



**HP 3000 SERIES II
COMPUTER SYSTEM**

**SYSTEM INSTALLATION
MANUAL**

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LIST OF EFFECTIVE PAGES

The List of Effective Pages gives the most recent date on which the technical material on any given page was altered. If a page is simply re-arranged due to a technical change on a previous page, it is not listed as a changed page. Within the manual, changes are marked with a vertical bar in the margin.

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PREFACE

This manual describes the installation activities for an HP 3000 Series II Computer System. These descriptions are intended for use by Hewlett-Packard Customer Engineers trained for the HP 3000 Series II Computer Systems.

Before a system can be installed, a site must have been prepared, as described in the **SITE PREPARATION MANUAL** and the **SITE PLANNING WORKBOOK** (listed below). After the installation procedures are complete, the System Verification procedures given in the **SYSTEM SERVICE MANUAL** (listed below) are used.

Organization of this manual presents the system installation activities in several sections:

SECTION I — contains instructions for the customer to inspect the shipment, move the equipment, unpack and account for the equipment and accessories, and how to file a claim against damages or missing items.

SECTION II — explains the equipment bays (cabinets) and how to join the bays physically and electrically (wiring details are given in the Signal and Power Distribution Manual listed below). The bays contain the computer main frame assemblies.

SECTION III — presents installation instructions for each of the several types of peripheral devices that are part of a standard system. This section is intended for an original installation of Models 7 and 9 in their standard configurations. Installation of any non-standard peripheral device is described in the subsystem or device Installation and Service Manual.

SECTION IV — describes the initial turn-On procedure for an installed system, and references the System Verification Procedure in the **SYSTEM SERVICE MANUAL**.

To install a system, the following documents may be required. The documents that are shipped with the system should be located before beginning to install any hardware.

HP 3000 Series II Computer System **SYSTEM SUPPORT LOG**, 30000-90117

HP 3000 Series II Computer System **SITE PREPARATION MANUAL**, 30000-90016

HP 3000 Series II Computer System **SITE PLANNING WORKBOOK**, 30000-90017

HP 29400B **SERIES CABINETS**, 02940-90256

HP 29400B **SERIES CABINETS (FOR HP 3000 COMPUTER SYSTEMS)**, 02940-90258

HP 29425A (7905A) **CABINET INSTALLATION AND SERVICE MANUAL**, 29425-90001

HP 3000 Series II Computer System **SYSTEM SERVICE MANUAL**, 30000-90018

The following manuals are not necessarily required to install the system, but may be required to train the system operator.

2644A **Mini DataStation Owners Manual** 02644-90001

2640A **Interactive Display Terminal Owners Manual** 02640-90011

PREFACE (Continued)

Care and Handling 30333A Disc Pack 30333-90001

HP 3000 Series II Computer System OPERATOR'S GUIDE, 30000-90013

HP 7905A Cartridge Disc Subsystem Installation and Service Manual, 30129-90003

HP 2607A/26013A/2617A/2618A Line Printer Subsystems Installation and Service Manual,
30209-90006

HP 2888A Disc File Subsystem Operating and Service Manual, 30102-90001

CONVENTIONS USED IN THIS MANUAL

NOTATION

DESCRIPTION

[]	An element inside brackets is <i>optional</i> . Several elements stacked inside a pair of brackets means the user may select any one or none of these elements. Example: $\left[\begin{array}{c} A \\ B \end{array} \right]$ user may select A or B or neither
{ }	When several elements are stacked within braces the user must select one of these elements. Example: $\left\{ \begin{array}{c} A \\ B \\ C \end{array} \right\}$ user must select A or B or C.
italics	Lowercase italics denote a parameter which must be replaced by a user-supplied variable. Example: CALL <i>name</i> <i>name</i> one to 15 alphanumeric characters.
underlining	Dialogue: Where it is necessary to distinguish user input from computer output, the input is underlined. Example: NEW NAME? <u>ALPHA1</u>
superscript C	Control characters are indicated by a superscript C Example: Y ^C
<i>return</i>	<i>return</i> in italics indicates a carriage return
<i>linefeed</i>	<i>linefeed</i> in italics indicates a linefeed
...	A horizontal ellipse indicates that a previous bracketed element may be repeated, or that elements have been omitted.

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RECEIVING THE SYSTEM

SECTION

I

The Hewlett-Packard Customer Engineer is responsible for installing the HP 3000 Series II Computer System and ensuring that it is operating according to factory specifications. Begin by supervising the unpacking and taking inventory. Then install and check-out the system and finally show the new system operator how to operate the system as described in Section IV of this manual. Note that you are not responsible for the setup and cabling of any terminals other than the system console, unless it has been negotiated as a separate contract.

The customer is responsible for moving the system to its final location, unpacking, disposing of non-reuseable packing materials, having the system connected to the electrical supply (Computer Mainframe Power Panel), and cabling of terminals.

When you have been notified by the customer that his system has arrived, tell the customer to inspect the shipment, verify the packing list, and, if no discrepancies are found, move the equipment to the installation site. If damages or discrepancies are noted, have him notify you and the carrier or the carrier's agent. Inform the customer when you will arrive at the site to begin the installation. Remind the customer that instructions on how to inspect, verify, and move the shipment appear in the SITE PREPARATION MANUAL. If the customer does not have ready access to the SITE PREPARATION MANUAL, relay to him the information contained in paragraphs 1-1 through 1-3.

1-1. INSPECTING THE SHIPMENT

The customer should begin by checking the carrier's Bill of Lading against the items (boxes, crates, cabinets, etc.) received; he should be sure to note any missing items and inspect all items for damage (crushed corners, dents, scratches, cracks, breaks, etc.) and for stains from liquids (water marks, damp boxes, etc.). If any damage or stains from liquids are found, have a carrier's representative present when an item is to be unpacked.

In case of damage, the Customer Engineer should notify the Product Support Engineer at the factory.

1-2. VERIFYING THE PACKING LIST

Only one Packing List is attached to the shipment, in an envelope on the outside of one of the cartons or boxes. Before your customer moves equipment to the installation site, and before he unpacks any item, he should check all items against that Packing List and note any missing items.

1-3. MOVING EQUIPMENT TO THE INSTALLATION SITE

WARNING

Use extreme caution when moving or working on cabinets. Move by applying force at a low point on cabinet to prevent tipping. Do not push from rear or side, push from front only.

System Installation

HP 3000 Series II Computer Systems are shipped in two or three HP 29402B Cabinets, one or more HP 29425A Disc Cabinets, and in various other containers. The customer should be sure to use proper equipment and techniques to move the system to the installation site, and to observe safety precautions described in this section. All cabinets will be broken down into single bays for shipment. The CPU bay is the heaviest and weighs 559 pounds (254 Kg) crated and 420 pounds (192 Kg) uncrated.

Eyebolts are provided if the customer needs to hoist or lift the equipment bays. If the customer doesn't have the proper equipment or know the proper techniques, be sure he obtains riggers and equipment from a local moving firm experienced with moving heavy electronic equipment. All equipment handling is the responsibility of the individual in charge of the activity.

CAUTION

Be sure to remove the eyebolts (if used) from each HP 29402B Cabinet after the equipment has been moved to the final site. These eyebolts block ventilation holes in the cabinet top. Discard the eyebolts after use.

After the cabinets have been moved to the final site, they can be moved for short distances on their casters. Be careful, however, to avoid obstacles on the floor or cracks in the floor that could cause the cabinet to tip over. This note applies to both individual cabinets and to the entire system after the cabinets have been joined together.

Individual cabinets can be moved by using a forklift, but this method is not recommended. If this method is to be used in spite of the recommendation against it, move only one cabinet at-a-time: put each cabinet on a skid and strap the cabinet down to prevent tipping it over, then lift the skid.

1-4. FINDING DOCUMENTS

Before the customer unpacks any hardware items, ask him to locate and unpack the carton marked "MANUALS". Several of the manuals will be required for the installation.

1-5. UNPACKING THE SHIPMENT

The customer should begin unpacking items in any order, at the installation site using the Installation Record in the SYSTEM SUPPORT LOG for a detailed inventory of the equipment. Unpack an item and inspect its contents for external or internal damage. Look for broken controls, dents, cracks, scratches, breaks, etc. Open all front and rear doors or panels to look for damaged or missing parts. Check all device serial numbers against the Packing List or the Product Identification Card(s). Inspect all software items (magnetic tapes, paper tapes, disc packs, card decks, etc.) for damage (torn tapes, broken reels, broken disc pack covers, etc.).

1-6. FILING CLAIMS

The customer should report any flaw in the shipment immediately, to the carrier or to the carrier's agent and to you. Be sure to save all crates, cartons, boxes, and packing materials for inspection. Don't make any verbal reports of damage or missing items without making a written report too.

The Customer Engineer should report any problem with the shipment or the Packing List or with the the equipment and supplies to the responsible Product Support Engineer at the factory. Missing or damaged items will be replaced without waiting for the settlement of claims.

1-7. ELECTRICAL EQUIPMENT

Remind the customer that an electrician will be required to install the power cabling Make sure that an electrician is available before you start (refer to paragraph 2-14).

The power isolation transformers must be installed at the site prior to starting this installation. The system will be connected to the power panels as shown in figure 1-1.

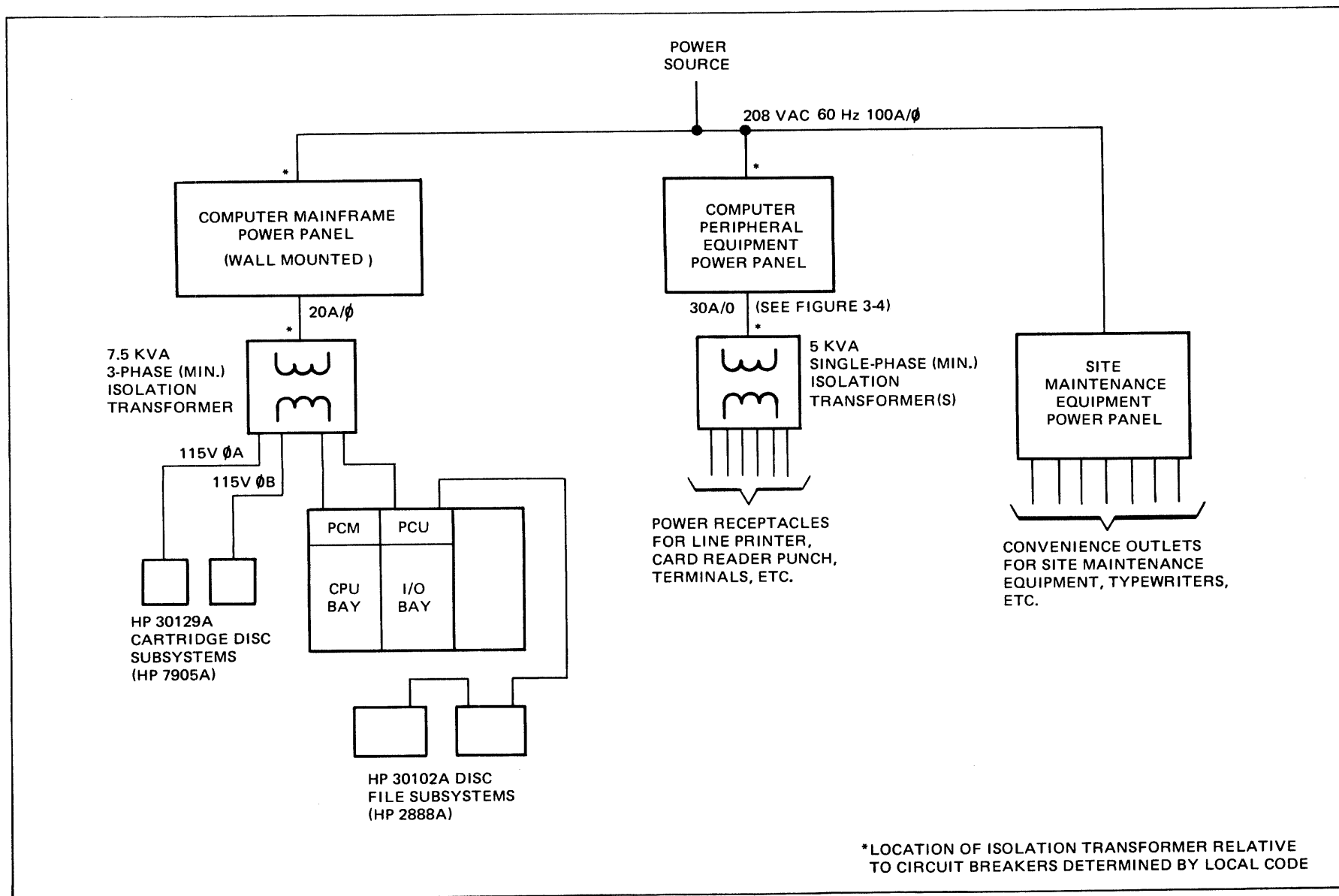


Figure 1-1. Computer System Power Isolation Plan

INSTALLATING CABINETS

SECTION

II

This section describes the mechanical and electrical features, and installation methods for the cabinets used to contain standard HP 3000 Series II Computer Systems.

2-1. EQUIPMENT BAYS

HP 3000 Series II Computer Systems are mounted in two or three HP 29402B Cabinets and one or more HP 29425A Disc Cabinets that have been assembled and thoroughly tested at the factory. The mechanical and electrical features are discussed later in this section.

Each system is assembled and thoroughly tested at the factory, then prepared for shipment. For shipment, the Cabinets have been separated from each other electrically and physically, but the system equipment is left securely contained in each cabinet.

Cabinets and equipment for an HP 3000 Series II Computer System are furnished in three standard configurations, one for each system model:

- For the HP 3000 Series II Computer System Model 9,
 - three Equipment Bays, containing the main-frame card cages and power supplies (see figure 2-1);
 - one System Table;
 - one HP 2640A Video Terminal as the System Console, located on top of the System Table;
 - two HP 30102A (HP 2888A) Disc File Subsystems (47 MB).

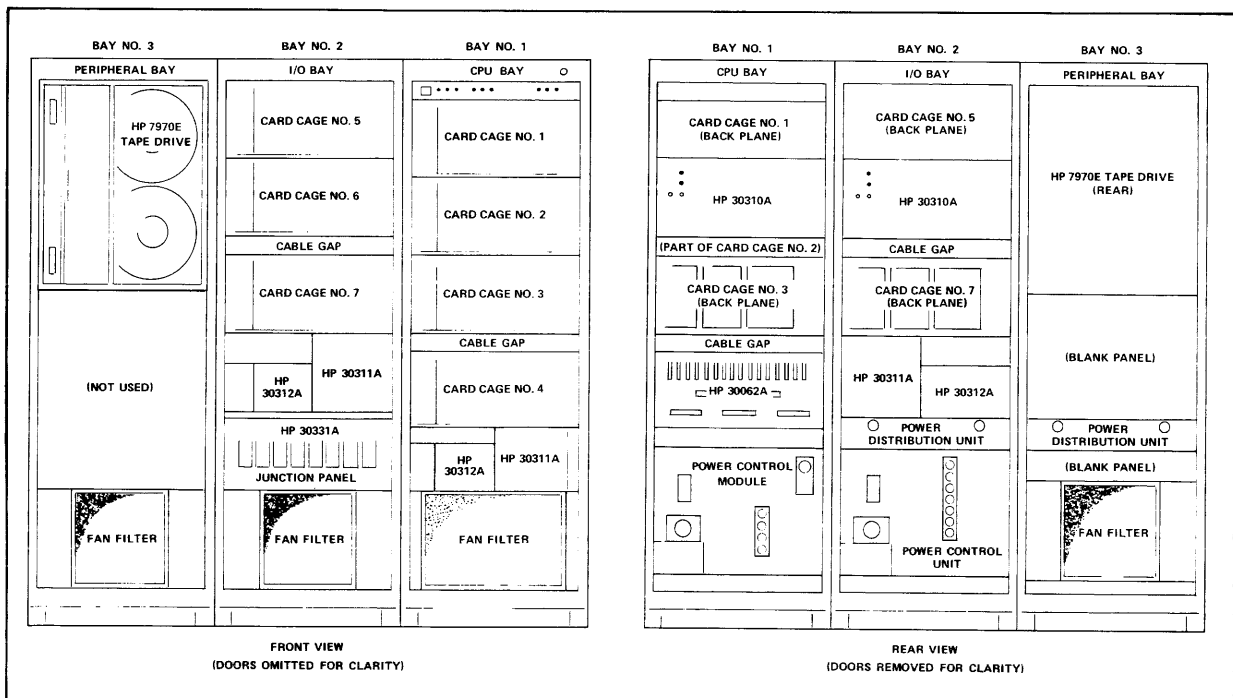


Figure 2-1. HP 3000 Series II Model 9 Equipment Bays

System Installation

- For the HP 3000 Series II Computer System Model 7,
 - two Equipment Bays, containing the main-frame card cages and power supplies (see figure 2-2);
 - one System Table;
 - one HP 2640A Video Terminal as the System Console, located on top of the System Table;
 - two HP 30102A (HP 2888A) Disc File Subsystems (47 MB).

- For the HP 3000 Series II Computer System Model 5,
 - two Equipment Bays, containing the main-frame card cages and power supplies (see figure 2-2);
 - one System Table;
 - one 2640A Video Terminal as the System Console, located on top of the System Table;
 - one HP 30129A (HP 7905A) Cartridge Disc mounted in an HP 29425A Disc Cabinet.

The following paragraph provide installation procedures and a brief description of the equipment bays. If additional information is needed, refer to the INSTALLATION AND SERVICE MANUAL 29400B-SERIES CABINETS (FOR HP 3000 COMPUTER SYSTEMS), 02940-90258; INSTALLATION AND SERVICE MANUAL 29400B-SERIES CABINETS, 02940-90256, and HP 29425A CABINET INSTALLATION AND SERVICE MANUAL, 29425-90001.

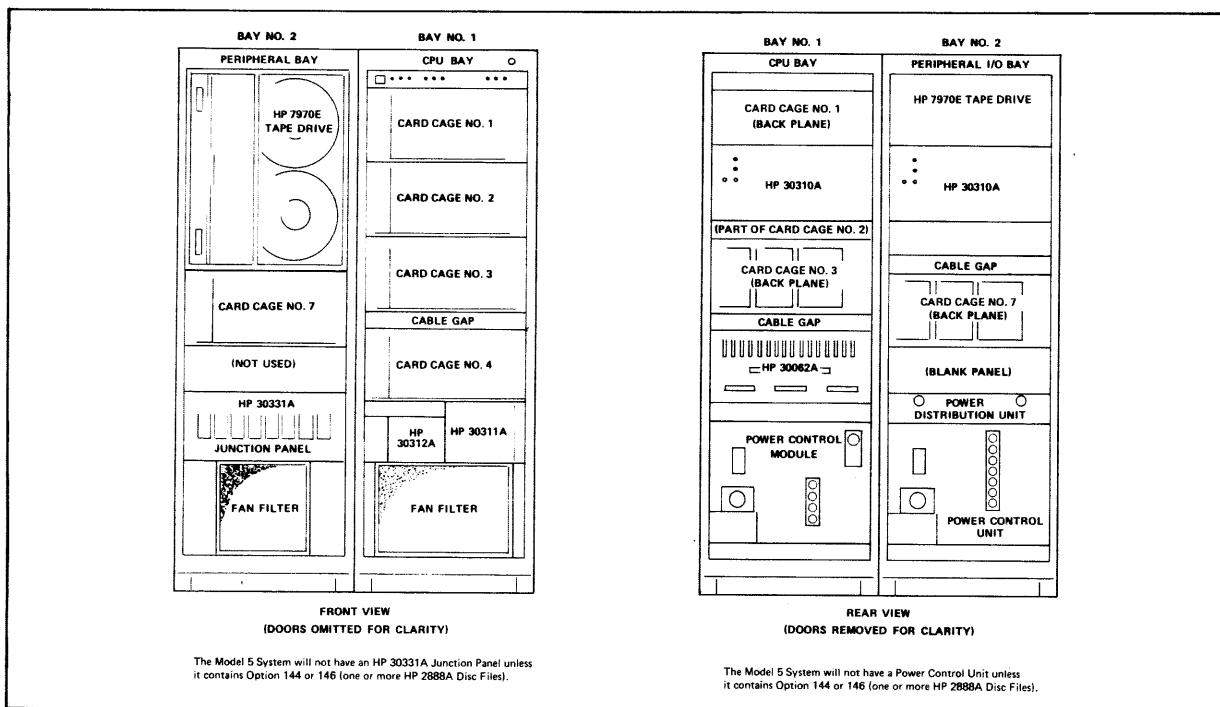


Figure 2-2. HP 3000 Series II Models 5 and 7 Equipment Bays

2-2. EQUIPMENT BAYS MECHANICAL FEATURES

Each of the three equipment bays of a Model 9 system has features to accommodate specific equipment. However, the CPU BAY, the I/O BAY, and the PERIPHERAL BAY share some features.

Each bay has a top cover; full-height mounting strips in rear columns; a cable access bottom panel; front and rear doors; a special trim at the top rear to accommodate door hinges; an Anti-Tip Base Extension; a 1.75-inch (44.45 mm) high blank panel at the rear base; and four floor casters.

2-3. CPU BAY

As the primary bay of a Model 9 system, the CPU Bay contains card cages, the PCM, and the EMERGENCY OFF pushbutton at the top front panel.

PCM = Power Control Module, HP Part Number 30390-60002. See figure 2-3.

One Anti-Tip Base Extension leg, two removable side panels, a barrier panel on the left side, special trims at the bottom front and rear, and a blower unit at the lower front, are also in this bay.

The front door is left-hinged and contains an air intake grill, a key lock and the System Control Panel. Power to the System Control Panel is taken from the CPU backplane via the DC Control Panel. A DC Control Panel behind the front door contains switches that control system and memory DC power.

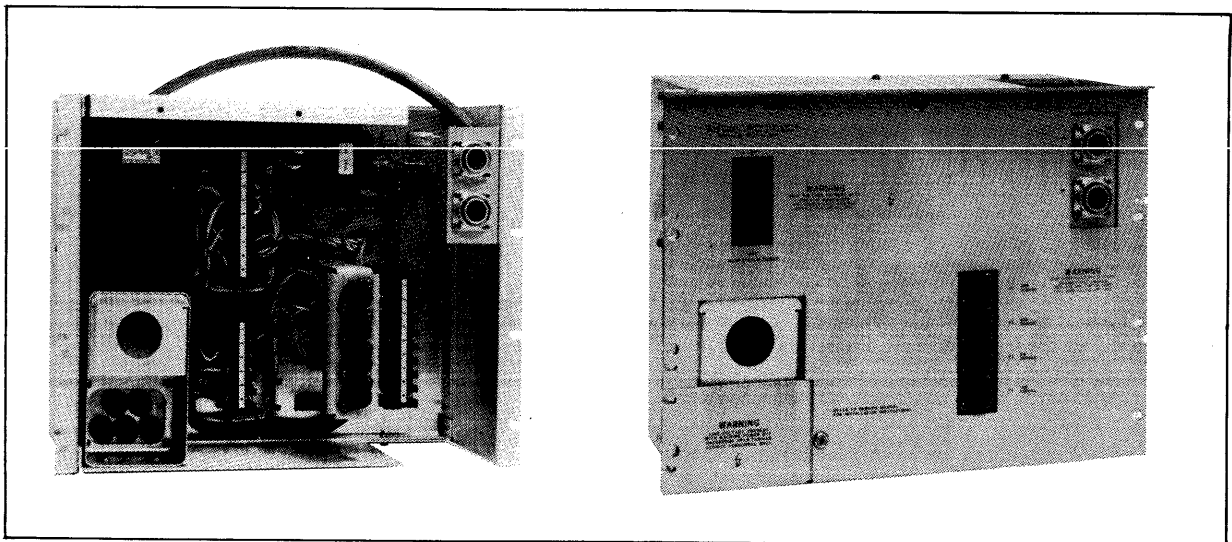


Figure 2-3. Power Control Module, HP P/N 30390-60002

2-4. I/O BAY

Hardware to join all of the bays together is packed for shipment in this bay. Card cages, a PDU and a PCU (when required) are mounted in this bay.

PDU = Power Distribution Unit, HP Part Number 30330-60003. See figure 2-4.

PCU = Power Control Unit, Model Number HP 30330A. See figure 2-5.

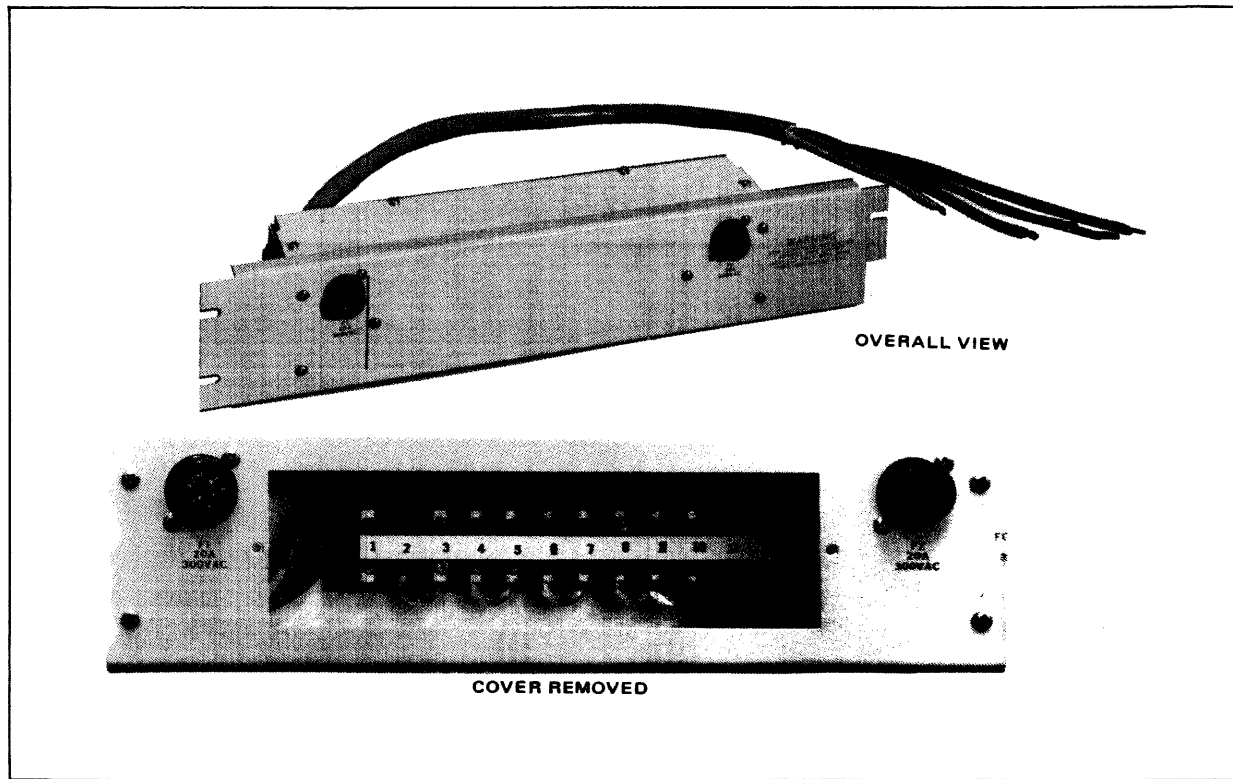


Figure 2-4. Power Distribution Unit, HP P/N 30330-60003

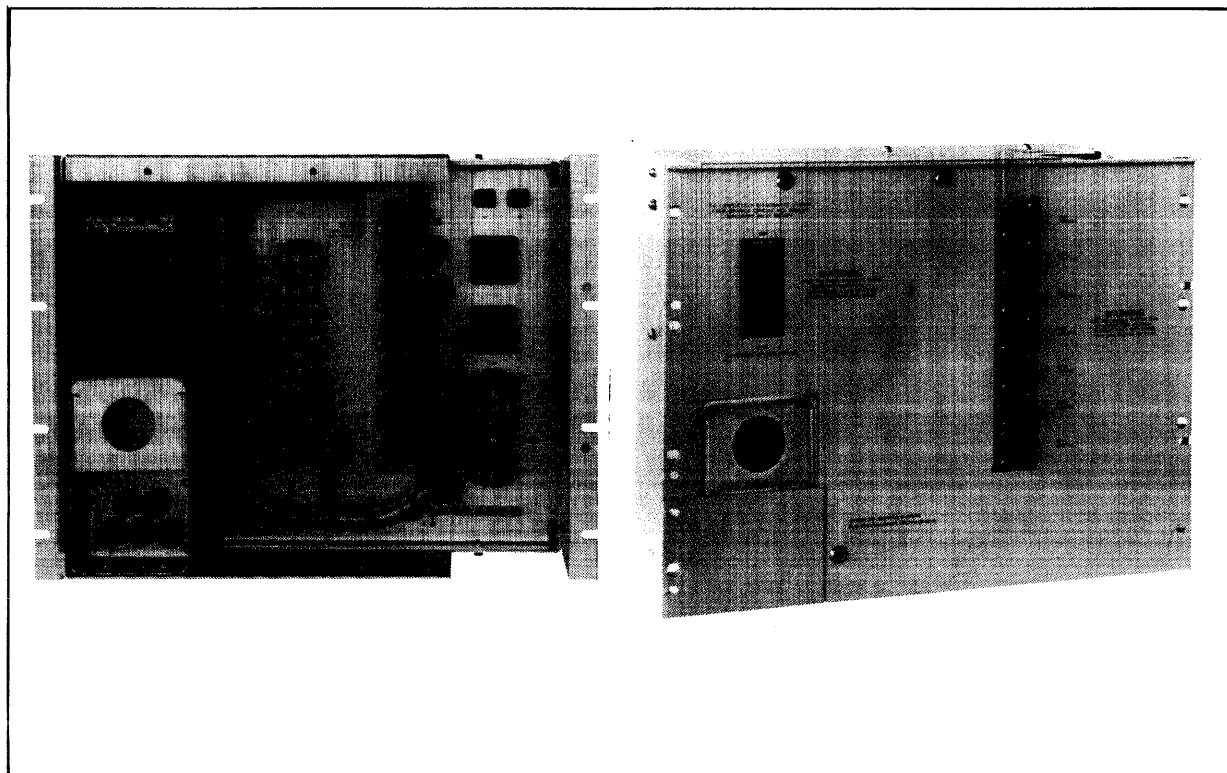


Figure 2-5. Model HP 30330A Power Control Unit

The front door is left-hinged and contains an air intake grill and a key lock. A panel fan is mounted at the bottom front of this bay.

2-5. PERIPHERAL BAY

Normally, only an HP 7970E Magnetic Tape Unit is mounted in this bay. Other devices may be included according to given special orders. One Anti-Tip Base Extension leg, a side panel, and hardware for joining this Peripheral Bay to the I/O Bay are included. The front door hangs on guide pins and presses into holding clips on the frame of the bay and contains an air intake grill. A panel fan and a PDU are mounted at the bottom rear of this bay.

2-6. EQUIPMENT BAYS ELECTRICAL FEATURES

Power requirements of an HP 3000 Series II Computer System are greater than the standard AC power options offered by HP 29402B Cabinets. Thus, the equipment bays used for a system contain a PCM and one or more PDU's to provide the AC power needed. Further, a PCU may be included to provide additional AC power for HP 30102A disc subsystems.

The primary unit is the PCM which controls and distributes AC power to the CPU Bay and to PDU's in other equipment bays (up to 30 amperes per phase). Each PCU included extends the AC power limit by providing another circuit breaker for 30 amperes per phase.

NOTE

The PCU(s) provide ac power only for the HP 2888A Disc Drives.

A 24 volt DC power supply is included in the PCM for the emergency power off feature. A relay included in the emergency power off circuits can be used to provide a remote indication. A three-pin connector to the + 5 volt DC bus (and return) of the HP 30312A Power Supply supplies power, when needed, to the HP 30354A Maintenance Panel when installed via the PCM.

The EMERGENCY OFF pushbutton switch is located in the upper right-hand corner of the CPU Bay front panel. When pressed, that switch energizes a trip coil to open the PCM MAIN SYSTEM POWER input circuit breaker and when present in the system, the PCU EXTENDED SYSTEM POWER circuit breaker. The equipment bays are then shut-down.

2-7. POWER REQUIREMENTS AT THE INSTALLATION SITE

Either one of two types of AC power will operate an HP 3000 Series II Computer System:

1. 120/208 volts, 60 Hertz, 3 phase, 4 wire plus earth wire.
2. 230 volts, 50 Hertz, 1 phase, 2 wire plus earth wire (system option 015).

Power input connections and strapping connections are shown in figure 2-11. The site must be already prepared as described in the SITE PREPARATION MANUAL, 30000-90016.

WARNING

Do not connect any AC power cables for the system to any AC power source until you are told to do so in this manual. Failure to heed this warning may result in injury or death.

2-8. POWER CONDUIT

Conduit or other suitable methods to route the AC power wiring to the installation site are to be furnished by the customer's qualified electrician or contractor, as described in the SITE PREPARATION MANUAL, 30000-90016.

2-9. INSTALLING EQUIPMENT BAYS

WARNING

Do not slide out or swing out any equipment from the bays or cabinets until all bays or cabinets of the system have been fully installed, Anti-Tip Base Extensions have been extended, and cabinet feet have been lowered. Failure to heed this warning may result in injury or death, and severe damage to equipment.

2-10. JOINING THE HP 29402B CABINETS

2-11. MECHANICAL. Locate the HP Accessory Number 40011A Tie-Together Kit in a packet within the CPU cabinet, then follow the instructions below and refer to figure 2-6.

1. Remove the top cover and the rear door of each bay. Hinge pins for the rear doors are held in place by springs and can be easily pulled up or down as needed.
2. Install Insert Part Number 40011-20001 into a top frame then insert a bolt (1/4-20 × 1-1/2 inch) through a steel plate, through that top frame and into the Insert, as shown in figure 2-6 detail A.
3. Repeat step 2 for the adjacent cabinet.
4. Repeat steps 2 and 3 until all HP 29402B Cabinets are joined together.
5. Find two channel nuts in a support column, left there during system testing and prior to shipment, as shown in figure 2-6 detail B.
6. Install two bolts (1/4-20 × 1-1/2 inch) into a bottom bracket and into threaded standoffs, as shown in figure 2-6 detail B.
7. Repeat step 5 for the adjacent column in the adjacent cabinet.

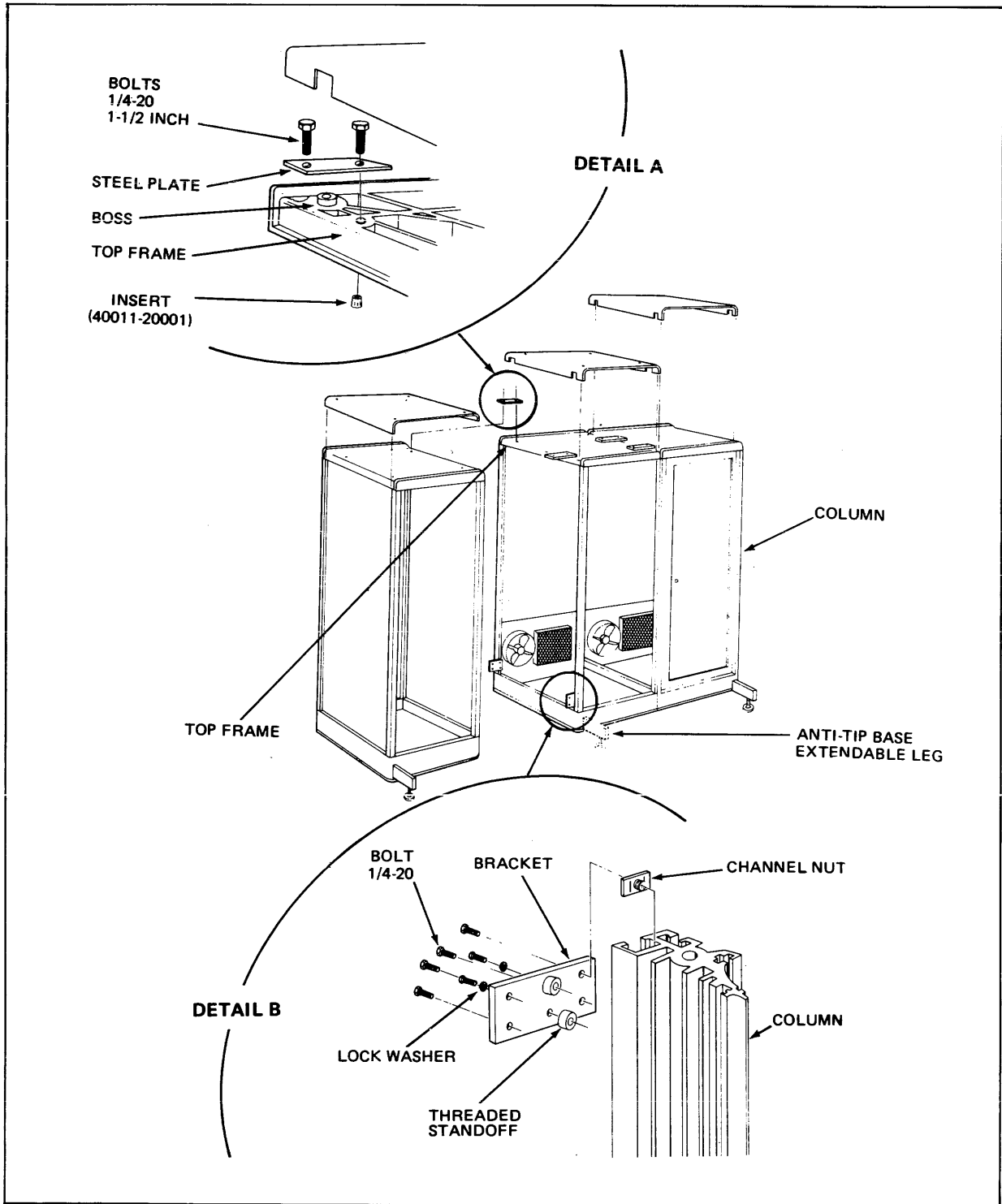


Figure 2-6. Tie-Together Kit Installation

8. Install four bolts (1/4-20 × 1-1/2 inch) through the bottom bracket, two in each cabinet, and into the channel nuts installed in steps 5 and 7.
9. Repeat steps 5 through 8 until all cabinet bottoms are joined together.

System Installation

10. Tighten securely all bolts installed in steps 2 through 9.
11. Re-install the top covers, matching notches in the covers to the steel plates installed during this procedure. Fasten the covers using the screws removed in step 1. Leave the rear doors off.
12. Install and extend the Anti-Tip Base Extension legs, then lower the cabinet feet at the end of the Extension legs and at the rear of the bays.

NOTE

The HP 29425A Disc Cabinets are free-standing and are not joined together. They need only to be rolled into position. The electrical installation for the HP 7905A is described in Section III.

2-12. ELECTRICAL. Looking at the equipment bays from the rear (see figures 2-1 and 2-2), note that a PCM is at the bottom of the left-most HP 29402B Cabinet. The PCU is located at the bottom of the next equipment bay to the right. Finally, note there is a PDU in each equipment bay other than the first bay. In the following instructions and in table 2-1, the cabinets are numbered 1 through 3, or 1 through 2, from left-to-right as seen from the rear. If the system you are installing is a special order, there may be more cabinets that would be numbered greater than 3, from left-to-right, for reference in table 2-1.

Table 2-1. PDU Straps Connections at TB-1

AC INPUT VOLTAGE			
120/208, 60 HZ		230, 50 HZ	
BAY NUMBER (COUNTED FROM REAR LEFT)	PIN TO PIN	BAY NUMBER (COUNTED FROM REAR LEFT)	PIN TO PIN
2,5,8, ...	2-3 4-5 6-7 8-9 9-10	2,3,4, ...	1-2 5-6 9-10
3,6,9, ...	1-2 4-5 7-8 8-9 10-11	(N/A)	(N/A)
4,7,10, ...	1-2 3-4 6-7 8-9 9-10	(N/A)	(N/A)

2-13. Power Distribution Unit. Perform these steps for each PDU in the bays:

1. Be sure that no AC power cables for the system are connected to any AC power source, and be sure that the MAIN SYSTEM POWER circuit breaker on the PCM, the EXTENDED SYSTEM POWER circuit breaker on the PCU, and all AC power switches on power supplies are OFF.

2. Remove the access plate from each PDU (see figure 2-4).
3. Connect straps between terminals of TB1 in each PDU according to the cabinet in which the PDU is located as listed in table 2-1, and shown in figure 2-7.

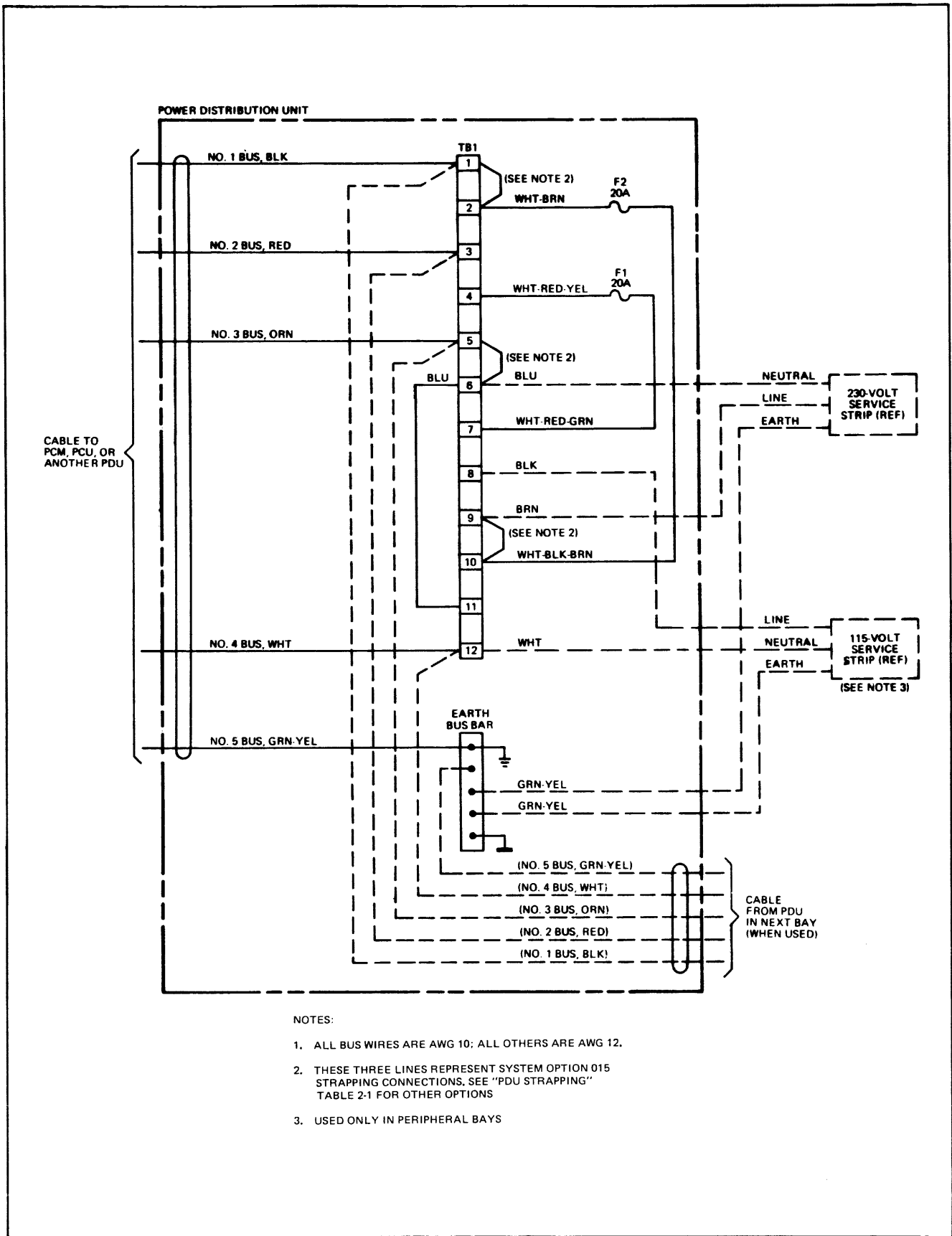
Table 2-2. PDU to PCM Connections

WIRE COLOR	PDU AT TB1	PCM AT TB3
black	1	6
red	3	7
orange	5	8
white	12	9
green-yellow	Earth Bus	Earth Bus

4. Connect the five-wire harnessed cable between the PCM in the CPU Bay (Bay 1) and the PDU in the I/O Bay, according to table 2-2.
5. Connect PDU's in adjacent bays, if any, through the five-wire harnessed cable(s) furnished, to join TB1 terminals 1 to 1, 3 to 3, 5 to 5, 12 to 12, and Earth Bus Bar to Earth Bus Bar. (See figure 2-7.)
6. Leave the access plates for each PDU off and proceed to paragraph 2-14.

2-14. Power Control Unit. If the system does not have a PCU, skip to paragraph 2-15. Otherwise, perform these steps for the PCU:

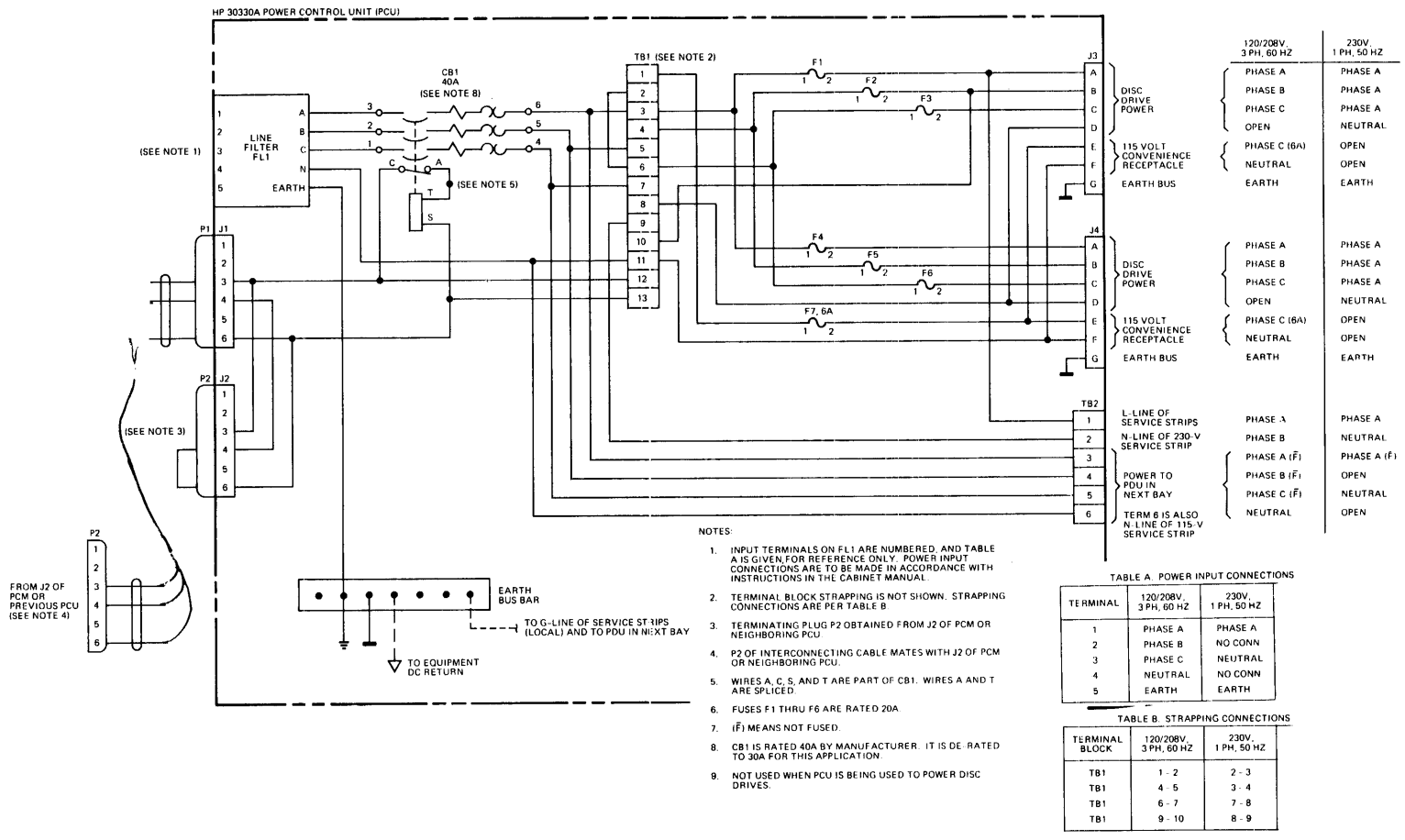
1. Remove the large and small panels, seen from the rear of the cabinets, from the PCU. Save all the hardware.
2. Verify that jumpers have been installed correctly on TB1, as listed within figure 2-8.
3. Have an electrician perform this step: Connect primary AC power cable wires to the PCU line filter terminals as shown in figure 2-9, then replace the panels removed in step 1 above.
4. Remove all AC power plugs from all AC power service strips in the bays.
5. Use the PCU-to-PCU/PCM Interconnecting Cable furnished with each PCU to connect J1 of the PCU to J2 of the PCM in the CPU Bay (see paragraph 2-15). figure 2-10 shows the wiring of the cable.
6. Be sure the AC power service strips have been connected to TB1 in each PDU as shown in table 2-3 and figure 2-7.
7. Leave the access plates off and proceed to paragraph 2-15.



NOTES:

1. ALL BUS WIRES ARE AWG 10; ALL OTHERS ARE AWG 12.
2. THESE THREE LINES REPRESENT SYSTEM OPTION 015 STRAPPING CONNECTIONS. SEE "PDU STRAPPING" TABLE 2-1 FOR OTHER OPTIONS
3. USED ONLY IN PERIPHERAL BAYS

Figure 2-7. PDU Schematic Diagram



- NOTES:
1. INPUT TERMINALS ON FL1 ARE NUMBERED, AND TABLE A IS GIVEN FOR REFERENCE ONLY. POWER INPUT CONNECTIONS ARE TO BE MADE IN ACCORDANCE WITH INSTRUCTIONS IN THE CABINET MANUAL.
 2. TERMINAL BLOCK STRAPPING IS NOT SHOWN. STRAPPING CONNECTIONS ARE PER TABLE B.
 3. TERMINATING PLUG P2 OBTAINED FROM J2 OF PCM OR NEIGHBORING PCU.
 4. P2 OF INTERCONNECTING CABLE MATES WITH J2 OF PCM OR NEIGHBORING PCU.
 5. WIRES A, C, S, AND T ARE PART OF CB1. WIRES A AND T ARE SPliced.
 6. FUSES F1 THRU F6 ARE RATED 20A.
 7. (f) MEANS NOT FUSED.
 8. CB1 IS RATED 40A BY MANUFACTURER. IT IS DE-RATED TO 30A FOR THIS APPLICATION.
 9. NOT USED WHEN PCU IS BEING USED TO POWER DISC DRIVES.

TABLE A. POWER INPUT CONNECTIONS

TERMINAL	120/208V, 3 PH, 60 HZ	230V, 1 PH, 50 HZ
1	PHASE A	PHASE A
2	PHASE B	NO CONN
3	PHASE C	NEUTRAL
4	NEUTRAL	NO CONN
5	EARTH	EARTH

TABLE B. STRAPPING CONNECTIONS

TERMINAL BLOCK	120/208V, 3 PH, 60 HZ	230V, 1 PH, 50 HZ
TB1	1 - 2	2 - 3
TB1	4 - 5	3 - 4
TB1	6 - 7	7 - 8
TB1	9 - 10	8 - 9

Figure 2-8. PCU Schematic Diagram

System Installation

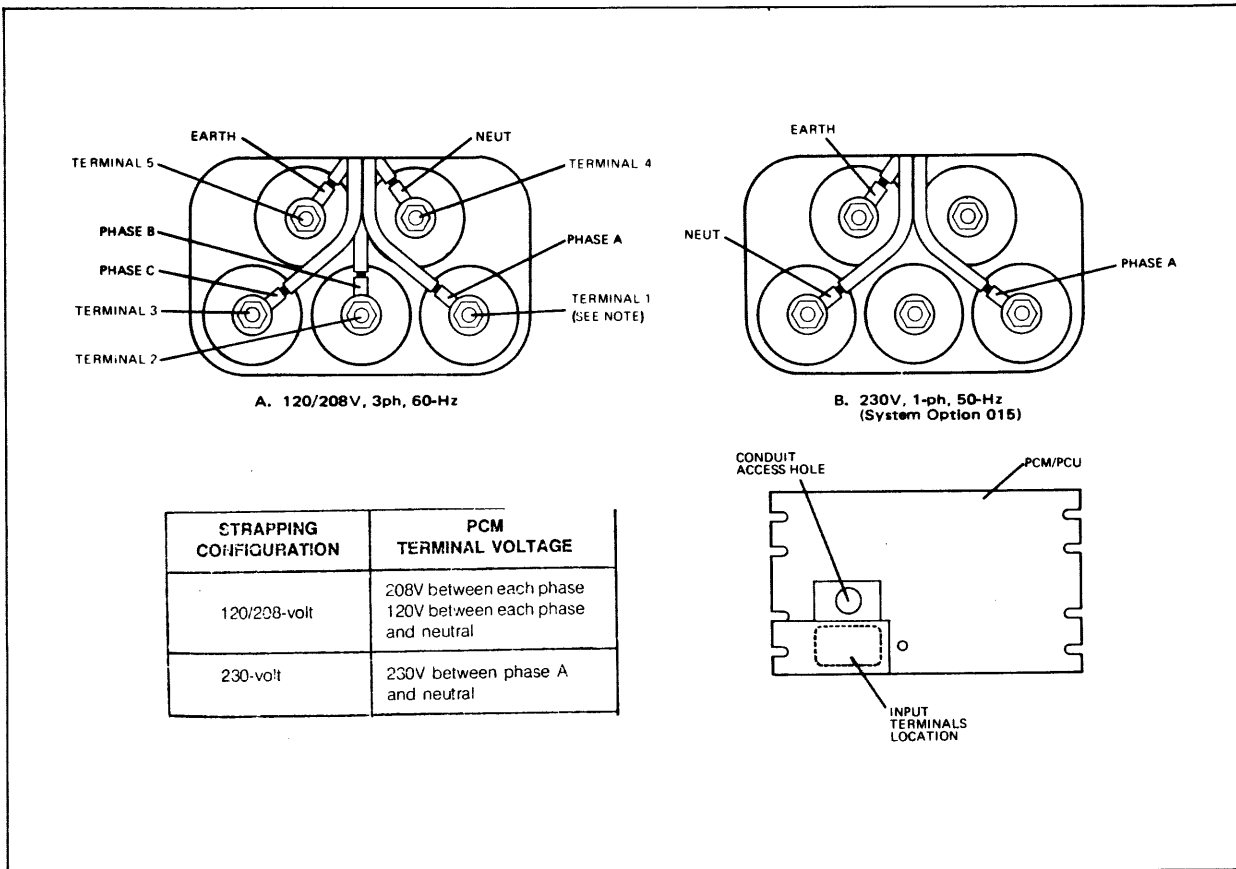


Figure 2-9. PCU/PCM Line Filter Connections

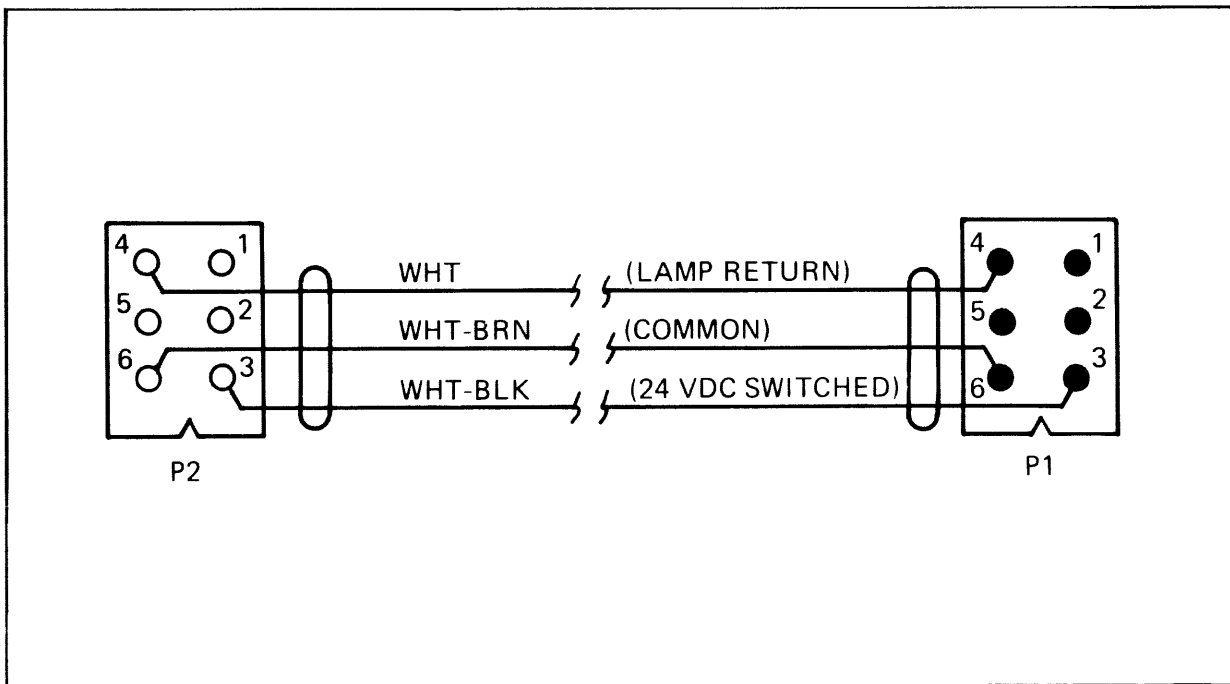


Figure 2-10. PCU-to-PCM Interconnecting Cable

Table 2-3. AC Service Strips Wiring in PCU

SERVICE STRIP IDENTITY	WIRE COLOR	PCU TERMINAL
115V	black white green-yellow	TB2 terminal 1 TB2 terminal 6 earth bus-bar
230V (CCE-22)	brown blue green-yellow	TB2 terminal 1 TB2 terminal 2 earth bus-bar

2-15. Power Control Module. Perform these steps for the PCM in the CPU Bay:

1. Remove the large and small panels, seen from the rear of the CPU Bay, from the PCM. Save all the hardware.
2. Verify that jumpers have been correctly installed on TB1 and TB2, as listed within figure 2-11.
3. Have an electrician perform this step: Connect primary AC power cable wires to the PCM line filter terminals as shown within figure 2-9.
4. Remove all AC power plugs from all AC power service strips in the bays.
5. Have an electrician perform this step. Be sure the AC power at the Computer Mainframe Power Panel and PCM MAIN SYSTEM POWER and PCU EXTENDED SYSTEM POWER circuit breakers are turned-OFF. Then connect the other end of the primary AC power cable wired in step 3 to the Computer Mainframe Power Panel. Then turn-ON the Computer Mainframe Power Panel main line.
6. Use a suitable voltmeter to check voltages at each of the PCM line filter terminals for correct value, as listed within figure 2-9.
7. Check that the EMERGENCY OFF pushbutton at the top front of the CPU Bay is lit. If it is not, press it once. If it fails to light, an error exists in that circuit. Do not proceed further until the error has been corrected and the pushbutton will light.
8. After you have confirmed that the EMERGENCY OFF lamp lights, set the PCM MAIN SYSTEM POWER circuit breaker ON then check the AC power voltages at the AC power service strips throughout the cabinets, as shown in figure 2-7. If the voltages are incorrect, set the PCM MAIN SYSTEM POWER and Computer Mainframe Power Panel circuit breakers OFF and check the AC power service strip within the PCU against table 2-3. If any errors are found correct them.
9. Set the PCM MAIN SYSTEM POWER circuit breaker OFF then replace the access covers on all PDU's.
10. Plug all fans, card cages and other devices in the cabinets into the appropriate AC power service strips, then set the PCM MAIN SYSTEM POWER circuit breaker ON. Check that all fans in the system operate.

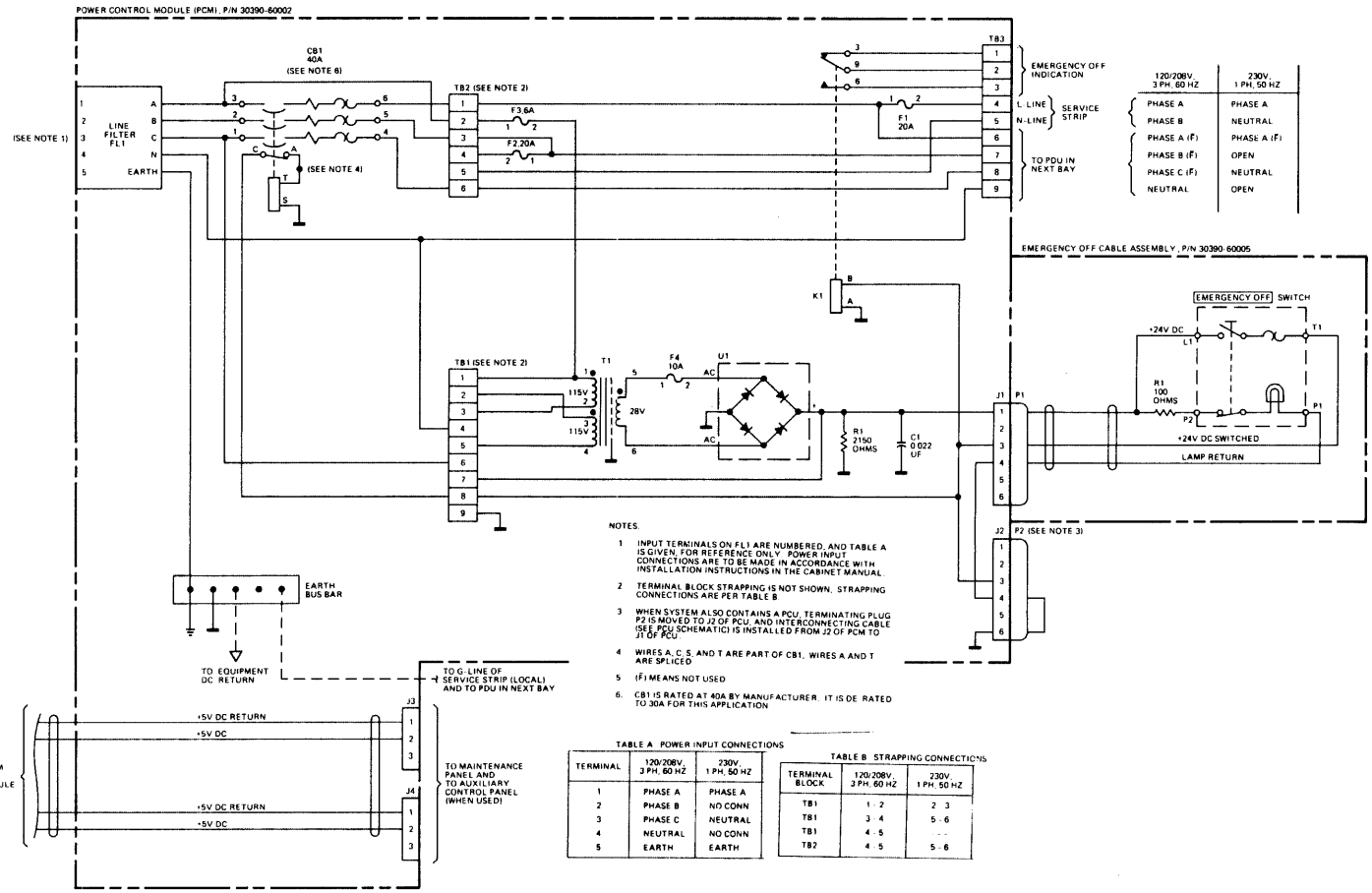


Figure 2-11. PCM Schematic Diagram

11. Press and release the EMERGENCY OFF pushbutton and check for three results:
 - a. The pushbutton lamp goes out.
 - b. All fans in the card cages, cabinets and other devices stop.
 - c. All circuit breaker handles on the PCM and, if present, all PCU's, move to the OFF (down) position.
12. Set the circuit breaker in the Computer Mainframe Power Panel OFF. Set the circuit breaker in the Computer Peripheral Equipment Power Panel OFF.
13. If step 11 is completed successfully, continue this procedure. Otherwise, go no further until the fault is corrected.
14. Continue installation by connecting the interrupt poll, data poll, MCU clock signal distribution, and flat cables as described in Section III of this manual. Then return to step 15, below.
15. Do not turn-ON the Computer Mainframe Power Panel or the Computer Peripheral Equipment Power Panel AC power until you are told to do so in Section IV of this manual.
16. Leave all equipment bay rear doors off.

INSTALLING PERIPHERAL DEVICES

SECTION

III

This section presents installation instructions for each of the peripheral devices that are part of a standard HP 3000 Series II Computer System. Installation of any non-standard peripheral device is described in a manual specifically for that device.

Before you begin any installation activities, have the SYSTEM SUPPORT LOG available.

3-1. INTERRUPT POLLING CONNECTIONS

The interrupt priority of a device is completely independent of the device number or physical location. It is determined by the device's logical proximity to the IOP on a jumpered interrupt poll line. The interrupt poll line is wired at system configuration time from the IOP to whatever device is assigned first priority and then from device to device according to assigned priority. The interrupt poll line terminates at the device of lowest priority.

Examination of the interrupt poll line of any system (figure 3-1) will find it starting at pins 79 (INTPOLL) and 80 (GND) of connector 10P1 of the CPU/IOP backplane which is the IOP connector P1. The connections are made using a twisted pair of wires; one wire is blue and the other is white. These twisted pair cables are terminated at each end with a two-pin spring-clip connector that clips onto

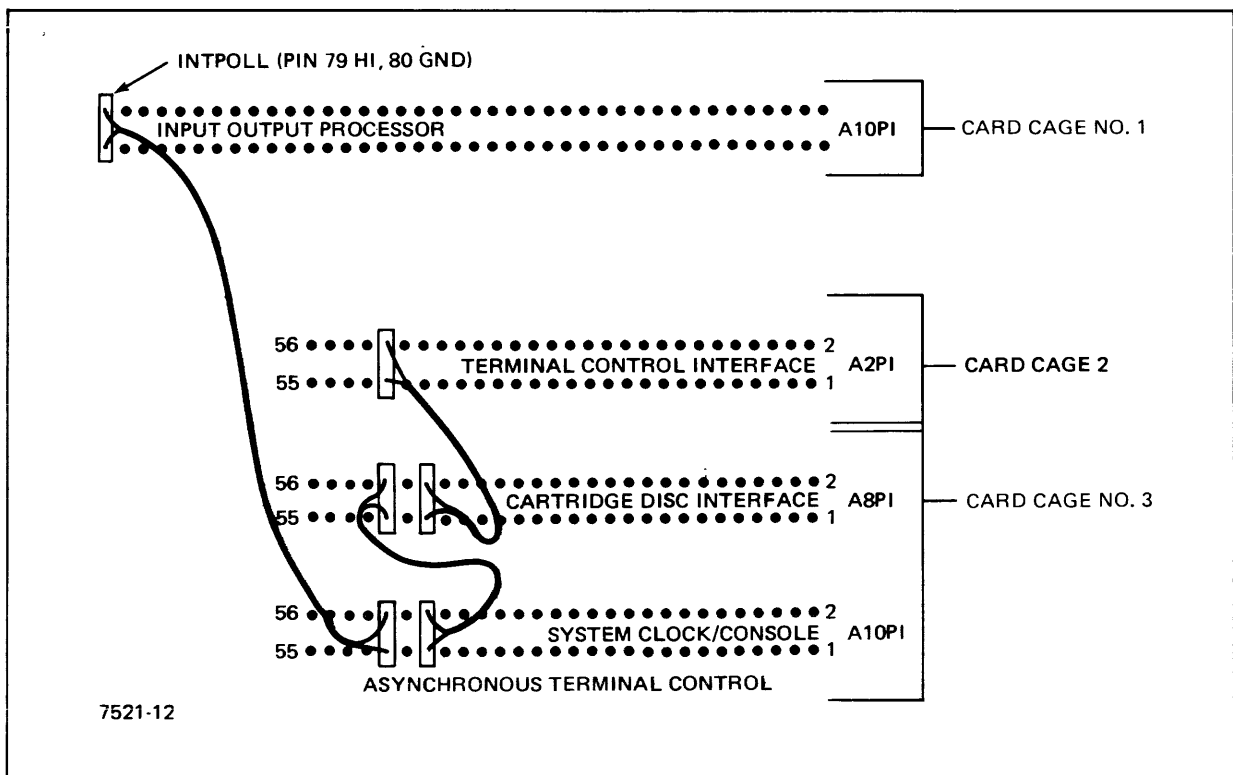


Figure 3-1. Typical Interrupt Poll Cabling

pairs of vertically-aligned pins. At the CPU/IOP backplane, the twisted pair must be connected with the white wire on the top pin of the pair of pins; at the device controller interfaces, the connections are made with the white wire on the bottom pin.

The INTPOLL signal from the IOP is routed to connector P1 of the device interface PCA with next highest priority where with the name INTPOLL IN it enters the interface PCA of the device controller on the fifth pair of pins from the left, pins 48 (signal) and 47 (ground). The signal will exit the PCA with the name INTPOLL OUT on the seventh pair of pins from the left, pins 44 (signal) and 43 (ground).

Table 3-1 provides a typical sequence for the interrupt polling of some devices.

Table 3-1. Controller Interrupt Polling

CONTROLLERS BY RANK	
First:	Terminal Data Interface System Clock/Console Paper Tape Reader Synchronous Single Line Controller 7905A Cartridge Disc 2660A Disc Drive 7900A Cartridge Disc 2888A Disc File Terminal Controller Interface Hardwired Serial Interface CalComp Plotter Programmable Controller Digital Magnetic Tape Unit Line Printer Card Reader Card Reader/Punch Card Punch
Last:	Paper Tape Punch
NOTE	
When there are duplicate controllers, they should be polled as a group in the sequence.	

Interrupt polling connections have been established during system testing at the factory. The interrupt polling priority sequence is listed in the System Configuration sheets of the SYSTEM SUPPORT LOG, 03000-90016. These connections remain intact during shipment, unless the equipment bays had to be separated for shipment. If you had to join the bays you will have to re-connect wires between bays.

Look for a twisted pair of wires, solid blue and solid white, about 22 ga., coiled behind the bottom card cage in the CPU cabinet. The twisted pair must be connected to each PCA in the interrupt polling sequence with the white wire to the top pin of the pin pair in the CPU/IOP backplane. In all other card cages, the twisted pair must be connected with the blue wire to the top pin.

3-2. DATA POLLING CONNECTIONS

The determination of priority among Multiplexer Channels is by means of a data poll. The data poll operates very much like the interrupt poll. That is, when the IOP receives a Service Request, it sends out the data poll. Since priority is determined by the wire proximity to the IOP, the poll is wired through each Multiplexer Channel in the desired priority sequence.

Examination of the data poll line of any system will find it starting at pins 1 (DATAPOLL) and 2 (GND) of connector 10P1 of the CPU/IOP backplane which is the IOP connector P1. The connections are made using a twisted pair of wires; one wire is orange and the other is white. These twisted pair cables are terminated at each end with a two-pin spring-clip connector that clips onto pairs of vertically-aligned pins. At the CPU/IOP backplane, the twisted pair must be connected with the white wire at the top pin of the pair of pins; at the MUX channel connections are made with the white wire on the bottom pin.

The DATAPOLL signal from the IOP is routed to connector P1 of the Multiplexer Channel PCA with the highest priority where with the name DATAPOLL IN it enters the PCA on pins 56 (signal) and 55 (ground). The signal will exit the PCA with the name DATAPOLL OUT on pins 52 (signal) and 51 (ground).

To reconnect data polling wires between bays for Models 5, 7 or 9, look for a twisted pair of wires, solid orange and solid white, about 22 ga., coiled behind the CPU card cage. The twisted pair must be connected to the CPU backplane and each Multiplexer with the white wire to the top pin of the pin pair. In all other card cages, the twisted pair is connected with the orange wire to the top pin.

3-3. MCU CLOCK SIGNAL CONNECTIONS

Figure 3-2 shows how the gray coaxial cables are patched on the backplane to carry the MCUFRC0 signal to the memory module and the MCUCLK5, MCUCLK6, and MCUCLK7 signals to modules A2, A3, and A4 respectively. (The cabling shown is typically that for a Model 5, 7 and 9 System.) As shown, a 61.9 ohm resistor terminates each of these clock signals with the resistor for module A4 located on the power bus terminator card. Jumper W1 on the backplane of modules A2, A3, and A4 are opened to isolate the MCUCLK signal to one module.

The signal wire (clear plastic over conductor) is connected to the odd numbered pin (bottom) and the ground lead (black heat-shrink over braid) is connected to the even numbered pin (top) of the pair of vertically-aligned pins.

Figure 3-3 shows the cable and terminator used in the two-bay Model 7 system, and figure 3-4 shows the cables and terminators used in the three-bay model 9 system.

To reconnect the MCU Clock signal connections on a Model 5, 7 or a Model 9 system look for several lengths thin gray of coaxial cable with black connectors, coiled behind the CPU card cage. Refer to figures 3-2 through 3-4 for connection points.

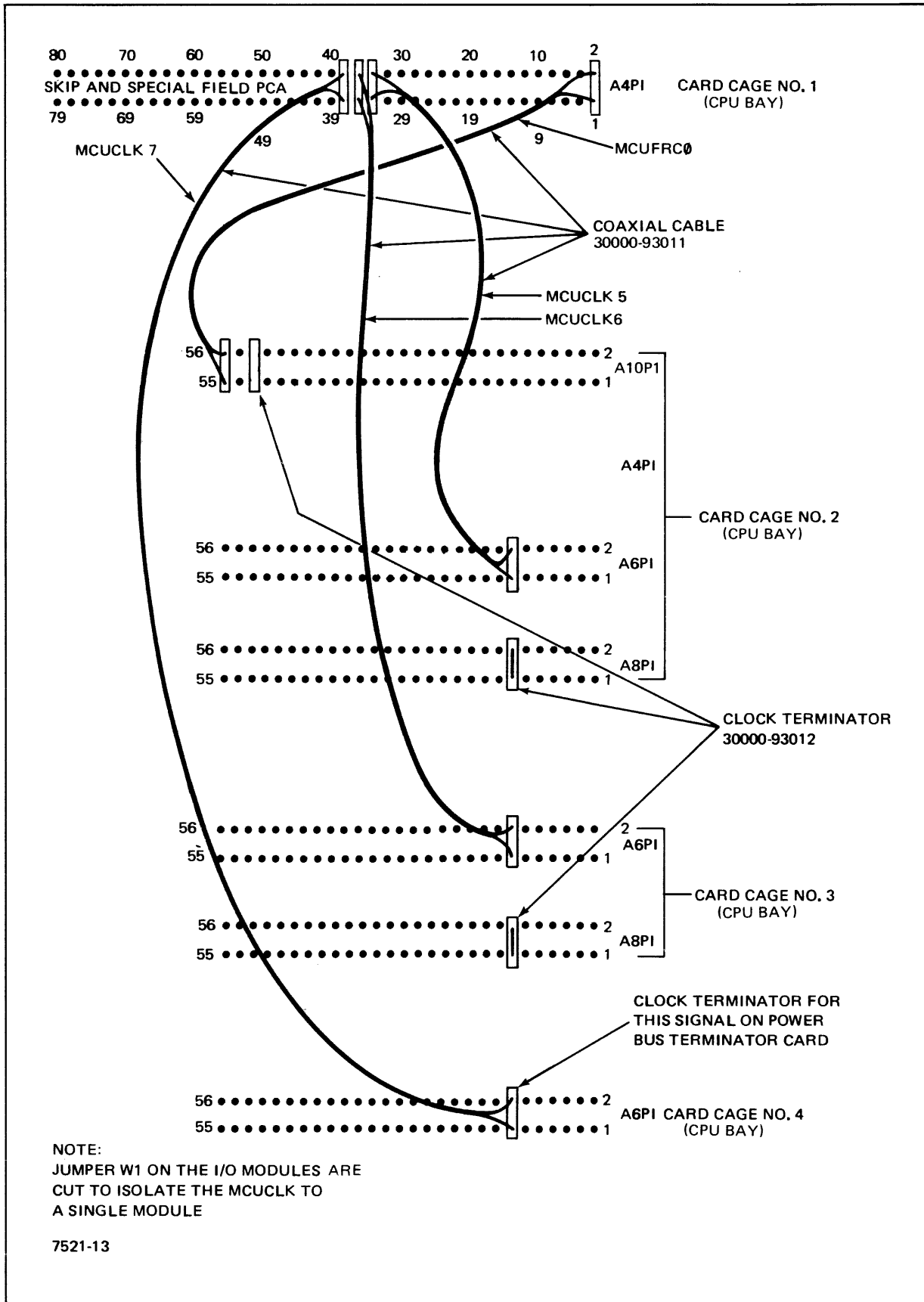


Figure 3-2. CPU Bay Clock Jumpers and Terminators (Models 5, 7, and 9)

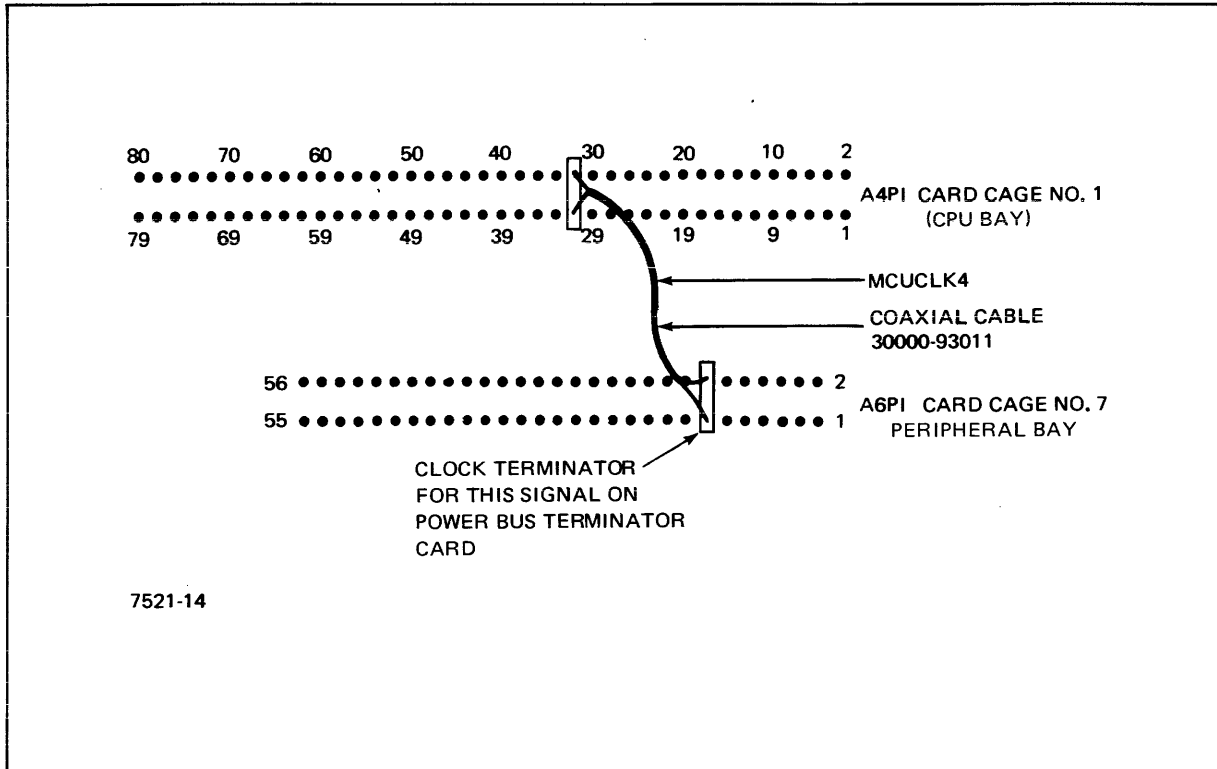


Figure 3-3. Bay 2 Clock Jumpers and Terminators (Models 5 and 7)

3-4. FLAT CABLE CONNECTIONS

In a Model 5 and 7 system, three flat cables must be connected between Bay 1 and Bay 2 if the system is shipped with the bays separated. These cables are for the IOP bus, Multiplexer Channel bus, and Power bus. One end of each cable is connected in Bay 1 at the time of shipment.

In a Model 9 system, two flat cables must be connected between Bay 1 and Bay 2 if the system is shipped with the bays separated. These cables are for the IOP bus and the Power bus.

To connect the three flat cables in a Model 5 and 7 system, perform the following steps:

1. Locate the free end of the IOP bus flat cable connected to cage 1, slot 1, connector P3.
2. Route and connect the free end of this cable to connector P3, slot 1, of cage 7 in Bay 2. The red stripe on the cable must be on the right side of the connector. Secure the cable connector with the hardware supplied.
3. Locate the Power bus flat cable (narrow cable) connected in Bay 1 to cage 2.
4. Uncoil the cable and route the free end to the top connector of the Power bus PCA on cage 7 in Bay 2. The red stripe on the cable must be on the right side of the connector. Secure the cable connector with the hardware provided.
5. Locate the Multiplexer Channel bus flat cable connected to connector P2, cage 4, slot 1 of Bay 1.

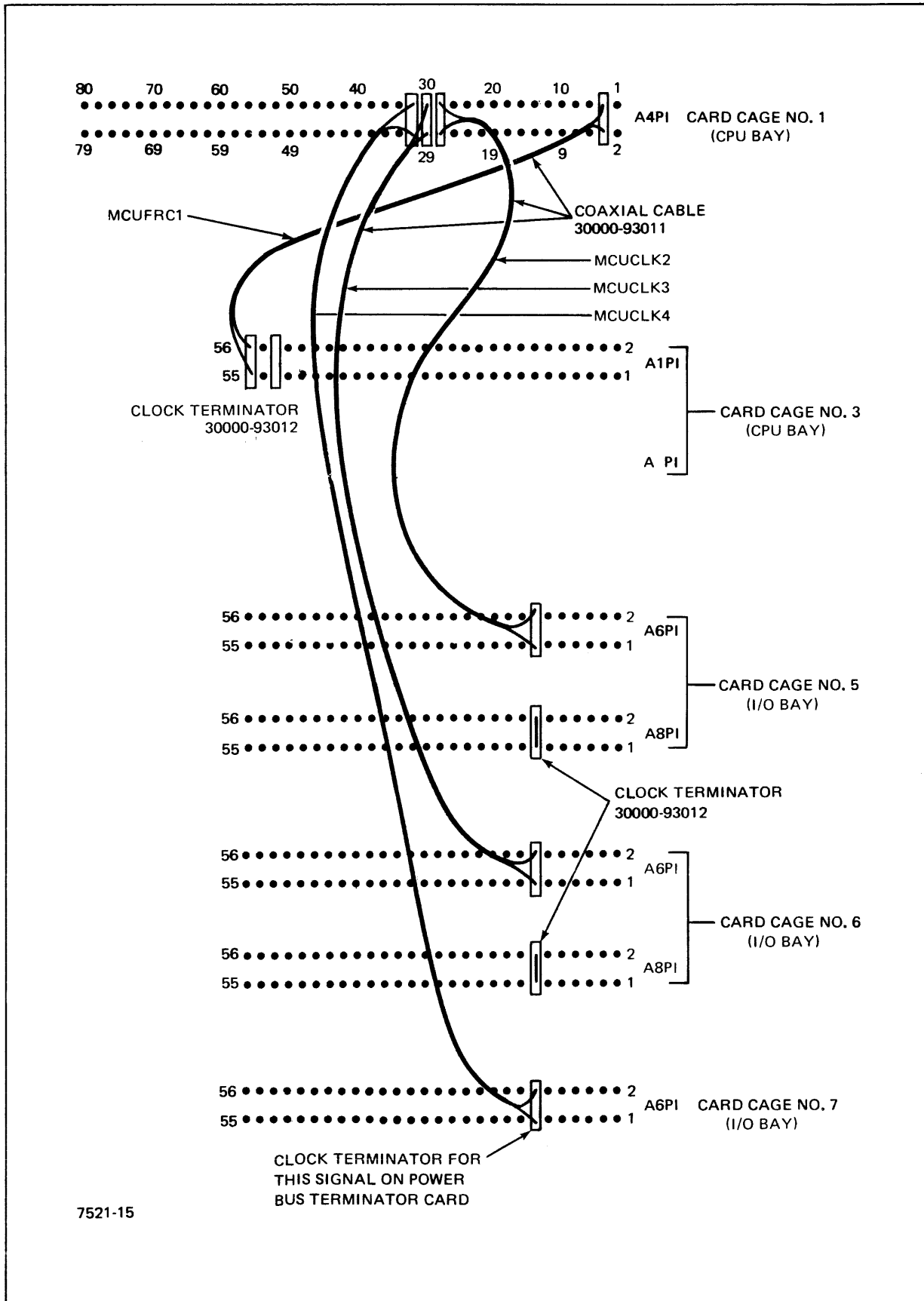


Figure 3-4. Bay 2 Clock Jumpers and Terminators (Model 9)

6. Uncoil the cable and route the free end to connector P2, slot 1, cage 7 in Bay 2. The red stripe on the cable must be on the right side of the connector. Secure the cable connector with the hardware provided.

To connect the two flat cables in a Model 9 system, perform the following steps:

1. Locate the IOP bus flat cable (wide cable) connected in Bay 1 to connector P3, cage 1, slot 1.
2. Uncoil the cable and route the free end to connector P3, cage 5, slot 1 in Bay 2.

The red stripe on the cable must be on the right side of the connector. Secure the cable connector with the hardware provided.

3. Locate the Power bus flat cable (narrow cable) connected in Bay 1 to cage 2.
4. Uncoil the cable and route the free end to the top connector of the Power bus PCA on cage 5 in Bay 2. The red stripe on the cable must be on the right side of the connector. Secure the cable connector with the hardware provided.

3-5. POSITIONING DEVICES AND DRESSING CABLES

Before you begin to install any peripheral devices, move them into the final positions around the equipment bays. Refer to the *SITE PLANNING WORKBOOK* for the planned location of free-standing peripheral devices. Check for a professional appearance of the entire system, then begin running cables under flooring or through whatever conduits have been provided between the devices and the equipment bays. Bring the cables inside cabinets where needed and dress them up to the connectors they will use. Don't install those cables on the connectors until 1) you have determined the neatest and most professional appearance for the entire set of cables, and 2) you are directed to install them in the following instructions.

Cable gaps are provided at the rear of each equipment bay, below the doors.

3-6. HP 30115A (7970E/7970B) DIGITAL MAGNETIC TAPE SUBSYSTEMS

The HP 7970E Subsystem includes a 1600 BPI (Bytes-Per-Inch), 45 IPS (Inches-Per-Second) PE (Phase-Encoded) Digital Magnetic Tape Unit. The HP 7970B Subsystem includes an 800 BPI, 45 IPS, NRZI Digital Magnetic Tape Unit. The HP 7970E is available as either a Master Unit or a Slave Unit. A system can include a combination of HP 7970B, Master HP7970E, and Slave HP 7970E Tape Units.

A HP 30215A Magnetic Tape Unit Interface, shown in figure 3-5, can control up to four tape units. Additional controllers can be included in a system if it is necessary to divide the control of two or more tape units. Each controller consists of the following parts:

- One Magnetic Tape (Nine-Track) Controller PCA, Part Number 30215-60001
- One Magnetic Tape Controller Processor PCA, Part Number 30215-60002
- Two Connecting Cable Assemblies, Part Number 30000-93052
- One Interface Cable Assembly, Part Number 30215-60003

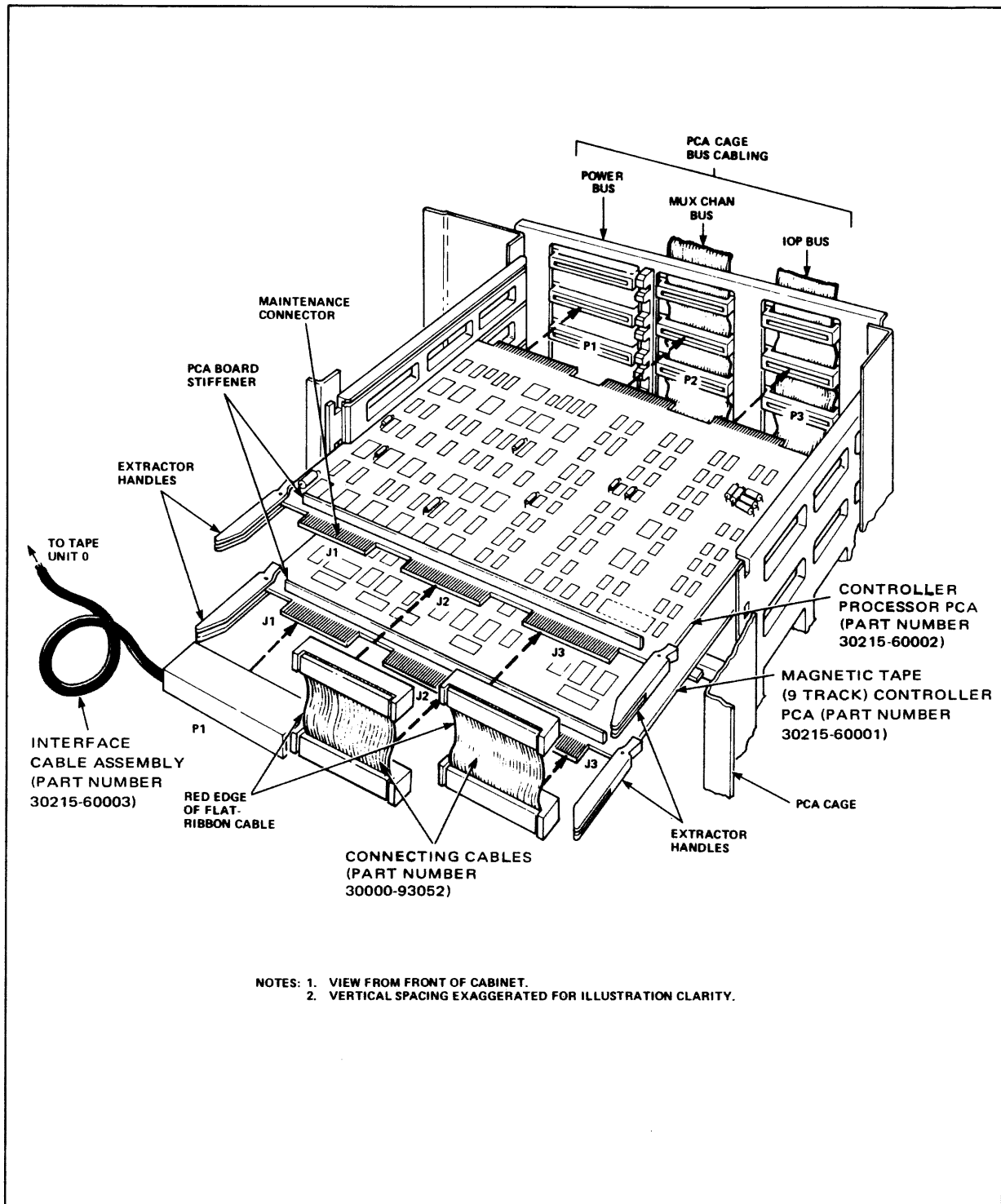


Figure 3-5. HP 30215A Magnetic Tape Unit Interface

3-7. MULTI-UNIT CONFIGURATIONS

A magnetic tape unit controller can control a combination of 7970B, and 7970E tape units (maximum of four tape units on one controller). Multi-unit installations are beyond the scope of this manual. There are 24 possible configurations for multi-unit magnetic tape units. Refer to the following list of manuals for use in multi-unit installations.

- HP 13194A Multiunit Cable Accessory Kit Installation Manual, 13194-90003
- HP 7970B Digital Magnetic Tape Unit Operating and Service Manual, 07970-90383
- HP 7970E Digital Magnetic Tape Unit Operating and Service Manual, 07970-90765
- HP 30115A Magnetic Tape Subsystem Installation and Service Manual, 30115-90001

NOTE

The HP 7970B tape unit must be the first in line from the tape controller if it is used in a mixed configuration with an HP 7970E.

3-8. INSTALLING AN HP 7970

Installation of an HP 7970E/7970B Magnetic Tape Subsystem consists of connecting the interface cable assembly and AC power cable.

The interface cable assembly is shipped attached to the device controller PCA and is coiled inside the equipment bay. Uncoil the cable and connect as shown in figures 3-5 and 3-6. Connect the AC power cable into the cabinet AC power receptacle. Do not turn-ON AC power to the HP 7970 at this time.

3-9. HP 2640A VIDEO TERMINALS

The HP 2640A Video Terminal is a free-standing cathode ray tube input/output device such as the HP 2640A Interactive Display Terminal. The Video Terminal is connected directly to an HP 3000 Series II Computer System through an HP 30032B Asynchronous 16-Channel Terminal Controller Subsystem as the System Console or as one of several remote user terminals. Remote user terminal connections are made through a Bell Telephone Model 103 Data Modem and an HP 30032B Option 001 or Option 002 Subsystem. See figures 3-7, 3-8, and 3-9.

All cables required for the three uses of the HP 2640A Video Terminal with a system are noted within figures 3-7, 3-8 and 3-9. Also, you should note the following restrictions:

1. For direct connections, the maximum wire length between the Terminal and the interface PCA or the HP 30062A Terminal Controller/Multiplexer Connector Panel is 100 ft.
2. For remote connections, refer to Bell Telephone Specification RS-232B for maximum wire length between the Terminal and the Data Modem. See figure 3-9.

3-10. INSTALLING AN HP 2640A

If an HP 2640A is to be used as the System Console, its interface cable must be connected to jack J0 on an HP 30062A Connector Panel. If an HP 2640A is to be used as a remote user terminal, its interface cable must be connected to any other jack than J0 on an HP 30062A Connector Panel. In either case, uncoil the interface cable and connect equipment as shown in figure 3-7 or 3-8 or 3-9. Connectors on the back of the HP 2640A are keyed or notched to match the cable terminators that can be installed there. Connect the AC power cable into the peripheral AC power receptacle. Do not turn-ON AC power to the HP 2640A at this time.

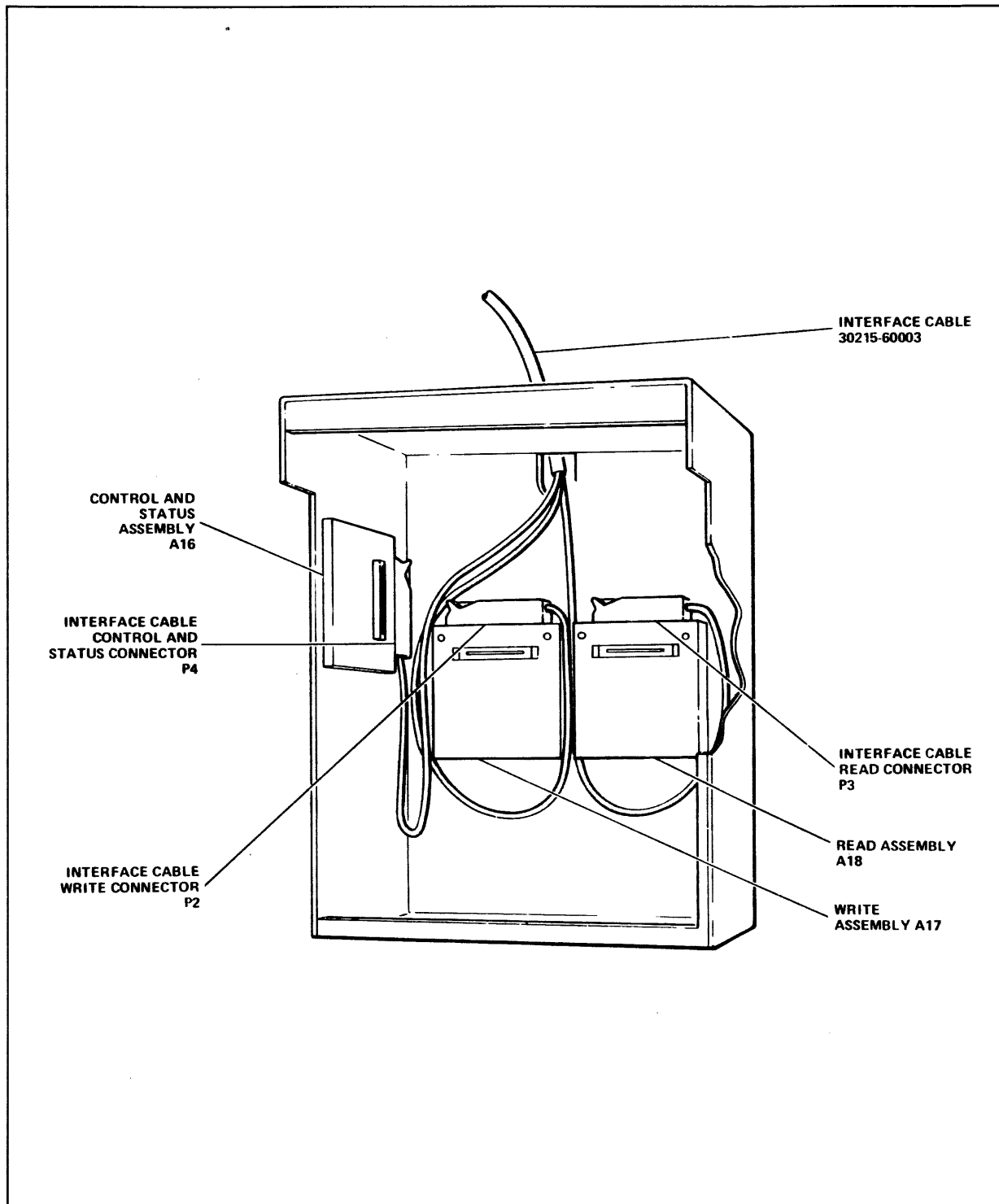


Figure 3-6. Cables at an HP 7970E/7970B

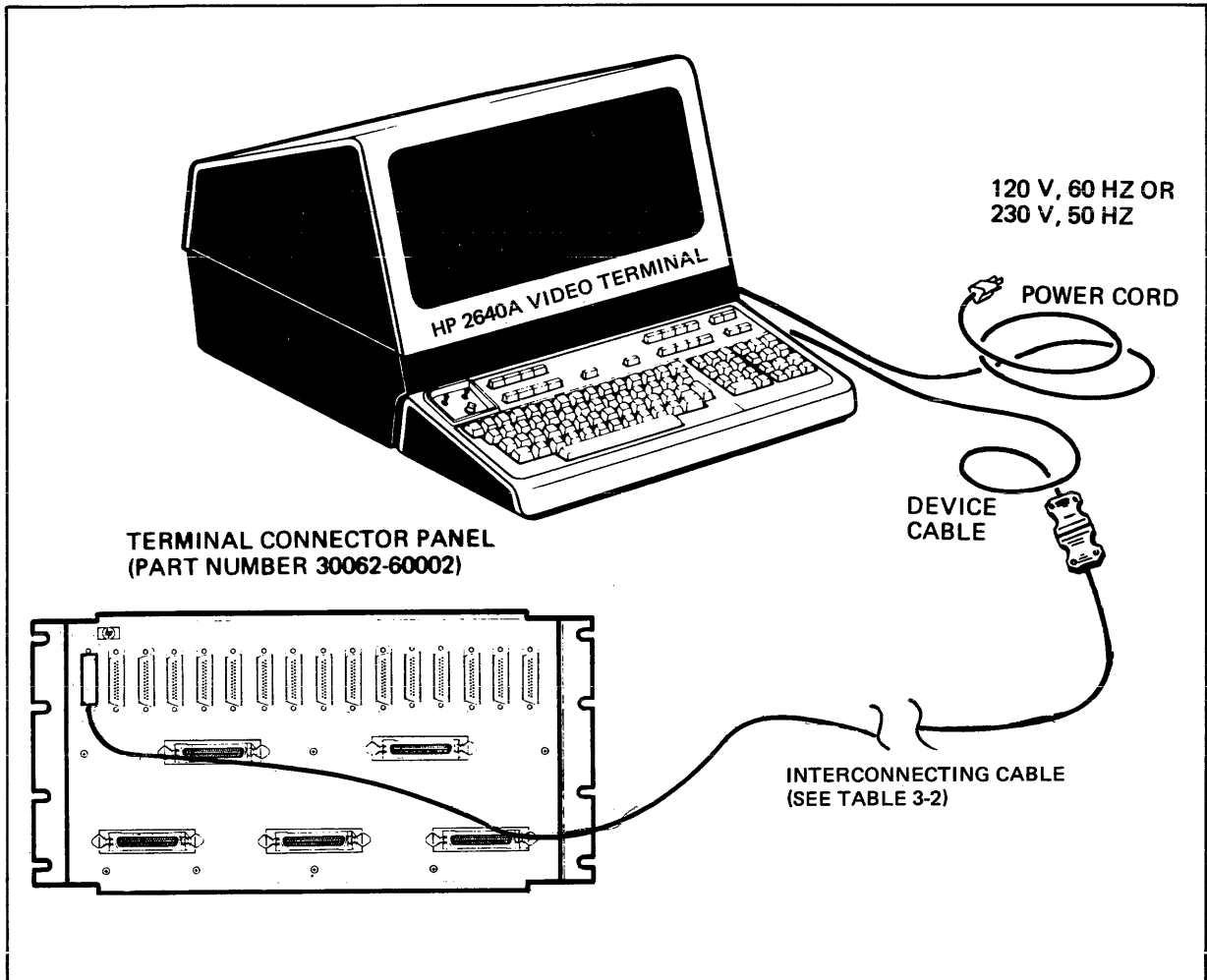


Figure 3-7. The HP 2640A System Console

NOTE

It is normally the Customer Engineer's task to set-up and cable the system console; all other terminals are the customer's responsibility. As a part of system operator training (refer to Section IV) make sure the customer is aware of this procedure and figures 3-8 and 3-9.

3-11. HP 7905A CARTRIDGE DISC SUBSYSTEM

The HP 7905A Cartridge Disc Subsystem provides a fully automatic, random access, mass storage memory. The subsystem consists of a disc controller (on three I/O-type boards), a cartridge disc, and an interface unit (on one I/O-type board), as shown in figure 3-10. Note that figure 3-10 does not show the cartridge disc drive mounted in its HP 29425A Disc Cabinet.

All cables and PCA's required for the HP 7905A Cartridge Disc Subsystem with a system are noted within figure 3-10. \ FIG 30 "Figure 3-10. HP 7905A Cartridge Disc Subsystem" \ NEW;FORMAT;MARGIN 5;JUST ON

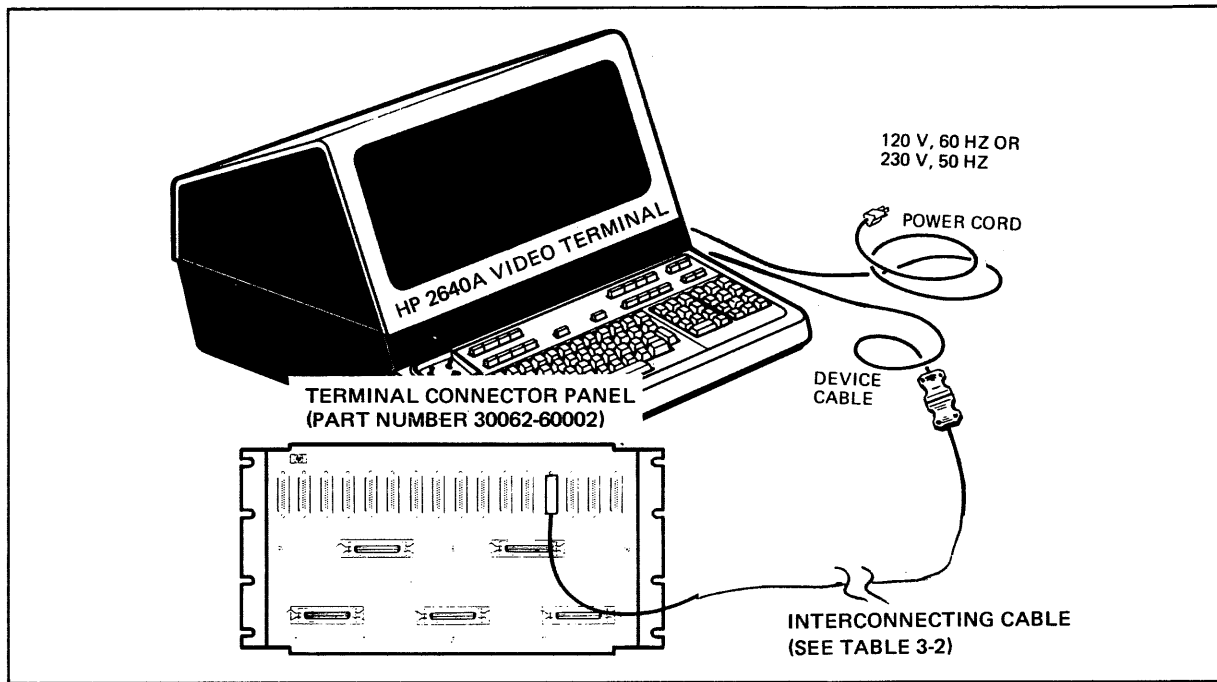


Figure 3-8. An HP 2640A Direct User Terminal

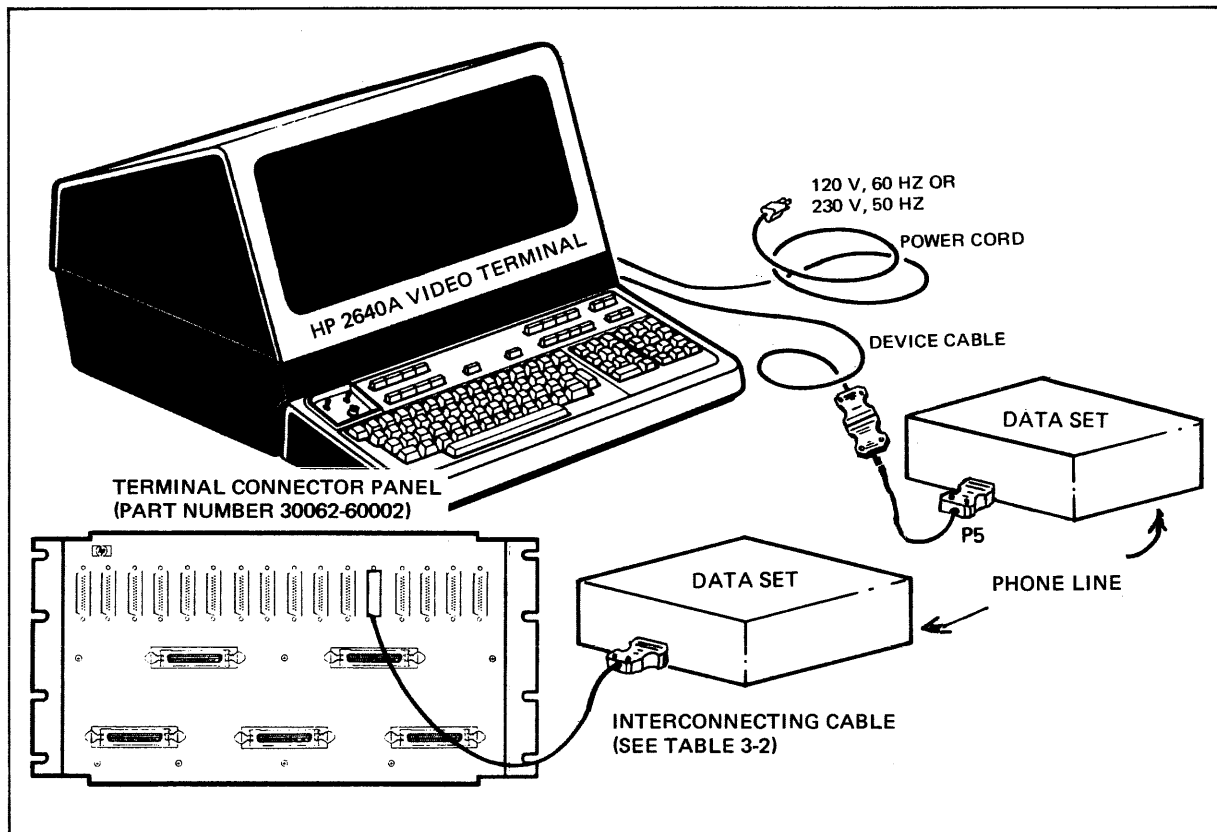


Figure 3-9. An HP 2640A Remote User Terminal

Table 3-2. HP 264XX Video Terminal Cables

CABLE DESCRIPTION	HP PART NUMBER
25 foot, terminal-to-connector panel	30062-60006
25 foot, data set-to-connector panel	30062-60004
50 foot, terminal-to-connector panel	30062-60009
50 foot, data set-to-connector panel	30062-60007
100 foot, terminal-to-connector panel	30062-60012
100 foot, data set-to-connector panel	30062-60010

NOTES

For data set-to-connector panel cables, refer to Bell Telephone Specification RS-232B for maximum wire lengths.

If longer wire lengths are needed, contact your nearest HP Sales and Service Office.

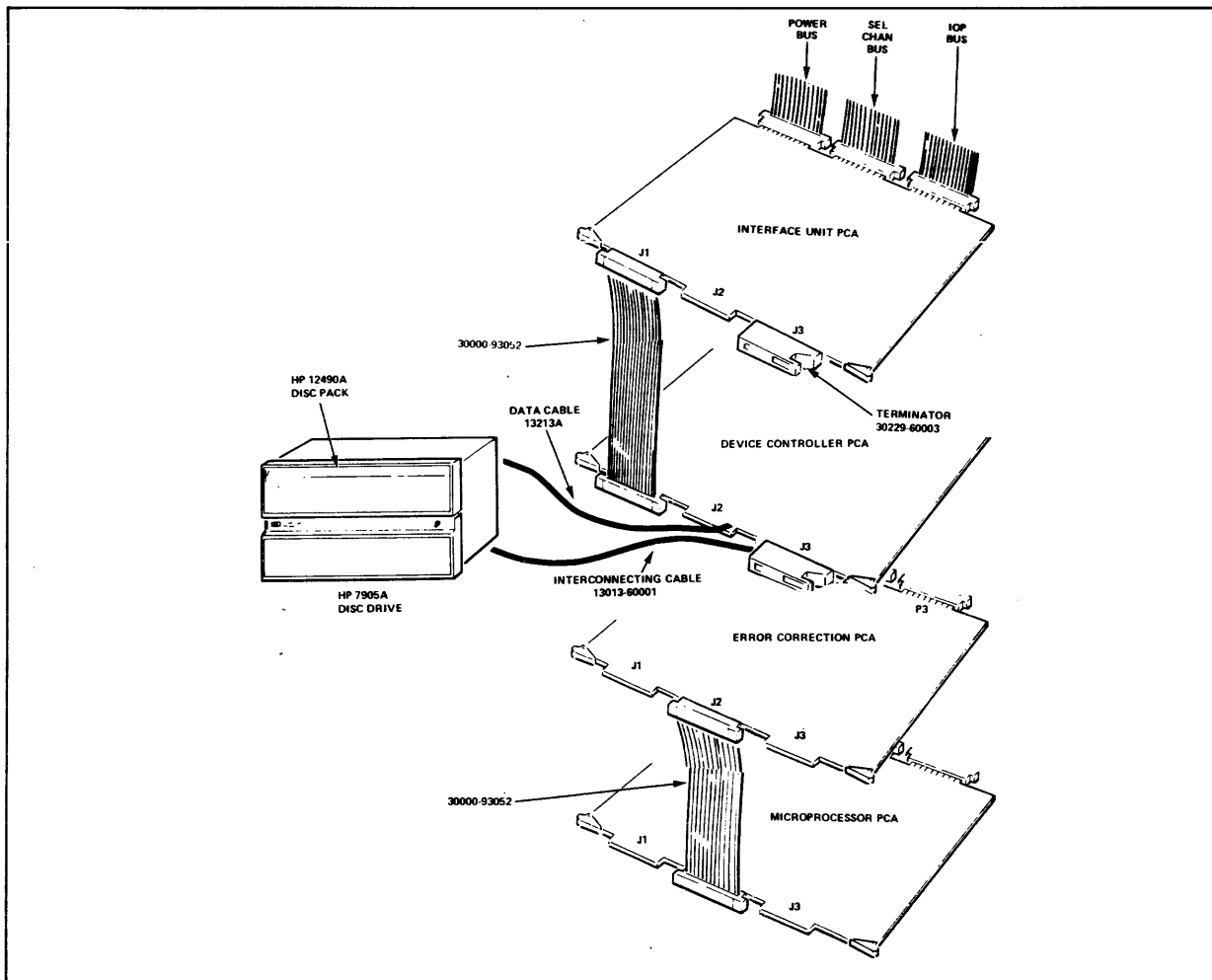


Figure 3-10. HP 7905A Cartridge Disc Subsystem

3-12. INSTALLING AN HP 7905A

Installation of a HP 7905A Cartridge Disc Subsystem consists of connecting the data cable, interconnecting cable, and AC power cable.

The interconnecting cable and data cable are shipped attached to the device controller PCA and are coiled inside the equipment bay. Uncoil the interconnecting and and data cables and connect equipment as directed in paragraph 3-13 and as shown in figure 3-10.

CAUTION

A flat, braided, grounding Cable supplied with the HP 29425A Disc Cabinet must be connected between that Cabinet and the equipment bay. Otherwise damage to equipment or faulty operations may occur.

3-13. INTERCONNECTING HP 7905A DISC DRIVES. Connecting an HP 7905A Disc Drive to the HP 3000 Series II Computer System Model 5 is a direct process for two cables. However, in multi-unit installations, two HP 7905A Drives must be "daisy-chained" from one part number 13037-60002 Device Controller PCA. Both methods are explained by figure 3-11 and these steps:

1. If they aren't already there, connect one end of an HP 13031A Multi-Unit Cable and an HP 13213A Data Cable to the part number 13037-60002 Device Controller PCA. Refer to the SYSTEM SUPPORT LOG and to figure 3-7 for the location of the Device Controller PCA. Also note the Data Cable Retainer shown in Detail C of figure 3-11.
2. For a single Drive installation, connect the free end of the part number 07905-60038 Cable to the part number 07905-60039 Terminator PCA, and orient the PCA as shown in detail A.
3. For a two Drive installation, connect the free end of the first (to be connected to the system) HP 7905A Drive's part number 07905-60038 Cable to the part number 07905-80010 Cable-to-Cable Adapter, and the free end of the last Drive's part number 07905-60038 Cable to the part number 07905-60039 Terminator PCA, and orient the PCA as shown in detail A.
4. Insert the Terminator PCA, and if step 2 above was used, the Cable-to-Cable Adapter into a part number 07905-60040 T-Connector. Orient the parts as shown in figure 3-11.
5. Connect one end of the HP 13031A Multi-Unit Cable already connected to the part number 13037-60002 Device Controller PCA to the right edge (as viewed from the rear) of the T-Connector, as shown in figure 3-11.
6. For a two Drive installation, connect one end of the other HP 13031A Multi-Unit Cable to the left edge (as seen from the rear) of the T-Connector, as shown in figure 3-11.
7. Mount the part number 07905-0050 Terminator Bracket(s) to the inside of the HP 29425A Disc Cabinet behind the Drive on the left side as seen from the rear.
8. Connect the one or two HP 13213A Data Cables with cable clamp to connector A7P4 at the rear of the Drive(s) through the opening shown in figure 3-11 detail B. Secure the cable clamp as shown.

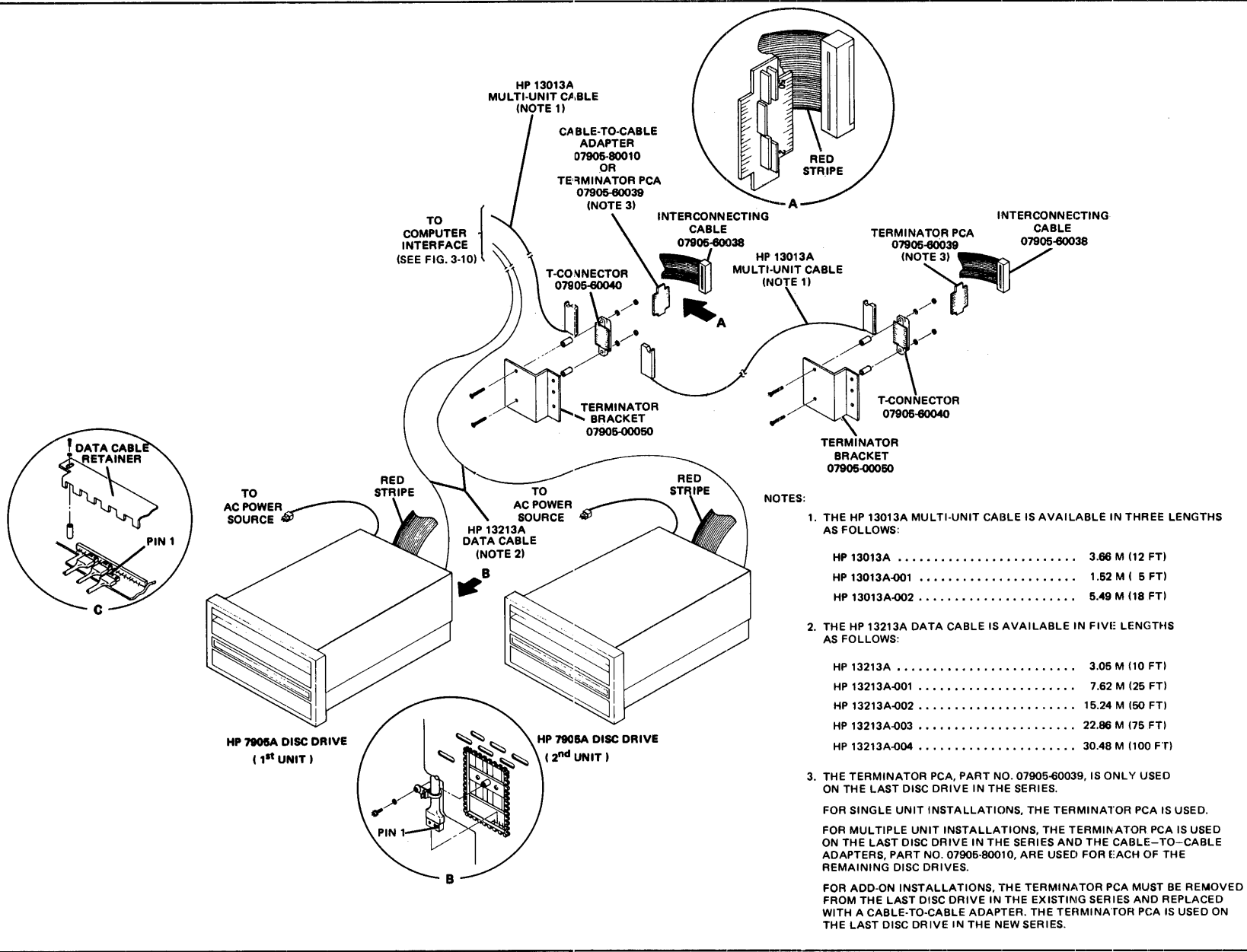


Figure 3-11. Interconnecting HP 7905A Disc Drives

NOTE

HP 29425A Disc Cabinets that are to be installed as part of a system using 50 Hz power are shipped without an AC power cable. This cable and connector cable must be fabricated at the time of site preparation by the customer. The cable must have a neutral and ground line and be capable of supplying 15 amps at 230 VAC. This AC power cable is connected to the circuit breaker on the HP 29425A cabinet Power Panel Assembly.

9. Plug each disc AC power cable into the HP 29425A cabinet AC power receptacle. Set the cabinet Power Panel circuit breaker OFF. Connect the disc cabinet PC power cable into an appropriate peripheral AC power receptacle. Do not turn-ON AC power to the HP 7905A at this time.

3-14. HP 2607A/2613A/2617A/2618A LINE PRINTER SUBSYSTEMS

The Line Printer Subsystems listed in the above title are called the Line Printer Subsystems in this text, for simplicity. Each of these subsystems consists of a Line Printer, an interconnecting cable and an interface PCA, as shown in figure 3-12. Table 3-3 shows the relationship between line printer model and subsystem number.

Table 3-3. Line Printer Model-Subsystem Number

HP MODEL LINE PRINTER	SUBSYSTEM NUMBER
2607A	30118A
2613A	30127A
2617A	30133A
2618A	30128A

Note that the line printer shown in figure 3-12 is not the same physical type as the HP 2613A, 2617A or 2618A Subsystems.

3-15. INSTALLING A LINE PRINTER SUBSYSTEM

Installation of a line printer subsystem consists of connecting the interconnecting cable and the AC power cable.

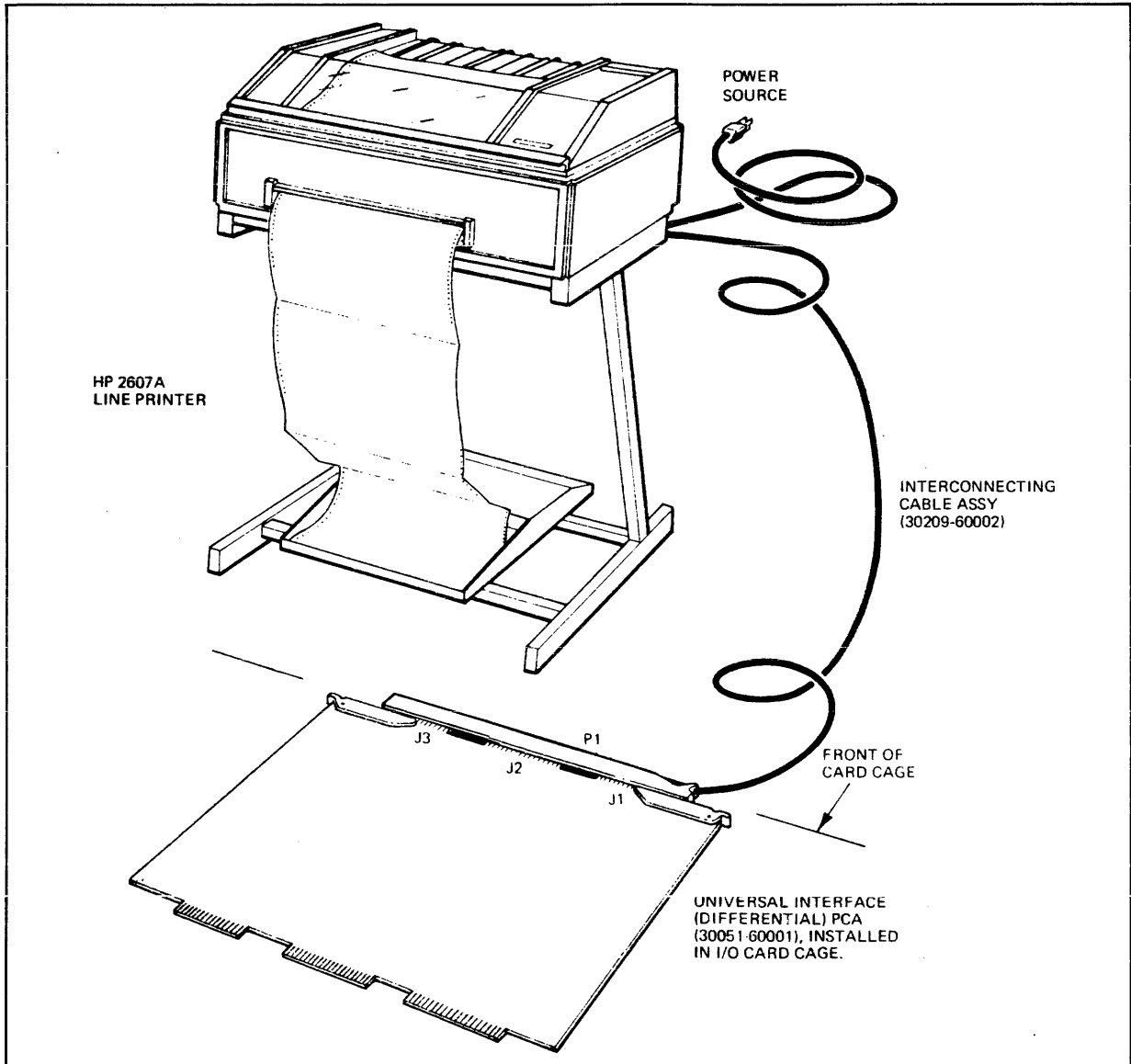


Figure 3-12. HP 2640A Line Printer Subsystem

The interconnecting cable is shipped attached to the Universal Interface (Differential) PCA and is coiled inside the equipment bay. Uncoil the cable and connect equipment as shown in figure 3-12. Do not turn-ON AC power to the line printer at this time.

3-16. HP 30102A (2888A) DISC FILE SUBSYSTEM

The HP 2888A Disc File is a free-standing device which uses removable disc packs (HP 30333A or equivalent). The disc file controller can control up to eight disc drives. The disc drives are connected to the controller by way of an HP 30331A Junction Panel located in the I/O Bay (see Section II figure 2-2). The Junction Panel will accommodate up to eight disc drives.

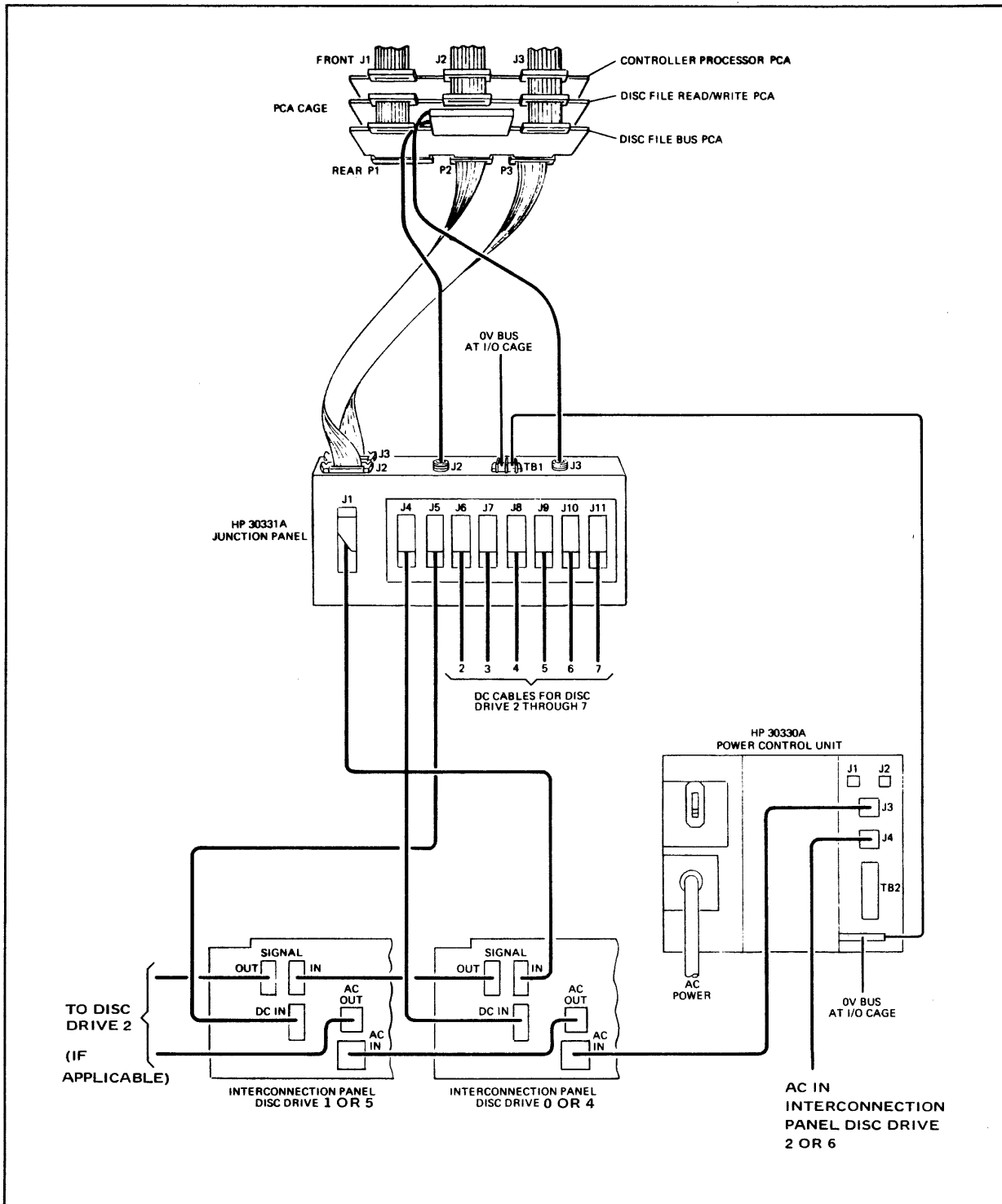


Figure 3-13. HP 30102A Disc File Subsystem Cabling

Power is supplied to the disc drives by a PCU (HP 30330A Power Control Unit), no matter which power option is chosen. The only difference from one option to another is the PCU terminal strapping. PCU strapping is described in Section II of this manual. When operating from 208V, 60 HZ, 3 phase power, one PCU is sufficient for up to eight disc drives. However, when operating from the other power option, a single PCU is sufficient for only four disc drives; a second PCU is supplied when a 5th disc drive is

delivered. Each PCU has two AC power output terminals (labeled J3 and J4) to which the disc drives are connected. Figure 3-13 shows how the disc drives are daisy-chain connected to the PCU; figure 3-14 shows a maximum configuration for both power options.

The HP 30202A Disc File Controller consists of the PCA's and cable assemblies shown in figure 3-15 and listed below:

- One Disc File Read/Write PCA, part number 30202-60001
- One Disc File Bus PCA, part number 30202-60002
- One Disc Controller Processor PCA, part number 30202-60003

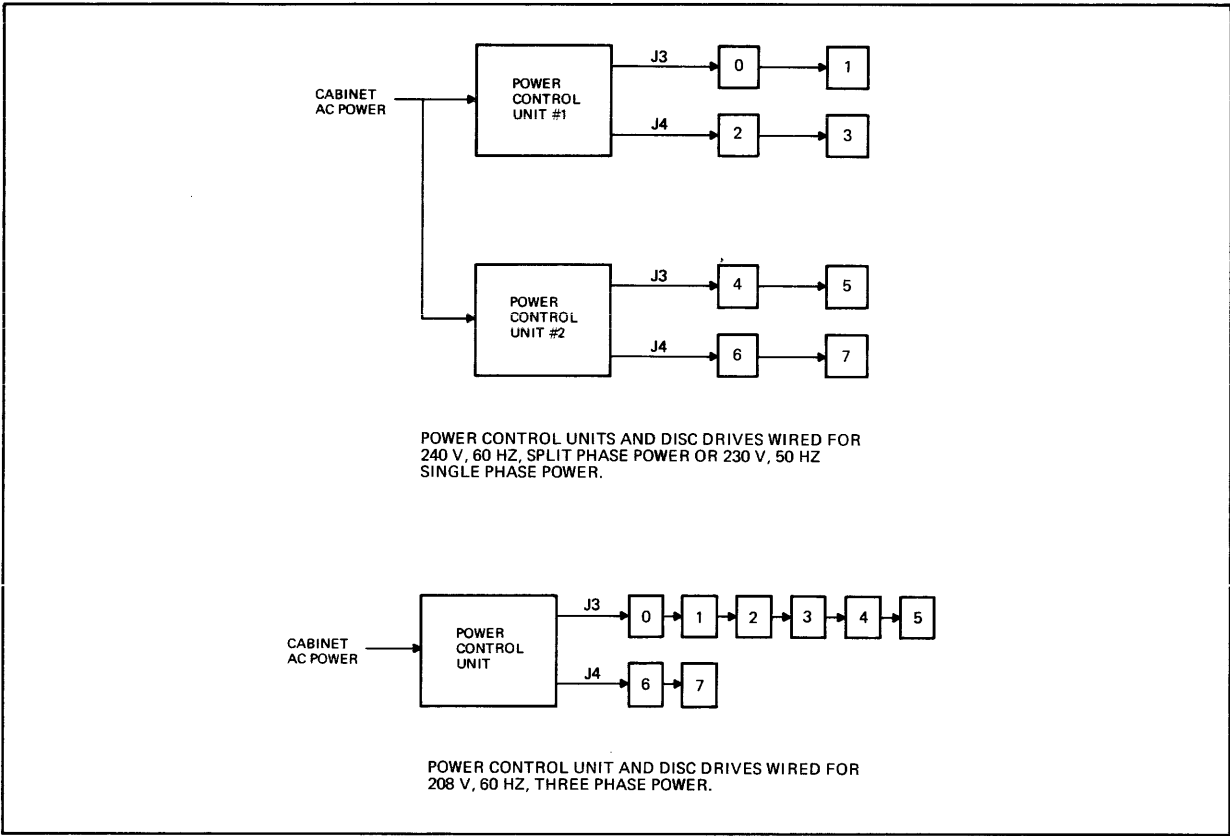


Figure 3-14. HP 2888A Disc File Power Configurations

3-17. INSTALLING AN HP 2888A DISC FILE

The disc file controller PCA's, the PCU's and the junction panel are already mounted in the appropriate equipment bays when the system is shipped. The disc drives and the connecting cables are shipped in separate containers.

Roll the disc to its intended location and position it in place allowing approximately 30 inches clearance on all sides for service access and proper ventilation. Level the drive by lowering the four leveler jacks to remove all weight from the casters.

After the bays are fastened together, the various cables must be uncoiled and connected to the appropriate equipment. The necessary cable connections are described below under Drive Cabling (see paragraph 3-19) and are shown in figures 3-13 and 3-14.

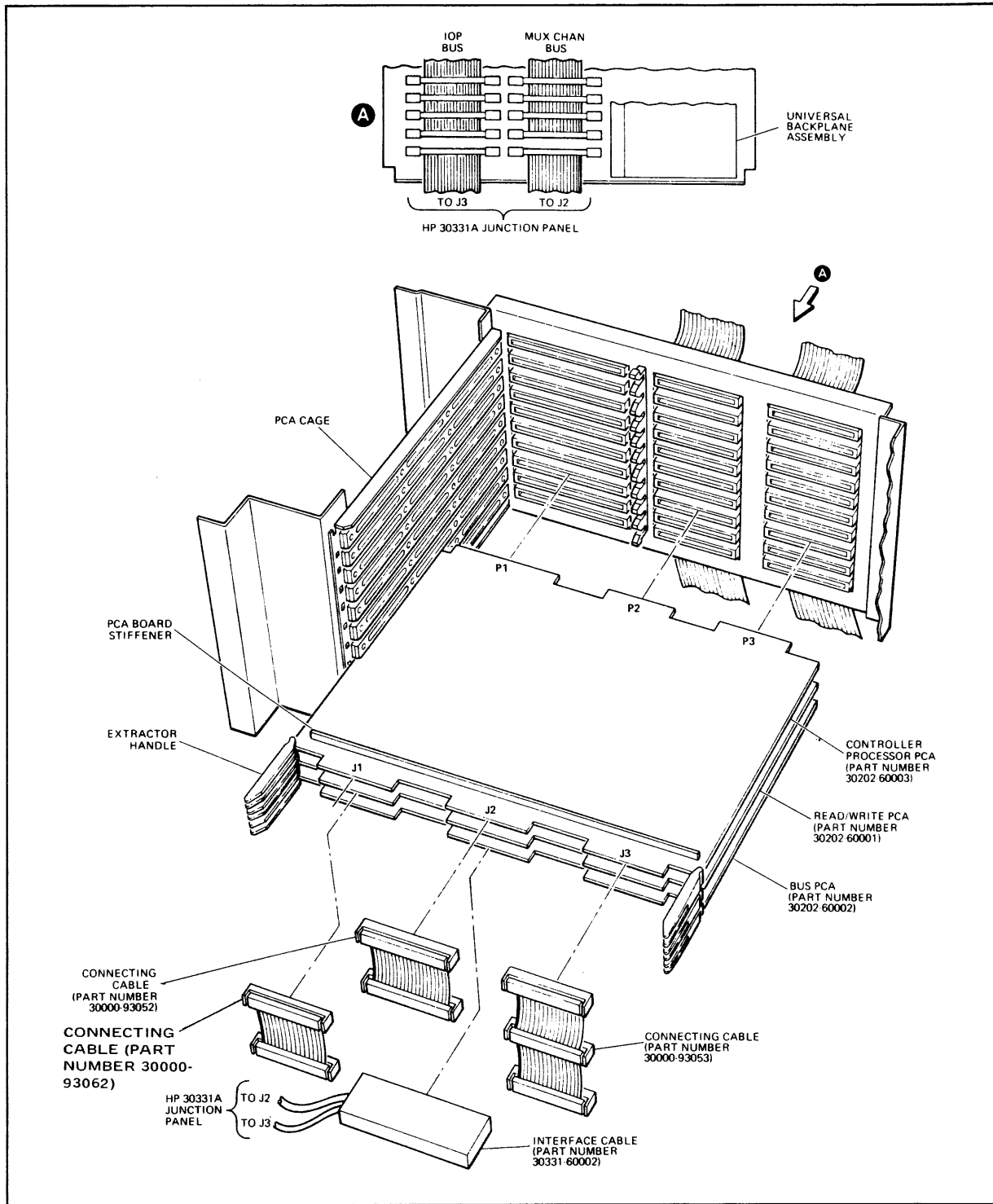


Figure 3-15. HP 3020A Disc File Controller PCA's, Cables

3-18. EQUIPMENT SET-UP. The equipment set-up procedure is as follows:

1. Remove the rear access cover and the package from inside the rear area (figure 3-16). Verify that the package contains two kick plates, six screws, an installation report form, and an identification marking strip. Do not replace the cover until all cables have been installed.

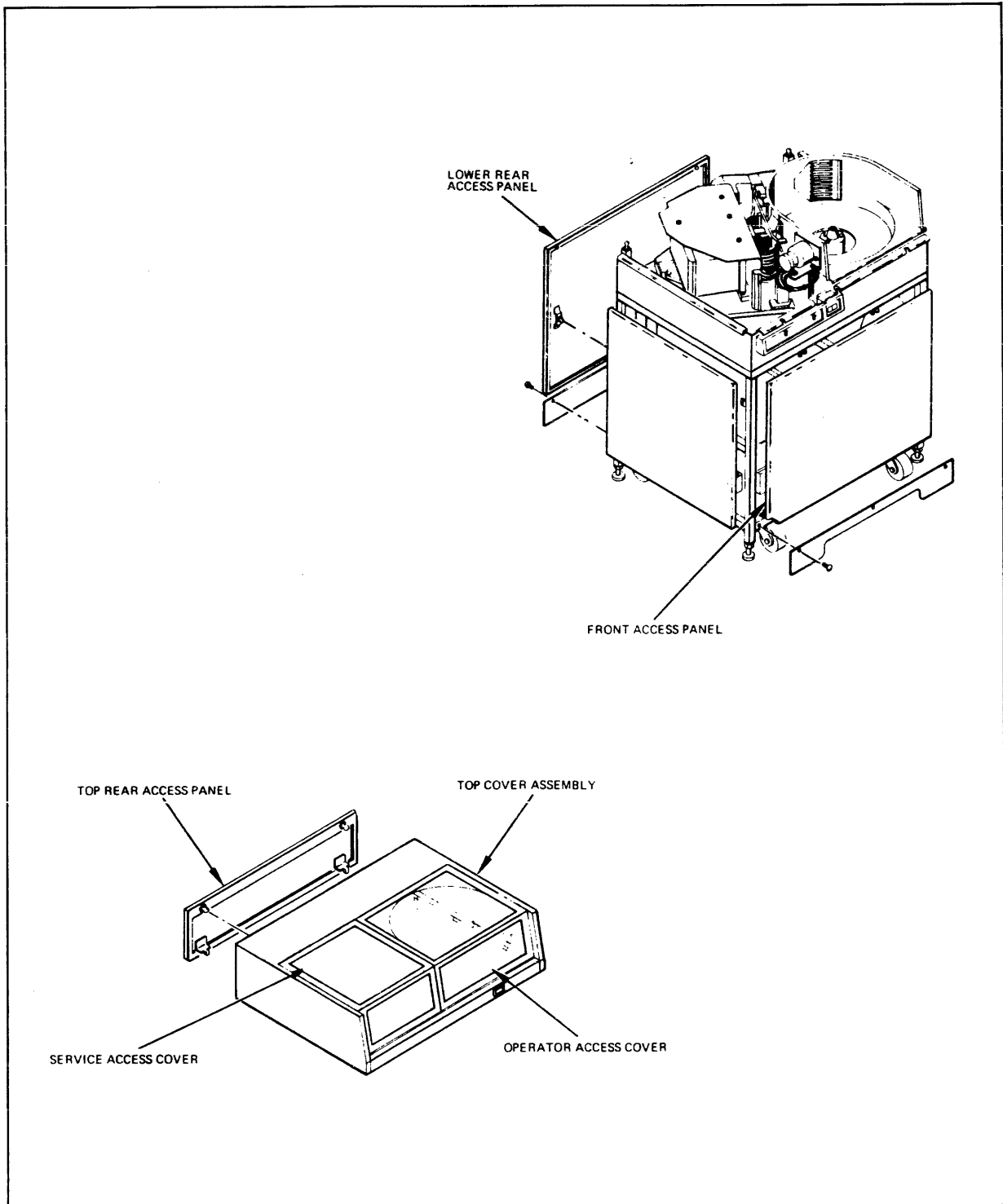


Figure 3-16. HP 2888A Service Access Covers

2. Raise the operator cover and try to manually turn the spindle. If the spindle hold brake is functioning properly, the spindle should lock.
3. Open the electronic gate shown in figure 3-18 and check all printed-wiring assemblies (PWA's) and paddle boards to ensure that all are securely seated in their respective sockets.

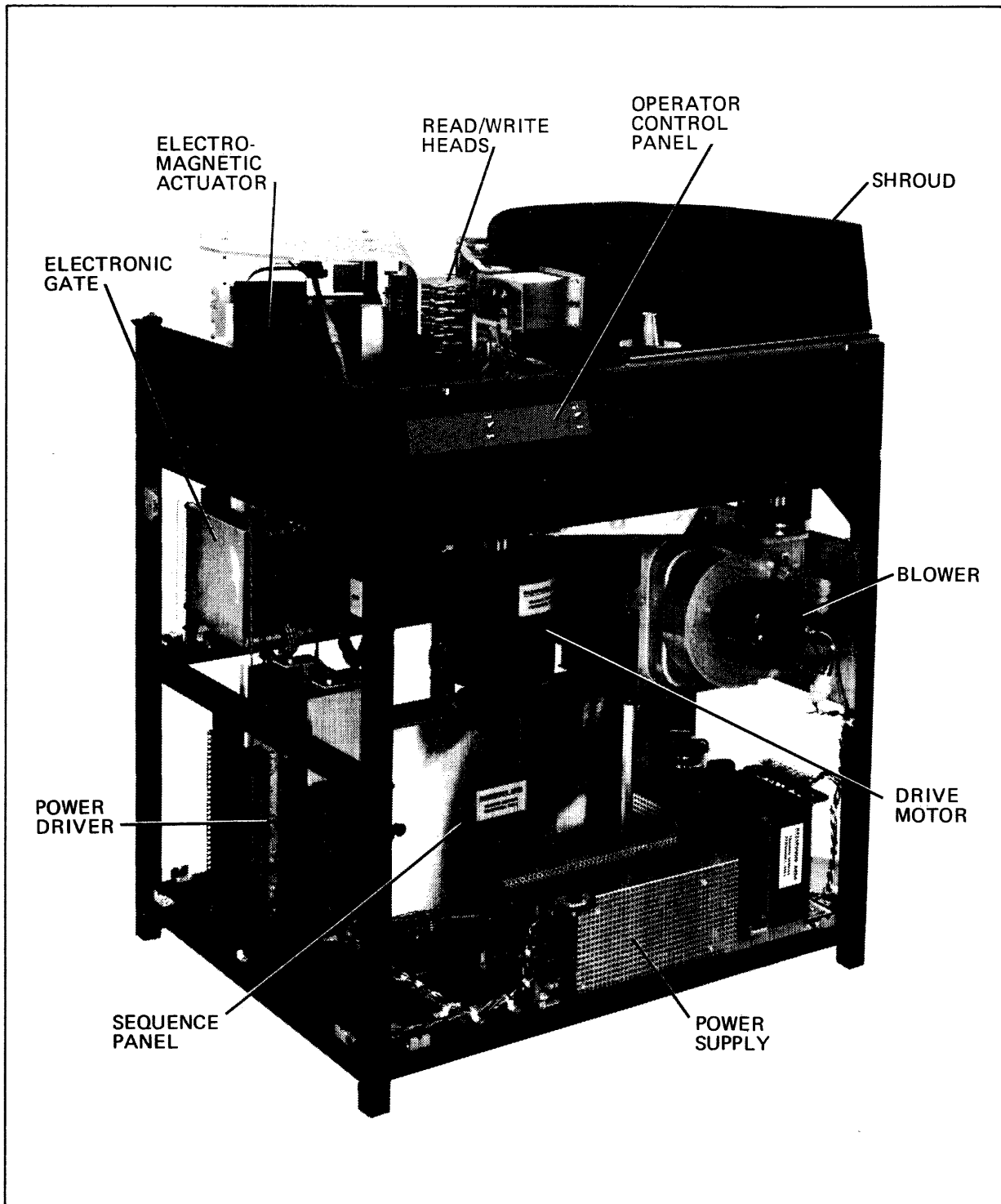


Figure 3-17. HP 2888A Front View, Covers Removed

4. Remove the carriage lock to free the carriage. The lock should be retained for re-installation prior to future relocation or reshipment of the unit. A tapped hole is provided on the terminal strip mounting block behind the control panel for carriage lock storage.
5. Check the drive belt assembly and spindle by manually turning the spindle to verify that it spins freely.

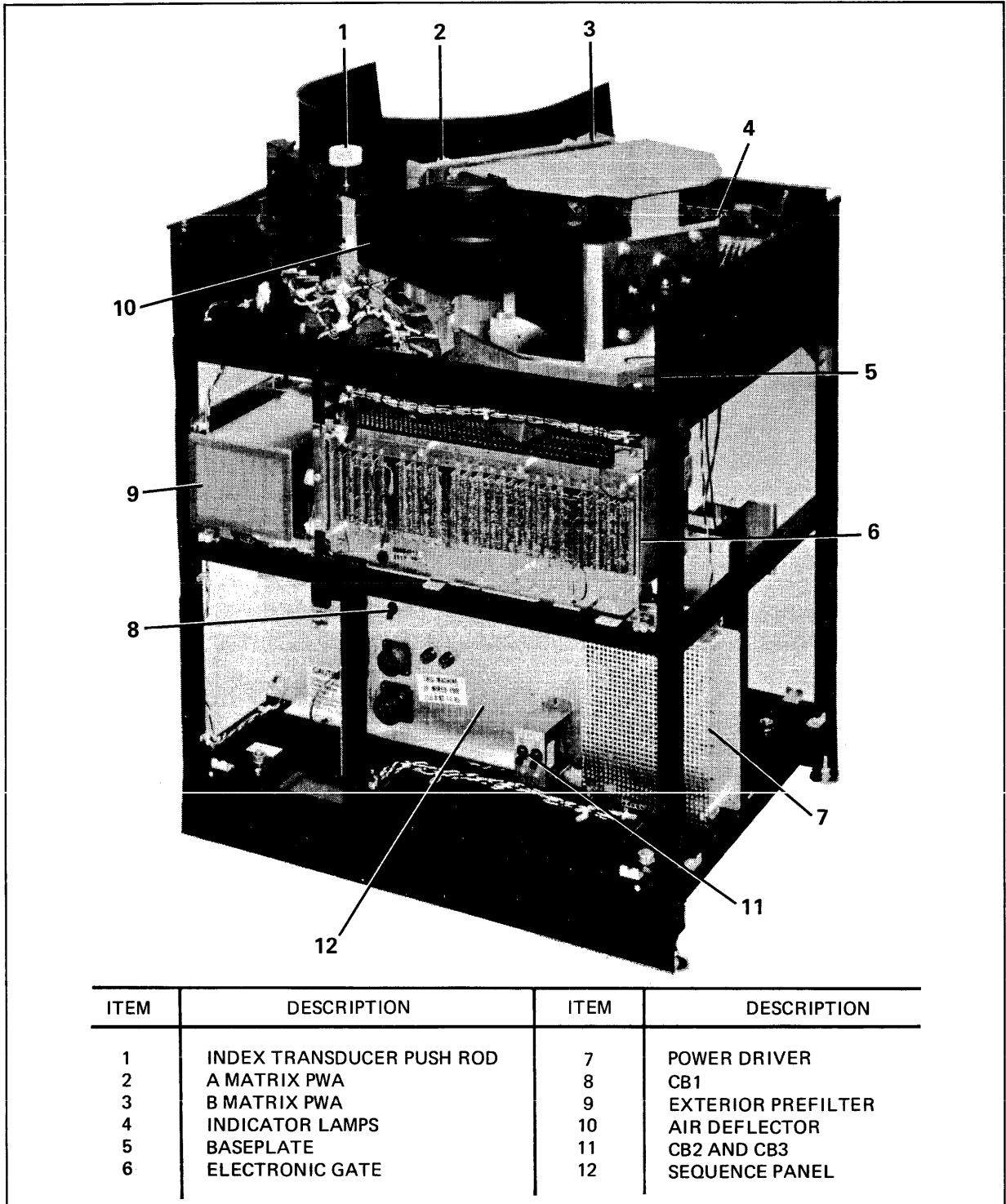


Figure 3-18. HP 2888A Rear View, Covers Removed

6. Check the electromagnetic actuator coil resistance across terminals 15 and 16 of PD1 on the rear of the power driver to ensure that no shorts or opens exist and to verify that resistance is within 2.0 to 2.5 ohms. See figure 3-18.
7. Check the pivot action of the index transducer by pressing the white index transducer pushrod on top of the air deflector and verify that the transducer pivots out of the shroud area. See figures 3-17 and 3-18.

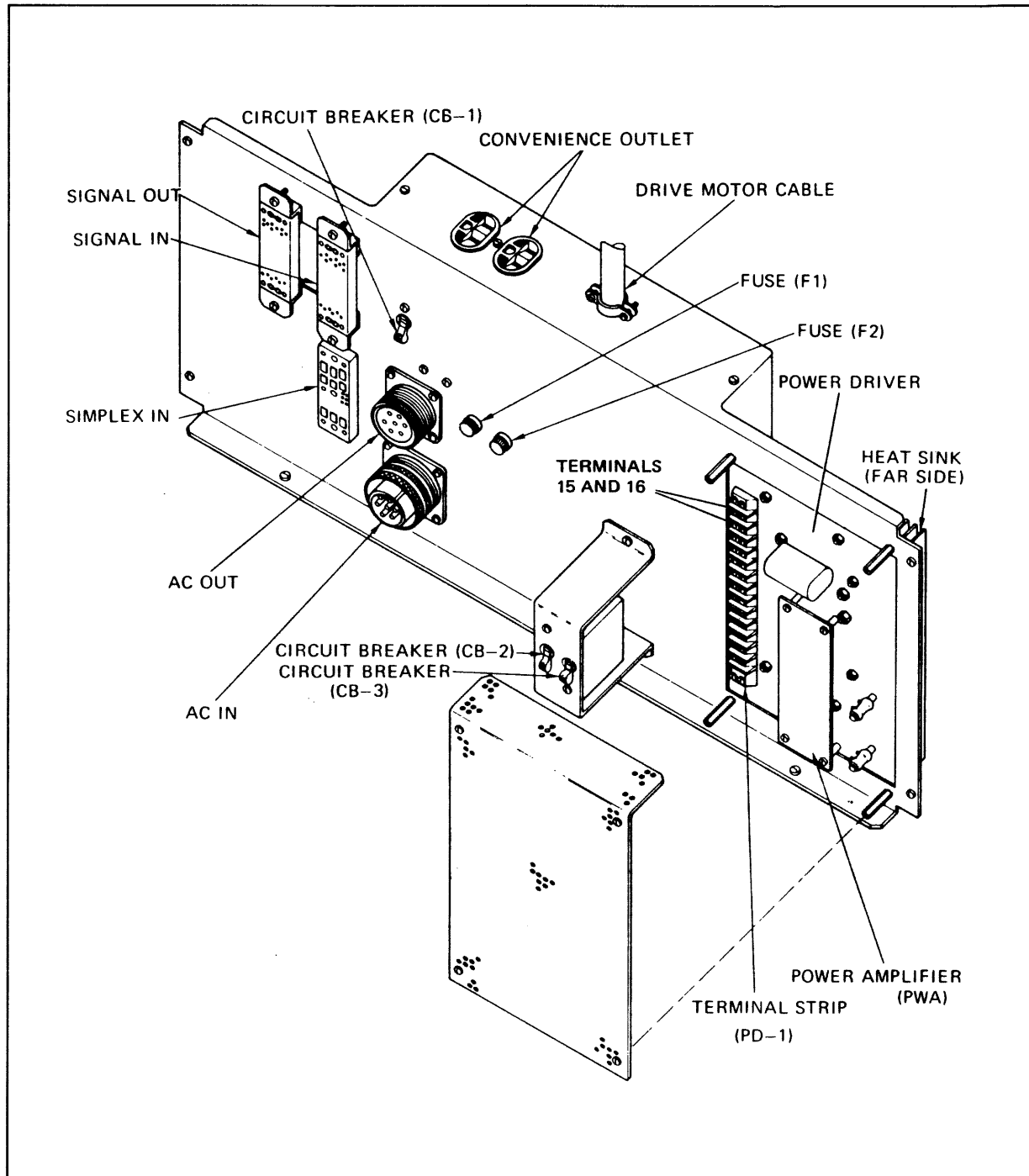


Figure 3-19. HP 2888A Sequence Panel and Power Driver

3-19. DRIVE CABLING. Input to each drive is by three cables: the AC power cable, the DC cable, and the signal cable. The disc drives are daisy chain connected to the AC power cable string as shown in figure 3-13. (J3 of PCU to AC IN of first drive, AC OUT of first drive to AC IN of second drive, etc.). A separate DC cable is connected between the junction panel and each individual disc drive, as shown in figure 3-13. The disc drives are daisy chain connected to the signal cable string as shown in figure 3-13 (J1 of junction panel to SIGNAL IN of first disc drive, SIGNAL OUT of first disc drive to SIGNAL IN of second disc drive, etc.). The last disc drive in the series must have signal terminator connected to its signal out receptacle (figure 3-19).

WARNING

Before cabling the disc drive, make sure that the circuit breaker in the Computer Mainframe Power Panel is OFF.

Install the cables into the equipment bays by these steps:

1. Use a nut driver to loosen six nuts holding a cable access cover in the bottom of the I/O Bay (bay #2) and remove the cover.

CAUTION

When installing the coaxial signal cables, take up the tension on the connector screws equally. Failure to do this may cause the center pin to be bent which will prevent good electrical contact.

2. Dress the cables up through the cable slot exposed in step 1; be careful to position the cables very close to their final places at the junction panel before you perform step 3.
3. Carefully position the cable clamps and retainer screws very close to their final places, push the connectors all the way in, then tighten the clamps and retaining screws.
4. Replace the cover removed in step 1 and tighten the holding nuts, then recheck the connectors installed in step 3.

To install cables onto connectors at the disc drive, position the cable clamps and retainer screws very close to their final places, push the connectors all the way in, then tighten the retaining screws.

The maximum length of each DC cable is 50 feet (15.2 meters). Both the cable and the signal cable are limited to a maximum accumulated length of 100 feet. The AC and signal cables are available in individual lengths of 8 to 54 feet, while the DC cables are available in lengths of 8 to 50 feet. The cable number and ISS part numbers are shown in table 3-4.

Table 3-4. HP 2888A Cables and Terminators ISS Part Numbers

ISS PART NUMBER	DESCRIPTION
84000694-x*	Cable Assembly, AC Interconnecting, 60 Hz
84003770-x*	Cable Assembly, AC Interconnecting, 50 Hz
84000729-x*	Cable Assembly, DC Interconnecting
83003857-x*	Cable Assembly, Signal Interconnecting, 50 Hz
83003856-x*	Cable Assembly, Signal Interconnecting, 60 Hz
84000731-x*	Cable Assembly, Signal Exit
76000696-5	

TURNING-ON THE NEW INSTALLATION

SECTION

IV

Before any device within an HP 3000 Series II Computer System is operated, the system must have been turned-on and checked by procedures presented in this section. Use these procedures for each installation of a system, whether the installation is for the entire system or only to add another peripheral device.

These procedures assume you have already performed mechanical and electrical (signal and AC power) installation steps presented in Sections II and III of this manual. It is especially important that you have measured AC voltages and phases and have checked circuit operations as described in paragraph 2-12 through 2-15.

4-1. INSTALLING THE MAINTENANCE PANEL

The HP 30354A Maintenance Panel is to be used only for maintenance procedures. This activity, turning-on a new installation, is a special maintenance procedure.

To install the Maintenance Panel, perform these steps:

1. Install the Maintenance Panel Interface PCA, part number 30354-60003, into slot 1 of the CPU Card Cage.
2. Set the NORMAL/LAMP TEST/SWITCH TEST toggle switch on the Maintenance Panel Interface PCA to NORMAL.
3. Install the part number 30354-80010 panel overlay.
4. Install the flat cable, part number 30354-60013, between connector J2 at the center front of the Maintenance Panel Interface PCA and connector J2 at the center front of the Current Instruction Register PCA located in A8 of the CPU card cage.
5. Install the Interface Cable, part number 30354-60007, between connector J1 on the Maintenance Panel and connector J1 at the left front of the Maintenance Panel Interface PCA.
6. Install the power cable, part number 30354-60005, between connector J2 on the Maintenance Panel and connector J3 on the PCM in the rear of the CPU Bay (Number 1).
7. Set all of the toggle switches on the Maintenance Panel down, one-at-a-time. Only those switches that are spring-loaded won't stay down; let the spring set those switches.

4-2. TURNING-ON THE NEW INSTALLATION

To turn-on the new installation for the first time, perform the following steps:

1. Set all power switches OFF on each HP 30310A, HP 30311A, and HP 30312A Power Supply in the system. All HP 30310A Power Supplies are at the rear of an equipment bay; all others are behind a front door of an equipment bay.

System Installation

2. Set the Computer Main Frame Power Panel circuit breaker ON.
3. At the rear of an equipment bay, set the PCM MAIN SYSTEM POWER (figure 2-3) and PCU EXTENDED SYSTEM POWER circuit breakers ON (figure 2-5), then check for the following conditions:
 - a. All fans in card cages and equipment bays or cabinets are blowing.
 - b. At the upper-right corner of the CPU Bay, the EMERGENCY OFF pushbutton is lit.

NOTE

If the EMERGENCY OFF pushbutton is not lit or any fan is not blowing, correct the error before going any further in this procedure. See Section II of this manual.

4. Behind the front door of the CPU Bay, set toggle switches ON in this order (see figure 4-1):
 - a. LOWER 128K MEMORY DC POWER
 - b. UPPER 128K MEMORY DC POWER
 - c. SYSTEM DC POWER.

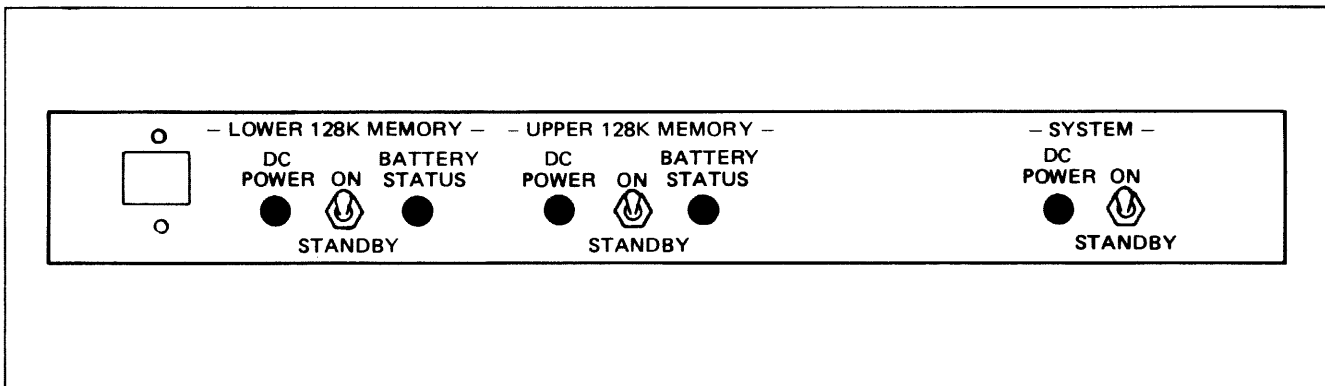


Figure 4-1. DC Control Panel

5. On the inside of the front door at the top, set two toggle switches: PANEL to ENBL (enable) and PF/ARS (Power Fail/ Automatic Restart) to ENBL (enable).
6. At the rear of equipment bays, set the power switch ON on each HP 30310A Power Supply.
7. Behind the front door of equipment bays, set the power switch ON on each HP 30312A Power Supply, then do so on each HP 30311A Power Supply.
8. Check the BATTERY STATUS lamps for the following indications:
 - a. The battery is charging; the lamp blinks at about a 0.5 Hz rate.

- b. The battery indicated is not needed, is absent, or an error condition exists; the lamp remains dark.
 - c. After the system has been ON for a while, the battery should become fully charged; the lamp remains lit.
9. Close the front door of equipment bay number 1 and check the panel at the top front. Two BATTERY STATUS lamps indicate the same conditions as those behind the door, and the EMERGENCY OFF pushbutton is lit.

4-3. HP 7970 INITIAL TURN-ON

1. Be sure the AC power toggle switch behind the front door of the tape unit is OFF.
2. Connect the HP 7970 ac power cable to the cabinet power receptacle.
3. Set the AC power toggle switch ON.

4-4. HP 2640A INITIAL TURN-ON

The following procedure is used to initially turn-ON the terminal.

1. Be sure the AC POWER toggle switch on the HP 2640A rear panel is OFF.
2. Connect the power cable to the peripheral AC power outlet.
3. Raise the hinged rear access cover (two rotating latches hold it in place). Then connect the keyboard cable hood connector to the printed-circuit card connector that is notched to match the keying insert in the keyboard cable hood connector. Align the connectors carefully and use no more pressure than necessary.
4. Place the Terminal on any convenient surface except a plush or soft surface that might restrict air flow to vents on the bottom. For example, do not set the Terminal on a typewriter pad. The keyboard can be set on any surface.
5. Set the DUPLEX, PARITY and BAUD RATE switches on the keyboard to settings determined by the equipment configuration and the programs that will use the HP 2640A.
6. Set the AC POWER switch ON and allow about 15 seconds warm-up time. Then press the TAPE TEST key on the keyboard; if a beep is heard and one or more sets of characters appear on the screen, the Terminal is ready for use. If the TAPE TEST key results are doubtful, consult the 2640A Video Terminal Owner's Manual.

4-5. HP 7905A INITIAL TURN-ON

The following procedure is used to initially turn-ON the HP 7905A Disc.

1. Be sure the AC power circuit breaker at the rear of the HP 29425A Disc Cabinet is OFF.

System Installation

2. Connect the HP 29425A Disc Cabinet power Cable to the peripheral AC power source.
3. Be sure the flat, braided, ground strap is connected between all HP 29425A Disc Cabinets and the equipment bay.
4. Set the AC power circuit breaker at the rear of the HP 29425A Disc Cabinet ON and set the POWER switch for the disc drive in that Cabinet ON.
5. Check that all equipment fans in the HP 29425A Disc Cabinet are blowing.

4-6. LINE PRINTER SUBSYSTEM INITIAL TURN-ON

The following procedure is used to initially turn-ON the line printer subsystem.

1. Ensure that the line printer ON and PRINT switches are in the off (extended) position.
2. Connect the line printer power cord to a peripheral AC power outlet.
3. Apply ac power to the line printer.

4-7. HP 2888A DISC FILE FUNCTIONAL CHECKS

Drive functional checks are performed only after the system initial turn-ON has been performed.

If the drive has been stored or exposed to extreme high or low temperatures just prior to positioning at the facility, allow the drive to stand for approximately six hours at facility environment to reach thermal equilibrium before performing the functional checkout.

4-8. HEAD LOAD CHECK. Perform this check as follows:

1. Install a disc pack on the drive.

CAUTION

When CB1 is energized in step 2, listen carefully for a high pitch sound (approximately two seconds in duration). This is caused by reverse current in the EMA. If no sound is heard, this indicates that you do not have reverse hold current. Do not try to load the heads until this condition is cleared or damage to the heads will result.

2. Set CB2 and CB3 to the ON position and then turn the master power circuit breaker (CB1) to the ON position.
3. Set the START/STOP switch on the disc drive control panel to the START position and look for the following indications as the disc drive cycles through the power-on sequence:
 - a. Drive motor starts.

- b. Brushes cycle into and out of the disc pack.
- c. Carriage moves forward to load the heads, then returns to cylinder 000 (the outermost cylinder).
- d. FILE READY indicator light illuminates.

NOTE

Refer to chapter 7 of the HP 2888A Disc File Operating and Service Manual for select lock troubleshooting procedures if a SELECT LOCK condition occurs.

4. Set the START/STOP switch on the disc drive control panel to the STOP position and make sure that the dynamic brake operates properly (the disc pack should stop rotating within 25 seconds). Refer to chapter 7 of the HP 2888A Disc File Operating and Service Manual troubleshooting charts if the dynamic brake is malfunctioning.

4-9. READ/WRITE HEAD ALIGNMENT. The read/write heads must be aligned when the disc drive is installed. Perform head alignment check and adjustment in accordance with the procedures in chapter 6 of the HP 2888A Disc File Operating and Service Manual. Note that approximately two hours warm-up time is required before adjusting the heads.

4-10. POWER-ON, DRIVE-START, SEQUENCE CHECK. This check must be performed with the disc drive on-line. The check procedure verifies that the installed drive can be stopped and restarted along with the other disc drives in the system. Perform the check as follows:

1. Make sure that the system power is OFF and that disc packs are installed on all the drives. Set all the disc drive START/STOP switches to the START position and then turn-ON the system power. All disc drive motors should turn-ON (in ascending sequence) and the brush cycle should start on all drives.
2. Power down the PCU. The disc drive motors will all stop when the PCU has been powered down.
3. Check each drive to verify that the heads are retracted from the disc pack.

4-11. PREPARATION FOR PERIPHERAL TURN-ON

Perform any necessary procedures for peripheral devices such as loading paper and ribbon in the line printer, install the cartridge disc, load magnetic tape, etc. Turn-ON all peripheral devices, in any order, then proceed to "Adjusting System Voltages" in this section.

4-12. ADJUSTING SYSTEM VOLTAGES

Voltage measurements to be made in the following procedures must reference the appropriate common circuit. The common circuits are labelled COM and common symbol and are specified in the following

System Installation

instructions. Use an HP 3439A Digital Voltmeter with an HP 3441A Range Selector (or their equivalents).

1. Allow at least 15 minutes warm-up time, preferably with the CPU in the RUN state (the RUN lamp is lit).
2. Check the control panel at the top front of the full length door on the CPU Bay. If the RUN lamp is lit, press the top of the RUN/HALT switch to turn-off the RUN lamp.
3. Behind the front door of equipment bays, look for the small panel of an HP 30312A Power Supply (figure 4-2). For each HP 30312A Power Supply in the system, perform these steps:
 - a. Set the ADJ R32 potentiometer fully counterclockwise.
 - b. Press and hold toggle switch S2 and turn ADJ R32 clockwise until the LED in the upper-right corner of the HP 30312A panel lights to indicate "overcurrent."
 - c. Release toggle switch S2 and check that the overcurrent LED goes out and a 5V LED lights.

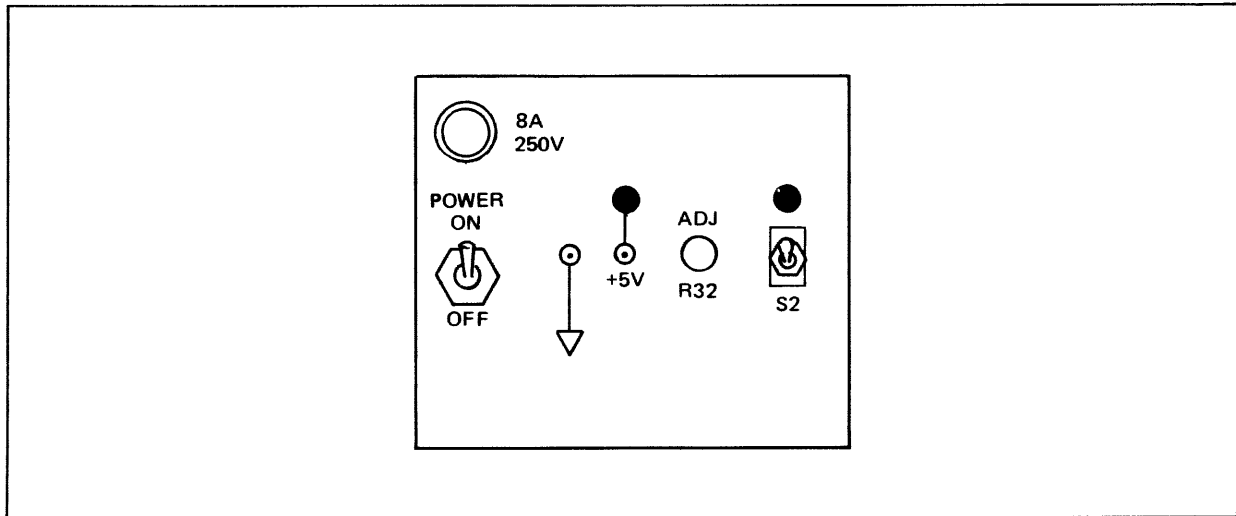


Figure 4-2. HP 30312A Power Supply Front Panel

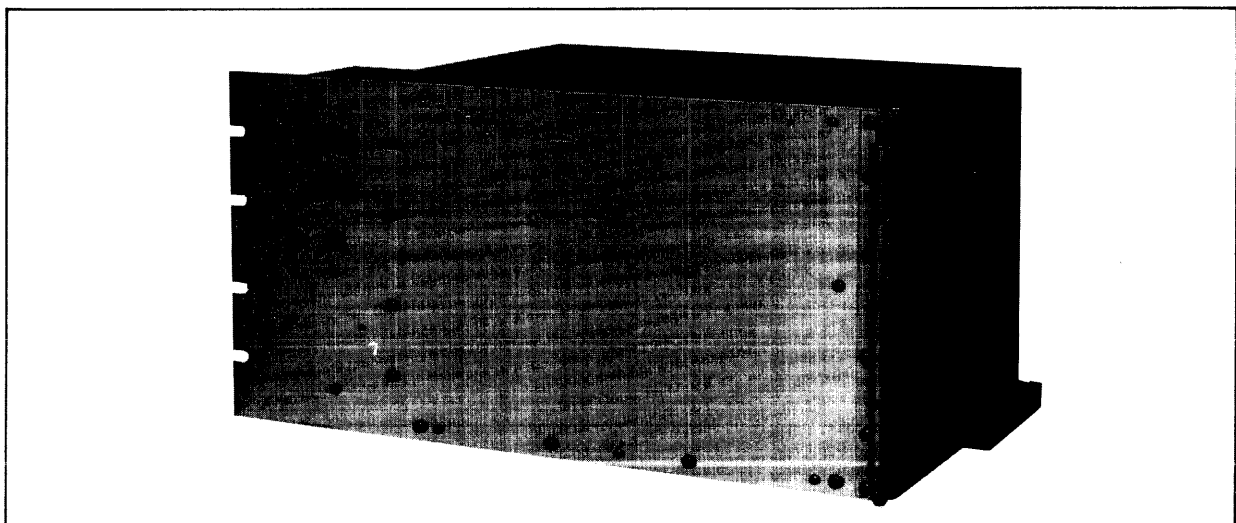


Figure 4-3. HP 30310A Power Supply

4. Open the rear door of equipment bay number 1, remove the screw(s) at the left edge of the HP 30310A Power Supply (figure 4-3) and swing that Power Supply out of the bay.
5. At the top of the HP 30310A Power Supply, turn R12 fully clockwise.
6. Connect the digital voltmeter between the +5VDC connector (BNC type) center conductor and a COM terminal lug on the back plane of the CPU card cage.

NOTE

Do NOT connect the digital voltmeter common lead to chassis ground. Failure to heed this note will produce erroneous and possibly destructive results.

7. Use a small tip screwdriver to reach through the top of the HP 30310A Power Supply to adjust A1R1 until the digital voltmeter displays +5.10 volts.
8. Leave the digital voltmeter common lead where it is now but move input lead to the +15, -5, and -15 test jacks on the HP 30310A rear panel. If the voltmeter displays a value < 14.2 or > 16.7 for either the +15 or -15 test jacks, or < 4.4 or > 5.3 for the -5 test jack, adjust A1R1 again, then repeat steps 6 and 7 and this step 8.
9. Move the voltmeter input lead to the +20 test jack on the HP 30310A panel, then use a small tip screwdriver to reach through the top of the HP 30310A Power Supply to set A3R2 fully clockwise and leave at this setting. The voltmeter should display a value > 18.54 or < 21.50 .
10. Move the voltmeter input lead to the -20 test jack; the same value (but opposite polarity) noted in step 7 should be displayed.
11. Repeat steps 4 through 10 for each HP 30310A Power Supply in the system.
12. Move the voltmeter to the front of the equipment bays.
13. Connect the voltmeter common or return lead to the common symbol jack on the front panel of the HP 30311A Power Supply in the CPU Bay (figure 4-4).
14. Connect the input lead of the voltmeter to each of the test jacks on the HP 30311A Power Supply front panel and compare the value displayed against table 4-1.
15. If all the values displayed are out of tolerance, proceed no further until the +5.00V Internal Reference Adjustment procedure described in the HP 3000 Signal and Power Distribution Manual, 30000-90021, has been performed on your HP 30311A Power Supply.
16. Repeat steps 13 through 15 for each HP 30311A Power Supply in the system.

4-13. VERIFYING SYSTEM OPERATION

Now you are ready to verify that the system operates correctly. Follow the instructions in Section I of the System Service Manual, 30000-90020, to perform the System Verification procedure.

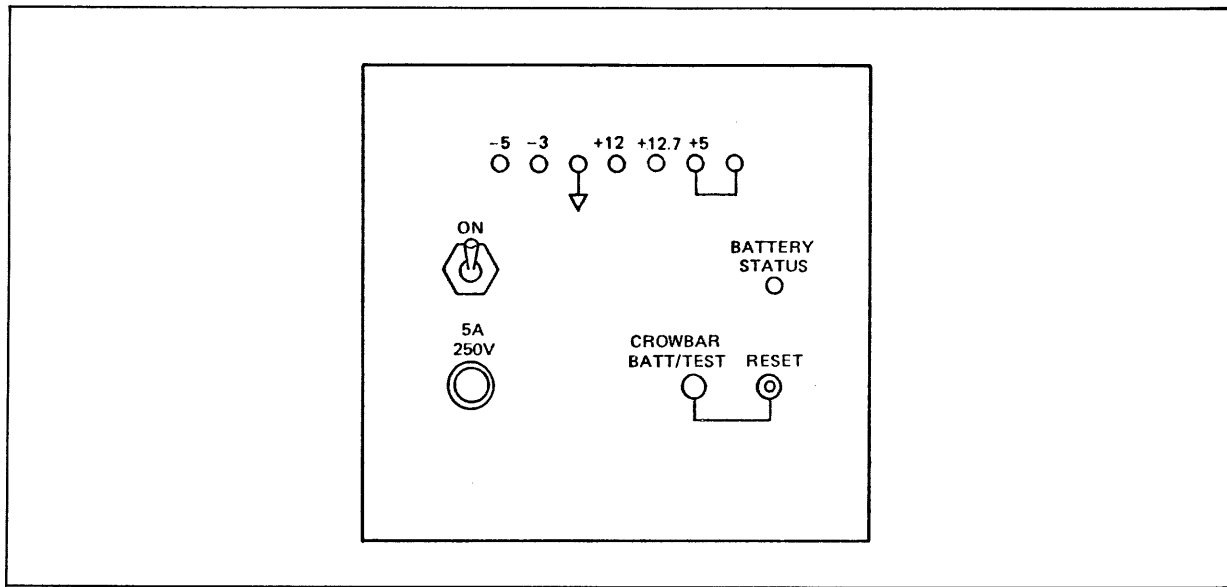


Figure 4-4. HP 30311A Power Supply Front Panel

Table 4-1. HP 30311A Test Jack Voltages

TEST JACK	VALUE REQUIRED
+5	+5.0; +-0.125
+12.7	+12.7; +0.7,-0.2
+12	+12.0; +- 0.12
-3	-3.0; +- 0.15
-5	-5.0; +- 0.05

4-14. COMPLETING THE INSTALLATION

To complete the installation of the system, all peripheral devices must be turned-on and connected on-line. Then run diagnostic programs as described in the SYSTEM SERVICE MANUAL, 30000-90018, then perform an MPE/3000 COLD-START PROCEDURE as described in the OPERATOR'S GUIDE, 32000-90013.

4-15. TRAINING THE NEW SYSTEM OPERATOR

If your customer's system operator hasn't been responsible for an HP 3000 system before, you must show him how to operate the system. Training must be given to cover the following topics:

- Power on/off
- Safety Precautions

- WARMSTART/SHUTDOWN/COLDSTART
- Daily Maintenance
- Physical operation of peripheral devices (loading paper, ribbon, magnetic tape, etc.)
- Taking a DUMP
- How to make a service call
- Connecting terminals (refer to Section III for details).

Other training will be given by the responsible Hewlett-Packard Systems Engineer.

4-16. I/O ERROR LOGGING

I/O error logging capability (log files) exists within the system software but must be enabled for use. Discuss the use of this feature with the system manager/supervisor. Refer to the SYSTEM MANAGER/SUPERVISOR REFERENCE MANUAL (30000-90014) for a description and use of log files.