUBSYSTEMS 50 SERIES CONFIGURATION LIMITS		
Subsystem	Maximum Per System	Required Board Slots
ICS1	4	1
ICS2	4	1
ICS3	4	1
PNC2	1	1
AMLC	8	1
MDLC	2	1
Maximum Controller Combinations		
Combination *		Maximum Number
Mixed synchronous controllers (MDLC, ICS1 and ICS3)		2**
Mixed asynchronous controllers (AMLC, ICS1, ICS2 and ICS3)		***
Mixed ICS controllers (ICS1, ICS2 and ICS3)		4

*   Mixed synchronous controllers refers to any
    controller that supports synchronous communications
    and is configured to operate synchronously on a
    50 Series system. Both the ICS1 and ICS3 may
    support synchronous communications; however, the
    ICS controllers may be used for asynchronous
    communications only.

** More than two synchronous capable controllers can
    be present in the same system. Only two of these
    controllers can be configured for synchronous use.

*** The limit is dependent upon the maximum number of
    asynchronous lines supported by PRIMOS.

TABLE 4-4. COMMUNICATIONS HARDWARE SUBSYSTEMS 50 SERIES COMMUNICATION LINE LIMITS				
System	Subsystem Key	Maximum Async Lines	Maximum * Sync Lines	Maximum RINGNETs
9955 II	a,b,c,d,e,f1,f3	256**	8	1
9955	a,b,c,d,e,f1,f3	256**	8	1
9950	a,b,c,d,e,f1,f3	256**	8	1
9755	a,b,c,d,e,f1,f3	192	8	1
9750	a,b,c,d,e,f1,f3	192	8	1
9655	a,b,c,d,e,f1,f3	128	8	1
9650	a,b,c,d,e,f1,f3	128	8	1
850	a,b,c,d,e,f1,f3	128	8	1
750	a,b,c,d,e,f1,f3	96	8	1
650	a,b,c,d,e,f1,f3	64	4	1
550II	a,b,c,d,e,f1,f3	64	4	1
550	a,b,c,d,e,f1.f3	64	4	1
500	c,d,e	64	4	1
450II	a,b,c,d,e,f1,f3	64	4	1
450	a,b,c,d,e,f1,f3	64	4	1
400	c,d,e	64	4	1
2655	a,b,c,d,e	64	4	1
2550	a,b,c,d,e	64	4	1
2450	a, c,d,e,f2	40	4	1
2350	a, c,d,e,f2	32	4	1
300	c,d,e	32	2	1
250II	a,b,c,d,e,f1,f3	32	2	1
2250	a,b,c,d,e	32	2	1
250	a,b,c,d,e,f1,f3	32	2	1
150	c,d,e	32	2	1

* Refer to individual software products in the Communications Software Section for the maximum number of lines that each product supports.

** Although these CPUs support 256 lines, PRIMOS has an absolute limit of 254 simultaneous users.

HOUSING INFORMATION

When ordering communications subsystems components, be aware that
different types of cabinets determine the suffixes appended to
standard model numbers. These suffixes indicate the proper internal
cables and packaging needed to fill the order. The type of cabinet
also determines the type of cables that are required.

Intelligent Communications Subsystem/1 (ICS1)

The ICS1 controller is always housed in either the CPU or in the
9750/9755/9950/9955 II I/O cabinet and takes one board slot. Four is
the maximum number of ICS1s that can be configured on a Prime 50
Series system. Note that the ICS1 is packaged with all 2250s and some
2350s.

Intelligent Communications Subsystem/2 (ICS2)

The ICS2 card cage can only be housed in the high-boy (53-inch) and
low-boy (30-inch) peripheral cabinets. An ICS2 card cage cannot be
housed in a system cabinet, or in 2350/2450 systems. The components
of the ICS2 (controller, card cage and communications line adapter
cards) are shown in Figure 4-1.

Figure 4-3 illustrates how the ICS2 mounts in FCC-compliant cabinets.
Configurations of high-boy peripheral cabinets are documented in
Section 5. Figure 4-4 illustrates the possible configurations with a
low-boy peripheral cabinet.

NOTE: If a 2550 or 2655 system requires more than eight CLACs, the
        ICS2 expansion kit (CLAC808) will include a modular bulkhead
        panel supporting eight additional CLACs.

Intelligent Communications Subsystem/3 (ICS3)

The three models of the ICS3 can be housed in a number of ways:

    1.   The ICS3 Model 5725 is always mounted in a peripheral
         cabinet. This model follows the same configuration rules as
         the ICS2, but is not suited for the 7564S 9X50 peripheral
         cabinet.

    2.   The ICS3 Model 5730 mounts in the system cabinet of a 2350 or
         2450.

    3.   The ICS3 Model 5735 mounts on the bulkhead of the 7564S
         peripheral cabinet. Only two 5735s can be mounted in a
         single 7564S cabinet.

For more information on the ICS3, refer to PPA 364.

FRONT
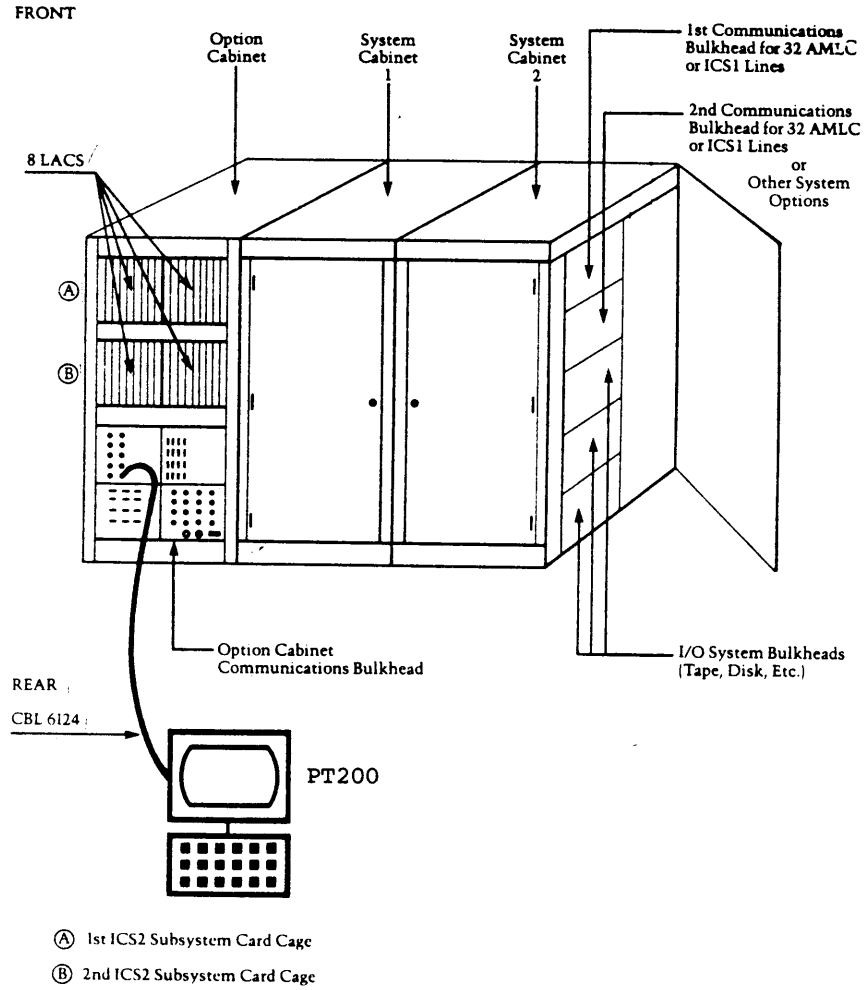
Figure 4-3. ICS2 with FCC-Compliant Cabinet

ICS2 CARD CAGE

CLAC
204

BULKHEAD
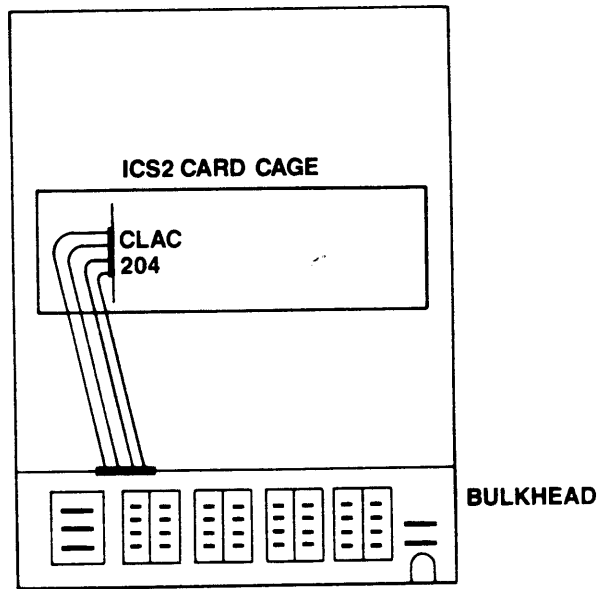
Figure 4-4. ICS2 with Low-Boy Peripheral Cabinet

Asynchronous Controllers - AMLC, ICS1, ICS2 and ICS3

AMLC controllers are always housed in the system CPU or I/O (975X or 995X) cabinet. Older, non-FCC cabinets can hold up to eight AMLC controllers (104 lines). The newer, FCC-compliant system cabinets support a maximum of 64 asynchronous lines (four AMLCs or two AMLCs and four ICS1s).

When a system configuration requires more than 64 asynchronous lines, the customer must use the ICS2 subsystem mounted in a peripheral cabinet. Also, if a system configuration has three or more disk controllers, space limitations on the system bulkhead restrict the number of AMLC or ICS1 lines to 32. The customer must use the ICS2 or ICS3 for asynchronous lines beyond these numbers.

Use the 1469/1470 series cables with non-FCC cabinets. These cables extend from the rear of the cabinet. Use the 6124/6109 series of cables with FCC-compliant cabinets.

Multi-line Data Link Controllers

MDLC controllers are similar to the AMLC, in that they are always housed in the system CPU or I/O cabinet. Up to two MDLC controllers can be configured on a system, and each MDLC can supply up to four lines, except the 2350 and 2450, which utilize the two-line version of the MDLC. These eight lines can be used on the 9655 and larger systems.

Use the 1471/1472 Series cables with non-FCC cabinets. These cables extend from the rear of the cabinet. In FCC-compliant cabinets, MDLC lines terminate at the system bulkhead located behind the system cabinet side door. Use the 6127/8780 series cables with FCC-compliant cabinets to connect synchronous modems and data adapter units to the system bulkhead.

PRIMENET Node Controller (PNC)

The PNC subsystem is always housed in the system or I/O cabinet. A system can contain only one PNC subsystem.

Depending on the type of cabinet, different suffixes are appended to the standard PNC model number to indicate the type of internal cables and packaging needed. The type of cabinet has no effect on the Prime-supplied RINGNET twin-axial cable used in the RINGNET local area network. See the section on Communications Cables for details on RINGNET cables.

CABLE CONFIGURATION REQUIREMENTS

Normally, when 50 Series peripheral devices are ordered, the external
cabling required for the devices are automatically included. The
AMLC, ICS1, ICS2, MDLC and PNC devices are exceptions to this.

Whenever you order these controllers for a system, the order will
include all the required internal cabling. The suffix for controllers
ensures that a system receives all the internal cabling and mounting
hardware appropriate for that system. For example, all devices
with the "-F", "-FP", "-L", "-T" or "-2250" suffix include cabling to
the system´s I/O bulkhead; devices without a suffix do not include any
cables. In every case, order external cabling separately, according
to the device suffix on the communications controller or ICS2 CLAC.

CABLING ASYNCHRONOUS DEVICES

Table 4-5 summarizes the cable requirements for systems in FCC-
compliant cabinets with I/O bulkheads. Table 4-6 shows the cable
requirements for systems in non-FCC compliant cabinets.

TABLE 4-5. CABLING ASYNCHRONOUS DEVICES ON FCC-COMPLIANT SYSTEMS			
Devices	5154:-2250;-L; -F;-FP;-T 5181:-2250;-L; -F;-FP;-T All ICS2s and ICS3s	5174: with no suffix; -FP; -F; -L; -2250	5175: with no suffix; -FP; -F; -L; -2250
RS232-C/CCITT V.24 Direct-Connect Devices	CBL6124 or CBL6109 and CBL6596	Not Applicable	CBL6124 or CBL6109 and CBL6596
Data Set (Modem) Types: Bell 103J, 103A3, 103F or 113 (or equivalent)	CBL6109	Not Applicable	CBL6109
Data Set (Modem) Types: Bell 212A, Racal-Vadic VA3400 (or equivalent)	CBL6109	Not Applicable	CBL6109
20 ma Current-Loop Direct-Connect Devices	Not Applicable	CBL7515	CBL7515

NOTES:

• All ICS2 and ICS3 models use an I/O bulkhead, even if the system is
  in a non-FCC compliant cabinet.

CABLING ASYNCHRONOUS DEVICES (continued)

● To assist in system upgrades, customers can connect their old-style
  cables (see Table 4-6) to controllers in FCC-compliant cabinets by
  using an adapter cable, Product Number CBL7508-001.

● When upgrading CPUs and retaining communications controllers for
  use in the upgraded cabinet, additional internal cables and/or
  modular bulkhead panels may be required. These must be ordered
  separately.

TABLE 4-6. CABLING ASYNCHRONOUS DEVICES ON NON-FCC CABINET SYSTEMS			
Devices	5154 5181	5174	5175
RS232-C/CCITT V.24 Direct-Connect Devices	CBL1470 or CBL1469 and CBL6596	Not Applicable	CBL1470 or CBL1469 and CBL6596
Data Set (Modem) Types: Bell 103J, 103A3, 103F, or 113 (or equivalent)	CBL1469	Not Applicable	CBL1469
Data Set (Modem) Types: Bell 212A, Racal-Vadic VA3400 (or equivalent)	CBL1469	Not Applicable	CBL1469
20ma Current-Loop Direct-Connect Devices	Not Applicable	CBL1457	CBL1457

BAUDRATE VERSUS CABLE LENGTHS FOR PRIME RS232-C

Prime uses, as does most of the industry, RS232 line drivers and
receivers at lengths longer than the recommended standard of 50 feet
or 15 meters. The most reliable method to drive distances greater
than 50 feet is to use circuits designed for this environment, such
as those suggested by the EIA-RS442/443 standard. These devices can
drive up to 4000 feet at high data rates; unfortunately, there is
very little equipment available from manufacturers (including Prime)
to support this standard.

When using RS232-C line drivers and receivers at lengths longer than
50 feet, follow these guidelines:

1. Use CBL6124 on FCC-compliant systems; CBL1470 on non-FCC
    50 Series systems

2. Use 22-gauge shielded, twisted pair cable

3. Use PT25, PT45, PT65, PST100, PT200 terminals or the Prime
    Producer 100, PERFORMER PC Option or PERFORMER Workstation

4. Observe the maximum cable lengths by baudrate shown in
    Table 4-7.

TABLE 4-7. BPS AND MAXIMUM CABLE LENGTHS FOR RS232	
Prime Customer Service Maximum Cable Length for Supported Service (see Note 1) (See Note 1)	Maximum Cable Length (Assumes optimum cable routing, no interference, etc.) (See Note 2)
19,200 bps 50 feet	200 feet
9,600 bps 500 feet	1,000 feet
4,800 bps 1,000 feet	2,000 feet
2,400 bps 1,500 feet	3,000 feet
1,200 bps 2,000 feet	4,000 feet
Note 1. These distances take into account circuit degrading over potentially poor cable routing and other factors.	
Note 2. These maximum distances can easily be exceeded with twisted pair cabling, grounded shielding and other methods. These figures are provided solely as recommended maximum.	

BAUDRATE VERSUS CABLE LENGTHS FOR PRIME RS232-C (continued)

Table 4-7 indicates that a current Prime terminal (1000 feet from the
processor) will be supported by Prime Customer Service at a line speed
of 4800 baud; it may very well function acceptably at 9600 bps, but
will not be supported at this speed and distance. If the speed is
essential, a pair of modem eliminators or line drivers can be
installed at customer expense.

If a customer is purchasing cables from a third party, recommend they
procure a low impedance type of cable (2-4 Picofarads per foot).

FCC EMISSIONS STANDARDS AND SYSTEM CABLE REQUIREMENTS

The United States Federal Communications Commission (FCC) continues to
enforce its restrictions on the levels of "noise" and "interference"
that a computing system (and its components) can generate. In order
to comply with these restrictions, certain changes have been made to
to 50 Series cabinets and the way that cables are connected to the
system. The major enhancement is the addition of an I/O bulkhead for
both asynchronous and synchronous device cabling, as well as tape
drive and disk drive cables.

This bulkhead serves as a common connection point for all cables
entering or leaving a system cabinet. For asynchronous and
synchronous devices, this is a neater and more convenient cabling
interface than the former "spaghetti cables" under a raised floor.

Use Table 4-5 to determine which cable you need for each device and
ORDER ONE CABLE PER DEVICE, according to the communications controller
type. Column 1 will almost always include the cables you need.

For devices housed in FCC-compliant cabinets, customers can continue
using their old-style cables, except when using an ICS2 or ICS3.
Table 4-6 includes these cables. NOTE THAT ALL CABLES IN TABLE 4-6
SUPPORT UP TO FOUR DEVICES!

If a customer upgrades from a system in a non-FCC cabinet to an
FCC-compliant system, one of the following options may be chosen:

    1. If the new system has no ICS2sor ICS3s, existing cables may be
        used, therefore bypassing the I/O bulkhead entirely. This is
        a special case provided for by FCC regulations, which exempts
        a customer's current environment from compliance.

    2. If the new system has ICS2sor ICS3s, or the customer wishes to
        take advantage of the I/O bulkhead to simplify cabling and
        reduce electrical interferences the following may be done:

        a. Replace all existing cables with selections from Table
            4-6; or

        b. Convert existing cables to use 9-pin "D" connectors to
            interface to the I/O bulkhead; or

        c. Adapt current cables to interface with the I/O bulkhead
            using the CBL7508-001 cable adapter.

NEW MODULAR BULKHEADS FOR 9XXX-SERIES

At the end of January, 1985, system cabinets began shipping with a
modified I/O bulkhead. A new communications controller Product Number
suffix, "-FP", must be used when ordering AMLC and ICS1 controllers
and ICS2 CLACs for 53-inch 9XXX systems. The "-S" suffix must be used
when ordering an ICS2 controller for a peripheral cabinet shipped
AFTER April 28, 1986. The "-S" suffix applies only to the main
controller. CLACs with an "-FP" suffix are used with "-S" ICS2
controllers.

The modified I/O bulkhead design makes all 53-inch system cabinet I/O
bulkheads similar to the 2550/2655 system cabinet I/O bulkhead, in
that it accomodates "modular panels" for communications controllers.
"Modular panels" are panels connected to the internal cables of a
communications controller during the manufacturing process. Figure
4-5 illustrates a "modular panel" for four asynchronous lines.

EDGE CONNECTOR
CONNECTS TO EDGE OF
CONTROLLER BOARD

INTERNAL CABLES

MODULAR PANEL
MOUNTS TO I/O
BULKHEAD
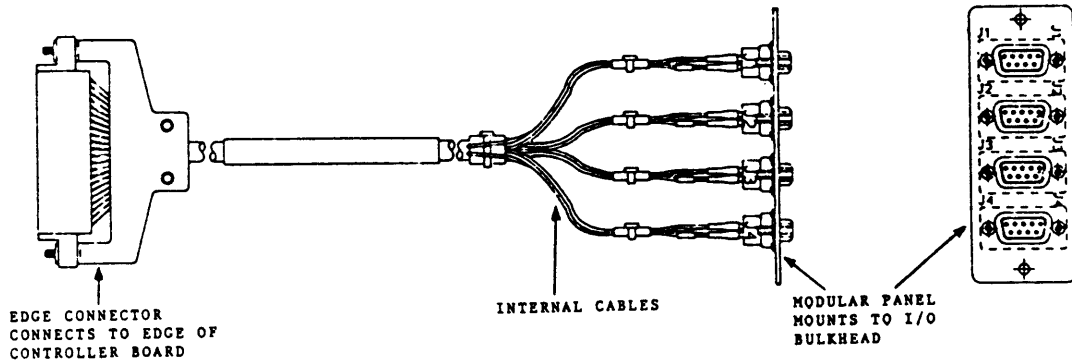
Figure 4-5. Modular Panel with Four Ports for Asynchronous Lines

Prior to this change, FCC-compliant AMLC and ICS1 controllers for
53-inch systems included the controller with attached internal cables,
but no modular panels. These internal cables were individually
connected to holes in the existing system cabinet I/O bulkhead. The
modified I/O bulkhead that supports modular panels on 53-inch system
cabinets makes installation of asynchronous and ICS2 synchronous lines
inn FCC-compliant cabinets more efficient. The new I/O bulkhead also
provides for a more logical and sequential arrangement of
communications ports on the I/O bulkhead.

Figure 4-6 (on the following page) shows three types of internal
cabling used with the AMLC and ICS1 controllers, based on their
suffixes. CLAC204, CLAC502 and CLAC522 for the ICS2 and ICS3 Model
5725 follow the same suffix convention. The ICS3 Models 5730 and 5735
do not have internal cables.

Product
Number
Suffix   ICS1   AMLC   COMMENTS

No suffix

No internal cables
or modular panels.
For use on non-FCC
compliant systems.

F
and
-2250

Includes internal
cables, but not
modular panels.
For use on FCC-
compliant systems
which do not support
modular panels.

ESA 8411-001
async

L
and
FP

CBL6125-901
sync

Includes internal
cables and, for
async lines, modular
panels. For use on
FCC-compliant systems
that support modular
panels.

Figure 4-6.   AMLC and ICS1 Controller Types

These diagrams indicate that the new suffix for AMLC, ICS1 and ICS2
CLAC Product Numbers is "-FP", where "F" indicates that it is an FCC-
compliant, 53-inch system cabinet, and "P" indicates that it is a
modular panel style cabinet. When ordering an AMLC or ICS1 for a
system in a 53-inch cabinet, you must determine whether the "-F",
"-FP" or "-S" suffix is appropriate. "-F" is correct for 53-inch
systems manufactured prior to the I/O bulkhead modularization, and
"-FP" must be used for 53-inch systems manufactured after the
modification. Figure 4-7 illustrates the I/O bulkhead of 53-inch
systems before and after the I/O bulkhead modification. Use these
illustrations to determine whether the "-F" or "-FP" suffix is
appropriate.
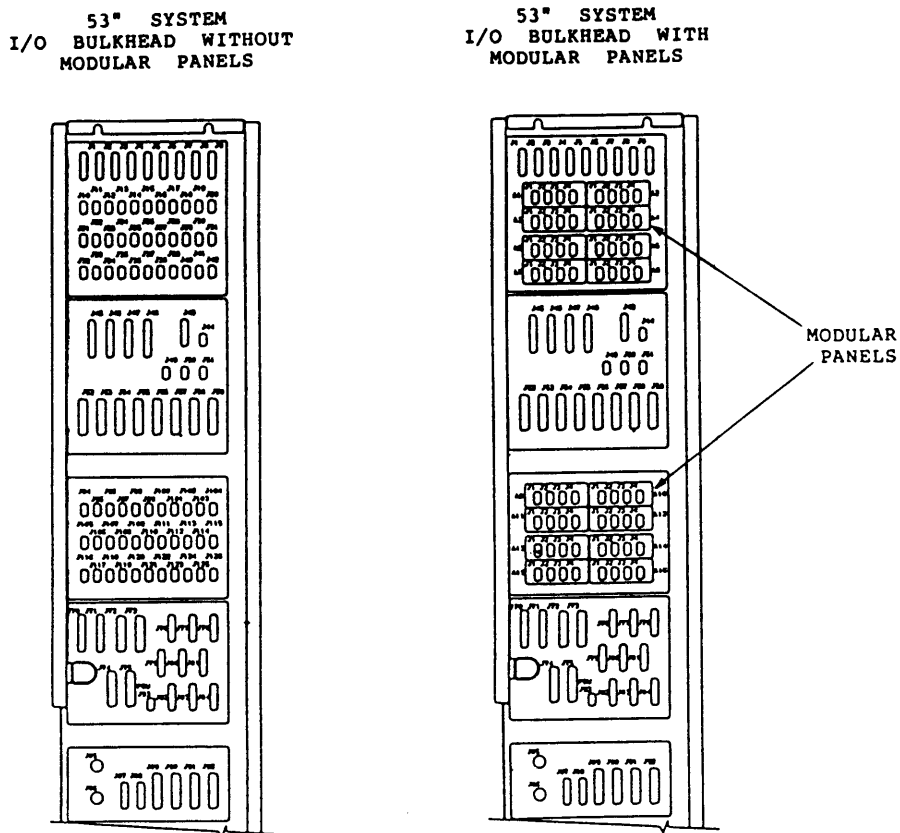
Figure 4-7. I/O Bulkhead Before and After Modification

CABLE DESCRIPTIONS

The following paragraphs describe Prime's standard cable offerings; a
specific suffix indicating length is required when ordering. Please
consult the Price Book for complete product numbers and prices.

CBL6124   (For use with all FCC-compliant systems and all ICS2/3s)

CBL6124 is generally used for connecting locally-configured devices,
such as terminals. These devices are normally in the same building as
the Prime host system to which they are connected. Each CBL6124 cable
supports a single asynchronous device, and is available in various
lenghts up to 100 meters (329 feet). See Figures 4-10, 4-11 and 4-12
for sample diagrams.

CBL6109   (For use with all FCC-compliant systems and all ICS2/3s)

CBL6109 is generally used for connecting to asynchronous modem devices
or to a data part on a PBX. This cable supports the same modems
identified in CBL1469. CBL6109 is 15 meters (50 feet) long and
supports a single device. It can be adapted to allow direct-connect
devices to connect to the Prime host system by ordering CBL6596.
Refer to Figures 4-10, 4-11 and 4-12 for sample diagrams.

CBL7515   (For use with all FCC-compliant systems)

CBL7515 is used for connecting 20ma terminal devices to AMLC Product
Numbers 5174F or 5175F. Each CBL7515 cable supports a single 20ma
device, and is 10 meters long.

CBL1470   (For non-FCC systems only)

CBL1470 is normally used for connecting locally-configured devices,
such as CRT terminals. Referred to as direct-connected devices, these
terminals are usually located in the same building as the 50 Series
system to which they are connected. Each CBL1470 cable has four EIA
female connectors, allowing up to four direct-connect devices to be
accommodated. CBL1470 is 9.2 meters (30 feet) long. Sample diagrams
are provided in Figures 4-8 and 4-9.

CBL1469   (For non-FCC systems only)

CBL1469 is usually used for connecting modems to the AMLC or ICS1 on
50 Series systems. The types of modems normally used are Bell 103J,
103A3, 103F, 113 and 212, VADIC 3400 or equivalent, full-duplex
modems. Each CBL1469 cable has four EIA male connectors to allow for
up to four modems to be configured. CBL1469 is 9.2 meters (30 feet)
long. CBL1469 can be adapted to allow direct-connect devices to be
connected to the AMLC or ICS1 by ordering CBL6569, which is described
later in this section. Refer to Figures 4-8 and 4-9 for sample
diagrams.

CBL1457 (For non-FCC systems only)

CBL1457 is used for connecting 20ma terminal devices to AMLC Type
Numbers 5174 and/or 5175. Each CBL1457 cable has four 20ma, lug-type
connectors to accommodate up to four 20ma terminal devices. CBL1457
is 9.2 meters (30 feet) long.

CBL1258 (For non-FCC systems only)

CBL1258 is normally used to connect full data set control modems to
the AMLC. Full data set control means half-duplex communications that
are not supported by PRIMOS. Each CBL1258 has four male EIA
connectors to allow up to four modems to be interfaced to the AMLC.
CBL1258 is 9.2 meters (30 feet) long.

ASYNCHRONOUS CABLE ADAPTERS

CBL6596 (For use will ALL systems)

CBL6596 is an adapter for CBL6109 or CBL1469 (modem cable), enabling
local devices to be connected to the Prime host system, as in CBL6124
or CBL1470, respectively. See Figures 4-8, 4-9, 4-10, 4-11 and 4-12
for illustrations. CLB6596 is available in 25 centimeters or three
meter lengths.

CBL7508 (For use will all FCC-compliant systems)

CBL7508 adapts existing CLB1469 and CBL1470 cables for use with FCC-
compliant systems. This cable has four 9-pin "D" connectors on one
end (which connects to the I/O bulkhead), and terminates in a 44-pin
edge card that will connect to a CBL1469 or CBL1470. CBL7508-001 is
three meters long.

CBL6366

A series of conversion cables are available which will adapt a
standard CBL6124 (with 4-40 screws) to a connector with either 4-40
lugs (to connect to an extension cable), or to 3mm screws (to connect
to a Terminet). No wiring changes are made with these cables--they
are merely to adapt the connectors.

Figures 4-8 and 4-9 show the cables used with AMLCs and ICS1s in non-FCC compliant systems:
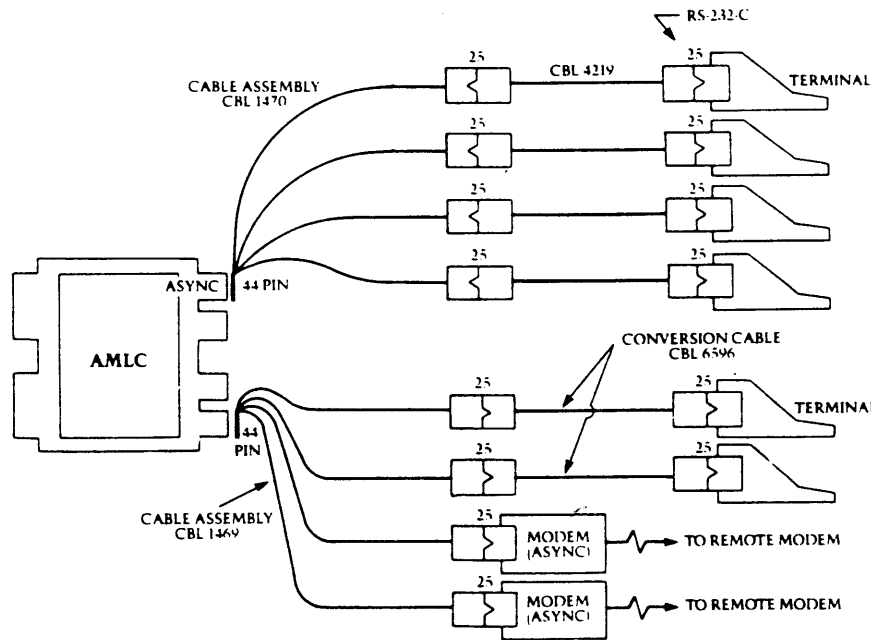
Figure 4-8.   AMLC Cabling Diagram for Non-Bulkhead
               (Non-FCC Compliant Systems)

NOTES:

● CBL4219 is six feet long and bundled with all Prime terminal
   products.

● Any of the following terminals can be configured on an AMLC:

   - CRT Product Numbers: 3221, 3222, 3223, 3225, PT25, PT45, PT65,
                            PST100, PT200 and the Prime Producer 100

   - Console Product Numbers: 3111 and 3113

   - Serial Printer Product Number: 3126

● Devices with an RS232-C Interface can be configured locally or
   remotely.

● Devices with 20ma Interfaces are direct-connect devices and can
   only be configured locally (not illustrated).
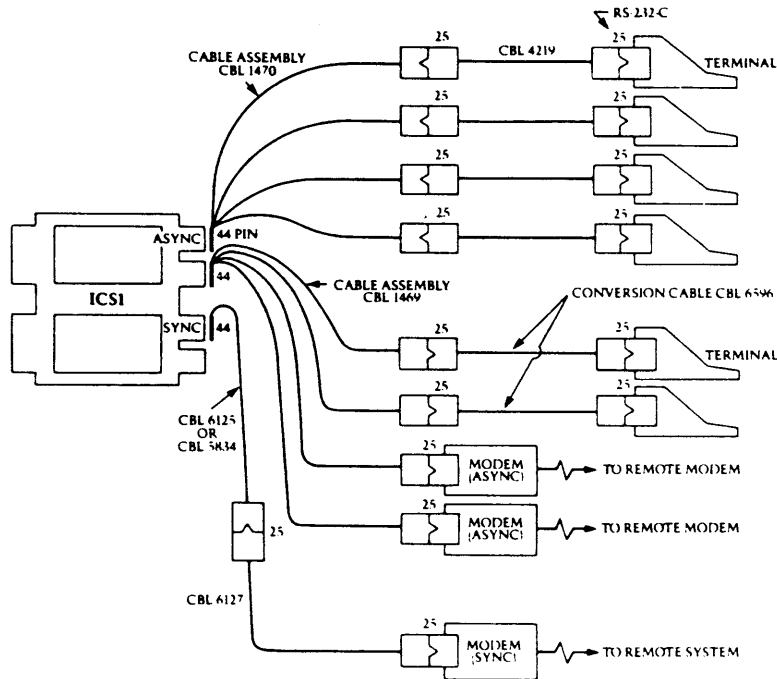
Figure 4-9.   ICS1 Cabling for Non-FCC Compliant Systems

NOTES:

● CBL5834 or CBL6125 is 46 cm long and bundled with ICS1 (Product Number 5181).

● CBL4219 is bundled with all Prime terminal products.

● CBL6125 or CBL5834 is bundled with ICS1 (Product Number 5181).

Figures 4-10, 4-11 and 4-12 show the cables used with AMLCs, ICS1s and ICS2s in FCC-compliant systems:
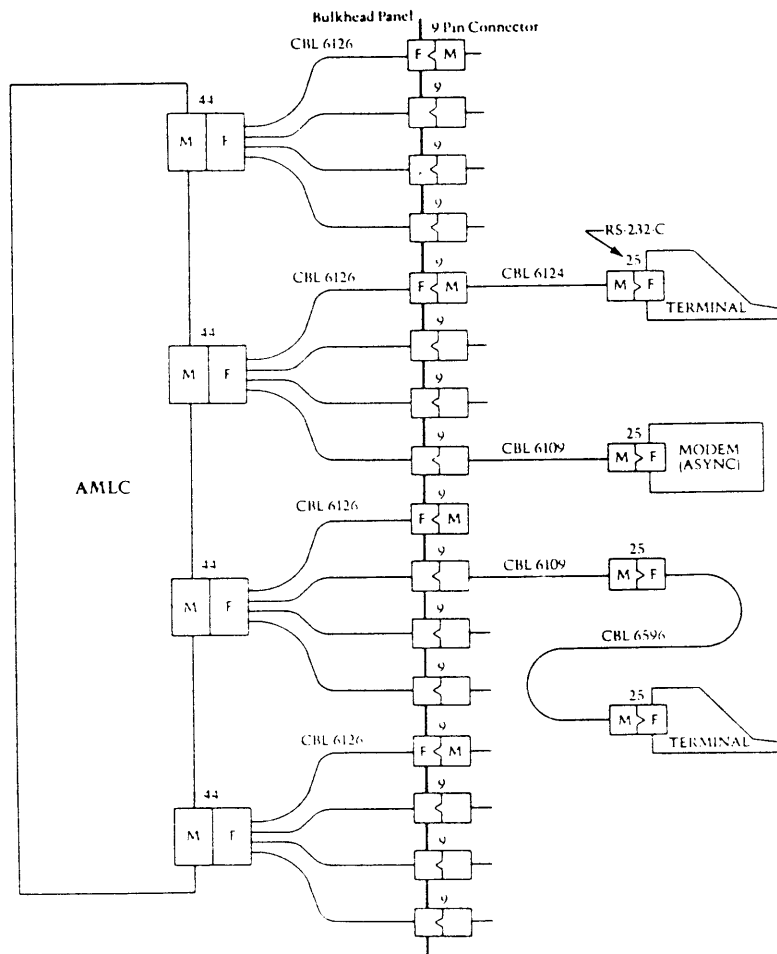
Figure 4-10.   AMLC Cabling for FCC-Compliant Systems
                with Bulkhead or I/O Panel

NOTES:

● CBL6126 is an internal cable, and is bundled for shipment with the system (Product Number 5154-2250, 5154F or 5154L).

● CBL6124 is available in various lengths up to 100 meters (329 feet).

PRIMENET Node Controller (PNC) Cable Requirements

One PNC Product Number (7041, 7041F, 7041T or 7041-2250) and one PNC
Cable is required for each Prime System in the network. The aggregate
distance between systems cannot exceed 230 meters (750 feet). The PNC
Cable lengths and their corresponding type numbers are listed below.

Cable Product Number	Length
CBL3532	3.2 meters (10 feet)
CBL3533	15 meters (50 feet)
CBL3534	65 meters (200 feet)
CBL3535	166 meters (500 feet)

CBL1451 (Non-FCC Compliant Systems)

CBL1451 is used for the Paper Tape Reader (Product Number 3121) or
the Paper Tape Reader of a Paper Tape Reader/Punch device (Product
Number 3122 or 3123). In both cases, the SOC 3006 Controller is used.
CBL1451 is 6.2 meters (10 feet) in length.

CBL1432 (Non-FCC Compliant Systems)

CBL1432 is used for the Paper Tape Punch of a Paper Tape Reader/Punch
device (Product Number 3122 or 3123), with the SOC 3066 Controller.
CBL1432 is 6.2 meters (10 feet) in length.

Figure 4-12. ICS2/3 Cabling (For All Systems)

NOTES:

● All cable assemblies for the ICS2/3 from the controller to the ICS2
card cage, and from the card cage to the peripheral cabinet
bulkhead, are included with the ICS2 and ICS3 subsystems.

● 5242 and 5725 (for use with non-FCC cabinets) includes a bulkhead
panel that mounts on old-style 50 Series cabinets, and may include
different internal cabling (external cables -- CBL6124 and CBL6109
will remain unchanged).

● External cables for the ICS3 are the same as those used for the
ICS2.

Figures 4-13 and 4-14 show the pin positions and jumpers for FCC-
compliant cables used with direct-connect and modem interfaces.
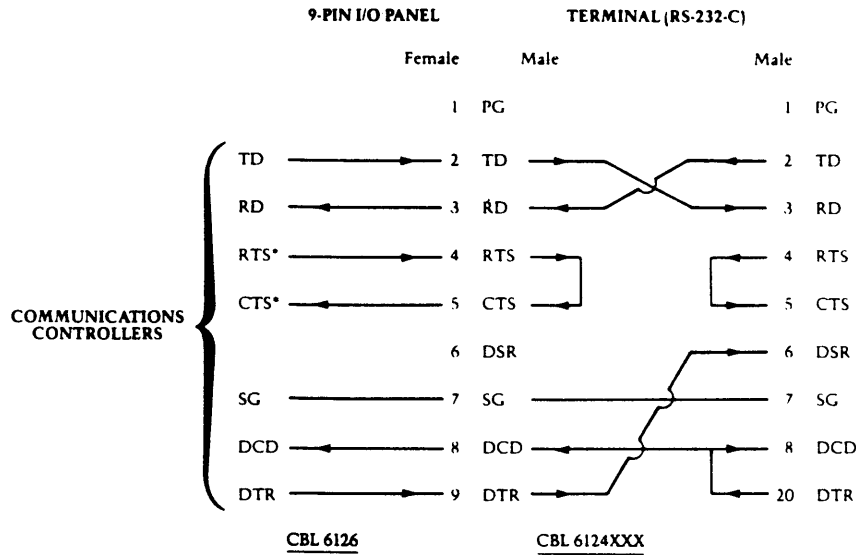
Figure 4-13.   ICS1/ICS2/ICS3/AMLC Async Terminal Cable Pin-Out
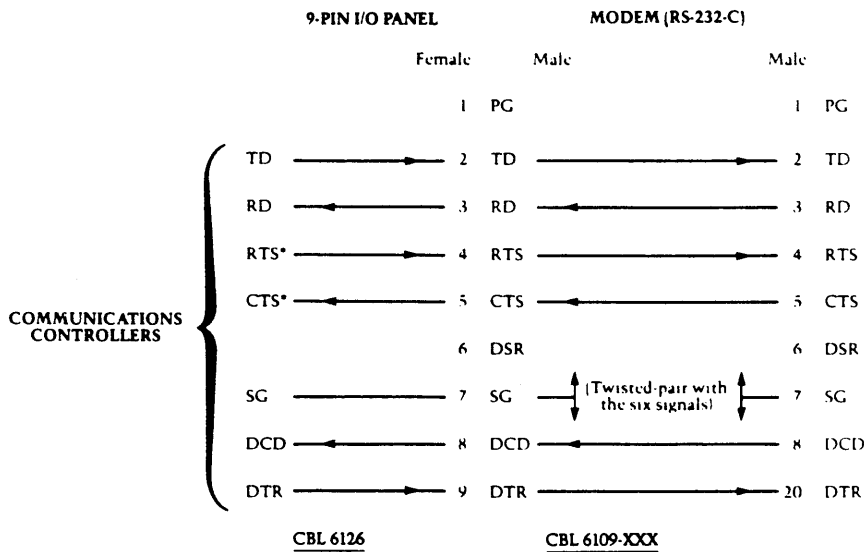
Figure 4-14.   ICS1/ICS2/ICS3/AMLC Async Modem Cable Pin-Out

SYNCHRONOUS CABLE REQUIREMENTS

Cables required for the MDLC and ICS1 are not supplied with the
controller and must be ordered as separate line items. The synchronous
device cable requirements are summarized in Table 4-8.

TABLE 4-8. SYNCHRONOUS CABLE REQUIREMENTS				
Data Sets	Controllers (Product Numbers)			
	5602 5604	5602F 5602-2250 5604F 5604-2250	5622 5624	5181 5181F 5181-2250
201A, B, C; 208A, B; DDS Interface (2K - 9.6K BPS)	CBL 1472	CBL 6127	See Note 1	CBL 6127
203A, B, C; 209A; DDS Interface (2K - 9.6K BPS)	CBL 1471	CBL 6127	See Note 1	CBL 6127
DDS Interface (56K BPS Only)	See Note 2	See Note 2	CBL 2278 See Note 2	See Note 2
Note 1: These areas in the table indicate non-supported device combinations. Note 2: Not available on the 2250 system.				

CBL1471   (For use with non-FCC systems)

CBL1471 is normally used to connect RS232-C modems (203A, B or C, or
209A types) or a DDS Interface (2000 to 9600 BPS). Each cable has two
modem connectors. The length of CBL1471 is 9.2 meters (30 feet).

CBL1472   (For use with non-FCC systems)

CBL1472 is normally used to connect RS232-C modems (201A, B or C, or
208A or B) or a DDS Interface (2000 to 9600 BPS). Each cable has two
modem connectors. CBL1472 is 9.2 meters (30 feet) long.

CBL2278   (For use with non-FCC systems)

CBL2278 is normally used for connecting to V.35/DDS CSU/DSUs, but only
at speeds between 9600 and 64,000 bps. Each cable supports two lines.
CBL2278 is 3.8 meters (12 feet) long.
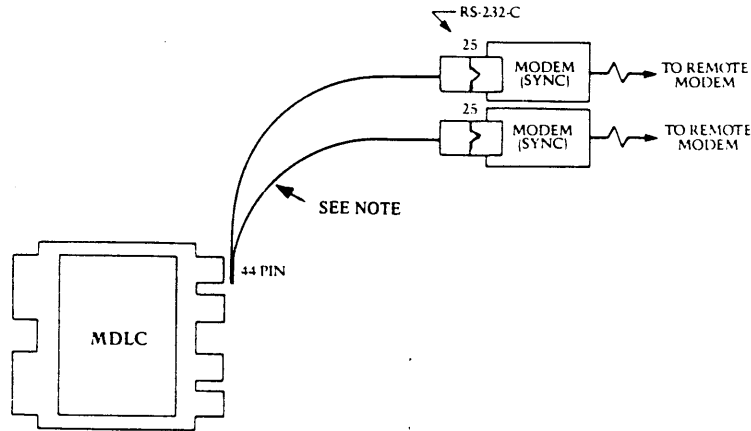
Figure 4-15.   MDLC Cabling for Non-Bulkhead
                (Non-FCC Compliant Systems)

NOTE:

● Cabling assembly varies with the modem type. Modem types 203A, B
  or C and 209A use CBL1471; DDS Interface Modem (2000 to 9600 bps)
  use CBL1471 or CBL1472; Modem types 201A, B or C and 208A or B use
  CBL1472.

Synchronous Cabling for FCC-Compliant Systems and the ICS3

FCC-compliant communications controllers and synchronous ICS2 CLACs
always include the appropriate internal cables, such as CBL6117. ICS3
Models 5730 and 5735 attach directly to the bulkhead, and therefore
have no internal cables. All external cables for FCC-compliant
systems and the ICS3 must be ordered separately.

CBL6127   (FCC-Compliant Systems and the ICS3)

CBL6127 is used to connect to V.24/RS232-C modems (Bell 201A/B/C or
208A/B), V.35/DDS interfaces between 2000 and 9600 bps, or synchronous
data ports on a PBX. Refer to figures 4-9, 4-11 and 4-16.

CBL8466   (ICS3; CLAC502 and CLAC602 only)

CBL8466 is a null modem cable used to directly connect a V.24/RS232-C
synchronous CLAC to another host's V.24/RS232-C synchronous port. One
of the two pieces of equipment must provide external clocking.
CLAC502/602s have the appropriate clocking circuitry to perform this
function, if needed.

CBL8780   (FCC-Compliant Systems and the ICS3)

CBL8780 is used to connect to a V.35/DDS CSU/DSU (Channel Service
Unit/Data Service Unit) or to a synchronous data port on a PBX, at
speeds up to 64,000 bps.

I/O PANEL OR BULKHEAD
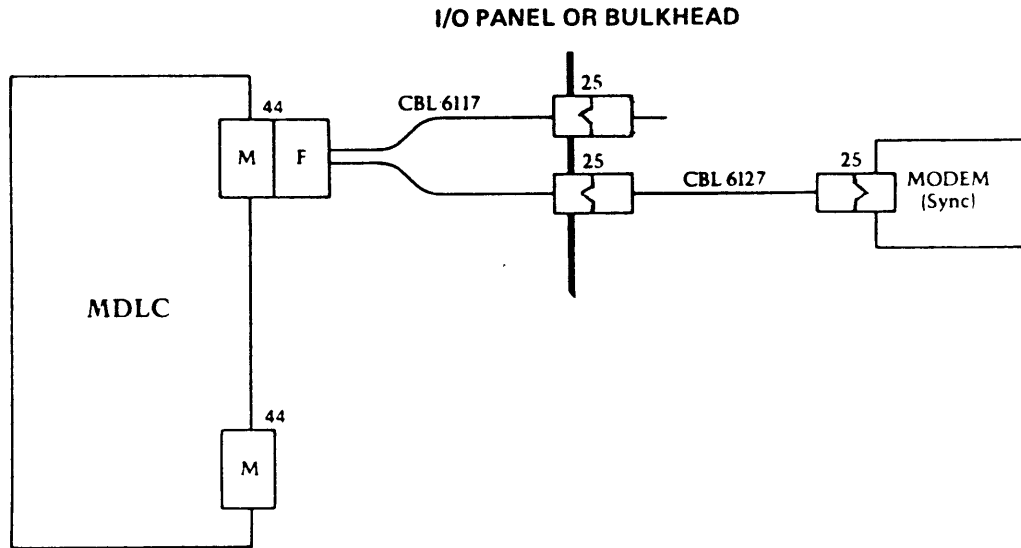
Figure 4-16. MDLC Cabling for FCC-Compliant Systems

NOTES:

● CBL6117 is bundled with FCC-compliant controllers.

● Only two synchronous lines are supported by a 2250 system.

PRIMENET Node Controller (PNC) Cable Requirements

One PNC Product Number (7041, 7041F, 7041T or 7041-2250) and one PNC Cable is required for each Prime System in the network. The aggregate distance between systems cannot exceed 230 meters (750 feet). The PNC Cable lengths and their corresponding type numbers are listed below.

Cable Product Number	Length
CBL3532	3.2 meters (10 feet)
CBL3533	15 meters (50 feet)
CBL3534	65 meters (200 feet)
CBL3535	166 meters (500 feet)

CBL1451   (Non-FCC Compliant Systems)

CBL1451 is used for the Paper Tape Reader (Product Number 3121) or the Paper Tape Reader of a Paper Tape Reader/Punch device (Product Number 3122 or 3123). In both cases, the SOC 3006 Controller is used. CBL1451 is 6.2 meters (10 feet) in length.

CBL1432   (Non-FCC Compliant Systems)

CBL1432 is used for the Paper Tape Punch of a Paper Tape Reader/Punch device (Product Number 3122 or 3123), with the SOC 3066 Controller. CBL1432 is 6.2 meters (10 feet) in length.

COMMUNICATIONS SOFTWARE

There are four product groups representing communications software
available with Prime's 50 Series systems:

- PRIME/SNA

- Bisync Remote Job Entry (RJE) Emulators

- IBM Bisync 3270 Emulation and Support

- PRIMENET Networking

As a general rule, any mix of communications software can be
configured on a Series system. Limitations, such as the number of
synchronous lines supported by each member of the 50 Series family
(currently eight for the 9655 and above), amount of system overhead
and memory must be taken into consideration. Consult the following
communications software summaries for individual product requirements.

PRIME/SNA

PRIME/SNA is a family of products that allows Prime systems to
communicate with IBM hosts in SNA networks. At first release,
PRIME/SNA consists of three components: the Server Subsystem,
PRIME/SNA Interactive and PRIME/SNA RJE. Table 4-9 describes the
components and their requirements.

TABLE 4-9. PRIME/SNA			
Component	Product Number	Product Description	Requirements
PRIME/SNA Server Subsystem	8081-P	(See Note Below) Provides PU.T2 support for other PRIME/SNA product	ICS3; CLAC502/602 and CBL6127 (V.24/RS232) or CLAC522/622 and CBL8780 (V.35/DDS); 1/2MB additional memory, PRIMOS Rev.19.4 or later.
PRIME/SNA Interactive	8082-P	Allows PT200s to emulate IBM 3278 Models 2 and 5; LU.T1 and LU.T3 printing	PT200 PERFORMER Terminal; Server Subsystem
PRIME/SNA Remote Job Entry (RJE)	8083-P	Provides LU.T1 support for IBM 3776-3 (MLU) emulation	Server Subsystem; disk space evaluation
PRIME/SNA Core Product	8080-P	Includes PRIME/SNA Server, Interactive and RJE Subsystems	Same requirements for Server, Interactive and RJE, listed above

IBM Software Supported by PRIME/SNA

- Operating System: OS/VS2/MVS; MVS/XA; DOS/VSE; VM

- Network Software: ACF/VTAM; VTAME; ACF/NCP; VM/VCNA

- Network Management: NCCF; NPDA; NLDM

- Application Subsystems: TSO; CICS/VS; CMS; IMS/VS DB/DC;
  (PRIME/SNA Interactive)   DSPRINT; JES/328X

- Application Subsystems: DOS/VSE POWER; JES2
  (PRIME/SNA RJE)

Configuration Rules

- Lines: PRIME/SNA allows users to run four high-speed lines concurrently, with speeds from 1,200 to 19,200 bps on V.24 (RS232) lines, and up to 64,000 bps on V.35 (DDS) lines. All four active lines must be resident on the same ICS2 controller. V.24 lines can be leased or switched. Leased V.24 and V.35 lines can be point-to-point, multipoint, or multi-multipoint. Synchronous lines can share the same ICS3 controller with asynchronous lines.

- Peripheral Nodes: Each PRIME/SNA Server configuration allows a Prime system to act as many as eight PU.T2 peripheral nodes.

- Logical Units: PRIME/SNA Interactive allows 40 LU ports to be configured as LU.T2 displays or LU.T1/LU.T3 logical printers for each PU.T2 peripheral node in the Server configuration. It also allows up to eight RJE sites to be active at one time. A maximum of 10 logical units may be configured per RJE site.

Table 4-10 shows that the number of active LUs supported by PRIME/SNA varies with CPU model. An LU port is considered active if it is engaged in a session with an SNA host.

TABLE 4-10. ACTIVE LUs SUPPORTED BY PRIME/SNA	
CPU Model	Maximum Number of Active LU Ports
2250	16
2350	16
2450	32
550-II	32
750	32
850	32
2550	32
2655	32
9650	32
9655	32
9750	32
9755	32
9955	48
9955 II	48

Disk Usage

Users of the SNA/RJE subsystem may have a tendency to use more disk storage than initially anticipated. RJE products use the spooler subsystem, and therefore, an SNA/RJE site could require 5-10MB of additional disk space if the customer sends or receives large print files. This additional disk capacity should be ordered with the RJE subsystem. (Refer to PPA 209 for more information on PRIME/SNA.)

REMOTE JOB ENTRY (RJE) EMULATORS

A wide variety of mainframe RJE emulation packages are available with
Prime 50 Series systems. The products and corresponding mainframe
protocols are shown in Table 4-11.

TABLE 4-11. REMOTE JOB ENTRY (RJE) EMULATOR PRODUCTS		
Emulator	Product Number	Protocol
EMX80	8020-P/M	IBM 2780/3780
EMXBM	8040-P/M	International Computers Limited (ICL) XBM
EM200UT	8060-P/M	Control Data Corp. (CDC) 200UT
EMHASP	8120-P/M	IBM HASP
EM1004	8180-P/M	Univac 1004
EM7020	8460-P/M	ICL 7020
EMGRTS	8470-P/M	Honeywell GRTS

To configure the emulators with the appropriate hardware, use Table
4-13. The key used in Table 4-12 references the key of Table 4-2.

TABLE 4-12. RJE EMULATOR/HARDWARE CONFIGURATION			
RJE Emulator	Controller Key	Maximum Number of Lines	Memory
EMX80	a1,e5,e6,e8,f1,f2,f3	8	128KB
EMXBM	e6,e7,f1,f2,f3	4	128KB
EM200UT	e6,e7,f1,f2,f3	4	128KB
EMHASP	a1,e5,e6,e8,f1,f2,f3	8	128KB
EM1004	e6,e7	4	128KB
EM7020	e6,e7	4	128KB
EMGRTS	e8	8	128KB

Note the maximum number of lines that each RJE emulator supports.
Generally, 128KB of system memory should be configured for each RJE
protocol used. Mixed protocols, multiple lines or high-speed lines
may require more memory.

RJE customers have a tendency to use more disk than initially
anticipated. Therefore, advise the customer that an adequate number
of disk devices should be ordered with the system. RJE products use
the spooler subsystem, and therefore, an average RJE installation
would require 5-10MB of additional disk space. If a customer expects
to send or receive large print files, more disk space may be required.

At PRIMOS Rev. 19.3, EMHASP, EMGRTS and EMX80 (3780) support high-
speed digital data links of up to 64,000 bps; EMX80 (2780) supports
digital data links of up to 38,400 bps. At the same time, high
average rates of data throughput are maintained. (Average throughput
is another name for line utilization.) This capability is supported
by the ICS3 and MDLC controllers listed in Table 4-2.

Table 4-13 can be used to roughly judge the impact of a high-speed
link on a system configuration.

TABLE 4-13. IMPACT OF A HIGH-SPEED DATA LINK			
RJE Emulator	Data Link Speed	Average Throughput %	CPU Resources (% of 750 CPU)
EMHASP	56K bps	60%	62%
EMX80(2780)	38K bps	60%	29%
EMX80(3780)	56K bps	60%	29%

Due to the amount of system resources required to support a high-
speed data link, a customer must adhere strictly to these restrictions
when configuring a system with line speeds greater than 9600 bps:

1. High-speed lines are not available on systems below the
    Prime 550-II.

2. Only one high-speed RJE or PRIMENET line per system.

3. Systems should be configured with an additional 256KB
    of memory.

4. As a guideline, a system with one high-speed line should
    not have more than one or two additional medium-speed
    synchronous lines (1200 to 9600 bps) in use by other
    communications products at the same time.

For more information about RJE at PRIMOS Rev. 19.3, refer to PMN 156.

IBM BSC 3270 EMULATION AND SUPPORT -- DPTX

With DPTX, Prime standard terminals and printers can emulate equipment
in the IBM bisync (BSC) 3270 environment. DPTX also allows IBM BSC
3270 terminals access to resources on Prime systems, as well as a
program interface and IBM printer emulation.

TABLE 4-14. IBM BSC 3270 EMULATION AND SUPPORT PRODUCTS		
Product	Product Number	Description
DPTX	8430-P/M	Support of communication networks between Prime and IBM equipment

DPTX (Product Number 8430-P/M)

The Distributed Processing Terminal Executive (DPTX) facilitates
communications between Prime and IBM equipment by supporting the BSC
3270 environment. DPTX supports or emulates up to 32 of the following
devices per Prime 50 Series system:

   ● IBM 3271 Model 2 and 3277 Model 2 Display Systems

   ● 3284/86/88 Printers

DPTX supports up to eight, 9600 bps lines using IBM's binary
synchronous communications protocol.

DPTX is compatible with all IBM mainframes using the System/370
architecture (including S/370, 4300, 303X, 308X and 309X), and a
variety of other systems, access methods and telecommunications
monitors, including:

   ● BTAM, TCAM, VTAM

   ● IMS/VS, CICS/VS

   ● TSO, VM/CMS

DPTX requires PRIMOS Rev. 19.3 or later, and may be configured on all
50 Series systems (including the 2250), as long as adequate memory is
provided. Other communications products (emulators and networking
software) may be configured on the same 50 Series system, but consult
each product (in this section) for details.

DPTX includes three software modules:

1. Data Stream Compatibility (DPTX/DSC)

    DSC permits Prime terminals to emulate IBM 3277 display
    stations, and the Prime spooler to emulate IBM 3284/86/88
    printers, allowing Prime equipment to communicate with IBM
    applications. Prime terminals and printers can also access
    Prime applications.

2. Terminal Support Facility (DPTX/TSF)

    TSF allows a customer to connect IBM 3277 display stations and
    3284/86/88 printers directly to a 50 Series system. IBM
    terminals can access PRIMOS and utilities, while IBM printers
    can print Prime generated reports.

3. Transparent Connect Facility (DPTX/TCF)

    DPTX/TSF allows IBM 3277 display stations connected to a Prime
    system to communicate with both IBM and Prime applications.

Configuration guidelines for these modules are provided in Table 4-15.
Note that the key used in Table 4-15 references the key in Table 4-2.

TABLE 4-15. DPTX HARDWARE/MEMORY CONFIGURATION				
DPTX Module	Maximum # of Users	Maximum Lines	Key	Memory
DPTX/DSC	32 *	8 **	e5,e6,e8	256KB
DPTX/TSF	32 *	8 **	e5,e6,e8	256KB
DPTX/TCF	16 *	8 **	e5,e6,e8	512KB ***

* Combined maximum number of users of DPTX/DSC and
DPTX/TSF is 32.

Maximum number of users of DPTX/TCF is 16. (Each user
of DPTX/TCF actually uses one DTPX/TSF and one DPTX/DSC
user slot.)

** Maximum number of MDLC lines which can be connected to
an IBM host.

*** Note that DPTX/TCF incorporates both DPTX/TSF and
DPTX/DSC; therefore, the maximum amount of memory
configured for DPTX would not exceed 512KB.

Table 4-16 lists the Prime standard terminals supported by DPTX:

TABLE 4-16. TERMINALS - DPTX 3277 EMULATION
PT200, PST100 Revision E (Refer to PPA 172 and PMN 158 for details), PT45, and OWL1200

Customers are responsible for obtaining the necessary modems for their particular requirements, e.g., multi-drop leased (private) line, and also for obtaining any IBM equipment (mainframe, terminal controllers, terminals) used with the DPTX configuration.

For more information about DPTX at PRIMOS Rev. 19.3, refer to PMN 158.

PRIMENET NETWORKING

The following products support networking and networking applications for the Prime 50 Series:

TABLE 4-17. NETWORKING PRODUCTS		
Product	Product Number	Description
PRIMENET	8440-P/M 8440-PU	Support of communication systems involving point-to-point leased, point-to-point dial-up and local area networks.
PRIMENET/w Packet Network Interface	8450-P/M 8440-PU	Support of PRIMENET and X.25 packet-switched data networks.
File Transfer Service	8480-P/M	Queued transfer of files on all PRIMENET and X.25 packet-switched data networks. Prerequisites are 8440 or 8450.

PRIMENET (Product Numbers 8440-P/M and 8440-PU)

PRIMENET provides a variety of transmission methods and services to
support network communications, including remote login, Remote File
Access (RFA), NETLINK and Interprocess Communications Facility (IPCF).
PRIMENET will run on any 50 Series system at PRIMOS Rev. 18.2 or
later.

PRIMENET can be utilized in local area networks (LANs) by connecting
several systems that are in close proximity to each other. This
facility, RINGNET, allows up to 128 systems to be linked in a local
area network.

The PRIMENET Node Controller (PNC) connects 50 Series systems in a
local area network using a token passing ring architecture. Each
system connected to RINGNET needs a PRIMENET license, a PRIMENET Node
Controller (PNC) and appropriate cabling. For a 3-node ring, the
order should include three PRIMENET licenses (one per system). The
PNC takes up one CPU board slot. The maximum cable length between
active PNCs (and therefore each node) is 230 meters (750 feet). If a
system fails, a relay inside the PNC assists in securing RINGNET
facilities (provided that the total length between active nodes is no
more than 230 meters). Cable requirements are covered in greater
detail later in this section.

For local area networks requiring distances greater than 750 feet
between nodes, the Custom Systems Group offers a RINGNET Repeater.
For more information, see PB 1536, or the Custom Systems Group Sales
Guide (SOU-2301-004).

So far we have only discussed ring networks. PRIMENET supports the
following types of networks with the following topologies:

● Local area network (RINGNET)

● Point-to-point full-duplex synchronous (leased/private)

● Point-to-point half-duplex synchronous (dial-up)

● X.25 packet-switched data network (leased)

● Point-to-satellite digital networks (see PF4262 for more
  details)

All synchronous PRIMENET communications require either an MDLC with a
Bisync or HDLC protocol option, or an ICS1 with PRIMOS Rev. 19.3 or
later. At PRIMOS Rev. 20.1, the ICS3 will run full-duplex PRIMENET.
Point-to-point, half-duplex synchronous connections require the MDLC
with the bisync protocol option. Only the MDLC supports half-duplex
PRIMENET. Table 4-18 shows PRIMOS and communication controller
support for half- and full-duplex PRIMENET.

TABLE 4-18. PRIMOS AND COMMUNICATIONS CONTROLLER SUPPORT SUPPORT FOR HALF- AND FULL-DUPLEX PRIMENET			
	Type of Communications Controller:		
	MDLC	ICS1	ICS3
Full-Duplex	PRIMOS Rev. 18.2 and above	PRIMOS Rev. 19.3 and above	PRIMOS Rev. 20.1 and above
Half-Duplex	PRIMOS Rev. 18.2 and above; except Rev. 19.3	None	None

At PRIMOS Rev. 19.3 and later, PRIMENET supports three synchronous
lines (out of a possible eight lines on the 50 Series), and speeds at
up to 64,000 bps (one line at a speed greater than 19,200 bps, the
other two at lower speeds). Please note that the 2250 supports a
a maximum of two PRIMENET synchronous lines.

Table 4-19 illustrates PRIMOS revision support and hardware configura-
tion information involving synchronous PRIMENET communications. Note
that the key used in Table 4-19 references the key of Table 4-2.

At PRIMOS Rev. 19.3, PRIMENET allows communications between two nodes
NOT directly connected by using intermediate nodes as gateways. This
is known at Route-Through Gateway support. For more informatino, see
PMN 273 and the Route-Through Installation Guidelines Sales Guide
(SOU-7403-000).

Please refer to PMN 166 for more information on PRIMOS Rev. 19.3´s
PRIMENET features and configuration limits.

At PRIMOS Rev. 19.4, PRIMENET offers Monitor Net, a valuable tool for
monitoring network activity and diagnosing network problems. With
Monitor Net, customers can analyze network activity with a PT200,
PST100, PT45, FOX or OWL terminal, or archive data for later analysis.
Monitor Net provides overview and detailed information on RINGNET
(available at Rev. 19.3), synchronous lines, and virtual circuits.
For more detailed information about Monitor Net, see PPA 206.

TABLE 4-19. SYNCHRONOUS PRIMENET SUPPORT			
H A L F - D U P L E X (MDLC ONLY)			
Dial-Up	Rev. 19.2 and earlier	Rev. 19.3	Rev. 19.4	Rev. 20.1
Supports:	MDLC	No Support	MDLC	MDLC
F U L L - D U P L E X (MDLC, ICS1 AND ICS3)			
Leased	Rev. 19.2 and earlier	Rev. 19.3	Rev. 19.4	Rev. 20.1
Supports:	MDLC	ICS1, MDLC	ICS1, MDLC	ICS1, MDLC, ICS3

Note that the ICS1 and ICS3 are down-line loaded from PRIMOS and do not require firmware protocol options. The MDLC supports only two protocol sets per board.

Cables for the MDLC, ICS1 and ICS3 must be ordered as a separate line item. Modems cannot be ordered from Prime; customers must purchase them. More detailed cable information is found later in this section.

PRIMENET with Packet Network Interface (Product Numbers 8450-P/M and 8440-PU)

PRIMENET with the packet-switched network interface license supports all of the previously listed functions and configuration guidelines of PRIMENET. The following information explains attaching to packet-switched data networks.

PRIMENET allows a system to connect two different PSDNs (such as Telenet and Tymnet) on each synchronous line. PRIMENET does not support more than one synchronous line to the same PSDN.

PRIMENET meets the internationally-recognized 1980 CCITT X.25 standard for packet-switching networks, allowing 50 Series systems to communicate easily with any other system (public or private) that complies with the X.25 standard (via the packet-switching network). PRIMENET supports both the 1976 LAP (bisync and HDLC) and 1980 LAPB (HDLC) specifications. With the packet network interface license, PRIMENET supports many X.25 packet-switched networks. When configuring the system for packet network communications, the packet carrier must be contacted to determine which specific protocol is required.

Most support the bisync protocol at this time; however, the HDLC
protocol is more efficient and should be used when available. Consult
your Regional Communications Specialist for assistance in connecting
to your national packet-switching networks, as some are currently
phasing-out bisync support.

Among the PSDNs that PRIMENET supports are: Telenet, Tymnet, Autonet
and Alaskanet in the United States; Datapac in Canada; Great Britain's
International Packet-Switching Service (IPSS); and France's Transpac.
PRIMENET also supports the European Packet-Switching Network, Euronet.
These are just a few of the packet-switching networks that PRIMENET
supports today.

For more information about PRIMENET at PRIMOS Rev. 19.3, please refer
to PMNs 148 and 166 and the PRIMENET Product Bulletin (PB1417-004).

File Transfer Service (Product Number 8480-P/M)

File Transfer Service (FTS) is a powerful utility providing trouble-
free, controlled data movement throughout a distributed network of
Prime systems. FTS is a queued transfer service. When a user submits
a transfer request, FTS takes care of the entire operation without
further attention or operator intervention. Thus, a request for a
file to be sent to a remote system can be submitted at any time,
regardless of the current network status. If the transfer is not
possible because the network link or node is not functioning, FTS will
automatically recover and retry at regular intervals until the
transfer succeeds. In addition, a sub-routine call interface is
available for application developers.

The purchase of FTS is recommended for all point-to-point, dial-up and
X.25 public data networks. FTS may also be used to transfer files
which reside on Prime local area networks. (Real-time, non-queued file
transfers on Prime local area networks are supported by PRIMOS
commands.) At PRIMOS Revs. 19.3 and 19.4 (FTS Rev. 2), FTS will
transfer simple files, as well as MIDASPLUS and V-mode program run
files. FTS Rev. 2 does not support transfers of segment directory-
based files such as ROAM, DBMS or RBF files.

FTS may be installed on any Prime node in a PRIMENET network. PRIMENET
is, of course, a prerequisite. One copy of FTS must be ordered for
each node using it, although each node in the network need not have
FTS installed if it is not needed.

FTS Rev. 1 can only transfer SAM and DAM files. FTS Rev. 1 also makes
transferred SAM files into DAM destination files if the files don't
exist at the remote site.

Table 4-20 shows FTS dependencies on PRIMOS revs.

TABLE 4-20. FTS DEPENDENCIES ON PRIMOS REVISIONS		
FTS Revision	PRIMOS Revision Release On:	Runs on PRIMOS Revision:
1.0	18.4	18.2 and above
1.0	19.0	18.2 and above
1.1	19.1, 19.2	19.0 and above
2.0	19.3, 19.4	19.0 and above

For more information on FTS, please refer to PMN 165.

The following tables (Tables 4-21 to 4-24) summarize the dependencies of hardware and software.

TABLE 4-21. COMMUNICATIONS HARDWARE SUBSYSTEMS 50 SERIES CONFIGURATION LIMITS		
Subsystems	Maximum Per System	Required Board Slots
ICS1	4	1
ICS2	4	1
ICS3	4	1
PNC2	1	1
AMLC	8	1
MDLC	2	1

TABLE 4-22. MAXIMUM CONTROLLER COMBINATIONS	
Combination *	Maximum Number
Mixed Synchronous Controllers (MDLC, ICS1 and ICS3)	2
Mixed Asynchronous Controllers (AMLC, ICS1, ICS2 and ICS3)	**
Mixed ICS Controllers (ICS1, ICS2 and ICS3)	4

 * Mixed synchronous controllers, for example, means any controller which supports synchronous communications and is being configured to operate synchronously on a Prime 50 Series system. Both the ICS1 and ICS3 may be configured to support synchronous and/or asynchronous communications.

** NOTE: There is no limit on the number of asynchronous controllers. However, there may be no more than 256 asynchronous lines present (configured or not) in the system.

TABLE 4-23. MDLC - PRIMOS REVISION DEPENDENCIES					
DEPENDENCY	18.3	19.1	19.2	19.3	19.4 and later
Asynchronous Devices	No	No	No	No	No
RJE - HASP 3780 GRTS	Yes w/ maximum speed = 9600	Yes w/ maximum speed = 9600	Yes w/ maximum speed = 9600	Yes w/ maximum speed = 64,000	Yes w/ maximum speed = 64,000
RJE - 2780	Yes w/ maximum speed = 9600	Yes w/ maximum speed = 9600	Yes w/ maximum speed = 9600	Yes w/ maximum speed = 38.4KB	Yes w/ maximum speed = 38.4KB
RJE - 200UT 1004 7020	Yes w/ maximum speed = 9600	Yes w/ maximum speed = 9600	Yes w/ maximum speed = 9600	Yes w/ maximum speed = 9600	Yes w/ maximum speed = 9600
RJE - XBM	No	Yes w/ maximum speed = 19.2KB	Yes w/ maximum speed = 19.2KB	Yes w/ maximum speed = 19.2KB	Yes w/ maximum speed = 19.2KB
DPTX - Distributed Procesessing Terminal Executive	Yes w/ maximum speed = 9600	Yes w/ maximum speed = 9600	Yes w/ maximum speed = 9600	Yes w/ maximum speed = 9600	Yes w/ maximum speed = 9600
PRIMENET - Dial-UP (HDX)	Yes w/ maximum speed = 9600	Yes w/ maximum speed = 9600	Yes w/ maximum speed = 9600	No	Yes w/ maximum speed = 9600
PRIMENET - Dedicated Line (FDX) (X.25)	Yes w/ maximum speed = 9600	Yes w/ maximum speed = 9600	Yes w/ maximum speed = 9600	Yes w/ maximum speed = 64K bps	Yes w/ maximum speed = 64K bps
SNA - Interactive	No	No	No	No	No
SNA - RJE	No	No	No	No	No

TABLE 4-24. ICS1 - PRIMOS REVISION DEPENDENCIES*				
DEPENDENCY	19.1	19.2	19.3	19.4
Asynchronous Devices	Yes	Yes	Yes	Yes
RJE - HASP 2780/3780	Yes w/ maximum speed = 4800	Yes w/ maximum speed = 4800	Yes w/ maximum speed = 4800	Yes w/ maximum speed = 4800
RJE - 200UT, 1004 GRTS, 7020, XBM	No	No	No	No
DPTX (Distributed Processing Terminal Executive)	No	No	No	No
PRIMENET - Dial-up (HDX)	No	No	No	No
PRIMENET - Dedicated Line (FDX) (X.25)	No	No	Yes w/ HDLC only maximum speed = 9600	Yes w/ HDLC only maximum speed = 9600
SNA - Interactive	No	No	No	No
SNA - RJE	No	No	No	No
* ICS1 NOT supported prior to Rev. 19.1.				

TABLE 4-25. ICS2/3 - PRIMOS REVISION DEPENDENCIES			
DEPENDENCY	19.2/19.3	19.4/20.0	20.1
Asynchronous Devices	Yes·	Yes	Yes

RJE - HASP 2780, 3780
     200UT, 1004,
     GRTS, 7020, XBM
	No	No	Yes; 2780,
			3780 and
			HASP only

DPTX - Distributed Processing Terminal Executive	No	No	No
PRIMENET - Dial-up (HDX)	No	No	No
PRIMENET - (X.25) Dedicated Line (FDX)	No	No	Yes
SNA - Interactive	No	Yes	Yes
SNA - RJE	No	Yes	Yes
* ICS2 <u>NOT</u> supported prior to Rev. 19.2.			

TABLE 4-26. VALID HARDWARE/SOFTWARE COMBINATIONS (UP TO PRIMOS REVISION 20.1)				
SOFTWARE PRODUCT	MDLC	PNC	ICS1	ICS3
Asynchronous Devices	No	No	Yes*	Yes
RJE - HASP 2780/3780	Yes - use PROM 5646, 5650 or 5654	No	Yes* w/ maximum speed = 4800 bps	Yes
RJE - 200UT 1004 XBM, 7020	Yes - use PROM 5650, 5651	No	No	No
RJE - GRTS	Yes - use PROM 5654	No	No	No
DPTX - Distributed Processing Terminal Executive	Yes - use PROM 5646, 5650 or 5654	No	No	No
PRIMENET - RINGNET	No	Yes	No	No
PRIMENET - Dial-Up (HDX)	Yes* - use PROM 5646, 5650 or 5654	No	No	No
PRIMENET - Dedicated Line (FDX)	Yes - use PROM 5646, 5650 5651, 5654	No	Yes*	Yes
PRIMENET - X.25	Yes - use PROM 5646, 5650 5651, 5654	No	Yes*	Yes
SNA - Interactive	No	No	No	Yes
SNA - RJE	No	No	No	Yes
* PRIMOS revision dependent				

SECTION 5

CABINET CONFIGURATION REQUIREMENTS

2250 SYSTEM REQUIREMENTS

The 2250 system has three types of cabinets: the 2250 system cabinet,
the 2250 peripheral cabinet and the 7653L peripheral cabinet. The
only peripherals available in the 2250 peripheral cabinets are
68/158MB disks and streaming tape drives. The streaming tape, 315MB
disk drive and ICS2 can be mounted in the 7653L peripheral cabinet.

2250 System Cabinet Space Allocation

The system cabinet of the 2250 houses an entire system, including:

  ● CPU chassis, power supply, backplane, peripheral controllers,
    Diagnostic Processor and an I/O Bulkhead convenience panel

  ● Up to two 68/158MB disks (product numbers 464X and 465X,
    respectively)

  ● Up to two cartridge tape drives (Product Number 4651-2250)

Figure 5-1 shows a rear-view of the 2250 system cabinet with the back
panel removed.

2250 Disk Peripheral Cabinet Space Allocation
(Model Number 7652-2250)

The 2250 disk peripheral cabinet can only be used to add up to two
additional 68/158MB disks to the system. The 2250 peripheral cabinet
is included when the third disk (Product Number 4643-2250 for the 68MB
or 4653-2250 for the 158MB) is ordered. The fourth drive (Product
Number 4644-2250 or 4654-2250) is mounted in the cabinet supplied with
the third disk. Only 2250-style disks may be mounted in this cabinet
(see Figure 5-2).

2250 Streaming Magnetic Tape Subsystem Peripheral Cabinet Space Allocation

The streaming tape peripheral cabinet on the 2250 can only be used to add up to two streaming tape drives to the system. The 2250 peripheral cabinet is included when the first drive (packaged or Product Number 4660-2250) is ordered. The second drive (Product Number 4661-2250) is mounted in the cabinet supplied with the first drive. Only a second streaming drive may be mounted in this cabinet (see Figure 5-3).

7653L Peripheral Cabinet   (Model Number 7653L)

The 7653L peripheral cabinet (Model Number 7653L) is used to house up to two 315MB disk drives, an ICS2 or streaming tape drive. The peripheral cabinet is included when ordering packages containing the 315MB drive (see Figure 5-4).

When a second 315MB disk drive is added to the 2250-019 system, the 7653L cabinet must also be ordered. This configuration makes use of two 7653L cabinets in total, since one comes packaged with the 2250-019.

When a second 315MB disk and a second Streamer are added to a 2250-019 system, the 315MB disk drives must be placed one above the other, in one 7653L cabinet; the Streaming Tape drives must be placed one above the other in the second 7653L cabinet.

2250 Desktop Extension   (Model Number 7560-2250)

An extension may be ordered for the 2250 that provides a desktop area to the right of the 2250 system. This desktop unit (Product Number 7560-2250) is adjustable to two heights.

2250 Cabinet Specifications

Specifications for the 2250 system cabinet and 2250 peripheral cabinets are summarized in Tables 5-1 and 5-2.

2ND TAPE DRIVE

TAPE DRIVE

2ND DISK DRIVE

1ST DISK DRIVE

REAR

10 SLOT CARD CAGE
(8 CARD MAXIMUM)

FRONT

BULKHEAD
CONNECTOR
PANEL

AC POWER

PNC

POWER SUPPLY

DIAGNOSTIC PROCESSOR BOARD   PDU
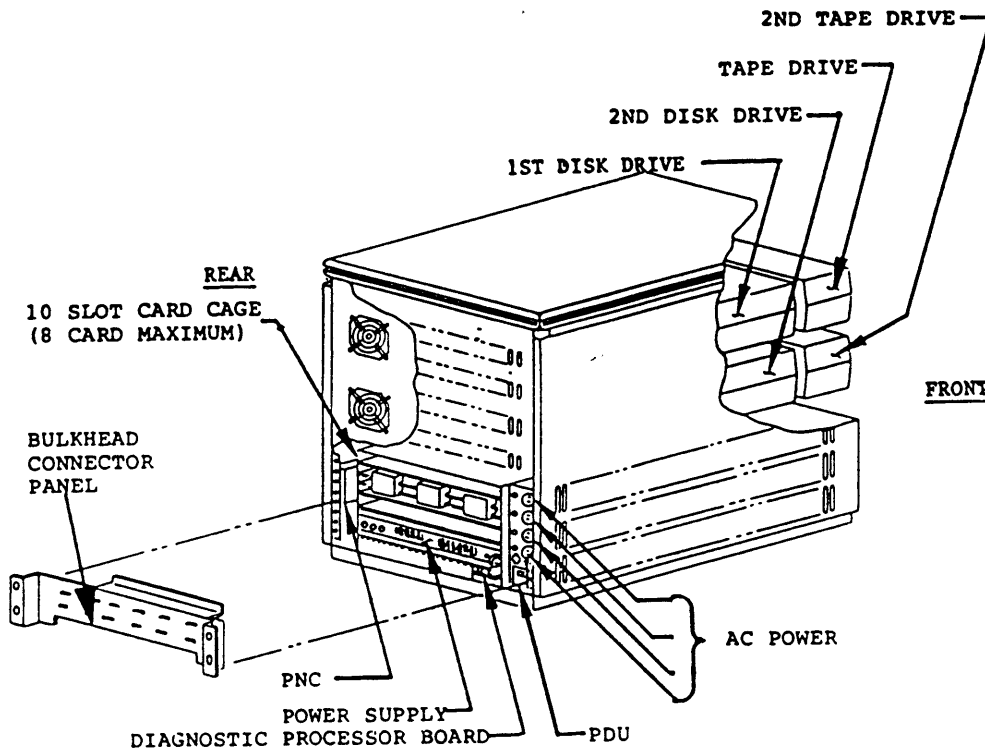
Figure 5-1. 2250 System Cabinet with Back Panel Removed

ONLY 2250 DISKS MAY BE MOUNTED
IN THIS CABINET
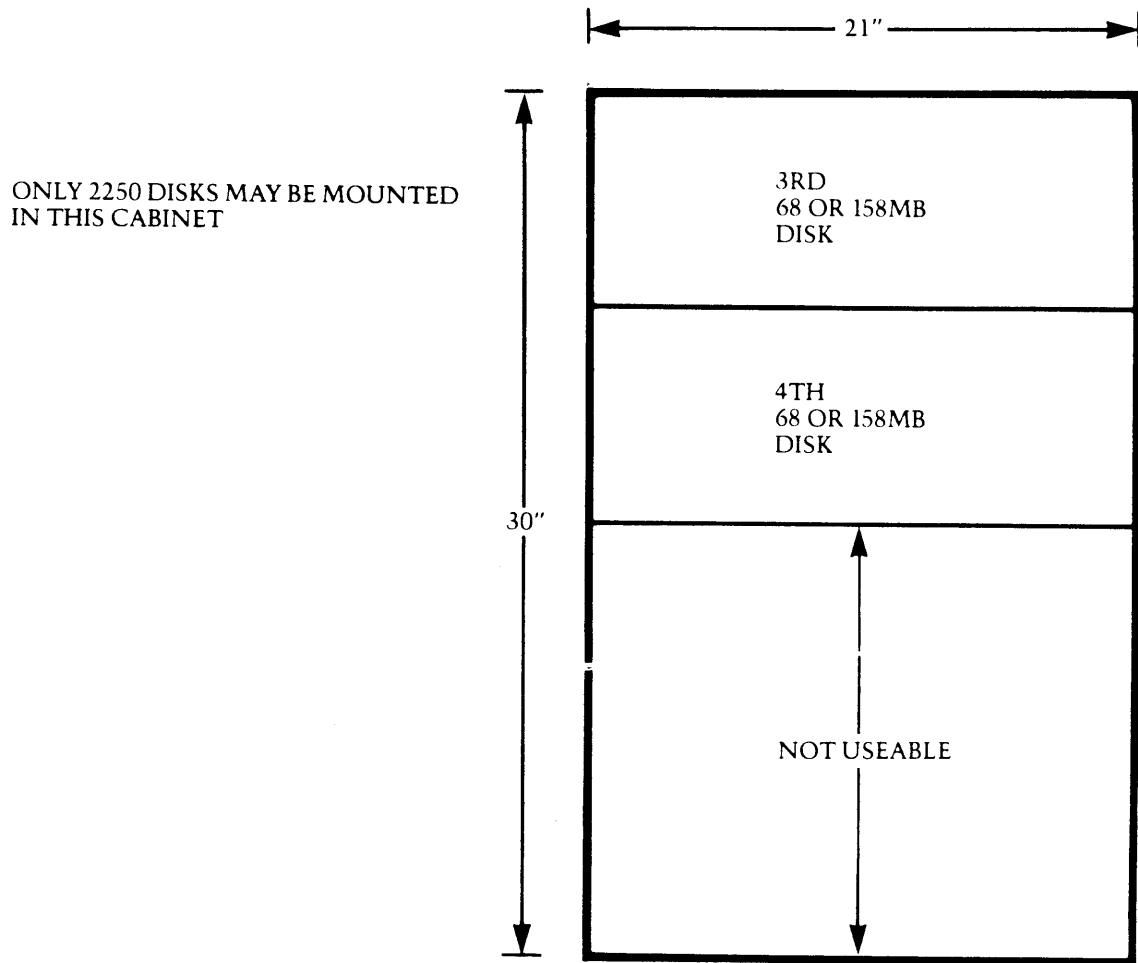
Figure 5-2.   2250 Disk Peripheral Cabinet

|← ———————————— 21" ———————————— →|

ONLY STREAMING MAGNETIC TAPE
DRIVES MAY BE MOUNTED IN THIS
CABINET

1ST
STREAMING MAGNETIC
TAPE DRIVE

2ND
STREAMING MAGNETIC
TAPE DRIVE

30"

NOT USEABLE
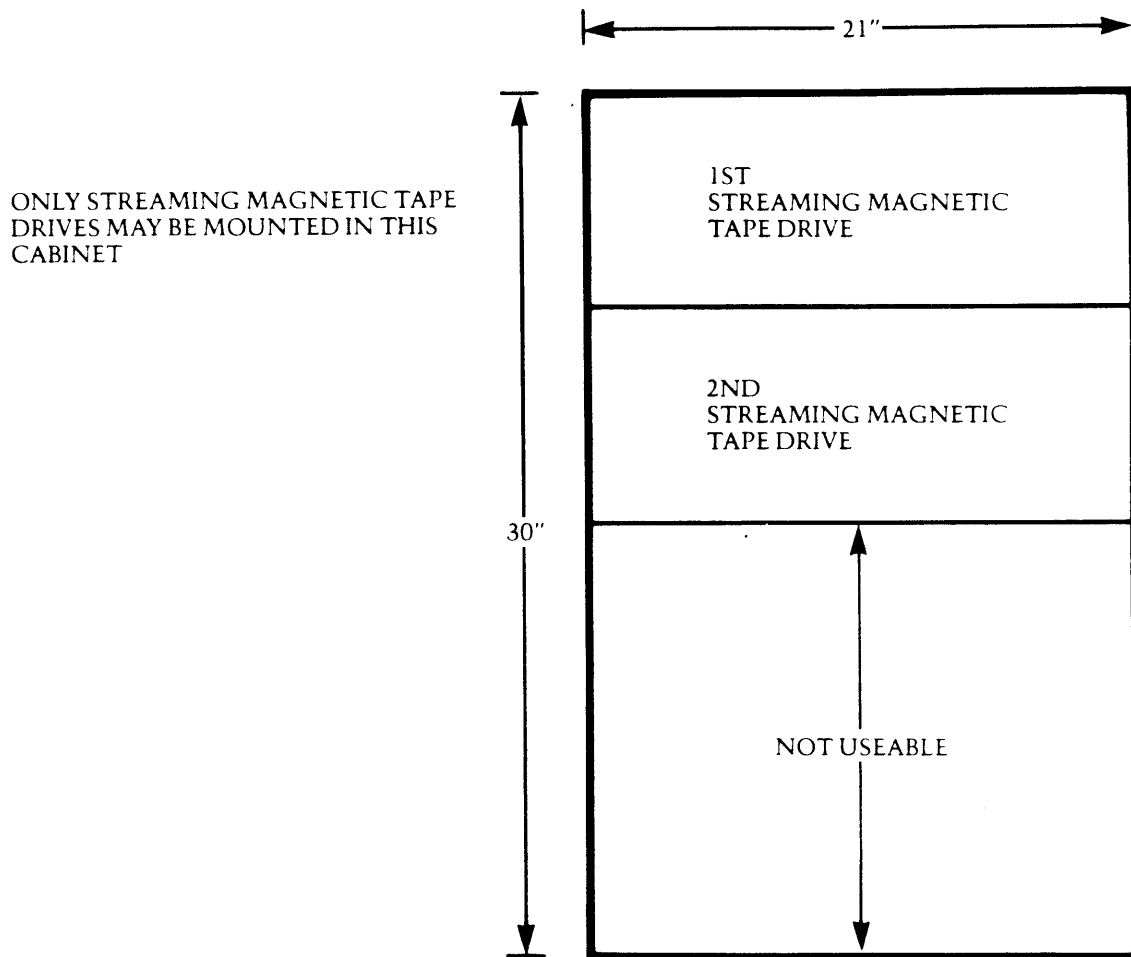
Figure 5-3. 2250 Streaming Magnetic Tape
             Peripheral Cabinet Space Allocation

ALLOWED
OFFICE PERIPHERAL COMBINATIONS
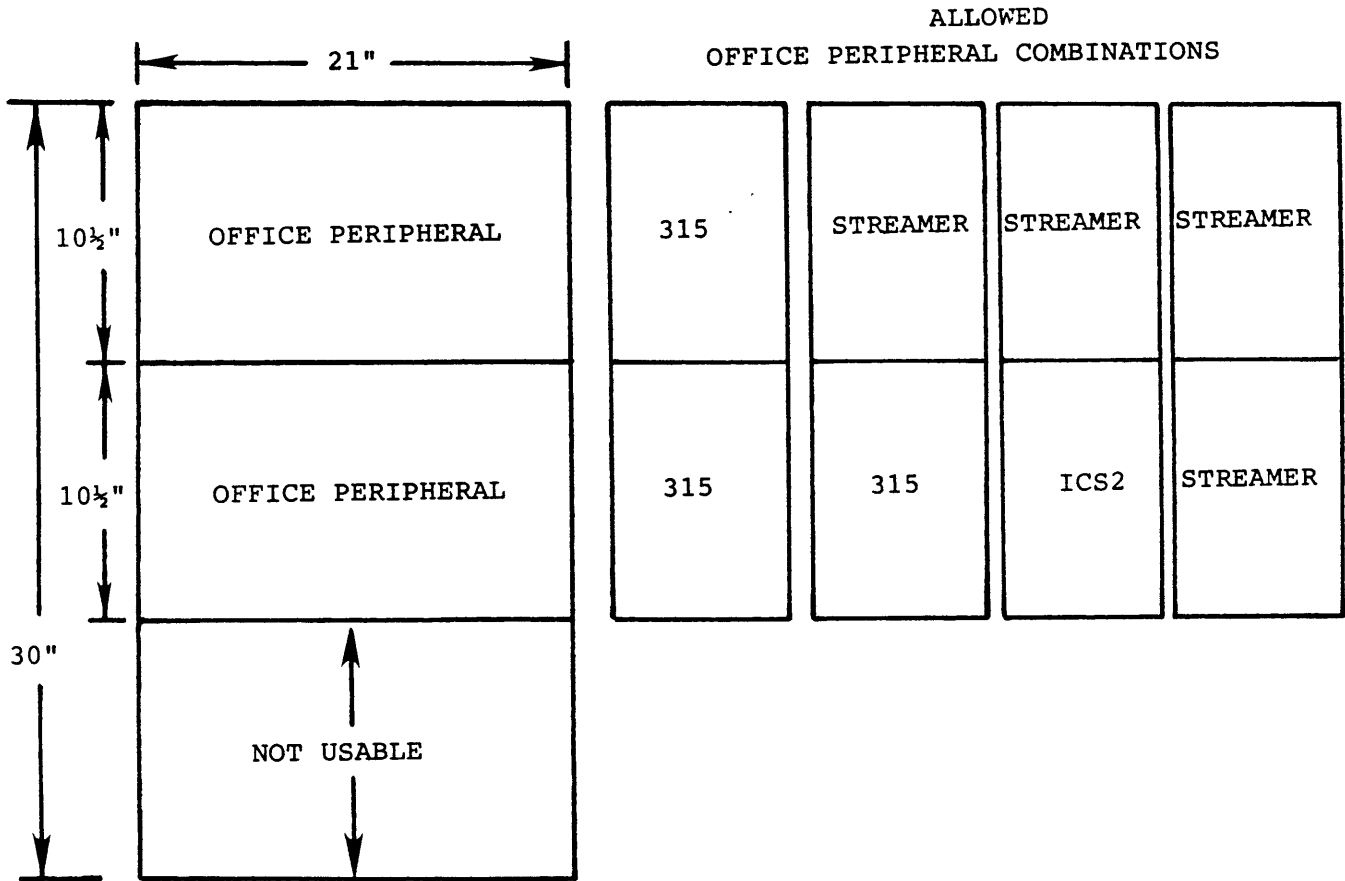
315 = 315MB FIXED MEDIA DISK
STR = STREAMING MAGNETIC TAPE SUBSYSTEM
ICS2 = INTELLIGENT COMMUNICATIONS SUBSYSTEM MODEL II

Figure 5-4.   7653L Office Peripheral Cabinet
              (For Use with 2250 Systems)

2350 AND 2450 SYSTEM REQUIREMENTS

The 2350 and 2450 systems have two types of cabinets: the 2350 and/or
2450 system cabinet, and the Streaming Magnetic Tape Subsystem
cabinet. The only peripheral available in the Streaming Magnetic Tape
Subsystem cabinet is the Streaming Magnetic Tape Drive. Refer to
Appendix A for cabinet specifications.

2350 and 2450 System Cabinet Space Allocation

The system cabinet of the 2350 (or 2450) houses an entire system,
including:

* CPU chassis, power supply, backplane, peripheral controllers,
  Diagnostic Processor and an I/O bulkhead

* Up to two disks of 60MB and 120MB formatted capacities
  (Product Numbers 4711 and 4715)*

* One QIC/600 5-1/4 inch Cartridge Tape Drive

* ICS1, AMLC or ICS3 Communications Controllers

Figure 5-5 shows a cut-away view of the 2350 (2450) system cabinet.

Figures 5-5A and 5-5B show examples of the I/O Bulkhead.

2350 and 2450 Streaming Magnetic Tape Subsystem Peripheral Cabinet
Space Allocation

The office peripheral cabinet (7653L) can only be used to add one
Streaming Magnetic Tape Drive to the 2350 or 2450 system. No other
peripherals may be mounted in this cabinet.

* Please note that a 2350 or 2450 may be configured with a mixed disk
   configuration of 60MB and 120MB disks.

60 MBYTE
CARTRIDGE TAPE

STATUS PANEL

PERIPHERAL
POWER SUPPLY

MAINTENANCE
PROCESSOR

CPU

MEMORY AND
I/O BOARDS

2ND 60 MBYTE
OR 120 MBYTE
FIXED DISK

1ST 60 MBYTE
OR 120 MBYTE
FIXED DISK

COOLING SYSTEM

CONTROL STORE
LOADER
(E-PROM CARTRIDGE)

POWER SUPPLY

LINE FILTER AND
POWER DISTRIBUTION
SYSTEM
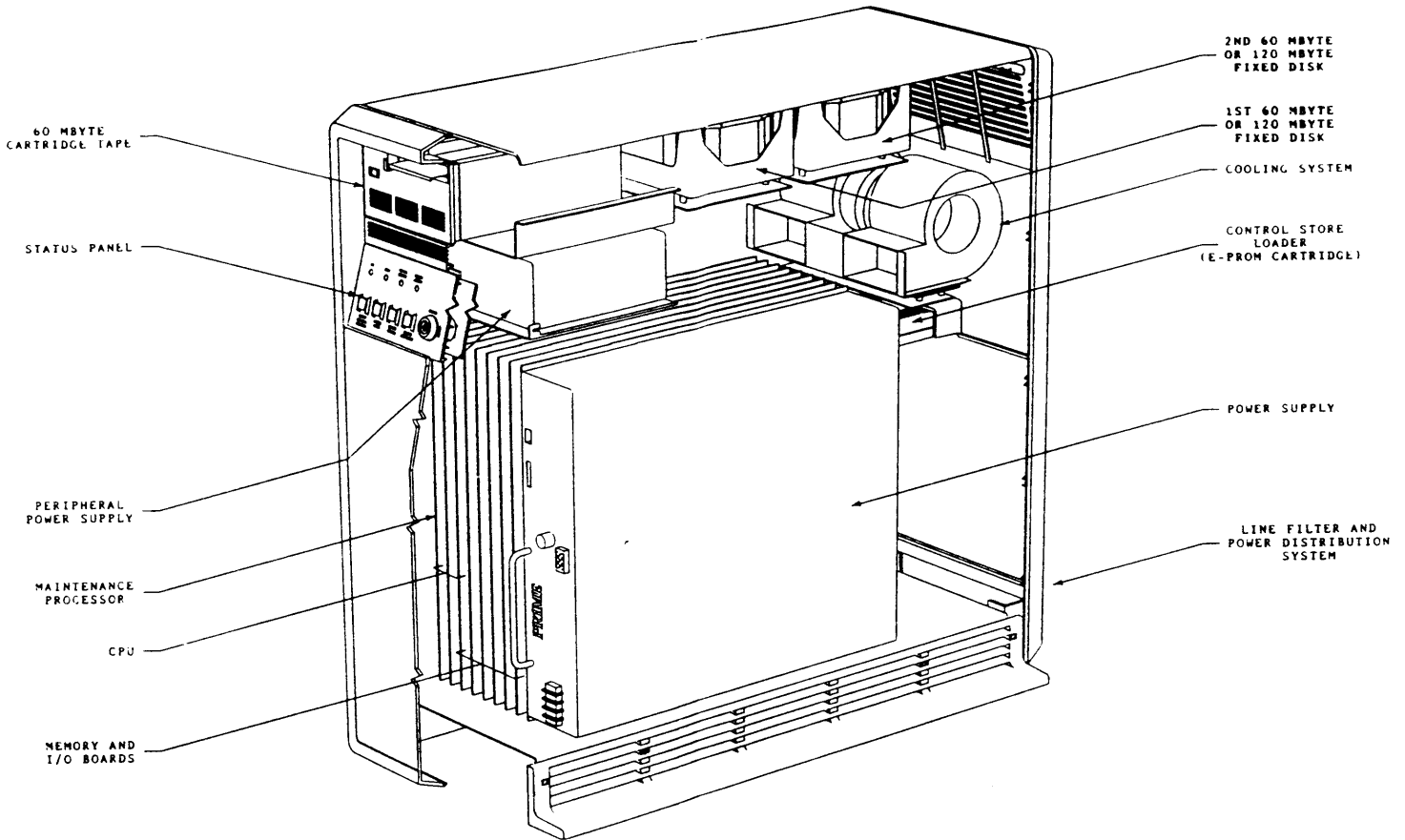
Figure 5-5.   2350/2450 System Cabinet (Cut-Away View)

2350/2450 BULKHEAD CONFIGURATION
EXAMPLES
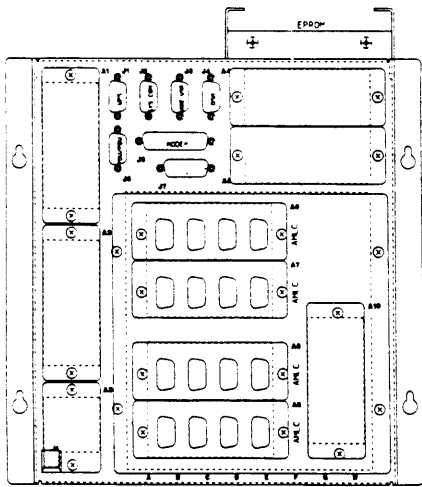
Figure 5-5A.

Standard System Package
with 16-Line AMLC
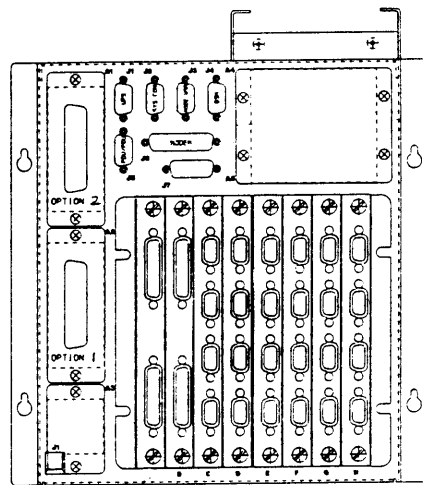
Figure 5-5B.

System Package with ICS3,
24 Asynchornous Lines and
4 Synchronous Lines

2655 SYSTEM REQUIREMENTS

The 2655 has two types of cabinets: the 2655 system cabinet and the
2655 office peripheral cabinet. The only peripherals available in
the 2655 office peripheral cabinet are the 315MB FMD, streaming tape,
cartridge tape and the Intelligent Communications Subsystem Model 2
(ICS2).

2655 System Cabinet Space Allocation

The system cabinet of the 2655 houses the following components:

- CPU chassis, backplane, modem for 60Hz system

- Power distribution unit (PDU), power supply

- CPU boards, memory boards, peripheral controllers,
  communications controllers

- Diagnostic Processor, I/O bulkhead

Figure 5-6 is a rear-view of the system cabinet with the back panel
removed.

2655 Office Peripheral Cabinet Space Allocation

The peripheral cabinet of the 2655 is used for housing the 315MB FMD,
1/2 inch streaming tape, cartridge tape and the ICS2 in the office
environment. All 2655 packaged systems having the 315MB FMD as the
first device include the office peripheral cabinet. If more space is
required when ordering additional rack-mounted peripherals, an
additional office peripheral cabinet (Product Number 7653L) must be
ordered (see Figure 5-7).

2655 Cabinet Specifications

Specifications for the 2655 and 2655 office peripheral cabinet are
found in Appendix A.
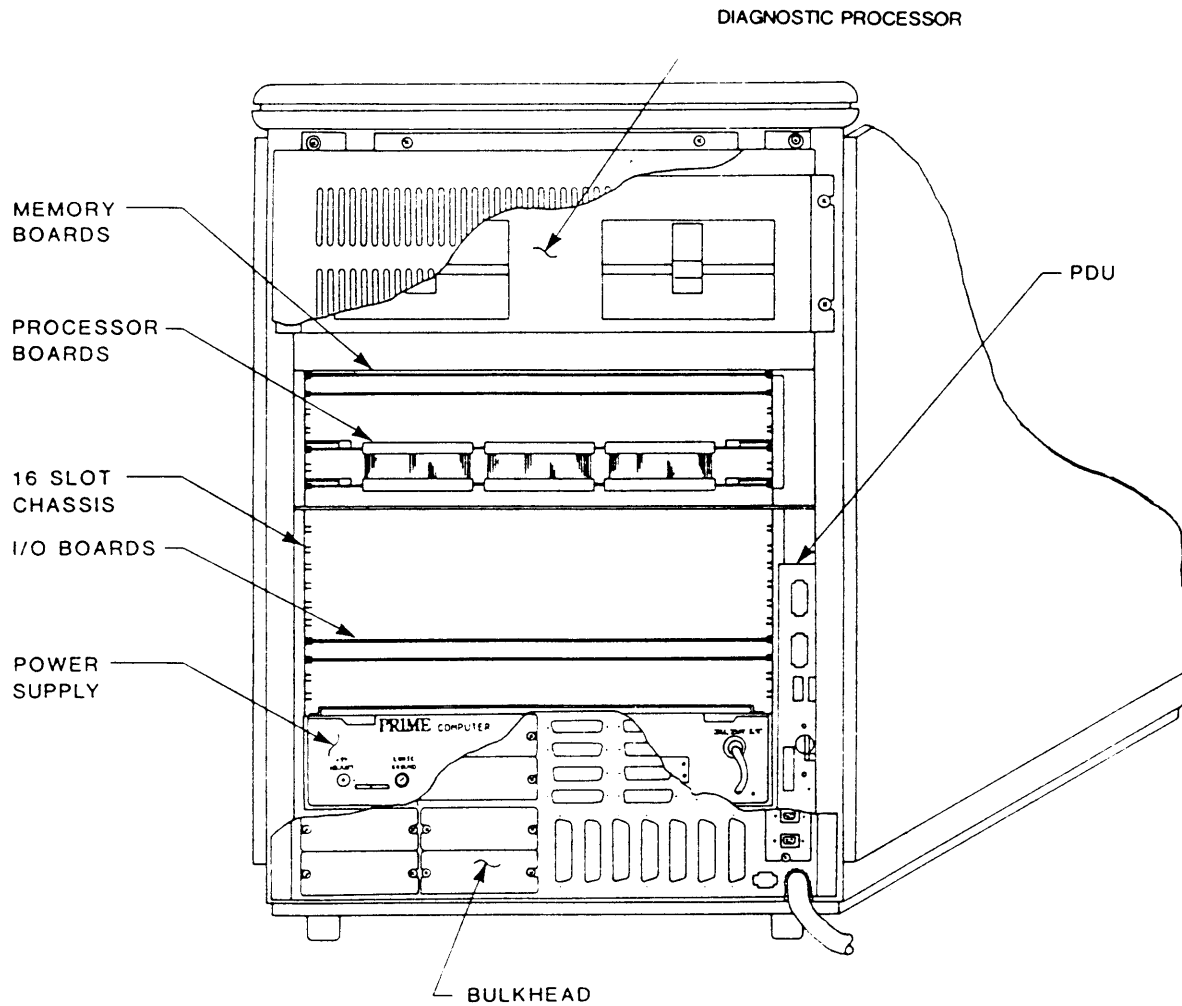
Figure 5-6. 2655 System Cabinet with Back Panel Removed

ALLOWED OFFICE PERIPHERAL MAXIMUM COMBINATIONS
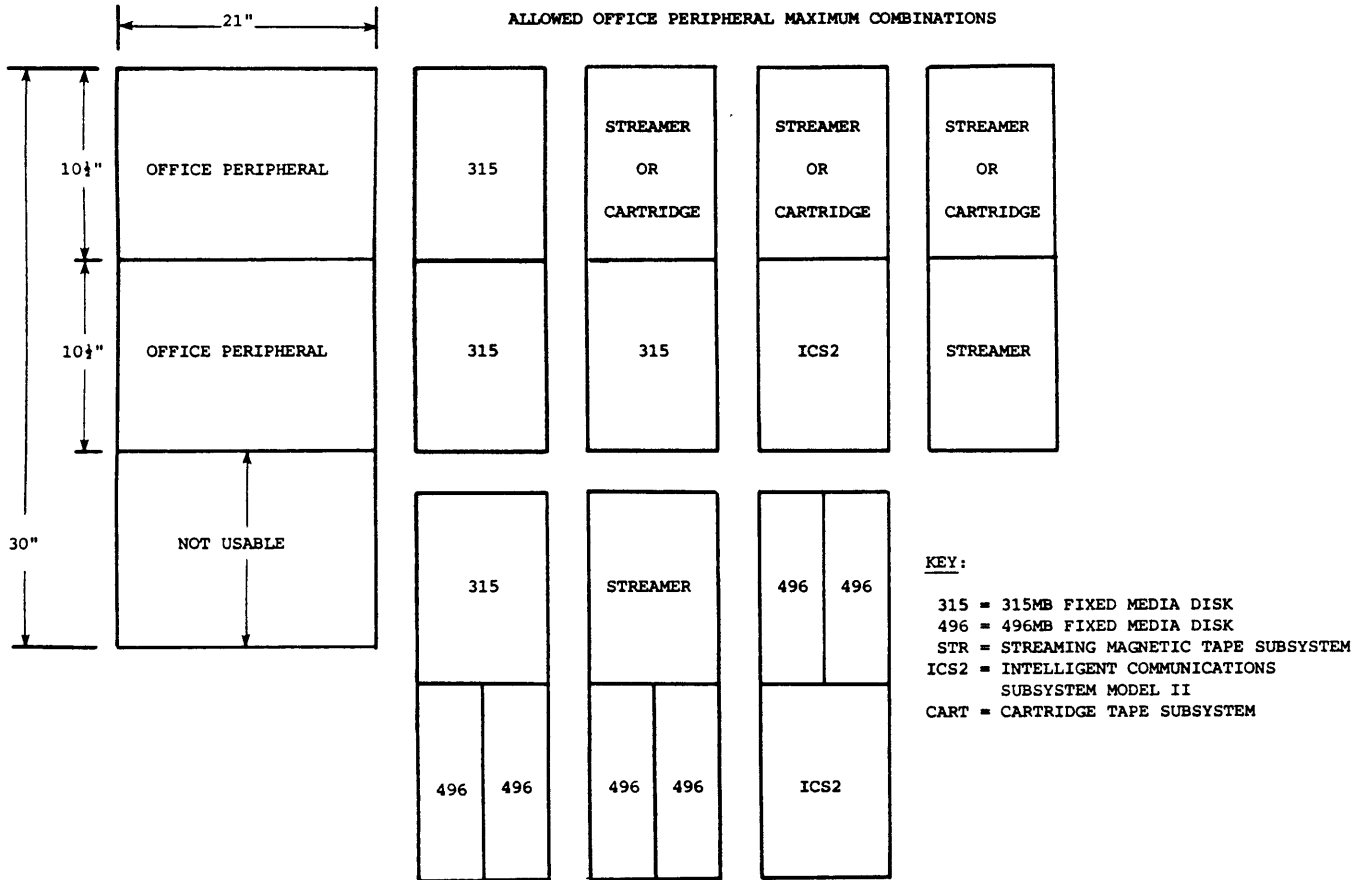
Figure 5-7.   7653L Office Peripheral Cabinet

9655 SYSTEM CABINET REQUIREMENTS

The 9655 utilizes a Product Number 7650F system cabinet (Figure 5-8)
and a Product Number 7651F* and/or 7564S* peripheral cabinet(s),
(Figures 5-10 and 5-11). The standard configuration for the 9655 is
described below.

9655 System Cabinet Space Allocations

The system cabinet is used to house the CPU chassis.
NOTE: NO PERIPHERALS MAY BE INSTALLED IN THE 9655 SYSTEM CABINET.

   ●   CPU Chassis - The CPU chassis is comprised of a 16-slot card
       cage and backplane assembly, and is installed in the system
       cabinet. The CPU chassis is located in the top of the system
       cabinet.

   ●   Main Memory - The system cabinet contains board positions for
       installing up to eight memory boards.

   ●   Peripheral Devices - Installation of peripheral devices is not
       allowed in the system cabinet.

   ●   I/O Chassis - The I/O chassis is comprised of a 19-slot chassis
       and backplane assembly, and is installed below the CPU chassis
       in the system cabinet. The I/O chassis can be configured with
       up to 10 controllers.

   ●   Two Basic Types of Peripheral Cabinets - The 9655 may be
       configured with the 7564S peripheral cabinet, which may be
       configured with up to eight (8) 496MB fixed media disks.

* The 9655 utilizes the 7651F peripheral cabinet under the following
   circumstance ONLY:

   ●   When the prospect orders the 4551F GCR tape drive.

9655 Cabinet Specifications

Specifications for the system cabinet and peripheral cabinet(s) used
with the 9655 are summarized in Appendix A.
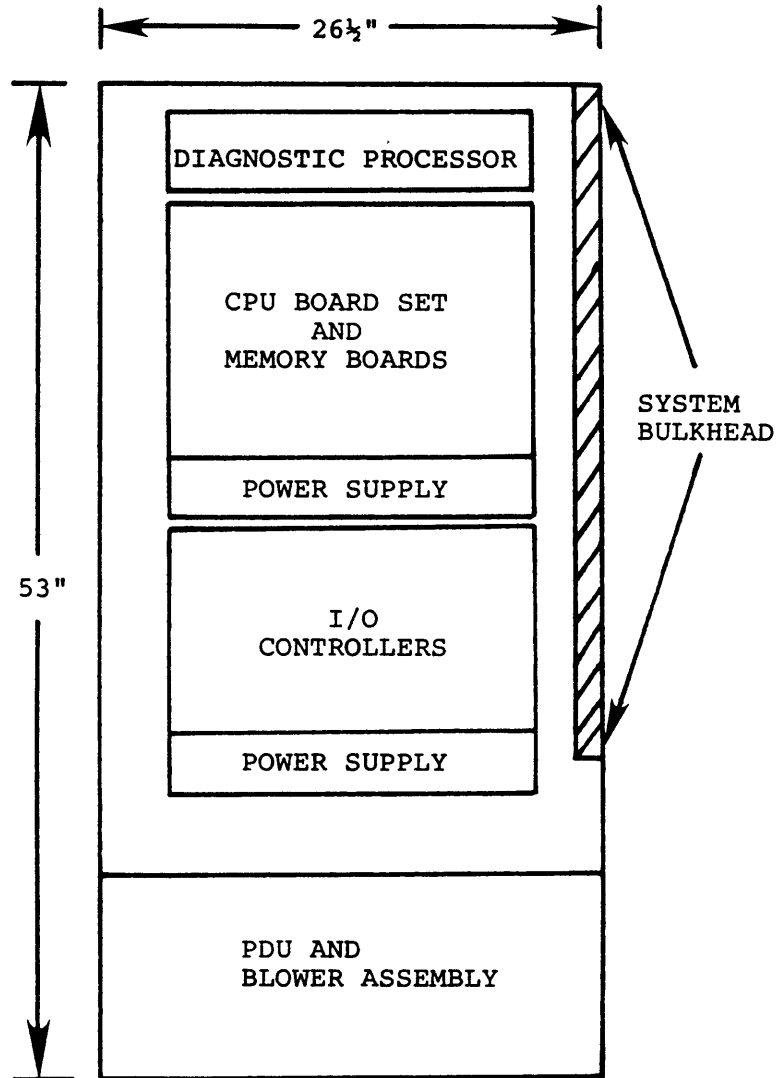
Figure 5-8. 9655 System Cabinet Space Allocation

9755 AND 9955 II SYSTEM CABINET REQUIREMENTS

Prime's 9755 and 9955 II systems utilize two Product Number 7650F
system cabinets and Product Number 7651F* and/or 7564S peripheral
cabinet(s). A description of the cabinets and their standard
configurations follows:

9755 and 9955 II System Cabinets Space Allocation

The two system cabinets (Product Number 7650F) used to house the
system are configured as Cabinet A and Cabinet B. System cabinet
space allocation and configuration requirements are illustrated in
Figure 5-9 and described below.

   • Cabinet A - is the CPU and main memory cabinet. The CPU chassis
     contains the CPU board set, memory controller and two ECL power
     supplies. The memory chassis contains eight (8) memory slots
     and a standard power supply.

   • Cabinet B - contains the I/O controllers and up to two power
     supplies. Cabinet B (and the I/O controllers) connects to
     Cabinet A via the appropriate I/O cables. The 9755 supports a
     maximum of 10 I/O controller boards; the 9955 II supports a
     maximum of 14. Cabinet B also houses the Diagnostic Processor
     and its separate power supply.

   • Peripheral Devices - No peripheral devices may be installed in
     either Cabinet A or B. Any cabinet-mounted peripherals must be
     mounted in a peripheral cabinet.

* The 9755 and 9955 II utilize the 7651F peripheral cabinet under
   the following circumstance ONLY:

   • When the prospect orders the 4551F GCR tape drive.

9755 and 9955 II Cabinet Specifications

Specifications for the system and peripheral cabinet(s) used with the
9755 and 9955 II are summarized in Appendix A.
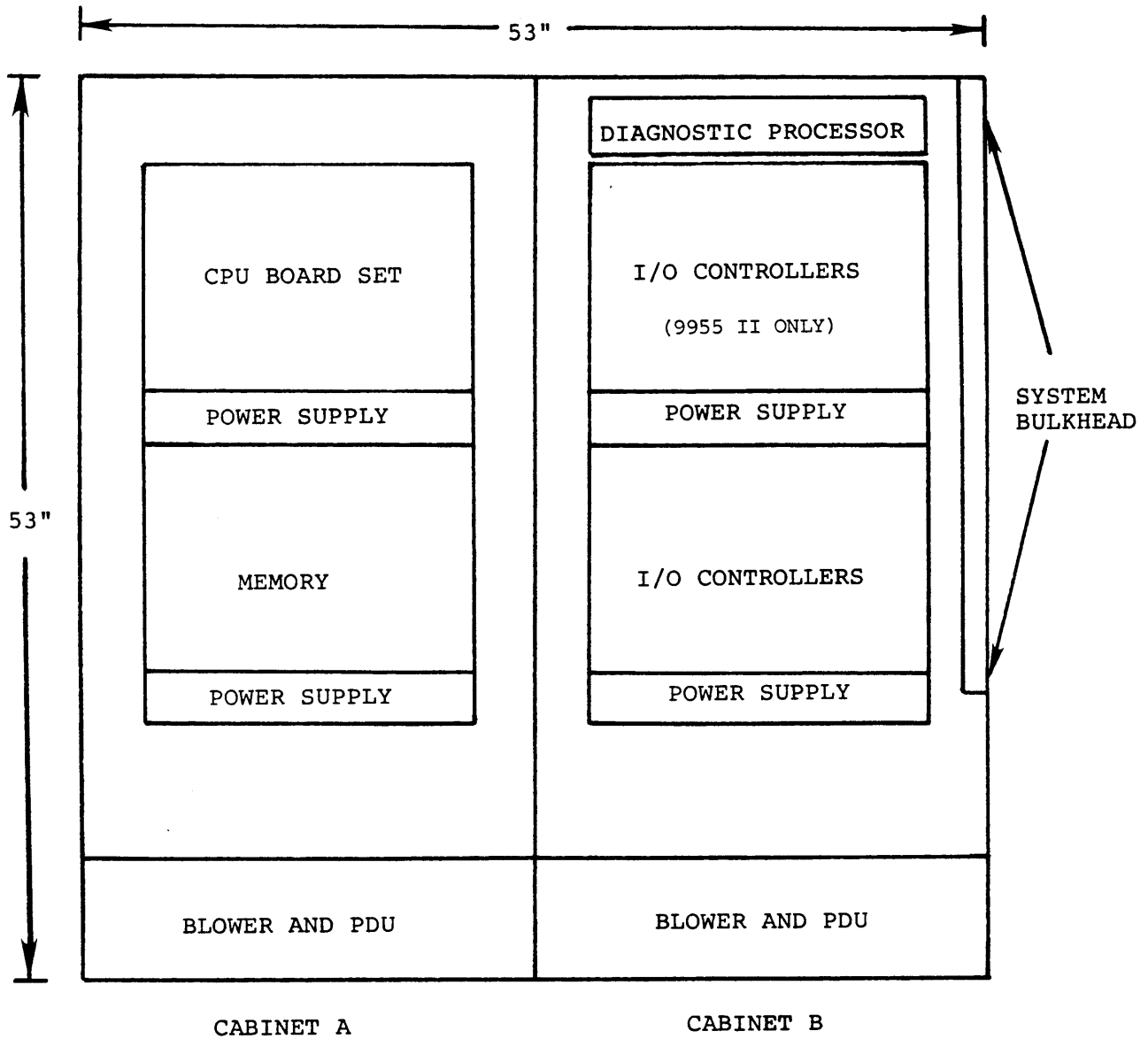
Figure 5-9. 9755 and 9955 II System Cabinet
(Rear-View) Space Allocation

9655, 9755 AND 9955 II PERIPHERAL CABINET SPACE ALLOCATION

7651F Peripheral Cabinet

The 7651F Peripheral Cabinet is used to house 50 Series rack-mounted
peripherals, and is being replaced by the 7564S Peripheral Cabinet.
Mounting space in the peripheral cabinet(s) is allocated in the
following priority order: magnetic tape transports, disk drives, and
other optional devices that are installed in the upper half of the
cabinet. All unused space, from the bottom of the installed
peripheral(s) to the bottom of the cabinet, is enclosed using filler
panels. Space allocation and configuration requirements for the major
peripheral devices installed in the peripheral cabinet(s) are
illustrated in Figures 5-10 and 5-11.

  ● Magnetic Tape Transport - The magnetic tape transport (MTT) is
    installed in the upper portion (upper 24-1/2") of the cabinet,
    as illustrated in Figure 5-10. Only one MTT may be installed
    per cabinet.

  ● Other - Disk drives that may be installed in the peripheral
    cabinet(s) are the rack-mounted devices: the Cartridge Module
    Disk (CMD) and the Fixed Media Device (FMD/160MB, 315MB and
    496MB), Streaming Tape, 15MB cartridge tape, and ICS2 card
    cages may also be installed in the peripheral cabinet.

If a magnetic tape transport (MTT) is installed in the cabinet, one
cabinet-mounted device may be installed in the 10-1/2 inch space below
the MTT, as shown in Figure 5-10.

If no MTT is installed in the cabinet, three cabinet-mounted
peripherals that occupy one 10-1/2 inch rack each can be installed in
the peripheral cabinet. If an ICS2 card cage is installed, the ICS2
occupies one 10-1/2 inch rack; this leaves two 10-1/2 inch racks
available for cabinet mounted peripherals (see Figure 5-11).

The 7651F cabinet supports up to two ICS2 card cages; when two are
configured in the cabinet, one 10-1/2 inch rack remains open between
them for cooling.

Configuring the 7651F Peripheral Cabinet with 496MB Disks

The 7651F cabinet supports up to three (3) 315MB FMDs; each occupying
one (1) 10-1/2 inch space. The 7651F also supports the 496MB disk,
but close attention must be paid to the following configuration
guidelines:

1.   A maximum of two (2) 496MB disks may be configured in the
      cabinet. The only combination supported is one (1) 4735F and
      one (1) 4738F (first and add-on disk drives).

2.   The 4735F and 4738F may be configured in any 10-1/2 inch rack
      space in which a 315MB FMD could be configured. The 4735F and
      4738F each occupy half of one 10-1/2 inch cabinet-mounted
      peripheral space.

3.   No configuration can exceed a total of four peripherals in the
      cabinet.

Based on these configuration rules, the 7651F peripheral cabinet can
be configured with up to two 315MB disks and two 496MB disks; provided
the 496MB disks have Product Numbers 4735F and 4738F.

NOTE: The 496MB disk (Model Number 4736) is not supported on the
        7651F cabinet because it is a right disk drive and controller.
        Proper bulkheading is not available for cables.

TYPES OF PERIPHERALS THAT MAY
BE CONFIGURED IN THE 7651F CABINET:

*   CABINET-MOUNTED PERIPHERALS MAY
    BE ONE OF THE FOLLOWING:

    -   CMD DISK
    -   160MB FMD DISK
    -   CARTRIDGE TAPE (15MB)
    -   HALF-INCH STREAMING TAPE*
    -   ICS2 CARD CAGE
    -   315MB FMD DISK
    -   (2) 496MB FMD DISKS (PRODUCT
        NUMBERS 4735F AND 4738F) CAN
        OCCUPY ONE RACK SPACE AVAILABLE.
        EACH DISK DRIVE OCCUPIES HALF OF
        ONE 10-1/2 INCH CABINET-MOUNTED
        PERIPHERAL SPACE.

    *   MULTIPLE STREAMING TAPE DRIVES
        MUST BE MOUNTED IN THE SAME
        PERIPHERAL CABINET.

NOTE: MODEL 4550 (OLD-STYLE) GCR
      TAPE DRIVES FILL AN ENTIRE
      PERIPHERAL CABINET, LEAVING
      NO ADDITIONAL MOUNTING ROOM.
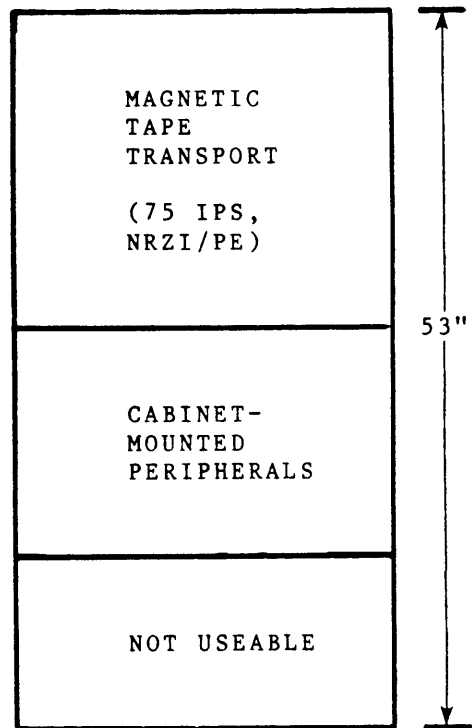
Figure 5-10. 7651F Peripheral Cabinet with NRZI/PE
              Magnetic Tape Space Allocation

CABINET SPACE OCCUPIED BY
PERIPHERALS THAT MAY BE
CONFIGURED IN THE 7651F CABINET:

* CABINET-MOUNTED PERIPHERALS
  CAN CONSIST OF THE SAME OR A
  MIX OF THE FOLLOWING DEVICES:

  - CMD DISKS (OCCUPIES 1
    (RACK SPACE)
  - 160MB FMD DISKS (OCCUPIES 1
    RACK SPACE)
  - 315MB FMD DISKS (OCCUPIES 1
    RACK SPACE)
  - CARTRIDGE TAPE (OCCUPIES 1
    RACK SPACE)
  - STREAMING TAPE (SEE NOTE)
  - (2) 496MB DISKS (PRODUCT
    NUMBERS 4735F AND 4738F);
    OCCUPIES 1 RACK SPACE.
    EACH DISK DRIVE OCCUPIES
    HALF OF A 10-1/2 INCH
    CABINET-MOUNTED PERIPHERAL
    SPACE.

* IN ADDITION, ICS2 CARD CAGES
  MAY BE MOUNTED UNDER THE
  FOLLOWING RULES:

  - MAXIMUM OF (2) ICS2 CARD
    CAGES ONLY .

  - (1) ICS2 CARD CAGE, AND UP
    TO 2 OTHER DEVICES FROM
    THE ABOVE LIST.

NOTE: MULTIPLE STREAMING TAPE DRIVES
      MUST BE LOCATED IN THE SAME
      PERIPHERAL CABINET; EACH
      DEVICE REQUIRES ON RACK SPACE.
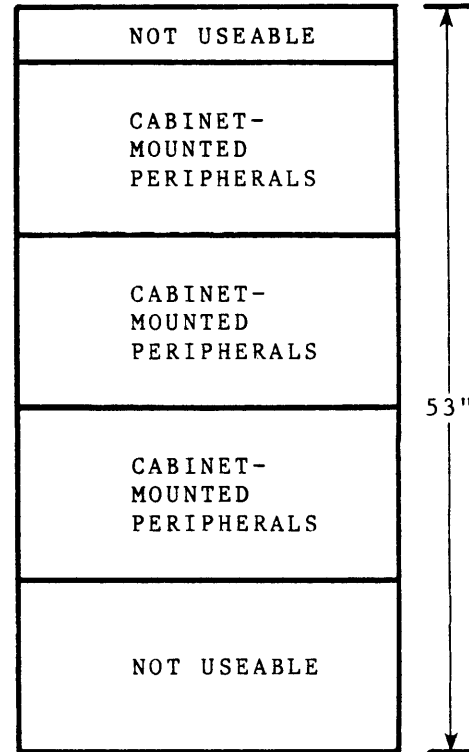
Figure 5-11. 7651F Peripheral Cabinet Space Allocation

7564S Peripheral Cabinet

The new 7564S peripheral cabinet houses all current 50 Series
peripheral devices. The peripheral cabinet contains four standard
10-1/2 inch rack slots. All 50 Series rack-mountable disk and tape
devices are designed to be housed in a given number of rack slots.
These peripherals include the 800/1600 BPI and 6250 BPI tape
transports, 1/2 inch Streaming Tape unit, 315MB FMD, 496MB FMD and the
ICS2 and ICS3 communications subsystems. Space allocation and
configuration requirements for the major peripheral devices which can
be installed in the peripheral cabinet(s) are illustrated in Figures
5-12, 5-13 and 5-14.

The new 7564S peripheral cabinet has the same dimensions as the 7651F
peripheral cabinet. The cabinets may be mixed on the same system, and
appear as a matched pair in appearance.

The 7564S peripheral cabinet contains its own power distribution unit
(PDU) and meets all FCC requirements.

4737S or 4735S	4736S or 4738S
4735S	4736S or 4738S
2 - 496MB DISK or 1 - 10½" DEVICE or OPEN	
2 - 496MB DISK or 1 - 10½" DEVICE or OPEN	

4737S or 4535S	4736S or 4738S
1 - 10½" DEVICE	
1 - 10½" DEVICE	
1 - 10½" DEVICE	

MAGNETIC TAPE UNIT	
4737S or 4735S	4736S or 4738S
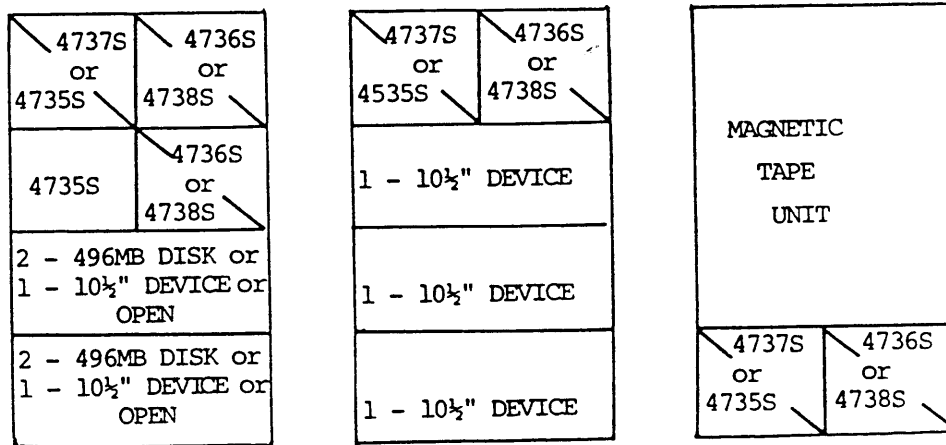
Figure 5-11. Examples of Possible 7564S
              Peripheral Cabinet Configurations

TYPES OF PERIPHERALS THAT MAY
BE CONFIGURED IN THE 7564S CABINET:

* MAGNETIC TAPE TRANSPORTS
  CAN BE ONE OF THE FOLLOWING:

  - 800/1600 BPI TAPE
     TRANSPORT (4522S)

  - 6250 BPI TAPE
     TRANSPORT (4590S)

* CABINET-MOUNTED PERIPHERALS
  CAN BE ONE OF THE FOLLOWING:

  - 315MB FMD (447XS)

  - 496MB FMD (473XS)

  - 1/2 INCH STREAMING TAPE
     (4660S)

  - ICS2 (5720S or 5242S)*

  - REFER TO FIGURE 5-14 FOR
     ICS3 CONFIGURATIONS.

```
+--------------------------+  ▲
|       NOT USEABLE        |  |
+--------------------------+  |
|                          |  |
|   RACK SLOTS 1, 2, 3     |  |
|                          |  |
|     MAGNETIC TAPE        |  |
|       TRANSPORT          |  |  53"
+--------------------------+  |
|                          |  |
|     RACK SLOT 4          |  |
|  CABINET-MOUNTED         |  |
|     PERIPHERAL           |  |
+--------------------------+  |
|                          |  |
|       NOT USEABLE        |  |
+--------------------------+  ▼
```
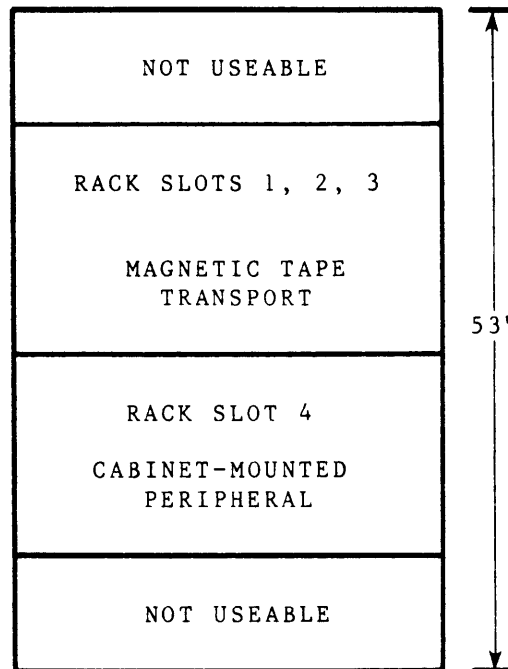
NOTE: For additional information on the configurable disks and
       peripheral products, please refer to Section 2 - Disk
       Subsystems.

*   A maximum of one ICS2 may be configured in the 7564S
       cabinet.

FIGURE 5-12.   7564S Peripheral Cabinet

NUMBER OF RACK SLOTS NECESSARY TO
CONFIGURE PERIPHERALS IN THE 7654S
PERIPHERAL CABINET:

1)   TWO 496MB FMDs CAN BE
     MOUNTED IN A RACK SLOT.
     THEREFORE, UP TO EIGHT
     496MB FMDs MAY BE CONFIGURED
     IN ONE CABINET.

2)   ONE 315MB FMD IS CONFIGURABLE
     PER SLOT, THEREFORE, UP TO FOUR
     315MB FMDs MAY BE CONFIGURED IN
     ONE CABINET.

3)   BOTH THE 800/1600 BPI TAPE
     TRANSPORT (4522S) AND THE 6250
     BPI TAPE TRANSPORT (4590S OR 4592S)
     OCCUPY THREE RACK SLOTS. THE RACK
     SLOT IMMEDIATELY BELOW THE TAPE
     UNIT MAY BE USED TO CONFIGURE TWO
     496MB DISKS OR ONE 315MB DISK.

4)   THE 1/2 INCH STREAMER TAPE UNIT
     OCCUPIES ONE RACK SLOT. STREAMER
     TAPES SHOULD BE INSTALLED IN THE
     BOTTOM SLOTS FIRST (RACK SLOTS
     3 OR 4) BEFORE USING RACK SLOTS
     1 AND 2.

5)   THE ICS2 COMMUNICATIONS SUBSYSTEM
     REQUIRES TWO RACK SLOTS IF
     CONFIGURED WITH A 315MB FMD, 496MB
     FMD, AND/OR STREAMER TAPE UNIT
     (ONE RACK IS FOR THE ICS2, THE
     OTHER IS FOR COOLING).
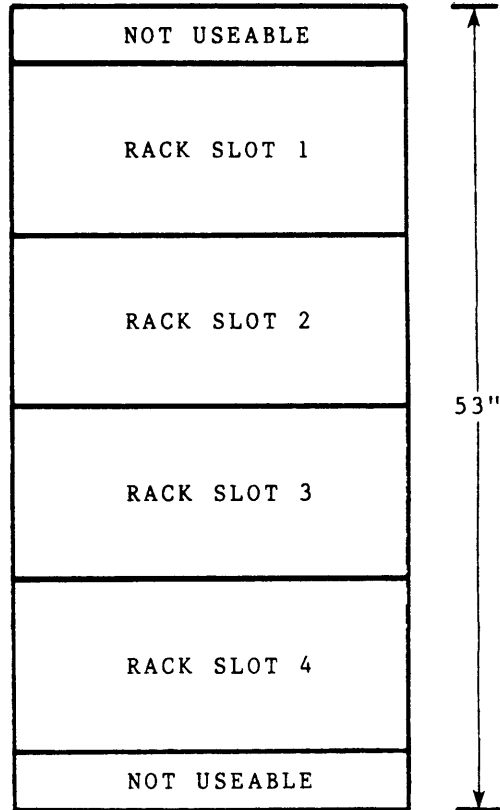
     IF A 800/1600 BPI TAPE TRANSPORT
     OR THE 6250 BPI TAPE TRANSPORT IS
     CONFIGURED, THE REMAINING RACK
     SPACE MAY BE USED TO CONFIGURE ONE
     ICS2 CARD CAGE. (AN OPEN COOLING
     SPACE IS NOT REQUIRED IN THIS CASE.)

     NOTE: A MAXIMUM OF ONE ICS2 CARD CAGE
     MAY BE CONFIGURED IN THE 7564S CABINET.

     REFER TO FIGURE 5-14 FOR ICS3
     CONFIGURATIONS.

```
+-------------------------+
|      NOT USEABLE        |
+-------------------------+
|                         |
|      RACK SLOT 1        |
|                         |
+-------------------------+
|                         |
|      RACK SLOT 2        |
|                         |
+-------------------------+        53"
|                         |
|      RACK SLOT 3        |
|                         |
+-------------------------+
|                         |
|      RACK SLOT 4        |
|                         |
+-------------------------+
|      NOT USEABLE        |
+-------------------------+
```

Figure 5-13. 7564S Peripheral Cabinet

- TWO ICS3s CAN BE HOUSED IN
  THE REAR OF RACK SLOTS 3 AND 4.

- STREAMER TAPE DRIVES CAN BE
  HOUSED IN RACK SLOTS 3 AND 4
  WITH ICS3s.

- RACK SLOTS 1 AND 2 CAN HOUSE
  THE 496MB OR THE 315MB DISKS,
  OR ANY OTHER RACK SLOT
  PERIPHERAL DEVICE.

- TWO ICS3s CAN ALSO BE HOUSED
  WITH MAGNETIC TAPE TRANSPORTS
  (4590S).

RACK SLOT 1	
RACK SLOT 2	
RACK SLOT 3	ICS3
RACK SLOT 4	ICS3
NOT USEABLE	
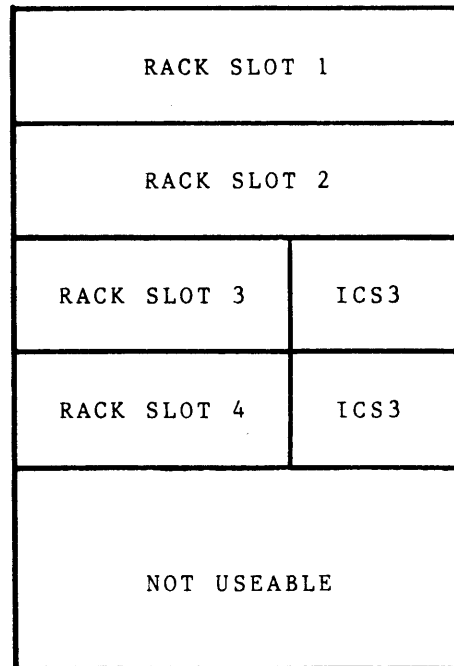
Figure 5-14.   7564S Side View

APPENDIX A

SYSTEMS SPECIFICATIONS

2250 SYSTEM CABINET

Specifications for the 2250 system is shown below for convenient reference.

Physical Dimensions

	DOMESTIC	INTERNATIONAL
Height	30 inches	76 cm
Width	21 inches	53 cm
Depth	31 inches	79 cm
Weight (fully loaded)	350 lbs	159 kgs

Electrical/Heat Dissipation

	DOMESTIC	INTERNATIONAL
Volts	104 – 127	208 – 254
Frequency, Hz	59 – 61	49 – 51
Current (amps)	14.5	7.5
Demand (KVA)	1.7	1.7
Input Power (watts)	1.3	1.3
Heat Dissipation	4500 BTU/hr	1134 Kcal/hr
NEMA Plug	5-20P	

NOTE: Domestic units are defined as 60Hz systems. International units are defined as 50Hz systems.

Environmental

Temperature:

	DOMESTIC	INTERNATIONAL
Operational	59 – 86 $^\circ$F	15 – 30 $^\circ$C
Storage	-40 – 140 $^\circ$F	-40 – 60 $^\circ$C

Humidity:

	DOMESTIC	INTERNATIONAL
Operational (non-condensing)	20 – 80%	20 – 80%
Storage (non-condensing)	0 – 95%	0 – 95%

Altitude:

	DOMESTIC	INTERNATIONAL
Operational	7,000 ft.	2,100m
Storage	40,000 ft.	12,200m

Acoustical   Not to exceed 55 dBA
Air Quality   Normal ofice environment
Electrostatic   0-5KVDC with no failures

2250 PERIPHERAL CABINET SPECIFICATIONS

68MB/158MB DISK OR STREAMER CABINET

	DOMESTIC	INTERNATIONAL
Height	30 in	76 cm
Width	21 in	53 cm
Depth	31 in	79 cm
Weight (Empty)	140 lbs	63.5 kgs

Environmental

Temperature	59 - 86 °F	15 - 30 °C
Relative Humidity	20 - 80%	20 - 80%
Heat Dissipation	30 BTU/hr	7.56 Kcal/hr

315MB DISK (7653L) CABINET

Height	30 in	76 cm
Width	21 in	53 cm
Depth	31 in	79 cm
Weight (empty)	140 lbs	63.5 kgs

Environmental:

Temperature	59 - 86 °F	15 - 30 °C
Relative Humidity	20 - 80%	20 - 80%
Heat Dissipation	30 BTU/hr	7.56 Kcal/hr

2350/2450

Specifications for all 2350/2450 systems are shown below for
convenient reference.

System Cabinet

	DOMESTIC	INTERNATIONAL
Height	29 inches	73.7 cm
Width	11.3 inches	28.7 cm
Depth	30.3 inches	77.0 cm
Weight (fully loaded)	142 lbs	64.4 kgs

Electrical/Heat Dissipation:

Volts	104 - 127	208 - 254
Current, Amps	8.2	4.1
Startup Current (Amps, 1 AC cycle)	110	110
Frequency, Hz	59 - 61	49 - 51
Demand, KVA	1.1	1.0
Input Power, Watts	660	660
Heat Dissipation	2300 BTU/hr	579.6 Kcal/hr
NEMA Plug	5-20P	

NOTE: Domestic units are defined as 60Hz systems. International
       units are defined as 50Hz systems.

Environmental:

Temperature		
Operational	50 - 95 $^\circ$F	10 - 35 $^\circ$C
Storage	-40 - 140 $^\circ$F	-40 - 60 $^\circ$C
Relative Humidity		
Operational (Non-Condensing)	10 - 90%	10 - 90%
Storage (Non-Condensing)	10 - 95%	10 - 95%
Altitude		
Operational	8,000 ft.	2,400m
Storage	40,000 ft.	12,200m

Acoustical	Not to exceed 55 dBA
Air Quality	Normal Office Environment
Electrostatic	0-5KVDC with no failures

2350/2450 PERIPHERAL CABINET SPECIFICATIONS

	DOMESTIC	INTERNATIONAL
Streamer Cabinet:		
Height	30 inches	76 cm
Width	21 inches	53 cm
Depth	31 inches	79 cm
Weight (Empty)	140 lbs	63.5 kgs
Streamer	80 lbs	36.3 kgs
Total Weight	220 lbs	99.8 kgs

Environmental:		
Temperature	59 – 86 $^\circ$F	15 – 30 $^\circ$C
Relative Humidity	20 – 80%	20 – 80%
Heat Dissipation (Without Devices)	30 BTU/hr	7.56 Kcal/hr

2655

Specifications for the 2655 system are given below for convenient
reference.

System Cabinet:

	DOMESTIC	INTERNATIONAL
Height	30 inches	76 cm
Width	21 inches	53 cm
Depth	31 inches	79 cm
Weight (Fully loaded)	250 lbs	113.4 kgs

Electrical/Heat Dissipation:

	DOMESTIC	INTERNATIONAL
Volts	104 - 127	208 - 254
Frequency, Hz	59 - 61	49 - 51
Current, Amps	10.4	5.2
Start-up Current (Amp peak, 3 AC Cycles)	170	170
Demand, KVA	1.2	1.2
Input Power, KWatts	.9	.9
Heat Dissipation/Hr.	3100 BTU's	781.2 Kcal
NEMA Plug	5-20P	LS-30

Environmental:

	DOMESTIC	INTERNATIONAL
Temperature	59 - 90 $^\circ$F	15 - 30 $^\circ$C
Relative Humidity	20 - 80%	20 - 80%
Altitude	8,000 ft	2,400 m

2655 PERIPHERAL CABINET SPECIFICATIONS

Cabinet Size:

	DOMESTIC	INTERNATIONAL
Height	30 inches	76 cm
Width	21 inches	53 cm
Depth	31 inches	79 cm
Weight (Empty)	140 lbs	63.5 kgs

Environmental:

	DOMESTIC	INTERNATIONAL
Temperature	59 - 86 $^\circ$F	15 - 30 $^\circ$C
Relative Humidity	20 - 80%	20 - 80%
Heat Dissipation (Without devices)	30	7.56

9655

Specifications for the 9655 system are given below for convenient
reference.

System Cabinet:

	DOMESTIC	INTERNATIONAL
Height	53.0 inches	134.6 cm
Width	26.25 inches	66.7 cm
Depth	35.25 inches	89.5 cm
Weight (fully loaded)	600 lbs (est.)	272 kgs (est.)

Electrical/Heat Dissipation:

	DOMESTIC		INTERNATIONAL
Volts	104-127		208-254
Frequency, Hz	59-61		49-51
Circuits	$\underline{1}$	$\underline{2}$	$\underline{1}$
Current, Amps	14.4	8.3	12.5 (est.)
Demand, KVA	1.7	.99 (=2.7)	2.7 (est.)
Input Power, Watts	1.2	.63 (=1.8)	1.8 (est.)
Heat Dissipation	3990	2150 (=6140)	1537.2 (est.)
	BTU/hr		Kcal/hr
NEMA Plug	L14-30		LS-30
Start-up Current	170		170
(Amp peak, 3 AC Cycles)			

Environmental:

	DOMESTIC	INTERNATIONAL
Temperature	59 - 90 °F	15 - 32 °C
Relative Humidity	20 - 80%	20 - 80%
Altitude	8,000 ft	2,400 m

9655 PERIPHERAL CABINET SPECIFICATIONS

Peripheral Cabinet:

Height	53 in	134.6 cm
Width	26.5 in	67.3 cm
Depth	35 in	88.9 cm
Weight (Empty)	280 lbs	120 kgs

Environmental:

Temperature	59 - 86 °F	15 - 30 °C
Relative Humidity	30 - 80%	30 - 80%
Heat Dissipation	286	72.07
(Without devices)	BTU/hr.	Kcal/hr.

9755

Specifications for the 9755 system are given below for convenient reference.

<u>System Cabinet</u> (Dual Bay):

	DOMESTIC	INTERNATIONAL
Height	53.0 inches	134.6 cm
Width	53.0 inches	134.6 cm
Depth	35.25 inches	89.5 cm
Weight (Fully loaded)	R=584/L=750 lbs	R=265/L=340 kgs

<u>Electrical/Heat Dissipation:</u>

	DOMESTIC			INTERNATIONAL		
Volts	104 – 127			208 – 254		
Frequency, Hz	59 – 61			49 – 51		
Circuits	<u>1</u>	<u>2</u>	<u>3</u>	^1^	^2^	^3^
Current, Amps	8.7	16.0	11.0	4.4	8.0	5.5
Demand, KVA	1.0	1.9	1.3	1.0	1.9	1.3
			(=4.2)			(=4.2)
Input Power, KWatts	.7	1.5	1.1	.7	1.5	1.1
			(=3.3)			(=3.3)
Heat Dissipation	12,000 BTU/hr.			3,024 Kcal/hr.		
NEMA Plug	L21-30			L22-20		
Start-Up Current	170			170		
(Amp peak, 3 AC Cycles)						

<u>Environmental:</u>

	DOMESTIC	INTERNATIONAL
Temperature	59 – 86 °F	15 – 30 °C
Humidity	20 – 80%	20 – 80%
Altitude	12,000 ft	3,700 m

9755 PERIPHERAL CABINET SPECIFICATIONS

<u>Peripheral Cabinet:</u>

	DOMESTIC	INTERNATIONAL
Height	53 in	134.6 cm
Width	26.5 in	67.3 cm
Depth	35 in	88.9 cm
Weight (Empty)	280 lbs	120 kgs

<u>Environmental:</u>

	DOMESTIC	INTERNATIONAL
Temperature	59 – 86 °F	15 – 30 °C
Relative Humidity	30 – 80%	30 – 80%
Heat Dissipation	286 BTU/hr.	72.07 Kcal/hr.
(Without devices)		

9955 II

Specifications for the 9955 II system are given below for convenient reference.

System Cabinet:
                                        DOMESTIC   INTERNATIONAL

        Height   53.0 inches   134.6 cm
        Width   26.25 inches   66.7 cm
        Depth   35.25 inches   89.5 cm
        Weight (Fully loaded)   R=584/L=750 lbs   R=265/L=340 kgs

Electrical/Heat Dissipation:

        Volts   104 - 127   208 - 254
        Frequency, Hz   59-61   49-51
        Circuits   1̂   2   3   1   2   3

        Current, Amps   10.5 16.2 12.4   5.7   8.1   6.2
        Demand, KVA   1.5   1.8   2.0   1.5   1.8   2.0
                                                    (=5.3)   (=5.3)
        Input Power, Watts   1.1   1.4   1.5   1.1   1.4   1.5
                                                    (=4.0)   (=4.0)

        Thermal Dissipation   11,000 BTU/hr.   2,772 Kcal/hr.
        NEMA Plug   L21-30   L22-L20
        Start-up Current   170   170
         (Amp peak, 3 cycles)

Environmental:
                                            o   o   o   o
        Temperature   59 - 86 F   15 - 30 C
        Humidity   20 - 80%   20 - 80%
        Altitude   12,000 ft   3,700 m

9955 II PERIPHERAL CABINET SPECIFICATIONS

Peripheral Cabinet:

        Height   53   in   134.6 cm
        Width   26.5 in   67.3 cm
        Depth   35   in   88.9 cm
        Weight (Empty)   280   lbs   120   kgs

Environmental:
                                            o   o   o   o
        Temperature   59 - 86 F   15 - 30 C
        Relative Humidity   30 - 80%   30 - 80%
        Heat Dissipation   854 BTU/hr.   215.2 Kcal/hr.
         (Without devices)

FOR INTERNAL USE ONLY

PERIPHERAL DEVICE SPECIFICATIONS

DISK DRIVES

32/64/96MB CARTRIDGE MODULE DISK DRIVES

	DOMESTIC	INTERNATIONAL
Physical:		
Height	10.2 in	25.8 cm
Width	19.0 in	48.1 cm
Depth	30.5 in	77.5 cm
Weight	170.0 lbs	77.3 kgs
Environmental:		
Temperature	50 - 95 °F	10 - 35 °C
Humidity	20 - 80%	20 - 80%
Altitude	6,500 ft	2,000 m
AC Power:		
Voltage, Volts	102-128	191-256
Frequency, Hz	59-60.6	49-50.6
Current, Amps	8.2	4.0
Start-up, Amps/Sec	20/30	7.5/30
Demand, KVA	.98	
Input Power, KW	.95	.95
Heat Dissipation	3240 BTU/hr.	816.5 Kcal/hr.
NEMA Plug	5-15P	

60MB WINCHESTER DISK SPECIFICATIONS

	DOMESTIC	INTERNATIONAL

Physical:

Height	3.25 in.	8.26 cm
Width	5.75 in.	14.61 cm
Depth	8.0 in.	20.32 cm
Weight	6.0 lbs.	2.7 kgs

Mounting	Mountable using industry-standard mounting holes, with SAE threads No. 6-32UNC-2B x .25 inches deep.

Environmental

Temperature	50 - 115 ^{o}F	10 - 46 ^{o}C
Humidity	10 - 80%	10 - 80%
Altitude	-200 - 7,000 ft.	-60 - 2,000m

Power:

AC Power Requirements - No AC power is required directly by this drive itself.

DC Power Requirements - +12 VDC (+-5%) ripple shall not exceed 240mV peak-to-peak.

+5 VDC (+-5%) ripple shall not exceed 100mV peak-to-peak.

Power Consumption:

Current - (+12 Volts)
Idle	2.1 Amp avg.
Seeking	3.1 Amp avg.
All times	4.25 Amp Peak

Current - (+5 Volts)
Idle, Amps	0.9 avg.
Seeking, Amps	0.9 avg.
Running, Amps	0.9 Peak

Power Dissipation:

Idle (28W)	96 BTU/hr.	24.2 Kcal/hr.
Positioning (38W)	130 BTU/hr.	32.8 KCal/hr.

120MB WINCHESTER DISK SPECIFICATIONS

	DOMESTIC	INTERNATIONAL
Physical:		
Height	3.25 in.	8.26cm
Width	5.75 in.	14.61cm
Depth	8.00 in.	20.32cm
Weight	6.0 lbs.	2.7kgs
Environmental:		
Temperature	50 - 122 °F	10 - 50 °C
Humidity	10 - 90%	10 - 90%
Altitude	-200 - 10,000 ft	-60% - 3,000m

Power:

AC Power Requirements - No AC power is required directly by this drive itself.

DC Power Requirements - +12 VDC (+-5%) ripple shall not exceed 240mV peak-to-peak.

+5 VDC (+-5%) ripple shall not exceed 100mV peak-to-peak.

Power Consumption:

Current - (+12 volts)
Idle   2.1 Amp average
Seeking   3.1 Amp average
All Times   4.25 Amp Peak

Current - (+5 volts)
Idle   0.9 Amp average
Seeking   0.9 Amp average
Running   0.9 Amp Peak

Power Dissipation

Idle (29W)	99 BTU/hr.	24.9 Kcal/hr.
Positioning (35W)	119 BTU/hr.	30.0 Kcal/hr.

68/158MB DISK DRIVE

	DOMESTIC	INTERNATIONAL
Physical:		
Height	7.0 in	18.0 cm
Width	18.0 in	46.0 cm
Depth	20.0 in	51.0 cm
Weight	64.0 lbs	28.0 kgs
Environmental:		
Temperature	50 - 104 °F	10 - 40 °C
Humidity	8 - 80%	8 - 80%
Altitiude	7,000 ft	2,100 m
AC Power:		
Voltage, Volts	108 - 132	198 - 264
Frequency, Hz	57 - 63	47 - 53
Current, Amps	3.8	
Start-up, Amps/Sec	15/90	
Demand, KVA	.46	
Input Power, KW	.35	
Heat Dissipation	1200 BTU/hr.	302.4 Kcal/hr.
NEMA Plug	5-15P	

80MB DISK DRIVE

Physical
                          DOMESTIC   INTERNATIONAL

    Height   34.0 in   86.3 cm
    Width   19.0 in   48.2 cm

Environmental:
                          o   o   o   o
    Temperature   59 - 104 F   15 - 40 C
    Humidity   20 - 80%   20 - 80%
    Altitude   6,500 ft   2,000 m

AC Power:

    Voltage, Volts   102 - 132   187 - 264
    Frequency, Hz   59 - 60.5   49 - 50.5
    Current, Amps   8.2   5.0
    Start-up, Amps/Sec   30/13   15/10
    Demand, KVA   .984
    Input Power, KW   .757   .900
    Heat Dissipation   2600 BTU/hr.   655.2 Kcal/hr.
    NEMA Plug   5-15P

160MB DISK DRIVE

	DOMESTIC	INTERNATIONAL
Physical:		
Height	10.2 in	25.9 cm
Width	19.0 in	48.3 cm
Depth	30.1 in	76.5 cm
Weight	125.0 lbs	56.7 kgs
Environmental:		
Temperature	50 – 104 °F	10 – 40 °C
Humidity	20 – 80%	20 – 80%
Altitude	6,500 ft	2,000 m
AC Power:		
Voltage, Volts	102 – 128	195 – 257
Frequency, Hz	59 – 60.6	49 – 50.6
Current, Amps	5.2	2.7
Start-up, Amps/Sec	23/7	14/7
Demand, KVA	.62	
Input Power, KW	.52	
Heat Dissipation	1770 BTU/hr.	446.0 Kcal/hr.
NEMA Plug	5-15P	

300MB DISK DRIVE

	DOMESTIC	INTERNATIONAL

Physical

Height	36.0 in	91.4 cm
Width	23.0 in	58.4 cm
Depth	36.0 in	91.4 cm
Weight	550.0 lbs	250.0 kgs

Environmental

Temperature	59 – 90 °F	15 – 32 °C
Relative Humidity	20 – 80%	20 – 80%
Altitude	6,500 ft	2,000 m

AC Power:

Voltage, Volts	179 – 245	195 – 257
Frequency, Hz	59 – 60.6	49 – 50.6
Current, Amps	8.0	9.5
Start-up, Amps/Sec	40/10	40/8
Demand, KVA	1.7	
Input Power, KW	1.2	1.3
Heat Dissipation	4200 BTU/hr.	1058.4 Kcal/hr.
NEMA Plug	L6-20P	

315MB DISK DRIVE

	DOMESTIC	INTERNATIONAL
Physical:		
Height	10.5 in	26.7 cm
Width	19.0 in	48.3 cm
Depth	30.0 in	76.2 cm
Weight	115 lbs	52.3 kgs
Environmental:		
Temperature	50 – 104 $^\circ$F	10 – 40 $^\circ$C
Relative Humidity	20 – 80%	20 – 80%
Altitude	10,000 ft	3,000 m
AC Power:		
Voltage, Volts	98 – 126	170 – 264
Frequency, Hz	59 – 60.6	49 – 50.6
Current, Amps	6	3
Start-up, Amps/Sec	16/12	11/12
Demand, KVA	.72	
Input Power, KW	.55	
Heat Dissipation	1800 BTU/hr.	453.6 Kcal/hr.
NEMA Plug	5-15P	

496MB DISK DRIVE

	DOMESTIC	INTERNATIONAL
Physical:		
Height	10.2 in	25.9 cm
Width	8.5 in	21.6 cm
Depth	30.0 in	76.2 cm
Weight	82.0 lbs	37.2 kgs
Environmental:		
Temperature	50 - 104 °F	10 - 45 °C
Humidity	20 - 80%	20 - 80%
Altitude	-983ft - 10,000ft	-300m - 3,000m
AC Power:		
Voltage, Volts	87 - 128	179 - 256
Frequency, Hz	48 - 62	48 - 62
Current, Amps	3.4	2.1
Start-up, Amps/Sec	8/14	6/14
Input Power, KW	.260	.252
Heat Dissipation	886 BTU/hr.	216.7 Kcal/hr.

675MB DISK DRIVE

	DOMESTIC	INTERNATIONAL
Physical:		
Height	36.2 in	91.9 cm
Width	23.0 in	58.4 cm
Depth	35.0 in	90.9 cm
Weight	635.0 lbs	289.0 kgs
Environmental:		
Temperature	50 - 95 °F	10 - 35 °C
Humidity	20 - 80%	20 - 80%
Altitude	6,500 ft	2,000 m
AC Power:		
Voltage, Volts	179 - 246	198 - 257
Frequency, Hz	59 - 60.6	49 - 50.5
Current, Amps	7.3	6.8
Start-up, Amps/Sec	40/8	
Demand, KVA	1.63	1.64
Input Power, KW	1.39	1.39
Heat Dissipation	4740 BTU/hr.	1194.5 Kcal/hr.
NEMA Plug	L6-20P	

TAPE DRIVES

STREAMING MAGNETIC TAPE DRIVE

	DOMESTIC	INTERNATIONAL
Physical:		
Height	9.0 in	22.9 cm
Width	19.0 in	48.3 cm
Depth	22.0 in	55.9 cm
Weight	80.0 lbs	36.4 kgs
Environmental:		
Temperature	50 - 95 °F	10 - 35 °C
Humidity	30 - 70%	30 - 70%
Altitude	10,000 ft	3,000 m
AC Power:		
Voltage, Volts	102 - 132	187 - 253
Frequency, Hz	48 - 61	48 - 61
Current, Amps	3.0	1.5
Demand, KVA	.36	
Input Power, KW	.30	
Heat Dissipation	950 BTU/hr.	239.4 Kcal/hr.
NEMA Plug	5-15P	

452X TAPE DRIVE

	DOMESTIC	INTERNATIONAL
Physical:		
Height	24.5 in	62.2 cm
Width	19.0 in	48.3 cm
Depth	21.6 in	54.9 cm
Weight	150.0 lbs	68.0 kgs
Environmental:		
Temperature	50 - 104 °F	10 - 40 °C
Humidity	30 - 70%	30 - 70%
Altitude	5,000 ft	1,500 m
AC Power:		
Voltage, Volts	115	220-240
Frequency, Hz	60	50
Current, Amps	5	
Demand, KVA	.80	
Input Power, KW	.35	
Heat Dissipation	1200 BTU/hr.	302.4 Kcal/hr.
NEMA Plug	5-15P	

4551 GCR TAPE DRIVE

	DOMESTIC	INTERNATIONAL
Physical:		
Height	35.0 in	88.9 cm
Width	19.0 in	48.3 cm
Depth	22.5 in	57.2 cm
Weight	400.0 lbs	181.9 kgs
Environmental:		
Temperature	$50 - 104$ °F	$10 - 40$ °C
Humidity	$30 - 70\%$	$30 - 70\%$
Altitude	7,000 ft	2,100 m
AC Power:		
Voltage, Volts	$108 - 137$	$180 - 275$
Frequency, Hz	$47 - 63$	$47 - 63$
Current, Amps	14	
Demand, KVA	1.80	
Input Power, KW	1.44	
Heat Dissipation	4500 BTU/hr.	1134 Kcal/hr.
NEMA Plug	5-15P	

4585 TABLETOP 60MB CARTRIDGE TAPE SUBSYSTEM

	DOMESTIC	INTERNATIONAL
Physical:		
Height	7.0 in	18 cm
Width	3.88 in	10 cm
Depth	15.6 in	40 cm
Weight	11.5 lbs	5.2 kgs
Environmental:		
Temperature	^{o} ^{o}	^{o} ^{o}
Operational	41 - 113 F	5 - 45 C
Storage	22 - 140 F	-30 - 60 C
Relative Humidity		
Operational	20 - 80%	20 - 80%
Storage	0 - 90%	0 - 90%
Altitude		
Operational	15,000 ft	4,572 m
Storage	50,000 ft	15,240 m
AC Power:		
Voltage, Volts	102 - 132	187 - 242
Frequency, Hz	47 - 63	47 - 63
Current, Amps	.5	.25
Demand, KVA	.060	.060
Heat Dissipation	1200 BTU/hr.	302.4 Kcal/hr.
Demand, KVA	.060	.060
Input Power, KW	.044	.060
Heat Dissipation	150 BTU/hr.	37.8 Kcal/hr.
Power Cord Length	14 ft.	4.3 m

4590 GCR TAPE DRIVE

	DOMESTIC	INTERNATIONAL
Physical:		
Height	24.5 in	62.25 cm
Width	19.0 in	48.25 cm
Depth	15.0 in	38.1 cm
Weight	137.0 lbs	62.15 kgs
Environmental:		
Temperature		
Operating	$40 - 110 °F$	$5 - 43 °C$
Storage	$-50 - 160 °F$	$-45 - 70 °C$
Humidity		
Operating	30 - 80%	30 - 80%
Storage	5 - 95%	5 - 95%
Altitude		
Operating	8,000 ft	2,440 m
Storage	50,000 ft	15,250 m
AC Power:		
Voltage, Volts	98-126	196-253
Frequency, Hz	47-63	47-63
Current, Amps	3.7	1.85
Heat Dissipation	1500 BTU/hr.	378 Kcal/hr.

PRINTERS

3115 TELEPRINTER
                              DOMESTIC   INTERNATIONAL
Physical:

        Height   5.5 in   14.0 cm
        Width   22.1 in   56.0 cm
        Depth   18.5 in   47.0 cm
        Weight   22.0 lbs   10.0 kgs

Environmental:

        Temperature   50 - 100 °F   10- 40 °C
        Humidity   20 - 80%   20 - 80%
        Altitude   12,000 ft   3,700 m

AC Power:

        Voltage, Volts   98 - 129   198 - 264
        Frequency, Hz   48 - 65   48 - 65
        Current, Amps   .4
        Demand, KVA   .050
        Input Power, KW   .040
        Heat Dissipation   140 BTU/hr.   35.28 Kcal/hr.
        NEMA Plug   5-15P

3166
                              DOMESTIC   INTERNATIONAL
Physical:

        Height   42.0 in   106.7 cm
        Width   36.5 in   92.7 cm
        Depth   39.0 in   99.0 cm
        Weight   570.0 lbs   258.5 cm

Environmental:

        Temperature   50 - 95 °F   10 - 35 °C
        Humidity   40 - 70%   40 - 70%
        Altitude   5,000 ft   1,500 m

AC Power:

        Voltage, Volts   103.5 - 119.5   180 - 253
        Frequency, Hz   59 - 61   49 - 51
        Current, Amps   6.0   3.0
        Start-up, Amps/Sec 15/.2   10/.2
        Demand, KVA   1.00
        Input Power, KW   .800
        Heat Dissipation   2700 BTU/hr.   680.4 Kcal/hr.
        NEMA Plug   5-15P

3173
	DOMESTIC	INTERNATIONAL

Physical:

	DOMESTIC	INTERNATIONAL
Height	16.5 in	41.9 cm
Stand	46.5 in	118.1 cm
Width	30.0 in	76.2 cm
Depth	24.5 in	62.2 cm
Weight	185.0 lbs	84.0 kgs

Environmental:

	DOMESTIC	INTERNATIONAL
Temperature	50 - 90 °F	10 -38 °C
Humidity	30 - 70%	30 - 70%
Altitude	7,500 ft	2,900 m

AC Power:

	DOMESTIC	INTERNATIONAL
Voltage, Volts	93.5 - 132	187 - 264
Frequency, Hz	58 - 62	48 - 52
Current, Amps	8.3	
Demand, KVA	1.00	
Input Power, KW	.800	
Heat Dissipation	2750	693
NEMA Plug	5-15P	

3185 LETTER QUALITY PRINTER

Physical:

	DOMESTIC	INTERNATIONAL
Height	6.6 in	16.8 cm
Width	23.2 in	60.0 cm
Depth	14.3 in	37.7 kgs
Weight	37.0 lbs	16.7 kgs

Environmental:

	DOMESTIC	INTERNATIONAL
Temperature	50 - 104 °F	10 - 38 °C
Humidity	30 - 70%	30 - 70%
Altitude	5,000 ft	1,500 m

AC Power:

	DOMESTIC	INTERNATIONAL
Voltage, Volts	95 - 132	190 - 264
Frequency, Hz	49 - 63	49 - 63
Current, Amps	1.5	
Demand, KVA	.19	
Input Power, KW	.150	
Heat Dissipation	520 BTU/hr.	131.0 Kcal/hr.
NEMA Plug	5-15P	

3320

	DOMESTIC	INTERNATIONAL
Physical:		
Height	43.5 in	110.5 cm
Width	30.3 in	77.0 cm
Depth	25.0 in	63.5 cm
Weight	185.0 lbs	84.0 kgs
Environmental:		
Temperature	50 - 100 °F	10 - 38 °C
Humidity	30 - 70%	30 - 70%
Altitude	5,000 ft	1,500 m
AC Power:		
Voltage, Volts	90 - 132	180 - 250
Frequency, Hz	58 - 62	48 - 52
Current, Amps	4.6	
Demand, KVA	.500	
Input Power, KW	.400	
Heat Dissipation	1400 BTU/hr.	352.8 Kcal/hr.
NEMA Plug	5-15P	

3330

	DOMESTIC	INTERNATIONAL
Physical:		
Height	44.5 in	113.0 cm
Width	34.3 in	87.0 cm
Depth	29.7 in	75.5 cm
Weight	350.0 lbs	160.0 kgs
Environmental:		
Temperature	50 - 100 °F	10 - 38 °C
Humidity	30 - 70%	30 - 70%
Altitude	5,000 ft	1.500 m
AC Power:		
Voltage, Volts	90 - 132	180 - 250
Frequency, Hz	58 - 62	48 - 52
Current, Amps	4.6	
Demand, KVA	.500	
Input Power, KW	.400	
Heat Dissipation	1400 BTU/hr.	352.8 Kcal/hr.
NEMA Plug	5-15P	

3350 SERIAL MATRIX PRINTER

                            DOMESTIC   INTERNATIONAL

Physical:

        Height   8.7 in   22.1 cm
        Width   25.5 in   64.0 cm
        Depth   27.0 in   68.6 cm
        Weight   69.0 lbs   31.4 kgs

Environmental:

        Temperature   50 - 100 °F   10 - 38 °C
        Humidity   30 - 70%   30 - 70%
        Altitude   10,000 ft   3,000 m

AC Power:

        Voltage, Volts   90 - 132   187 - 264
        Frequency, Hz   58 - 62   48 - 52
        Current, Amps   2.1
        Demand, KVA   .250
        Input Power, KW   .200
        Heat Dissipation   700 BTU/hr.   176.4 Kcal/hr.
        NEMA Plug   5-15P

3159 CARD READER

	DOMESTIC	INTERNATIONAL
Physical:		
Height	11.0 in	27.9 cm
Width	19.3 in	48.9 cm
Depth	14.0 in	35.5 cm
Weight	60.0 lbs	27.3 kgs
Environmental:		
Temperature	$50 - 104$ F	$10 - 40$ C
Humidity	$30 - 90\%$	$30 - 90\%$
Altitude	6,000 ft	1,800 m
AC Power:		
Voltage, Volts	$103.5 - 126.5$	$207 - 253$
Frequency, Hz	$58 - 62$	$48 - 52$
Current, Amps	5.5	
Start-up, Amps/Sec	12/3	
Demand, KVA	.650	
Input Power, KW	.525	
Heat Dissipation	1800 BTU/hr.	453.6 Kcal/hr.
NEMA Plug	5-15P	

TERMINALS

PT200

	DOMESTIC	INTERNATIONAL
Physical:		
Height		
Display	15.0 in	38.1 cm
Keyboard	1.5 in	3.8 cm
Width		
Display	15.0 in	38.1 cm
Keyboard	19.5 in	49.5 cm
Depth		
Display	16.0 in	40.6 cm
Keyboard	7.5 in	19.1 cm
Weight		
Display	27.0 lbs	12.3 kgs
Keyboard	7.0 lbs	3.2 kgs
Environmental:		
Temperature	50 - 104 °F	10 - 40 °C
Humidity	10 - 90%	10 - 90%
Altitude	8,000 ft	2,400 m
AC Power:		
Voltage, Volts	90 - 132	180 - 264
Frequency, Hz	47 - 63	47 - 63
Current, Amps	.59	.30
Start-up (amps/sec)	9/.05	9/.05
Demand, KVA	.07	.07
Input Power, KW	.04	.04
Heat Dissipation	140 BTU/hr.	35.28 Kcal/hr.
NEMA Plug	5-15P	

PT200C

	DOMESTIC	INTERNATIONAL

Physical:

Height		
Display	15.0 in	38.1 cm
Keyboard	1.5 in	3.8 cm
Width		
Display	15.0 in	38.1 cm
Keyboard	19.5 in	49.5 cm
Depth		
Display	17.0 in	43.2 cm
Keyboard	7.5 in	19.1 cm
Weight		
Display	30.0 lbs	13.6 kgs
Keyboard	7.0 lbs	3.2 kgs

Environmental:

Temperature	$50 - 104$ °F	$10 - 40$ °C
Humidity	$10 - 90\%$	$10 - 90\%$
Altitude	8,000 ft	2,400 m

AC Power:

Voltage, Volts	$90 - 132$	$180 - 264$
Frequency, Hz	$47 - 63$	$47 - 63$
Current, Amps	1.25	.745
Demand, KVA	.150	.179
Input Power, KW	.09	.09
Heat Dissipation	310 BTU/hr.	78.12 Kcal/hr.
NEMA Plug	5-15P	

POWER LINE CONDITIONERS

LINE CONDITIONER (2 KVA, 115V)

	DOMESTIC	INTERNATIONAL
Physical:		
Height	8.12 in	20.6 cm
Width	9.00 in	22.9 cm
Depth	17.9 in	45.5 cm
Weight	71.0 lbs	32.2 kgs
Environmental:		
Temperature	32 - 122 °F	0 - 50 °C
Humidity	20 - 95%	20 - 95%
Altitude	10,000 ft	3,000 m

AC Power:

Voltage	Input: 120V tapped at 108V, 100V
	Output: 120V
Frequency	50/60Hz
Current, Amps	16.0
Inrush Current	240 A 1/2 cycle
Load Power Factor	0.3 leading to 0.3 lagging
Power Rating, KVA	2.0
Efficiency	>95% at rated load
Input Connector	9ft shielded power cord w/5-20P plug
Output Connector	One 5-20R duplex receptacle
	One 5-15R duplex receptacle

LINE CONDITIONER (2 KVA, 240 V)

	DOMESTIC	INTERNATIONAL

Physical:

Height	8.12 in	20.6 cm
Width	9.00 in	22.9 cm
Depth	17.9 in	45.5 cm
Weight	71.0 lbs	32.2 kgs

Environmental:

Temperature	32 - 122 °F	0 - 50 °C
Humidity	20 - 95%	20 - 95%
Altitude	10,000 ft	3,000 m

AC Power:

Voltage	Input: 240V tapped at 228V, 220V, 216V, 208V, 200V.
	Output: 240V tapped at 234V, 228V.
Frequency	50/60Hz
Current, Amps	8.3
Inrush Current	120 A 1/2 cycle
Load Power Factor	0.3 leading to 0.3 lagging
Power Rating, KVA	2.0
Efficiency	>95% at rated load
Input Connector	9ft shielded power cord w/SCHUKO CEE 7-7 plug, model 1700.
Output Connector	Four single SCHUKO model 1601 sockets.

LINE CONDITIONER (2.8 KVA, 240V)

	DOMESTIC	INTERNATIONAL
Physical:		
Height	10.5 in	26.7 cm
Width	10.3 in	26.2 cm
Depth	18.0 in	45.7 cm
Weight	96.0 lbs	43.5 kgs

Environmental:

Temperature	$32 - 122^\circ$ F	$0 - 50^\circ$ C
Humidity	20 - 95%	20 - 95%
Altitude	10,000 ft	3,000 m

AC Power:

Voltage	Input:	240V tapped at 228V, 220V, 216V, 208V, 200V.
	Output:	240V tapped at 234V, 228V.
Frequency		50/60Hz
Current, Amps		12.0
Inrush Current		230 A 1/2 cycle
Load Power Factor		0.3 leading to 0.3 lagging
Power Rating, KVA		2.8
Efficiency		>97% at rated load
Input Connector		9 ft power cord with SCHUKO CEE 7-7 plug, model 1700
Output Connector		Four single SCHUKO CEE 7-4 receptacles

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