I
INTRODUCTION

This manual is designed to provide the reader with an understanding of the relationship of the product components within the Honeywell Series 60 Level 6 Model 43 and Model 53 minicomputer systems. Modular in design, easily configurable, and with a flexible set of software which enables these systems to be tailored to a variety of user applications.

The versatile Model 43 is a powerful minicomputer system with increased performance improvement. The Model 53 uses the same set of components as the Model 43 system plus the addition of a buffer type cache memory. The cache memory reduces the access time required by the central processor to obtain main memory information, thereby further increasing system performance.

This document covers both Model 43 and Model 53 systems and within this manual "system" refers to both models unless otherwise specified.

1.1 APPLICABLE DOCUMENTS

The following related supporting documents used in conjunction with this manual, provide supplementary information for data presented in this manual and will aid in the understanding of the system.

Product Manuals	Order Number
Level 6 Site Preparation Manual	AY52
Level 6 Model 3X, 4X, 5X System Installation Manual	CB68
Power System Manual	FL34
Model 43/53 Central Processor Unit Manual (Vol I)	FN28
Model 53 CPU Manual (Vol II) Cache Memory	FQ30
Model 53 CPU Manual (Vol III) Memory Management Unit	FW85
Type CPF 9501 Memory Management Unit Manual	FN34
Level 6 MOS Main Memory Manual	FL33
Level 6 Single Word Fetch Memory Manual	FN63
Level 6 Double Word Fetch Memory Manual	FN37
CMC9009/9010 128K Double Fetch Memory Manual	FQ36
Type CPF9502 Scientific Instruction Processor Unit Manual	FN30
Type CPF9509 Writable Control Store Manual	FN67
Type MDC 9101 Multiple Device Controller Manual	FL19
Type MTC 9101 Magnetic Tape Controller Manual	FM88
Type MSC 9101/9102 Medium Performance Disk Controller Manual	FM54
Type MLP 9103 Multiple Line Communications Processor	FL48
Level 6 Intersystem Link Manual	FN78
VIP Terminals Site Preparation Manual	AX78
Type GIS 9001 General Purpose DMA Interface Controller Manual	FL14

Miscellaneous Documents	Order Number
Honeywell Level 6 Minicomputer Handbook	AS22
MLCP/DLCP Programmer's Reference Manual	AT96
Level 6 Writable Control Store User's Guide	FQ41
Level 6 System and Peripheral Operation Handbook	AT04

1.2 SYSTEM CVERVIEW

The Model 43/53 system is built around a system bus chassis and separate functional components that can be easily installed in the system. The central processor, memories, and a full complement of optional peripheral controllers are contained on separate full-size (15- by 16-inch) printed circuit boards. The basic system contains either a five-board slot or a 10-board slot system chassis which also houses the dc power supplies and a Megabus* network. The full-size printed circuit boards, hereafter referred to as controller boards, plug directly into the chassis Megabus slots. Peripheral devices attach to the system through device cables connected to smaller-size printed circuit boards mounted in a piggy back manner on the full-size controller boards. Any smaller-size board attached to a full-size controller is hereafter referred to as an adapter board. Full-size memory controller boards also plug directly into the Megabus and each memory controller can support up to four separate adapter boards containing either 8KW (Kilowords) or 32KW of main memory storage space, depending on the size and type of memory selected by the user. A minimum of 16KW to a maximum of 1028KW of memory can be configured in the system. A variety of control panels are available which connect directly to the central processor to provide an operator interface in the system. The peripherals and the system chassis can be housed in a variety of cabinetry. Figure 1-1 shows a typical rack-mountable system.

A self initializing bootload capability is provided in the Central Processor Unit (CPU). It is a firmware controlled process that is stored in a CPU resident read only memory. The initialization/bootload process is activated when power is applied to the system or manually initiated from the control panel. The initialize sequence causes the CPU and all other controllers configured in the system to perform self-contained Quality Logic Tests (QLTs). These tests verify the integrity of the hardware before loading the software. When all units successfully complete their QLT test, the bootload sequence is entered causing software to be loaded from a boot device into main memory. The CPU then branches to and executes the software. Firmware sequences stored in the CPU read only memory, control the step by step actions necessary for central processor execution of each software instruction.

System operations are controlled by the central processor execution of software programs stored in main memory. The CPU communicates with other system components primarily through the system Megabus. A combination of firmware and hardware controls the communications. Hardware switches are used to assign a unique I/O channel address to each unit attached to the Megabus. Software uses these addresses to direct instructions to the proper peripheral controllers, the controllers inturn, direct and

control their associated peripheral devices accordingly. Execution of an I/O instruction causes the CPU firmware to transfer the channel address and function command specified in the instruction of the Megabus. Only the controller assigned to the corresponding channel address can decode the command. Dependent on the command, the controller may communicate with the CPU, perform some controller or device specific action, or the controller may initiate and control data transfers between main memory and peripheral devices. Controller controlled activities are independent and asynchronous to CPU operations. However, software is kept informed when controller data transfers are completed by the controller issuing interrupts to the CPU over the Megabus. The CPU processes the interrupts on a priority basis according to established procedures.

1.3 SYSTEM COMPONENTS

Table 1-1 contains a list and a description of the individual components that comprise the system.

Table 1-1 System Components (Sheet 1 of 2)

COMPONENT	DESCRIPTION
Central Processor Unit	CPU board with attached adapter board with or without a Memory Management Unit (MMU). (MMU is standard on the Model 53).
4KW Cache Memory (available only on Model 53)	
Memories (minimum of 16KW must be installed)	MOS (Metal Oxide Semiconductor) memories: 16 through 1028 kilowords, 18-bit, parity RAM memory 16 through 1028 kilowords, 22-bit EDAC (Error Detection Automatic Correction) RAM memory Core Memory: 16KW or 32KW, 18-bit parity memory modules
Level 6 Megabus Chassis/Power Supply	Five-card slot or 10-card slot basic chassis Five-card slot or 10-card slot expansion chassis - optional One dc power supply for each five-card slot.

Table 1-1 System Components (Sheet 2 of 2)

COMPONENT	DESCRIPTION
Memory Save Power Supply (optional) Power Distribution Unit	One for each rack cabinet.
Control Panel	Basic control panel Full control panel - optional Portable control panel - optional
Processor Controllers (optional)	Scientific instruction processor Multiline communications processor with line adapters Writable control store Intersystem link controller
Peripheral Controllers (optional)	Multiple device controller supports: Printer adapter Card reader adapter Console adapter (ASR/KSR/CRT) Diskette adapter Medium performance disk controller supports: Cartridge disk adapter Mass storage unit adapter Magnetic tape controller supports: Nine-track NRZI tape adapter Seven-track NRZI tape adapter Card reader adapter Printer adapter General purpose interface controller
Cabinetry and Enslosures (refer to subsection 1.4)	

1.4 PHYSICAL CHARACTERISTICS

The system can be assembled in the following configurations:

- Rack-Mountable System (see Figure 1-1)
- Office Furniture Package System (see Figure 1-2)
- Tabletop System (see Figure 1-3).

Figure 1-4 illustrates how the basic system components are assembled for each type of configuration. The additional space within the rack-mountable and office furniture package configurations can be occupied by optional components (i.e., peripheral devices, memory save power supply, or expansion chassis). Figure 1-5 shows the panels available for the rack-mountable and office furniture package systems. The specific panels installed are dependent on the users needs and the equipment configured within the cabinet. In the tabletop systems all peripheral devices and the optional memory save power supply are separate stand alone units.

Figures 1-6 through 1-10 illustrate typical system components. These figures are shown to aquaint the reader with the physical system and are referenced throughout the manual. A typical rack-mountable system, a five-board system chassis, a 10-board system chassis, a typical memory save power supply, a typical power distribution unit, are depicted in Figures 1-6 through 1-10, respectively. The layout of the processor, controller and associated adapter boards is shown in Figure 1-11.

1.4.1 Rack-Mountable System

System components in a rack-mountable system are installed in either a customer or Honeywell supplied rack. The Honeywell rack comes with a variety of panels and access doors which forms either a 60-inch high-boy or 30-inch low-boy Level 6 cabinet. The rack cabinet provides enough space to house the basic system components plus additional space for some peripheral devices and/ or expansion chassis. If additional space is required for optional components, expansion cabinets are employed. An optional tabletop wing can be attached to the rack to provide a flat surface for tabletop peripherals or extra operator working space.

Installed in the bottom rack postion of each rack cabinet is a Power Distribution Unit (PDU). This unit supplies ac power to rack-mountable components within the cabinet.

Figure 1-6 illustrates a typical rack-mountable system. The configuration of the components in the rack cabinet and chassis are option dependent and must follow Level 6 configuration rules described in the Model 3X, 4X, 5X System Installation Manual, Order Number CB68. The following components can be installed on the rack cabinet:

- System chassis (processor/controller/adapter boards plus system power supplies)

- Memory save power supply

- Diskette devices

- Cartridge disk devices

- Magnetic tape drive devices

- Power distribution unit.

The characteristics of the rack-mountable system are listed in Table 1-2.

1.4.2 Office Furniture Package System

The physical characteristics of the office furniture package system are the same as the rack-mountable system described in subsection 1.4.1, except for the cabinet and the location of the control panel. The office furniture package incorporates the 30-inch high rack in desk-styled cabinetry for operator convenience and a more pleasing appearance (see Figure 1-2).

The control panel can be recessed in the tabletop surface and can be concealed by a hinged dress cover, or a tilt-up control panel can be installed within the 30-inch high cabinet (see Figure 1-12).

If additional space is required for optional components, 30-inch high expansion cabinets are employed. Each 30-inch high cabinet requires one Power Distribution Unit (PDU). Components within a cabinet enclosure must conform to system configuration rules described in the Model 3X, 4X, 5X System Installation Manual, Order Number CB68.

1.4.3 Tabletop System

The physical characteristics of the tabletop system are the same as the rack-mountable system except that the tabletop system can contain only one five-slot system chassis/power supply and is enclosed by a stylish cover that incorporates the control panel (see Figure 1-3). The complete assembly can be placed on a desk, table, or other flat surface. No power distribution unit is required for the tabletop system. The chassis power supply plugs directly into an ac outlet, or into a switch controlled ac outlet on either the optional tabletop diskette or optional tabletop memory save unit.

Table 1-2   Rack-Mountable System Characteristics (Sheet 1 of 2)

UNIT	CHARACTERISTICS	
Rack Cabinets	**High-Boy**	**Low Boy**
	Height: 152 cm (60 in.) Width: 52 cm (20.5 in.) Depth: 76 cm (30 in.)	76 cm (30 in.) 52 cm (20.5 in.) 76 cm (30 in.)
System Chassis	**Five-Board Basic/Expansion Chassis**	**10-Board Basic/Expansion Chassis**
	Height: 13.4 cm (5.25 in.) Width: 44.5 cm (17.5 in.) Depth: 57.2 cm (22.5 in.) Requires one power supply	26.8 cm (10.5 in.) 44.5 cm (17.5 in.) 57.2 cm (22.5 in.) Requires two power supplies
System Power Supplies Type M170 (70 Amp) Located in the rear of the system chassis. One power supply is required for each five-board slot.	**Input Voltage** 120Vac 50/60 Hz Height: 14 cm (5.5 in.) Width: 39.4 cm (15.5 in.) Depth: 12.7 cm (5 in.)	**Output Voltage** +5Vdc +12Vdc -12Vdc
Memory Save Power Supply Type PSS9001 Rack-Mountable Type PSS9002 Tabletop Unit	**Input Voltage** 120Vac 60 Hz Height: 8.9 cm (3.5 in.) Width: 44.5 cm (17.5 in.) Depth: 44.5 cm (17.5 in.)	**Output Voltage** +5Vdc +12Vdc
Power Distribution Unit	**Input Voltage** Type PSS9004 220/240 Vac, 60 Hz Type PSS9004B 220/240 Vac, 50 Hz Type PSS9005 120 Vac, 60 Hz Type PSS9005B 120 Vac, 50 Hz Type PSS9006 120 Vac, 60 Hz Type PSS9007 120 Vac, 60 Hz (Typical) Height: 12.7 cm (5 in.) Width: 44.5 cm (17.5 in.) Depth: 30.5 cm (12 in.)	**Output Voltage** 120 Vac, 60 Hz, 30 Amps 120 Vac, 50 Hz, 30 Amps 120 Vac, 60 Hz, 30 Amps 120 Vac, 50 Hz, 15 Amps 120 Vac, 60 Hz, 20 Amps 120 Vac, 60 Hz, 30 Amps Varies with PDU Type
Peripherals	For specific physical characteristics of each peripheral device, refer to the peripheral manuals.	

Table 1-2 Rack-Mountable System Characteristics (Sheet 2 of 2)

UNIT	CHARACTERISTICS
Processor/Controller Boards (see Figure 1-11)	All processor or controller boards plug directly into system chassis slots and are manufactured in one size: Width: 38.1 cm (15 in.) Depth: 40.6 cm (16 in.) Thickness: one chassis slot
Adapter Boards (see Figure 1-11)	All adapter boards mount on their associated full-size controller or processor board. Adapter boards are manufactured in different sizes: Single Size Width: 8.9 cm (3.5 in.) Depth: 29.2 cm (11.5 in.) Double Size Width: 19 cm (7.5 in.) Depth: 29.2 cm (11.5 in.) Triple Size Width: 26.7 cm (10.5 in.) Depth: 29.2 cm (11.5 in.) Square Type Width: 16.8 cm (6.6 in.) Depth: 16.8 cm (6.6 in) Full Size Width: 34.3 cm (13.5 in.) Depth: 29.2 cm (11.5 in.)
Megabus Terminator Boards (see Figure 1-11)	Termination boards plug directly into the system chassis slots and are manufactured in one size: Width: 36.6 cm (14.85 in.) Depth: 7.2 cm (2.2 in.) Two terminator boards are required per system and one located at the top and bottom of the Megabus.
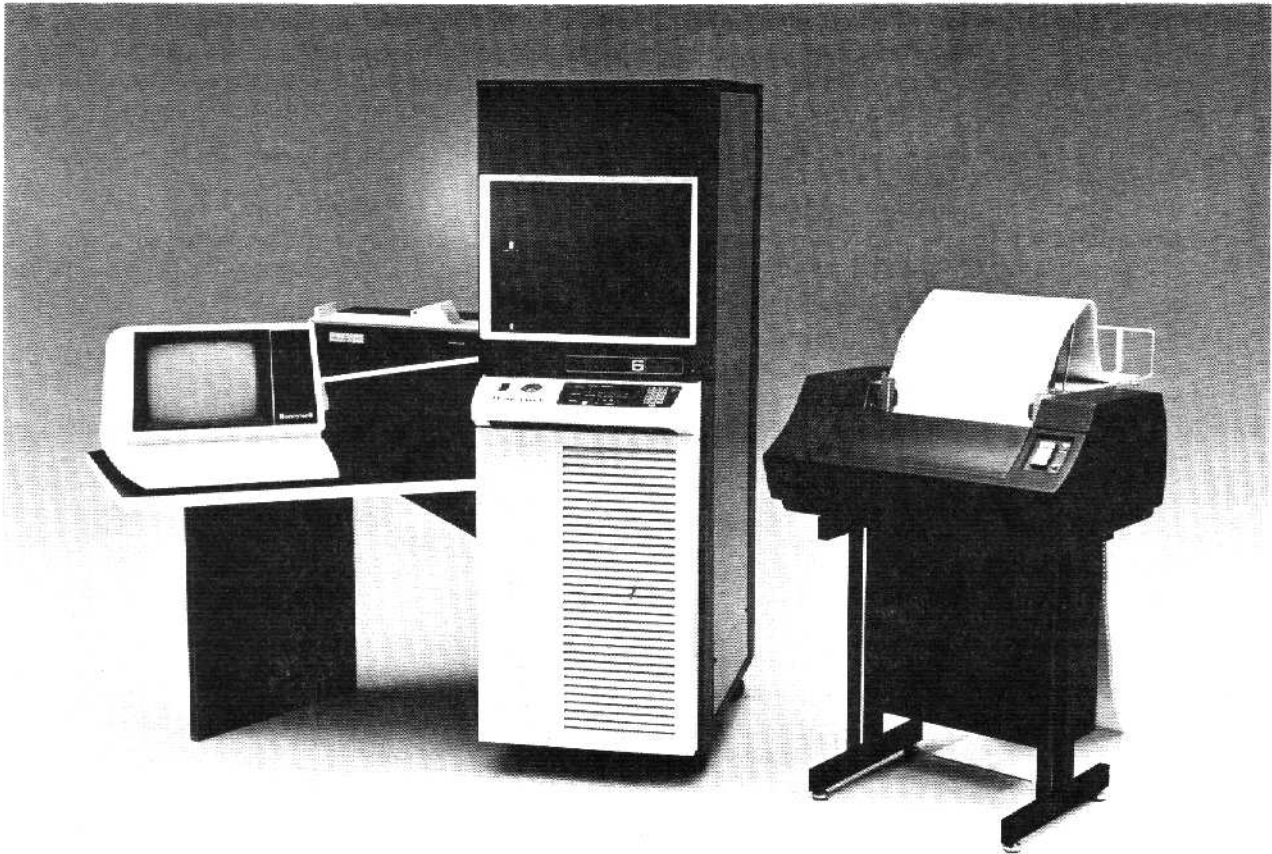
Figure 1-1 Typical Rack-Mountable System

Figure 1-2 Typical Office Furniture Package System
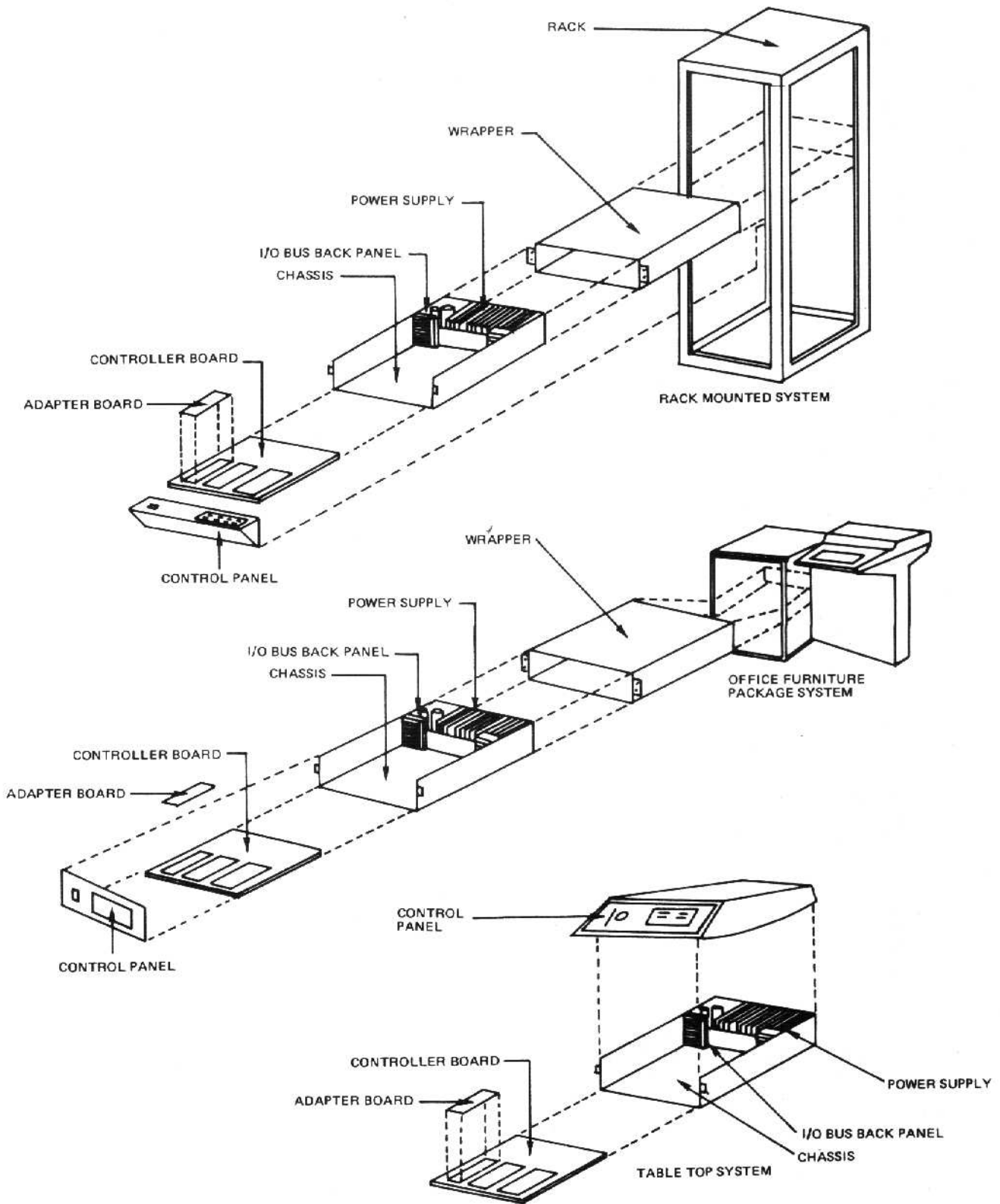
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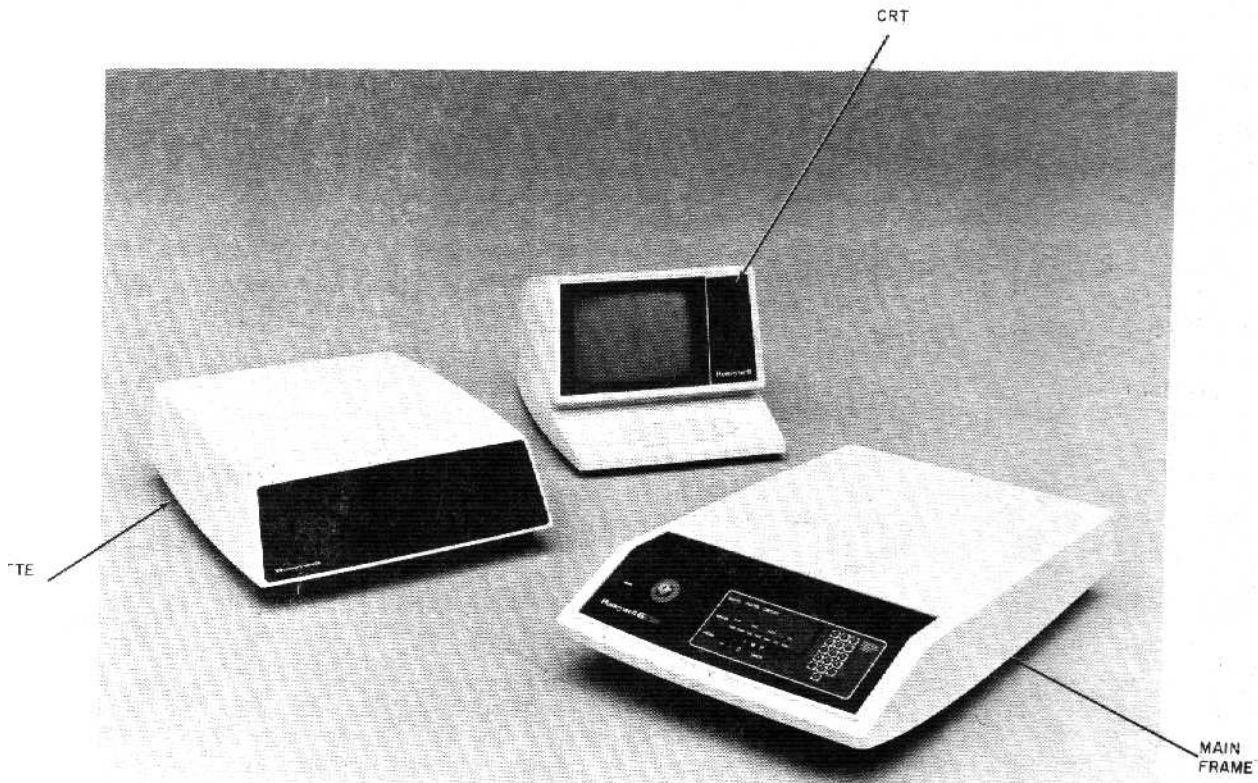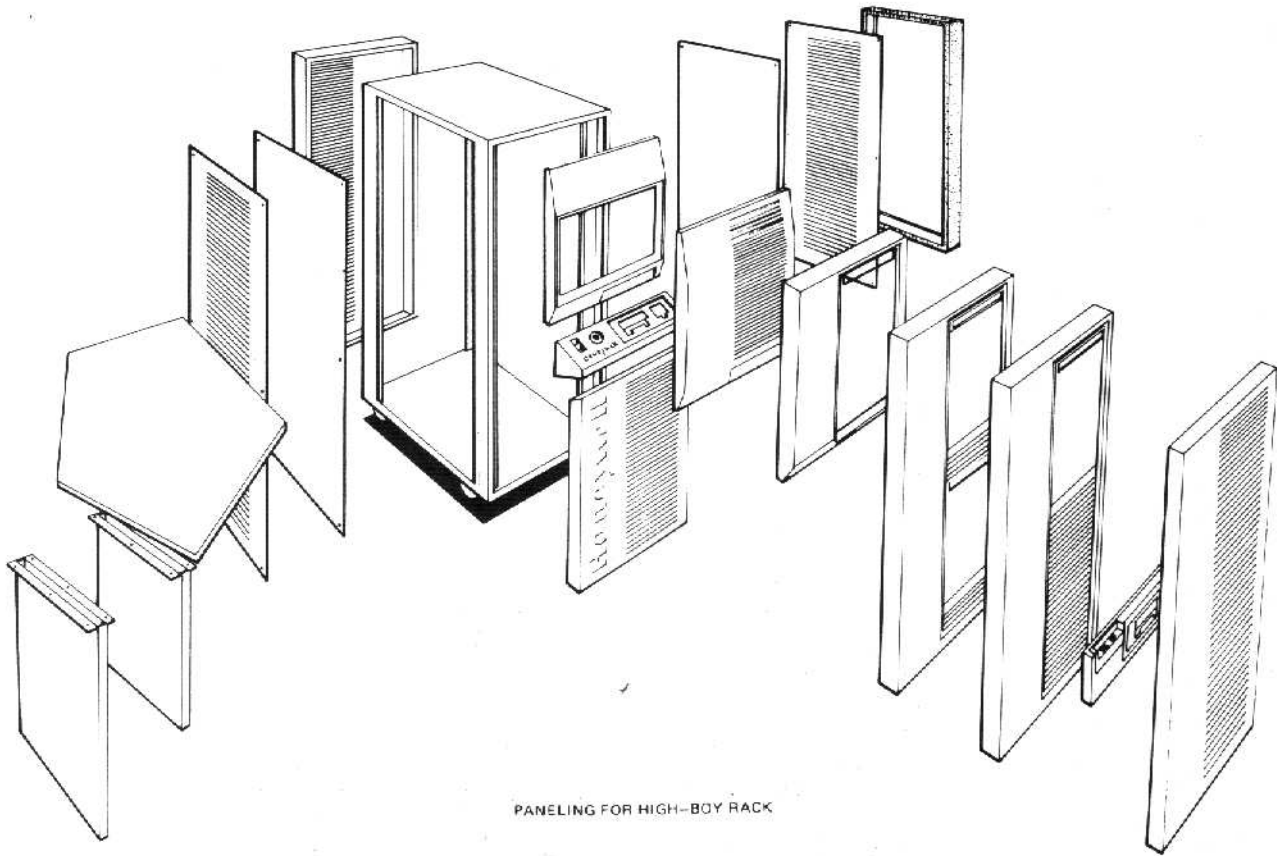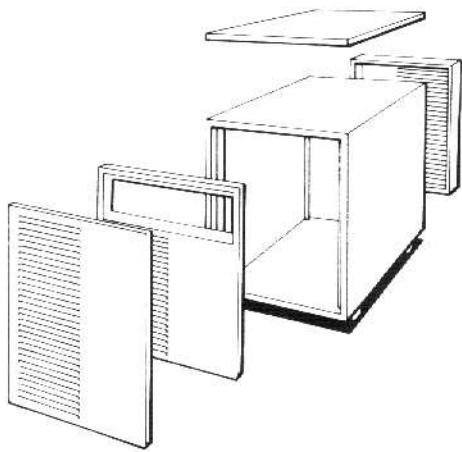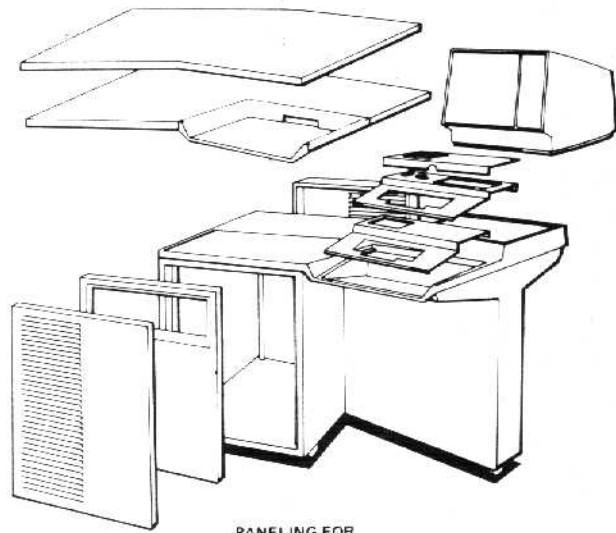
Figure 1-3 Typical Tabletop System

Figure 1-4 Typical Configurations and Components

PANELING FOR HIGH—BOY RACK

PANELING FOR
LOW—BOY RACK

PANELING FOR
OFFICE FURNITURE
SYSTEM
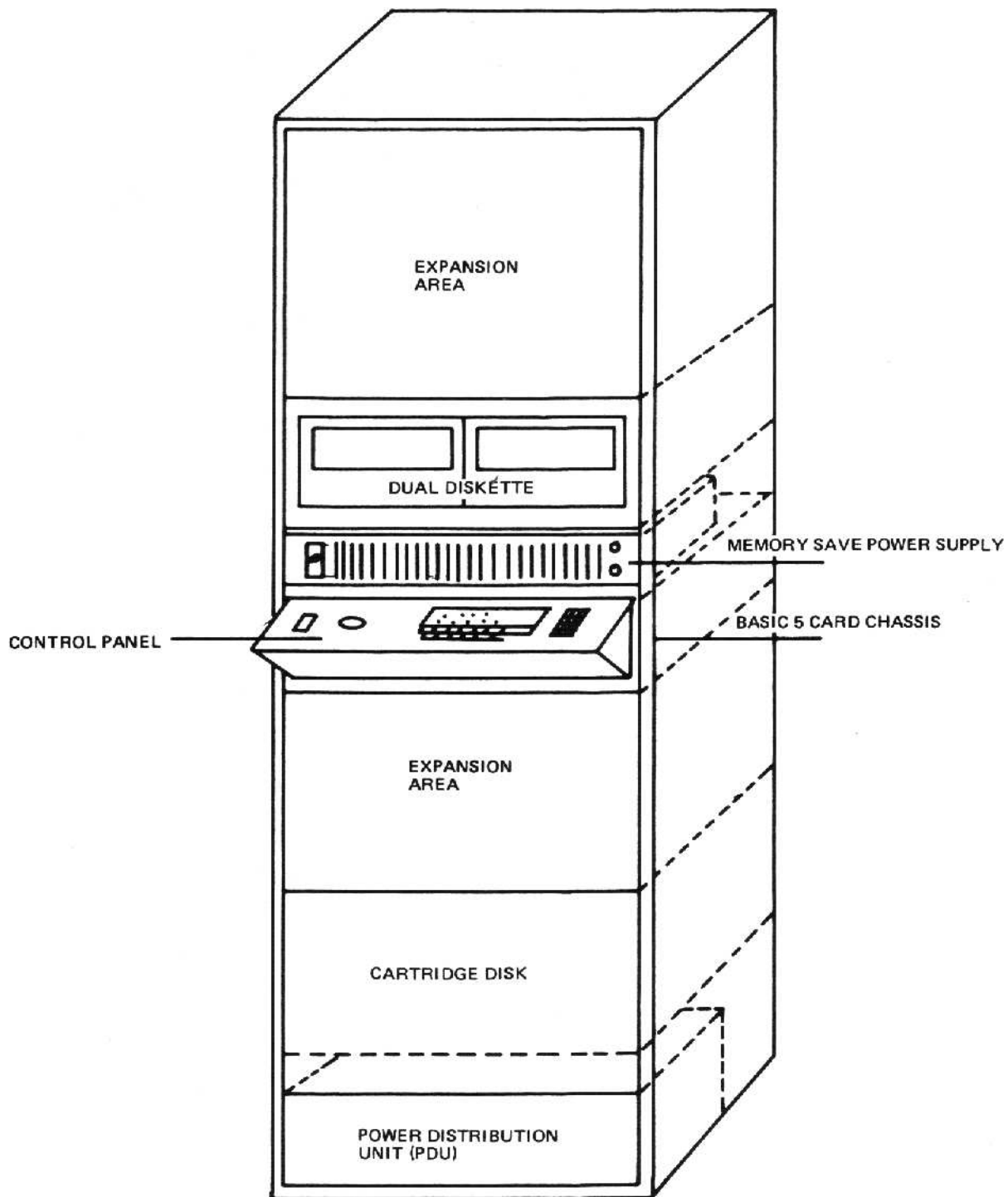
Figure 1-5 Cabinetry Panels

EXPANSION
AREA

DUAL DISKETTE

MEMORY SAVE POWER SUPPLY

BASIC 5 CARD CHASSIS

CONTROL PANEL

EXPANSION
AREA

CARTRIDGE DISK

POWER DISTRIBUTION
UNIT (PDU)

Figure 1-6   Typical Rack-Mountable System Component Area
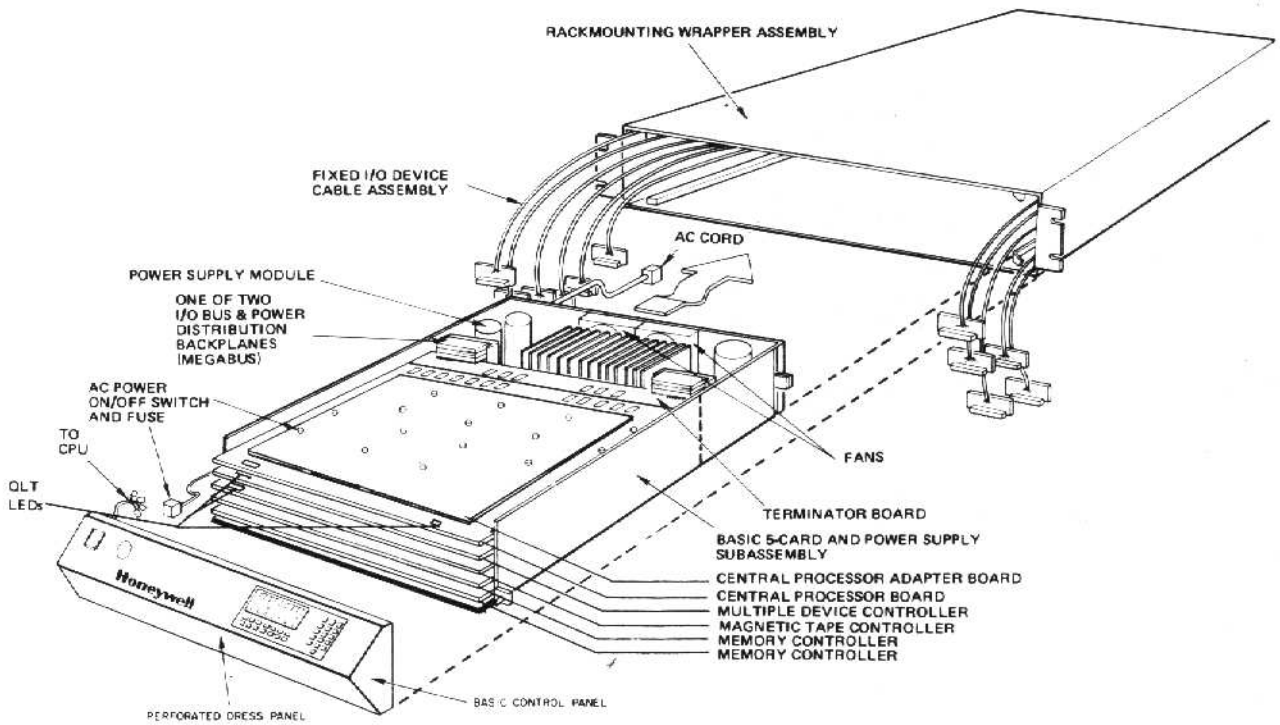
Figure 1-7   Typical Five-Board System Chassis
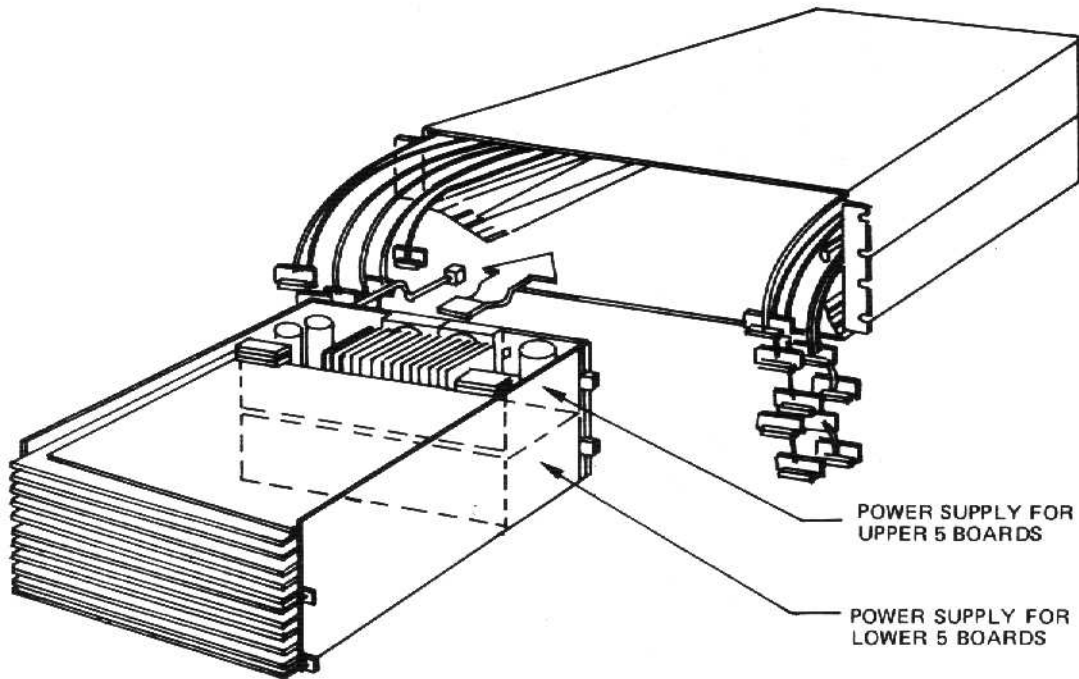
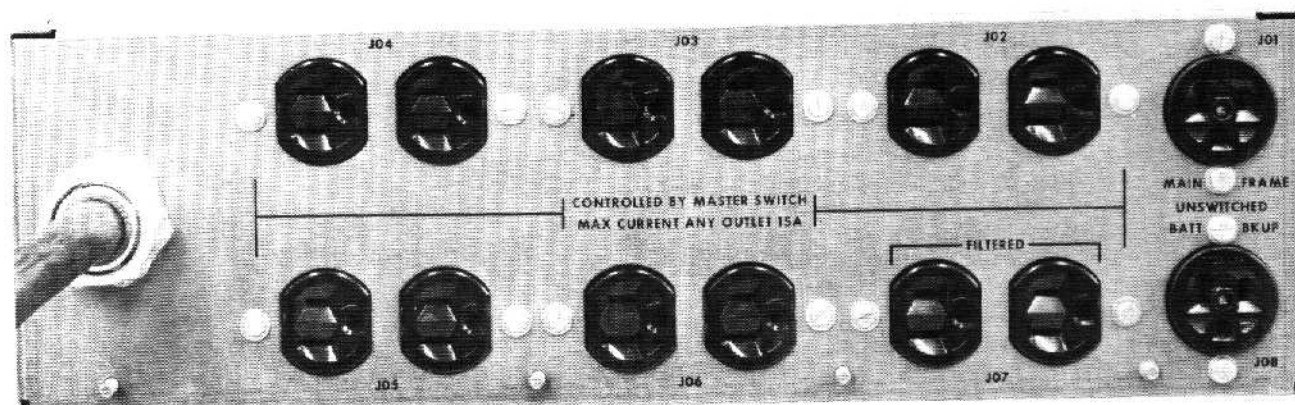Figure 1-8   Typical 10-Board System Chassis and Power Supplies
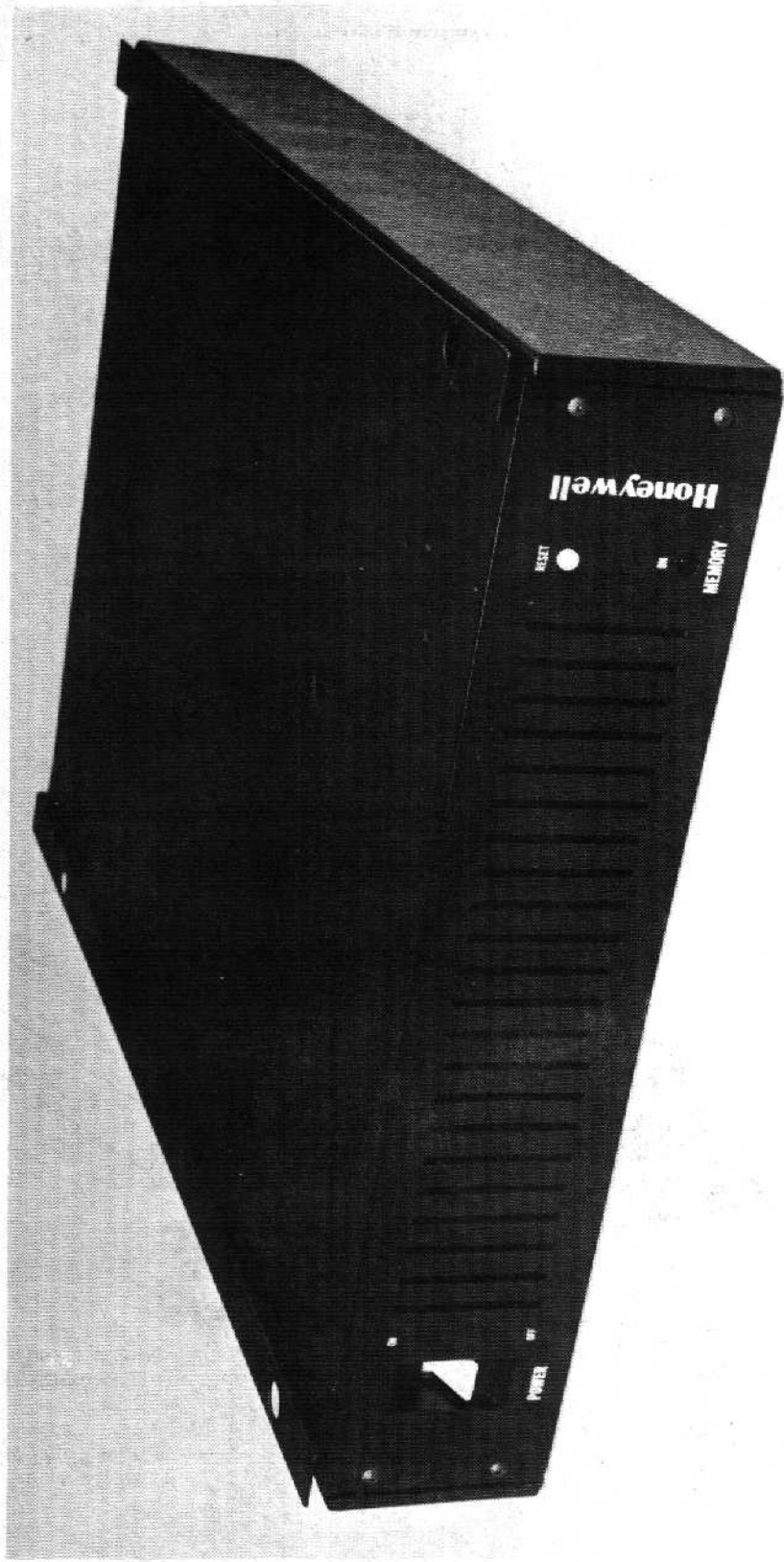
Figure 1-9 Memory Save Power Supply
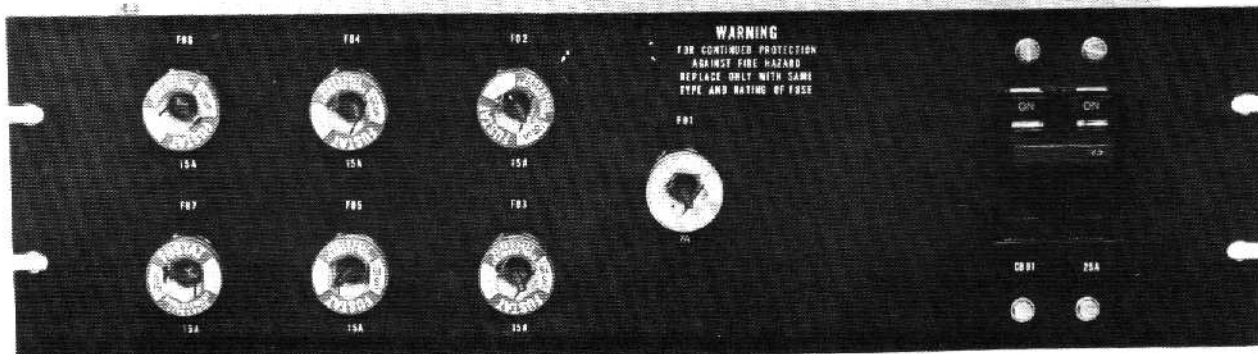
(Front View)

(Rear View)

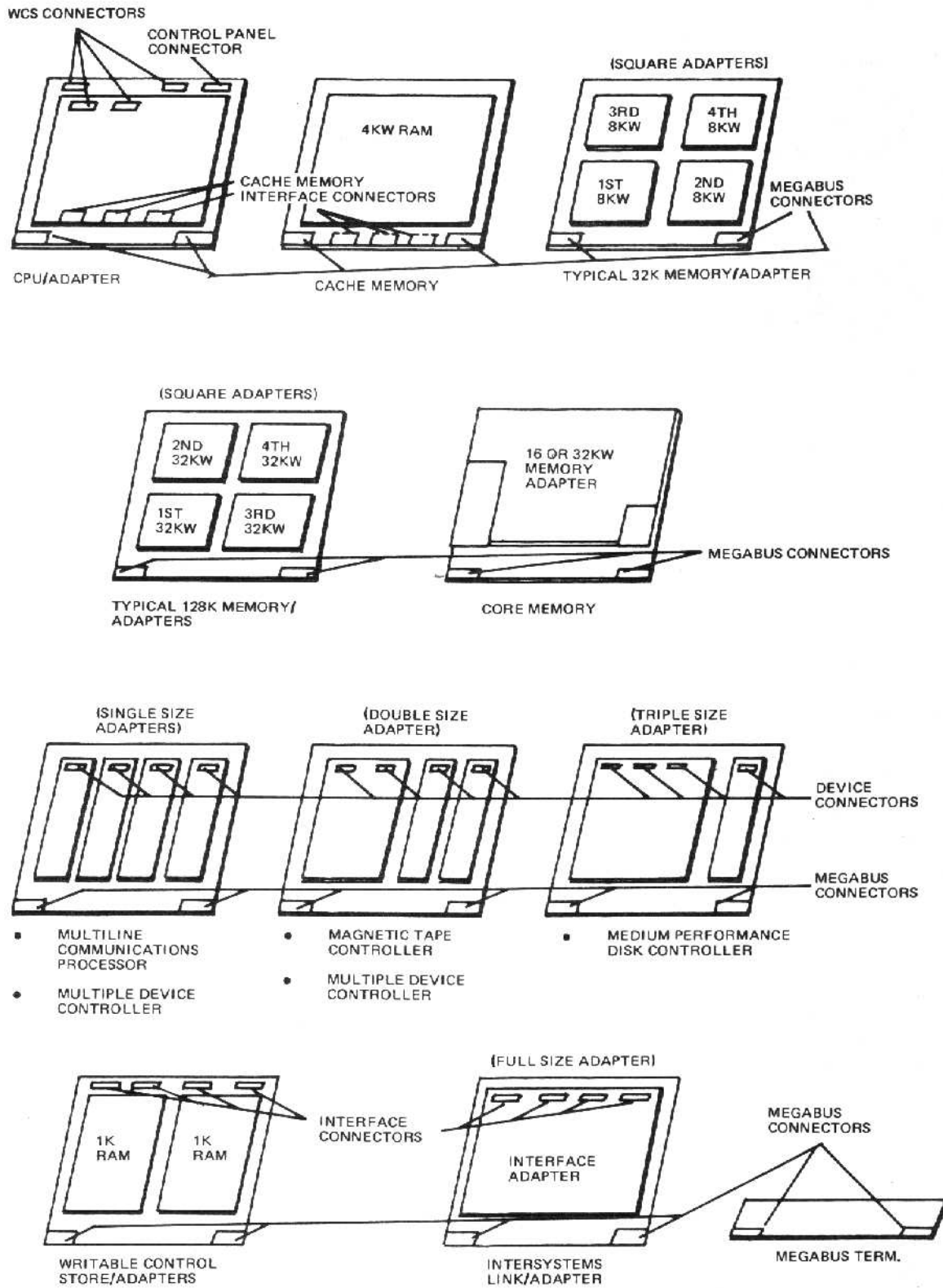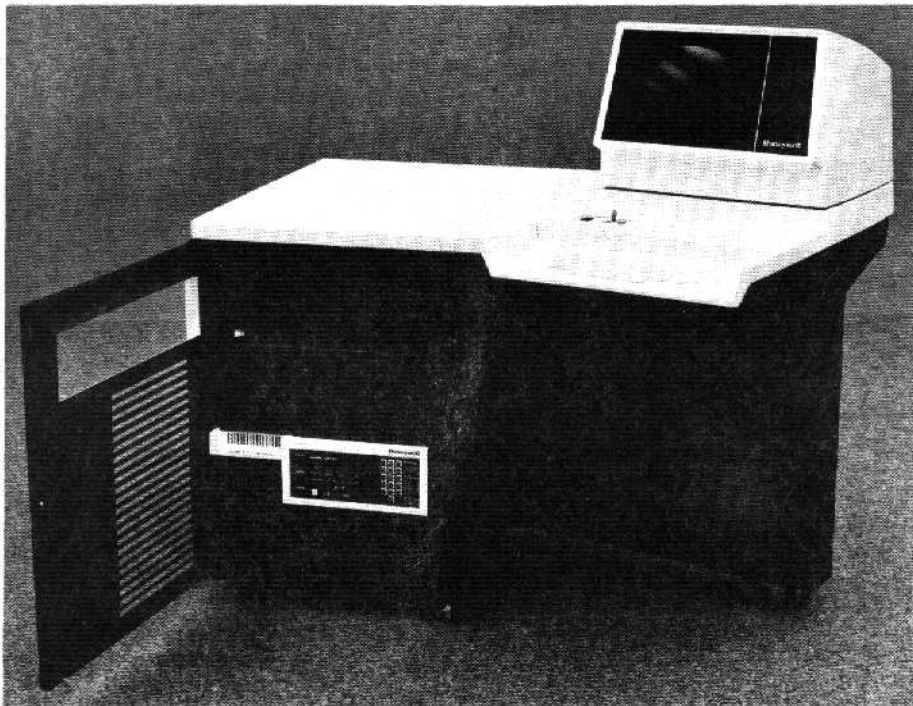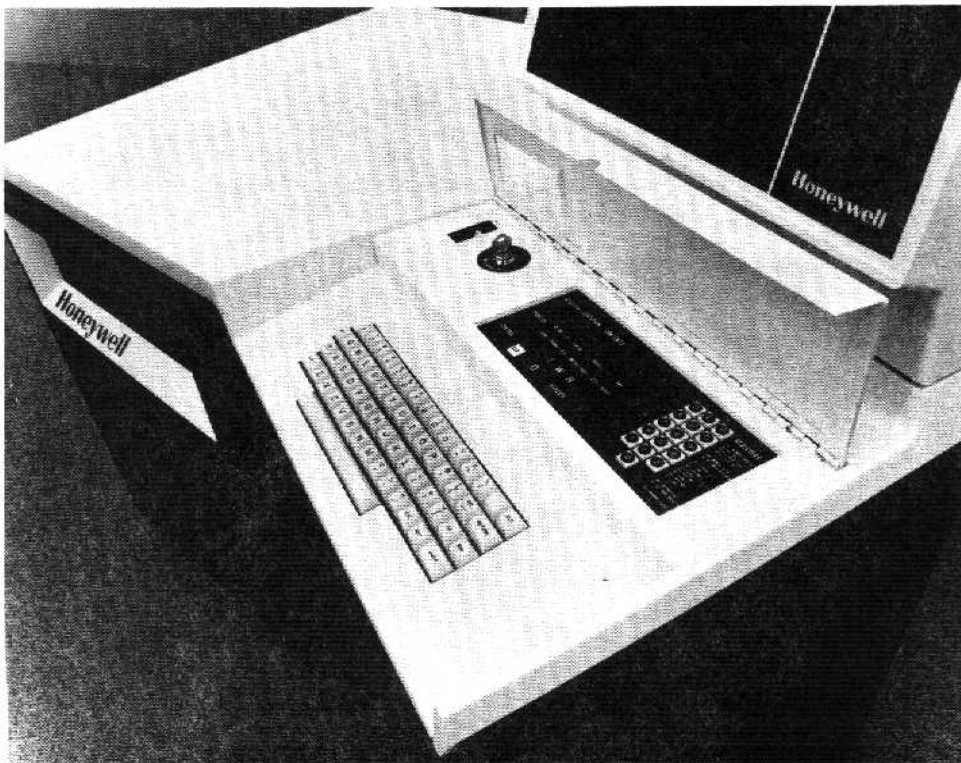Figure 1-10 Typical Power Distribution Unit

Figure 1-11 Typical Controller/Processor Boards and
Adapter Boards Layout

OFFICE PACKAGING WITH TILT-UP CONTROL PANEL

OFFICE PACKAGING WITH INTEGRATED TABLETOP CONTROL PANEL

Figure 1-12 Office Furniture Package Control Panel Locations