HP 3000 Series 40

Familarization Guide

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PART NO. 30170-90005

1/82

INTRODUCTION

This guide is intended to familiarize the reader with the HP 3000 Series 40 (3000/40). It is expected that the reader has already been trained on both the HP 3000 Series 30 and Series 44. The following topics will discuss the 3000/40 product specifications.

1. Product Description
2. Hardware Differences from the 44
3. Repair Documentation
4. Repair Tools
5. Service Materials
6. Cabling
7. Cooling
8. Power Unit
9. Cardcage Configuration

PRODUCT DESCRIPTION

SECTION I

PROCESSOR

The HP 3000 Series 40 is an HP 3000 running the MPE IV operating system. This system is packaged in a cabinet which is very similar to that of the Series 30 but takes advantage of much of the Series 44 hardware. The standard system includes a Series 44 CPU set, Control and Maintenance Processor (CMP), Series 44 memory controller, 256 Kb memory array, system control panel, 2 General I/O Channels (GICs), and a new power supply and cooling system. Capability for four RS-232 terminals (including console) is provided by an ADCC which must be ordered separately.

There are two models of the Series 40 system. Each product and its options are described below.

32445A	HP 3000 Series 40 System Processor Unit. 120V, 60 Hz, single phase; includes 256 Kb memory, 2 GICs. Software distributed on 1600 bpi magnetic tape. One ADCC-Main with cable (30018A-040) is required and must be ordered separately.
Option 003	Software distributed on cartridge tape.
Option 015	Specifies 220V-240V, 50Hz international operation.
Option 507	Expands memory to 1 Mb.
32446A	HP 3000 Series 40SX System Processor Unit. 120V, 60 Hz, single phase; includes 256 Kb memory; 2 GICs; Software distributed on cartridge tape. A 7911P-001 or 7912P-001 system disc drive with integrated 9140A cartridge tape drive is required and must be ordered with the system. An ADCC with cable (30018A-040) is required and must be ordered separately. A system console (262x, 264x, 2382A, 2635B) with cable is required and must be ordered separately. Coordinated shipment must be specified.
Option 002	Software distributed on 1600 bpi magnetic tape.
Option 015	Specifies 220V-240V, 50Hz international operation.

PERIPHERALS

The Series 40SX standard system specifies a system disc, backup device and console which must be ordered with the system. The Series 40 system must be ordered with the following:

One system disc: 7911P-140, 7912P-140, 7920M-102, 7925M-102, 7935H. Discs may be ordered from DMD. Note that the 7906 is supported on upgrades only, but not in split mode.

One backup device: 7970E-426 or 7976A Magnetic Tape Drive. The tape units may be ordered from Boise. In the case of a system with a single 7911P or 7912P system disc, Option 001 may be specified to use the integrated 9140A cartridge tape drive with dual controller as the system backup device.

One system console: 262x, 264x, 2635B, 2382A. Terminals are available from DTD; the 2635B printing terminal may be ordered from Vancouver Division.

Optional peripheral equipment which may be added to the Series 40 system is listed below:

- 7970E, 7976A Magnetic Tape Drives
- Integrated Storage Units: 7911P-001 or 7912P-001 disc with integrated 9140A cartridge tape unit and dual controllers
- 7920M/S, 7925M/S disc drives
- 7911P, 7912P, 7935H disc drives
- 9895A Flexible disc drive
- 2631B Character printer
- 2608A Line printer
- 2613A, 2617A, 2619A Line printer
- 2601A Daisy Wheel printer
- 2680A Page Printer
- 262x, 264x, 2382A terminals
- 307x data capture terminals
- 2635B, 2675A printing terminals
- 7260A optical mark reader (supported as a terminal device)
- 30106A Card Reader
- 37230T Short Haul Modem
- 13265 300 baud modem for 262x terminals
- 30020B DSN/Intelligent Network Processor

For additional information regarding individual device maximums, refer to the Series 40 Field Training Manual, the HP 3000 Configuration Guide, or the Series 40 Installation Manual.

The Series 40 is essentially a repackaging of the Series 44 memory, processor, microcode, and I/O controllers. Whereas the Series 44 memory may be expanded to 4 Mb, the Series 40 maximum memory size is 2 Mb. There are 13 I/O slots available on the Series 40, and 11 I/O slots on the Series 44. The first three slots on each system must be used for the sytem disc GIC, the backup device GIC, and the first ADCC-Main. There are 15 additional I/O slots available in the second card cage on a Series 44. Note also that the Series 44 can handle 5 GICs, while the Series 40 maximum is 4 GICs. Therefore, the real distinction between the two machines is in I/O expansion capabilities and memory size.

HARDWARE DIFFERENCES FROM THE 44

SECTION II

The following hardware items are unique to the HP 3000 Series 40:

ADCC Modem Cable	30170-60028
CMP/ADCC Cable	30170-60030
System Control Panel	30170-60002
Status (LED) Board	30170-60012
Backplane	30170-60008
Power Distribution PCA	30170-60004

ADCC MODEM CABLE

This cable attaches to the ADCC via a hood connector and terminates in a metal quad box which lies on the floor. It is required for all ADCCs beyond the first ADCC-Main which uses the CMP/ADCC cable. Four terminals may then be attached via this cable. This cable design includes TranZorb devices which help supress high voltage transients and reduce the susceptibility of equipment failures caused by lightning induced transients and noise.

CMP/ADCC CABLE

Because the Series 40 does not use junction panels, a new CMP/ADCC cable was required. This cable terminates in a metal quad box rather than a connection to the junction panel. Like the ADCC modem cable, this box also contains TranZorb devices to provide for lightning protection. The cable goes from the CMP into the ADCC, and from the ADCC to the Quad Box which lays on the floor. Port 0 is defined as the system console (quad box is lettered "System Console"). Port 1 of the quad box is marked "Remote Console/1" and is used as the remote console/session terminal. Note that this port is available as a user terminal when it is not being used as a remote console. The other two ports are available for user terminals.

SYSTEM CONTROL PANEL AND STATUS BOARD

The System Control Panel (SCP) assembly consists of two PCA's: one which contains all the logic (30170-60005) and another which contains the switches (30170-60006). In order to access these boards you must remove the top shroud of the system which slides off to the rear once the two rear captive screws are loosened.

The left half of the panel contains the system name plate with the Power and Remote LEDs showing through the plate. The right half contains the remaining controls and indicators, and is behind a nonlockable door. The System Control Panel switches and lights are very similar to those used on the Series 44 (see Figure 2-1). The Activity LED shows the status of the ADO signal from the CPU to provide a visual indication of CPU activity. The Battery LED is normally off and comes on to indicate that the battery is being discharged and memory is being sustained on battery power (as in the case of power fail). The Disc Volume switch should be in the Normal (NOR) position for all currently supported discs. The Alternate (ALT) position addresses Head 2, but is not used for any currently supported discs.

Unlike the Series 44, the Series 40 uses a key operated switch to select the desired security level. There are four levels of system security. CTRL ON refers to the ability to execute control panel functions such as load and dump from the console using the CMP. MAINT ON allows the use of the CMP Display function. REMOTE ON enables the use of a Remote Console. The fourth level of security disables all of the above mentioned capabilities.

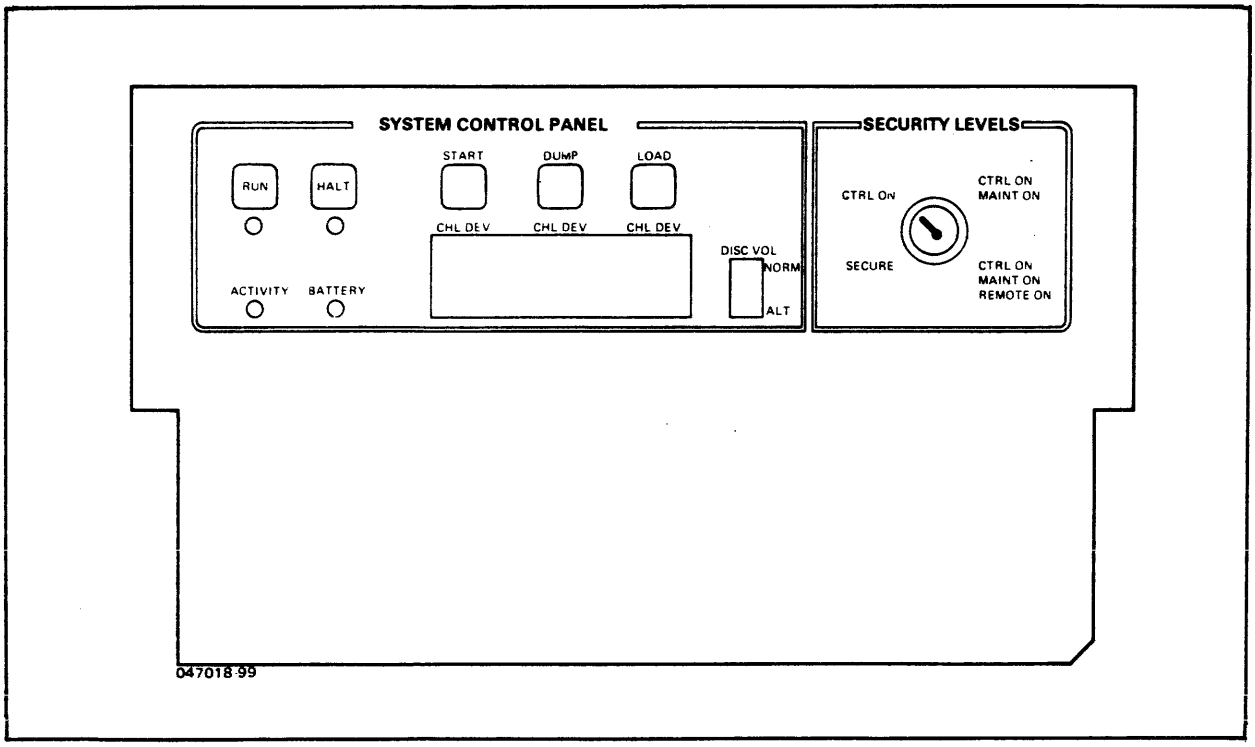

Figure 2-1. System Control Panel

There are several cable connections to the logic board. The 30170-60023 FCA connects the SCP to the backplane. There is another cable between the SCP and the Status Board (30170-60013). A third cable connects the key switch on the front panel to the SCP logic board. The key switch and cable together comprise the 30170-60014 SCP Key Switch Cable Assembly. If this cable is disconnected the system security defaults to the most secure level.

The Status or LED board is simply used to mount the two LEDs which can be viewed through the nameplate. The POWER LED indicates if PON is up, and the other LED is on if REMOTE is enabled.

BACKPLANE

A new backplane was required for this system to allow for more I/O slots and also empty slots around the CPU boards to aid in cooling them. For this reason there are no connectors loaded in slots 8, 10, and 12. The slots in the backplane are allocated as follows: (See Figure 2-2)

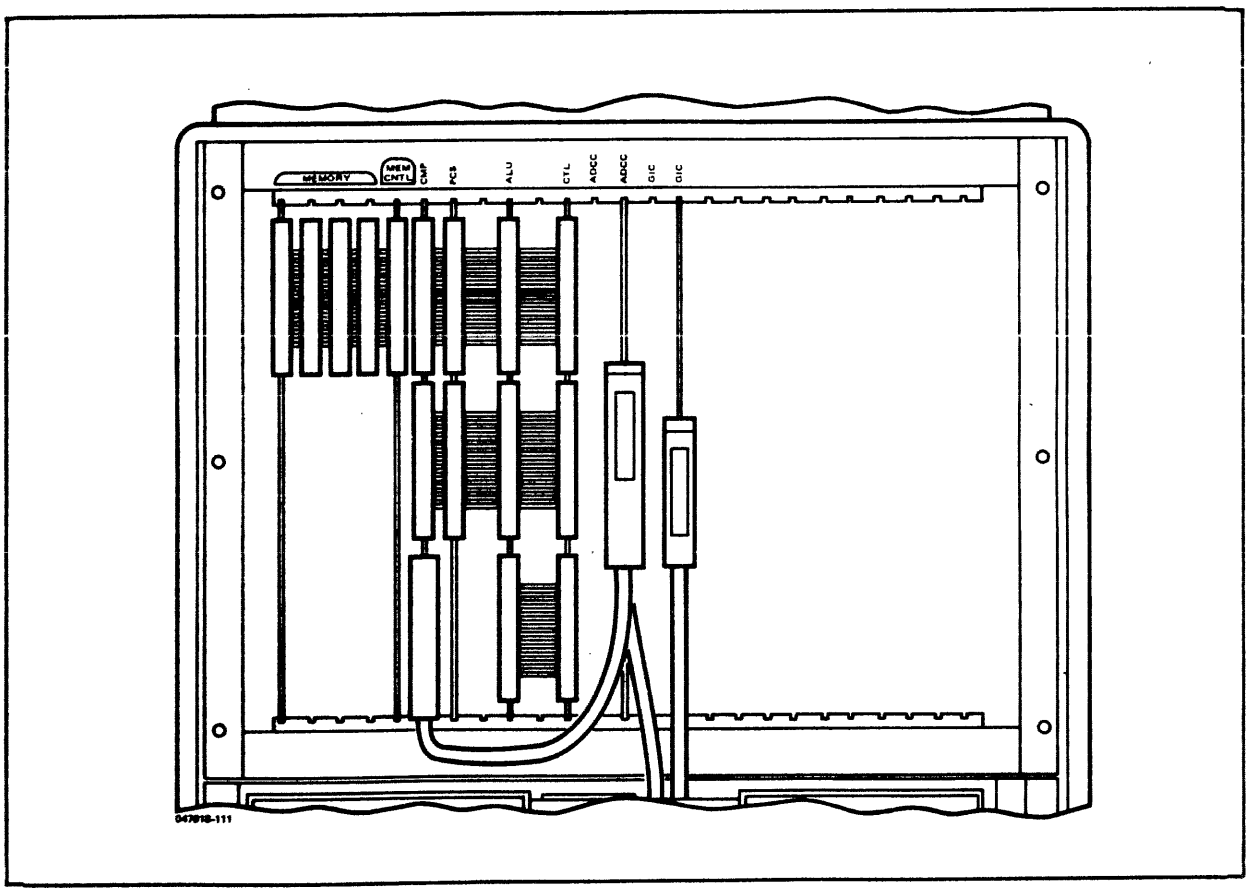

Figure 2-2. Backplane Slots

One other difference in the Series 40 backplane involves the priority tree which is used to establish DMA bus request priority as a function of physical location on the bus. There are three signals defined by the Intermodule Bus protocol which are used for this priority scheme. These are PRI, PRO, and PCRY. PRI (Priority In) is a normally high input signal to an I/O channel. Each I/O channel has its own PRI signal. The AND of all PRI signals must be true in order for a channel to be given access to the bus to perform a DMA transfer. PRO (Priority Out) is a normally high output signal from an I/O channel indicating a lack of interest in the bus. By pulling PRO low, a channel requesting the bus can prevent access to the bus by modules of lower priority by pulling their PRI signals low.

Because the priority tree "AND" gate can only handle ten input PRI signals, there must be a method of extending the priority tree structure in a situation where there are more than ten I/O slots. PCRY (Priority Carry) is an output signal from an I/O channel representing the AND of PRO of that module and all input PRI signals to that module. This is used for slot-to-slot propagation in order to restart the priority tree in the next slot when it is broken.

The priority tree implementation in the Series 40 is slightly different from that of the Series 44. There are 13 I/O slots yet the priority tree "AND gate" only consists of 10 PRI signals. Therefore slots 13 and 14 have separate PRI signals which are used by slot 15 in generating the PCRY signal. The PCRY signal then is used by the last 10 slots (16-25) in the normal priority tree structure. In the Series 44, the PCRY signal is generated by a chip on the backplane. However, the Series 40 takes advantage of the circuitry already on the GIC to do this. The end result is that if slot 13 or 14 contains a GIC or other DMA-type channel, slot 15 MUST contain a GIC in order to generate the PCRY and insure continuity of the priority tree structure for DMA bus requests. See Figure 2-3 for a picture of the backplane priority tree. Note also that slots which are closest to the CPU have the highest DMA priority. Therefore slot 13 has highest priority, and slot 25 has the lowest.

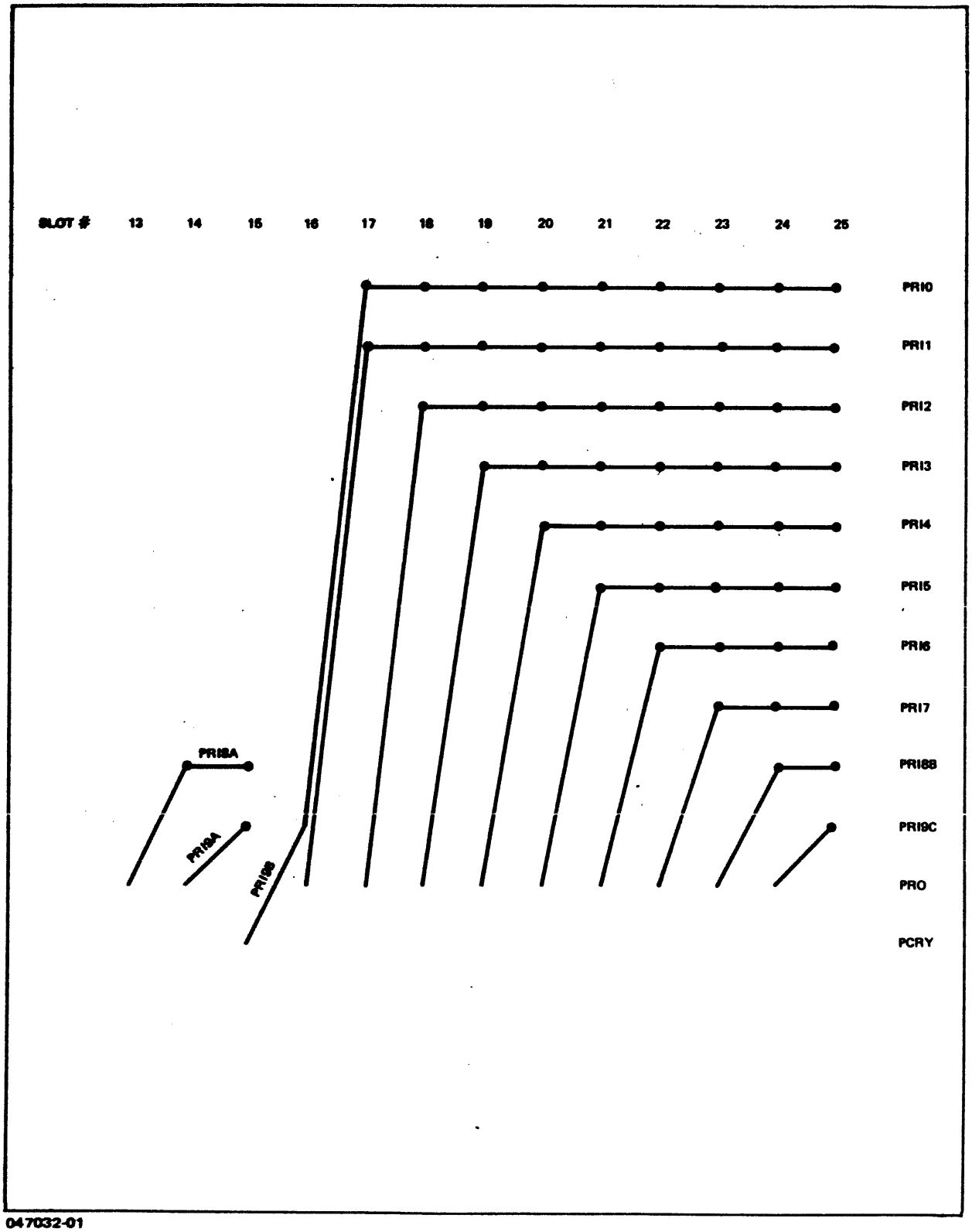

Figure 2-3. Backplane Priority Tree

This backplane has a poly-pack of LED's, visible from the left-most PCA guide, which are defined the same as those in the Series 30. From top to bottom these 5 LED's indicate the following: (See Figure 2-4)

NAME	Startup	Operation	Shutdown
+12	1	1	X
PFW	*	0	*
PONL	*	0	*
not used	0	0	0
+12M	1	1	X

1 = on
0 = off

* = Momentarily on then turns off
X = On then off

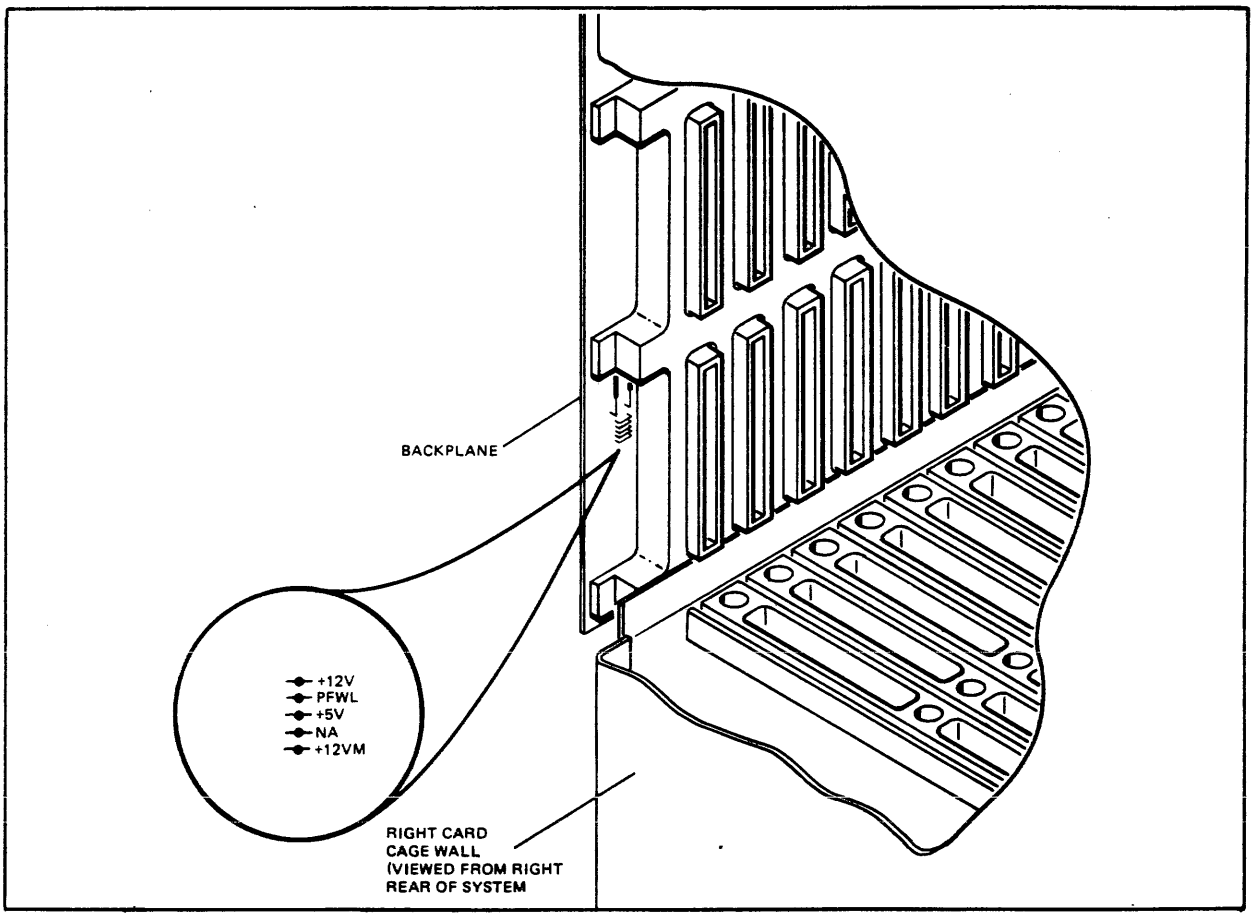

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Figure 2-4. Backplane LED's

POWER DISTRIBUTION PCA

This is the board which mounts directly on the 63909F Power Supply. It may be accessed by removing the front cover of the system. The Power Distribution PCA is the small board at the lower left of the machine. This PCA contains the overtemperature LED and reset switch as shown in Figure 2-5. For more details see Power Unit Section 8.

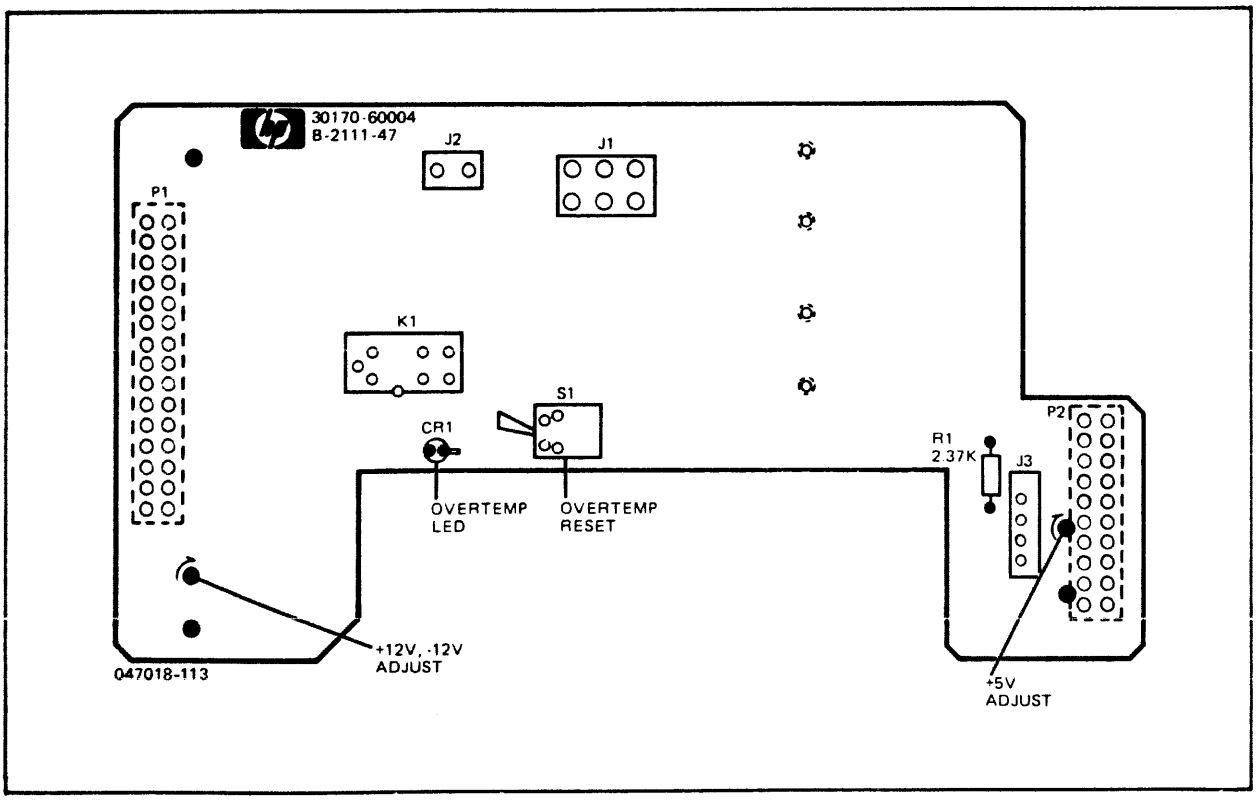

Figure 2-5. Power Distribution Board

REPAIR DOCUMENTATION

SECTION III

Because of the similarity in the hardware and diagnostics of the Series 40 and Series 44, much of the current Series 44 documentation is also applicable to the Series 40 with some changes. The following manuals will be updated to include relevant Series 40 information:

Description	Part Number
* Diagnostic Manual Set	30070-60068
Microcode Manual	30090-90004
CE Handbook	30070-90010
Site Preparation Set	30000-60029
* System Support Log	03000-90016
Reference/Training Manual	30090-90001

In addition, the following unique documentation will be generated:

* System Installation Manual	30170-90002

* These manuals will be shipped with the system.

REPAIR TOOLS

The service tools which were developed for the Series 44 will continue to be used for the Series 40. These tools contribute to total product supportability in all phases. The table below lists the tools available for system maintenance.

Description	Utilization
1. System Self-test	Customer, CE, TSE, SE
2. Sleuth Simulator	CE, TSE
3. Product Support Package	CE, TSE
4. CE Handbook	CE, TSE
5. Memory Logging and I/O Logging Files	Customer, CE, TSE, SE
6. Stand-alone Diagnostics	CE, TSE
7. Maintenance Mode	CE, TSE, SE
8. Remote (RSVP)	Customer, CE, TSE, SE
9. Reference/Training Manual	CE, TSE
10. Repair Documentation	CE, TSE
11. MPE Listings	TSE, SE
12. Tables Manuals	TSE, SE
13. Memory Dump Analysis	SE, TSE
14. System Utilities	CE, TSE, SE
15. Diagnostic Manual Set	Customer, CE, TSE
16. Workout2	CE, TSE
17. On-Line Diagnostics	CE, TSE

There are three microdiagnostics which are executable from the CMP: SELFTEST, SHUTTEST, and DCTEST. The Series 40 has overtemperature protection but because it is implemented in a different manner than the Series 44, it cannot be tested using the SHUTTEST command. The following sequence will occur if you type "SHUTTEST" on a Series 40 system in response to the CMP prompt:

1) Message printed: "Cycle power to restart"
2) After a few seconds, message printed: "TEST FAILED" in flashing inverse video.
3) CMP prompt printed; system is ready for the next command.

Therefore, typing the command does no harm to the system, but the resulting failure message should not be interpreted as an error in the system.

SERVICE MATERIALS

EXCHANGE ASSEMBLIES

Most of the current Field Service Inventory for the Series 44 is also applicable to the Series 40. The table below lists the exchange assemblies used on the Series 40:

Description	Exchange P/N	NEP
Front Panel Assy	30170-69002	$ 472
* ALU PCA	30090-69002	599
* CTL PCA	30090-69003	1015
* PCS PCA	30090-69004	1210
* CMP PCA	30090-69006	690
* 256 KB Module	30092-69001	1070
* Memory Cntl	30094-69001	365
** ADCC Main	31264-69001	370
** ADCC Extend	31265-69001	330
** GIC PCA	31262-69001	500
* 63909F P/S Unit	63909-69001	805
** P/S Regulator	31000-69094	270
** P/S Pre-Regulator	31000-69095	270
** P/S Control	31000-69056	117

* Common to HP 3000/44
** Common to HP 3000 Series 30/33/44 and HP 300

PRODUCT SUPPORT PACKAGE

The existing contents of the Series 30/33/44 PSP (30070-67001 Rev C) has been updated so that it is also applicable to the Series 40. Existing PSP's in the field may be updated by ordering one cable, P/N 30170-60029, which is an additional power supply extender cable used only on the Series 40. PSP's which are applicable to all four products can be identified as a 30070-67001 "REV D".

PARTS

The following lists identifies low failure rate and consumable parts which will be available through CPC and PCE.

Description	Part Number
Power Distribution PCA	30170-60004
Status Board	30170-60012
Backplane	30170-60008
Fan Tbax 6.75 OD	3160-0373
CMP/ADCC Cable	30170-60030
SCP Status Cable	30170-60013
SCP Key Switch Cable	30170-60014
AC Pwr Cntl Board Cable	30170-60015
DC Pwr Cntl Board Cable	30170-60016
AC Fan Cable	30170-60017
AC Fans, Ext Cable	30170-60018
Temp Sense Cable	30170-60019
CPU Long FCA	30170-60020
CPU Short FCA	30170-60021
SCP FCA	30170-60022
SCP/Bkplane FCA	30170-60023
Bkplane Pwr Cable	30170-60024
Grounding Cable	30170-60025
GIC HPIB Cable	30170-60026
ADCC Modem Cable	30170-60028

BLOCK DIAGRAM

Figure 6-1 illustrates a Series 40 block diagram which depicts the system data and control paths. This block diagram is essentially the same as that of the Series 44 with a few I/O and memory constraints. The Series 40 can have a maximum of 2 Mb of memory. Also note that the Series 40 does not have a junction panel. Terminals are connected via quad boxes which lay on the floor behind the system, and GIC cable connections also lay on the floor.

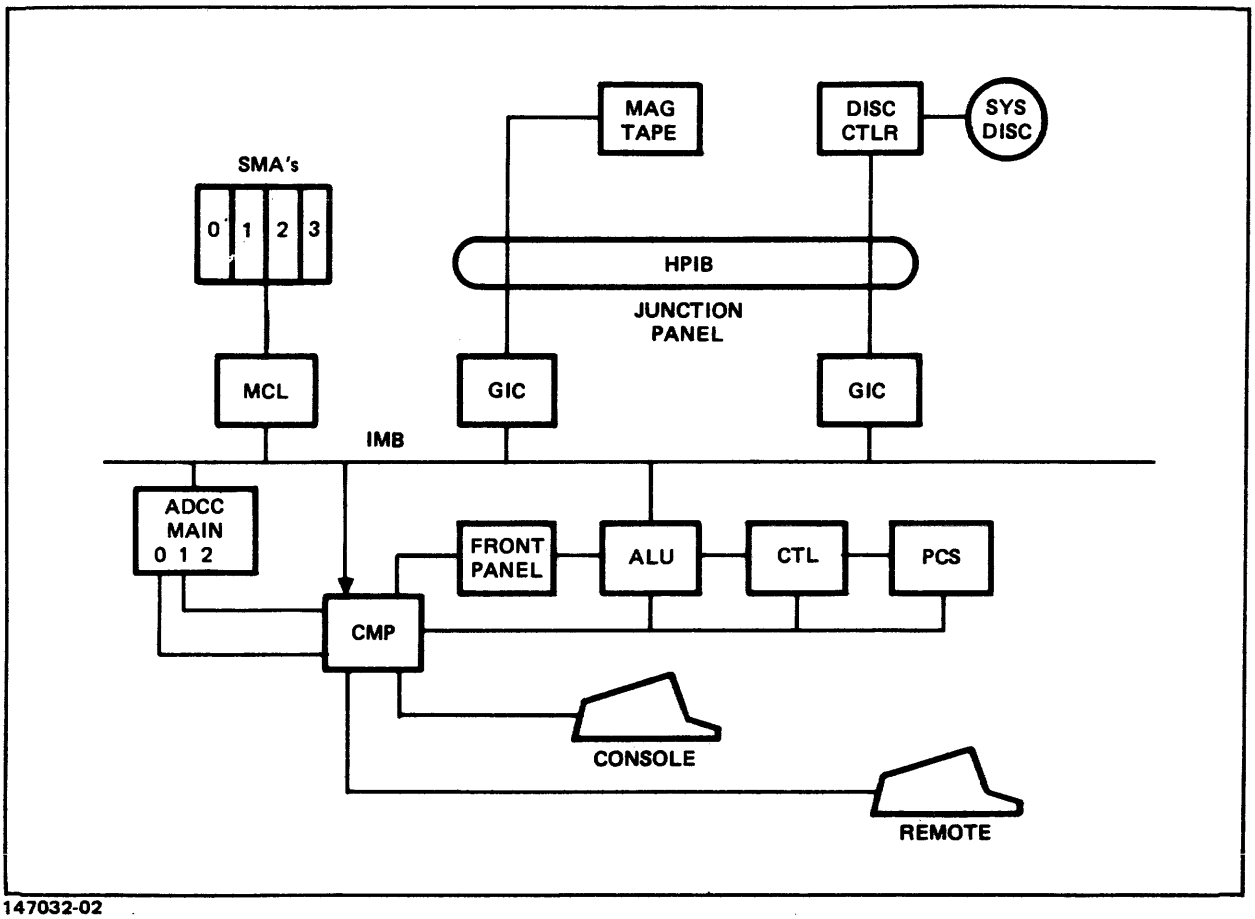

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Figure 6-1. System Block Diagram

POWER SUPPLY WIRING

Figure 6-2 illustrates power supply to backplane wiring for the HP 3000/40.

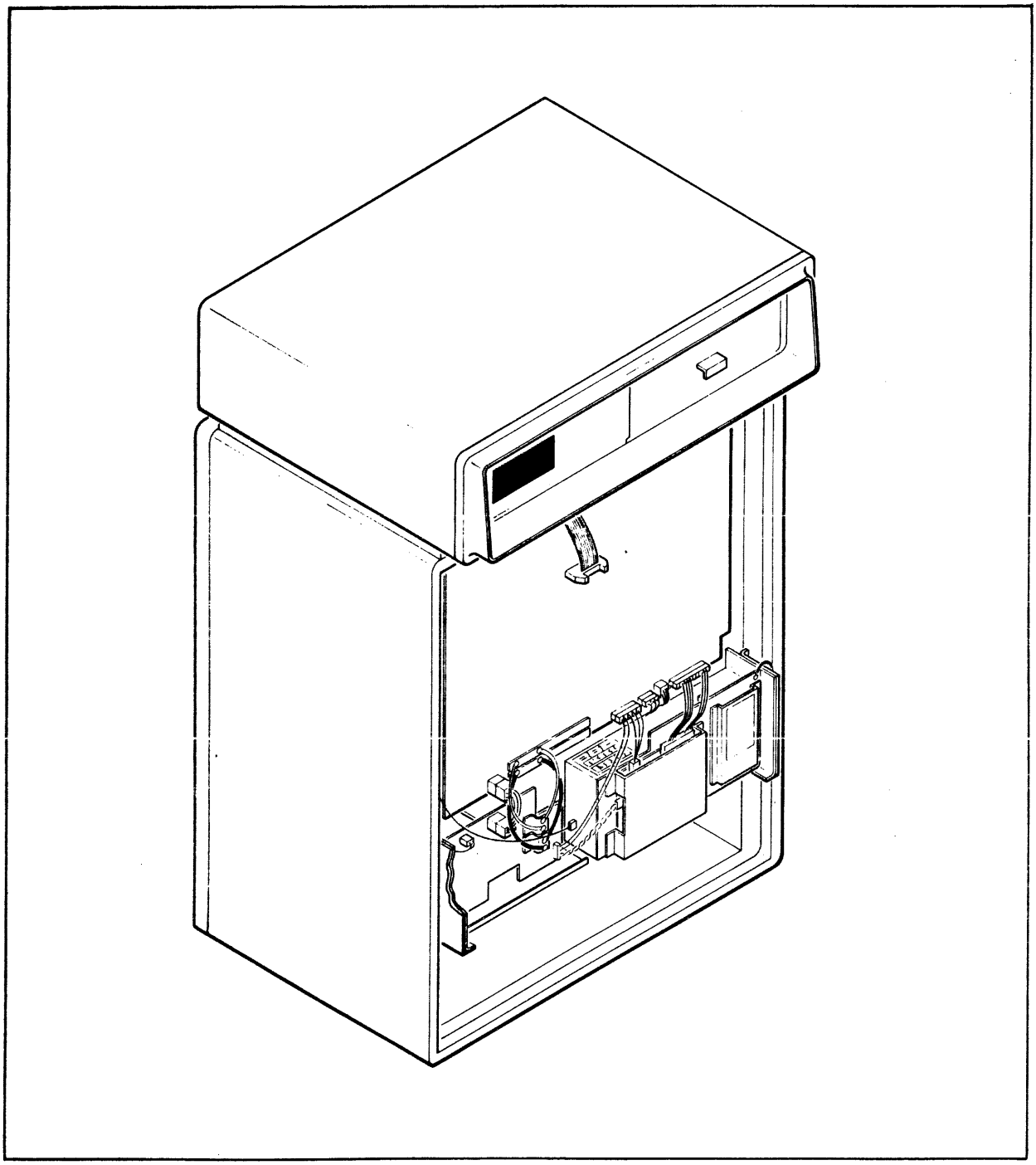

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Figure 6-2. HP 3000/40 Computer

I/O CABLE MANGEMENT

Figure 6-3 illustrates I/O cable routing and management. Efforts should be made to maintain the standard cable configuration illustrated below.

A few points to remember about System I/O cables:

1. External I/O cables are grounded as they enter the processor cabinet. Each cable comes with a special shield clamp on it, which contacts the cable shield. The cable clamp must be secured to the cabinet with the attached thumb screw.

2. The cable clamp not only serves to ground the cable but provides cable strain relief.

3. Use the two threaded posts to guide cables between the fan frames.

4. ADCC quad boxes and HP-IB connectors are placed on the floor, behind the processor.

Ensure that all connections are secure.

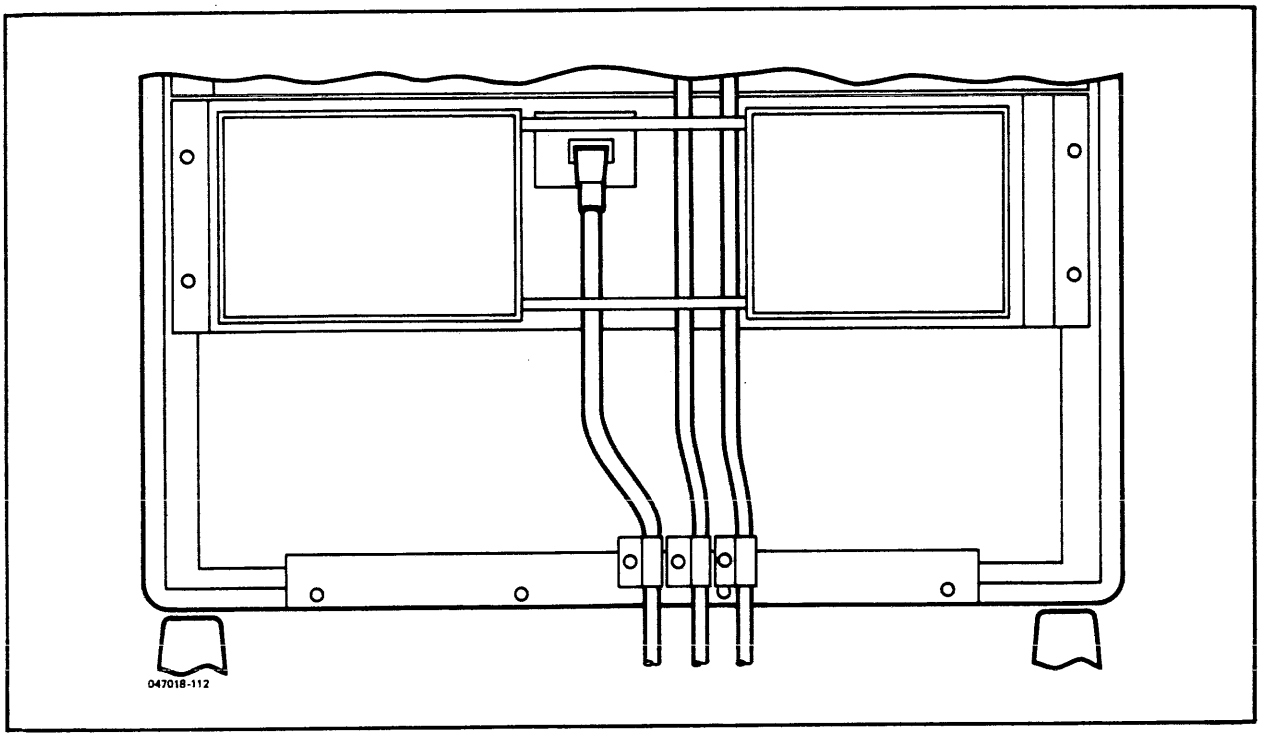

Figure 6-3. Cable Routing Diagram

PANEL AND DOOR REMOVAL

The front and rear doors and top shroud are removable cabinet assemblies which provide access to all replaceable mainframe modules. Figure 6-4 below illustrates the removal action of these pieces.

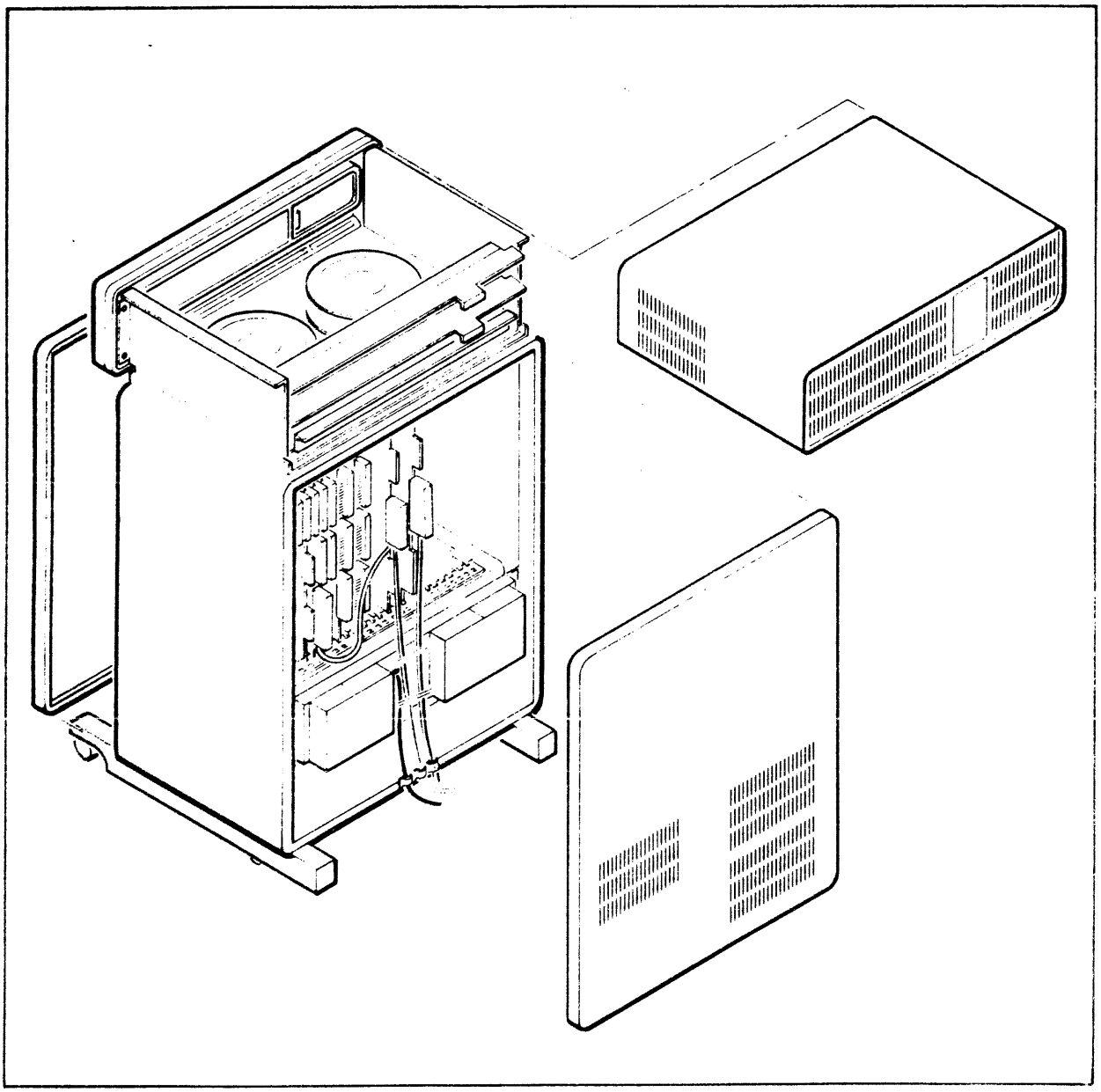

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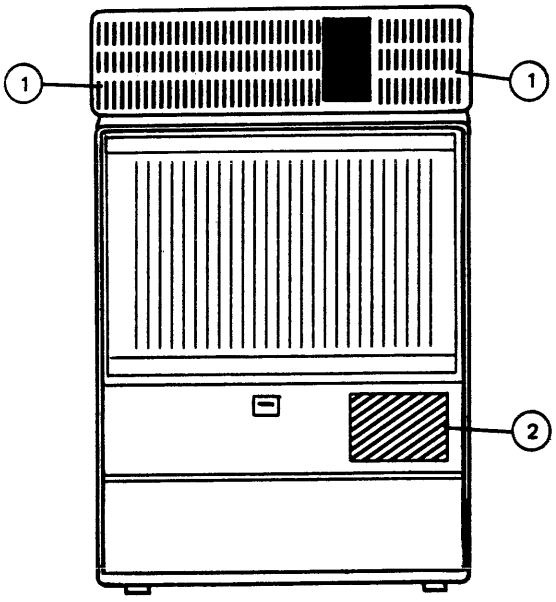
Figure 6-4. Rear View

COOLING

The Series 40 is cooled by two fans which have been optimized for cooling efficiency and minimum noise (See Figure 7-1 below). There are two large 6" Rotron Patriot fans mounted above the cardcage. These fans draw air in through the lower back of the machine, through the power supply area, then up through the cardcage, finally exhausting the air out the upper back of the machine. This drawn air system provides a nearly uniform airflow through the cardcage with twice as much air flowing through the double-spaced hot CPU boards. The 63909F Power Supply also has an intake cooling fan which is built into the power supply itself.



1. TWO FANS FOR SYSTEM COOLING (3160-0373)
2. INTAKE COOLING FAN FOR POWER SUPPLY AND CARD CAGE

147032-03

Figure 7-1. Computer Cooling

INSTALLATION

The Power Supply Unit (PSU) in this document refers to the power supply drawer in the Series 40 which contains both the main power supply (63909F) and the memory supply. The Power Supply Unit is slid into the mainframe from the rear of the system. The 5V main supply output is connected to the backplane 5V bus bars with heavy gauge wire using screw terminals. The +12V and -12V is connected with an AMP-connector cable from J1 of the Distribution board to J10 of the backplane. This cable also has the 5V sense lines. J11 of the backplane is not used. The AMP-connector memory power cable from the Memory Regulator Board in the Power Unit is connected to J7 of the backplane. The power control cable is connected from J1 of the Power Control Board to J6 of the backplane. The 3 pin Molex connector from the transformer goes to J8 of the backplane. The 5 pin Molex connects J2 of the Power Control Board and J3 of the Power Distribution Board to J9 of the backplane.

INPUT VOLTAGE RANGE

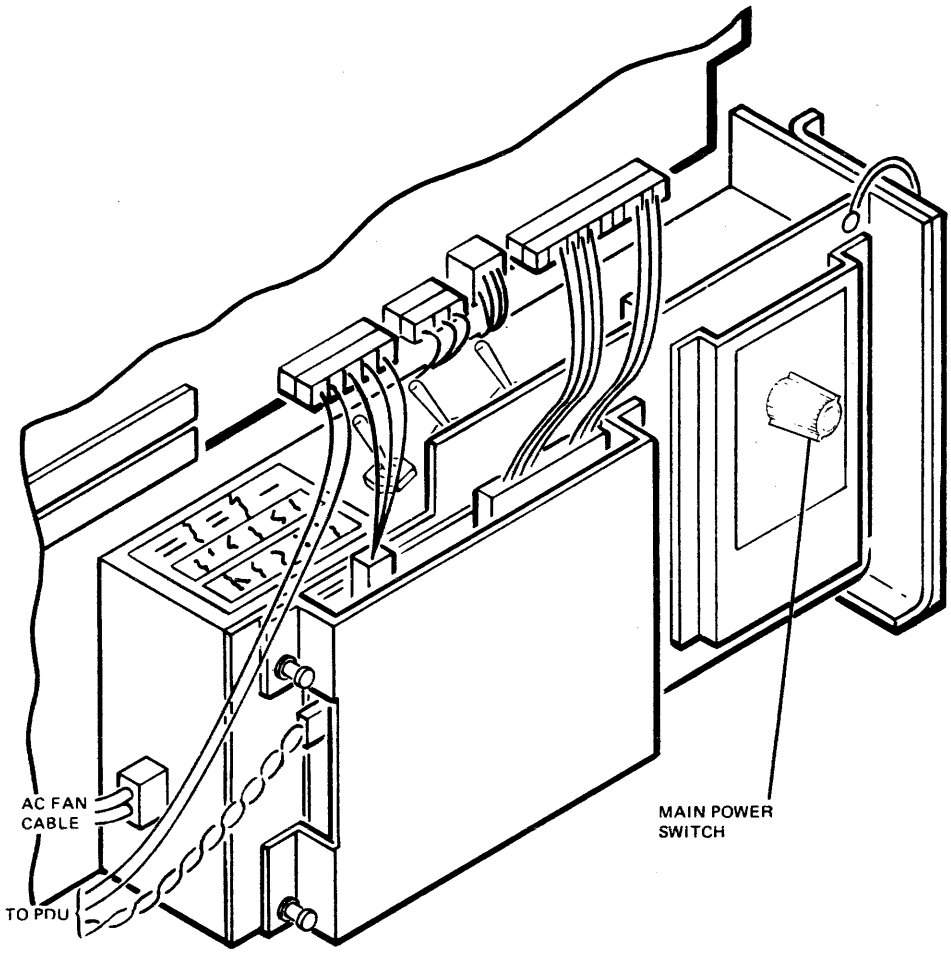
Input voltage range is selected by 3 toggle switches on the top front of the power unit (see Figure 8-1). These are labeled as shown below:

INPUT VOLTAGE RANGE SELECTION

Switch	S1	S2	S3
Position 1	100/220	220/240	220/240
Position 2	120/240	100/120	100/120

CAUTION: Switches S2 and S3 must be in the same position or serious circuit failure may result.

Fuse F1 is a 3-amp slow-blow and F2 is a 15-amp normal-blow for the 100/120 Vac ranges. When the 220/240 Vac ranges are used, the fuses F1 must be changed to a 1.5-amp slow-blow, and F2 to a 8-amp normal-blow.



AC LINE VOLTAGE	⚠ SWITCH SETTING ⚠	FUSE
100		3A (250V)
120		3A (250V)
220		1.5A (250V)
240		1.5A (250V)

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Figure 8-1. Voltage Selection Switches

MAIN SUPPLY

The main power supply used in the Series 40 is the 63909F Multiple Output Supply. Current limits are on the +5V, +12V, and -12V outputs in order to protect the power supply. Undervoltage and overvoltage detectors on the regulated outputs shut down the supply in case of an output fault or improper voltage setting. To restart from a shut-down caused by a fault, input power must be cycled off and then back on using the processor POWER switch.

THERMAL PROTECTION

Impaired cooling caused by excessive ambient temperature, clogged filters, or fan failure will cause mainframe shutdown much like power failure. Internal air temperature above the card cage is sensed by 3 thermal switches. When the temperature rises excessively, the switch will close, activating a latching relay, and cause a power-fail shutdown. This shutdown turns off the main power supply but allows the fans and backup memory supply to operate normally. Depending on the particular situation, the memory supply may be operating from the line voltage or the battery, however due to the way that overtemperature protection is implemented, the BATT light on the front panel will be on.

An LED indicator located inside the front door on the power supply distribution board is ON when the thermal protection relay is in the latched condition. To resume normal operation following cool-down, the AC power can be cycled on and off (by pulling the plug), or the push-button reset switch on the distribution board can be activated. Either action will clear the latch and re-enable the main power supply. Unlike the Series 44, the Series 40 does not allow logging of the over-temperature condition by the CMP or display of a message on the system console. Also, as indicated in Section 4, the CMP SHUTTEST will not execute correctly on the Series 40.

LOW LINE DETECTOR

Field adjustment of the low line detector is provided by shorting test point E1 on the Power Control Board to ground and then adjusting the potentiometer up from the extreme CCW position until a system power fail results. Then by removing the jumper the setting will be at about 10% below the present AC line voltage.

MAIN POWER SUPPLY ADJUSTMENTS

The voltages are set to the proper nominal values by screwdriver adjustments which are accessible through the Power Distribution Board. No load is needed to do this. The +5V is adjusted by the pot marked V1 VOLTAGE ADJ. The +12V and -12 V outputs are adjusted by a single pot marked V2,V3 VOLTAGE ADJ. Some PCA's may not have these markings silkscreened on the board, so refer to Figure 2-4 as a locator for the positions. The +12V output is slaved to the -12V output. The pot should be adjusted so that the +12V output is exactly at 12.0 volts. The -12V output should then be within +/- 0.25 volts of its nominal value.

MEMORY POWER SUPPLY

The memory supply consists of a 50/60 Hz transformer, a 7-cell lead-acid battery, a preregulator and a memory regulator board. The preregulator provides a single 16.5 volt output which drives the memory regulator and charges the battery. When a power failure occurs, the battery maintains input to the memory regulator and thus sustains the memory voltages to the backplane.

The ON/OFF switch on the front door disconnects the battery and also turns off the input power.

Battery backup time is at least 30 minutes for four 256 Kb memory array boards. Extreme temperature conditions or an aging battery may reduce backup time. The SPU should not be left unpowered for longer than 60 days in order to maintain battery charge.

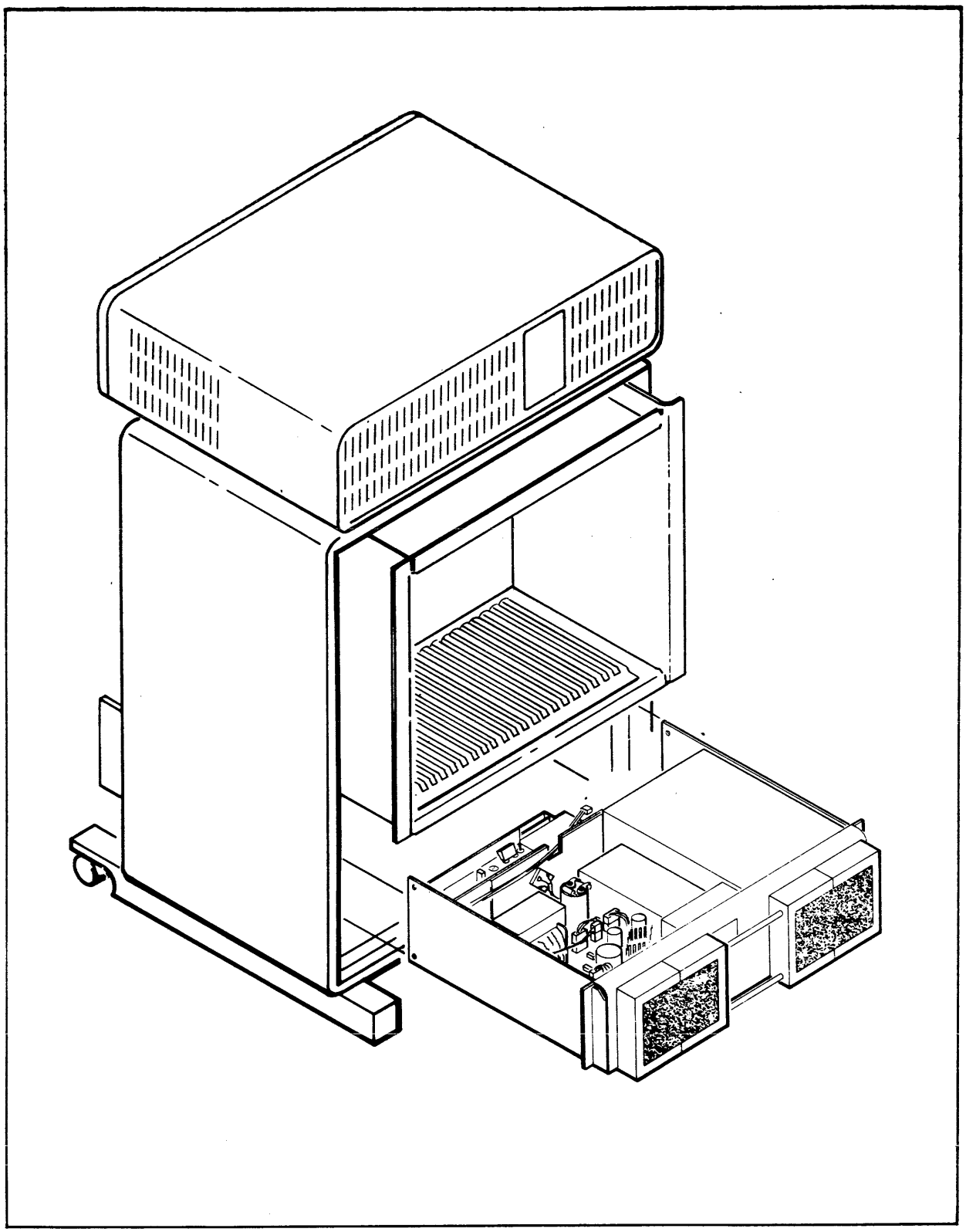
Since sealed lead-acid batteries have a finite functional life, the battery backup capability should be periodically tested (at least once a year) to verify continued functionality. The required time to fully recharge a discharged battery is 16 hours.

POWER UNIT REMOVAL

The Power Supply Unit (PSU) must be removed from the mainframe cabinet for module replacements and Memory voltage adjustment. The procedure is the same as that used on the Series 30. For completeness, the steps necessary to remove the unit are repeated in this document:

1. Remove the front and rear doors.
2. Turn power OFF.
3. Remove all I/O PCA hood connectors from the cardcage PCAs (rear of cabinet).
4. Remove the PSU cable guide posts, see Figure 8-2, and free the I/O cables (rear of cabinet).
5. Remove the AC power cord (rear of cabinet).
6. Remove all PSU to Backplane connections at front of cabinet (see detail Figure 8-3).
7. Remove 8 screws (4 front; 4 rear) using 1/4" nut driver-see Figure 8-2.
8. Slide the PSU out toward rear of cabinet.

9. The extender cables are to be connected as follows: (See Figure 8-3)
   a. The red and black temperature sense cable (30170-60019) should be disconnected.
   b. Remove the cable connections between J9 of the backplane to the Power Control Board (PCB). Remove the 3-pin connector which goes between the transformer and J8 of the backplane; instead, connect it to the 3-pin slot of the Power Control Board where the J9 connection was.
   c. Remove the 30170-60015 cable between J6 of the backplane and the PCB. Replace this connection with 30080-60051 of the extender cables.
   d. Remove the short cable between J10 of the backplane and the Power Distribution Board. Replace this connection with 30080-60053 of the extender cables.
   e. Remove J7 connection to backplane and splice in 30080-60052 of the extender cables.
   f. Disconnect AC Fan Cable where it enters the PSU on the side of the PCB. Splice in 30170-60029 from extender cables to extend its length.



047032-05

Figure 8-2. Power Supply Removal

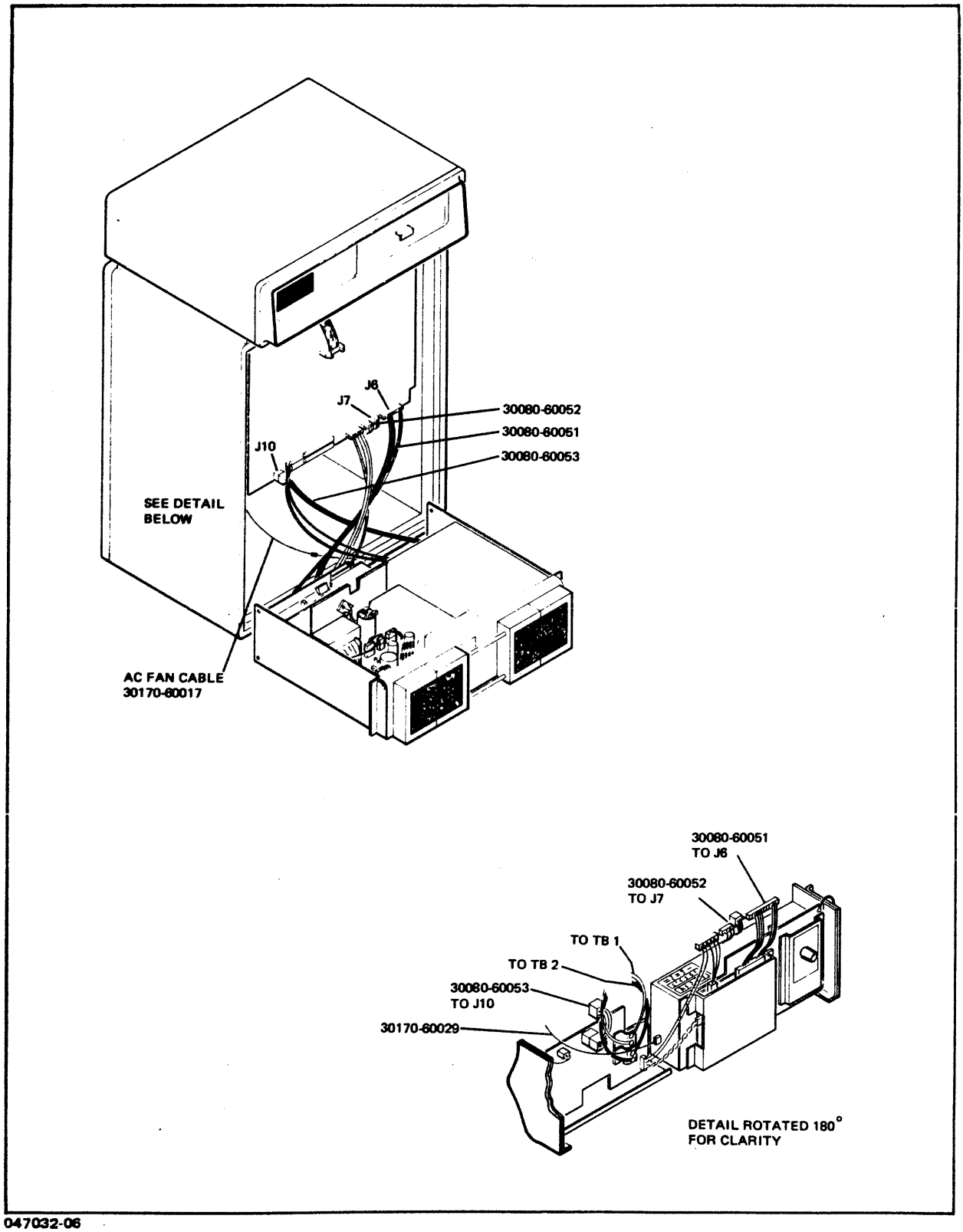


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Figure 8-3. Power Supply Extender Cables

POWER SUPPLY SERVICING

The PSU used in the Series 40 is a combination of those used on both the Series 30 and Series 44. The following exchange assemblies and battery pack are used on the HP 3000 Series 40:

1.	Power Control PCA	31000-69056
2.	Memory Regulator	31000-69094
3.	Memory Pre-regulator	31000-69095
4.	Power Supply	63909-69001
5.	Battery Pack	31000-60001

A detailed description of the PSU can be found in the Series 40 Update Section of the Reference/Training Manual. Important highlights, however, are discussed below:

1. Once removed the PSU may be serviced utilizing the same Voltage Extension Cable set used on Series 30 and available in 30070-67001 Rev D Product Support Packages. Three of these cables are used on the Series 30: 30080-60051, 30080-60052, 30080-60053. One additional cable, 30170-60029, is necessary for the Series 40 in order to provide AC power to the two fans in the top of the system. The extension cables allow the PSU to apply power to the backplane, for service purposes only, while the PSU is on the floor in front of the mainframe. (see figure 8-3).

2. The only adjustment available on the memory power supply is the +5M voltage. This is done by adjusting the +5M potentiometer on the Memory Regulator PCA until the +5M voltage as read on the backplane shows a meter reading of +4.77 to +5.25 volts. No other voltages should be adjusted in the Memory Power Supply.

3. Battery charge (red) and discharge (green) LEDs are visible underneath the leftmost PCA guide while the PSU is in the cabinet with rear cabinet doors removed.

4. Voltages should be monitored on the backplane at the marked test points.

5. PSU Voltage limits:

+5V	+4.99	to	+5.01	
+12V	+11.99	to	+12.01	
-12V	-12.25	to	-11.75	
+5M	+4.95	to	+5.15	
+12M	+11.90	to	+12.10	
-12M	-11.0	to	-14.0	(non-adjustable)

6. Note that the Series 40 does not have an intake cooling fan for the memory supply as does the Series 30. Therefore the system should be operated with the power supply removed from the power supply drawer for only a short time. The only servicing activity which must be done with the power supply removed is adjustment of the memory power supply voltage.

CARDCAGE CONFIGURATION

SECTION IX

The following cardcage configuration rules apply to all Series 40 systems:

1. The first Memory Array board must be installed in slot 1 with the Memory Controller in slot 5 to prevent the memory front-plane cable from hanging free or coming loose.

2. The CMP uses slot 6, and the other CPU boards (PCS, ALU, and CTL) use slots 7, 9, and 11 in order to provide adequate cooling. No boards can be installed in the empty slots 8, 10, and 12. Note that the ALU and CTL boards must be positioned adjacent to each other to allow installation of the front-plane flat cable which runs between them.

3. The first ADCC MAIN must be installed in slot 13 so that it can be reached by the CMP cable. Slot 14 must be reserved for an ADCC-Extend.

4. ADCC MAIN and ADCC EXTENDER boards must be installed in adjacent slots to allow interconnection.

5. The first GIC must be installed in slot 15.

6. Internal HP-IB devices such as INPs or Printer Interfaces must be installed in slots adjacent to their controlling GIC. This allows the internal HP-IB flat cable to connect them without passing over other boards.

7. The GIC used for the System Disc(s) may also be used for internal devices only. Additional external HP-IB devices such as printers must be connected to a separate GIC in order to not compromise ESD susceptibility of the total system.

The cardcage configuration is shown in Figure 9-1.

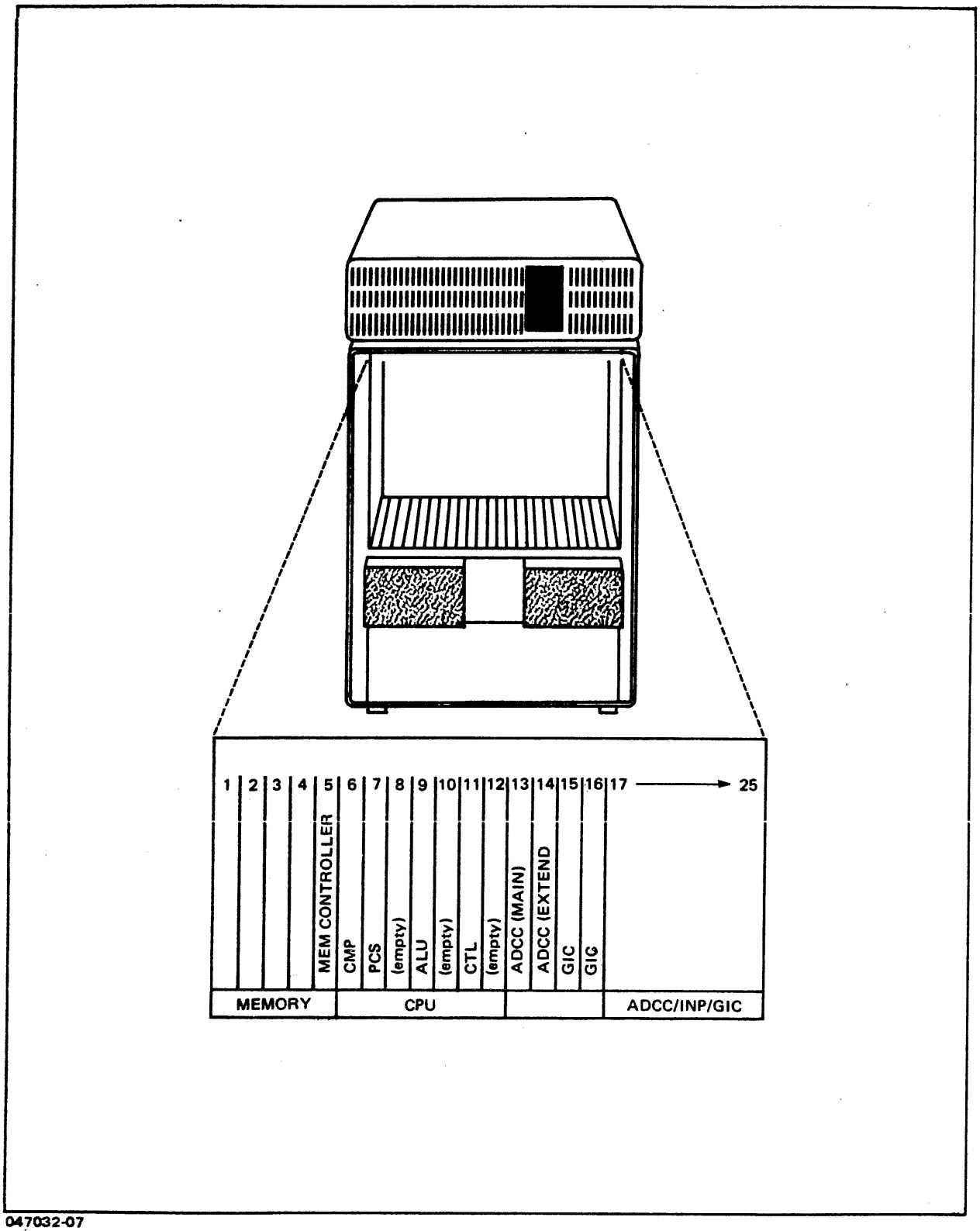

Figure 9-1. Cardcage Slot Assignments