PERKIN-ELMER

MODEL 3205 SYSTEM

Installation and Configuration Manual

47-057 R00

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PREFACE

The Model 3205 System contains a single processor board with up to 1Mb of memory, a multiperipheral controller (MPC) board, a disk subsystem containing a 50Mb cartridge disk drive (CDD50) and controller, a power subsystem, a central processing unit (CPU) chassis and a consolette, all contained in a 76.2cm (30") cabinet. The Model 6100 Video Display Unit (VDU) is provided as the system console.

This manual provides the information needed by the technician who installs the Model 3205 System.

Chapter 1 contains a general description of the system components. Chapter 2 provides a detailed description of power and environmental requirements and mechanical configuration for the installation of the system cabinets. Chapter 3 describes the cabling and installation requirements for the components and options in the Model 3205 System; it also details the configuration of the system cabinet. Chapter 4 describes specifications, product structure and system configurations. Chapter 5 lists the diagnostics available. Appendix A describes Perkin-Elmer Hardware Documentation.

Schematic drawings referenced in this manual are located in the Model 3205 System Schematic and Assembly Drawings Manual, Publication Number 47-068.

For information on the contents of all Perkin-Elmer 32-bit manuals, see the 32-Bit Systems User Documentation Summary.

CHAPTER 1
GENERAL DESCRIPTION

1.1   INTRODUCTION

The Model 3205 System is a compact 32-bit computing system ideally suited for scientific and commercial applications. The Model 3205 System contains a single processor board with up to 1Mb of memory, a multiperipheral controller (MPC) board, a disk subsystem containing a 50Mb cartridge disk drive (CDD50) and an intelligent disk controller (IDC), a power subsystem, an 8-slot central processing unit (CPU) chassis and a consolette, all contained in a 76.2cm (30") cabinet. The Model 6100 Video Display Unit (VDU) is provided as the system console. Figure 1-1 shows the Model 3205 System.

8866
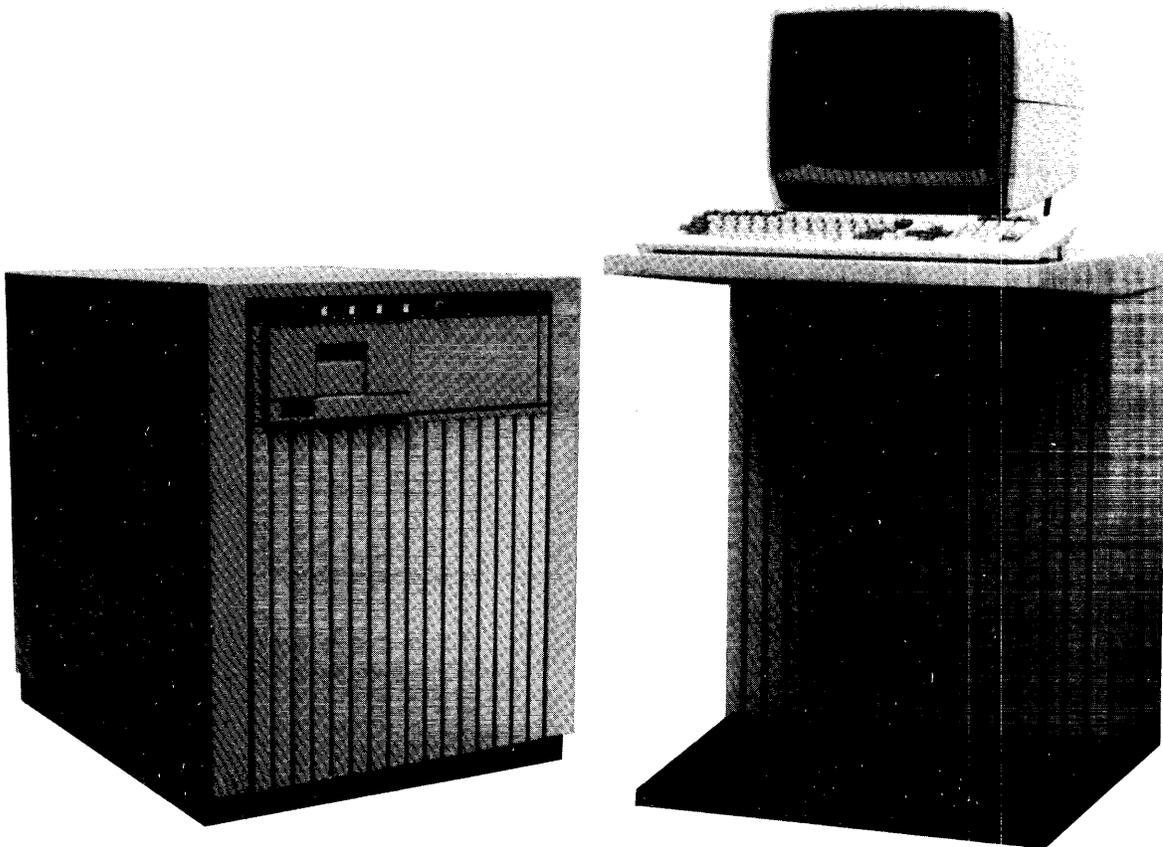
Figure 1-1   Model 3205 System

This manual contains information for the installation and configuration of the Model 3205 System. An unbundled Model 3205, referred to as the Model 3205 Processor Subsystem, is also available. The Model 3205 Processor Subsystem consists of a processor board with memory, an MPC board, a consolette and an 8-slot chassis. For details on the Model 3205 Processor Subsystem, see the Model 3205 Processor Subsystem Installation and Configuration Manual.

Options for the Model 3205 System include a memory expansion board with up to 3Mb of memory, an additional MPC board, input/output (I/O) device controllers, battery back-up, and up to three additional CDD50s. In systems configured with 208/230V, an 8-slot I/O expansion chassis and slave power supply can also be accommodated within the system cabinet.

This manual provides the technician with the information necessary to install and operate the Model 3205 System and optional equipment where required. This chapter provides a system block diagram analysis and describes the internal structure of the system.

1.2 SYSTEM COMPONENTS

The Model 3205 System consists of seven major components:

● Processor board

● MPC board

● Memory system

● Disk subsystem

● Consolette

● System cabinet

● Model 6100 VDU

A block diagram of the system components is shown in Figure 1-2.

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8834-2


```
        MEMORY
        EXPANSION
        BOARD*          MEMORY EXPANSION


                    EXPANSION (E) MEMORY BUS


                            MEMORY

        PROCESSOR
        BOARD
                            PROCESSOR        (HANDSHAKING ONLY)


                    MULTIPLEXOR (MUX) BUS


    I/O                                          IDC
    EXPANSION    I/O              MPC
    CHASSIS*     EXPANSION        BOARD     CONSOLETTE     DISK


                    CONSOLE    USER      LINE        OTHER        OTHER
                               DEVICES*  PRINTER*    DEVICES*     DEVICES*
```

PRIVATE MUX (PMUX) BUS
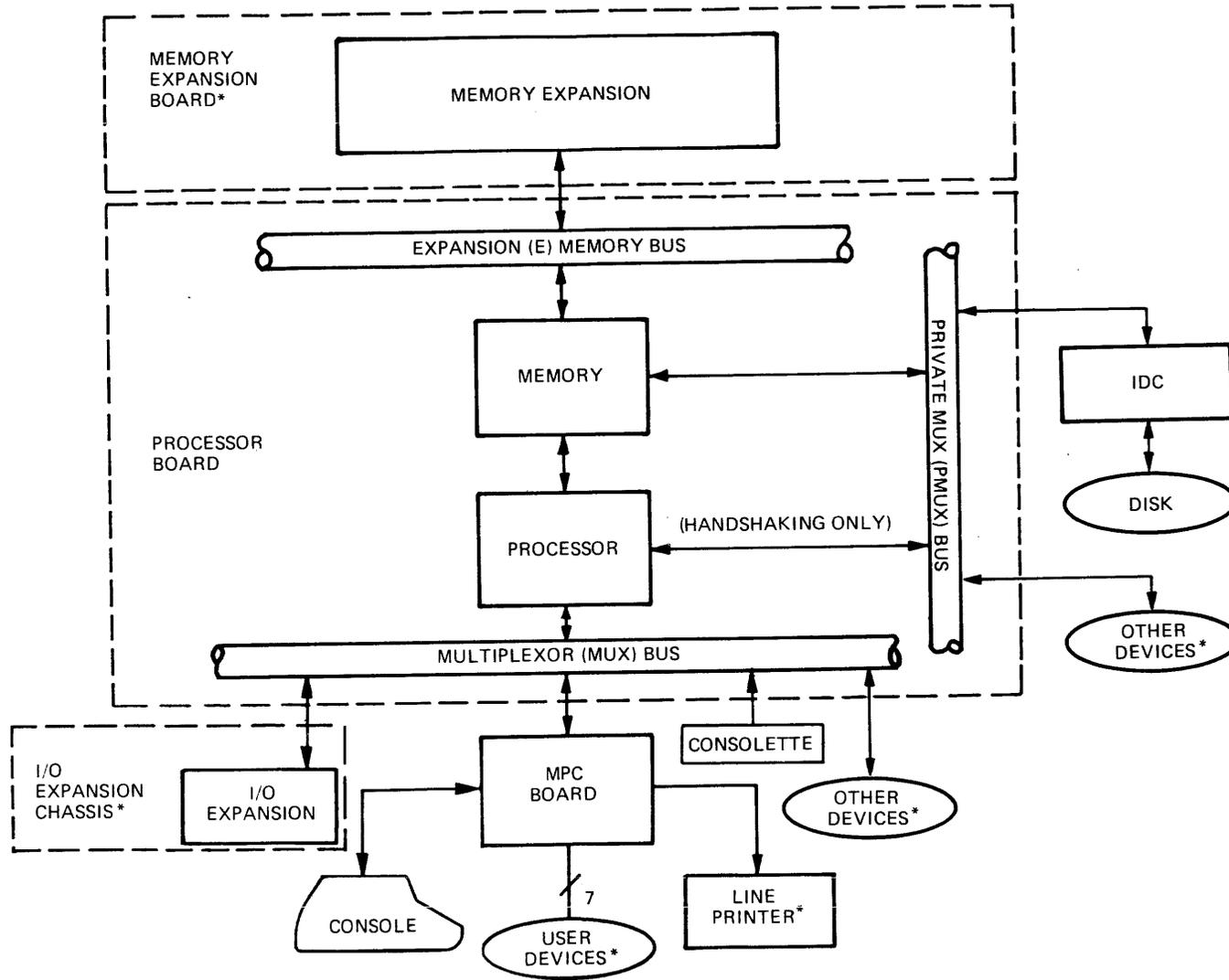
Figure 1-2   Model 3205 System Block Diagram

1.2.1 Processor Board

All processing and arithmetic logic unit (ALU) functions are contained on a single 38.1cm x 43.2cm (15" x 17") printed circuit (PC) board with built-in single and double precision floating point. The processor board monitors all system activity, provides user and memory interface and manages all system I/O.

1.2.2 Multiperipheral Controller (MPC) Board

The MPC is a single 381cm x 381cm (15" x 15") PC board which provides the means of interfacing user devices or terminals to the system over eight programmable, full-duplex data communication channels (asynchronous or synchronous). The 8-channel data communications multiplexor can be increased by eight channels when an additional MPC is added. The first MPC board in the system interfaces the console terminal to the processor through one of the eight communication channels. The MPC also contains the clocks, hardware communciation assist, bootloader, line printer interface, and loader storage unit (LSU) modules.

1.2.3 Memory System

The memory system for the Model 3205 System is expandable according to application requirements. Memory size ranges from 512kb to 4Mb of directly addressable MOS memory. The first megabyte is contained on the processor board with the additional 3Mb on the optional memory expansion board, expandable in 1Mb increments. The memory system contains an error logger, error correction/detection and can be configured with optional battery back-up.

1.2.4 50Mb Cartridge Disk Drive (CDD50) Subsystem

The CDD50 subsystem supplied with the basic Model 3205 System consists of one CDD50 with power supply and an intelligent disk controller (IDC).

The CDD50 provides both removable and fixed storage. The unformatted capacity of the CDD50 is 50Mb. The removable disk (cartridge) provides 25Mb of storage with the remaining 25Mb being provided by the nonremovable disk. The CDD50 has a transfer rate of 1.2Mb per second, average access time of 35ms and an average rotational latency of 8.55ms.

The IDC interfaces the CDD50 to the processor and provides the processor with the capability of writing to and reading from the disk. One IDC can interface up to four disk drives to the system.

1.2.5 Consolette

The consolette controls initial program load (IPL) and power to the system. It also provides controls for system initialization, processor halt/run and single-step operation. Colored LEDs indicate current system status.

1.2.6 Cabinet

The Model 3205 System is contained in a 76.2cm (30") lowboy cabinet.

1.2.6.1 115V System

The system cabinet contains the CPU chassis, consolette, 115V power subsystem and a maximum of two rack-mountable 50Mb disk drives (see Figures 1-3 and 1-4).

The CPU chassis is an 8-slot, 17.8cm (7") chassis installed in the system cabinet. Slot 4 is dedicated to the IDC board, slot 5 is dedicated to the MPC board, slot 6 is dedicated to the processor board and slot 7 is dedicated to the optional memory expansion board. Slots 0 through 3 are available for I/O expansion.

8835

```
+-------------------------------------------------+
|  +-------------------------------------------+  |
|  |               CONSOLETTE                  |  |
|  +---------------------+---------------------+  |
|  |                     |                     |  |
|  |     DISK DRIVE      |     DISK DRIVE       |  |
|  |                     |      (OPTION)        |  |
|  |                     |                     |  |
|  +---------------------+---------------------+  |
|  |                     | DISK POWER SUPPLY   |  |
|  |  DISK POWER SUPPLY  |      (OPTION)        |  |
|  +---------------------+---------------------+  |
|  |                                           |  |
|  |          CENTRAL PROCESSING               |  |
|  |          UNIT (CPU) CHASSIS               |  |
|  |                                           |  |
|  |                                           |  |
|  +-------------------------------------------+  |
|  |                                           |  |
|  |                                           |  |
|  |                                           |  |
|  |                                           |  |
|  |                                           |  |
|  +-------------------------------------------+  |
+-------------------------------------------------+
```
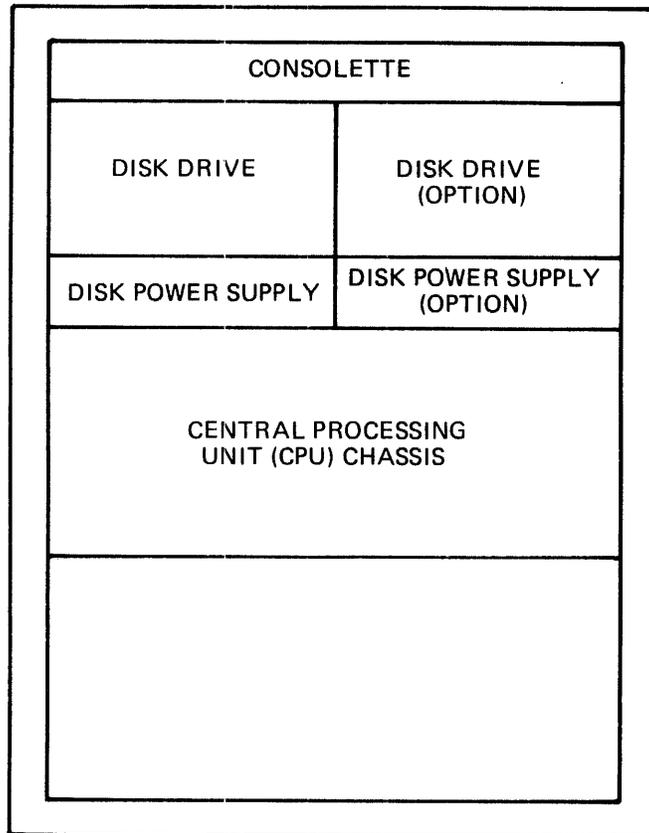
Figure 1-3   115V System Cabinet (Front View)
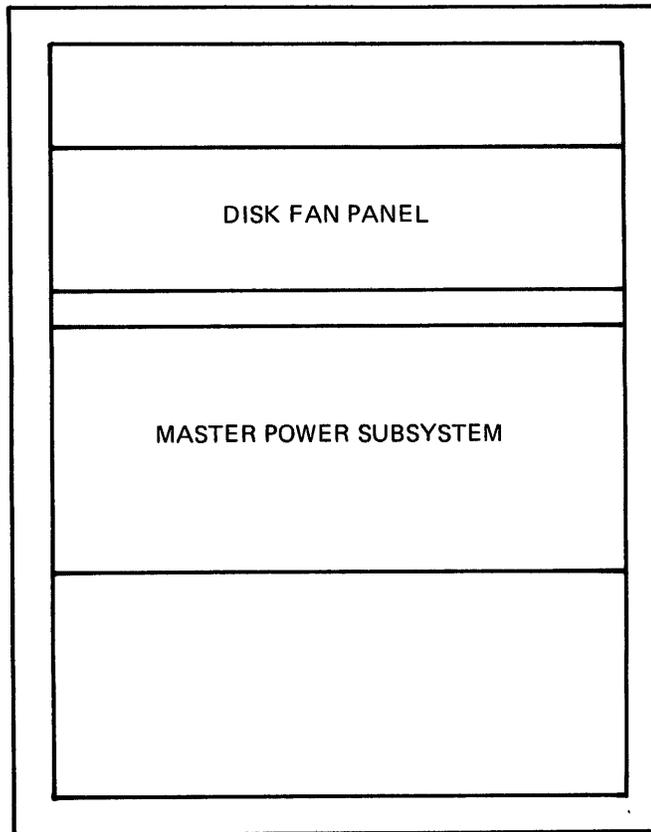
Figure 1-4   115V System Cabinet (Rear View)

1.2.6.2 208V and 230V Systems

In a 208V or 230V system, an optional 8-slot, 17.8cm (7") I/O expansion chassis and 75A slave power supply can also be configured into the cabinet (see Figures 1-5 and 1-6).

8837

```
+-------------------------------------------------+
|  +-------------------------------------------+  |
|  |                CONSOLETTE                 |  |
|  +---------------------+---------------------+  |
|  |                     |                     |  |
|  |     DISK DRIVE      |     DISK DRIVE      |  |
|  |                     |      (OPTION)       |  |
|  |                     |                     |  |
|  +---------------------+---------------------+  |
|  |                     | DISK POWER SUPPLY   |  |
|  |  DISK POWER SUPPLY  |     (OPTION)        |  |
|  +---------------------+---------------------+  |
|  |                                           |  |
|  |          CENTRAL PROCESSING               |  |
|  |         UNIT (CPU) CHASSIS                 |  |
|  |                                           |  |
|  |                                           |  |
|  +-------------------------------------------+  |
|  |                                           |  |
|  |                                           |  |
|  |           INPUT/OUTPUT (I/O)              |  |
|  |          EXPANSION CHASSIS                 |  |
|  |              (OPTION)                     |  |
|  |                                           |  |
|  |                                           |  |
|  +-------------------------------------------+  |
+-------------------------------------------------+
```
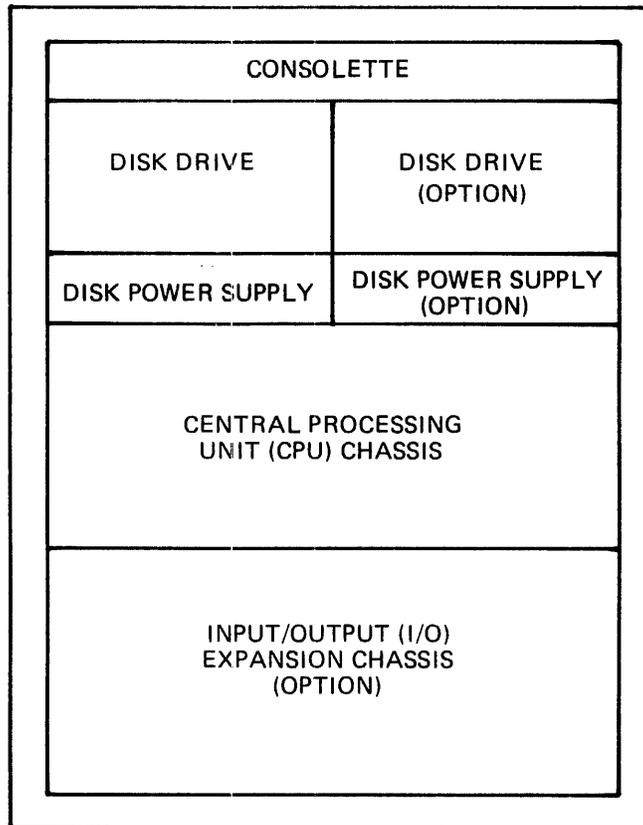
Figure 1-5   208/230V System Cabinet (Front View)

```
┌─────────────────────────────────────┐
│  ┌───────────────────────────────┐  │
│  ├───────────────────────────────┤  │
│  │                               │  │
│  │        DISK FAN PANEL         │  │
│  │                               │  │
│  ├───────────────────────────────┤  │
│  ├───────────────────────────────┤  │
│  │                               │  │
│  │        MASTER POWER           │  │
│  │         SUBSYSTEM             │  │
│  │                               │  │
│  │                               │  │
│  ├───────────────────────────────┤  │
│  │                               │  │
│  │        SLAVE POWER            │  │
│  │         SUBSYSTEM             │  │
│  │                               │  │
│  │   (REQUIRED WITH I/O EXPANSION│  │
│  │         CHASSIS)              │  │
│  └───────────────────────────────┘  │
└─────────────────────────────────────┘
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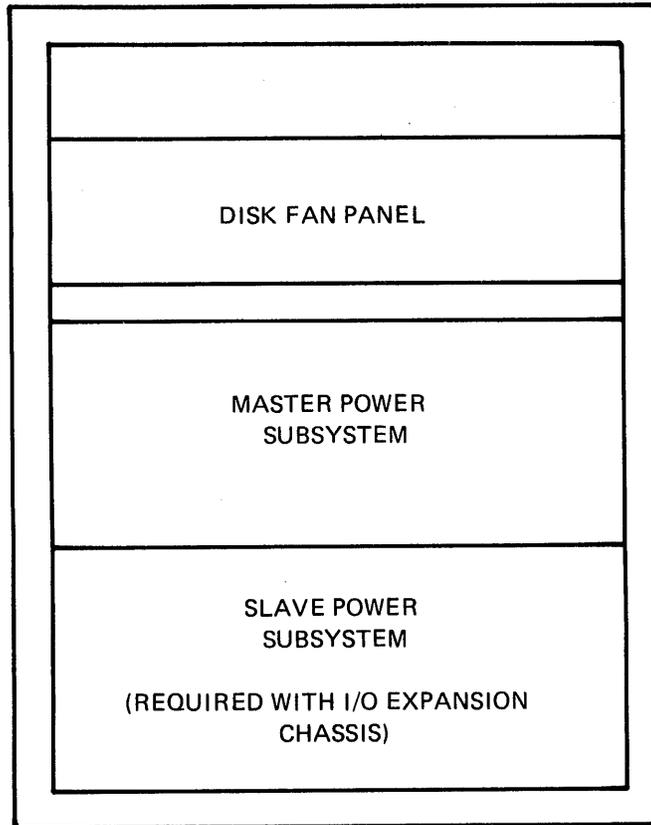
Figure 1-6   208/230V System Cabinet (Rear View)

1.2.7 Model 6100 Video Display Unit (VDU)

The Model 6100 VDU, which serves as the system console, consists
of a green phosphorous monitor and an adjustable low profile
keyboard. The alphanumeric screen format of the monitor is 24
lines by 80 characters each, with a 25th line for status display.
The keyboard is detachable and comes equipped with a 6-foot
coiled cable for operator flexibility and mobility.   The Model
6100 VDU provides a printer port, four programmable function keys
shiftable to eight, a numeric keypad and a full 128 ASCII
character set. The Model 6100 VDU is available with an amber
phosphorous monitor and international character sets, if desired.

1.3 COMMUNICATION BUSES

The following sections describe the communication buses for the
Model 3205 System.

1.3.1 Multiplexor (MUX) Bus

The MUX I/O bus can address up to 1,023 medium-speed devices (such as printers, terminals and card readers) to the processor for request/response signals and data communications. The register set associated with the I/O interrupt level speeds context switching. The maximum transfer rate for the MUX bus is 334kb per second. Data transfers over the MUX bus are accomplished in byte or halfword mode between a user I/O device and memory under control of an I/O instruction. Data transfers are also performed via an autodriver channel which provides a means for multiplexing block data transfers between memory and low- or medium-speed I/O devices.

1.3.2 Private Multiplexor (PMUX) Bus

The PMUX bus provides direct memory access (DMA) and supports data transfers to and from memory. The PMUX can support up to five independent device controllers and has an addressing capability of 16Mb. The PMUX cannot be extended out of the CPU chassis. Data transfers are performed in byte or halfword mode with a maximum transfer rate of 1.4Mb per second. The PMUX is programmed in a completely autonomous fashion with one controller or device actively transferring data at any one time. Once the PMUX has finished a data transfer, it is placed in the idle mode. In the idle mode, the PMUX serves as an extension of the MUX bus.

1.3.3 Expansion (E) Memory Bus

The E bus is a 16-bit bidirectional bus that enables the transfer of memory data between processor board connector 1 (CONN1) and the memory expansion board.

1.3.4 Consolette Interface

The consolette interface provides a means for accessing the consolette from the processor board for systems clear, halt/run and single-step operation.

1.4 SYSTEM OPTIONS

The following sections describe the options available for the Model 3205 System.

1.4.1 Memory Expansion Board

The memory expansion board is a 38.1cm x 43.2cm (15" x 17") PC board that enables expansion of system memory to 4Mb. The memory expansion board is available in 1Mb increments up to 3Mb.

1.4.2 Additional Multiperipheral Controller (MPC) Board

The Model 3205 System has the capability of supporting two MPC boards. The second MPC board provides eight additional full-duplex data communication channels. In systems configured with two MPC boards, the LSU and clocks are enabled only on the MPC board in the highest priority slot and the line printer interface is enabled only on the MPC board in the lowest priority slot.

1.4.3 Additional Disk Drives

A second CDD50 can be installed in the system cabinet and up to two additional CDD50s can be installed in an expansion cabinet. The additional drives are connected in daisy-chain fashion to the first disk drive, with all four disk drives being serviced by a single IDC board located in slot 4 of the CPU chassis.

1.4.4 Battery Back-Up

Since MOS memory is volatile, the optional battery back-up system provides power to maintain the contents of memory for up to 36 minutes depending upon the configuration. When line power is lost, the battery system automatically provides the power to maintain memory contents. Upon restoration of power, the processor reloads its registers and resumes operation.

1.4.5 Input/Output (I/O) Expansion Chassis

The I/O expansion chassis, available on 208/230V systems only, is an 8-slot, 17.8cm (7") chassis that accommodates user device controllers. The controllers can be eight fullboards, 16 halfboards or a combination of fullboards and halfboards. The I/O expansion chassis supports only MUX bus devices. A 75A slave power supply is required with the I/O expansion chassis.

1.4.6 Magnetic Tape Controllers

The Model 3205 System can support one magnetic tape controller.

CHAPTER 2
POWER REQUIREMENTS AND MECHANICAL CONFIGURATION

2.1 INTRODUCTION

A fully configured Model 3205 System is contained in a 76.2cm (30") equipment cabinet. This chapter contains power, environmental, mechanical configuration and cooling information pertinent to the installation of the system cabinet.

2.2 UNPACKING

Follow these procedures before installation:

1. If the components are shipped separately, carefully remove each component from its carton or crate, observing any special unpacking instructions.

2. Inspect all components for physical damage.

3. The disk drive is secured in the cabinet for shipping by four #8-32 x 1" long screws and lock washers located at the bottom of the disk drive. These four screws should be removed during installation of the system. Do not remove the four disk mounting screws that secure the sheet metal plate to the disk rubber shock mounts.

4. Ensure that all terminals and connectors are properly secured following shipment.

5. Strapping for the individual printed circuit (PC) boards is preset in the factory. Ensure that all straps are properly set.

To prevent any damage from electrostatic discharge (ESD), the following three procedures are recommended before touching any PC board in the Model 3205 System.

1. All personnel should wear an antistatic smock to minimize the electromotive force (EMF) produced by synthetic clothing.

2. All personnel should wear a conductive wrist strap (electrically grounded), to "bleed" acquired body voltage.

3.   If any PC boards are removed from the chassis, they must be
      shielded from static sources immediately by placing them
      into approved antistatic or conductive bags.

2.3 POWER

The following sections describe the AC power, DC power and
central processing unit (CPU) chassis power requirements. A list
of battery back-up times is also provided.

Power is supplied to the system by cables equipped with the
following connectors.

- 3-Wire Hubbell 5366-C 125VAC, 20A plug (domestic), NEMA
  Reference 5-20P

- 3-Wire TW LK Hubbell 2711 125VAC/250VAC, 30A plug (domestic),
  NEMA Reference L14-30P

- 5-Wire TW LK Hubbell 45115 250VAC, 30A plug (international)

2.3.1 AC Power

AC power is distributed within the cabinet through the AC
distribution panel accessible from the rear of the cabinet. See
Figure 2-1 and Assembly Drawing 09-166 D03. The panel provides
AC power for the following:

- 34-042 F01 (115V) master power subsystem

- 34-039 (208/230V) master power subsystem (see Table 2-1)

- 34-040 slave power subsystem required with the input/output
  (I/O) expansion chassis available on the 208/230V systems

- Two fan modules

- Two disk drives

- Video display unit (VDU)

- Spare convenience outlet

8861-1
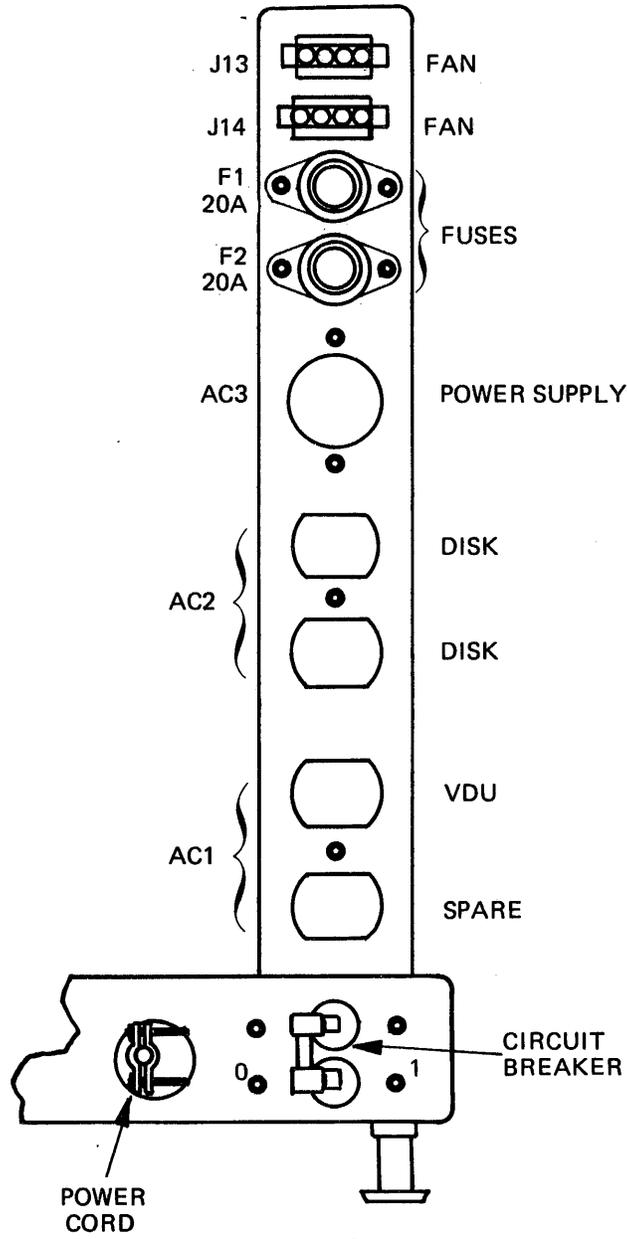
Figure 2-1   AC Distribution Panel

TABLE 2-1 AC POWER REQUIREMENTS

	34-042F01	34-039	
	DOMESTIC (115V)	DOMESTIC (208V)	INTERNATIONAL (230V)
AC Voltage	90-132VRMS	180-264VRMS	180-264VRMS
Frequency	47-63Hz	47-63Hz	47-63Hz
Phase	Single 3-Wire	Two 4-Wire	Single 3-Wire
Input Hardware Rating	20A	30A	30A
Circuit Breaker Rating	20A	30A	30A
Power Cord Length	711mm (28")	711mm (28")	711mm (28")

2.3.2 DC Power

The power subsystems provide 5V logic power (P5). When the system is configured with optional battery back-up, an uninterruptible 5V memory power (P5U) is also provided.

The DC power provided for the Model 3205 System is listed below.

● 75A P5 (logic power)

● 10A P5U (memory power, optional with battery back-up)

2.3.3 Central Processing Unit (CPU) Chassis Power Requirements

Table 2-2 provides the power requirement specifications for the PC boards in the CPU chassis.

TABLE 2-2   CPU CHASSIS POWER REQUIREMENTS

SLOT NO.	PC BOARD	DC VOLTAGE NOMINAL VALUE (V)	MAXIMUM VOLTAGE	MAXIMUM TOLERANCE (%)	P5 (AMPS)	P5U (AMPS)*				
						512kb	1Mb	2Mb	3Mb	4Mb
7	MEM.EXPANSION	5.0	5.25	5%	1.0	–	–	4.5	6.5	8.6
6	PROCESSOR	5.0	5.25	5%	18.0	3.6	4.6	4.6	4.6	4.6
5	MPC	5.0	5.25	5%	12.0					
4	IDC	5.0	5.25	5%	11.0					
3	I/O	5.0	5.25	5%	7.0					
2	I/O	5.0	5.25	5%	7.0					
1	I/O	5.0	5.25	5%	7.0					
0	I/O	5.0	5.25	5%	7.0					

* optional with battery back-up

2.3.4   Battery Back-Up Times

For systems configured with optional battery back-up, Table 2-3 lists the approximate times in minutes that battery back-up will retain the contents of memory. The retention times are for 23°C to 55°C (74°F to 131°F) ambient room temperature.

TABLE 2-3   BATTERY BACK-UP TIMES

MEMORY CAPACITY	BACK-UP TIMES
1/2Mb	36 minutes
1Mb	30 minutes
2Mb	25 minutes
3Mb	11 minutes
4Mb	10 minutes

2.3.5   Grounding

For safety and reliability, system signal ground (DC ground) is connected to chassis ground (AC ground) at a single point (unipoint) ground in the equipment cabinet. Unipoint ground is maintained throughout the equipment cabinet and the multicabinet configuration (see Figure 2-2 and Assembly Drawing 01-262 D03).

REAR VIEW

SYSTEM CABINET   EXPANSION CABINET

DISK 2   DISK 1   DISK 4   DISK 3

·17-584F02
TYP 4 PLACES

DISK POWER   DISK POWER
SUPPLY 1   SUPPLY 3

DISK POWER   DISK POWER   17-584F01
SUPPLY 2   SUPPLY 4   TYP 2 PLACES

CPU CHASSIS   17-585F02
BACKPANEL   TYP 2 PLACES

DC GROUND

17-585F01

AC GROUND

UNIPOINT
GROUND

SCREW

FLAT
WASHER

EXT. TOOTH
WASHER

LUG 17-585F02

HARDWARE DETAIL FOR
UNIPOINT GROUND CONNECTIONS

Figure 2-2   System Grounding

2.4 ENVIRONMENTAL GUIDELINES

This section provides the recommended temperature and humidity ranges and the clearance area required around the equipment for trouble-free operation.

- Temperature:

  - 0°C to 40°C (32°F to 104°F)

- Temperature rate of change:

  - 2°C per hour (3.6°F per hour)

- Relative humidity:

  - 20 to 80% noncondensing

- Humidity rate of change:

  - ±2% per hour

- System shutdown temperature:

  - 30 C (85 F)

- Equipment area clearance:

  - 91.4cm (36") behind all equipment

  - 91.4cm (36") in front of all equipment

  - 30.5cm (12") on each side of all equipment

2.5 MECHANICAL CONFIGURATION

Mechanical configuration includes the basic system cabinet hardware, cooling system and cable routing and connections.

2.5.1 Mechanical Components

The Model 3205 System is designed to permit a configuration suitable to the user's current requirements and provide a means for expansion as that requirement increases. This section describes the basic cabinet for the Model 3205 System and the optional disk drive expansion cabinet. Figures 2-3 and 2-4 show mounting information, side skins, doors, number and placement of support rails and a multicabinet configuration. Figures 2-5 and 2-6 show the rear and front views of the basic cabinet.

The basic system cabinet (09-166) is shown in Figure 2-3 and Assembly Drawing 09-166 D03. The side skin panels are installed in all system configurations. In a multicabinet system, the adjacent side skin panels must be removed before bolting the cabinets together. They are released by two 1/4-turn tool operated fasteners and one tool-operated ground strap. Figure 2-4 shows a multicabinet configuration.

CAUTION

DO NOT PLACE ANY MAGNETIC SENSITIVE EQUIPMENT, SUCH AS VDUS, ON TOP OF THE SYSTEM CABINET AS THE MAGNETIC FIELD GENERATED BY THE DISK DRIVES MAY CAUSE INTERFERENCE.
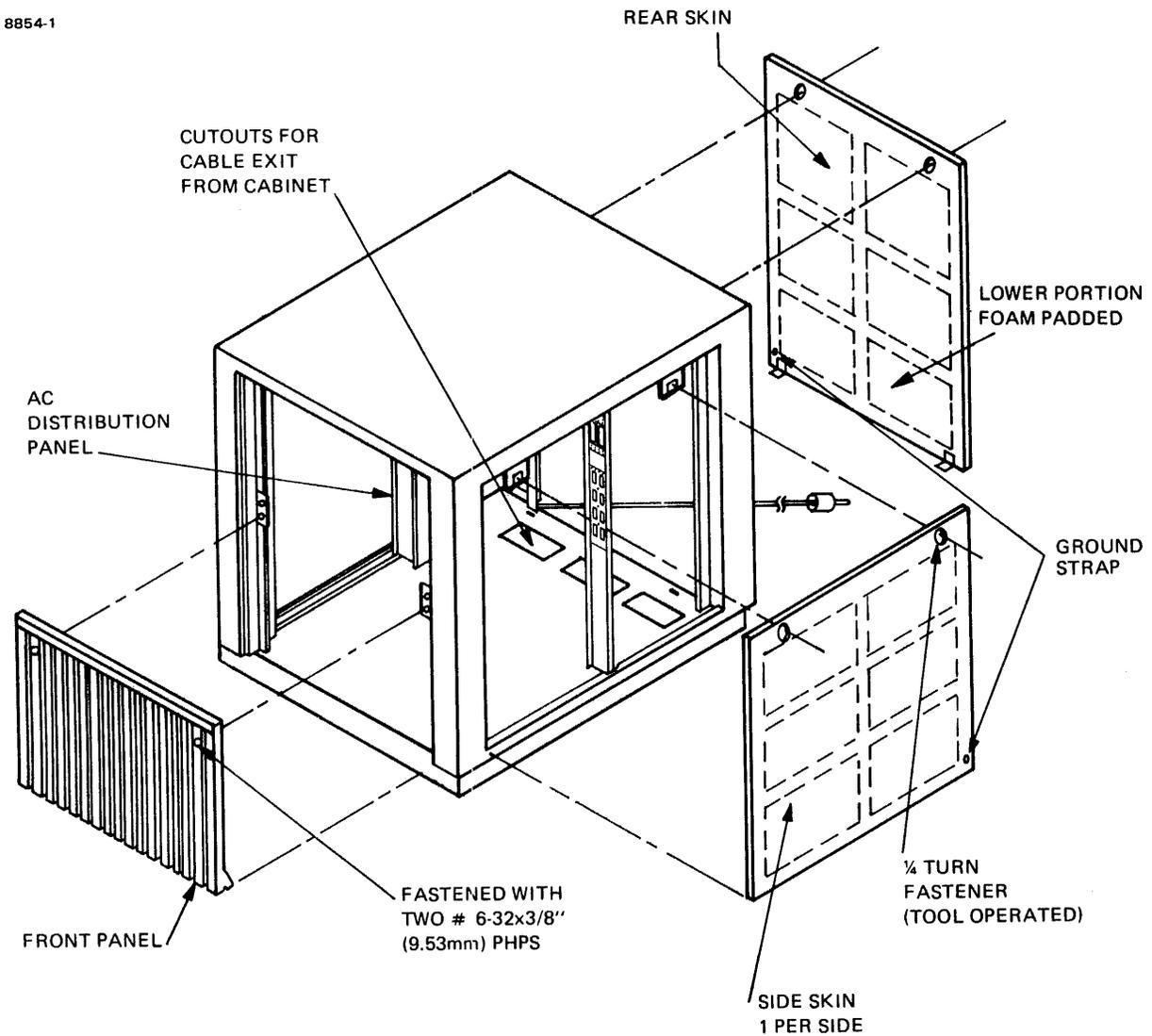
Figure 2-3   Basic System Cabinet (09-166) Structure

ALL SURFACES TO BE FLUSH

SECURE CABINET
WITH 5/16 - 18x3/4
LG HEX HEAD BOLT
2 EA. EXT TOOTH LOCK WASHERS
5/16 - 18 HEX NUT
4 PLACES
EACH CABINET

REMOVE ALL INTERNAL
KNOCKOUT PLUGS IN
MULTI CABINET ASSEMBLY
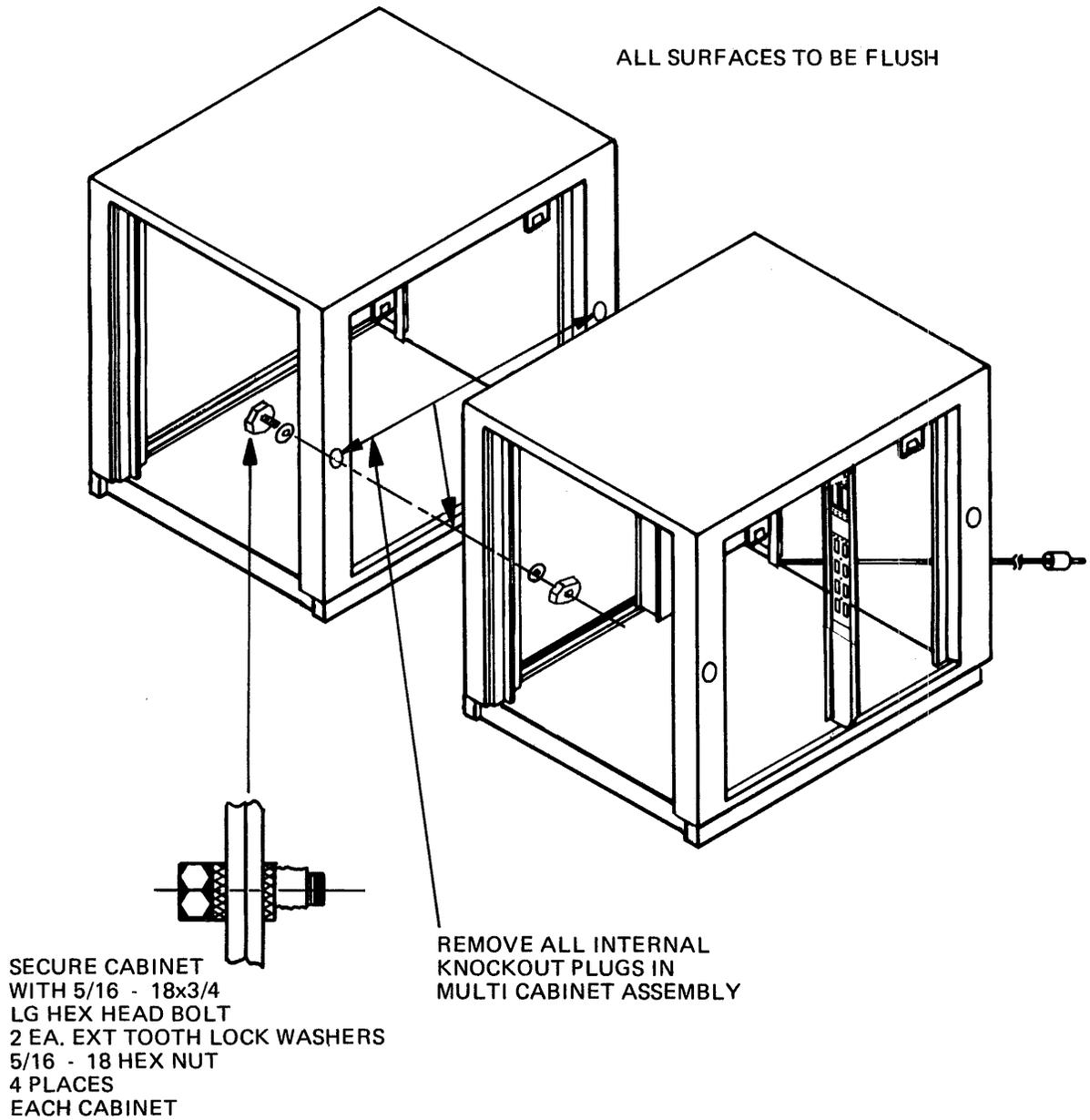
Figure 2-4   Multicabinet Configuration

DISK DRIVE
FAN PANEL

DISK DRIVE
CHASSIS
SUPPORT
RAIL

MASTER
POWER
SUBSYSTEM
(P5)

I/O
CONVENIENCE
PANEL

CPU
CHASSIS
SUPPORT
RAIL

DISK DRIVE
POWER SUPPLY CHASSIS
SUPPORT RAIL

AC DISTRIBUTION
PANEL
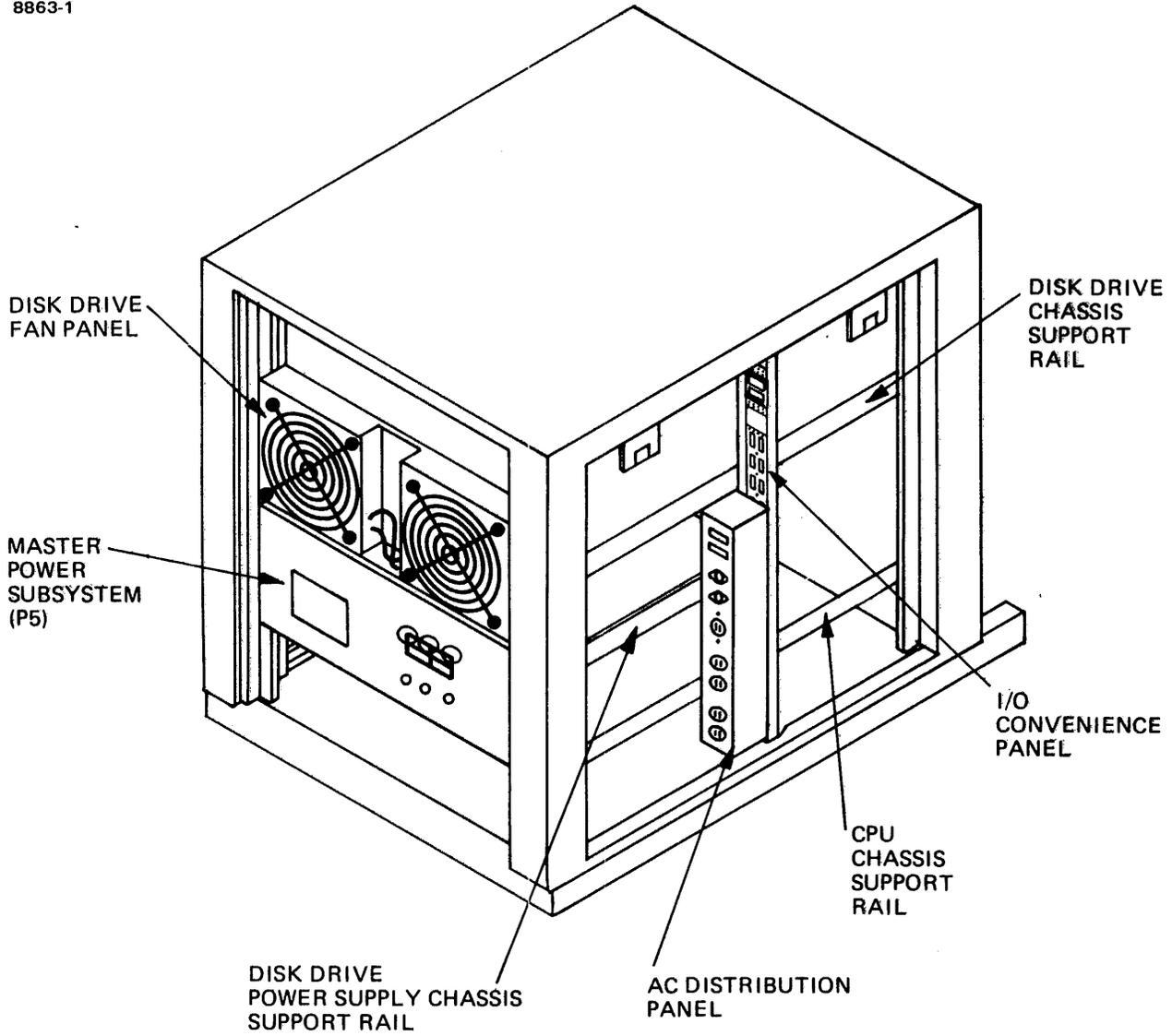
Figure 2-5 Basic System Cabinet (Rear View)

CONSOLETTE

I/O
CONVENIENCE
PANEL

SUPPORT RAILS

AC
DISTRIBUTION
PANEL
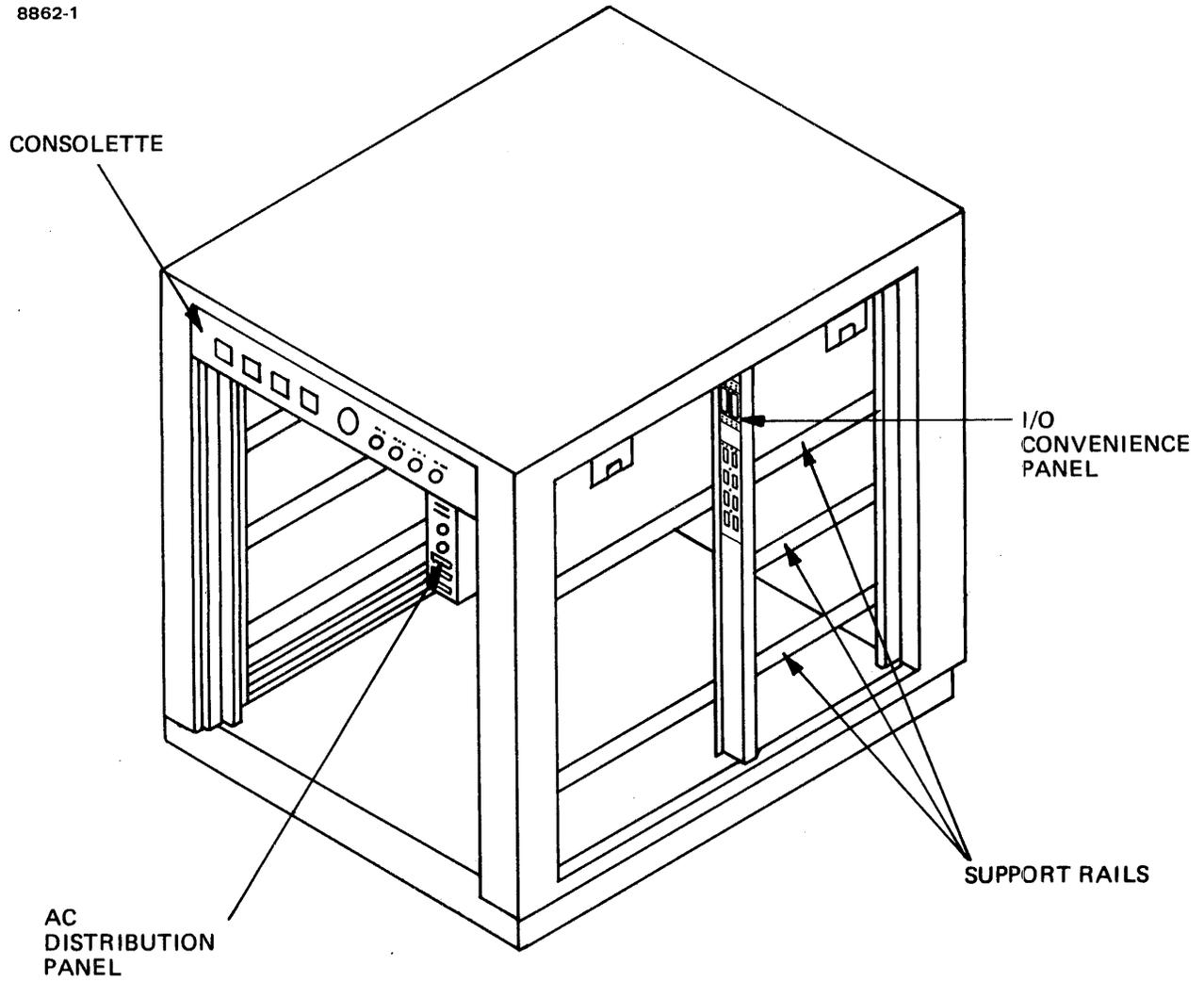
Figure 2-6 Basic System Cabinet (Front View)

2.5.2 Cooling

The cabinet is designed to allow cooling and ventilation, using room ambient air, for heat generating components.

The CPU chassis is cooled by modular fan assemblies mounted to the cabinet structure on the right side of the chassis. Air flow is across the PC boards from right-to-left. The power subsystems include fans that force air across the units from left-to-right.

The disk subsystem is cooled by modular fan assemblies mounted to the cabinet structure in the rear of the disk drives. Mounting is designed to allow the fan panel to swing out for installation and service. When the disk is in operation, fans must be operating with the panel in the closed position.

NOTE

Air enters and exits the cabinet through perforated side skins. To ensure maximum component life, keep the cabinet clear of obstructions that could restrict air flow through the sides of the cabinet.

2.5.3 Cable Routing and Connections

Disk cables are routed along the left side of the cabinet. The consolette and multiperipheral controller (MPC) board cables are routed along the right side of the cabinet. Cables from the optional MPC board are routed along the left side of the cabinet. Two I/O convenience panels are mounted on the left and right center uprights to provide a convenient interface between internal and external cables (see Figure 2-7). Cables that exit the cabinet are routed through one of three slots in the base assembly. Care must be taken to ensure that cables are dressed and secured to allow sufficient clearance and slack to accommodate swing out or slide-mounted assemblies.

MPC PRINTER
CABLE
CONN6

MPC
CONN2

CONN3

MPC FULL-DUPLEX
COMMUNICATION
CHANNEL CONNECTORS

CONN4

CONN5
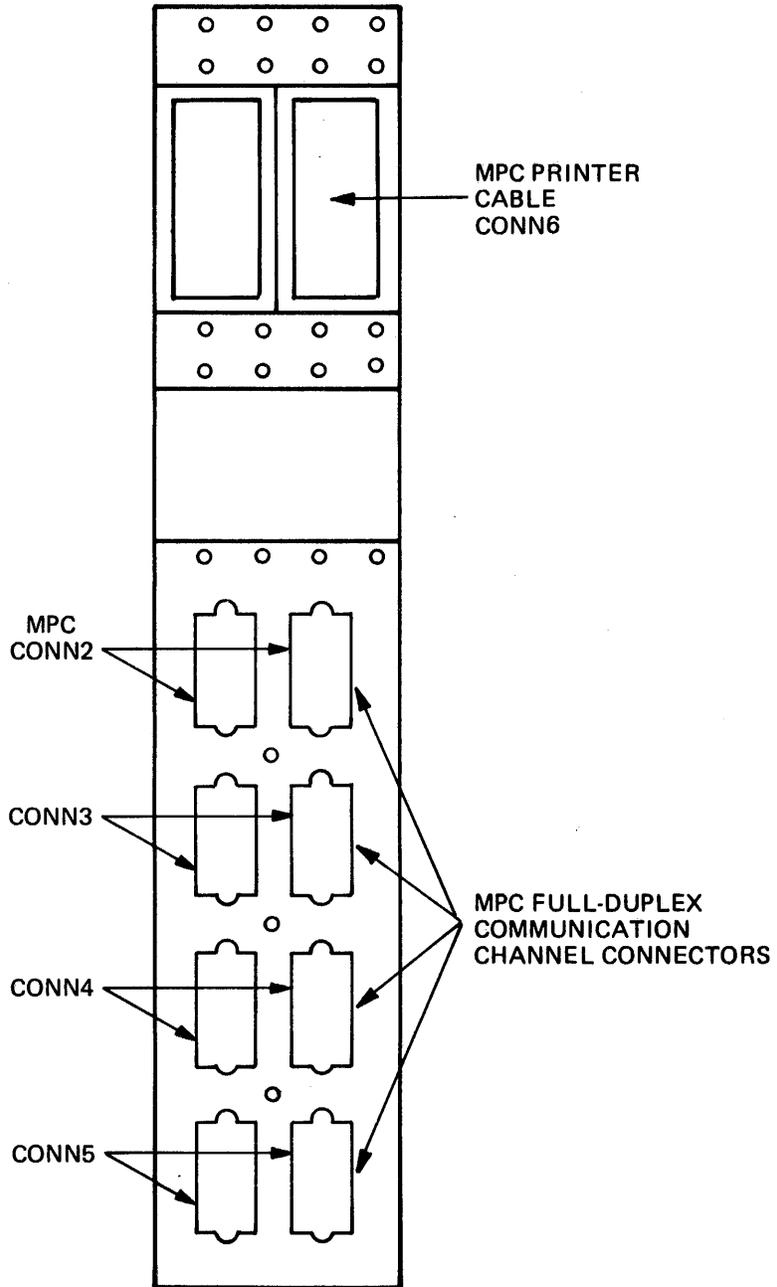
Figure 2-7   Right I/O Convenience Panel

CHAPTER 3
SYSTEM CONFIGURATION

3.1 INTRODUCTION

This chapter describes cabling, system cabinet configuration, installation and backpanel wiring information for the components and options in the Model 3205 System.

3.2 CABLES AND TERMINATORS

The following sections describe the cables and terminators for the Model 3205 System.

3.2.1 Power Cables

The master power supply cables are connected to connector J2 (CONNJ2) and CONNJ4M on the backpanel of the central processing unit (CPU) chassis and the power cord is plugged into AC3 on the AC distribution panel. Connect jumper from position B to C of CONNJ3 on the CPU chassis backpanel when a power supply with P5 only is used (see Figure 3-1).

NOTE

No connection to CONNJ2E in this configuration.

The power cables for the 115V system are described in detail in the 34-042 Power Subsystem Installation and Maintenance Manual. The power cables for the 208/230V systems are described in detail in the 34-039 Power Subsystem Installation and Maintenance Manual.

3.2.2 Consolette Cabling

The 09-140 consolette is installed at the top front of the system cabinet. A ribbon cable with a 26-pin connector (CONNP1) is routed along the right side of the cabinet and connected to pins 28 through 40 of CONN0 in slot 7 of the CPU chassis backpanel (see Figure 3-2 and Assembly Drawing 09-166 D03). CONNP1 is keyed to ensure correct orientation.

8858-1

J3

CONNECT JUMPER FROM POSITION
B TO C WHEN PWR. SUP. WITH P5
ONLY IS USED.
CONNECT JUMPER FROM POSITION
A TO C WHEN PWR. SUP. WITH
P5/P5U IS USED.

A   B   C

J2E

CONN 2

J13

J14

F1   20A

F2   20A

J2

J3

J4M

AC3

CONN 1   J4S

POWER SUPPLY SHOWN
REMOVED FROM CABINET
TO CLARIFY DWG.

AC2

PWR. SUP. CABLES TO BE COILED
WITHIN UPRIGHT CHANNEL OF CABINET
AND SECURED WITH TIES

AC1   UNIPOINT GROUND
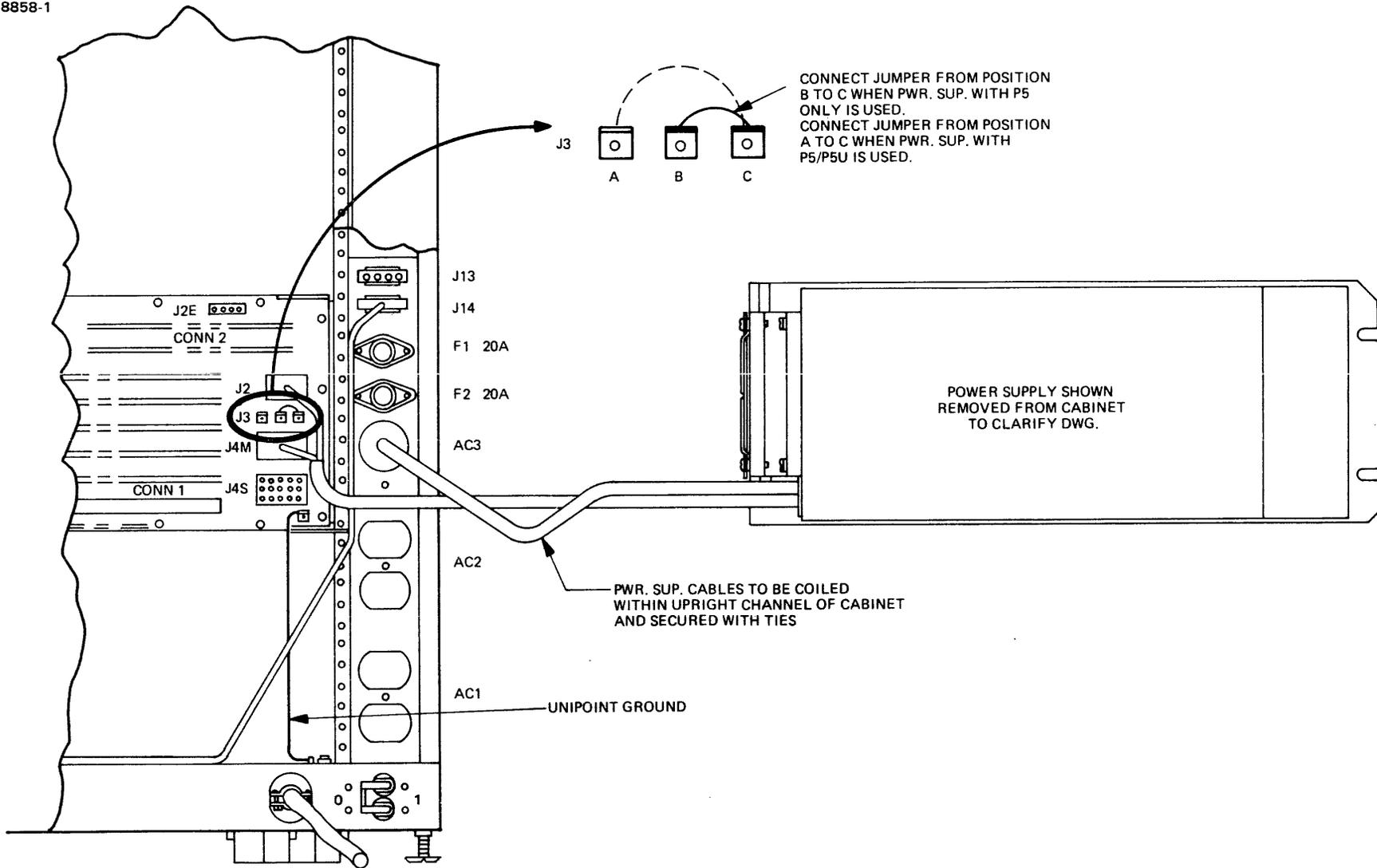
Figure 3-1   Power Supply Cabling
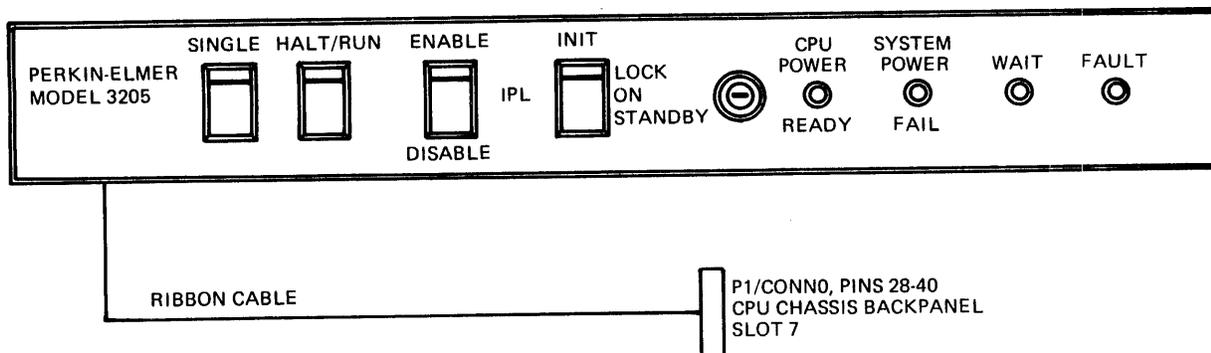
Figure 3-2 Consolette Cabling

3.2.3 50Mb Cartridge Disk Drive (CDD50) Cabling

This section describes the cables required for installation of the CDD50 (see Figure 3-3 and Information Drawing 16-942 D12).

- 17-663 A/B 152.4cm (60") shielded cable - This two part (A/B) cable connects the intelligent disk controller (IDC) board to the disk power supply. Cable A is connected between the IDC front edge CONN2 and I/O CONNJ1 at the rear of the disk power supply. Cable B is connected between the IDC front edge CONN6 and I/O CONNJ3 of the disk power supply.

- 17-672 C/D 91.4cm (36") shielded cable - This two part (C/D) cable connects the disk drive to the disk power supply. Cable C is connected between I/O CONNJ1 at the rear of the disk drive and I/O CONNJ4 at the rear of the disk power supply. Cable D is connected between I/O CONNJ2 at the rear of the disk drive and I/O CONNJ5 at the rear of the disk power supply.

- AC power cable, black/green - This cable connects the AC power distribution CONNJ1 on the disk drive to AC power distribution CONNJ1 on the disk power supply.

- DC power cable, gray - This cable connects the disk drive power supply to the AC power distribution CONNJ3 on the disk drive.

- AC power input cable, black - This cable connects the AC power input receptacle on the disk power supply to receptacle AC2 on the AC distribution panel.
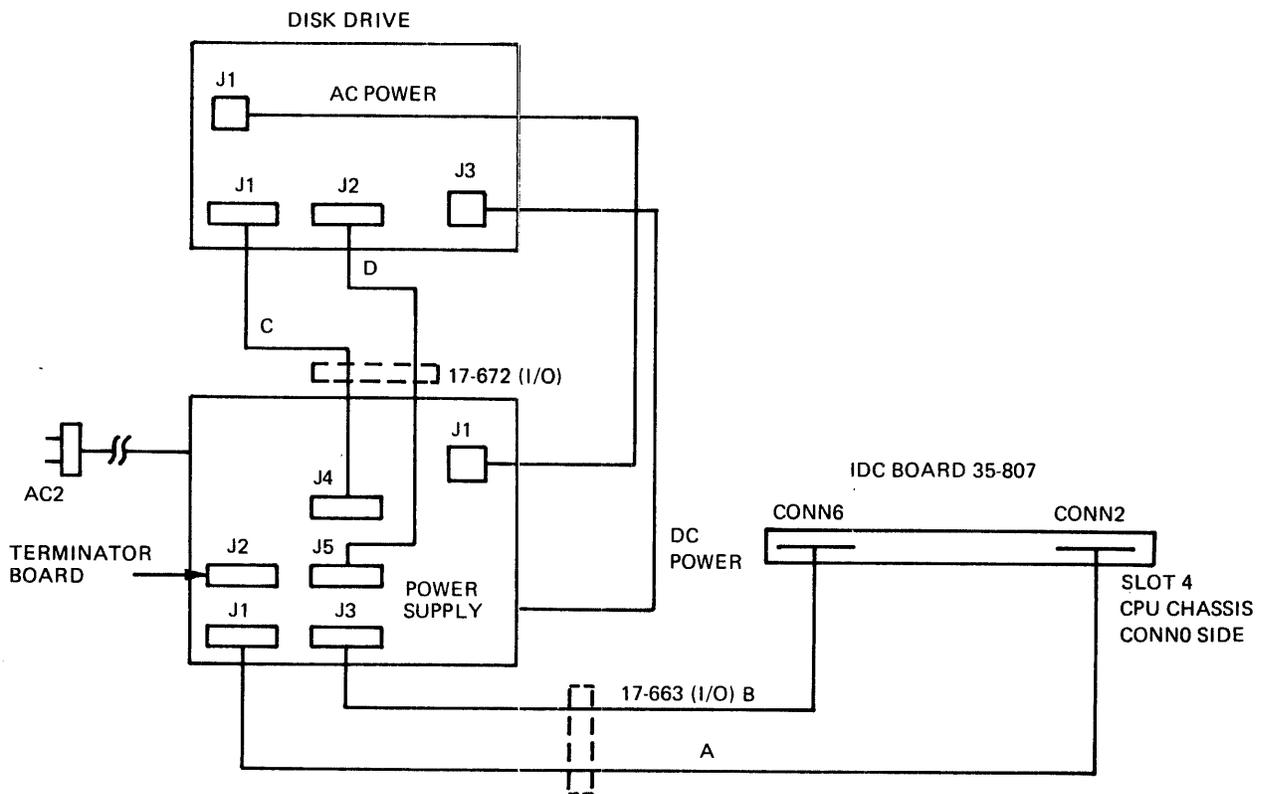
DISK DRIVE

Figure 3-3 Disk Drive Cabling

3.2.4 Multiperipheral Controller (MPC) Cabling

This section describes the cables required to ensure proper operation of the MPC board (see Figure 3-4).

● 17-680 F01 121.9cm (48") shielded cable – The system is provided with four 17-680 F01 cables. Each cable has a 34-pin connector that connects to the MPC front edge connector (2, 3, 4 or 5) and two 15-pin connectors that connect to the I/O convenience panel on the right side of the cabinet. The two 15-pin connectors allow the user to interface two full-duplex devices to the system.

● 17-643 F01 121.9cm (48") printer interface cable – This internal cable is connected between the MPC front edge CONN6 and the I/O connector panel on the right side of the cabinet.

● 17-644 6.7m (22') printer cable – This external cable is connected between the I/O convenience panel and the printer.

RIGHT
I/O
PANEL

17-643 F01   17-644   PRINTER

MPC BOARD (35-867)
FRONT EDGE CONNECTORS

RIGHT
I/O
PANEL

CHANNEL
NUMBER

| 6 | 5 | 4 | 3 | 2 |

17-680 F01   1

0

17-680 F01   3

2

17-680 F01   5

4

17-680 F01   7

6
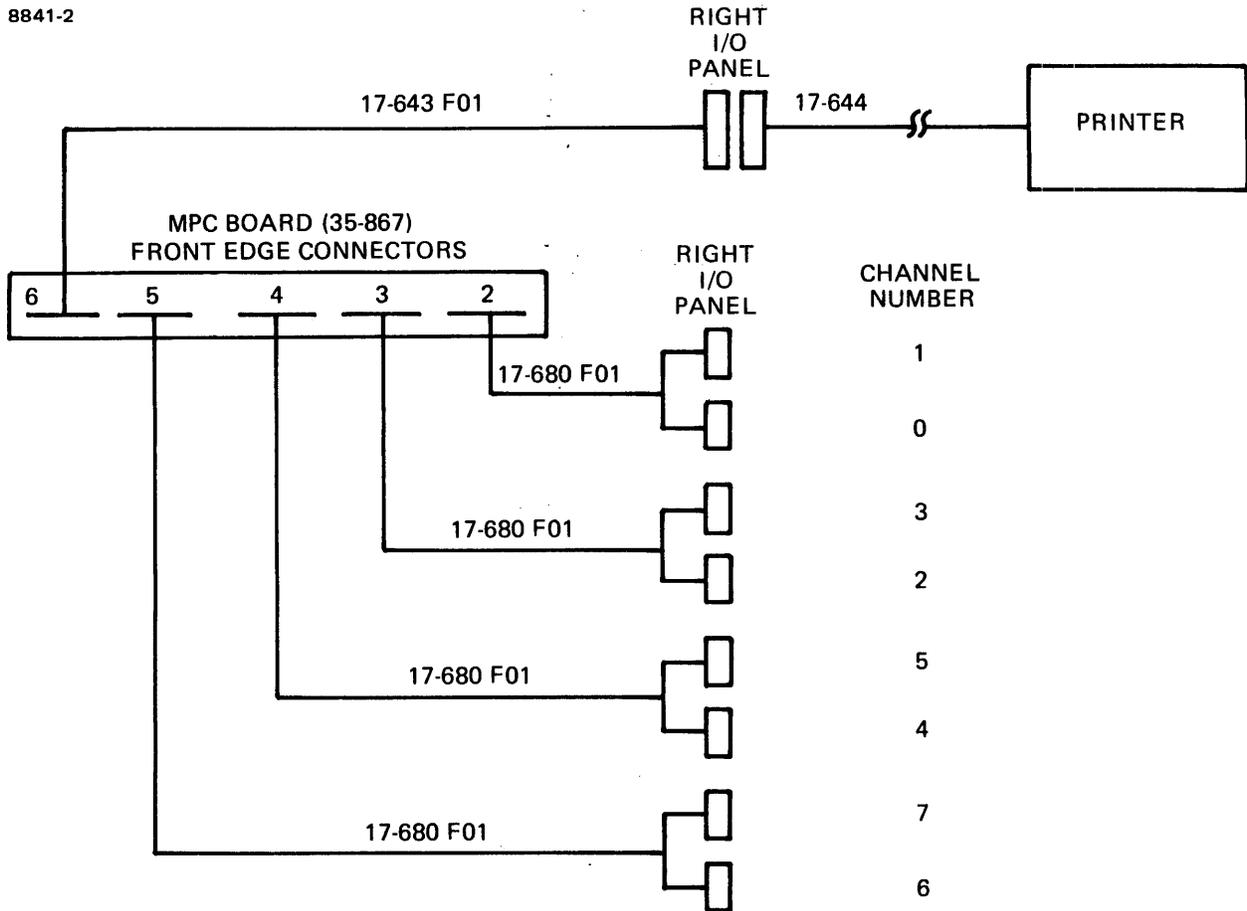
Figure 3-4   MPC Board Cabling

3.2.5   Model 6100 Video Display Unit (VDU) Cabling

The external signal cable 17-272 F01 M02 is connected between the
VDU and the I/O convenience panel and between the I/O convenience
panel to one of the four front edge connectors (2, 3, 4 or 5)   on
the MPC board by a 17-680 F01 cable (see Figure 3-5).

8842

MODEL
6100
VDU

AC POWER
AC1   DISTRIBUTION PANEL

MPC BOARD
35-867

| 6 | 5 | 4 | 3 | 2 | SLOT 5
CPU
17-272 F01 M02   17-680 F01   CHASSIS
CONN 2, 3, 4, OR 5

I/O
PANEL
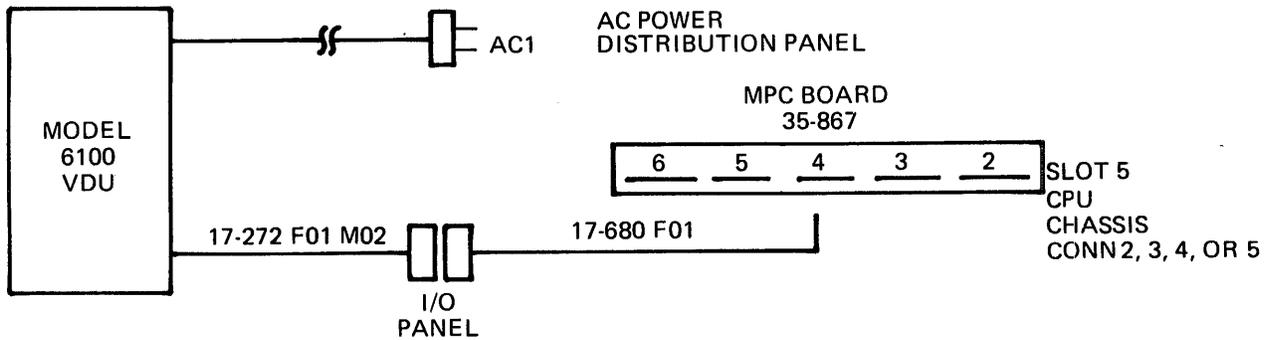
Figure 3-5   Model 6100 VDU Cabling

3.2.6 Terminators

The following terminators are available for the Model 3205 System.

- 35-813 F01 M01 one-field terminator - This terminator is installed in the 0 and 1 sides of slot 0 of the CPU chassis. The terminator on the CONN1 side of slot 0 terminates the private multiplexor (PMUX) bus.

- Disk drive terminator - This terminator is supplied with the disk drive power supply. The terminator is installed in I/O CONNJ2 at the rear of the last disk drive power supply in the system.

3.3 INITIAL POWER-UP

Prior to initial power-up, the following steps should be verified.

1. Verify that the START/STOP switch on the front of the disk drive is in the STOP (out) position.

2. Ensure that all cables and terminators are properly secured.

3. Unscrew carriage locking pin on the top of the disk drive in a counterclockwise direction until head of screw is flush with top of cover (see Section 3.4.2 and Figure 3-8). Resistance to turning will be felt as locking pin nears the correct position.

4. Ensure that the circuit breakers on the disk drive power supply, the master power supply and the system cabinet are in the ON (1) position.

3.4 CABINET CONFIGURATION

The configuration of the system cabinet is shown in Figure 3-6. The following sections provide mounting information for the components within the system cabinet.
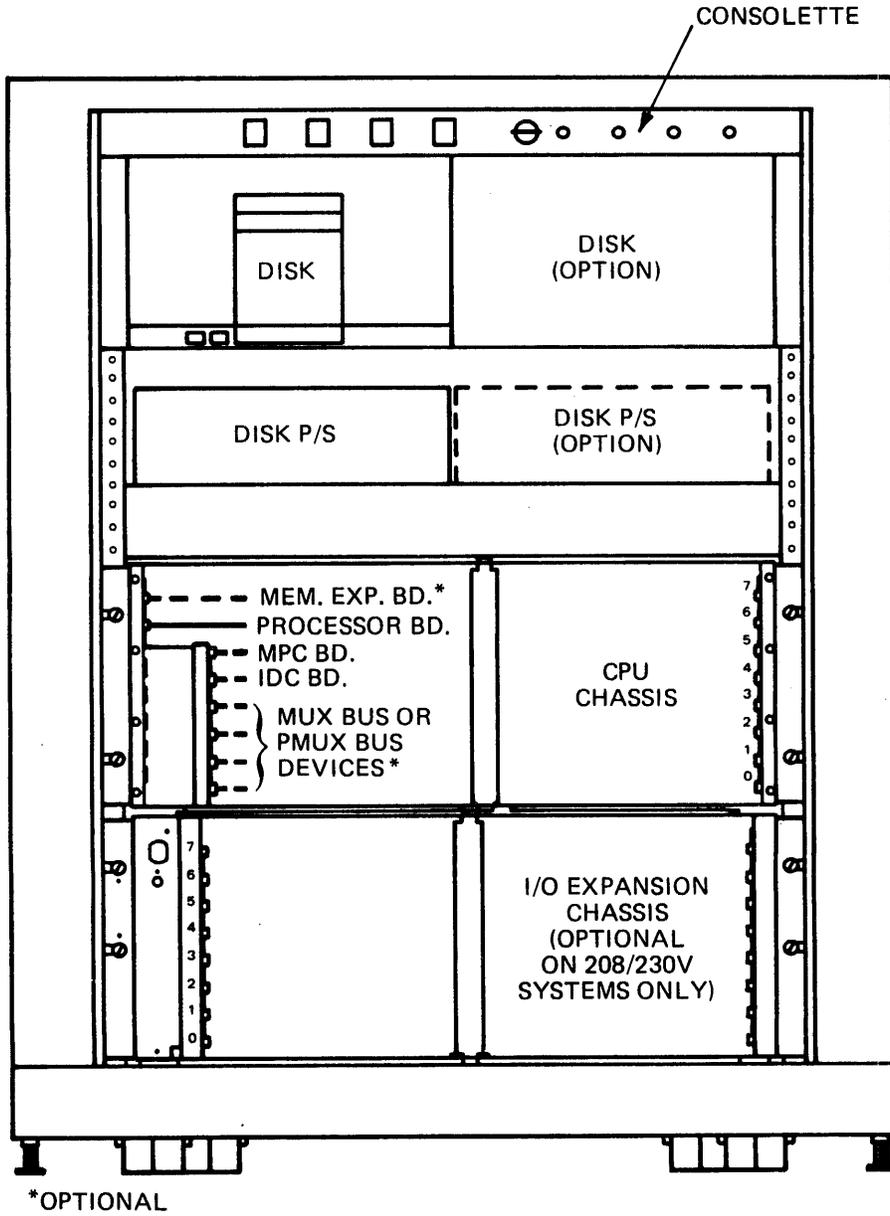
Figure 3-6 Model 3205 System Cabinet

3.4.1 Consolette

The 09-140 consolette is installed at the top front of the cabinet and mounted to the vertical uprights of the cabinet with two #4-40 machine screws and two lock washers.

3.4.2 50Mb Cartridge Disk Drive (CDD50)

The disk chassis is mounted directly below the consolette to the front uprights with four #10-32 thread-forming screws. The disk power supply and power supply chassis are mounted below the disk drive chassis to the rear uprights of the cabinet. The 11-333 fan panel is mounted behind the disk drive chassis.

The disk drive is installed in the chassis by engaging the disk-mounting plates in the guides of the chassis (see Figure 3-7 and Information Drawing 16-942 D12). The disk mounting plate is secured to the disk chassis in the rear by one #8-32 screw and lock washer and is secured to the cabinet by two plastic fasteners located directly below the front of the disk.

The disk drive is supported when extended from the cabinet to expose the locking pin located on the top surface of the disk drive. See Figure 3-8. The carriage locking pin must be in the unlocked position for proper operation of the disk and in the locked position when the disk drive is removed from the cabinet.

CAUTION

DO NOT REMOVE THE CARRIAGE LOCKING PIN AT
ANY TIME. THE AIR SYSTEM SEAL INTEGRITY
OF THE DISK REQUIRES THAT THIS SCREW
REMAIN IN THE TOP COVER AT ALL TIMES.

To remove the disk drive from the cabinet, it is necessary to override the stop mechanism located at the bottom surface of the disk chassis. When the disk is extended past the stop mechanism, care should be taken as the disk is no longer supported in the cabinet.

8859-1

CARRIAGE LOCKING PIN TO BE
IN LOCKED POSITION WHEN DISK
IS REMOVED FROM CABINET

DISK DRIVE

PLASTIC
FASTENERS

POSITION BEHIND PLASTIC
STOP PROVIDED IN DISK CHASSIS
WHEN INSTALLING DISK

CAUTION

DISK IS NOT SUPPORTED WHEN
EXTENDED FROM CABINET
PAST DISK STOP MECHANISM.

CPU CHASSIS

DISK
CHASSIS

DISK STOP
MECHANISM
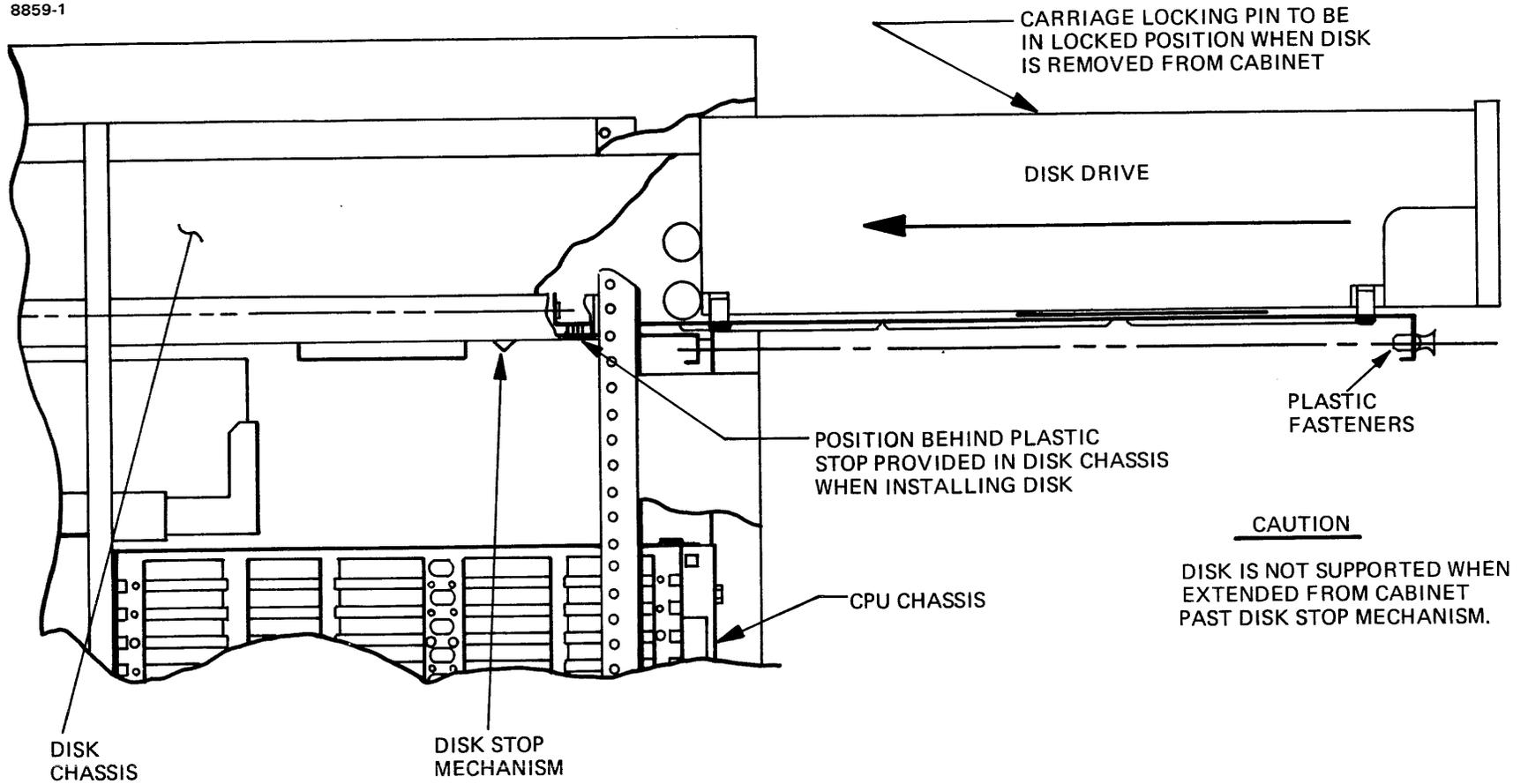
Figure 3-7   CDD50 Installation

8865

TO RELEASE CARRIAGE
LOCK, BACK OFF
CAPTIVE SCREW UNTIL
FLUSH WITH THE TOP
OF THE COVER

LOCKING PIN
(DO NOT REMOVE
COMPLETELY
FROM HOLE)

START/STOP
SWITCH
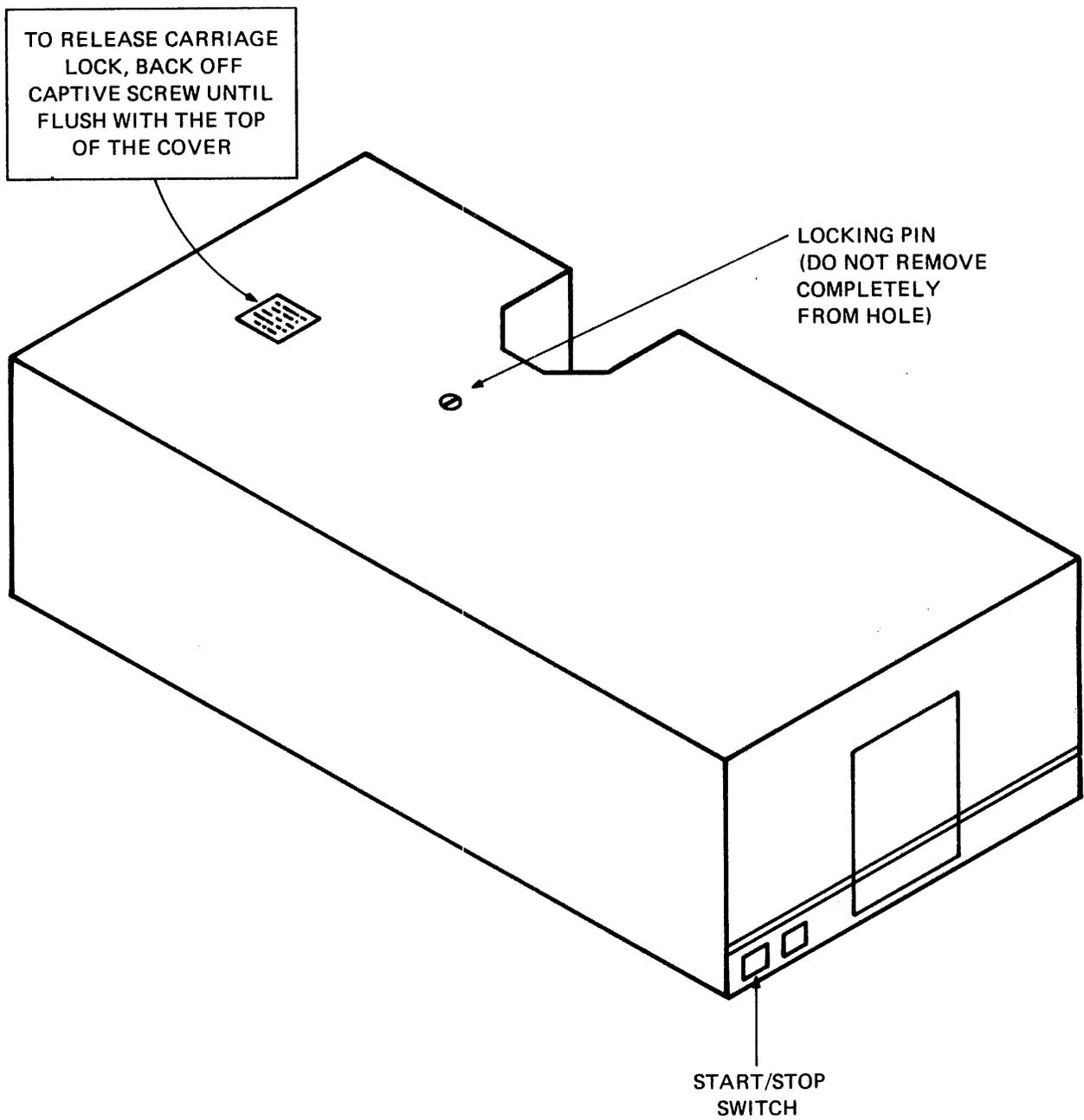
Figure 3-8   CDD50 Carriage Lock

3.4.3 Central Processing Unit (CPU) Chassis

The CPU chassis is mounted to the front uprights with four #10-32 thread-forming screws, directly below the disk drive power supply. The chassis contains eight slots; slot 7 accepts the 43.2cm (17") memory expansion board; slot 6 the 43.2cm (17") processor board; slot 5 the 38.1cm (15") MPC board; slot 4 the 38.1cm (15") IDC board; and the remaining slots, 3 through 0, can be used for either MUX bus or PMUX bus devices. The boards in the CPU chassis are installed in the following sequence:

QUANTITY	BOARD NAME	PART NUMBER	SLOT NUMBER
1	Memory Expansion	35-865	7
1	Processor	35-864	6
1	MPC	35-867	5
1	IDC	35-807	4
1	I/O		3
1	I/O		2
1	I/O		1
1	I/O		0

The configuration of the CPU chassis is shown in Figure 3-9.

8843

7	MEMORY EXPANSION BOARD (OPTION)	7
6	PROCESSOR BOARD	6
5	MPC BOARD	5
4	IDC BOARD	4
3	I/O (OPTION)	3
2	I/O (OPTION)	2
1	I/O (OPTION)	1
0	I/O (OPTION)	0

Figure 3-9   CPU Chassis Configuration

3.4.3.1 Processor Board (35-864)

The processor board connects to the 0, 1 and 2 connectors of the backpanel in slot 6 of the CPU chassis. To verify processor board strapping, see the Model 3205 Theory of Operation and Maintenance Manual.

3.4.3.2 Multiperipheral Controller (MPC) Board (35-867)

The MPC board is connected to the 0 side of the backpanel in slot 5 of the CPU chassis. To verify MPC board strapping, see the MPC Theory of Operation and Maintenance Manual.

3.4.3.3 Intelligent Disk Controller (IDC) Board (35-807)

The IDC board is connected to the 1 side of the backpanel in slot 4 of the CPU chassis. The IDC interfaces the disk drive to memory via the PMUX bus on the processor board. To verify IDC board strapping, see the IDC Installation and Theory of Operation Manual.
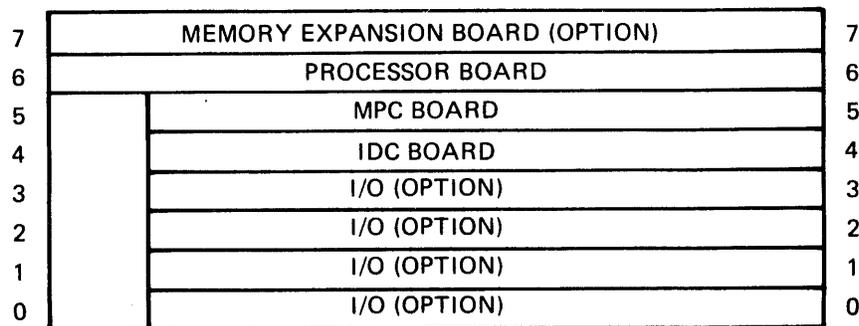

3.4.4 Power Subsystem

The power subsystem (P5) mounts into the rear of the cabinet, attached to the right vertical uprights with four #10-32 thread-forming screws through the hinged front panel (see Figure 3-9). The power subsystem is located behind the CPU chassis, raised 17.8cm (7") above the base to allow for the addition of a slave power supply if the optional I/O expansion chassis is configured to the system (208/230V systems only). Mounting and cable routing are designed to allow the power subsystem chassis to swing out for installation and service. When the power subsystem is in the operating position, it is secured to the left vertical upright using two #10-32 thread-forming screws. The AC distribution panel is mounted vertically on the left rear cabinet upright, fastened with four #6-32 screws (see Figure 3-10).
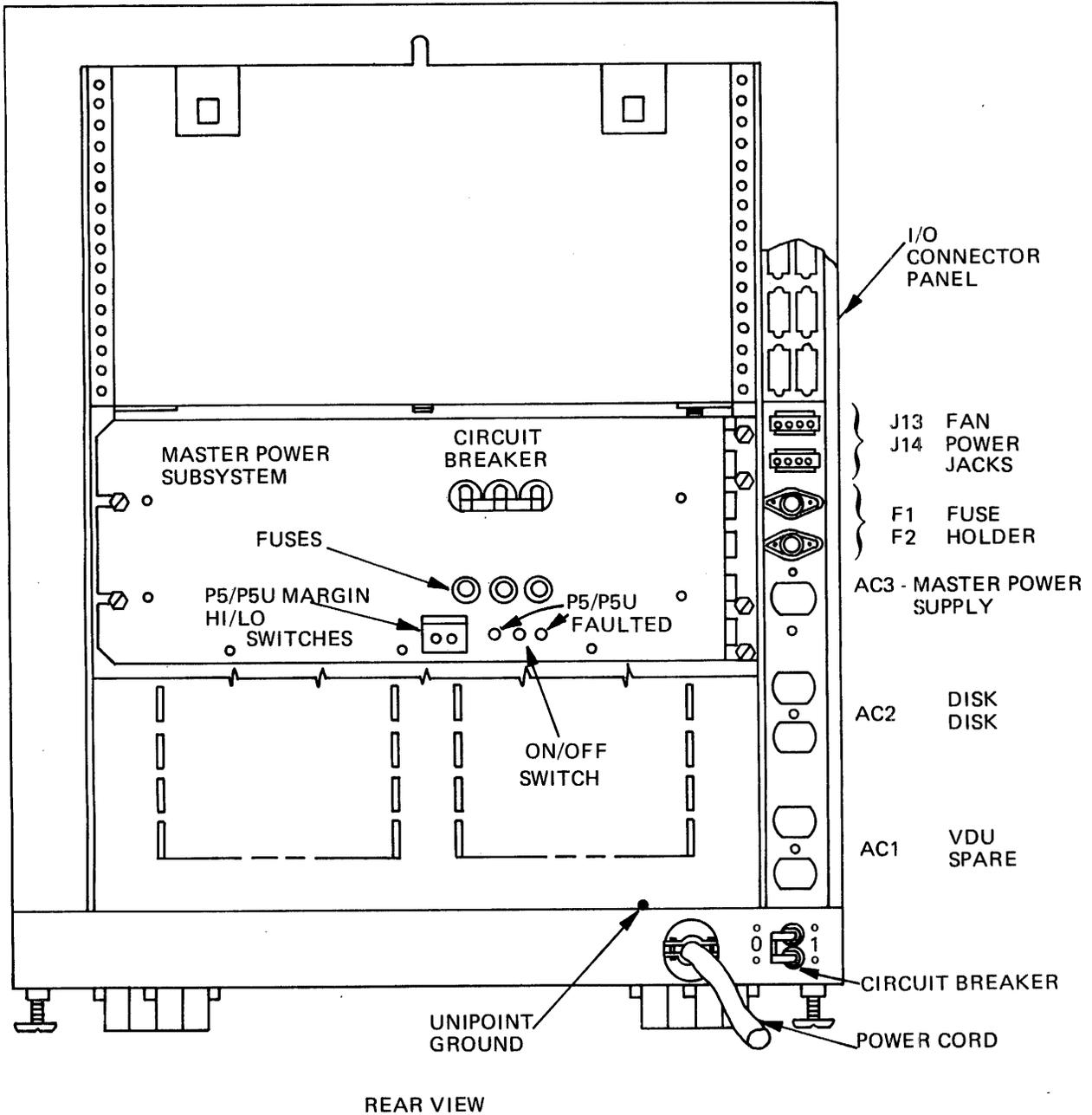
8861

REAR VIEW

Figure 3-10   Power Subsystem/AC Power Distribution Panel

3.5 OPTIONS

Installation and cabling information for the various options is provided in the following sections.

3.5.1 Memory Expansion

The memory capacity of the Model 3205 System ranges from 512kb expandable to 4Mb of directly addressable MOS memory. The first 1Mb of memory is contained on the processor board with an additional 3Mb of memory available on the optional memory expansion board, expandable in 1Mb increments. The processor board must contain 1Mb of memory before the memory expansion board can be added to the system. Memory is expanded by installing single in-line package (SIP) 256k x 1 random access memory (RAM) chips (19-326).

3.5.1.1 Processor Board Memory Expansion

There are two rows provided on the processor board for memory. Each row contains 1/2Mb of memory. The basic Model 3205 processor board (35-864F00), which comes equipped with 1/2Mb of memory, has 22 SIPs (512kb) installed in row 0. To expand memory to 1Mb, insert 22 additional 19-326 SIPs in row 1 and replace the 19-339F01 programmable array logic (PAL) at location A9 with a 19-339F02 PAL. See Figure 3-11 and Assembly Drawing 35-864 E03.

3.5.1.2 Memory Expansion Board (35-865)

To expand the memory capacity of the processor from 1Mb to 2, 3, or 4Mb, the memory expansion board must be added. The memory expansion board is connected to the 0, 1 and 2 connectors of the backpanel in slot 7 of the CPU chassis. The basic memory expansion board contains 1Mb of memory installed in rows 2 and 3 (Area A). To expand the memory on the board to 2Mb or 3Mb, insert 44 SIPs (19-326) in rows 4 and 5 (Area B) and rows 6 and 7 (Area C), respectively. See Figure 3-12 and Assembly Drawing 35-865 E03. The 19-339 PAL at location A9 on the processor board must be replaced with the appropriate functional variation of the PAL for that memory configuration (see Table 3-1).

Figure 3-11 Processor Board Memory Expansion
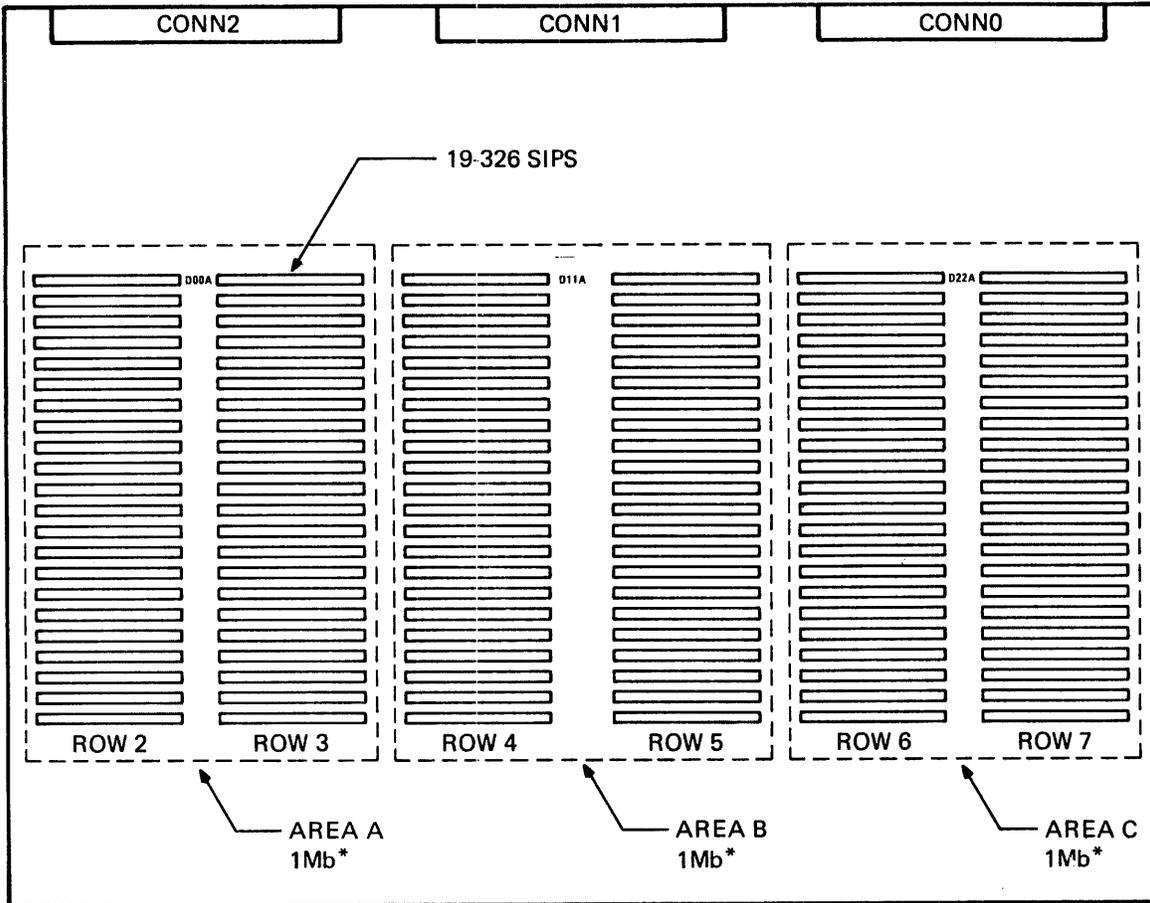
*REPLACE CHIP A9 ON PROCESSOR BOARD WITH CORRECT 19-339Fxx. SEE TABLE 3-1.

Figure 3-12 Memory Expansion Board

TABLE 3-1 MEMORY EXPANSION CONFIGURATIONS

MEMORY SIZE	PROCESSOR BOARD REQUIRED	MEMORY EXPANSION BOARD REQUIRED	PAL REQUIRED
1/2Mb	35-864 F00	NOT REQUIRED	19-339 F01
1Mb	35-864 F01	NOT REQUIRED	19-339 F02
2Mb	35-864 F02	35-865 F02	19-339 F03
3Mb	35-864 F03	35-865 F03	19-339 F04
4Mb	35-864 F04	35-865 F04	19-339 F05

3.5.2 Battery Back-Up

To provide battery back-up, install the P5U assembly and the battery into the master power subsystem as shown in Figure 3-13 and Information Drawing 02-745 M01 D12. Ensure that polarity is observed when connecting the positive and negative battery cables on the front panel of the master power subsystem to the positive and negative terminals of the battery. Connect jumper from position A to C of CONNJ3 on the CPU chassis backpanel when power supply with P5/P5U and battery back-up is used (see Figure 3-13).

3.5.3 Input/Output (I/O) Expansion Chassis (208/230V Systems Only)

The system cabinet accommodates one I/O expansion chassis (12-053) with a maximum of eight I/O slots. The I/O expansion chassis is mounted directly below the CPU chassis to the front uprights with four #10-32 thread-forming screws.

The following signal cables and terminators are required for the I/O expansion chassis (see Figure 3-14 and Information Drawing 02-865 D12).

- 17-464 F01 transmission cable 9.90cm (3.90") - This cable is connected between the 35-813 F01 M01 terminator on slot 0 CONN0 of the CPU chassis and the 35-813 F01 M01 terminator on slot 7 CONN0 of the I/O expansion chassis. This cable extends the MUX bus to the I/O expansion chassis.

- 17-464 F02 transmission cable 41.9cm (16.5") - This cable is connected between the 35-813 F01 M01 terminator on slot 0 CONN0 of the I/O expansion chassis and the 35-813 F01 M01 terminator on slot 7 CONN1 of the same chassis. This cable cascades the bus from CONN0 to CONN1 of the I/O expansion chassis.

- 35-813 F01 M01 I/O terminator - This terminator is mounted on slot 7 CONN0, slot 0 CONN0, slot 7 CONN1 and slot 0 CONN1 of the I/O expansion chassis.

NOTE

Strap E1 to E3 on any 35-813 F01 M01 terminator in slot 0 which has a 17-464 FXX cable attached. This terminator should be strapped on both the CPU chassis and the I/O expansion chassis. Strap E2 to E3 on the 35-813 F01 M01 terminator in slot 7 of the I/O expansion chassis.

8860-1

TO PROVIDE BATTERY BACK-UP, INSTALL P5U
ASSEMBLY AND BATTERY INTO MASTER POWER
SUBSYSTEM AS INDICATED

FRONT PANEL

SEE DETAIL "A"

BATTERY

─ BATT

CONNECT APPROPRIATE
CONNECTIONS TO
BATTERY FROM FRONT
PANEL

+

+ BATT
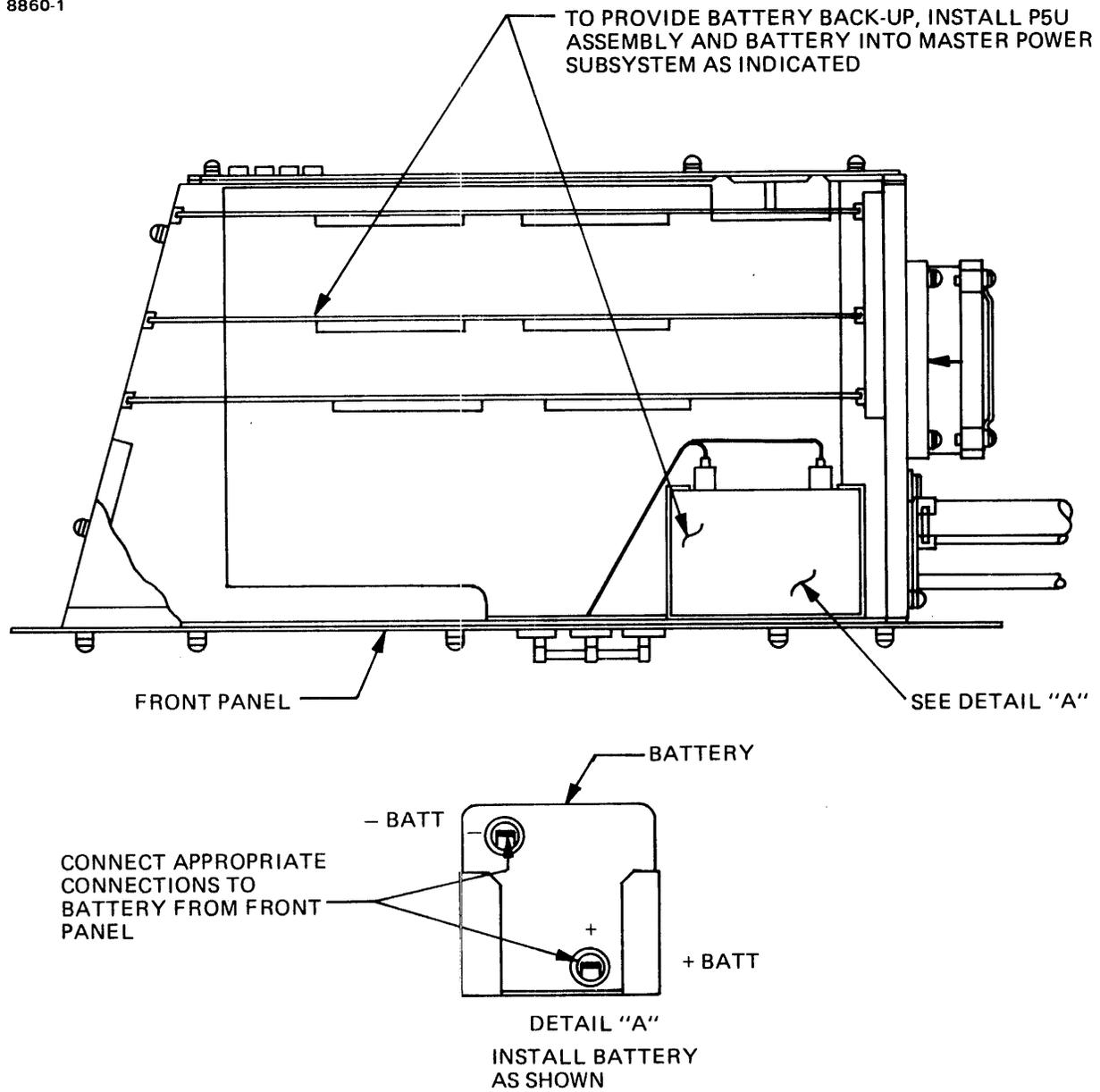
DETAIL "A"

INSTALL BATTERY
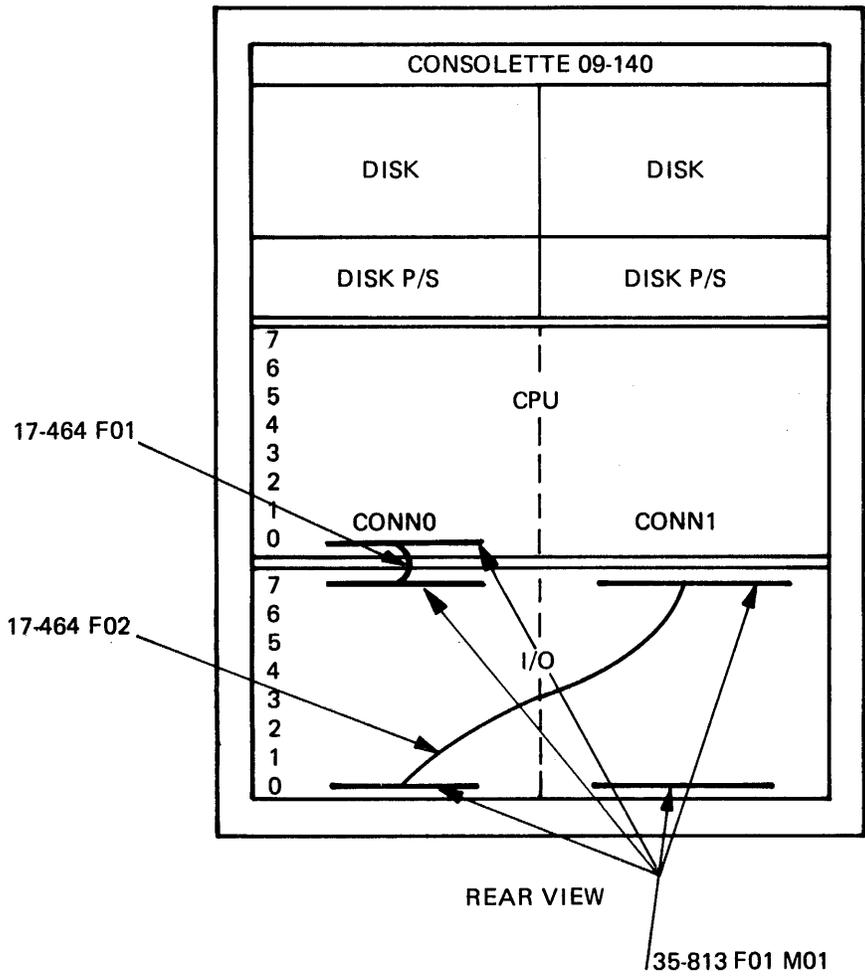AS SHOWN

Figure 3-13   Battery Back-Up Installation

Figure 3-14   I/O Expansion Chassis Cabling

3.5.3.1 Slave Power Supply

The slave power supply required with the I/O expansion chassis mounts in the rear of the cabinet in the same manner as the master power supply chassis. The master and slave power supply chassis are fastened to each other via their front panels with four #6-32 machine screws and four lock washers, forming a single, hinged unit.

The following cables are required for the slave power subsystem (see Figure 3-15 and Information Drawing 02-865 D12).

- 17-678 I/O power interface cable - This cable is connected from CONNJ4S on the CPU chassis backpanel to slave power subsystem cable 17-565 CONNP4S and P5 or P5 ground on the I/O chassis backpanel.

- 17-563 signal ribbon cable - This cable is connected between CONNJ8M on the master power subsystem and CONNJ8S on the slave power subsystem.

- 17-565 power cable - CONNP11 on this cable connects to CONNJ11 on master power cable 17-560.

For details on the power cables, see the 34-039 Power Subsystem Installation and Maintenance Manual.

3.5.4 Additional Disk Drives

Up to three additional CDD50s can be connected to the system. The second disk drive in the system can be installed directly in the system cabinet. The third and fourth additional disk drives must be installed in an expansion cabinet. Each disk drive is connected in daisy-chain fashion to the previous disk drive for signals by a 17-664 A cable. When an additional disk drive is installed, the terminator in I/O CONNJ2 of the previous disk drive power supply is removed and installed in I/O CONNJ2 of the new disk drive power supply. The disk drive terminator is always installed in I/O CONNJ2 at the rear of the last disk drive power supply in the system. For each additional disk drive, a 17-665 B cable is connected between I/O CONNJ3 of the disk drive power supply and the IDC board front edge connectors 3, 4 or 5. Each additional disk drive has a 17-672 C/D shielded cable connected from the disk drive to the disk drive power supply as explained in Section 3.2.4 (see Figure 3-16).

8857-1

POWER SUPPLY & POWER EXP SLAVE
REMOVED FROM CABINET
TO CLARIFY DWG

J14A

P13

J2

J3

J4M

J4S

I/O POWER
INTERFACE
17-678

17-560

MASTER POWER
SUBSYSTEM
34-039

P8-M

J11

P11

SLAVE POWER
SUBSYSTEM
34-040

J4S/P4S

P5 GND

P5
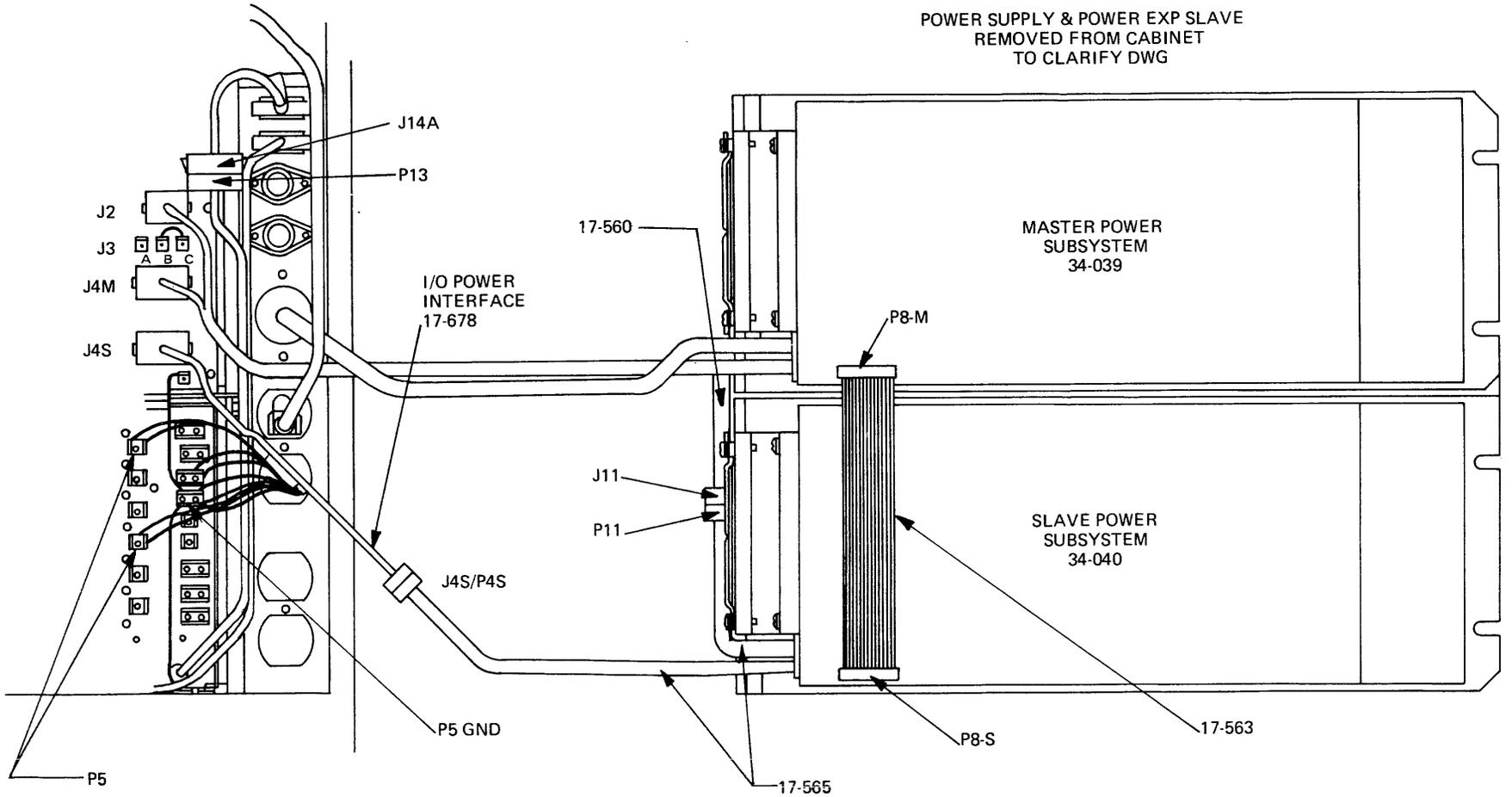
P8-S

17-563

17-565

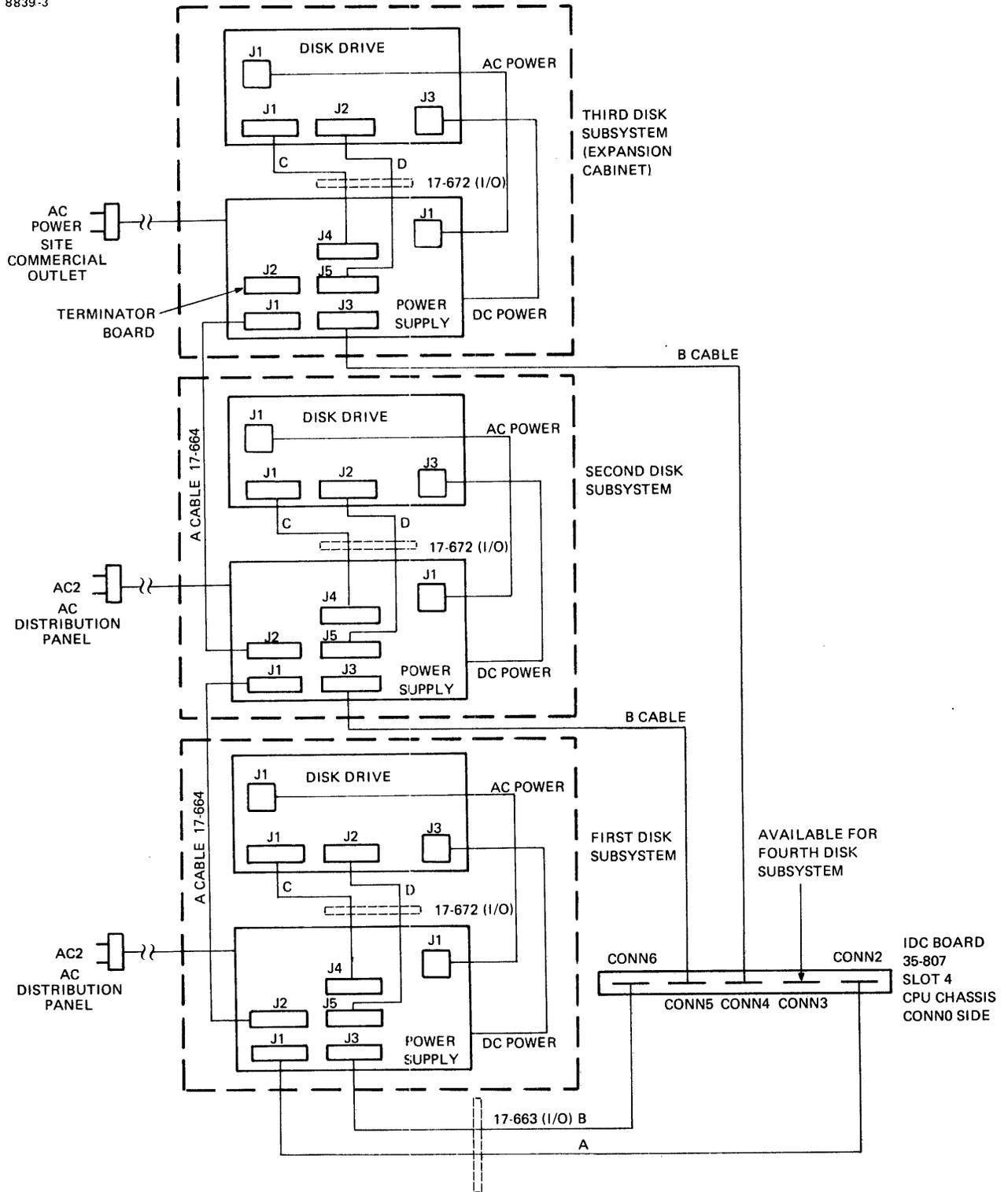Figure 3-15 Slave Power Subsystem Cabling

8839-3

Figure 3-16 Additional Disk Drive Cabling

3.5.5 76.2cm (30") Expansion Cabinet

The 76.2cm (30") expansion cabinet is only required for the third
and fourth optional disk drives. Up to two expansion disk drives
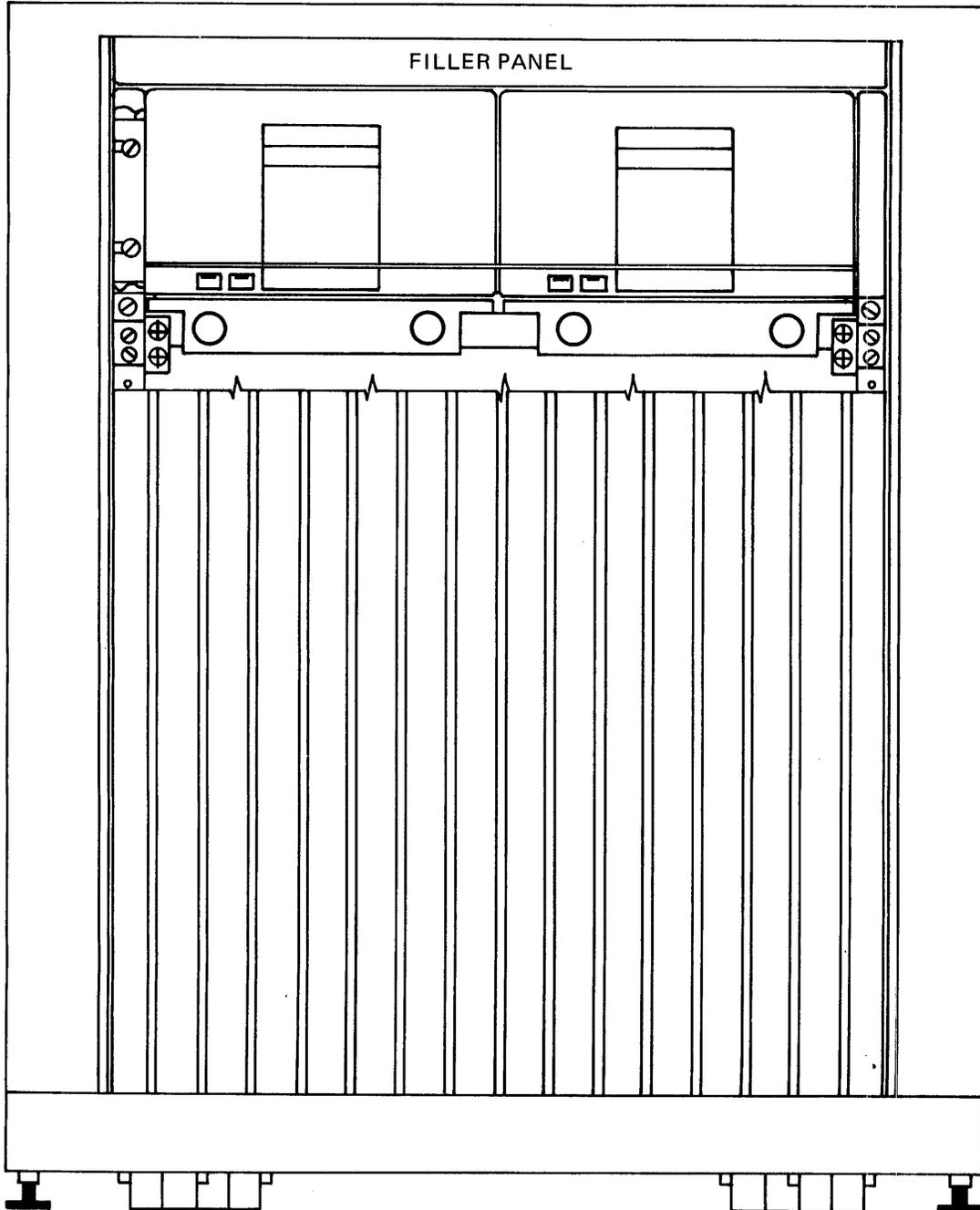can be installed in this cabinet (see Figure 3-17).

8852

Figure 3-17 Disk Drive Expansion Cabinet

3.6 INTERRUPT PRIORITY BACKPANEL WIRING

The acknowledge (ACK) control line from the processor board in the CPU chassis carries the interrupt ACK signal. This line breaks into a series of short lines at each device controller in the CPU or I/O chassis slot to form the daisy-chained priority. The ACK signal must pass through every controller equipped with interrupt control circuits in a serial fashion.

Backpanel wiring for interrupt control at a given position is as follows. The received ACK (RACK0) is input at pins 122-0 and 122-1 and the transmitted ACK (TACK0) is output at pins 222-0 and 222-1. The daisy-chain bus is formed by a series of line segments that connect TACK0 at pins 222-1 and 222-0 of a given slot to RACK0 at pins 122-1 and 122-0, respectively, of the next slot (lower priority). Slots unequipped with controllers are bypassed by jumpers that short pin 122-1 and pin 122-0 to pin 222-1 and pin 222-0, respectively, on the same chassis. Backpanels are wired with jumpers on all slots. Therefore, whenever a chassis slot is equipped with a controller that requires interrupt capability, the jumper between pin 122-1 and pin 222-1 and/or the jumper between pin 122-0 and pin 222-0 must be removed at that slot according to installation instructions for that controller. When the PMUX bus, which is wired down the 1 side of the CPU chassis, is idle, it serves as an extension of the MUX bus. During PMUX operation, MUX bus RACK0/TACK0 operates on the 0 side of the backpanel and the PMUX bus RACK0/TACK0 operates independently on the 1 side of the CPU chassis backpanel. Figure 3-18 shows an example of the interrupt priority wiring, the arrows indicating the direction of priorities. Slot 5 on side 0 (CONN0) of the CPU chassis has the highest priority. The PMUX bus has the lowest priority.

When the optional I/O expansion chassis is configured in the system, remove the wire between 222-0 slot 0 and 122-1 slot 6 of the CPU chassis backpanel. Connect a wire between 222-1 slot 0 of the I/O expansion chassis and 122-1 slot 6 of the CPU chassis. Figure 3-19 shows an example of the interrupt priority wiring with the I/O expansion chassis configured to the system, the arrows indicating the direction of priorities.

To extend the MUX bus in the CPU chassis, cut the PMUX bus above the selected slot and install a 35-813 F01 M01 terminator in this slot. Connect a 17-464 F02 cable between the 35-813 F01 M01 terminator on slot 0 CONN0 to the 35-813 F01 M01 terminator on CONN1 of the selected slot. Disconnect the wire from 222-0 slot 0 and reconnect it to 222-1 slot 0. Figure 3-20 shows the extension of the MUX bus to slots 3 through 0 on the CONN1 side of the CPU chassis. In this example, the PMUX bus extends only to slot 4 on the CONN1 side of the CPU chassis.

757-7

CONN0　　　　　　CONN1　　　　　　CONN2
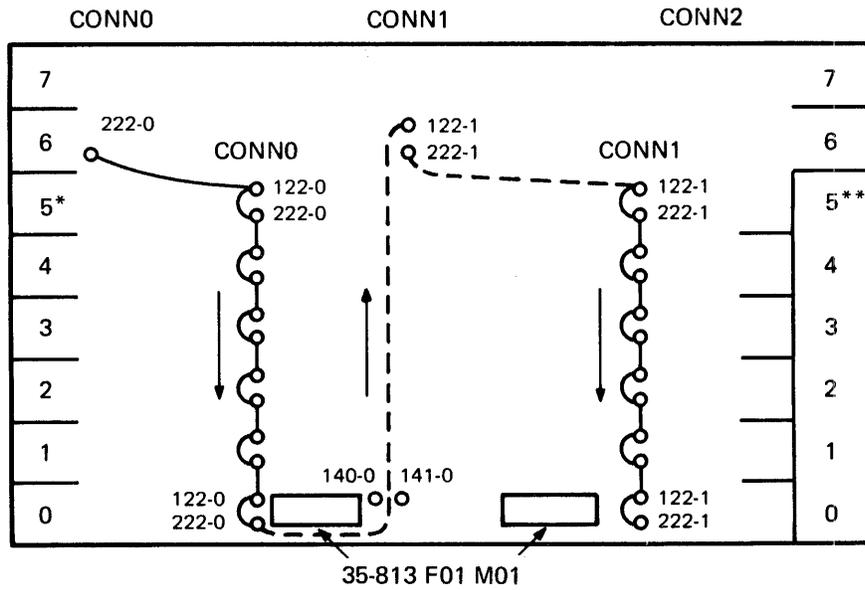
*MUX BUS OPERATION
**PMUX BUS OPERATION
— — — — DENOTES TWISTED PAIR

Figure 3-18　Interrupt Priority Wiring
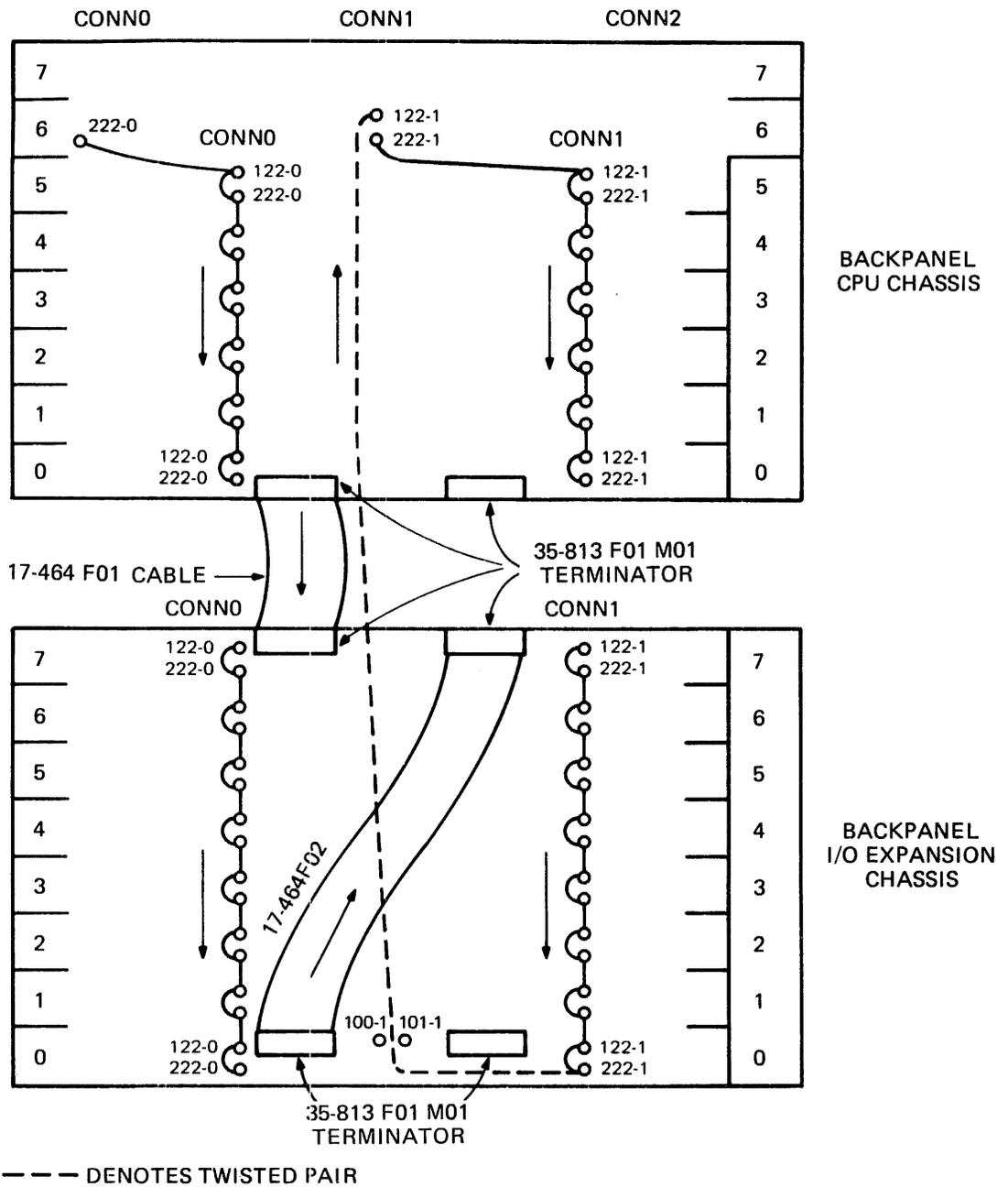
Figure 3-19   Interrupt Priority Wiring in I/O Expansion Chassis
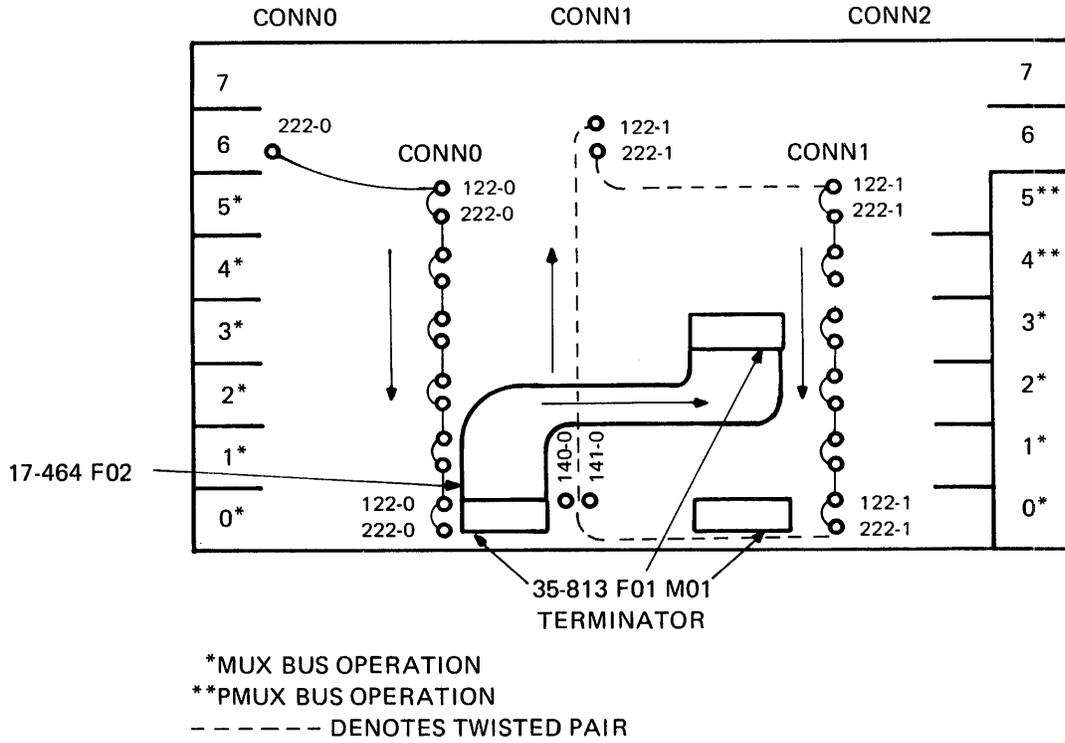
Figure 3-20   Interrupt Priority Wiring for MUX Bus
             Extension (CONN1 Side)

CHAPTER 4
SYSTEM SPECIFICATIONS AND CONFIGURATIONS

4.1 INTRODUCTION

This chapter provides the specifications and configurations for the Model 3205 System. It also includes a section on the product structure.

4.2 SPECIFICATIONS

The following sections provide a summary of the specifications for the Model 3205 System.

4.2.1 Memory

The memory specifications for the Model 3205 System are:

- A maximum memory size of 4Mb

- A minimum memory size of 512kb

- Memory increment from 512kb to 1Mb on the processor board and from 1Mb to 4Mb in 1Mb increments on the memory expansion board

4.2.2 Central Processing Unit (CPU) Chassis

The CPU chassis specifications are:

- One CPU chassis per system

- One slot for the memory expansion board

- One slot for the processor board

- Six slots for input/output (I/O) controllers or direct memory access (DMA) boards with slot 5 normally used for the multiperipheral controller (MPC) board

4.2.3 Input/Output (I/O) Expansion Chassis

The I/O expansion chassis specifications are:

- One optional I/O expansion chassis per 208/230V system

- Eight I/O slots provided for eight fullboards, 16 halfboards, or a combination of fullboards and halfboards

4.2.4 Disk

The disk specifications are:

- One intelligent disk controller (IDC) per system

- A minimum of one 50Mb cartridge disk drive (CDD50) per system

- A maximum of two disk drives per 76.2cm (30") cabinet

- A maximum of four disk drives per system

4.3 PRODUCT STRUCTURE

The following is a list of marketing numbers for the Model 3205 System and corresponding product line structures.

MODEL 3205 SYSTEMS

M33-700   Model 3205 System with 512kb of memory; for 115V, 60Hz operation

M33-702   Model 3205 System with 512kb of memory; for 208V, 60Hz operation

M33-703   Model 3205 System with 512kb of memory; for 230V, 50Hz operation

M33-704   Model 3205 System with 1Mb of memory; for 115V, 60Hz operation

M33-706   Model 3205 System with 1Mb of memory; for 208V, 60Hz operation

M33-707   Model 3205 System with 1Mb of memory; for 230V, 50Hz operation

M33-708   Model 3205 System with 2Mb of memory; for 115V, 60Hz operation

M33-710	Model 3205 System with 2Mb of memory; for 208V, 60Hz operation
M33-711	Model 3205 System with 2Mb of memory; for 230V, 50Hz operation
M33-712	Model 3205 System with 3Mb of memory; for 115V, 60Hz operation
M33-714	Model 3205 System with 3Mb of memory; for 208V, 60Hz operation
M33-715	Model 3205 System with 3Mb of memory; for 230V, 50Hz operation
M33-716	Model 3205 System with 4Mb of memory; for 115V, 60Hz operation
M33-718	Model 3205 System with 4Mb of memory; for 208V, 60Hz operation
M33-719	Model 3205 System with 4Mb of memory; for 230V, 50Hz operation

MODEL 3205 SYSTEM MEMORY EXPANSIONS

M33-750	Memory expansion from 1/2Mb to 1Mb
M33-752	Memory expansion from 1Mb to 2Mb
M33-754	Memory expansion from 2Mb to 3Mb
M33-756	Memory expansion from 3Mb to 4Mb

MODEL 3205 SYSTEM OPTIONS

M33-762	75A expansion power supply; for 50/60Hz operation (used only with M33-768)
M33-764	Battery back-up; for 115V, 60Hz operation
M33-765	Battery back-up; for 208V or 230V operation
M33-768	I/O expansion chassis; for 208V or 230V systems only
M33-770	CPU or I/O expansion chassis mounting rails
M33-776	76.2cm (30") CPU or peripheral expansion cabinet; for 115V, 60Hz operation

M33-778	76.2cm (30") CPU or peripheral expansion cabinet; for 208V, 60Hz operation
M33-779	76.2cm (30") CPU or peripheral expansion cabinet; for 230V, 50Hz operation
M60-140	CDD50 disk subsystem consisting of disk drive, controller, power supply, rack-mounting hardware and necessary cables; for 60Hz operation
M60-141	Same as M60-140; for 50Hz operation
M60-142	CDD50E (50Mb expansion disk located in system cabinet); consists of disk drive, power supply and necessary cables; for 60Hz operation
M60-143	Same as M33-782; for 50Hz operation
M60-144	Removable 20.3cm (8") disk cartridge for the CDD50 disk drive; provides a 32-sector formatted capacity of 19.8Mb of disk storage
M60-146	CDD50 rack-mounting hardware kit. This kit is required to rack mount a CDD50 expansion disk in a configuration with more than two CDD50 disk drives. This kit is also required in a configuration that does not have the required hardware to rack mount two CDD50 disk drives.

NOTE

M60-140, M60-141 and all Model 3205 Systems that include a CDD50 have the necessary mounting hardware for the first expansion disk. M60-146 is required for subsequent expansion CDD50 disk drives (up to four drives per IDC).

M60-160	Model 6100 Video Display Unit (VDU); for 115V, 50/60Hz operation
M60-161	Model 6100 VDU; for 230V, 50/60Hz operation
M60-162	Same as M60-160 with amber screen
M60-163	Same as M60-161 with amber screen
M60-164	Model 6100 French character set; must be ordered with Model 6100 VDU

M60-165	Model 6100 Swedish character set; must be ordered with Model 6100 VDU
M60-166	Model 6100 Danish character set; must be ordered with Model 6100 VDU
M60-167	Model 6100 German character set; must be ordered with Model 6100 VDU
M60-168	Model 6100 United Kingdom character set; must be ordered with Model 6100 VDU
M60-169	Model 6100 Spanish character set; must be ordered with Model 6100 VDU

4.4 SYSTEM CONFIGURATIONS

The following sections describe the configurations available for the Model 3205 System.

4.4.1 Basic Model 3205 System

The basic M33-700, M33-702 and M33-703 system is shown in Figure 4-1.   It includes a processor board with 512kb of memory, an MPC board, a disk subsystem containing a 50Mb disk and an IDC, an 8-slot 17.8cm (7") chassis, a power subsystem and a consolette, all contained in one 76.2cm (30") beige cabinet.   The system also includes a Model 6100 VDU as a system console.

The memory capacity of these systems can be expanded to 1Mb by installing an M33-750 memory expansion.

8846-1
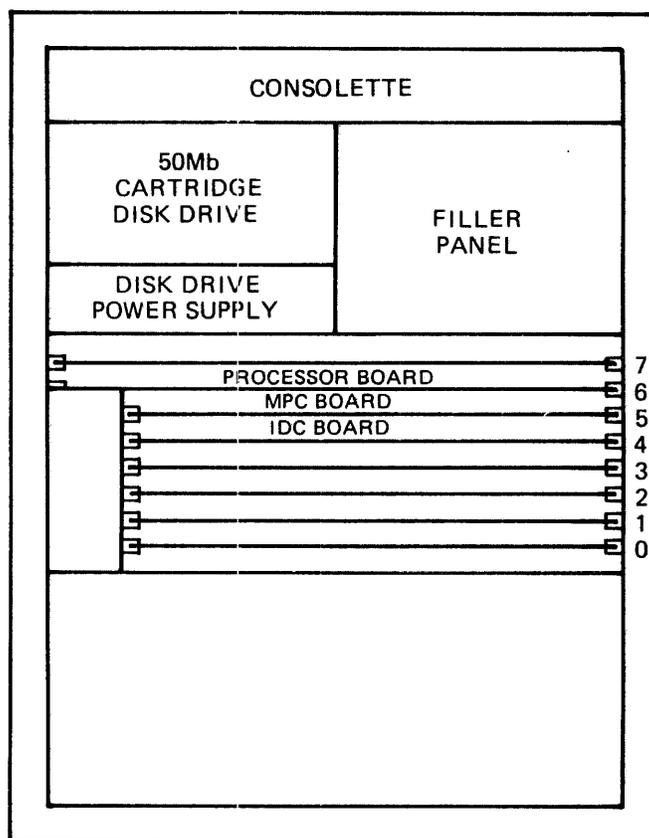
POWER SUBSYSTEM MOUNTED AT REAR
OF CPU CHASSIS. SEE FIGURE 1-4.

Figure 4-1 Basic Model 3205 System

4.4.2 Model 3205 System with Memory Expansion

The basic M33-700 through M33-707 systems can be expanded as shown in Figure 4-2 by installing the M33-752, which provides a memory expansion board with 1Mb of memory. The processor board must contain 1Mb of memory before the memory expansion board can be added to the system. M33-754 and M33-756 provide memory expansion from 2Mb to 4Mb in 1Mb increments.

A memory expansion board is provided with the M33-708 through M33-719 systems.

8847-1
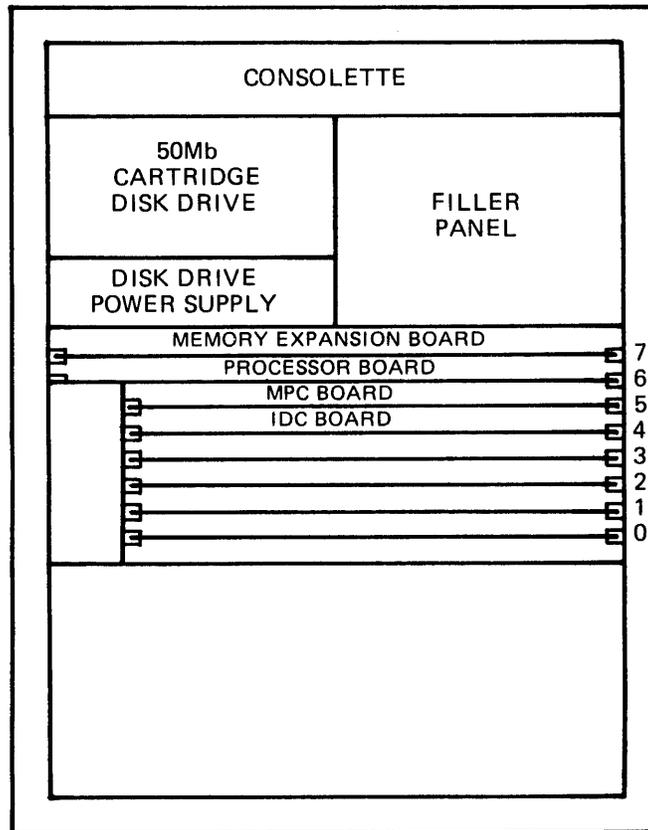
Figure 4-2 Model 3205 System with Memory Expansion Board

4.4.3 Model 3205 System with Second Disk Drive

The basic M33-700 through M33-719 systems can be expanded as shown in Figure 4-3 by installing the M60-142 expansion disk drive in the system cabinet.
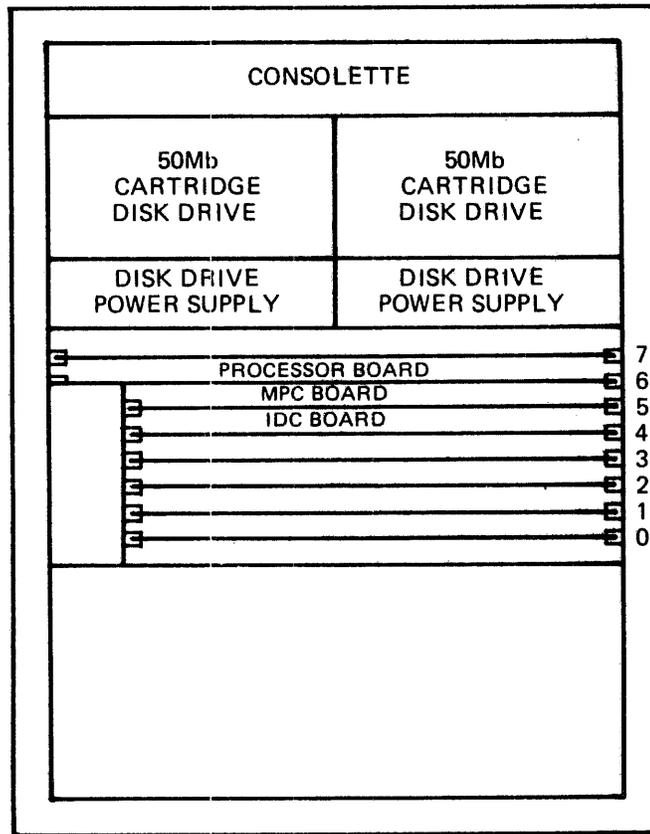
Figure 4-3   Model 3205 System with Second Disk Drive

4.4.4   Model 3205 System with Expansion Cabinet

The basic M33-700 through M33-719 systems configured with the M60-142 expansion disk drive can be expanded as shown in Figure 4-4 by installing a third and fourth M60-142 expansion disk drive in a M33-776, M33-778 or M33-779 expansion cabinet.   An M60-146 rack-mounting hardware kit is required for each expansion disk drive in the expansion cabinet.

4.4.5   Model 3205   System with Input/Output (I/O)   Expansion Chassis

The basic M33-702/703, M33-706/707, M33-710/711, M33-714/715 and M33-718/719 systems can be expanded as shown in Figure 4-5 by installing the M33-768 I/O expansion chassis in the system cabinet.   An M33-762 slave power supply is required with the M33-768 chassis.

8849-1

FILLER PANEL		CONSOLETTE	
50Mb CARTRIDGE DISK DRIVE	50Mb CARTRIDGE DISK DRIVE	50Mb CARTRIDGE DISK DRIVE	50Mb CARTRIDGE DISK DRIVE
DISK DRIVE POWER SUPPLY	DISK DRIVE POWER SUPPLY	DISK DRIVE POWER SUPPLY	DISK DRIVE POWER SUPPLY

PROCESSOR BOARD — 7
MPC BOARD — 6
IDC BOARD — 5
— 4
— 3
— 2
— 1
— 0

FRONT PANEL
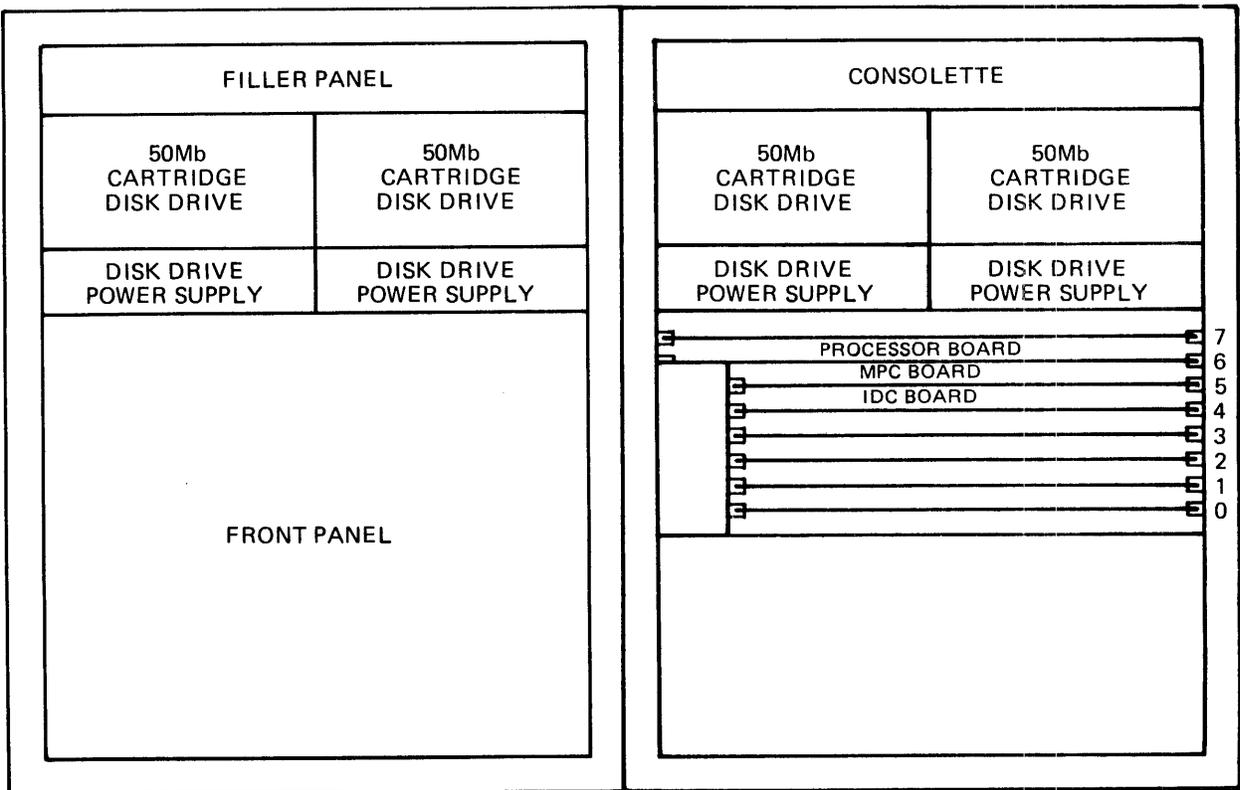
Figure 4-4   Model 3205 System with Expansion Cabinet

```
+-----------------------------------------------+
|  +-----------------------------------------+  |
|  |              CONSOLETTE                  |  |
|  +-------------------+---------------------+  |
|  |      50Mb         |                     |  |
|  |   CARTRIDGE       |      FILLER         |  |
|  |   DISK DRIVE      |      PANEL          |  |
|  +-------------------+                     |  |
|  |   DISK DRIVE      |                     |  |
|  | POWER SUPPLY      |                     |  |
|  +-------------------+---------------------+  |
|  |==== PROCESSOR BOARD ================= 7  |  |
|  |==== MPC BOARD ======================= 6  |  |
|  |==== IDC BOARD ======================= 5  |  |
|  |===================================== 4  |  |
|  |===================================== 3  |  |
|  |===================================== 2  |  |
|  |===================================== 1  |  |
|  |===================================== 0  |  |
|  |                I/O                       |  |
|  |===================================== 7  |  |
|  |===================================== 6  |  |
|  |===================================== 5  |  |
|  |===================================== 4  |  |
|  |===================================== 3  |  |
|  |===================================== 2  |  |
|  |===================================== 1  |  |
|  |===================================== 0  |  |
|  +-----------------------------------------+  |
+-----------------------------------------------+
```
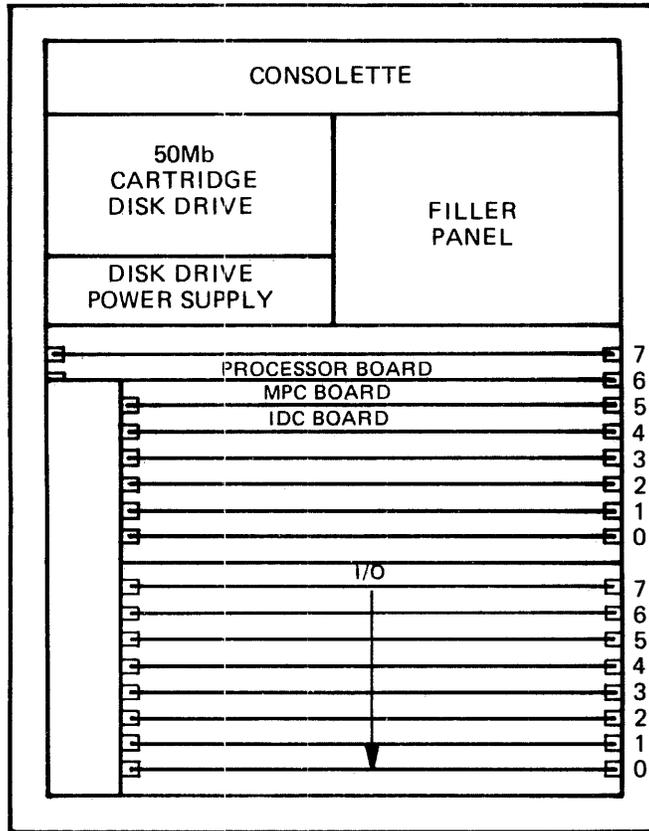
SLAVE POWER SUPPLY MOUNTED BELOW MASTER POWER
SUPPLY IN REAR OF CABINET. SEE FIGURE 1-6.

Figure 4-5   Model 3205 System with I/O Expansion Chassis

CHAPTER 5
TESTING

5.1 INTRODUCTION

This chapter provides a list of the diagnostics available for the Model 3205 System.

5.2 DIAGNOSTICS

To test the Model 3205 System's on-line capabilities after final checkout, run the following multi-media diagnostics that apply to the configuration.

06-228	Perkin-Elmer Series 3200 System Processor Test Part 1
06-229	Perkin-Elmer Series 3200 System Processor Test Part 2
06-289 F01	Model 3205 System Memory Test
06-289 F02	Model 3205 System Memory Test
06-280 F01	Memory Address Translator (MAT) Test
06-280 F02	Memory Address Translator (MAT) Test
06-161	32-Bit Selector Channel (SELCH) Test
06-291	Multiperipheral Controller (MPC) Test
06-288	Model 6100 Video Display Unit (VDU) Test
06-267	Intelligent Disk Controller (IDC) Disk Test
06-268	Intelligent Disk Controller (IDC) Disk Format Test
06-238	Commercial Instruction Set Test
06-231	Perkin-Elmer Series 3200 Floating Point Test
06-159	32-Bit System Exerciser

See the appropriate test description or maintenance manual if problems are encountered.

APPENDIX A
HARDWARE DOCUMENTATION GENERAL DESCRIPTION

A.1 INTRODUCTION

The hardware documentation system establishes the guidelines for:

- Logic boards and connector pin numbers

- Number notation

- Part, drawing and publication identification

- Component reference designation

- Connector pin numbering

- The drawing system

Hexadecimal numbering and equipment identification systems are also explained.

Component reference designations are determined by the logic board layouts. Assigned reference designations are used throughout the text and drawings when referring to components.

All logic boards have one or more header connectors to connect the board to the chassis backpanel. The boards can have one or more front edge cable connectors, allowing the boards to be interconnected. The pin numbering scheme explains the pin callouts for all connectors used.

The drawing system defines the standard format of all drawings. It specifies how nets and registers are named and how integrated circuits (ICs), flip-flops and clocked devices are represented. Schematic drawing conventions are described.

A.2 SCOPE

This appendix aids the digital technician in understanding the documentation system. It describes logic boards and connector pin numbers, number notation, the part numbering system, the drawing system and includes detailed illustrations.

A.3 LOGIC BOARDS

Three sizes of logic boards may be used in the equipment: 17.8cm (7") (halfboard), 38.1cm (15") and 43.2cm (17"). All logic boards contain one or more header connectors to connect the logic board to the chassis backpanel. The boards can contain front edge cable connectors, as required, which allow boards to be interconnected. Component locations on the logic boards are determined by the board layout.

Two standard 17.8cm (7") chassis house the logic boards in the Model 3205 System. The chassis and the logic boards they can accommodate are outlined in Table A-1.

TABLE A-1 CHASSIS/BOARD CONFIGURATIONS

| CHASSIS	SLOTS	MAXIMUM NUMBER OF BOARDS AND TYPE
CPU	8	Two 43.2cm (17") boards
		Six 38.1cm (15") boards or 12 17.8cm (7") halfboards*
I/O	8	Eight 38.1cm (15") boards or 16 17.8cm (7") halfboards*

* Can be a combination of 38.1 (15") boards and 17.8cm (7") halfboards

A.3.1 17.8cm (7") Halfboard Logic Layout

Figure A-1 illustrates a 17.8cm (7") logic board layout. Halfboards measure 17.8cm x 38.1cm (7" x 15") and can be placed in either the right or left half chassis position, as required.

With header connectors oriented to the right as shown in Figure A-1, components are numbered from left-to-right, starting in the upper-left corner. The front edge cable connector number, location, and number of pins depend upon the function of the board.

Two 17.8cm (7") halfboards can be inserted into a designated chassis slot via the 16-398 halfboard adapter kit. See Figure A-2. Depending on requirements, the halfboard adapter kit can mechanically support two active 17.8cm (7") boards or one active board and one blank board. Wiring does not take place between the boards and the adapter. Because of the design of the adapter, the connector on the board plugs directly into the chassis slot backpanel connector.

0726-2
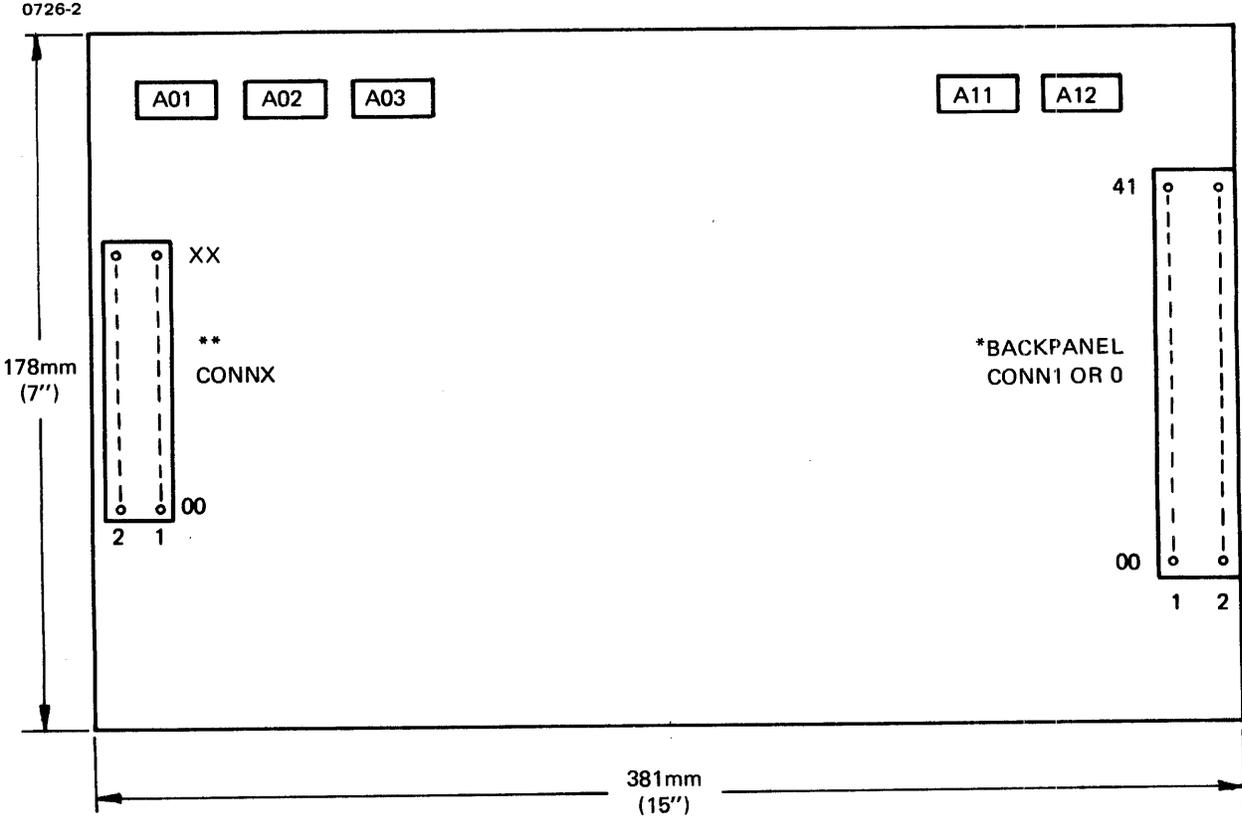
*THE 178mm (7") HALFBOARD IS INSTALLED WITH AN ADAPTER IN EITHER THE 1 OR 0 SIDE OF A CHASSIS SLOT. THE BACKPANEL CONNECTOR AND PINS ARE REFERENCED BY THE BOARD LOCATION 1 OR 0.

**THE FRONT EDGE CONNECTOR NUMBER (X) AND LOCATION DEPENDS UPON THE BOARD.

Figure A-1   17.8cm (7") Halfboard Logic Layout

BACKPANEL
CONNECTOR

ACTIVE OR BLANK
HALFBOARD
178mm x 381mm
(7" x 15")

ACTIVE OR BLANK
HALFBOARD
178mm x 381mm
(7" x 15")

CABLE EXIT PATH
(TO I/O PANEL OR
DEVICE) ON RIGHT
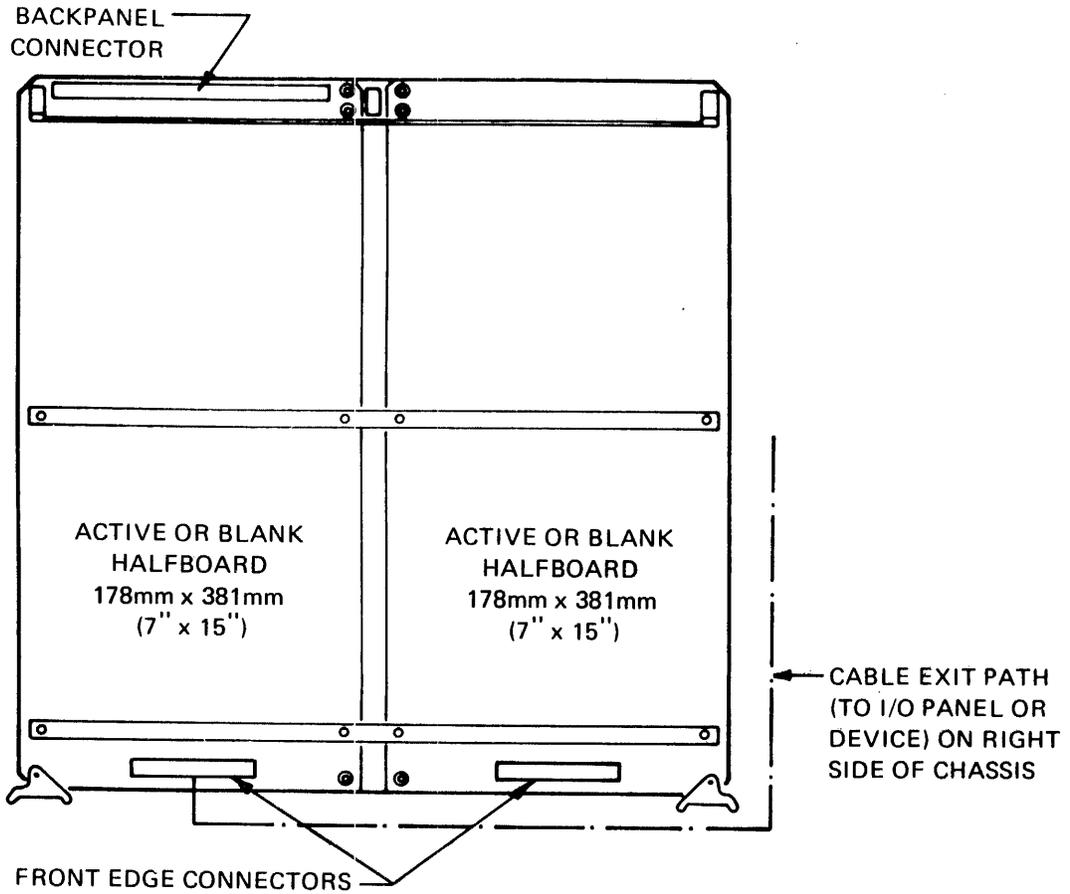SIDE OF CHASSIS

FRONT EDGE CONNECTORS

Figure A-2   16-398 Halfboard Adapter Kit

A.3.2   38.1cm (15") Logic Board Layout

Figures A-3 and A-4 illustrate a 38.1cm (15") logic board layout.
These logic boards measure 38.1cm x 38.1cm (15" x 15") with
header connectors (CONN0 and CONN1) located on the right. The
first IC in the upper-left corner is 01, and the first capacitor
is C1. Optional front edge cable connectors (CONN2, CONN3, CONN4
and CONN5) are located as shown in Figure A-3.
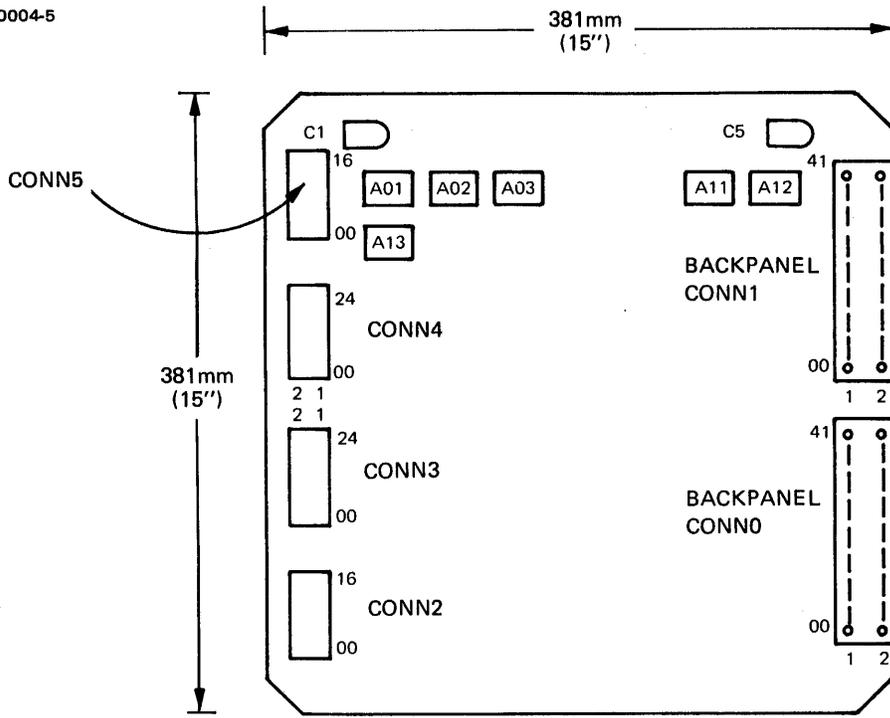
Figure A-3   38.1cm (15") Logic Board Layout Copper Printed
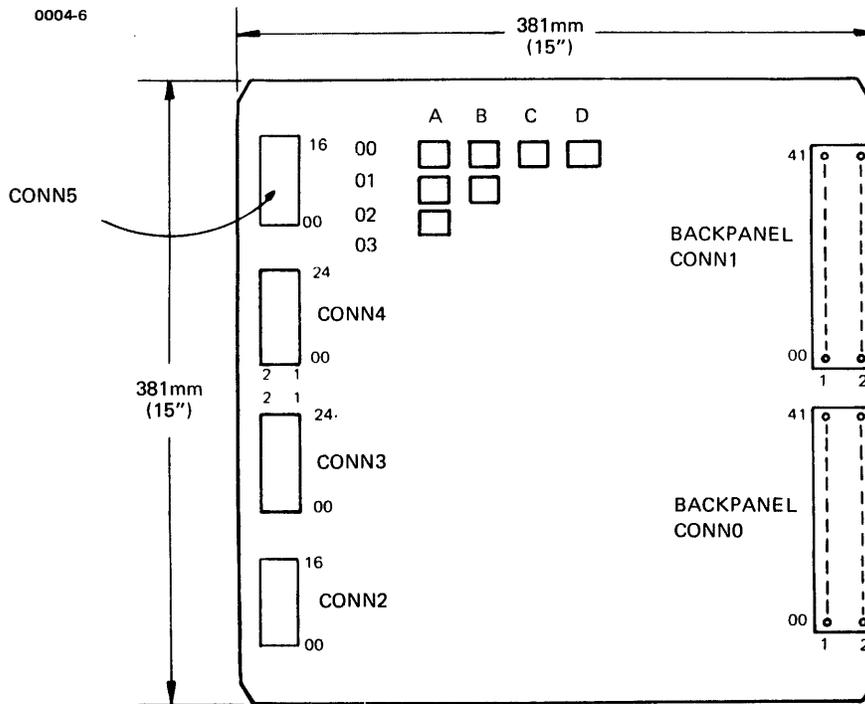Circuits

Figure A-4   38.1cm (15") Logic Board Layout Multiwire IC Location

A.3.3 43.2cm (17") Logic Board Layout

Figure A-5 illustrates a 43.2cm (17") logic board layout. These logic boards measure 38.1cm x 43.2cm (15" x 17"). The boards have three header connectors (CONN0, CONN1 and CONN2). Five front edge connectors (CONN3, CONN4, CONN5, CONN6 and CONN7) are located as shown. For individual board layouts, see the related installation manual. To ensure that the three header connectors on the 43.2cm (17") board are mated to the backpanel pins, the board is inserted/removed by two special card injectors/ejectors located at the front edge corners. See Figure A-6.

0727-3

BOARD LAYOUT**

CONN6*

CONN5*

CONN7

CONN4*

CONN3*

CONN2

CONN1

CONN0

432mm
(17")

381mm
(15")
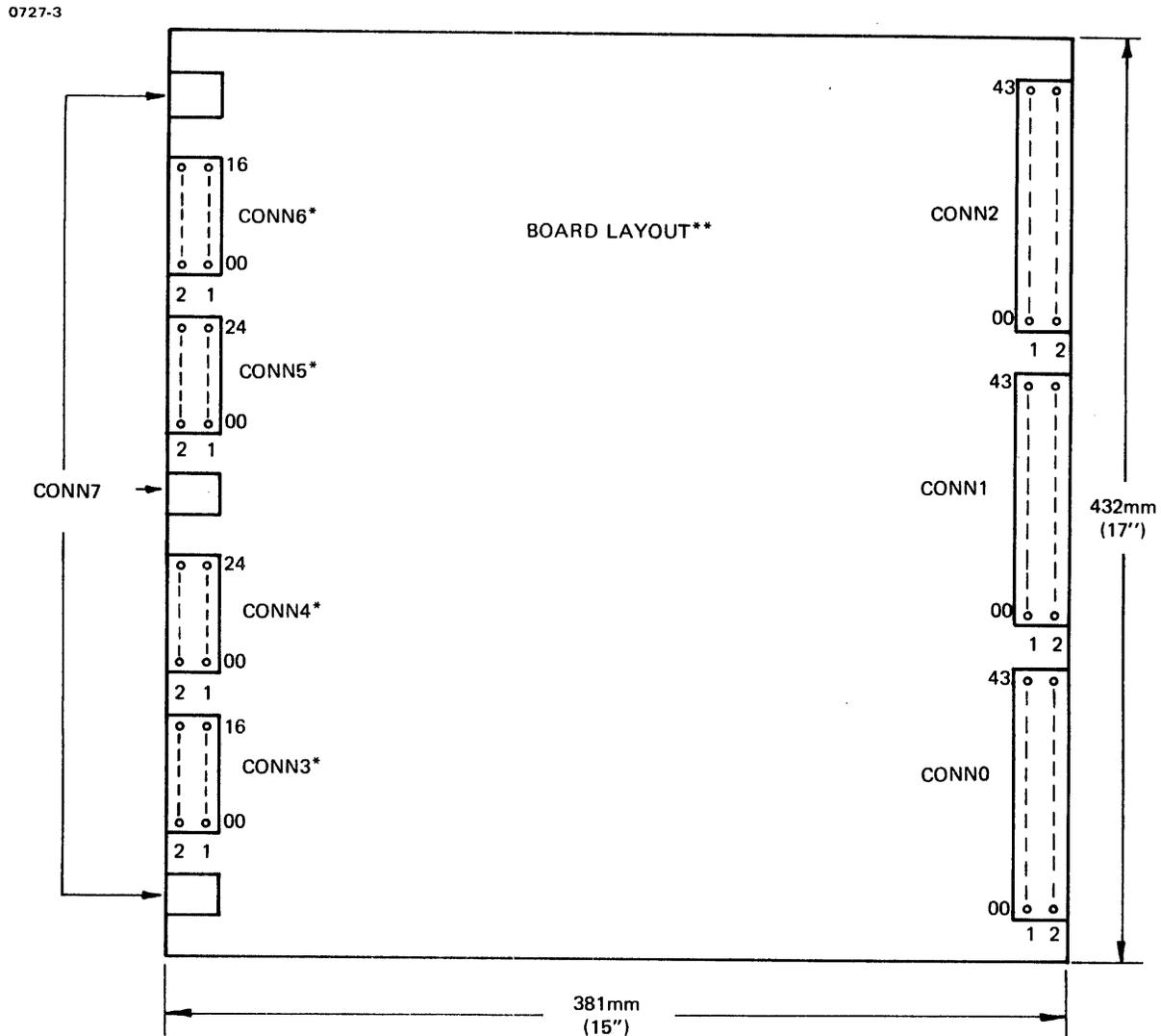
*FRONT EDGE CONNECTORS AS REQUIRED.
**REFER TO APPLICABLE INSTALLATION MANUAL FOR INDIVIDUAL BOARD LAYOUT.

Figure A-5 43.2cm (17") Logic Board Layout

INJECTOR/EJECTOR

17"
PRINTED CIRCUIT
BOARD
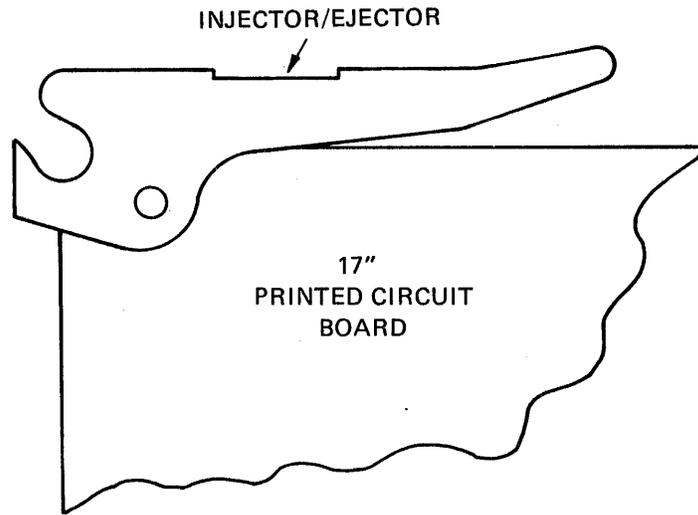
Figure A-6   43.2cm (17") Board Injector/Ejector

A.4   LOGIC BOARD CONNECTOR PIN NUMBERS

Connector pin numbers are identified by a four-digit number in the format:

rpp-c

Where:

r   is the row number.

pp   is the two-digit pin number.

c   is the connector number.

For example, connector pin number 103-1 refers to the fourth pin (03) in row 1 of CONN1 (see Figure A-7).

A.4.1   17.8cm (7") Halfboards

Figure A-7 shows the header and front edge cable connector pin numbering scheme for 17.8cm (7") halfboards. They have two rows of pins and 42 positions. The front edge connectors have two rows of pins, but the number of pin positions vary.
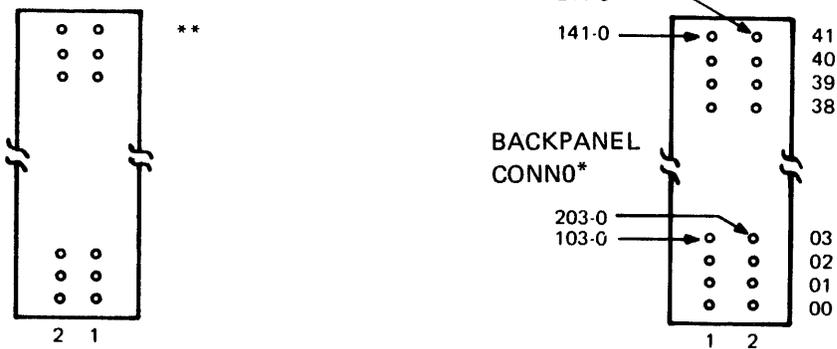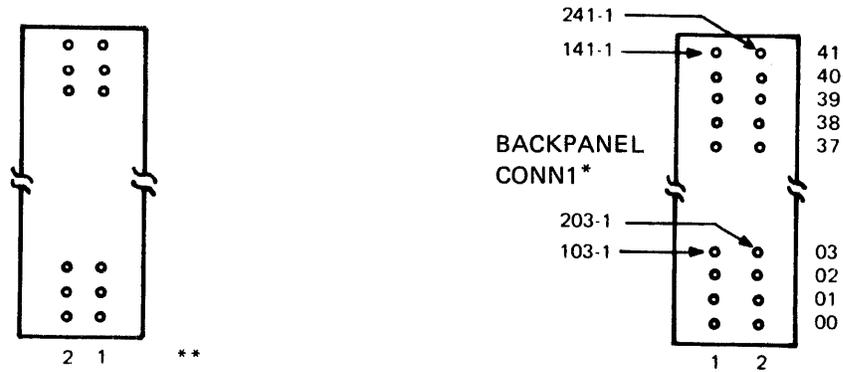
BACKPANEL
CONN1*

BACKPANEL
CONN0*

*THE HALFBOARD IS INSTALLED WITH AN ADAPTER, IN EITHER
THE 1 OR 0 SIDE OF A CHASSIS SLOT. THE BACKPANEL CON-
NECTOR AND PINS ARE REFERENCED BY THE BOARD LOCATION,
1 OR 0.

** THE FRONT EDGE CONNECTOR NUMBER, LOCATION,
AND NUMBER OF PINS DEPENDS UPON THE BOARD.

Figure A-7   Halfboard Connector Pin Numbering

A.4.2   38.1cm (15") Boards

Figure A-8 shows the header and front edge cable connector pin
numbering scheme for 38.1cm (15") boards. Header connectors have
two rows of pins and 42 positions. The front edge cable
connectors (CONN2, CONN3, CONN4 and CONN5) have two rows of pins,
but the pins vary in the number of positions.

CONN3

24
23
22 ← 122-3
← 222-3

← 202-3
02 ← 102-3
01
00

2 1

CONN1

241-1
141-1 → 41
40
39
38
37

203-1
103-1 → 03
02
01
00

1 2

CONN2

00
01
02 ← 102-2
← 202-2

← 222-2
22 ← 122-2
23
24

2 1

CONN0

241-0
141-0 → 41
40
39
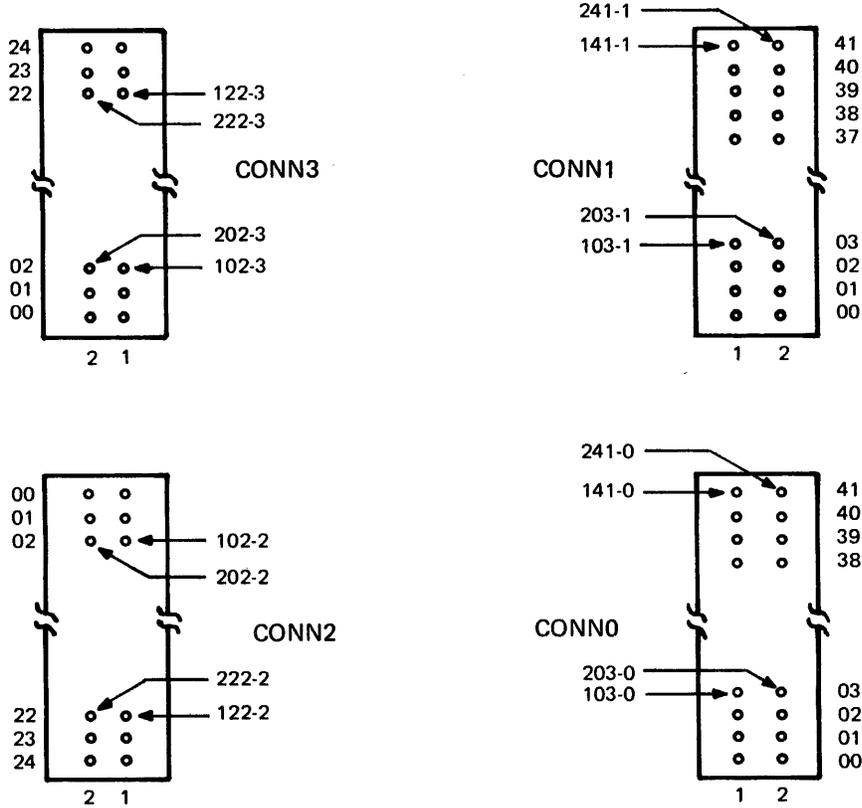38

203-0
103-0 → 03
02
01
00

1 2

*THE HALFBOARD IS INSTALLED WITH AN ADAPTER, IN EITHER
THE 1 OR 0 SIDE OF A CHASSIS SLOT. THE BACKPANEL CON-
NECTOR AND PINS ARE REFERENCED BY THE BOARD LOCATION,
1 OR 0.

Figure A-8   38.1cm (15") Board Connector Pin Numbering

A.4.3   43.2cm (17") Boards

Figure A-9 shows the header and front edge cable connector pin
numbering scheme for 43.2cm (17") boards. Header connectors
(CONN0, CONN1 and CONN2) have two rows of pins and 44 positions.
The front edge cable connectors (CONN3, CONN4, CONN5 and CONN6)
have two rows of pins, but the pins vary in number. CONN7 is
located in three positions, as indicated.

14

216-6
116-6

16
15

CONN6

201-6
101-6

01
00

2   1

224-5
124-5

24
23

CONN5

201-5
101-5

01
00

2   1

CONN7   4

224-4
124-4

24
23

CONN4

201-4
101-4

01
00

2   1

216-3
116-3

16
15

CONN3

201-3
101-3

01
00

2   1

2

243-2
143-2

43
42
41

BACKPANEL
CONN2

203-2
103-2

03
02
01
00

1   2

243-1
143-1

43
42
41

BACKPANEL
CONN1

203-1
103-1

03
02
01
00

1   2

243-0
143-0

43
42
41

BACKPANEL
CONN0
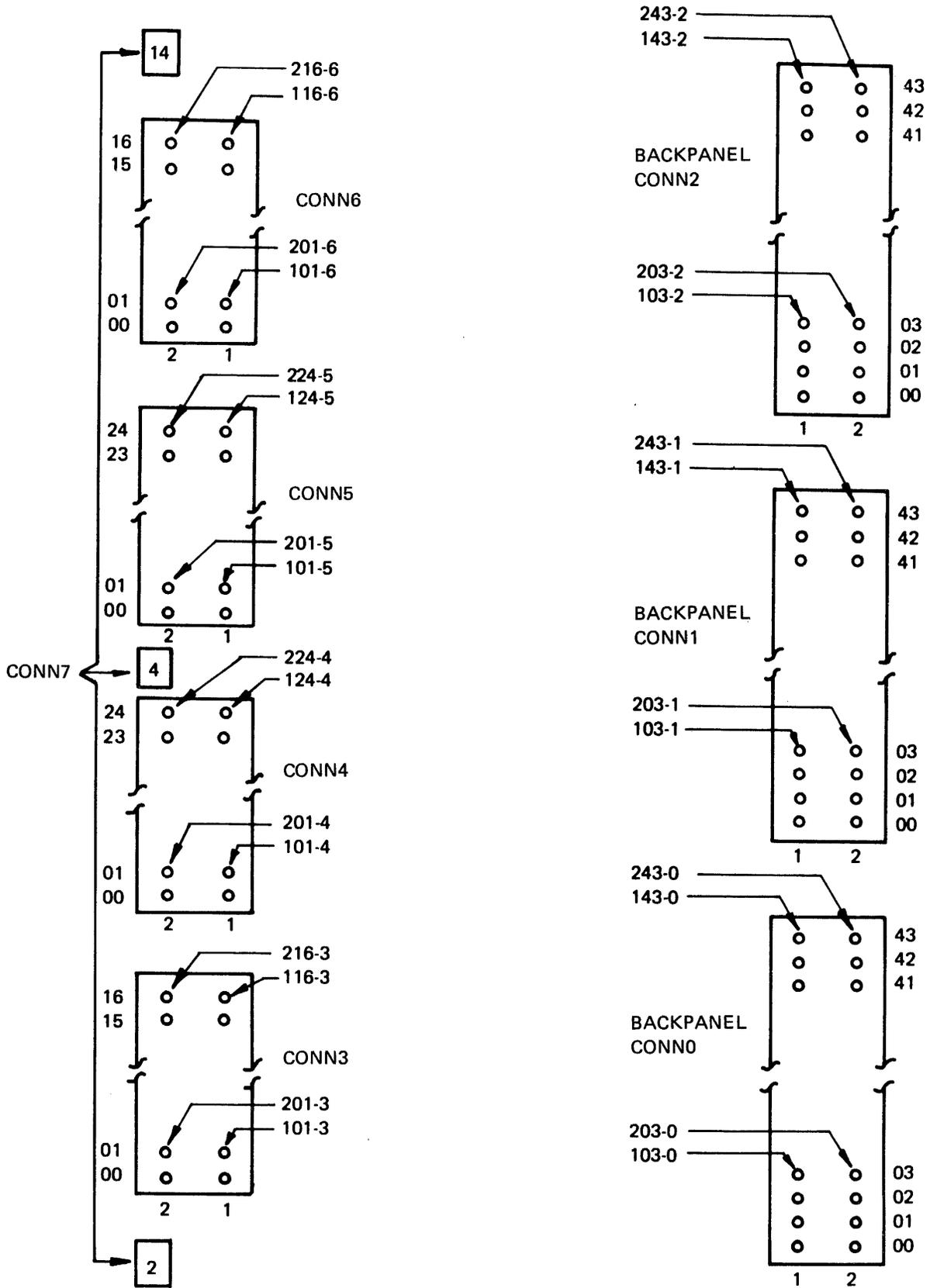
203-0
103-0

03
02
01
00

1   2

Figure A-9   43.2cm (17") Board Connector Pin Numbering

A.5 NUMBER NOTATION

Hexadecimal notation is the most common form of number notation used in Perkin-Elmer Data Systems Group documentation. A single hexadecimal digit represents a group of four binary digits (bits). Table A-2 lists the hexadecimal characters used.

Hexadecimal numbers are preceded by the letter X and the number is enclosed in single quotation marks. Examples of hexadecimal numbers are: X'1234', X'2EC6', X'A340', X'EEFA' and X'10B9'.
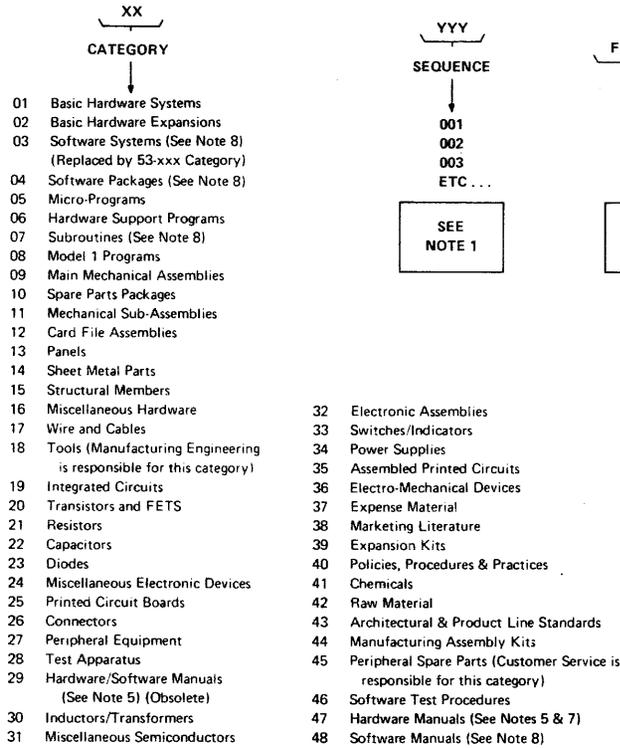
TABLE A-2   HEXADECIMAL CHARACTERS

1884

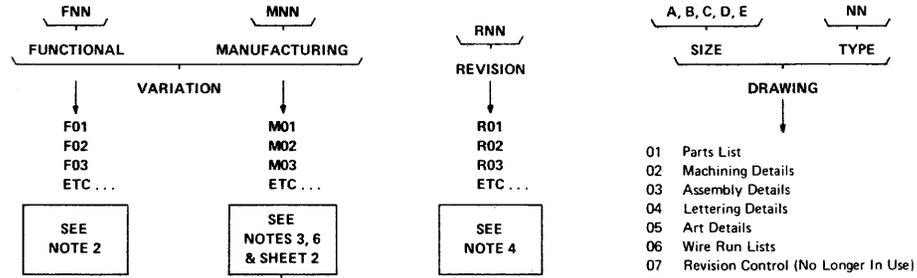| BINARY	DECIMAL	HEXADECIMAL	BINARY	DECIMAL	HEXADECIMAL	BINARY	DECIMAL	HEXADECIMAL
0000	0	0	0110	6	6	1100	12	C
0001	1	1	0111	7	7	1101	13	D
0010	2	2	1000	8	8	1110	14	E
0011	3	3	1001	9	9	1111	15	F
0100	4	4	1010	10	A			
0101	5	5	1011	11	B			

A.6   PART NUMBERING SYSTEM

Perkin-Elmer Data Systems Group parts, drawings and publications use a common numbering system. The part number and drawing numbers for schematics that describe a particular part are related. Figure A-10 shows the part number format. The following sections describe the different fields.

47-057 R00

6412

PERKIN-ELMER

Data Systems Group

PART NUMBER FORMAT CHART

XX — CATEGORY

YYY — SEQUENCE

FNN — FUNCTIONAL

MNN — MANUFACTURING — VARIATION

RNN — REVISION

A, B, C, D, E — SIZE / NN — TYPE — DRAWING

CATEGORY

01 Basic Hardware Systems
02 Basic Hardware Expansions
03 Software Systems (See Note 8)
(Replaced by 53-xxx Category)
04 Software Packages (See Note 8)
05 Micro-Programs
06 Hardware Support Programs
07 Subroutines (See Note 8)
08 Model 1 Programs
09 Main Mechanical Assemblies
10 Spare Parts Packages
11 Mechanical Sub-Assemblies
12 Card File Assemblies
13 Panels
14 Sheet Metal Parts
15 Structural Members
16 Miscellaneous Hardware
17 Wire and Cables
18 Tools (Manufacturing Engineering
is responsible for this category)
19 Integrated Circuits
20 Transistors and FETS
21 Resistors
22 Capacitors
23 Diodes
24 Miscellaneous Electronic Devices
25 Printed Circuit Boards
26 Connectors
27 Peripheral Equipment
28 Test Apparatus
29 Hardware/Software Manuals
(See Note 5) (Obsolete)
30 Inductors/Transformers
31 Miscellaneous Semiconductors

32 Electronic Assemblies
33 Switches/Indicators
34 Power Supplies
35 Assembled Printed Circuits
36 Electro-Mechanical Devices
37 Expense Material
38 Marketing Literature
39 Expansion Kits
40 Policies, Procedures & Practices
41 Chemicals
42 Raw Material
43 Architectural & Product Line Standards
44 Manufacturing Assembly Kits
45 Peripheral Spare Parts (Customer Service is
responsible for this category)
46 Software Test Procedures
47 Hardware Manuals (See Notes 5 & 7)
48 Software Manuals (See Note 8)

SEQUENCE

001
002
003
ETC...

SEE NOTE 1

FUNCTIONAL

F01
F02
F03
ETC...

SEE NOTE 2

MANUFACTURING

M01
M02
M03
ETC...

SEE NOTES 3, 6 & SHEET 2

REVISION

R01
R02
R03
ETC...

SEE NOTE 4

SOFTWARE EXCEPTIONS

49 Peripheral Spare Parts (Test Engineering is
responsible for this category)
50 Hardware Support Manuals (Users & Programming -
See Note 7)
51 Vendor Manuals (See Note 7)
53 Software Systems (See Note 8)
Software Package
Hardware Package
Cable-BSD Special
Peripheral Device
59 Manual-BSD Special
} Business Systems Division is responsible for this block of numbers.
58 Hardware Documentation Packages (See Note 7)
60 Manual Binder Accessories (See Note 8)
89 Non-Standard Systems & Expansions
91 Manual or Program
92 Top Assembly
93 Subassembly or Sheet Metal Part
94 Miscellaneous Purchase Item
95 Cable Assembly & Wire
96 Printed Circuit Board Assembly
97 Peripheral Device
98 Loader Storage Units
99 Non-Standard Systems & Expansions
(Replaced by 89-xxx Category)

} Special Systems Group is Responsible For This Block of Numbers

DRAWING

01 Parts List
02 Machining Details
03 Assembly Details
04 Lettering Details
05 Art Details
06 Wire Run Lists
07 Revision Control (No Longer In Use)
08 Schematics
09 Test Specifications
10 Purchase Specifications
11 Bill of Materials
12 Information
13 Program Listing
14 Abstracts
15 Program Description
16 Operating Instructions
17 Program Design Specifications
18 Flow Charts
19 Product Specifications
20 Installation & Shipping Specifications
21 Maintenance Specifications
22 Programming Specifications
23 Replaceable Parts List
24 Application Information
25 Functional Specifications
26 Revision Control Document
(No Longer Used)
27 Configurator Drawing
28 Interface Specification
29 Solder Mask
30 Multiwire Plots

NOTES

1. Sequence numbers are assigned serially for every part as they appear. Numbers are assigned by Drafting Department unless otherwise stated.

2. The F Field is used to distinguish between essentially the same part except for minor mechanical or electrical changes. Not all parts require a functional variation Field F. Number is assigned by the Drafting Department.

3. Parts are mechanically and electrically equivalent, M Field designates a different technique of manufacturing. Software exceptions are listed. See Sheet 2.

4. The letter R in the first position corresponds to a Revision. The Field is used to indicate a minor mechanical or electrical change to a part which causes no difference in the part's original character. Numbers are assigned by the Drafting Department for pre-production drawings and Manufacturing Engineering Revision Control Department for production released drawings.

5. When manuals are prefixed by a letter B, it indicates that full (cosmetic) treatment by Systems Publications and Art and Composition have not been accomplished. Manuals prepared in this manner do not necessarily conform to all standards.

6. Here the M Field number, when used, indicates the form in which a particular program is presented. For example, define a program as a set of machine instructions. These same instructions may be presented on punched cards, paper tape, or magnetic tape; and for any of these they could be in symbolic form or in relative or absolute binary form. Thus, there are many ways to present the same program.

7. Part Number Request Form to be initiated by Technical Systems Publications (TSD).

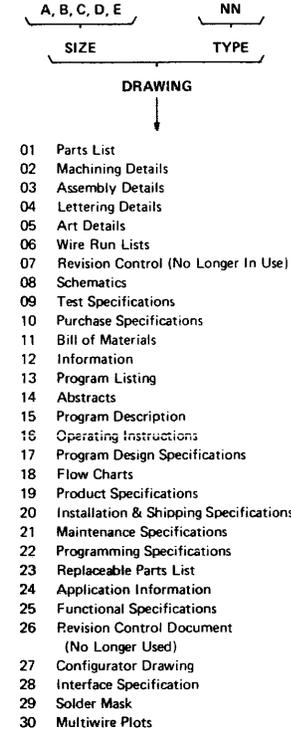8. Product Assurance and Control (PAC) is responsible for this category.

SHEET 1 OF 2

Figure A-10   Part Number Format

PERKIN-ELMER

SOFTWARE USE OF THE 'M' VARIATION

THE FORMAT OF THE M FIELD AND ITS MEANING FOR SOFTWARE IS:

MXY
(SEE NOTE 6)

NOTE:

WHERE X IDENTIFIES THE MEDIA SELECTION (I.E., PAPER
TAPE, MAG TAPE, CASSETTE, DISK, ETC.) AND Y IDENTIFIES
OBJECT OR SOURCE AND THE FORMAT.

THE M FIELD NUMBER, WHEN USED, INDICATES THE FORM
IN WHICH A PARTICULAR PROGRAM IS PRESENTED, FOR
EXAMPLE:

DEFINITION

M00

MEANING OF X			MEANING OF Y
CONCEPTUAL	0	0	CONCEPTUAL OBJECT
PAPER TAPE	1	1	OBJ PROGRAM STANDARD FORMAT 32-BIT PROCESSOR
CASSETTE	2	2	NOT USED
MAG TAPE (800)	3	3	NOT USED
CARDS	4	4	MEMORY IMAGE
DISK (2.5)	5	5	NOT USED
DISK (10)	6	6	OBJ PROGRAM STANDARD FORMAT 16-BIT PROCESSOR
MAG TAPE (1600)	7	7	OBJ NON-STANDARD FORMAT
FLOPPY DISK	8	8	OBJ ESTABLISHED TASK
PRINTED PAPER	9	9	SOURCE PROGRAM
MICROFICHE (F01)			
DISK (80Mb)	A		
DISK (300Mb)	B		
NOT USED	C		
DISK (16) SCHOONER	D		
MAG TAPE (6250 bpi)	E		
DISK (600Mb)	F		
IDC DISK (16)	G		
IDC DISK (80)	H		
IDC DISK (300)	I		

DEFINES A PROGRAM AS A SET OF MACHINE INSTRUCTIONS.
THESE SAME INSTRUCTIONS MAY BE PRESENTED ON PUNCHED
CARDS, PAPER TAPE, OR MAGNETIC TAPE; AND FOR ANY OF
THESE THEY COULD BE IN SYMBOLIC FORM OR IN RELATIVE
OR ABSOLUTE BINARY FORM. THUS THERE ARE MANY WAYS
TO PRESENT THE SAME PROGRAM.

ADDITIONAL MXY VARIATION DEFINITIONS
FOR SOFTWARE:

00	CONCEPTUAL OBJECT
90	MULTIMEDIA PARTS LISTS
91	32-BIT OBJECT LISTING
92	SPECIAL CODING SPECIFICATIONS
93	CONVERSION REFERENCE DOCUMENTS
94	SOURCE REFERENCE DOCUMENTS
95	OBJECT REFERENCE DOCUMENT
96	16-BIT OBJECT LISTING
97	MISCELLANEOUS LISTING
98	OPERATING PROCEDURES
99	DOCUMENTATION & MANUALS

THE ABOVE NUMBERS REFER TO THE PHYSICAL PROGRAM
PLACED ON AN APPROVED MEDIA FOR PERKIN-ELMER SOFTWARE.

SHEET 2 OF 2

Figure A-10   Part Number Format (Continued)

A.6.1 Category Field

The two-digit category number indicates the board class or category to which a part belongs. Examples of category number assignments are:

01	Basic hardware systems
02	Basic hardware expansions
03	Basic software systems
04	Software packages
05	Microprograms
06	Test programs
07	Subroutines of general utility
10	Spare parts packages
12	Card file assemblies
13	Panels
17	Wire and cables
19	Integrated circuits (ICs)
20	Transistors
27	Peripheral equipment
34	Power supplies
35	Assembled printed circuit (PC) boards
36	Electromechanical devices
47	Hardware manuals
48	Software manuals

A.6.2 Sequence Field

The sequence number identifies a particular item within the category. Sequence numbers are assigned serially and have no other significance.

A.6.3 Functional Variation Field

The optional functional variation field consists of the letter F followed by two digits. The F field distinguishes between parts that are not necessarily electrically or mechanically equivalent, but are described by the same set of drawings. For example, a power supply can be internally strapped to operate on either 110 or 220VAC. With the exception of this strap, all power supplies of this type are identical. A note on the assembly and test specification drawings describes the strapping option.

A.6.4 Manufacturing Variation Field

The optional manufacturing variation field consists of the letter M followed by two digits.

The M field distinguishes between parts that are electrically and mechanically equivalent (interchangeable), but vary in manufacture method. For example, if leads are welded instead of soldered on an assembly, the M field is different.

For software-related categories the M field has a different meaning. When used in software, the M field number indicates the form in which a particular program is presented. If a program is a set of machine instructions, these instructions can be presented on punched cards, paper tape or magnetic tape and can be in symbolic, relative or absolute binary form. Thus, the same program can be presented several ways.

The format for the M field and its meaning for software is:

Mxy

Where:

x   identifies the media selection (i.e.; cards, magnetic tape, cassette, etc.).

y   identifies whether the software is an object or source program and its format.

The following have the specified meanings.

	x		y
0	conceptual	1	object program standard
1	paper tape		format 32-bit processor
2	cassette	4	memory image
3	magnetic tape (800 bpi)	6	object program standard
			format 16-bit processor
4	cards	7	object nonstandard format
5	disk (2.5Mb)	8	object established task
6	disk (10Mb)	9	source program
7	magnetic tape (1600 bpi)		

These numbers refer to the physical program placed on an approved media for software. A paper tape object program, in standard format for a 16-bit processor, has an M16 identifier. A magnetic tape object program, in standard format for a 32-bit processor, has an M31 identifier.

The following M numbers also have special meaning:

    00   Conceptual object
    91   32-bit object listing
    92   Programming specifications
    95   Program description
    96   16-bit object listing
    98   Operating procedures
    99   Documentation and manuals

A.6.5 Revision Field

The optional revision field consists of the letter R followed by two digits.

The R field indicates electrical or mechanical changes to a part that do not change the part's original character. R field changes often reflect improvements. A part with a revision level higher than the one specified can be used; however, a part with a revision level lower than that specified cannot be used.

NOTE

A part number must contain a category number and a sequence number. All other fields are optional.

A.6.6 Drawing Field

The optional drawing field consists of a letter from A to E followed by two digits. The letter indicates the size of the original drawing, as follows:

A	21.6cm x 27.9cm (8 1/2" x 11")
B	27.9cm x 43.2cm (11" x 17")
C	43.2cm x 55.9cm (17" x 22")
D	55.9cm x 86.4cm (22" x 34")
E	86.4cm x 111.8cm (34" x 44")

The two digits indicate the drawing type:

01	parts list	15	program description
02	machine details	16	operating instructions
03	assembly details	17	program design specifications
05	art details	18	flowcharts
06	wire run list	19	product specification
08	schematic	20	installation specification
09	test specification	21	maintenance specification
10	purchase specification	22	programming specification
12	information	24	application information
13	program listing	25	functional specifications
14	abstracts		

Examples:

Some examples of the part numbering system follow. In most cases, the numbers are fictitious.

35-060	The sixtieth PC board assigned a part number under this system
35-060M01	A PC board electrically and mechanically interchangeable with the 35-060, but differing in manufacture method
35-060F01	A PC board mechanically but not electrically interchangeable with the 35-060 and described by the same set of drawings
35-060R01	A revised 35-060 PC board that supersedes the 35-060
35-060B01	The 27.9cm x 43.2cm (11" x 17") parts list for a 35-060
35-060B08	The 27.9cm x 43.2cm (11" x 17") schematic for a 35-060
06-072A13	A 21.6cm x 27.9cm (8 1/2" x 11") listing of the 06-072 test program
06-072A12	A 21.6cm x 27.9cm (8 1/2" x 11") information drawing on the 06-072 test program
47-060	The sixtieth manual assigned a number under this system; this number is not referenced to the part number of equipment described in the manual

A.7 DRAWING SYSTEM

This section describes the drawings provided with the equipment. Drawings provided with peripheral devices and other purchased items may vary from the system described in this section. A digital system can be divided into a collection of functionally-independent circuits such as memory, processor and input/output (I/O) device controllers. These circuits could be saleable units in their own right; electrically, they are self-contained and perform their function with minimum dependence on other functional circuits in the system. Hence, a functional circuit is treated as a building block. Each schematic contains information including type and location of discrete ICs, pin connections, all interconnections within the schematic, connector pin numbers and connections to other boards. The schematics reflect all the logical operations performed by the circuits. Symbols used on schematics generally conform to MIL-STD-806B.

A.7.1 Register Naming System

The following rules are used to name registers:

- Mnemonic names are restricted to six characters and a state indicator.

- Each bit in the register is numbered, usually starting at 00 on the left, or most significant positions, and continuing to N-1 on the right. N is the number of bits in the register.

- The 00 bit is the most significant bit (MSB) and the N-1 bit is the least significant bit (LSB).

A.7.2 Integrated Circuit (IC) Representation

The ICs mounted directly on the logic board are represented on the schematic drawing by logic symbols. Each symbol contains the reference designation, device part number (category and sequence), and symbol mnemonic designation (see Figure A-10).

0003
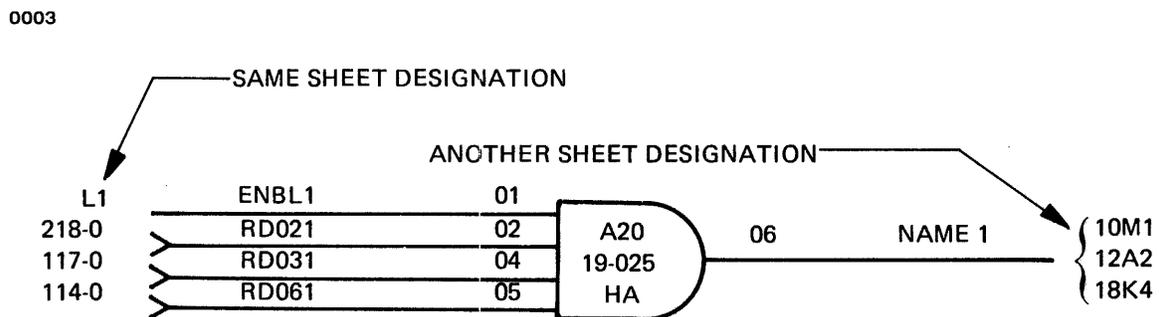
Figure A-11 High-Speed AND Gate

The designations, numbers and references shown in Figure A-11 are listed below.

A20   shows the component location on the logic board (see Section A.6.1).

19-025   19 is the category number of ICs, and 025 is the sequence number of the component.

HA	designates that this component is a high-speed AND gate. Other common designators are:

P	power gate
SDF	Schottky, D flip-flop
SG	Schottky gate
SGO	Schottky high-speed gate, open collector
SBO	Schottky high-speed buffer, open collector
B	buffer
SB	Schottky high-speed buffer
LOR	low power Schottky OR
LN	low power Schottky NOR
SOR	Schottky OR
SN	Schottky NOR
SA	Schottky AND
SF	Schottky J/K flip-flop

L1	is the input lead from area L1 on the same schematic sheet.

10M1 12A2 18K4	designate output to other logic.

218-0 117-0 114-0	designate input from CONN0.

Pin numbers 01, 02, 04, 05 and 06 correspond directly to the actual IC pin numbers.

A.7.3 Flip-Flops

When possible, the immediate output from a flip-flop (1 or 0 side) has a mnemonic name preceded by an F. Usually, a flip-flop named PSEL (processor-selected) has an output mnemonic on the 0 side of FPSEL0 (see Figure A-12). Thus, when observing a mnemonic at the terminal end of a net, the digital technician has an indication that the signal is the output from a flip-flop rather than a decoded function.

A. NEGATIVE EDGE   B. POSITIVE EDGE   C. POSITIVE LEVEL
   TRIGGERED   TRIGGERED   TRIGGERED
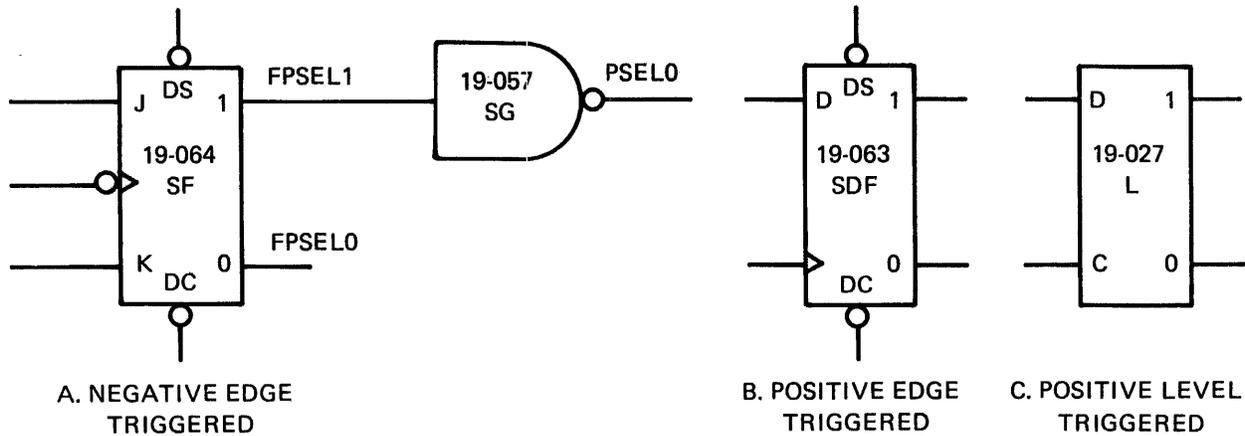
Figure A-12   Clocked Devices

A.7.4   Clocked Devices

Clocked devices, flip-flops and counters in particular, are drawn
to indicate information concerning their input. A circle
adjacent to the input pin designation implies that a low active
signal is needed to perform the specified operations. The symbol
> at the clock input shows that the device changes state on an
edge. If no circle is present, the chip is positive-edge-
triggered (see Figure A-12).

A.7.5   Nets

A net is an electrical connection between two or more points in
a circuit. Ordinarily, a net has an originating end, usually a
connector where the signal is generated, and one or more
terminating ends. It is often convenient to assign descriptive
mnemonic names to nets to identify them on schematics. Whether
or not a net is named is arbitrary; however, a net is always
assigned a name if:

● the net is contained on one drawing sheet, but is not a
  complete solid line on that sheet,

● parts of the net appear on more than one sheet,

● part of the net connects with a different schematic, or

● part of the net leaves a logic board.

If a net is named, the following rules apply:

- Except in special cases, mnemonic names are a maximum of six characters plus a state indicator.

- No other characters are permitted.

- Where possible, mnemonics are descriptive; however, descriptive names are not always possible, so the danger of misinterpreting a mnemonic exists.

- A given mnemonic name can be assigned to only one net.

- A state indicator suffixes every mnemonic. This indicator consists of the digit 1, for the logically true state, or the digit 0, for the logically false state. For example, the set side of a flip-flop normally has the 1 state indicator; the reset side normally has the 0 state indicator. The state indicator for a function changes each time that function is inverted. Thus, the state indicator permits assigning the same mnemonic to functions that are identical except for an inversion. Logic 0=.5VDC or less, logic 1=2.4VDC or more.

- When a logical function is inverted, an inversion indicator is added after the state indicator, allowing functionally equivalent but electrically different nets to have the same mnemonic name. Assume a signal NAME1 can be inverted to produce NAME0. If NAME0 is then inverted, NAME1A is produced. NAME1 and NAME1A are functionally equivalent, but physically different nets.

If a net fans out to many sheets of a schematic or to sheets on different schematics, it is assigned a mnemonic name and zoned from sheet-to-sheet. This zoning allows for proper identification of the originating and terminating ends of the net. The originating end of a net is the driver where a signal is generated. Terminating ends are all other points to which the net connects. When a lead leaves a sheet at the originating end, it is zoned by first indicating the sheet on which the net reappears. Assume that the gate shown in Figure A-11 is on schematic sheet 110. The output NAME1 appears on sheets 10, 12 and 18 of the schematic. The schematic number is implied. When a net enters a sheet from another sheet, it is labeled with the same mnemonic name and is only zoned back to the originating end of the net. In Figure A-11, the net ENBL1 may have many other terminations in addition to the one shown. When a net leaves the sheet where it originated, it is generally zoned to every other sheet where the net terminates; the terminating end is zoned only to the originating sheet. On schematics, signals are coordinated between sheets only when the sheets are related to the same board. When a signal leaves a board, the backpanel map must be used.

When a net leaves a logic board, it usually leaves through a logic board backpanel connector pin. Even if the complete net is on one drawing sheet, these connector pins must be shown on the schematic. Since the logic board location number, either in the logic symbol or the footnote, implies the connector number itself, only the connector pin number must be indicated under the pin symbol. In Figure A-11, RD061 enters the logic board on pin 114 of backpanel header CONNO.

A.7.6 Schematics

Figure A-13 is a schematic sheet with call-outs of the described conventions. The schematic drawings for a basic digital system are generally located in the rear of the appropriate digital system maintenance manual. For the Model 3205 System, an entire manual (the Model 3205 System Schematic and Assembly Drawings Manual) is dedicated to this. Schematic drawings for other expansions are included with the expansion or with the publications that describe the expansion.

Figure A-13   Functional Schematic Format Drawing

NOTES:
1. ALL APPARATUS ON THIS SHEET LOCATED ON CPU H1 BOARD
   35-446F00, 35-446F01, 35-446F02 & 35 446F03 UNLESS OTHERWISE SPECIFIED.
2. THIS OPTION, WHEN EQUIPPED, IS INSTALLED AT THE BACKPANEL ON
   SLOT 6, CONNECTOR 0.
3. 35-446R02 ASSEMBLIES USING 25 355R02 BOARDS EMPLOY GATES A100
   PINS 11 & 10 AND A133 PINS 05 & 06 INSTEAD OF A100 PINS 13 & 12 AND
   A100 PINS 11 & 10 RESP.

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