HP 3000 Computer Systems

SERIES 64/68/70 COMPUTER

Installation Manual

HEWLETT PACKARD
19447 PRUNERIDGE AVENUE, CUPERTINO, CA 95014

Part No. 30140-90007
E0486

Printed in U.S.A. 04/86

FEDERAL COMMUNICATION COMMISSION RADIO
FREQUENCY INTERFERENCE STATEMENT

The United States Federal Communications Commission (in Subpart J, of Part 15, Docket 20780) has specified that the following notice be brought to the attention of the users of this product:

"Warning: This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instructions manual, may cause interference to radio communications. It has been tested for compliance with the limits for Class A computing devices pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference. Operation of this equipment in a residential area is likely to cause interference in which case the user at his own expense will be required to take whatever measures may be required to correct the interference."

"This product has been tested and licensed by the Fernmeldetechnisches Zentralamt (FTZ) for use in West Germany. Included with the system is a registration postcard to be completed and mailed for all German installations."

LIST OF EFFECTIVE PAGES

The List of Effective Pages gives the date of the current edition, and lists the dates of all pages of that edition and all updates. Within the manual, any page changed since the last edition is indicated by printing the date the changes were made on the bottom of the page. Changes are marked with a vertical bar in the margin. If an update is incorporated when an edition is reprinted, these bars and dates remain. No information is incorporated into a reprinting unless it appears as a prior update.

Seventh Edition.....April 1986

Effective Pages	Date
ALL	APR 1986

PRINTING HISTORY

New editions are complete revisions of the manual. Update packages, which are issued between editions, contain additional and replacement pages to be merged into the manual by the customer. The date on the title page and back cover of the manual changes only when a new edition is published. When an edition is reprinted, all the prior updates to the edition are incorporated. No information is incorporated into a reprinting unless it appears as a prior update. The edition does not change.

First Edition	MAR 1982
Second Edition	JUL 1982
Third Edition	FEB 1983
Fourth Edition	DEC 1983
Fifth Edition	DEC 1983
Update #1	MAY 1984
Update #2	AUG 1984
Sixth Edition	JAN 1985
Seventh Edition	APR 1986

CONTENTS

PREFACE ix

Section 1
RECEIVING THE SYSTEM

System Receiving Guidelines 1-1
Unpacking Instructions 1-1

Section 2
SYSTEM PROCESSOR UNIT

Physical Description 2-1
AC Power Description 2-3
Inspecting 50-Hz Systems 2-3
Processor Bays 2-5
Connecting the Bays 2-5
Hardware Configuration 2-10
Connecting IOB Cables 2-11
Junction Panels 2-12
DCU-ATP Remote Cable 2-15
Installing GIC PCAs 2-17/2-18

Section 3
SYSTEM INSTALLATION

Introduction 3-1
Installing the Processor 3-4
Installing the System Console 3-4
Installing the HP Touchscreen II as the System Console 3-4
Installing the HP 2642A or 2647F as the System Console 3-15
Installing Disc Drives 3-17
Installing the HP 7920M/7925M System Disc Drives 3-17
Installing the HP 7920S/7925S System Disc Drives 3-17
Installing the HP 7933/35XP/H System Disc Drives 3-20
Installing the HP 7911/12/14 System Disc Drives 3-20
Installing the HP 7945A Disc Drive 3-21
Installing the HP 9895A Flexible Disc Drive 3-21
Installing Printers 3-21
Installing the HP 2563A/65A/66A Line Printers 3-21
Installing the HP 2601A/02A/03A Daisywheel Printers 3-22
Installing the HP 2608A/S Line Printers 3-22
Installing the HP 2680A/86A/87A/88A Page Printers 3-22
Installing the HP 2932A/34A Printers 3-22
Installing Magnetic Tape Drives 3-23
Installing the HP 7970E Magnetic Tape Drive (Master) 3-23
Installing the HP 7974A and 7978A/B Magnetic Tape Drives 3-23
Installing the HP 9144A Magnetic Tape Drive 3-23
Installing Terminals 3-26

CONTENTS (continued)

Section 4
POWERING THE SYSTEM

DC Power Supplies 4-1
Power Distribution Monitor 4-1
Final System Preparation 4-3
System Startup 4-3
MPE Boot-Up 4-4
System Load (MPL) Errors 4-5
Cache Initialization (NCAC or OCAC) Errors 4-5
Microcode Program Load (MPL) Error Messages 4-5
Hardware Error Messages (Printed on DCU Console) 4-9/4-10

Section 5
SYSTEM VERIFICATION

Introduction 5-1
Offline Verification 5-3
Fault Locating Diagnostics 5-3
Online Verification 5-4
System Power Fail Recovery 5-4

Section 6
TRAINING THE SYSTEM OPERATOR 6-1/6-2

Appendix A
HARDWARE CONFIGURATION

Loading General I/O Channels A-1
CPU Card Cage Configuration A-3
I/O Card Cage Configuration A-5
HP-IB Cable Configuration A-9
Internal Cables A-10
External Cables A-10
Add-Ons A-11/A-12

Appendix B
UPGRADE INSTALLATION INFORMATION

Introduction To Upgrades B-1
Upgrading To HP 3000 Series 70 From HP 3000 Pre-Series II, Series II, III, 30, 33, 37, 37XE, 39, 40, 42, 42XP, 44, 48, Or 58 . . . . . B-1
Upgrade Installation Procedures B-3
Peripheral Upgrades B-5

FIGURES AND TABLES

LIST OF FIGURES

Figure 1-1. Packing Assembly 1-3/1-4
Figure 2-1. SPU, Front/Side View, Panels On 2-1
Figure 2-2. SPU, Rear View, Panels On 2-2
Figure 2-3. Power Line Connection 2-4
Figure 2-4. SPU Panel Removal 2-7
Figure 2-5. SPU Front View, Panels Removed 2-8
Figure 2-6. SPU Rear View, Panels Removed 2-9
Figure 2-7. IOB Cables Connection 2-11
Figure 2-8. Junction Panels and Mounting Panels 2-13
Figure 2-9. Junction Panel Layout 2-14
Figure 2-10. DCU-ATP Remote Connector 2-16
Figure 3-1. HP Touchscreen II and Equipment Supplied 3-5
Figure 3-2. Removable Cable Covers - Top and Back 3-5
Figure 3-3. Disc Drive Power Cord Location 3-6
Figure 3-4. HP Touchscreen II With HP 9123D Connected 3-7
Figure 3-5. Keyboard Cable Connector Identification 3-7
Figure 3-6. Keyboard Cable Connection 3-8
Figure 3-7. Keyboard Cable Routing 3-8
Figure 3-8. Keyboard To Display Cable Connection 3-9
Figure 3-9. HP Touchscreen II Switch and Cable Connector Location 3-9
Figure 3-10. MS-DOS Device Configuration Main Menu 3-10
Figure 3-11. Global Configuration Menu 3-11
Figure 3-12. Terminal Configuration Menu 3-12
Figure 3-13. Full Duplex Hardwired Port 1 Configuration Menu 3-13
Figure 3-14. Diskette Write-Protect Tab 3-15
Figure 3-15. Processor-to-Console Cable Routing and Connection 3-16
Figure 3-16. Master/Slave Disc Cabling 3-18
Figure 3-17. System Disc HP-IB Device Select Switch 3-19
Figure 3-18. HP 2563A/65A/66A Line Printer Installation 3-24
Figure 3-19. Magnetic Tape HP-IB Device Address Switch, Cable and Connector 3-25
Figure 4-1. DC Power Supplies 4-2
Figure A-1. CPU Card Cable Assignment A-4
Figure A-2. I/O Card Cage Assignment for First IMB A-6
Figure A-3. I/O Card Cage Assignment for First and Second IMBs A-7
Figure A-4. I/O Card Cage Assignment for Third IMB A-8
Figure A-5. Typical HP-IB Cable Configurations A-9

LIST OF TABLES

Table 2-1. I/O Hardware Configuration 2-10
Table 3-1. Supported HP-IB Devices 3-2
Table 3-2. HP 3000 64/68/70 Peripheral Devices. 3-3
Table 4-1. MPL Error Codes with DCU ROM Date Code 2403 and >. 4-6
Table 4-2. Hardware Error Messages 4-9/4-10
Table 5-1. Available Device Tests 5-2
Table A-1. GIC Requirements For Peripherals A-2
Table A-2. CPU Card Cage Configuration A-3
Table A-3. First, Second or Third IMB Configuration. A-5
Table A-4. Internal Cables. A-10
Table A-5. External Cables A-10
Table B-1. UPGRADE OPTIONS. B-2

PREFACE

This manual describes the installation procedures for an HP 3000 Series 64/68/70 Computer System. It is intended for Hewlett-Packard Customer Engineers (CEs) trained on the computer.

Before the computer can be installed, the site must be prepared in compliance with the guidelines in the HP 3000 Series 64/68/70 Site Preparation Set, P/N 30140-60085.

Other manuals that may be helpful in installing the computer are:

Reference/Training Manual	30140-90005
Diagnostic Manual Set	32342-60001 (copy with system)
C.E. Handbook	30140-90006
MPE V System Operation and Resource Management Reference Manual	32033-90005 (copy with system)
MPE V Utilities Reference Manual	32033-90008 (copy with system)

Service and installation manual(s) for the peripheral devices to be installed with the computer should also be taken on site.

The manual is organized as follows:

Section 1-Defines Hewlett-Packard and the customer's responsibilities in receiving and unpacking the computer.

Section 2-Describes the mechanical installation of the System Processor Unit (SPU).

Section 3-Describes the electrical installation of the computer system.

Section 4-Describes powering-up the system and bringing it up to a running condition.

Section 5-Describes system verification.

Section 6-Describes training the System Operator.

Appendix A-Describes the computer's hardware configuration.

Appendix B-Describes procedures for upgrading to a Series 70 Computer from a Series 30/33, 37/37XE, 39/40/42/42XP, 44/48, 58, II/III, or Pre-Series II.

BITTE SORGFAELTIG LESEN!
HP 3000 SERIE 64/68/70 INSTALLATIONS-UND EINSCHALTUNGSRICHTLINIEN

Installation

Ihr HP Kunden Ingenieur ist verantwortlich fuer Installation und Instandhaltung Ihrer HP 3000 Serie 64/68/70.

Vergewissern Sie sich, dass die HP 3000 Serie 64/68/70 fuer die richtige Netzspannung eingerichtet ist. Diese ist an dem Netzspannungsmodul, an der Ruecksseite des Geraets markiert. Das Modul kann eine der folgenden sein:

Netzspannung	Frequenz	Max. Strom
208 VAC 3ph	60 Hz	12 A/phase
380 VAC 3ph	50 Hz	13 A/phase
415 VAC 3ph	50 Hz	12 A/phase

Falls die angegebene Netzspannungsmodul nicht fuer die richtige Netzspannung/ Freauenz eingerichtet ist, setzen Sie sich bitte mit Ihrem HP Vertriebsbeanftragter in Verbindung.

WARNUNG

Oeffnen des Geraets zur Bedienung
nicht erforderlich. Wartung nur
durch qualifiziertes Personal.

60 Hz Systeme werden mit Netzkabel ausgeliefert; 50 Hz Systeme werden ohne Netzkabel ausgeliefert. Anschlussklemmen und Zugentlastung fuer ein Kabel mit mindestens 1,5 mm2 Leiterguertschnitt (2,5 mm2 vorzugsweise) werden mitgeliefert. Bitte wenden Sie sich an Ihren HP Kunden Ingenieur.

Lokale Vorschriften koennen die Installation eines zusaetzlichen Wandschalters erforderlich machen. Dies ist normalerweise der Fall, wenn das Geraet fest an das Netz angeschlossen wird.

Einschaltung

Ihr HP 3000 Serie 64/68/70 Computer wird durch den "ON/OFF" Schalter eingeschaltet. Dieser befindet sich an dem Netzspannungsmodul, unten an der Rueckseite des Geraets. Der Schalter sollte sich vor Inbetriebnahme in der Grundstellung "OFF" befinden.

HP 3000 Series 64/68/70 Installation/Power-on Instructions

Installation

Your HP Customer Engineer will provide installation and maintenance for your computer system.

For proper operation, ensure that the unit is configured for a voltage compatible with the voltage at the site. This voltage is labeled on the AC unit located at the rear of the I/O Bay. The unit can be one of the following:

Voltage	Frequency	Maximum Current
208 VAC 3-phase	60 Hz	12 A/phase
380 VAC 3-phase	50 Hz	13 A/phase
415 VAC 3-phase	50 Hz	12 A/phase

If the labeled voltage is not compatible with the voltage at your site, contact your HP Sales Representative.

WARNING

There are no operator-serviceable parts in the computer.
Refer all servicing to your HP Customer Engineer.

Systems shipped to sites in the United States and Canada are provided with a 15-foot power cord with a 120/208 VAC 30-Ampere plug. A wall receptacle with isolated ground is required.

Systems shipped outside the United States or Canada are not provided with a power cord. A wiring terminal and a strain relief bushing are provided for attaching a cable with a minimum conductor size of 1.5 sq. mm (2.5 is preferred) or 8 AWG wire. Consult your HP Customer Engineer and local electrical codes.

As part of the installation, local codes may require a wall disconnect device in a readily accessible location.

Power On

The computer is powered on by the Main ON/OFF System Switch, located on the AC Unit at the lower rear of the I/O Bay. Before starting any procedure, ensure it is in the OFF position.

RECEIVING THE SYSTEM

SECTION 1

SYSTEM RECEIVING GUIDELINES

The Hewlett-Packard Customer Engineer (CE) is primarily responsible for the installation of the HP 3000 Series 64/68/70 Computer according to the information presented in this text. This includes installation and verification of the System Processor Unit (SPU) and any HP peripheral devices which are part of the system order. Refer to the policy on installing HP data terminals as described by the Computer Support Division.

The customer is responsible for initial unpacking, inspecting, and locating of the system. The disposing of packing material is also the responsibility of the customer.

Each Hewlett-Packard shipment has a packing list on one of the cartons specifying material shipped. In addition, unpacking instructions are provided.

The customer should report any flaws in the shipment immediately to the carrier or to the carrier's agent and to the HP CE. Be sure to save all crates, cartons, boxes, and packing materials for inspection. Do not make any verbal reports of damage or missing items without making a written report. The CE should report problems which are HP's responsibility to the Support Engineer at the appropriate HP division.

Missing or damaged items will be replaced without waiting for the settlement of claims. Items shipped to replace damaged parts will be billed to the customer until the damaged parts are returned to Hewlett-Packard. The customer should not release the carrier until the shipment is verified to be in good order.

UNPACKING INSTRUCTIONS

Tools Required: 9/16" open end wrench or socket and ratchet; a Phillips and blade type screwdriver

People required: two

To unpack either bay, proceed as follows:

1. Compare packing list with what is received.
2. Position unit so side marked "Unload This Side" is six feet from all obstacles.
3. Remove Klimps fasteners from one side and four bottom edges with screwdriver. Cut straps. Remove cardboard cover.
4. Remove ramp, which is attached upright to unit.
5. Remove from each end of base two outside bolts (bolts are color coded red). Now unit is free from base. (See Figure 1-1.)
6. Insert ramp in recessed area under mounting plate, lining up holes with sheet metal inserts of ramp.

7. Be sure levelers are fully raised.

8. Ensure casters are free of base. At end opposite ramp, give a heavy push to move unit two or three inches. Now casters are in contact with base, allowing the unit to move easily down the base onto ramp.

9. Pull unit from other end and guide it down ramp.

NOTE

Mounting plates act as a brake to slow the unit as it comes down the ramp.

10. Remove end panel to access inside bay.

11. Remove two inside bolts from mounting plates.

12. Remount end panel.

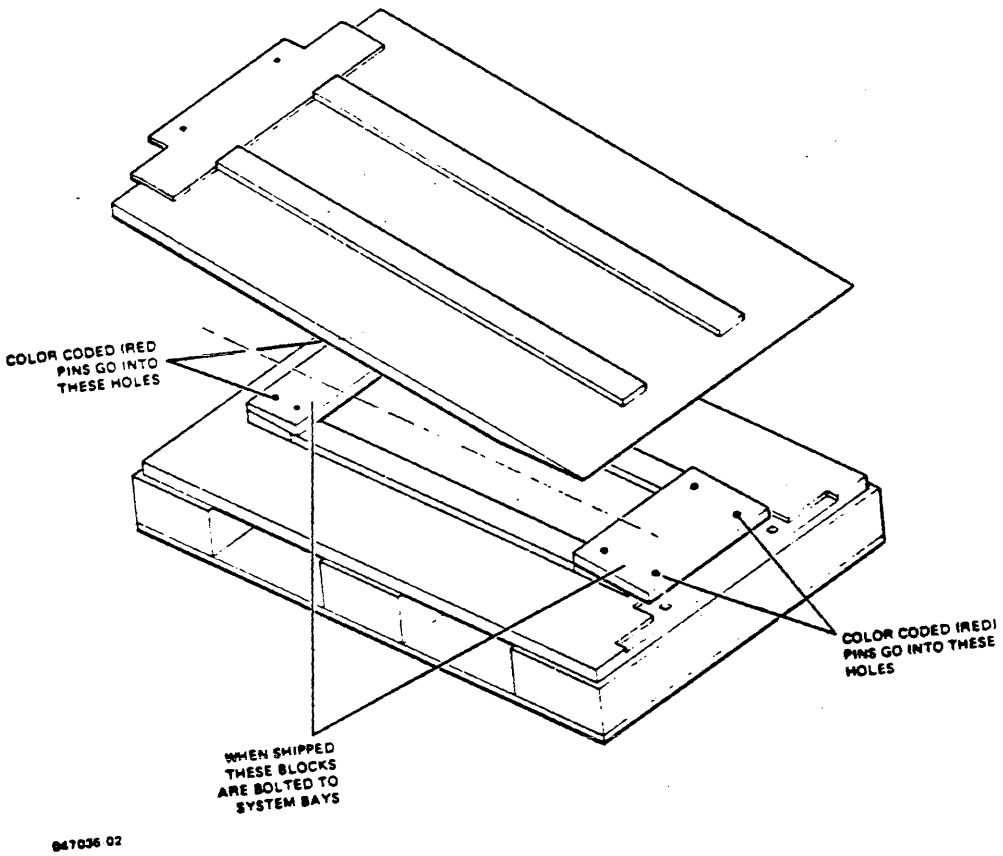


Figure 1-1. Packing Assembly

SYSTEM PROCESSOR UNIT

SECTION 2

PHYSICAL DESCRIPTION

The System Processor Unit (SPU) consists of the CPU and I/O Bays. It is tested before shipment. Since the bays must be disconnected for shipment, the installing CE must connect the bays mechanically and electrically. See Figures 2-1 and 2-2 for the front/side or rear views of the two bays in the SPU.

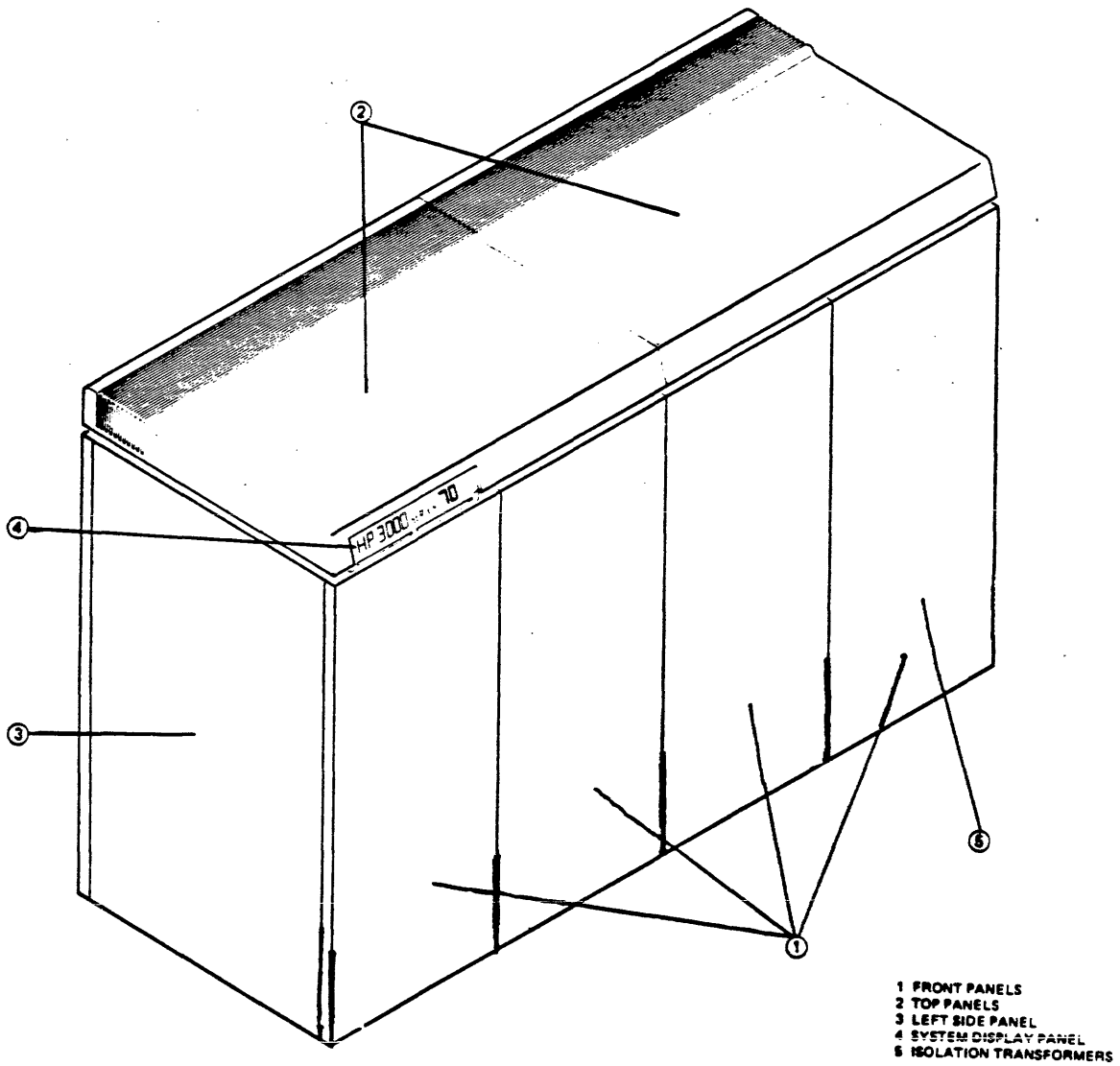


Figure 2-1. SPU, Front/Side View, Panels On

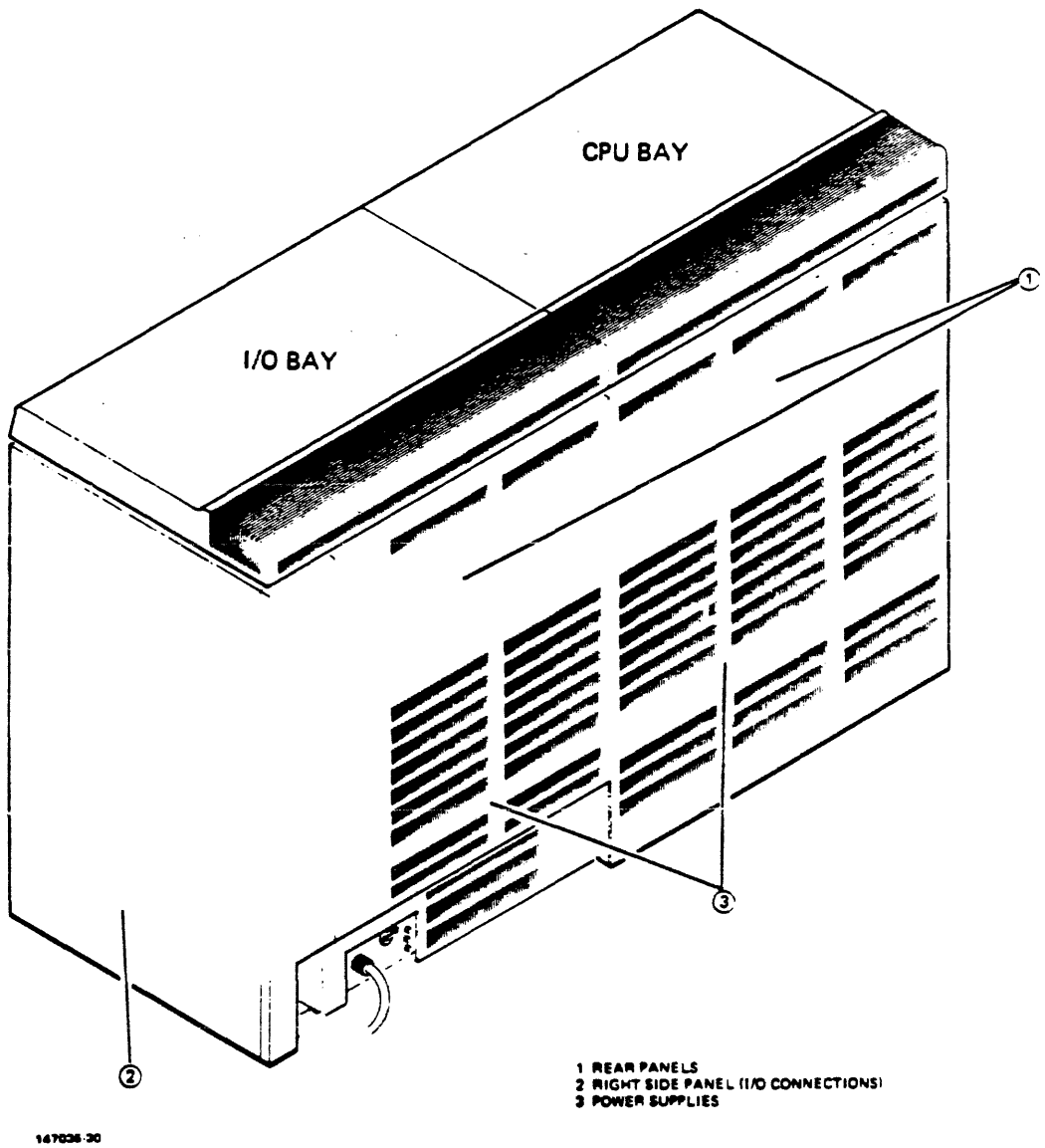


Figure 2-2. SPU, Rear View, Panels On

AC POWER DESCRIPTION

The AC power generation system consists of an AC Unit and three transformers, all mounted in the bottom of the I/O Bay.

The AC power system works with three amplitude/phase levels of line power:

a. 208-volt, three-phase, four-wire-plus-ground, 60 Hz.

b. 380-volt, three-phase, three-or-four-wire-plus-ground, 50 Hz.

c. 415-volt, three-phase, three-or-four-wire-plus-ground, 50 Hz.

The input AC power uses a five-wire Wye. However, the neutral wire into the system connects to a terminal lug and is not used. (For hardwired connections outside the U.S. the neutral line can be omitted.) The ferro-resonant transformers provide a three-phase delta load powered from a 120/208 WYE source.

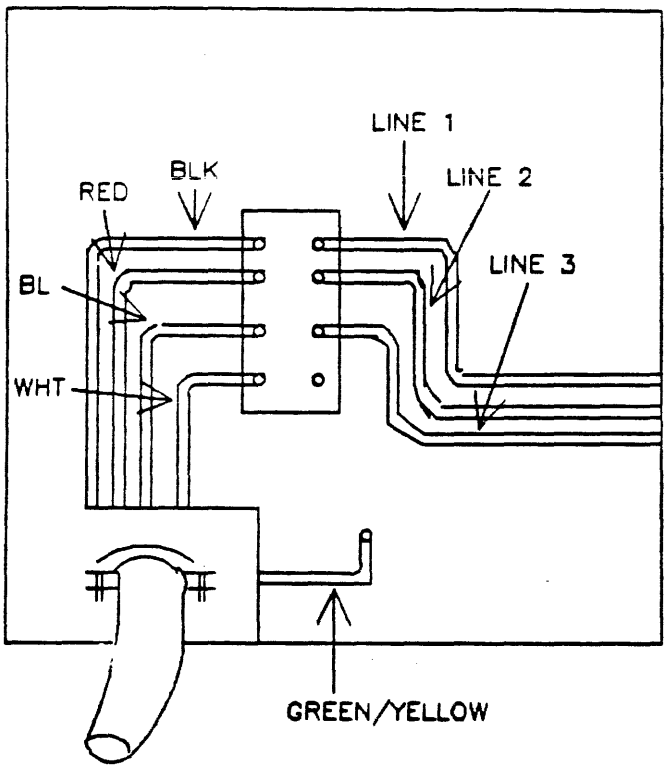
The computer will not work with 240V Delta power lines. Customers with Delta power will have to provide a Delta-to-Wye or Delta-to-Delta voltage conversion transformer to obtain nominal system input. A customer who does not have three-phase power will have to provide it via such means as a motor generator set.

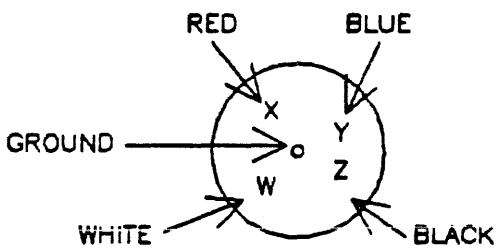
Some internal regulating capabilities are provided by the ferro-resonant transformers. The DC power system will not disturb the computer when the AC power line to the power supplies is subjected to the following transients in normal or common mode: (a) a 100 ns rise time with a 50 percent duration of 100 us and 1000 volts peak; (b) a 1.5 us rise time with a 50 percent duration of 10 us and 1000 volts peak. Also, the DC power system will not disturb the computer for AC line dropouts to below the minimum operating level if their duration is not more than 20 ms (one cycle at 50 Hz).

Although this power system offers added immunity from AC line propagated noise, it is still wise to dedicate a branch circuit free of other large noise-generating equipment to the system. As a precautionary measure when running conduit directly to the SPU, protect the system quiet ground scheme by connecting the conduit to the SPU with an insulating bushing (if permitted by local electrical code). In all cases, a dedicated green wire safety ground should be supplied to the system.

INSPECTING 50 Hz SYSTEMS

Hewlett-Packard does not provide power cords for systems used with 50 Hz power. Customers with 50 Hz power must provide a cord and may hardwire it, in accordance with local electrical code. Installation of the cord should be done by a qualified electrician. The AC Power to the SPU may be connected by either conduit or flexible cable, depending on local electrical code. Figure 2-3 shows the scheme for wiring a power line to the AC Unit. The Hewlett-Packard Customer Engineer is responsible only for inspecting the power line after it is installed, not for installing it.





POWER CORD PLUG WIRING

60 Hz ONLY

WARNING

When the cover plate is removed, hazardous voltages are present unless breaker at the branch circuit panel is set to OFF.

Figure 2-3. Power Line Connection

PROCESSOR BAYS

The HP 3000 Series 64B/68B/68C and Series 70 Computer System is housed in two bays: a CPU Bay and an I/O Bay. The CPU Bay has a card cage containing 36 slots for CPU, Cache Memory, Writable Control Store, Main Memory, and I/O Buffer PCAs. The CPU Bay also contains DC converters, cooling fans, and a Power Distribution Monitor (PDM) PCA.

The I/O Bay houses a card cage containing 24 PCA slots for I/O peripheral interfaces, Intermodule Bus Interface (IMBI PCAs), General I/O Channels (GIC PCAs), Advanced Terminal Processor (ATP PCA), Local Area Network (LAN) Cards, Intelligent Network Processor (INP PCA), and printer interface PCAs. The I/O Bay also contains power supplies, the AC transformers, the AC Unit, cooling fans, and a multi-purpose junction panel. The slot assignments for the two bays are shown in Appendix A.

Connecting the Bays

To connect the CPU and I/O Bays, you need a 1/2" open end wrench, a 7/16" wrench, a Phillips head screwdriver, and a straight slot head screwdriver.

Proceed with inter-bay connections, as follows:

1. Remove four front panels and two back panels. After removing the half-turned captive Phillips head screws, pull panel out and lift up. (See Figure 2-4.)

2. Ensure that levelers are raised. Move bays close together, but leave enough space between them to connect cables.

3. Inspect cables for any defects.

4. Start at front of bays. (See Figure 2-5.) Locate three-pin Temperature Sense Cable connectors on tops of CPU Bay and I/O Bay card cages. Connect them.

5. Attach three connectors from CPU Bay to jacks at bottom of I/O Bay Backplane as follows. From left: a six-pin connector attaches to J18, a 15-pin connector attaches to J19, and a four-pin connector attaches to J21.

6. Attach 5V and Return cables from bottom of CPU Bay Backplane to 5V and Return metal standoff buses on I/O Bay. The 5V wires are in two bundles which connect to the standoff bus closest to CPU Bay, as shown in Figure 2-5. Return cable is a single wire; it attaches to standoff bus to immediate right of 5V bus. Screws and washers for each cable are in plastic bags stapled around cable. If you try to connect one of cables to wrong bus, screws will not fit cable holes.

NOTE

Check and, if necessary, tighten backplane DC power connections. The proper torque specifications for these screws are shown below.

10/32 screw 42-48 inch lbs.
8/32 screw 32-38 inch lbs.
6/32 screw 16-22 inch lbs.
4/40 screw 10-16 inch lbs.

7. Find two 20-pin connectors which trace back to J9 of PDM PCA in CPU Bay. Connect them to J2 of Power Supplies D1 and D2 in the I/O Bay.

8. Move to rear of bays. (See Figure 2-6.) Find two cables with five-pin connectors and cable with nine-pin connector extending from CPU Bay. Attach one five-pin connector to J2 on AC Unit of I/O Bay. Attach other five-pin connector to J3 of AC Unit. Attach nine-pin connector to J5 of AC Unit. J1, J2, and J3 of AC Unit each provide 230 VAC and 300 VDC to I/O Bay(s).

9. Move bays together, align bolt holes and Inter-Card Cage Panel. Use care not to pinch any inter-bay cabling when moving bays together.

10. Adjust levelers to stabilize unit. Depending on the type of floor, the front and rear U-channels on I/O Bay may have to be loosened to make alignment possible.

11. Locate, insert and finger tighten all cabinet bolts, then wrench tighten these bolts snugly.

CAUTION

Be extremely careful not to bend pins on backplanes when bolting bays together.

This completes inter-bay cabling except for IOB cables which are described under Connecting IOB Cables in this section.

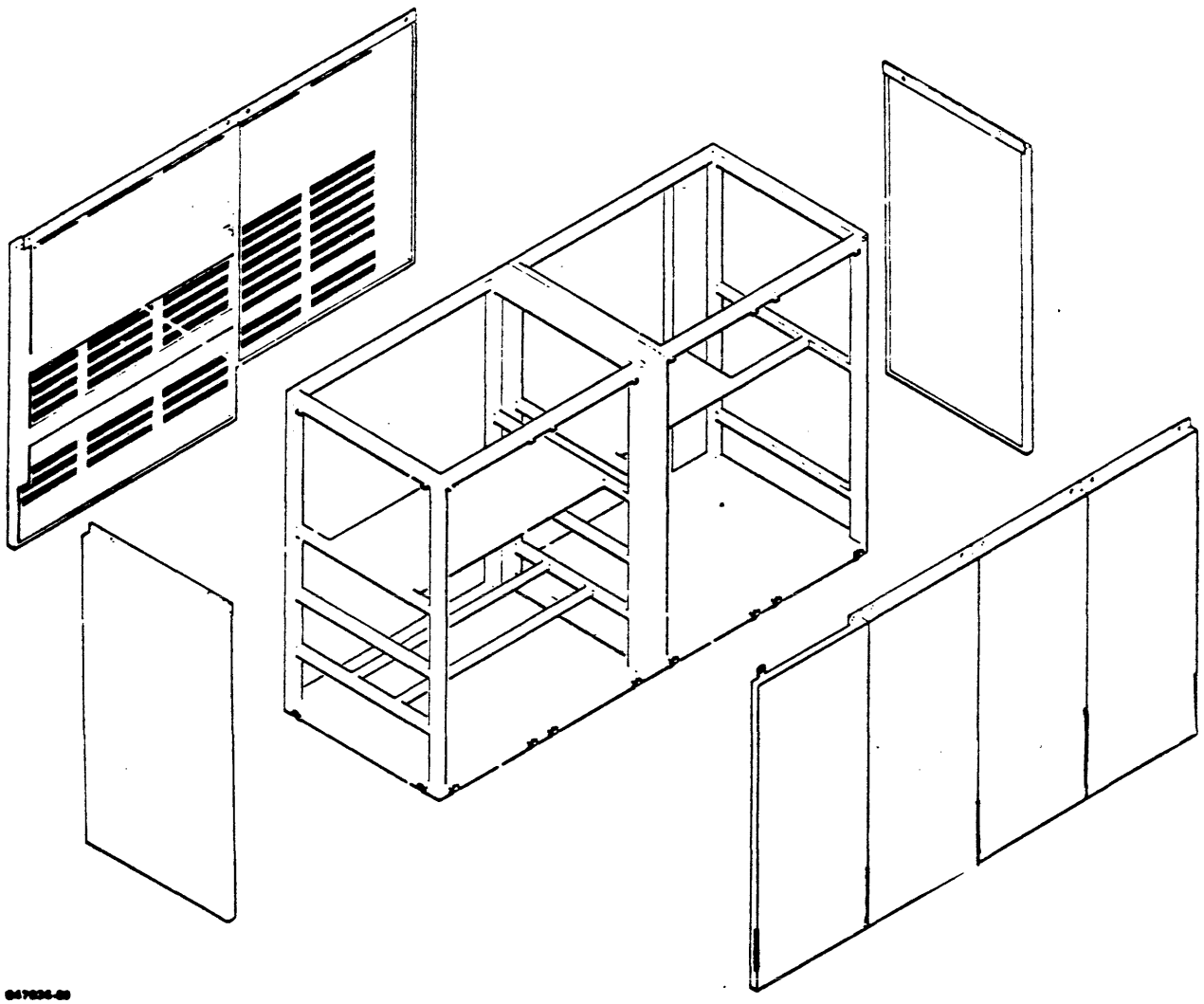


Figure 2-4. SPU Panel Removal

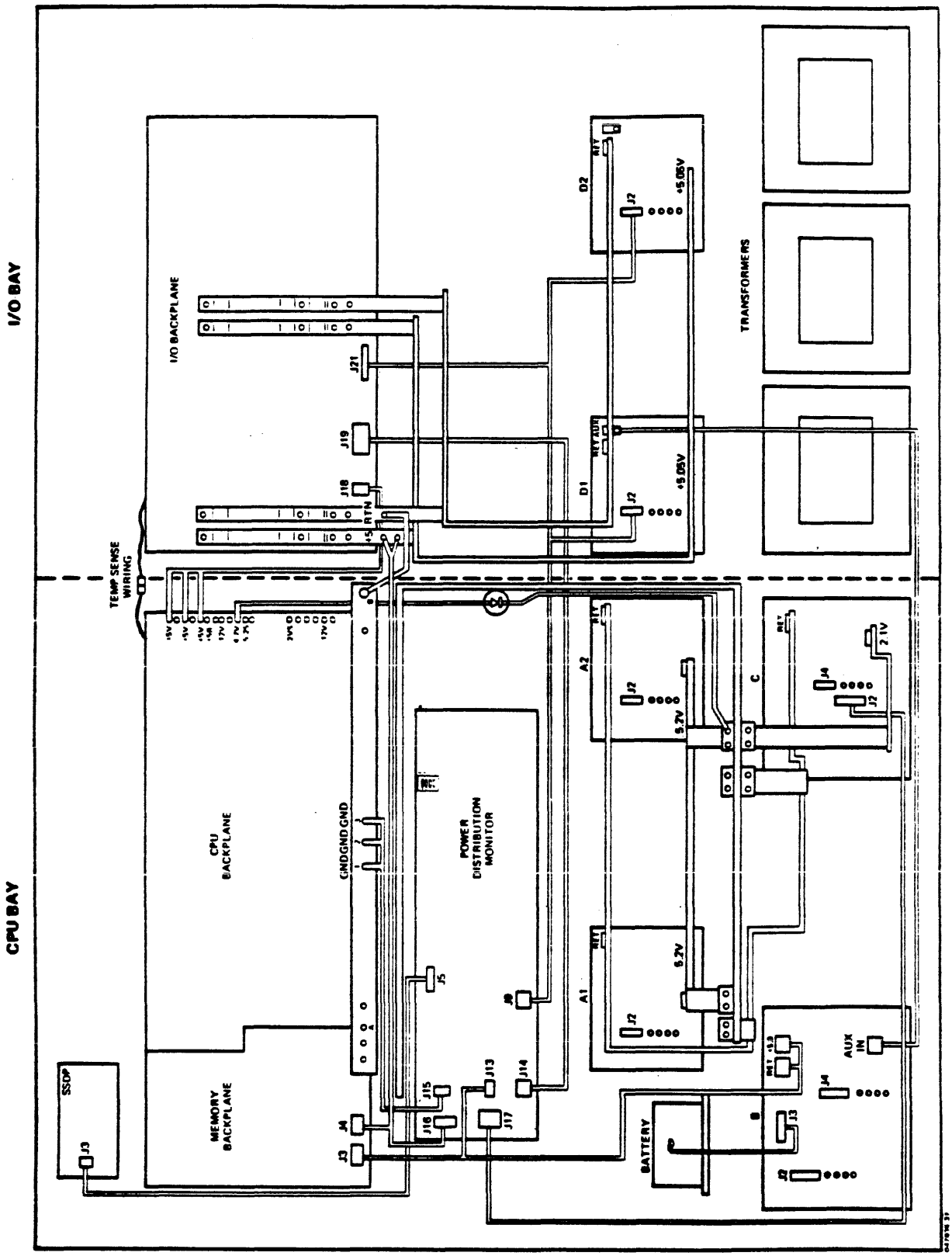


Figure 2-5. SPU Front View, Panels Removed

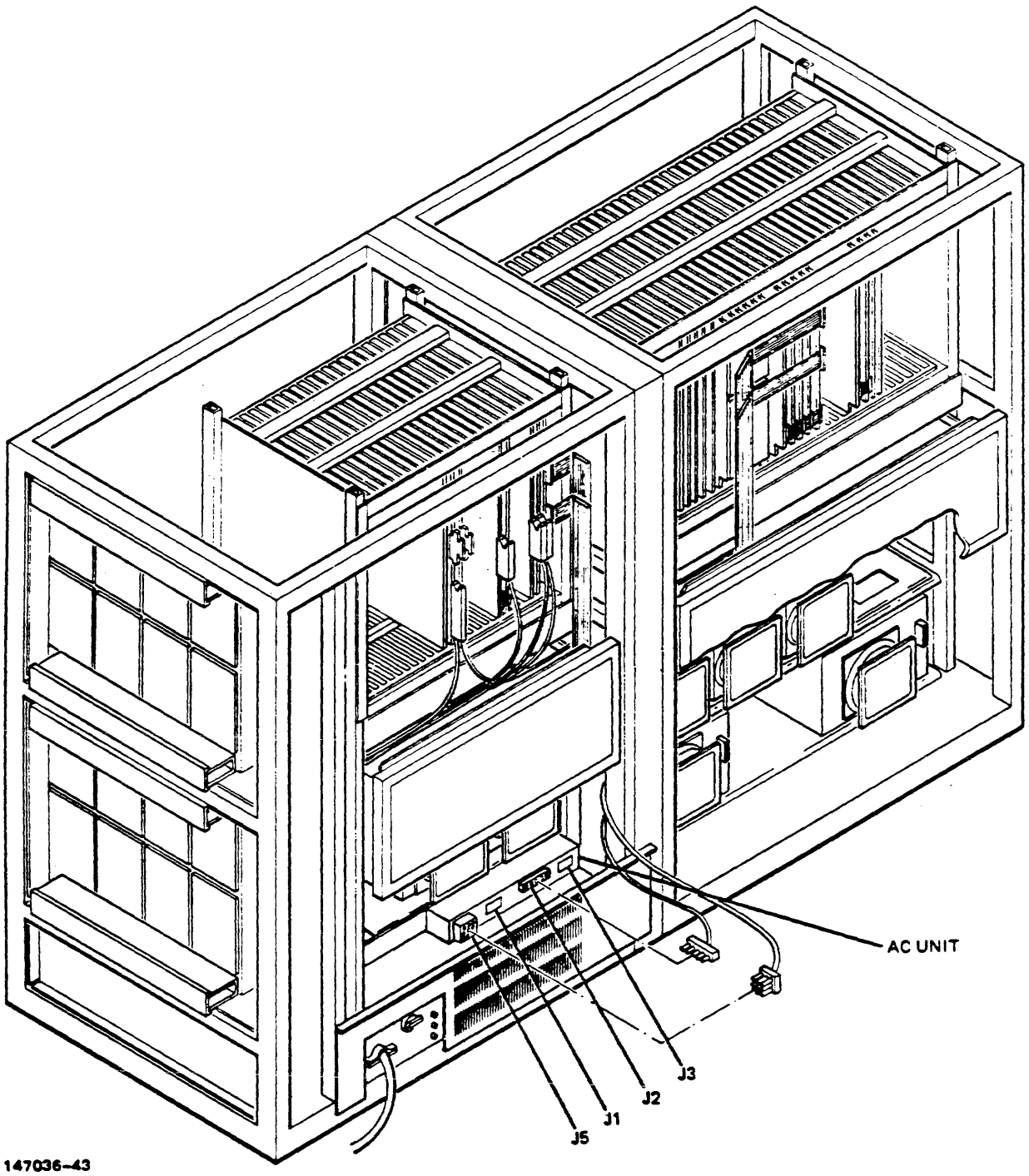


Figure 2-6. SPU Rear View, Panels Removed

Hardware Configuration

Configure the hardware as follows:

CAUTION

ESD protection requires the use of a grounded wrist strap when handling PCAs. Failure to comply may result in PCA component damage.

1. Check location of PCAs. Refer to Appendix A for configuration. Ensure that PCAs are securely fitted into card cage slots.

2. Ensure that CPU and Cache frontplanes are tight.

3. Install minimum I/O hardware, which includes two General I/O Channels (GIC PCAs) and one Advanced Terminal Processor (ATP). Refer to Table 2-1 for slot assignments. Refer to Installing GIC PCAs in this section for GIC installation information. For ATP installation refer to the ATP Installation and Service Manual (P/N 30144-90002).

4. Do not install any other PCAs until the minimum configuration is verified.

Table 2-1. I/O Hardware Configuration

SLOT	ASSEMBLIES	CHANNEL #	"TO" DEVICE
24	IMBI		
23	GIC	2	MAG TAPE
22	GIC	3	SYSTEM DISC
21-13	GIC or DEV.INTF.	4-15	OTHER DISCS; INPs; MAG TAPES; PRINTERS ETC.
12or17	SIB (ATP)	1	AIB
11-4	AIB (ATP)		ASYNCHRONOUS TERMINALS, 2687A PAGE PRINTER

CAUTION

A GIC PCA or SIB PCA must be installed within every ten physical slots; thus the SIB PCA is configured in slots 12 or 17 to ensure standard configuration. If optional GIC PCAs are installed, the SIB PCA should be installed in slot nine, with the AIB PCAs in slots one thru eight. Two INP PCAs should never be installed in slot pairs one and two, or nine and ten. Failure to comply with this warning can result in permanent hardware damage.

Connecting IOB Cables

Dress lower cable from IOB PCA to lower front edge connector of IMBI PCA. Dress upper cable from IOB PCA to upper edge connector of IMBI PCA. Leave cable slack in space between bays so it can fold freely. (See Figure 2-7.)

CAUTION

Handle the IOB Cables carefully. If handled roughly, the wires may break.

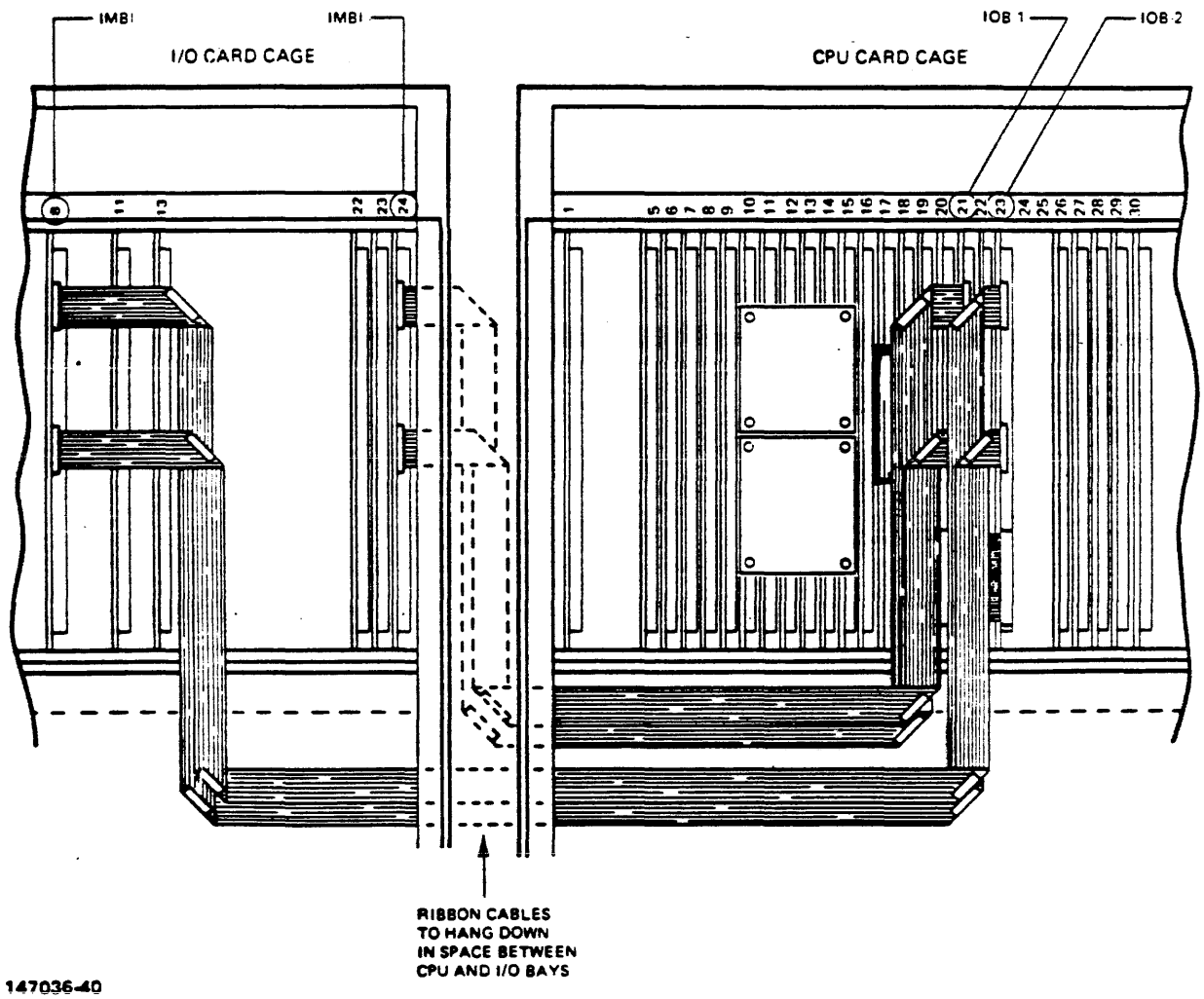


Figure 2-7. IOB Cables Connection

NOTE

IOB cable crushing may occur whenever ATP exists on both sides of IMBI, causing intermittent timeout or parity errors. To avoid this potential problem, omit IOB cable clip and fasten a small clamp-cable (P/N 1400-0611) onto the vertical metal strip near slot 24 of the I/O Card Cage frame. The IOB cable will run flat against the J1 connectors of all cards in slots 10 through 24 and then fasten onto the small clamp.

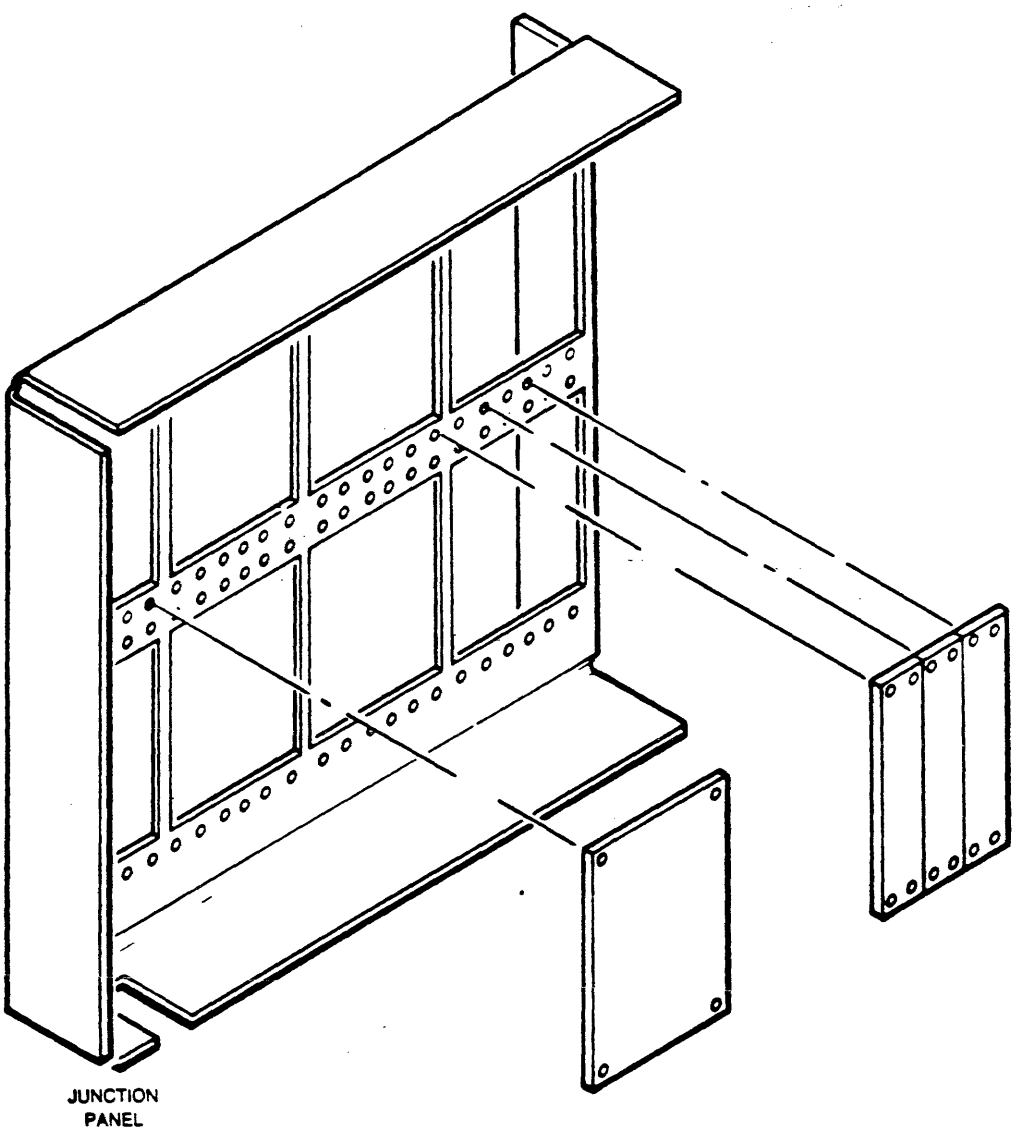
Junction Panels

Junction panels are used in the connection of GIC, LANIC, INP, AIB, and LPI cards to peripherals, terminals, or other systems. The junction panels are found on the outside ends of each I/O bay and allow external cabling of terminals, peripherals, and other systems to connect to internal system cabling. The number of these devices permitted in a configuration may be restricted by the number of junction panel spaces available.

One-third of a panel accomodates individual GIC, LANIC, INP, or LPI connectors. These connections should be started in the lower row of the junction panel. (See Figure 2-8.) The System Disc Drive, Magnetic Tape Drive and Line Printer HP-IB connectors should start in junction panel 16, as shown in Figure 2-9. These peripheral connectors are installed as described in Section 3.

A full panel accomodates either 12 direct connect ports or six modem connect ports. The bottom 12 mounting panels on the standard I/O bay are reserved for connections to GICs, LANICs, INPs, and LPIs. GIC, LANIC, INP, and LPI cards connected to external devices each require one mounting panel. All terminal ports should start in junction panel 9. The System Console should be installed in Port 0 of the junction panel. (See Figure 2-9.)

Refer to ATP Installation and Service Manual (P/N 30144-90002) or Lanic Installation and Service Manual (P/N 30242-90001) for installation information.



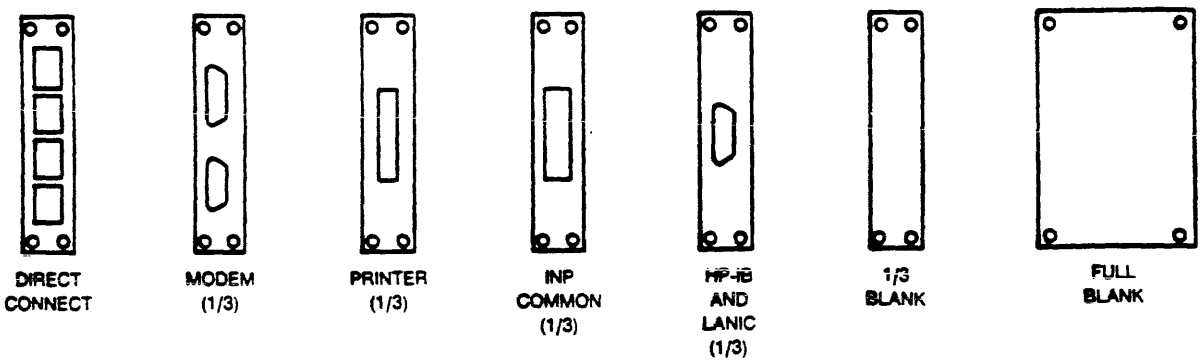


Figure 2-8. Junction Panels and Mounting Panels

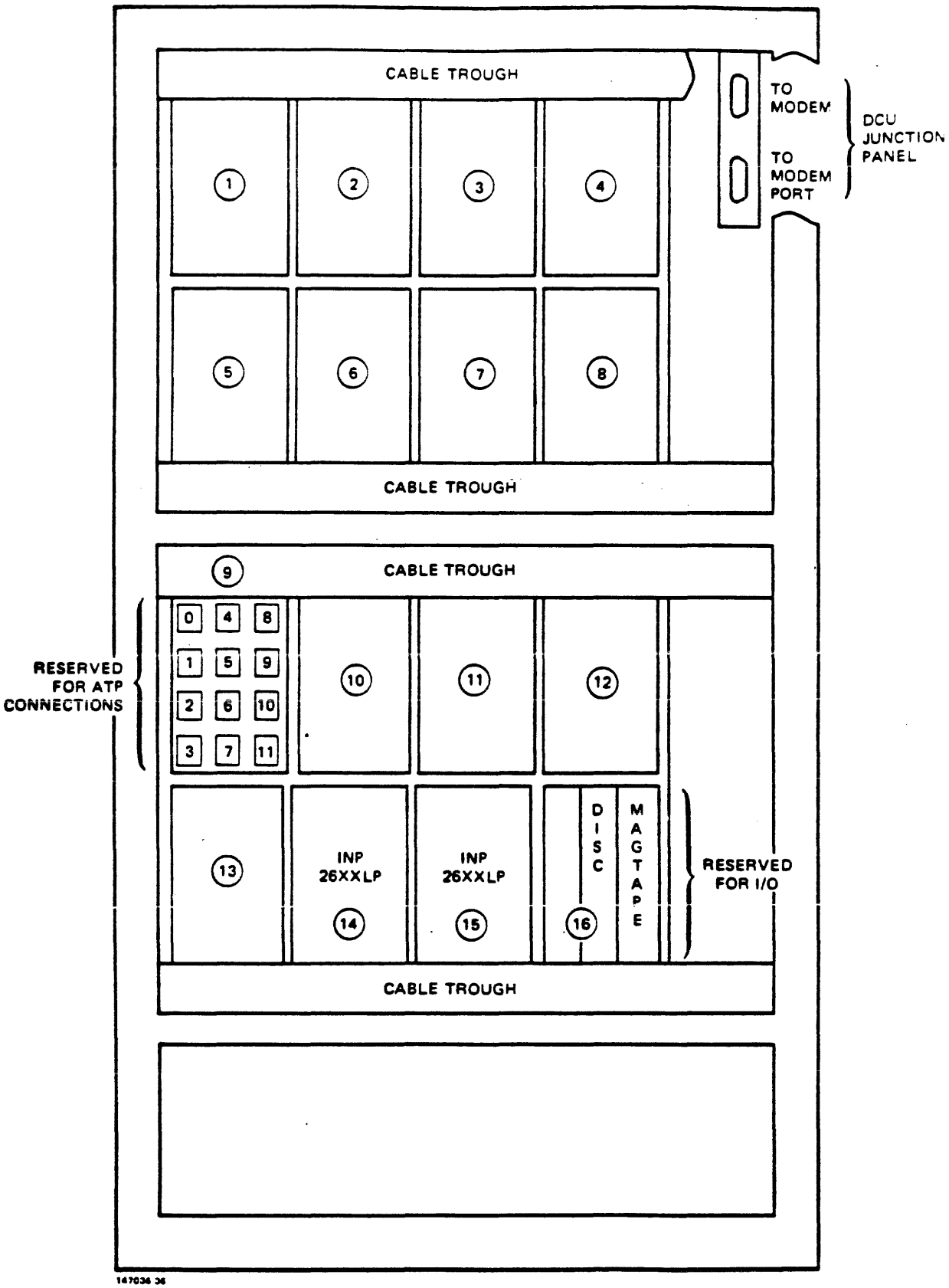


Figure 2-9. Junction Panel Layout

DCU-ATP Remote Cable

Install DCU-ATP cable connections as follows:

1. Route DCU Cable Connector under brace and connect to DCU PCA. (See Figure 2-10).

2. Connect AIB PCA hood connector to AIB PCA, then from AIB PCA, attach Port Connector Cable to Port Connector Assembly. Refer to the ATP Installation and Service Manual (P/N 30144-90002) for details.

3. Remote Diagnostic Interface Connector is factory installed. It is located on remote junction panel slot, recessed and to right of main junction panel array.

4. Install System Console in Port 0 of junction panel 1.

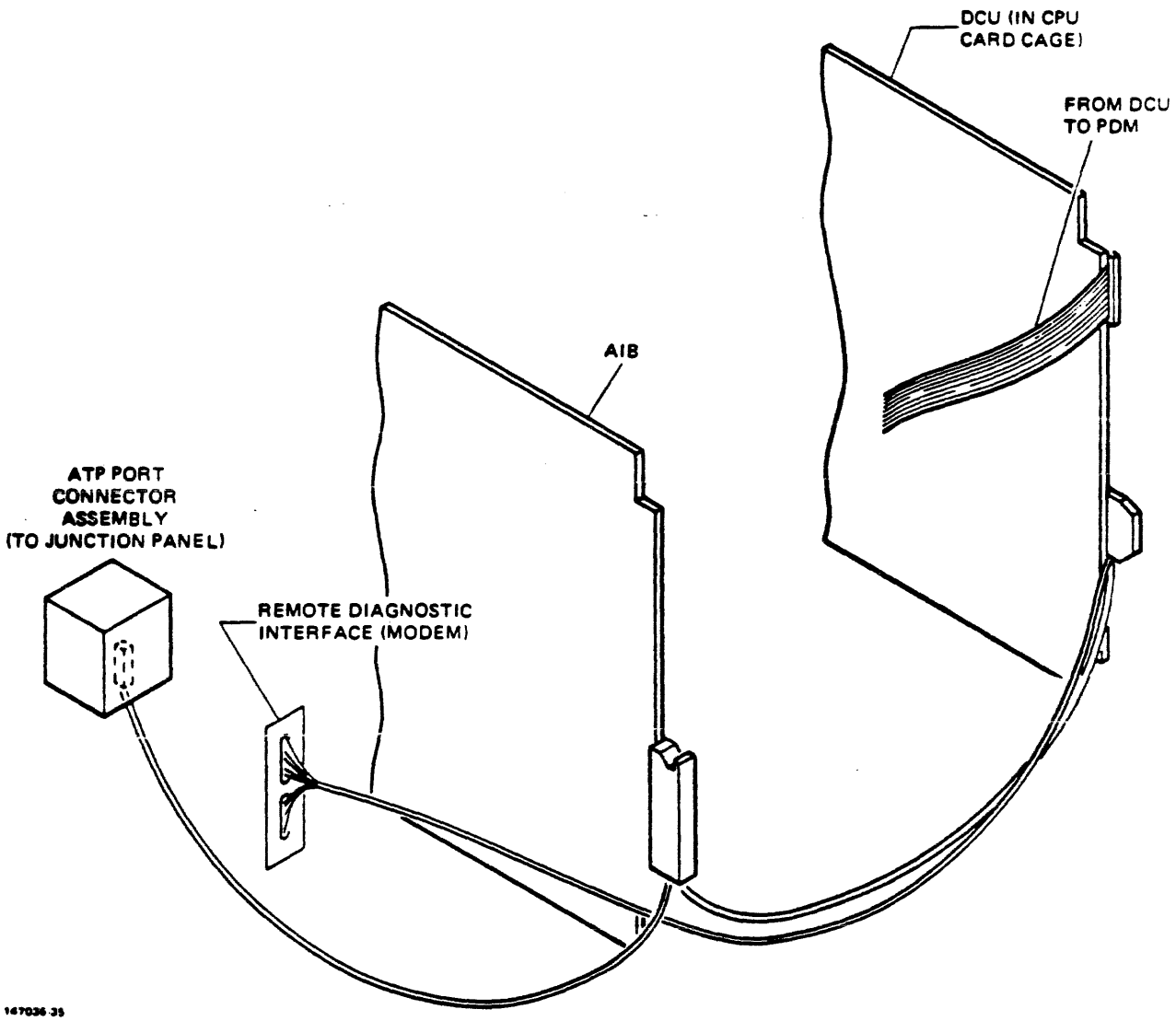


Figure 2-10. DCU-ATP Remote Connector

Installing GIC PCAs

Install the GIC PCAs as follows:

1. Unpack GIC PCAs (P/N 31262-60001) and proceed as follows:

   a. Locate Processor Switch on GIC frontplane and note whether switch is labeled A/B or CPU/CPP. If labeled CPU/CPP, open spare parts three ring binder and find A and B labels. On GIC PCAs where processor switch is located, cover CPU and CPP with labels A and B respectively.

   b. Configure all switches to the in position (towards stiffener bar) except Processor Switch which is set to out, B position.

2. Install first GIC PCA in slot 23 and set to channel 2, then install second GIC PCA in slot 22 and set to channel 3. Two GIC PCAs are minimum configuration. (Refer to Table 2-1.)

3. Obtain two GIC PCA hood identification labels from spare parts. One label goes on lower portion of hood, indicating IMB channel number. Second label goes above connector on junction panel with its corresponding device name.

4. Attach hood connector to GIC PCA front plane edge connector. On lower left row of junction panel, secure other end of GIC PCA hood connector and install all four screws to attach mounting panel to junction panel. (See Figure 2-8.)

SYSTEM INSTALLATION

SECTION 3

INTRODUCTION

System installation consists of integration of the processor, the peripheral devices, and the system operating software. The peripheral devices interface with the processor through the terminal and I/O junction panels. For technical descriptions of the I/O system and other related hardware, refer to the HP 3000 Series 64/68/70 Reference/Training Manual (P/N 30140-90005). This section covers:

a. Installing the Processor

b. Installing the System Console

c. Installing Disc Drives

d. Installing Printers

e. Installing Magnetic Tape Drives

f. Installing Terminals

The HP 3000 Series 64/68/70 Computer consists of a System Processor Unit (SPU) and associated peripheral devices. Supported peripherals are listed in Tables 3-1 and 3-2 in this section.

In general, installation of a peripheral device consists of connecting an HP-IB cable and an AC power cord. If questions arise or problems occur with any device, refer to the appropriate service manual. Unpack and move each device into place, then install it according to the procedures given in this section. After installation, identify the devices on receptacle tags at the junction panels.

Table 3-1. Supported HP-IB Devices

HP Device	HP-IB Loads	Intrn'l Cable Length, Meters	Identity Code	Remarks
DISC DRIVES				
13037C Controller for 7920/25	1	0.75	!0002	HS, No Selftest
7933XP/H	1	0	!0212	HS, CS80
7935XP/H	1	0	!0212	HS, CS80
7912P	1	1	!0208	HS, CS80
7911P	1	1	!0204	HS, CS80
7914	1	1	!020A	HS, CS80
7945A	1	0	!0220	HS, CS80
TAPE DRIVES				
7970E	1	0	!0183	DG, No selftest
7974A	1	1	!0174	HS
7976A	2	2	!0176	HS
7978A/B	1	0	!0178	HS
Integrated Cartridge Tape Unit	1	0	!0240	DG, CS80
9144A	1	0	!0260	HS, CS80
PRINTERS				
26069A Line Prntr Interface for 2611/13/17/19	1	1	!200A	
2563A/65A/66A	1	0	!2101	HS
2608A	1	1	!2001	NOT HS
2608S	1	1	!2101	HS, DO NOT MIX WITH 7906/20/25
2680A	4	1	!2004	HS
2686A/87A/88A	4	1	!2004	HS*
OTHER				
30020B INP	1		!4003	
2893A Card Reader	1	0	!0101	DG, DL
31262 GIC acting as a device	7	0	!6000	for testing only
37203A HP-IB Ext.	1			DG

Remark Codes:

CS80 = Device selftest/loopback can be initiated using CS80DIAG.
HS = High speed device, attach to high speed GIC only.
HS* = Low speed if connected via HP-IB Extender 37203A opt. 10.
NOT HS = Device cannot be attached to high speed GIC.
DG = Device requires a dedicated GIC.
DL = Requires a dedicated line conditioner, HP 35030A or equivalent.

Table 3-2. HP 3000 64/68/70 Peripheral Devices

Device	HP Model	Channel Type
Terminals	as specified by Information Networking Division	ATP
Data Collection Terminals	3075A/76A/77A	ATP
Line Printers	2563A	INP-GIC-ATP
	2565A/66A	GIC
	2608A opt. 346	GIC
	2608S	INP-GIC
	2610A/14A/18A	GIC
	2611A/17A/19A w/opt. 364	GIC
Serial Printers	2601A/02A/03A (RS-232-C)	ATP
	2932A/34A (RS-232-C)	ATP
Page Printers	2680A opt. 364	GIC
	2686A (RS-232-C)	ATP
	2686A opt. 200	ATP
	2687A (RS-232-C)	ATP
	2688A	GIC
Dot Matrix Printer	2631B (RS-232-C)	ATP
Mag Tapes	7970E opt. 426	N/A
	7970E opt. 421	GIC
	7974A/78A/78B	GIC
	7976A opt. 616	GIC
	9144A	GIC
Floppy Drive	9895A	GIC
Disc Drives	7933/35XP/H	GIC
	7920M/S	GIC
	7925M/S	GIC
	7911/7912/7914	GIC
	7945A	GIC
Integrated Cartridge Tape Unit (ICTU)	opt. 001 w/ICTU opt. 140 w/o ICTU	GIC
Card Reader	30106A	GIC
Multiple System Access Selector INP	30020B	GIC

WARNING

Hazardous voltages exist in the processor and peripheral cabinets when AC power is connected. Do not connect the processor or any peripheral to AC power until all system components have been installed and interconnections have been made. Failure to comply may result in serious injury or death.

CAUTION

The procedures in this section should not be started until Sections 1 and 2 have been completed. As in all sections, the steps in this section must be done in the sequence listed.

INSTALLING THE PROCESSOR

Install processor (see Section 2 for illustrations) as follows:

1. Ensure that unit is positioned in an area which allows for complete cabinet door access and AC power receptacle access.
2. Secure and level SPU by adjusting levelers.
3. Ensure that Main POWER Switch is set to OFF.

INSTALLING THE SYSTEM CONSOLE

The standard System Console is the HP 150 Touchscreen II (HP 45851A). In some cases, the HP 2642A with option 964 or the 2647F with option 890 are used as the System Console. Instructions for the installation of the System Console are in the following procedures.

Installing the HP Touchscreen II as the System Console

Equipment supplied with the HP 150 Touchscreen II is depicted in Figure 3-1. Install the console as follows:

1. Ensure the HP Touchscreen II POWER switch, located at the lower left front of the display unit, is in the OFF (out) position.
2. Remove the top and back covers from the HP Touchscreen II by pressing in on the left and right release tabs (see Figure 3-2).

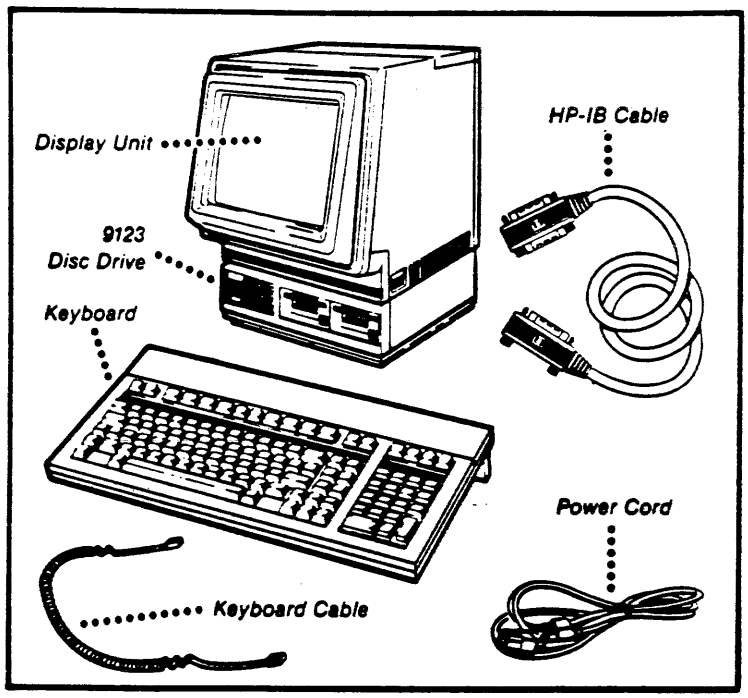


Figure 3-1. HP Touchscreen II and Equipment Supplied

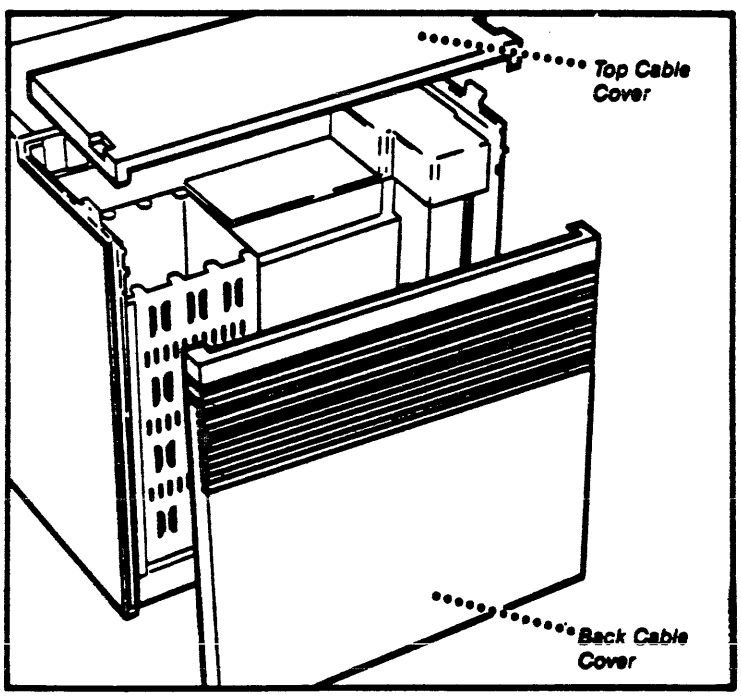


Figure 3-2. Removable Cable Covers - Top and Back

3. Connect the HP 9123D Disc Drive to the HP Touchscreen II as follows:

   a. Remove the sheet of stickers from the back of the Getting Started With Your Touchscreen II Personal Computer Manual (P/N 45487-90001), supplied with the HP Touchscreen II.

   b. Place the "A" sticker next to the left disc drive slot and the "B" sticker next to the right disc drive slot of the HP 9123D. "A" and "B" are the names that the HP Touchscreen II uses to identify which drive (left or right) contains the disc to be accessed.

   c. Remove the rear cable cover from the disc drive and locate the disc drive power cable. (See Figure 3-3.)

   d. Place the HP Touchscreen II display unit on top of the disc drive, as shown in Figure 3-4.

   e. Connect the single-sided connector of the HP-IB cable to the back of the disc drive and the double-sided connector to the HP-IB connector of the HP Touchscreen II. (See Figure 3-4.)

   f. Connect the disc drive power cord as shown in Figure 3-4.

4. Connect the keyboard as follows:

   a. Identify and connect the keyboard cable connector, marked with one dot, to the receptacle marked with one dot on the back of the keyboard. (See Figures 3-5 and 3-6.)

   b. Secure the flat section of the cable in the slot provided as shown in Figure 3-7.

   c. Connect the other end of the cable, marked with two dots, into the receptacle on the right front side of the HP Touchscreen II. (See Figure 3-8)

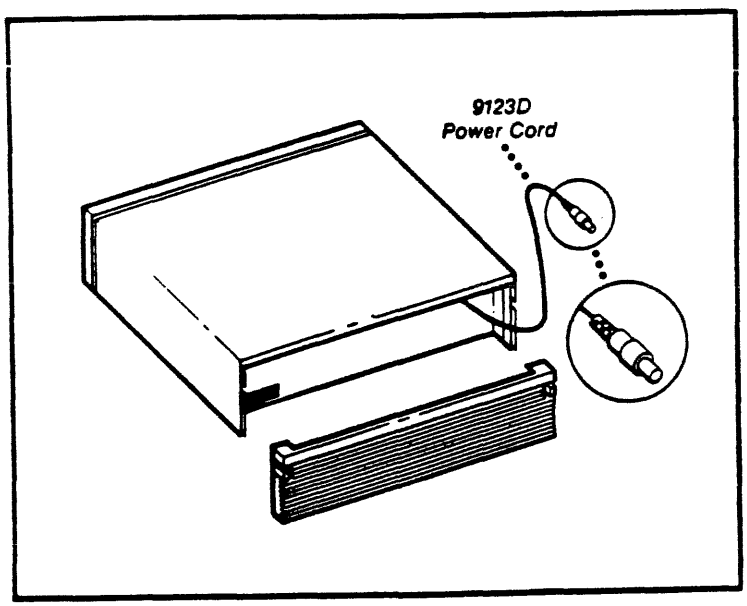


Figure 3-3. Disc Drive Power Cord Location

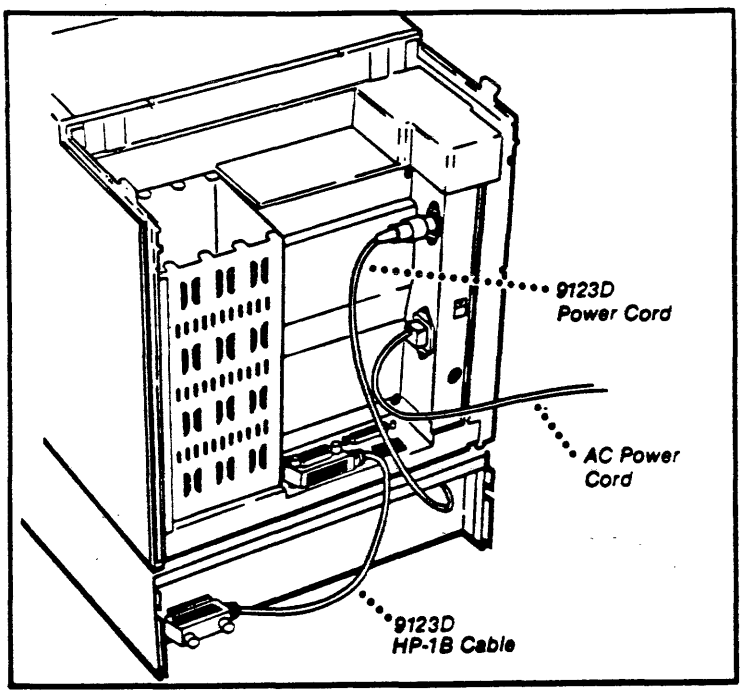


Figure 3-4. HP Touchscreen II With HP 9123D Connected

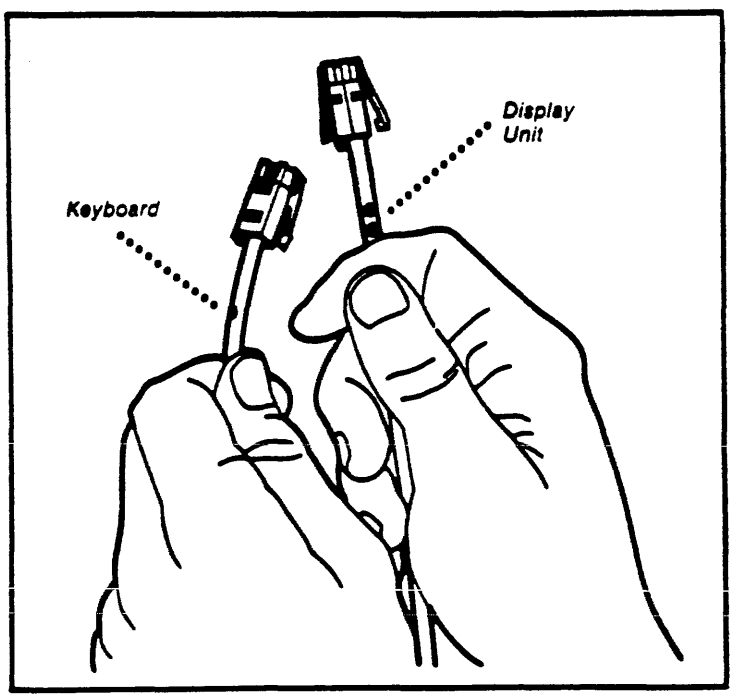


Figure 3-5. Keyboard Cable Connector Identification

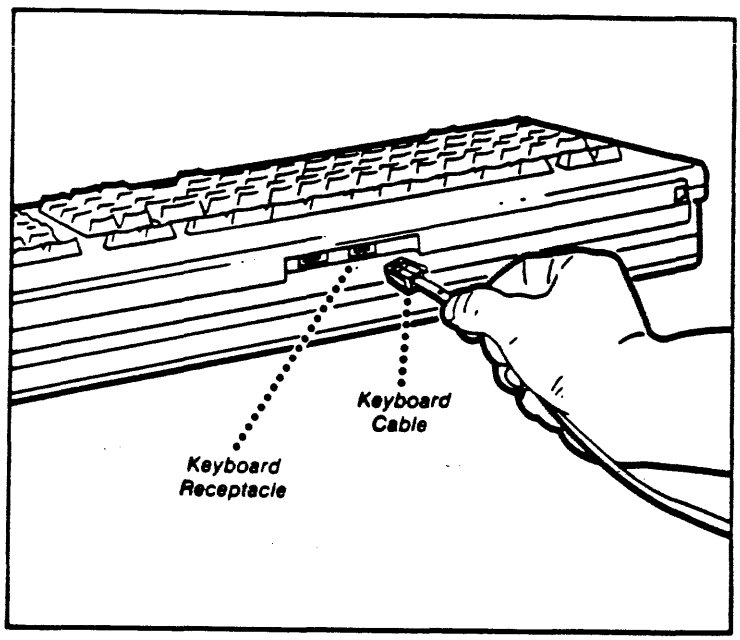


Figure 3-6. Keyboard Cable Connection

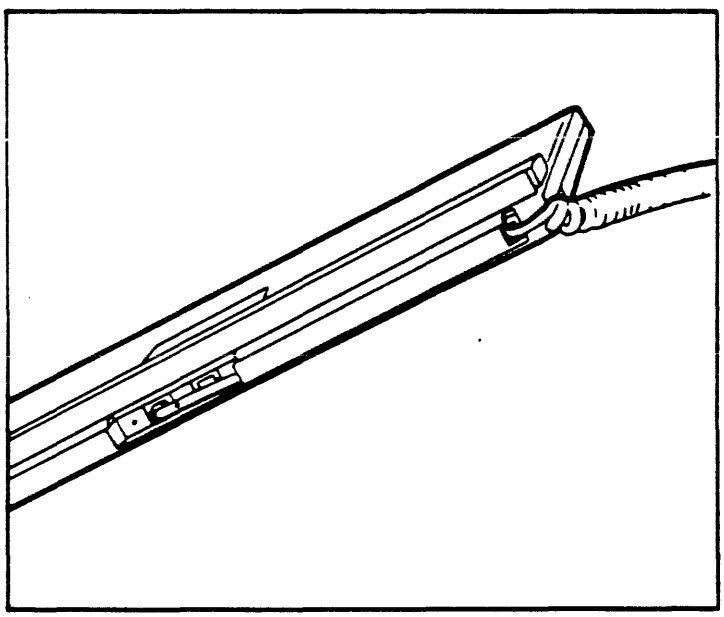


Figure 3-7. Keyboard Cable Routing

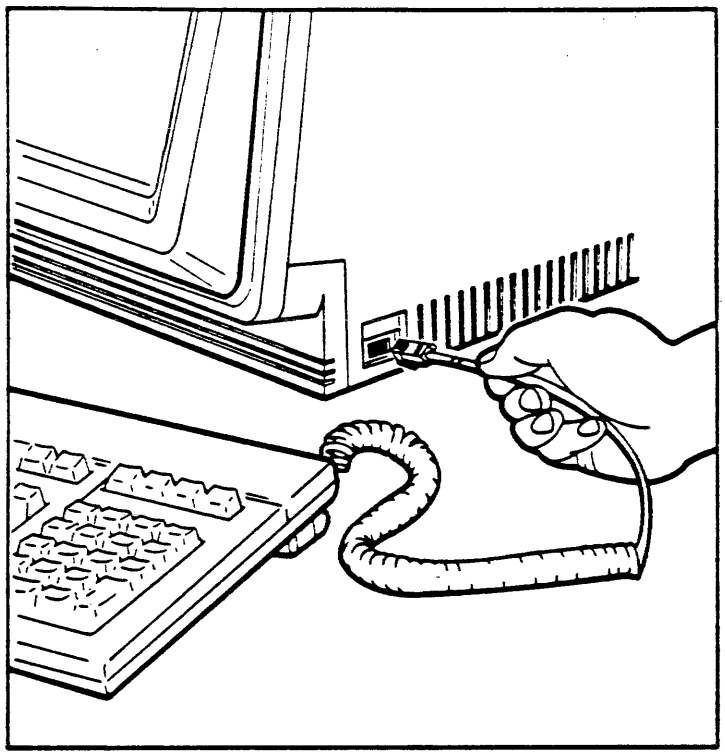


Figure 3-8. Keyboard To Display Unit Cable Connection

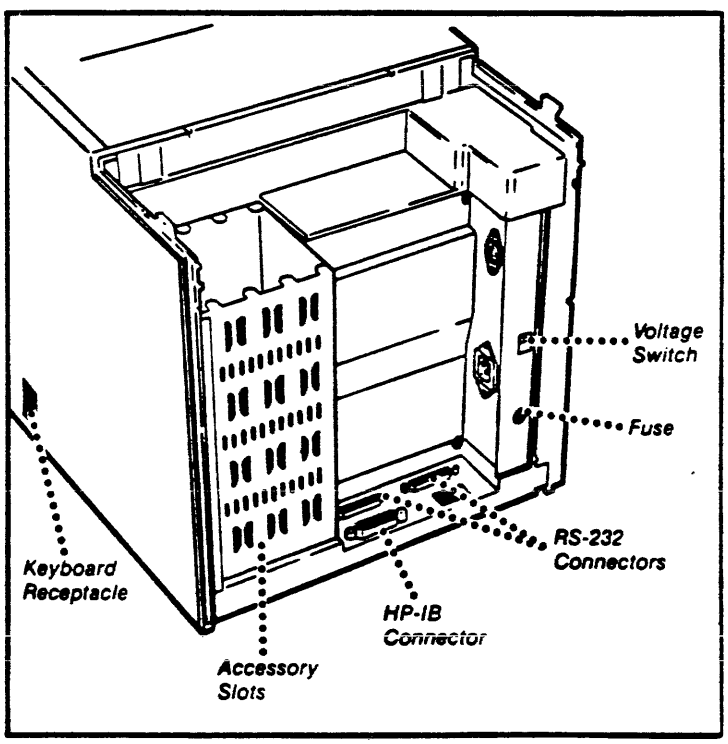


Figure 3-9. HP Touchscreen II Switch and Cable Connector Location

5. Check the VOLTAGE switch setting to ensure it is set to the proper voltage for the area (See Figure 3-9.)

6. Connect the HP Touchscreen II AC power cord as shown in Figure 3-4. Connect the other end to a dedicated AC power source that has the same ground as the Series 64/68/70 CPU.

7. Insert the HP 150 Touchscreen II System Work Disc (P/N 45847-13001) in Drive A of the HP 9123D and power-up the HP Touchscreen II (this disc is found in the back of the Using Your Touchscreen II Personal Computer Manual (P/N 45847-90005) shipped with the HP Touchscreen II).

8. When the Personal Applications Manager (P.A.M.) Main menu appears on the screen, use the Tab key to highlight the box labeled DEVICE CONFIG.

9. Press the Start Application key (f1). The MS-DOS Device Configuration menu will appear on the screen.

10. Refer to the Using Your Touchscreen II Personal Computer Manual, (P/N 45847-90005) shipped with the HP Touchscreen II. Follow the instructions in Chapter 11, "CONFIGURING YOUR TOUCHSCREEN II," under the heading "Using Device Config" to configure the printer (optional), the disc drive, and the Primary Host Computer (COM1) port. Figure 3-10 shows how a properly configured HP Touchscreen II Device Configuration Main menu should look (if the optional printer is not used).

```
MS-DOS Device Configuration

System Devices
                                          Print
       Interface  Address   Model         Wheel          Interface  Address
   PRN: No Device                                   PLT: No Device

   LST: No Device                                  COM1:  Port1

   AUX: No Device                                  COM2: No Device

Disc Drives      Maximum Sector Size  512  bytes    RAM Disc Size  0 K bytes

   Interface  Addr  Drive      Interface  Addr  Drive      Interface  Addr  Drive
A:   HP-IB     0     0      E: No Device               I: No Device

B:   HP-IB     0     1      F: No Device               J: No Device

C: No Device                G: No Device               K: No Device

D: No Device                H: No Device               L: No Device
```

Figure 3-10. MS-DOS Device Configuration Main Menu

Only the Printer configurations shown below are supported.

	Interface	Address	Model			Interface	Address	Model
PRN:	HP-IB	1	Thinkjet	or	PRN:	HB-IB	1	2934A

NOTE

If this configuration is not done or is incorrect, random and unpredictable failures of the Communication Program are likely to occur. Two of the failures which might occur are, CHECKSUM ERRORS while loading FLD's, and MEMORY FULL on the HP Touchscreen II.

11. Perform the following steps to set the Global Configuration for the HP Touchscreen II:

    a. Press the User\System key on the HP Touchscreen II keyboard to display and access the System Configuration Keys.

    b. Press the User\System key again (if necessary to display and access the System Configuration
    c. Keys). Press the Config Keys function key [f8].

    d. Press the Global Config function key [f1].

    e. Verify the following Global configuration (use the Tab key and the NEXT CHOICE and PREVIOUS CHOICE keys to change any incorrect values). Figure 3-11 is an example of a Global Configuration Menu.

GLOBAL CONFIGURATION

Click On

Keyboard USASCII Power On Computer

Op Sys Dev HP-IB 0 0 Remote/Serial Dev PORT1/PORT2

Figure 3-11. Global Configuration Menu

NOTE

For local language keyboards select the correct keyboard value (e.g., ESPANOL in Venezuela, FRANCAIS in France etc.).

    f. If you made any changes to the values on the screen then press the SAVE CONFIG key [f1] to save the new values.

12. Perform the following steps to set the Terminal Configuration for the HP Touchscreen II:

    a. Press the User\System key on the HP Touchscreen II keyboard to display and access the System Configuration Keys.

    b. Press the User\System key again (if necessary to display and access the System Configuration Keys).

    c. Press the Config Keys function key [f8].

    d. Press the Terminal Config function key [f5].

    e. Verify the following Terminal configuration (use the Tab key and the NEXT CHOICE and PREVIOUS CHOICE keys to change any incorrect values). Figure 3-12 is an example of a Terminal Configuration Menu.

```
                        TERMINAL CONFIGURATION

        Bell On     Cursor Type Line     Tab = Spaces No

  Return Def CR  RETURN=ENTER No   PrinterCode4 Ext  PrinterNulls 0

  Local Echo Off     Caps Lock Off   Start Column 1   ASCII 8 Bits Yes

XmitFnctn(A) No       SPOW(B) No   InhEolWrp(C) No  Line/Page(D) Line

InhHndShk(G) No   Inh DC2(H) No    Auto Term(J) No  ClearTerm(K) No

InhSlfTst(L) No                     Esc Xfer(N) No  InhDcTest(W) No

                                                    Graph Compat Off

Field Separator u/s       Block Terminator r/s      Alternate Set Line(B)

Terminal Id 150A                          Transmit All Fields
```

Figure 3-12. Terminal Configuration Menu

    f. If you made any changes to the values on the screen then press the SAVE CONFIG key [f1] to save the new values.

13. Perform the following steps to set Port 1 Configuration for communication to the Series 68 or Series 70 console port:

    a. Press the User\System key on the HP Touchscreen II keyboard to display and access the System Keys.

    b. Press the User\System key again (if necessary to display and access the System Keys).

    c. Press the Config Keys function key [f8].

    d. Press the Port 1 Config function key [f3].

e. Verify the following Port 1 configuration, although the baud rate may vary (use the Tab key and the NEXT CHOICE and PREVIOUS CHOICE keys to change any incorrect values). Figure 3-13 is an example of a Full Duplex Hardwired Port 1 Configuration Menu.

NOTE

Only baud rates of 300, 1200, 2400, 4800, and 9600 are supported.

```
                    FULL DUPLEX HARDWIRED      Port 1

BaudRate  9600    Parity  None  DataBits 8                    Clock  INT

Asterisk  Off                   Stop Bits 1      EnqAck  Yes

  TR(CD)  Hi    Check Parity  No    SR(CH)  Lo

RecvPace  None                    SRRXmit  No   RR(CF)Recv  No

XmitPace  None                    SRRInvert  No  CS(CB)Xmit  No  DM(CC)Xmit  No
```

Figure 3-13. Full Duplex Hardwired Port 1 Configuration Menu

f. If you made any changes to the values on the screen then press the SAVE CONFIG key [f1] to save the new values.

NOTE

The MPE configuration for the Communication Package is the same as that for the HP 2647F.

14. The HP Touchscreen II serial port 1 has a female DB-25 RS-232C D shell connector which must be connected to the HP 3000 Series 68 or 70 DCU console port (port 0). (See Figure 3-15.) Select one of the cables listed below, that matches your installation needs.

    a. The HP 3000/6X/7X Modem port uses one of the following cables:

       13242N U.S. Modem cable RS-232C.
       13242M European Modem cable RS-232C.

    b. The HP 3000/6X/7X ATP direct connect port uses one of the following cables:

       13242P RS-422 cable (25 pin to 5 pin).
       13242X RS-232C cable (25 pin to 3 pin).

15. Replace the top and back covers.

16. Remove the MS-DOS Operating Disc from Drive A.

17. Insert the Communication Program Disc into Drive A.

NOTE

Leave the Communications Program Disc inserted in Drive A at all times. It contains files that are often accessed by the Communication Program. This software will operate only, if the Communication Program disc is inserted in Drive A.

18. Test the Communication Program Disc:

    a. Turn off the power to the HP 150 Touchscreen II, wait several seconds, and then turn on the power to the HP 150 Touchscreen II.

    b. Verify that the Communication Program starts up displaying the header message:

```
HP 3000 Series 68 System Console version C.01.01
    Copyright 1985 by Hewlett-Packard Company
```

19. Power up the HP 3000 Series 68 or Series 70 Computer System. Verify that the Diagnostic Control Unit (DCU) passes self-test by observing the message "DCU SELF TEST COMPLETE". (Refer to the MPE V System Operation and Resource Management Reference Manual, P/N 32033-90005, Appendix A, "QUICK REFERENCE GUIDE", for the appropriate power-up procedure.)

20. Your HP 150 Touchscreen II is now operational as the System Console.

21. Perform the following steps to create a back-up copy of the Communication Program Disc:

    a. Insert the Communication Program master distribution diskette (P/N 32342-13402) into the left-hand disc (Drive A) of the dual disc drive attached to the HP 150 Touchscreen II.

    b. Turn off the power to the HP 150 Touchscreen II, wait several seconds, and then turn on the power to the HP Touchscreen II. Wait for the Communication Program to start and print the header message:

```
HP 3000 Series 68 System Console version C.01.01
    Copyright 1985 by Hewlett-Packard Company
```

    c. Put a blank diskette into the right-hand disc (Drive B). (Make sure that the diskette is NOT write-protected by sliding the write-protect tab towards the diskette hub as in Figure 3-14. Refer to the Using Your HP Touchscreen II Personal Computer Manual (P/N 45847-90005), Chapter 3, "HANDLING AND USING DISCS", for detailed instructions on write-protecting diskettes.)

    d. Press the `help & utility` function key (f3).

    e. Press the `utility` function key (f1).

    f. Press the `MAKE CON DISC` function key (f3). The following will be displayed:

```
WARNING! A CONSOLE DISC WILL BE GENERATED IN DRIVE B.
INSERT A BLANK FLOPPY DISC INTO DRIVE B.  ALL FILES (IF ANY)
```

h. Remove and label the diskette from Drive B. (Write-protect the diskette by sliding the write-protect tab away from the diskette hub.) This diskette will now be referred to as the "Communication Program Disc".

i. Press the main menu function key [f8].

j. Remove the master distribution diskette from Drive A and store it in the accompanied carrying case for future use.

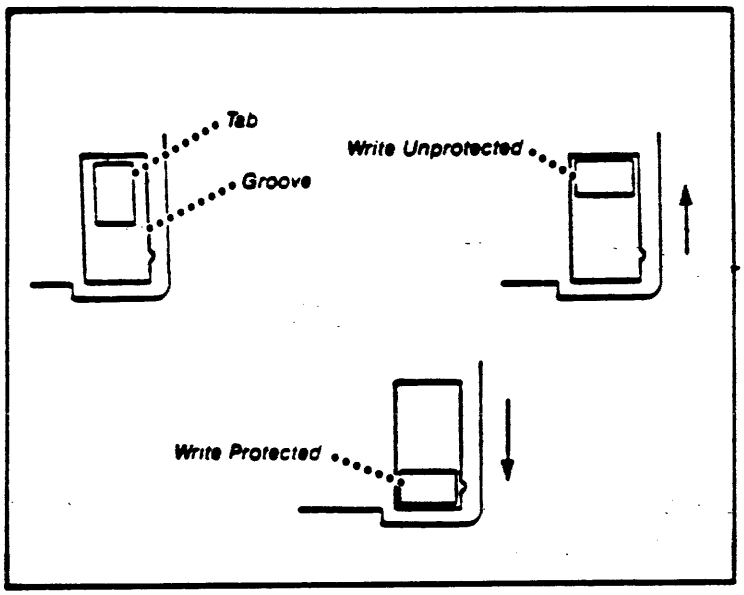


Figure 3-14. Diskette Write-Protect Tab.

23. Refer to the Series 64/68/70 FLD Manual (P/N 32342-90003), that is also located in Volume 1 of the Series 64/68/70 Diagnostic Manual Set (P/N 32342-60001) for information on how to run Fault Locating Diagnostics (FLDs) using a Touchscreen II as a System Console.

Installing the HP 2642A or HP 2647F as the System Console

The System Console that may also be used is the HP 2642A opt. 964 or the HP 2647F opt. 890. Install either of these consoles as follows:

1. Ensure that the terminal POWER switch is set to OFF.

2. Connect AC power cord from console to a dedicated source of AC power.

3. Connect console keyboard cable hood connector to printed circuit card edge connector that is notched to match cable connector.

4. Connect remaining console cables as shown in Figure 3-15.

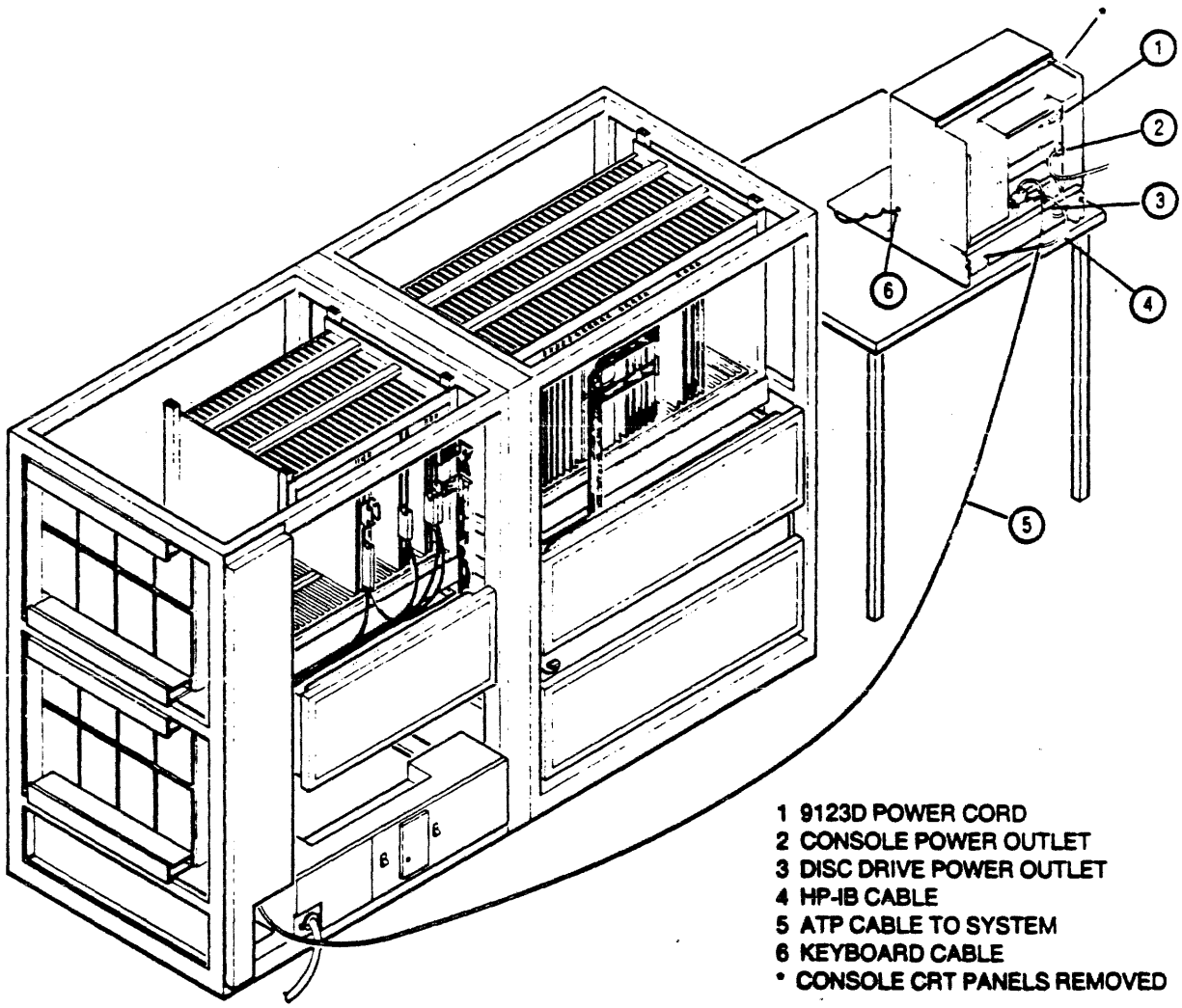


Figure 3-15. Processor-to-Console Cable Routing and Connection

INSTALLING DISC DRIVES

Only one HP 7920M, HP7925M, HP 7914CT, HP 7914TD, HP 7914ST, HP 7933H or HP 7935H can be configured as the first system disc drive (LDEV1) for the Series 64/68/70 Computer. The HP 7911/12/14 can be configured as additional drives (with logical device numbers of 2 and higher). The general installation of these discs is described in the following paragraphs. The service and installation manual(s) shipped with the disc(s) contain detailed set-up instructions and parts lists.

Position the System Disc Drive on the side of the processor cabinet allowing for the full opening of any access doors. The HP 7920/25 Master Disc Drive cabinets contain the HP 13037B disc controller (identified with an M on the cabinet serial tag). Next, position slave disc(s) near the master disc unit as required. This does not apply to the HP 7911/12/14 and HP 7933, as they have integral controllers and are masters only. (See Figure 3-16.)

Installing the HP 7920M/7925M System Disc Drives

The HP 7920M/7925M are master disc drives that can individually support up to seven slave disc drives. The master disc interfaces to the system through the HP 10833C HP-IB device I/O cable. The cable has one end preconnected onto the disc HP-IB I/O connector. Connect the free end to the system as described below and as shown in Figure 3-16.

1. Ensure that disc drive POWER switch is set to OFF.
2. Connect HP-IB cable to connector on rear of disc drive.
3. Route HP-IB cable to junction panel 1-1 as shown in Section 2.
4. Configure CPU number select switch (S1=0) and the HP-IB device address switch (S2) in HP 13037B Disc Controller. (See Figure 3-17.)
5. Connect disc drive AC power cord to a dedicated source of AC power.

Installing the HP 7920S/7925S System Disc Drives

The HP 7920S and HP 7925S are slave disc drives. A slave disc drive connects to the controller on the master HP 7920M or HP 7925M disc drive and are not part of the HP-IB cabling. Install the slave disc(s) as follows:

1. Ensure that disc drive POWER switch is set to OFF.
2. Connect disc drive AC power cord to a dedicated power source that has an isolated ground (or to a power line treatment device, if required).
3. Connect slave disc(s) data cables as depicted in Figure 3-16 and appropriate disc service and installation manual(s).

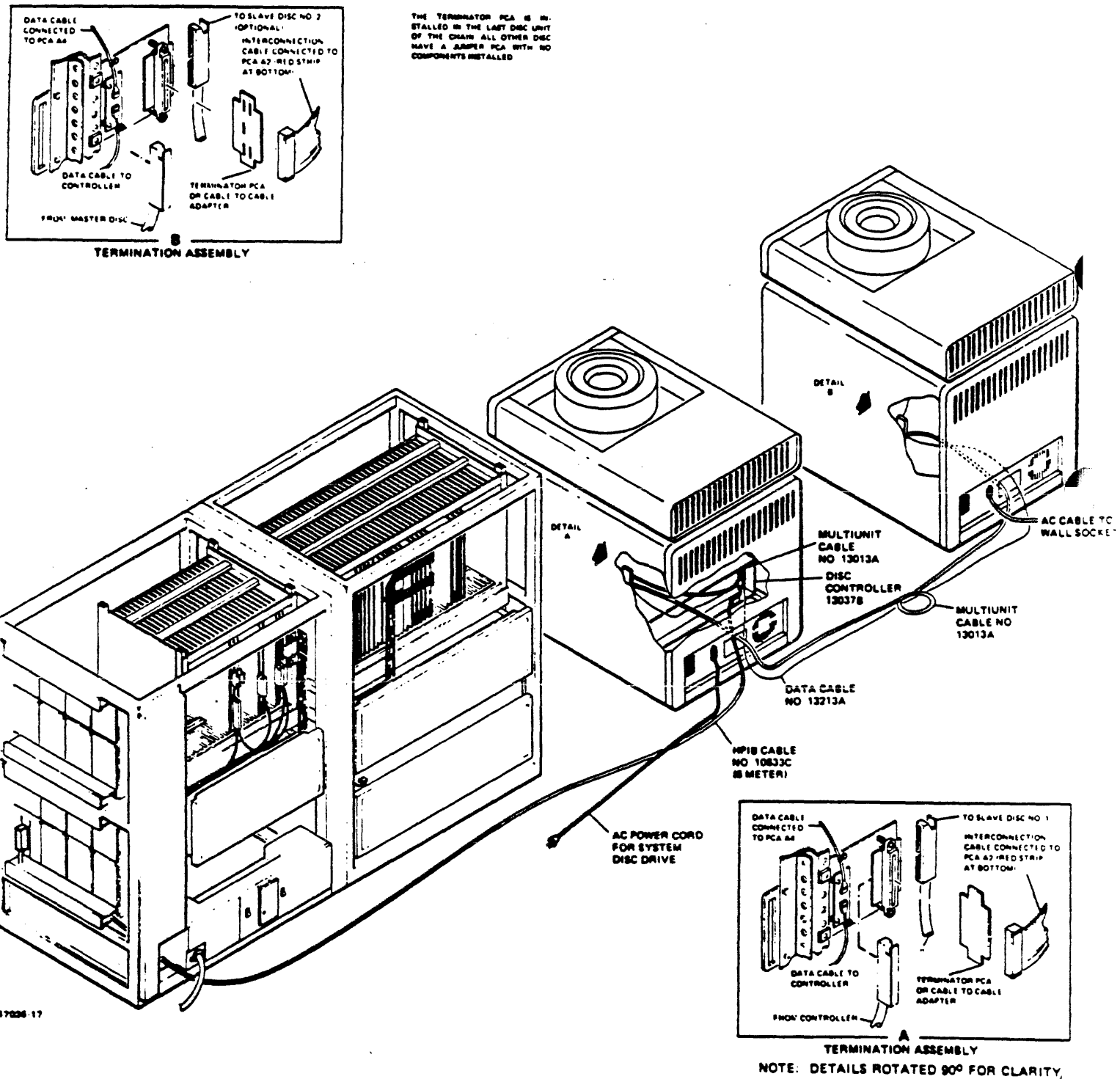
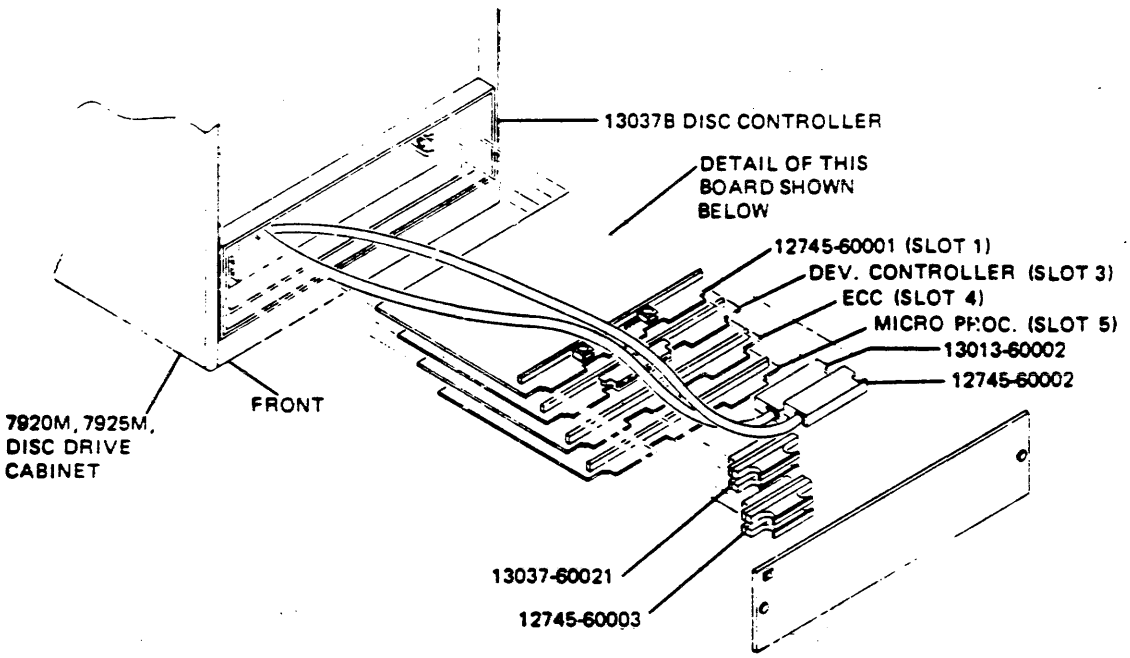
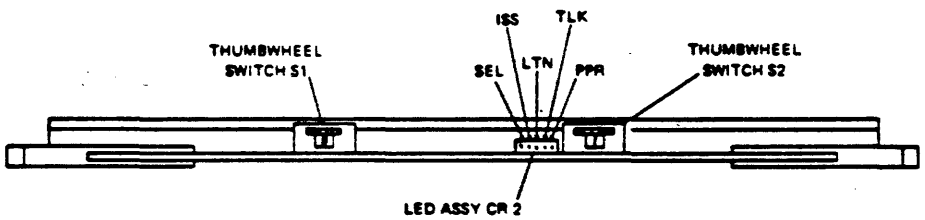


Figure 3-16. Master/Slave Disc Cabling





12745A DISC HPIB CONTROLLER BOARD

CONTROL/ INDICATOR	FUNCTION
SWITCH S1	Selects CPU number (0 - 7). Number is detected by controller during its polling operation. In a multi-CPU system, no two CPU's can have the same number.
SWITCH S2	Selects HP-IB address (0 - 7).
LED ASSY CR2	Indicates operational state of adapter kit PCA. LED's are coded as follows: SEL – SELECT. When LED is lit, it indicates that controller is operating on adapter kit PCA. When controller is idle. LED will be dimly lit. ISS – IDENTIFY STANDBY STATE. LTN – LISTEN. When LED is lit, it indicates that adapter kit PCA is in Listen mode. TLK – TALK. When LED is lit, it indicates that adapter kit PCA is in Talk mode. PPR – PARALLEL POLL RESPONSE. When LED is lit, it indicates that adapter kit PCA is ready to respond to a Parallel Poll from the controller of the HP-IB as soon as it is given.

147036-28

Figure 3-17. System Disc HP-IB Device Select Switch

Installing the HP 7933/35XP/H System Disc Drives

The HP 7933XP/H and 7935XP/H disc drives can be configured as LDEV1 or as additional system disc drives for the HP 3000 Series 64/68/70. The general installation of the HP 7933XP/H and 7935XP/H is described in the following paragraph. The Disc Drive Operation and Installation Manual (P/N 07930-90902) should be referenced for detailed setup instructions.

NOTE

No two devices on a GIC can have the same device number. The first device to be installed in the system should be configured with device number 1; others should follow sequentially.

1. Ensure that disc drive POWER switch, located on rear of drive, is set to OFF.
2. Connect HP-IB device I/O cable to connector on rear of disc drive.
3. Route HP-IB device I/O cable to junction panel port on I/O Bay, corresponding to assigned GIC PCA.
4. Set HP-IB device address switches, located on rear of drive, to appropriate address.
5. Connect disc drive AC power cord to a dedicated AC power source.

Installing the HP 7911/12/14 System Disc Drives

The HP 7911P/12P/14P are integrated storage units that include both a Winchester disc drive and an integral Cartridge Tape Unit. The HP 7911P/7912P cannot function as a first system disc (LDEV1), but the HP 7914P can be configured as the first system disc (LDEV1). The 7911P/12P/14P with cartridge tape units require a dedicated GIC.

The HP 7914CT combines the HP 7914 disc drive with a HP 9144A Cartridge Tape Unit which does not require a dedicated GIC or separate controller. The HP 7914TD includes an HP 7970E Master Tape Drive and the HP 7914ST includes an HP 7974A tape drive.

To install the HP 7911/7912/7914 system discs, refer to detailed instructions provided in their accompanying documentation.

For the HP 7911/12/14 refer to the HP 7911/7912/7914 Operating and Installation Manual (P/N 07912-90902) and the HP 7911/7912/7914 Disc/Tape Drive Service Manual (P/N 07912-90903).

For the HP 7914TD refer to the HP 7914TD Installation and Service Manual (P/N 07914-90902) and for the HP 7914ST refer to the HP 7914ST Installation and Service Manual (P/N 07914-90912).

Installing the HP 7945A Disc Drive

The HP 7945A cannot be configured on the same GIC as the system disc or the cold load device. It cannot be used as the system disc. Refer to the HP 7945 Service Manual (P/N 07940-90903) for installation procedures.

Installing the HP 9895A Flexible Disc Drive

The flexible disc drive may be installed in the system and used for user backup. The following procedure applies to single or multiple flexible disc installation.

1. Connect HP-IB I/O cable from flexible disc drive to junction panel 13 as shown in Section 2.
2. Ensure that AC POWER switch on flexible disc drive is set to OFF.
3. On flexible disc controller, set device address number to first available device address.
4. Connect flexible disc drive power cord to a dedicated power source with an isolated ground.
5. If an HP 9895 is sharing a GIC with other devices, it should remain powered on at all times otherwise HP-IB cable length must be limited to meet specifications without its active load.

INSTALLING PRINTERS

Installing the HP 2563A/65A/66A Line Printers

The following steps apply to the installation of single or multiple HP 2563A/65A/66A Printers. (See Figure 3-18.) Refer to detailed instructions in the accompanying documentation (HP 2563A Service Manual, P/N 02563-90904 or HP 2565A/66A Service Manual, P/N 02566-90904).

1. Ensure that main POWER switch on back of computer is set to OFF.
2. Verify that source voltage matches requirements of printer. (See Printer Power Label.)
3. Connect interface cable from computer system to interface connector on back of printer.
4. Connect AC power cord to AC power input jack on back of printer and plug other end into AC outlet.
5. Ensure that main POWER switch located on back of printer is set to ON.
6. Load ribbon and paper as described in ribbon and paper loading portions of Operator's Manual.
7. If you have an HP-IB interface, select HP-IB address as described in HP-IB Address Section of the Operator's Manual. If you have an interface other than HP-IB, configure your interface as described in the interface manual supplied with your printer.
8. With printer offline, press TEST key on Operator Control Panel. Then press [ENTER] key. A self-test printout will be printed. Compare results with self-test printout in back of Operator's Manual. Remember that self-test printout varies depending on which character set options are

installed. Printer is ready for operation if no error numbers flash on self-test display and characters on self-test printout are clear and well defined.

Installing the HP 2601A/02A/03A Daisywheel Printers

To configure the HP 2601A/02A/03A Daisywheel Printers, refer to the Printer Customer Engineer Handbook (P/N 5955-6415). Refer to the HP 2601A Installation and Reference Manual (P/N 02601-90902), the HP 2602A Daisywheel Printer Service Manual (P/N 02602-90002), or the HP 2603A Owner's Operator Guide (P/N 02603-90004) for the applicable installation information.

Installing the HP 2608A/S Line Printers

To install the HP 2608A/S Line Printers, refer to the HP 2608A/S Service Manual (P/N 02608-90904 for the A or P/N 02608-90909 for the S) or the HP 2608A/S Technical Reference Manual (P/N 02608-90903 for the A or P/N 02608-90910 for the S) for detailed instructions.

Installing the HP 2680A/86A/87A/88A Page Printers

To install the HP 2680A/86A/87A/88A Page Printers, refer to detailed instructions provided in the accompanying documentation.

For the HP 2680A refer to the HP 2680A Service Manual, P/N 02682-90904.

For the HP 2686A refer to the Laserjet Service Manual, P/N 02686-90904.

For the HP 2687A or 2688A refer to the HP 2683A Service Manual (P/N 02683-90904) and the HP 26087 Serial Controller Service Manual (P/N 26087-90904).

WARNING

The HP 2680A/86A/87A/88A page printer contains a laser. The safety precautions in the documentation shipped with it must be obeyed. Only trained personnel should install and service the 2680A printer.

Installing the HP 2932A/34A Printers

To install the HP 2932A/34A Printers, refer to detailed installation procedures in the HP 2930 Series Printers Owner's Manual (P/N 02932-90001) and the HP 2930 Series Printers Service Manual (P/N 02932-90007).

INSTALLING MAGNETIC TAPE DRIVES

Installing the HP 7970E Magnetic Tape Drive (Master)

To install the HP 7970E magnetic tape drive, refer to instructions in the accompanied HP 7970E Magnetic Tape Unit Service Manual (P/N 07970-90914).

Installing the HP 7974A and 7978A/B Magnetic Tape Drives

Install the tape drive as follows:

1. Ensure that POWER switch is set to OFF and source voltage matches that required by tape drive.

2. Connect one end of HP-IB device I/O cable to Magnetic Tape Drive and other end to assigned GIC PCA.

3. Connect power cord from Magnetic Tape Drive to a dedicated power source.

4. Ensure that HP-IB address is set correctly and the configuration is as illustrated in Figure 3-19. Refer to the HP 7974A or 7978A/B Service Manual (P/N 07974-90030 for HP 7974A and P/N 07978-90030 for HP 7978A/B) for additional installation procedures.

Installing the HP 9144A Magnetic Tape Drive

The HP 9144A is not supported as a cold load device. It cannot share a GIC with a system disc or cold load device. Refer to the HP 9144 Service Manual (P/N 09144-90030) for installation procedures.

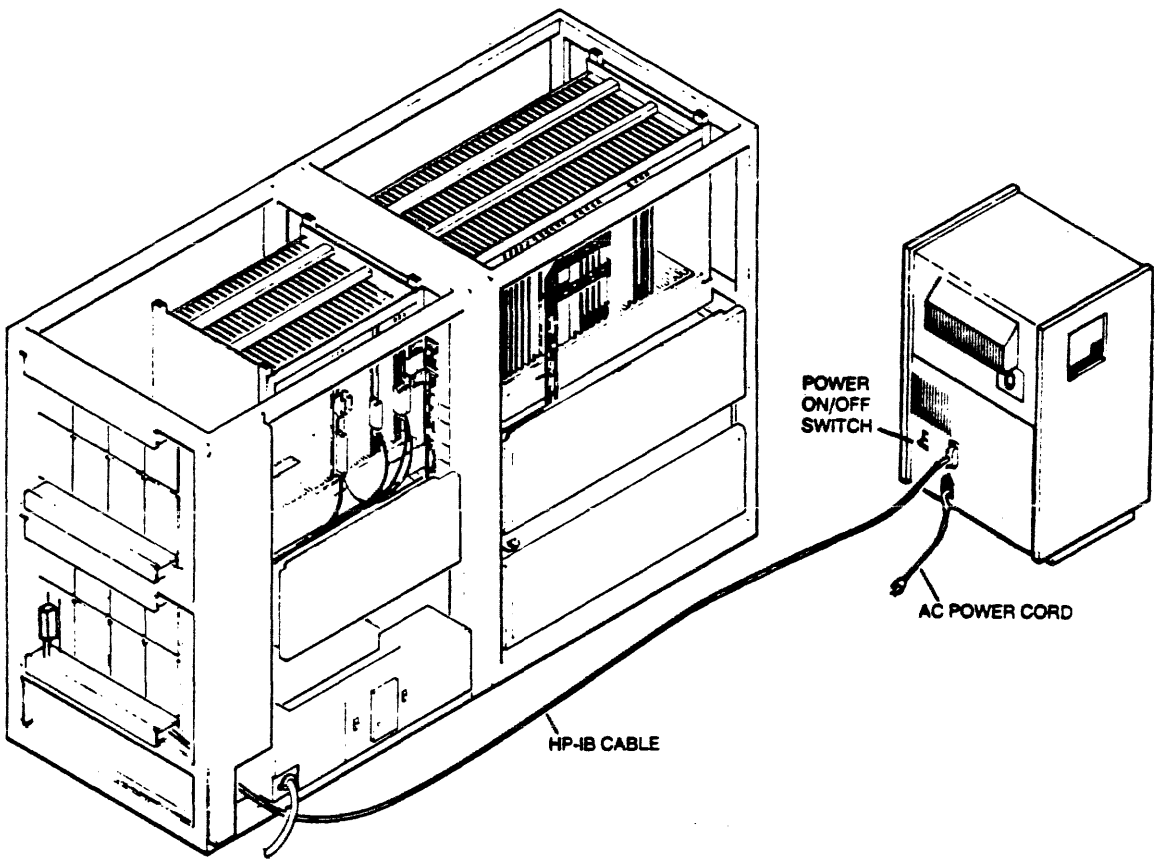
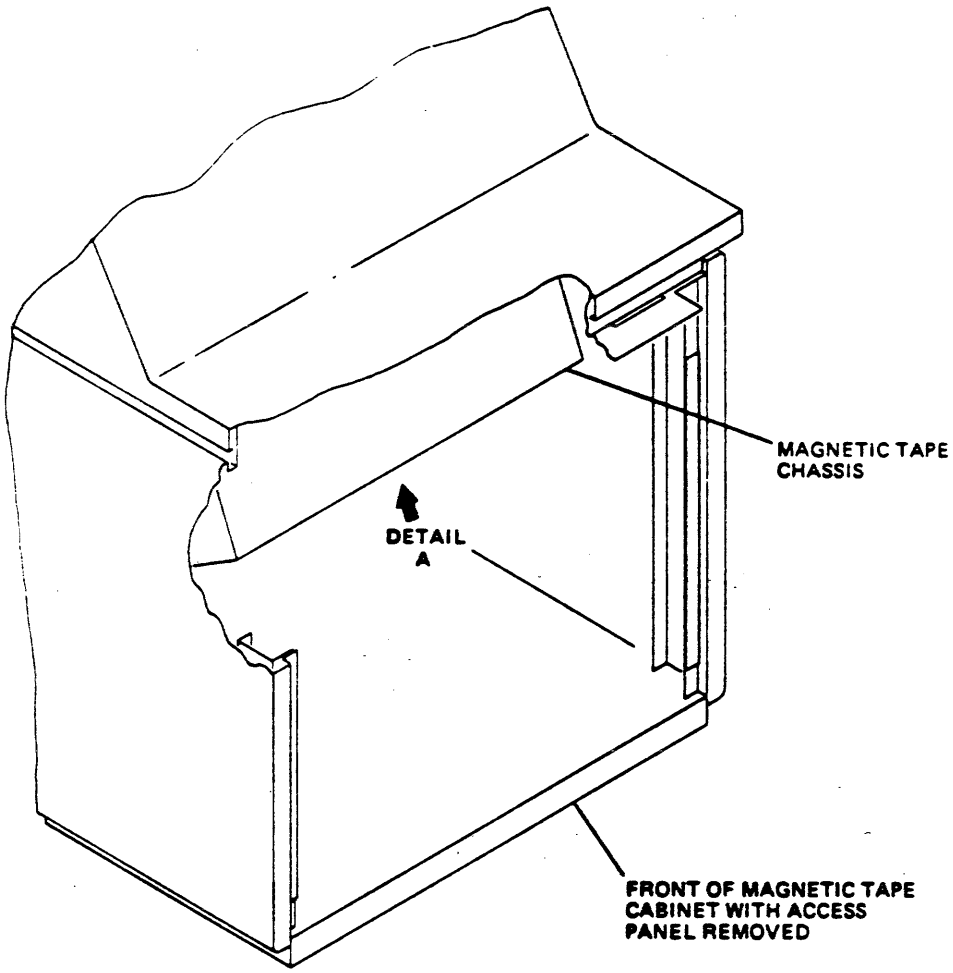


Figure 3-18. HP 2563A/65A/66A Line Printer Installation



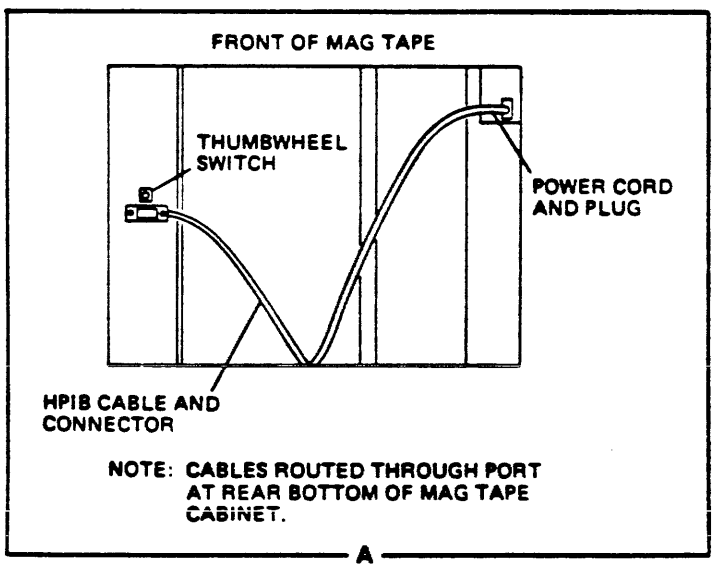


Figure 3-19. Magnetic Tape HP-IB Device Address Switch, Cable and Connector

INSTALLING TERMINALS

Install the terminals as follows:

1. Ensure that terminal POWER switch is set to OFF.
2. Ensure that power source voltage matches terminal requirements.
3. Connect power cord from terminal to a dedicated power receptacle with an isolated ground.
4. Connect keyboard and RS-232 or RS-422 cables to connectors which match cable connectors on terminal.
5. Route free end of data communication cable from terminal to installed connector on junction panel. Next, configure terminal to appropriate LDEV/DRT designation.

POWERING THE SYSTEM

SECTION 4

DC POWER SUPPLIES

The HP 3000 Series 64/68/70 Computer uses six power supplies in four sets to provide DC power. As shown in Figure 4-1, the sets are identified A through D.

Set A contains two parallel supplies. They provide -5.225V to the Main Memory, CPU, and Cache Memory PCAs. Set B consists of only one supply, but it has a battery backup (see Figure 4-1). Supply B provides 5.05V to the memory arrays on the Main Memory Array PCAs. In a power failure, its battery backup will provide power to the memory arrays for at least 15 minutes.

Set C also consists of only one supply. It provides -2.1V, 12V, and -12V to the CPU and Cache Memory PCAs. Set D contains two parallel supplies; they provide 5.05V to the Main Memory and I/O PCAs. (If an optional Auxiliary I/O Bay is present, it contains a fifth set, E; its characteristics are identical to Set D's.)

Each supply has a vertical display of four LEDs:

- ON (This green LED is lighted when the supply is working properly.)
- OV (Over Voltage. This LED is red.)
- UV (Under Voltage. This LED is red.)
- OT (Over Temperature. This LED is red.)

When a power supply fails, the System Status Display Panel (SSDP) lights the corresponding A through E LED. The operator can look at that supply, see which of the three failure LEDs is lighted, and call the HP Customer Engineer.

POWER DISTRIBUTION MONITOR

The Power Distribution Monitor (PDM) PCA has a four-contact rocker switch near the upper right corner (see Figure 2-5). If the system being installed has an Auxiliary I/O Bay, Contact 2 "AUX I/O" should be closed. If the system does not have an Auxiliary I/O Bay, Contact 2 should be open. Contacts 1, 3, and 4 have no effect on system operation and can be opened or closed.

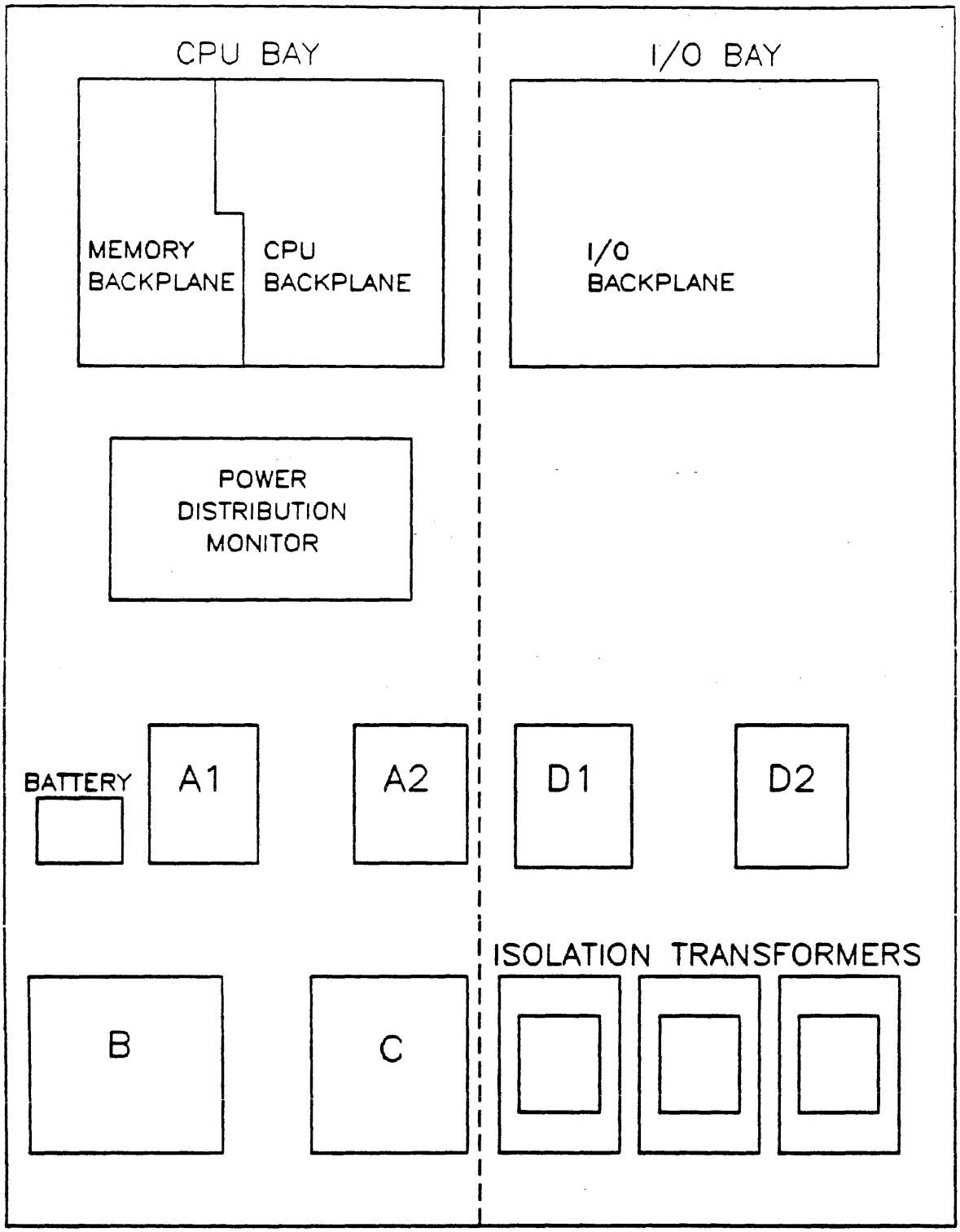


Figure 4-1. DC Power Supplies

FINAL SYSTEM PREPARATION

Prepare for system startup as follows:

1. Ensure that all disc drives have been checked for proper head alignment, as described in service manuals shipped with them, before connection. This must be done to guarantee disc pack/cartridge interchangeability.

2. Verify that both external and internal cables are installed in compliance with guidelines in Appendix A.

3. If an HP 7920/25 Disc Drive is LDEV1, open its front door and set unit select switch (upper right corner) to 0. Also set HP 13037B Interface PCA HP-IB device no. to 1. If installing an HP 7933 as LDEV1, set HP-IB device no. to 1.

4. Ensure that all discs in system domain indicate Drive Ready.

5. If system cold load device is an HP 7970E, set unit no. to 0 on unit switch at lower right front. Also set HP-IB device no. (bottom of drive) to 1. If system cold load device is an HP 7974A/78A, set HP-IB device no. to 1.

6. Insert the Series 68/70 Computer System key in the key switch on the left side of I/O Bay as seen from rear. Turn key to the CONTROL position.

SYSTEM STARTUP

Startup the system as follows:

1. Power up all peripheral devices.

2. Ensure that the console is powered up, the Communication Keys (Touchscreen II) are configured and the Communication Program is running properly. (Refer to Installing the System Console located in Section 3 of this manual.)

3. Set Main POWER Switch, located on AC Unit (rear of I/O Bay), to ON.

4. Verify that the following message is displayed on System Console within ten seconds:

   DCU SELF TEST COMPLETE

5. Verify that the following indicators are displayed on SSDP:

INDICATOR	POSITION/INDICATION
LINE	LINE - or ON
REMOTE	off
BATTERY	off
OVERTEMP	off
RUN	off
HALT	HALT - or ON
CIR LED readout	off
Power Supply Indicators	off

MPE BOOT-UP

Load MPE software as follows:

NOTE

When software installation is to be accomplished by the customer, refer them to the HP 3000 Software Update Manual (P/N 32033-90036) for detailed installation procedures.

1. Ensure that system disc drive (previously configured as LDEV1) is connected to channel 3 as device 1, unit 0. This is the default case; it is displayed at System Console Banner.
2. Ensure that system cold load device is connected to channel 2 as device 1, unit 0.
3. Mount cold load tape.
4. Enter command **LOAD** which initializes the cache and starts initial Micro Program Load (MPL). As there is nothing on disc at this point, **START** command will not be successful.
5. The MPL will display the following:

   INITIALIZING 128 KB CACHE (Series 70) or
   INITIALIZING 8 KB CACHE (Series 64/68)
   LOADING MPL MICROCODE
   LOADING SYSTEM MICROCODE

6. Respond "**RELOAD**" to message "**COLD START/RELOAD/UPDATE.**" Refer to Table 4-1 for a description of the major system error codes/messages and corrective action to be taken.

7. Prompt for time and date is displayed on System Console:

   DATE (M/D/Y)?
   TIME (H:M)?

8. Computer now does an automatic logon to OPERATOR.SYS. A message similar to the following is displayed:

   LOG FILE NUMBER xxxx ON
   WELCOME
   :HELLO OPERATOR.SYS;HIPRI
   14:00/12/SP#6/SPOOLED OUT
   14:00/#S1/LOGON FOR: OPERATOR.SYS,PUB ON LDEV #20
   HP3000/MPE V x.xx.xx WED,AUG 5,1985, 2:00PM

System Load (MPL) Errors

These are error messages which can be received on a system load (LO or ST commands); they apply only to ROM date codes 2403 and greater. Each error is described along with possible clues to the problem:

- INIT/IDENT FAILED (was not able to successfully complete INITIALIZATION/IDENTIFICATION part of MPL).
- BAD INIT/IDENT DEVICE TYPE (device specified was not a proper MPL device 7914 disc, 792x disc, 797x tape or 793x disc).
- MPL FAILED (could not load system microcode from specified device).
- NO RESPONSE FROM CPU (timeout).
- UNEXPECTED CPU INTERRUPT (CPU interrupt other than DIAG freeze).
- MPL ERROR CODE = Annn (system microcode bootstrap loader has detected a problem--error codes follow).

Cache Initialization (NCAC or OCAC) Errors

These are error messages which can be received on a system load (LO or ST commands) or Auto Restart; they apply only to DCU ROM date codes 2601 and greater. A description of each error is as follows:

- CACHE RETURNED BAD CACHE TYPE IN CACSTAT (CAC or CACX had bad bit 7 in CACSTAT). CACSTAT (7:1) = 0 for 8 Kb CAC and CMA; CACSTAT (7:1) = 1 for 128 Kb CACX and CMAX.
- NO RESPONSE FROM CPU (timeout).
- UNEXPECTED CPU INTERRUPT (CPU interrupt other than DIAG freeze).
- CACHE INIATIALIZATION FAILED (could not initialize the cache).

Microcode Program Load (MPL) Error Messages

These error messages are printed on DCU console when loading system microcode. Table 4-1 applies only to DCU ROM date codes 2403 and greater.

Table 4-1. MPL Error Codes (DCU ROM Date Code 2403 and >)

ERROR CODE	DESCRIPTION	ACTIONS
A001	Message timeout - either the message cannot be sent because the receiving module (IOA) is busy, or because there is no response from the receiving module.	1. Check the cables between the IOB and IMBI of the cold load channel. 2. Run I/O microdiagnostics.
A002	Disc status not ready.	1. Check if the system disc is powered up and is ready. 2. Check HPIB cables from GIC to the coldload disc. 3. Check the IMB number, channel number, and device number used to specify the coldload device. 4. Check if correct channel number is set on the coldload channel GIC. 5. Check if correct HPIB address is set on the coldload device. 6. Run I/O microdiagnostics. Run IOMAP and DUS device diagnostics on the coldload disc.
A003	The coldload channel cannot be brought on line as a controller-in-charge.	1. Check if correct channel number is set on the coldload channel GIC. 2. Check if 'SYS CTRL' is set on the coldload channel. 3. Run I/O microdiagnostics. Run IOMAP and DUS GIC diagnostics on the coldload channel.
A004	WCS/LUT checksum error.	1. Check to make sure the correct system firmware is installed on the coldload device. 2. Try another copy of the operating system if loading from tape. 3. Clean the heads on the coldload device if loading from tape. 4. Run DUS device diagnostics on the coldload device. 5. Run DMA exerciser. 6. Run FLDs to locate possible hardware error condition.
A005	No WCS/LUT on the tape.	1. Check if the tape drive unit 0 is selected, and on line. 2. Check if the proper magnetic tape is mounted on the drive.

Table 4-1. MPL Error Codes (DCU ROM Date Code 2403 and >) (con't.)

ERROR CODE	DESCRIPTION	ACTIONS
A006	Device Specified Jump Response not equal to zero. The coldload device has detected an error in the data sent to the system. Possible errors include parity, drive fault, power-fail, illegal disc address, read requested past end or file, etc. Check the device programming manual for the possible error causes.	1. Check to make sure the correct system firmware is installed on the coldload device. 2. If loading from a tape, verify that the tape is at the load point before attempting to load the system. 3. Check HPIB cables to coldload device. 4. Clean the heads on the coldload device if loading from tape. 5. Run DUS device diagnostics on the coldload device. 6. Run DMA exerciser.
A007	CSRQ timeout after SIOP command. The channel program has not completed within the allowed time limit.	1. Check if the switch on channel is set to 'CPP PROCESSOR'. 2. Run I/O microdiagnostics. 3. Run DMA exerciser.
A008	Channel Program Abort. The channel program used to read from the coldload device has aborted due to an error condition that it encountered.	1. Check if the system coldload device is powered up and online. 2. Check HPIB cables to coldload device. 3. Run I/O microdiagnostics. 4. Run DUS device diagnostics on the coldload device. 5. Run DMA exerciser.
A009	CSB I/O ERROR. An error has been detected on a data transfer across the Central System Bus.	1. Run FLDs to locate possible hardware error condition.

Table 4-1. MPL Error Codes (DCU Date Code 2403 and >) (con't.)

ERROR CODE	DESCRIPTION	ACTIONS
A00A	INVALID MODULE NUMBER. The MPL microcode has detected an attempt to access a module that does not exist.	1. Check the IMB number used to specify the coldload device. 2. Run FLDs to locate possible hardware error condition.
A00B	NON-RESPONDING MODULE. The MPL microcode has detected an attempt to access a module that does not respond.	1. Check the IMB number used to specify the coldload device. 2. Run FLDs to locate possible hardware error condition.
A00C	UNIMPLIMENTED CHANNEL OPCODE. The channel program interpreter has encountered an illegal channel program opcode while executing the channel program used to read from disc or tape.	1. Run FLD memory diagnostics or DUS main memory diagnostics to test main memory banks zero and one. 2. Execute DCU selftest command, ZS, to verify that the DCU ROMs still checksum properly. 3. Run FLDs to locate possible hardware error condition.
A00D	COLDLOAD DEVICE WON'T IDENT. The coldload device won't respond to an IDENT request with a valid identification code.	1. Check if the system coldload device is powered up and ready. 2. Check HPIB cables from GIC to the coldload device. 3. Check the IMB number, channel number, and device number used to specify the coldload device. 4. Check if correct channel number is set on the coldload channel GIC. 5. Check if correct HPIB address is set on the coldload device. 6. Run I/O microdiagnostics. Run IOMAP and DUS device diagnostics on the coldload disc.

Hardware Error Messages (Printed on DCU Console)

The error messages described in Table 4-2 indicate a specific hardware problem as detected by the DCU during normal startup and system operation. These are referred to as DCU hardware halts, caused by the CBI or CTLB PCA pulling on the SYSTOP line. Run FLDs to further isolate the problem.

Table 4-2. Hardware Error Messages

Hardware CBI Error (1/2/3/5/7)
Catastrophic hardware fault as detected by the indicated CBI. The indicated CBI module is not necessarily the cause of the error.

WCS Parity Error
Catastrophic single bit parity error. Generally caused by a faulty WCS PCA which may be encountered when loading system microcode, or during normal system operation.

CPU Timeout
CPU has not received a required response from one of the other CSB modules in the allotted time. (64K clocks .)

CAC Error (Series 64/68, only)
The cache array controller has detected one or more cache conditions. In most conditions, an active DMA transfer will be allowed to complete (I/O).

CMA Error (Series 64/68, only)
Single bit cache memory array parity error.

CACX or CMAX Error
A cache error (other than a data parity error) has been detected.

Multi Bit Error
A catastrophic multi bit parity error has been detected in main memory.

Invalid Address Module (1/2/3/5/7)
Detected by receiving CBI. Caused by a module SENDING an illegal memory address.

Invalid Address - CACX
Illegal addressing of CMAX as detected by the CACX.

Continuous DCUSTOR Error
Series 64/64B/68/68B is generating continuous DCUSTOR interrupt to the DCU. The system is in an abnormal state and the DCU had to disable this interrupt line.

LUT Parity Error
The system microcode Lookup Table has a parity error, generally caused by a faulty CIR PCA.

Unexpected Debug
This usually results from attempting to run diagnostics without the ED command. A special diagnostic microcode command (DEBUG) has been encountered. The DCU is not prepared to handle this.

Diag Stop Error
A hardware failure has forced the microcode to do 'panic stop'.

Mem Breakpoint at xxxx.xxxx/WCS Breakpoint at xxxx.xxxx
A memory or WCS breakpoint previously set in maintenance mode has been reached.

SYSTEM VERIFICATION

SECTION 5

INTRODUCTION

The HP 3000 Series 64/68/70 Computer System is verified in two steps. Step one is an OFFLINE verification which tests the following:

- Cold Load Path.
- Selected assemblies.
- Peripheral devices.

Step two is an ONLINE activity which accomplishes the following:

- System Cold Load from magnetic tape.
- System configuration.
- System utilization.
- Workout2.
- Power Fail verification.

Refer to the HP 3000 Series 64/68/70 Diagnostic Manual Set (P/N 32342-60001) when information is required to run diagnostics or self tests. If a step does not complete successfully, corrective action is required before proceeding. Use the diagnostics to help isolate hardware problems. Use the HP 3000 Series 64/68/70 Computer Reference/Training Manual (P/N 30144-90005) for any required technical descriptions of the processor components. Use the appropriate peripheral device service manuals for specific hardware and maintenance descriptions. Table 5-1 lists the available device tests that can be performed.

Table 5-1. Available Device Tests

HP Device	Standalone	Verifier	Self-Test	Sleuth Sim.	DCU	ON LINE
7945A	x		x	x		x
7933	x		x	x		x
7920/25		x		x		
7911/12	x		x	x		x
7914	x		x	x		x
13037C/D	x			x		
2563A	x	x	x			
2565A	x	x	x			
2566A	x	x	x			
2608A			x	x		
2608S			x			
2617A				x		
2619A				x		
2631B			x	x		
2680A		x	x			x
2687A			x			
2688A		x	x			x
7970E	x			x		
7974A	x		x			
7976A	x		x	x		x
7978A	x		x			
9144A	x		x			
9895A	x		x	x		
262XX			x			
264XA			x			
30XXA			x			
GIC	x				x	
INP	x		x			x
ATP	x		x			x
MEMORY	x				x	
CPU	x		x		x	
DCU			x		x	

OFFLINE VERIFICATION

Perform offline verification as follows:

1. Run System Console Self Test.

2. Run DCU Self Test.

3. Run Kernel and Fault Locating Diagnostics (FLDs).

4. Cold load Diagnostic/Utility System (DUS) as described in diagnostic manual.

5. Enter IOMAP. A map of I/O configuration of devices connected to the system will appear at System Console. Verify that all device and channel numbers correspond to configuration matrix (refer to Appendix A).

6. Run GIC, MEMORY, and ATP standalone diagnostics from DUS tape.

7. Run all appropriate diagnostics, self tests, and SLEUTH verifiers on any of peripheral devices installed, including:

   - Printers.
   - Magnetic Tape Drives.
   - Disc Drives.
   - Flexible Disc Drives.

NOTE

Format and verify all disc packs/cartridges; flag defective tracks. Refer to the Contributed SLEUTHSM section of the HP 3000 Series 64/68/70 CE Handbook, P/N 30140-90006.

FAULT LOCATING DIAGNOSTICS

The Fault Locating Diagnostics (FLDs) test the PCAs in the CPU card cage and most of the PCAs in the I/O card cage. They are used when troubleshooting the system. The System Console, during FLD execution, will indicate the status of the diagnostic and show which PCA(s) failed.

The FLDs are on floppy discs and are loaded into the Write Control Store (WCS) by the Diagnostic Control Unit (DCU). To run the diagnostics:

1. Obtain the appropriate FLD flexible disc. (The FLD flexible disc for the HP 150 is P/N 32342-13403 and the FLD flexible disc for the HP 2647F is P/N 32342-13401, both with date/revision code of B2610.)

2. Insert disc into console drive.

3. Turn key switch located on DCU Junction Panel to MAINTENANCE position.

4. On System Console, observe >M prompt, indicating system has switched to Maintenance Mode.

5. Enter FL (RETURN) and follow instructions on CRT to start FLD process. Testing time is approximately 20 minutes.

6. If necessary, refer to Series 64/68/70 Fault Locating Diagnostic Manual (P/N 32342-90003) for more details.

ONLINE VERIFICATION

1. Ready all disc drives, referencing disc drive unit 0 as the system disc drive or, if using an HP 7933, reference as device 1.

2. For installation of system software, refer to the HP 3000 Fundamental Operating Software Installation Manual (P/N 32033-90046), Section III, that is included with the Installation Tape (IT) at system installation. (Refer to the MPE V System Operation and Resource Management Manual, P/N 32033-90005, for additional configuration information.)

System Power Fail Recovery

Now that the system is up and MPE has been completely installed, the Power Fail test should be performed. Proceed as follows:

1. Log on :HELLO MANAGER.SYS (RETURN)

2. Type LISTF @.@.@,2 (RETURN)

3. Power fail the system by tripping main system breaker on the wall. If the customer's site permits, use customer's breaker box to simultaneously power fail system and all discs associated with the system. Do not turn off main system power switch/breaker.

Reconnect power after approximately 30 seconds. Verify successful recovery by observing all of the following:

- System Console does not hang.
- A "*** POWERFAIL ***" message appears on the console.
- Observe that the LISTF command continues to execute.
- System does not HALT or go into a loop.

Repeat this procedure for two additional cycles, using power fail periods of approximately 15 and 5 seconds.

TRAINING THE SYSTEM OPERATOR

SECTION 6

The Hewlett-Packard Customer Engineer (CE) is responsible for familiarizing the operator with the operation and the periodic customer maintenance of the HP 3000 Series 64/68/70 Computer. The main sources of information the CE should use are found in Functions within the Console Operator Section of the Console Operator's Guide (P/N 32002-90004) and the Customer Preventive Maintenance Section of the HP 3000 System Support Log (P/N 03000-90117). General information covering the following topics should be discussed:

- Documentation supplied with the system.
- Power on/off.
- System Control Panel and DCU operation.
- Daily maintenance.
- Connecting data terminals.
- Other peripheral device operation.
- Self test and Fault Locating Diagnostics (FLDs).
- Remote maintenance facility.
- Starting from disc.
- Starting from tape.
- Memory dumps.
- Shutdown.
- System backup.
- Conditioning private volume disc using Volume Initialize (VINIT).
- Serializing disc packs/cartridges.

HARDWARE CONFIGURATION

APPENDIX
A

LOADING GENERAL I/O CHANNELS

Up to eight HP-IB electrical device loads are allowed on a single General I/O Channel (GIC). Each peripheral may generate between one and eight HP-IB electrical device loads. Some peripherals require a dedicated GIC to which additional peripherals cannot be attached. Whether a GIC is considered high-speed or low-speed depends upon which peripherals are attached to it. Table A-1 summarizes the requirements of peripherals and other devices using GICs to interface with the Series 64/68/70.

In addition to the limit of eight electrical device loads per GIC, other rules for loading GICs are as follows:

- The maximum length of an HP-IB cable connecting a peripheral device to a GIC PCA is seven meters plus one meter per device load, to a maximum of 15 meters per GIC.
- High-speed peripherals can be attached to no more than two GICs on each Intermodule Bus (IMB). With two IMBs, high-speed peripherals can be attached to as many as four GICs. A maximum of six devices can be attached to a GIC with high-speed peripherals.
- Low-speed peripherals (except an HP 2608A) can be attached to any GIC.
- A cartridge tape drive requires the addition of its own dedicated GIC.

Table A-1. GIC Requirements For Peripherals

HP Peripherals	Peripheral Speed	HP-IB Electrical Device Loads
Cartridge Tape in 7911P/12P/14P/14TD/14ST	Low	1 (Dedicated GIC)
7911/12/14 Disc Drives	High	1
7920M/25M, 7945A, 7933XP/H, and 7935XP/H Disc Drives	High	1
7970E/71A Master Tape Drive	Low	1 (Dedicated GIC)
7974A/78A/78B 1/2" Tape Drive	High	Shipped w/1 (variable from 1 to 3)
7976A 1/2" Tape Drive	High	Shipped w/2(variable from 1 to 4)
9144A/7914CT (Tape Portion)	High	1
7914ST Integrated Storage Unit	High	Shipped w/2 (variable from 2 to 4)
2608A Line Printer	Low (Do not mix w/high)	1
2608S Line Printer (Do not mix with 7906/20/25)	High	Shipped w/1 (Variable from 1 to 7)
2563A/65A/66A Line Printer	High	Shipped w/1 (variable from 1 to 7)
2563A/65A/66A and 2680A/88A Printers	Low	If configured via HP-IB Extenders
2611A/13A//17A/19A Line Printer Interface Card	Low	1
2680A/86A/87A/88A Page Printer	High	Shipped w/4(variable from 1 to 8)
9895A Opt 010 Flex. Disc Drive	Low	1
26075A Multiple System Access Selector	High (Do not mix w/discs)	0
37203A HP-IB Extender	Low	1 (Dedicated GIC)
30106A Card Reader	Low	1 (Dedicated GIC)
Network/INP Card	Low	1

CPU CARD CAGE CONFIGURATION

The CPU card cage must be configured as listed in Table A-2 and as shown in Figure A-1.

Table A-2. CPU Card Cage Configuration

SLOT	SLOT #	NAME
DCU	1	Diagnostic Control Unit
OPT1	2	Reserved
OPT2	3	"
OPT3	4	"
		--WCS--
WCS	5	Writable Control Store
WCS	6	Writable Control Store
		--CPU--
VBUS	7	V-Bus
CIR	8	Current Instruction Register
SKSP	9	Skip Special
RAL2	10	Register/Arithmetic Logic Unit
RAL0	11	Register/Arithmetic Logic Unit
CTLA	12	Control A
RAL3	13	Register/Arithmetic Logic Unit
RAL1	14	Register/Arithmetic Logic Unit
CTLB	15	Control B
		--CACHE--
	16	Reserved
CAC	17	Cache Address Controller or
CACX	17	Cache Controller
CMA	18	Cache Memory Assembly or
CMAX	18	Cache Memory Array
CBI5	19	Common Bus Interface
		--I/O ADAPTORS---
CBI1	20	Common Bus Interface
IOB1	21	Input/Output Buffer
CBI2	22	Common Bus Interface
IOB2	23	Input/Output Buffer
CBI3	24	Common Bus Interface
IOB3	25	Input/Output Buffer
		--MEMORY--
CBI	26	Common Bus Interface
MCS	27	Memory Correction and Storage
MMC	28	Main Memory Control
MMA0	29	Main Memory Array 0
MMA1	30	Main Memory Array 1
MMA2	31	Main Memory Array 2
MMA3	32	Main Memory Array 3
MMA4	33	Main Memory Array 4
MMA5	34	Main Memory Array 5
MMA6	35	Main Memory Array 6
MMA7	36	Main Memory Array 7

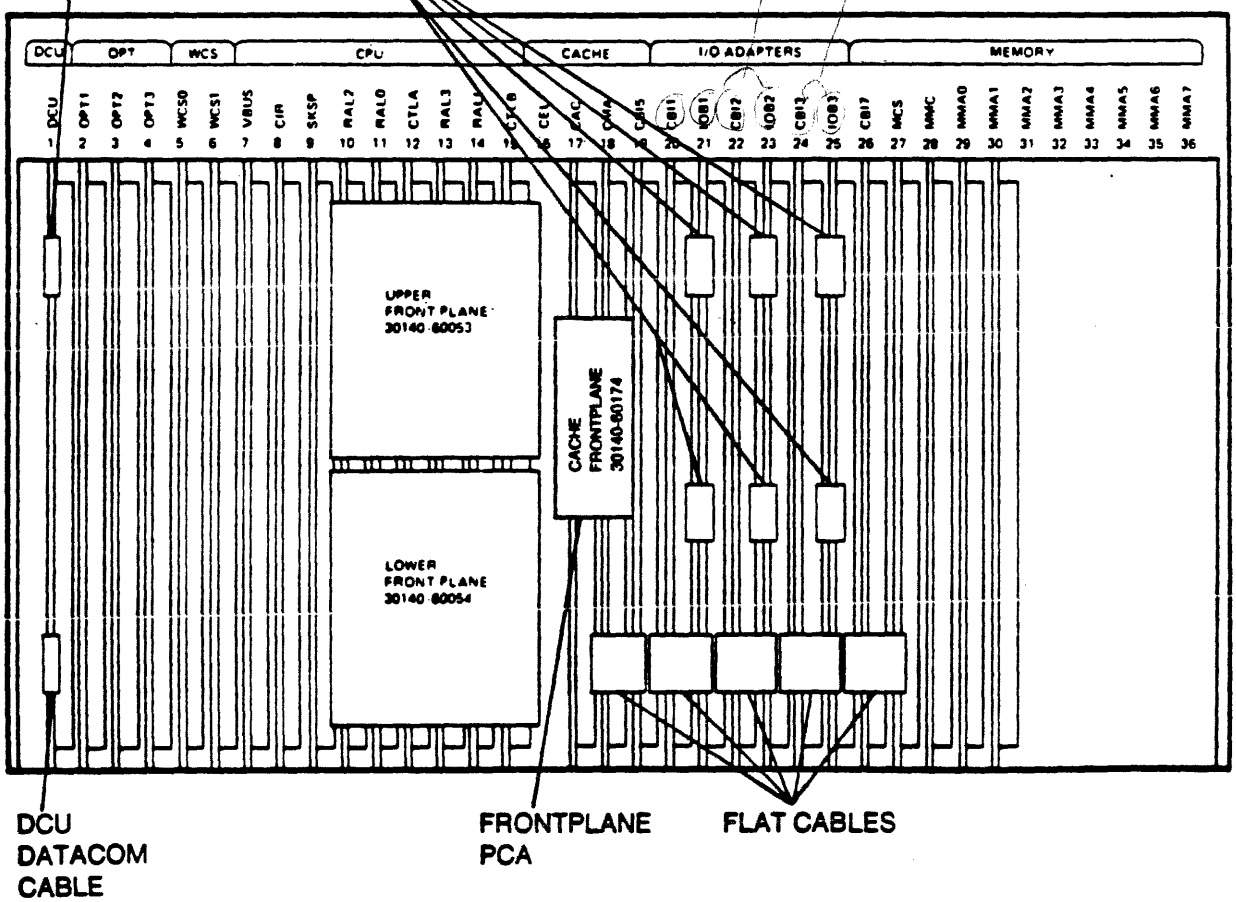


Figure A-1. CPU Card Cage Assignment

I/O CARD CAGE CONFIGURATION

The I/O card cage(s) must be configured as listed in Table A-3 and shown in Figures A-2 through A-4.

Table A-3. First, Second or Third IMB Configuration

IMB No. 1 (Logical IMB 0)			
SLOT	ASSEMBLIES	CHANNEL #	"TO" DEVICE
24	IMBI		
23	GIC	2	MAG TAPE
22	GIC	3	SYSTEM DISC
21-13*	GIC or DEV. INTF.	4-15	OTHER DISCS, INPs, MAG TAPES, PRINTERS ETC.
12	SIB	1	AIB
11-4	AIB		ASYNCHRONOUS TERMINALS, 2687A PAGE PRINTER

IMB No. 2 (Logical IMB 1)			
SLOT	ASSEMBLIES	CHAN #	"TO" DEVICE
8	IMBI No. 2		
7-1*	GIC, DEVICE INTERFACES, SIB, AIB	1-15	PERIPHERALS, INPs, ETC.

Auxilliary Card Cage, IMB No. 3 (Logical IMB 2)			
SLOT	ASSEMBLIES	CHAN #	"TO" DEVICE
24	IMBI No. 3		
9-23	GIC,DEVICE INTERFACES, SIB, AIB	1-15	PERIPHERALS,INP,ETC.

* Ensure that the GIC and SIB PCAs are always installed within ten physical slots of each other on the same IMB.

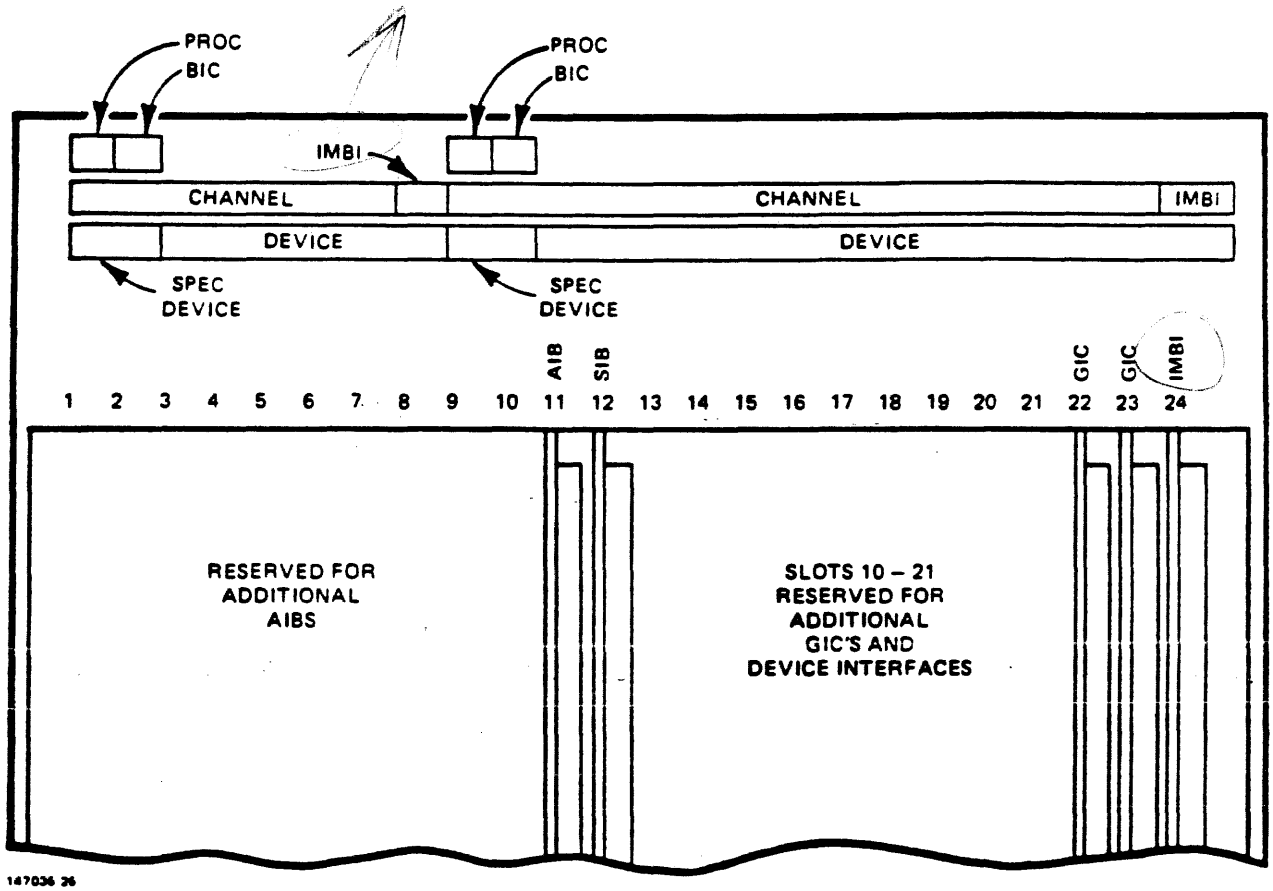


Figure A-2. I/O Card Cage Assignment for First IMB

WARNING

A GIC PCA or SIB PCA must be installed within every ten physical slots; thus the SIB PCA is configured in slot 12 to ensure standard configuration. If optional GIC PCAs are installed, the SIB PCA should be installed in slot nine, with the AIB PCAs in slots one thru eight. Two INP PCAs should never be installed in slot pairs one and two, or nine and ten. Failure to comply with this warning can result in permanent hardware damage.

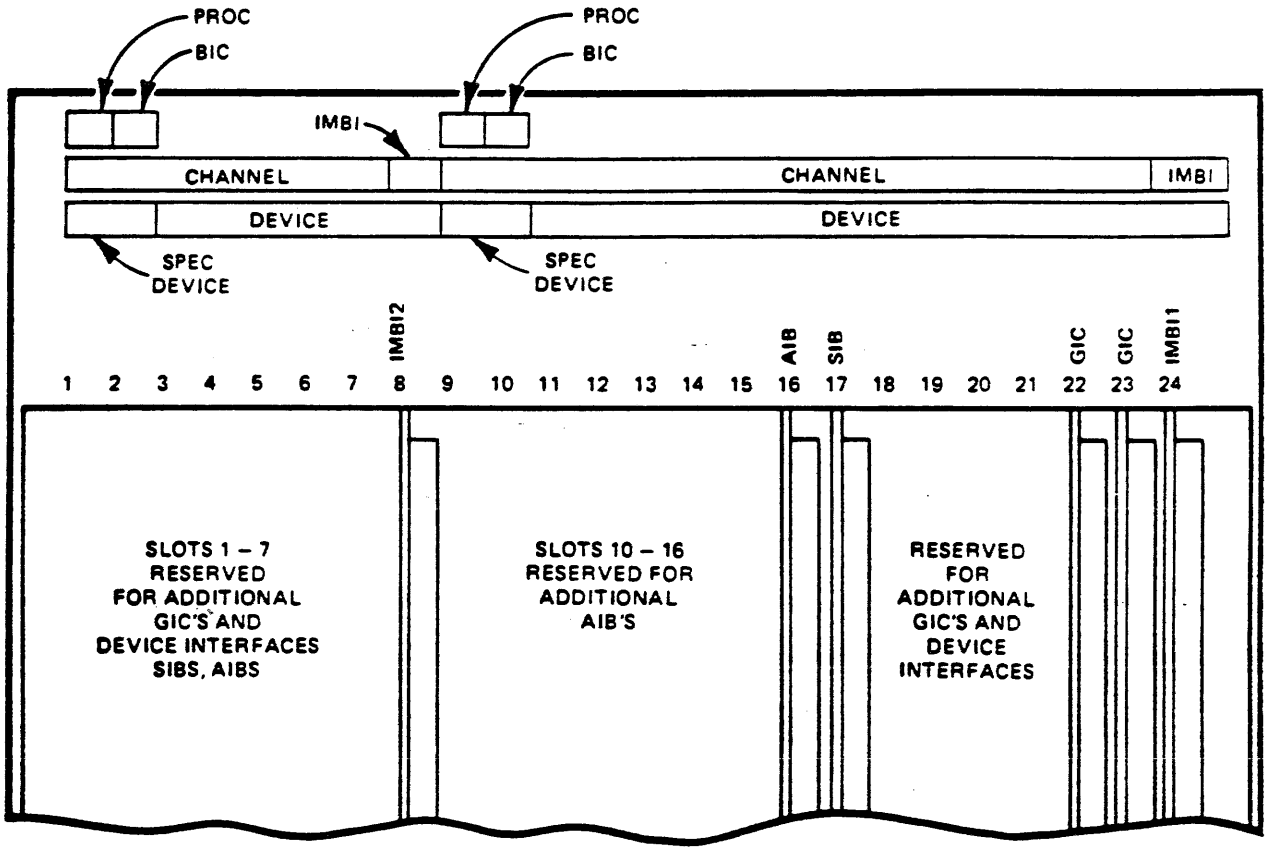


Figure A-3. I/O Card Cage Assignment for First and Second IMBs

WARNING

A GIC PCA or SIB PCA must be installed within every ten physical slots; thus the SIB PCA is configured in slots 12 or 17 to ensure standard configuration. If optional GIC PCAs are installed, the SIB PCA should be installed in slot nine, with the AIB PCAs in slots one thru eight. Two INP PCAs should never be installed in slot pairs one and two, or nine and ten. Failure to comply with this warning can result in permanent hardware damage.

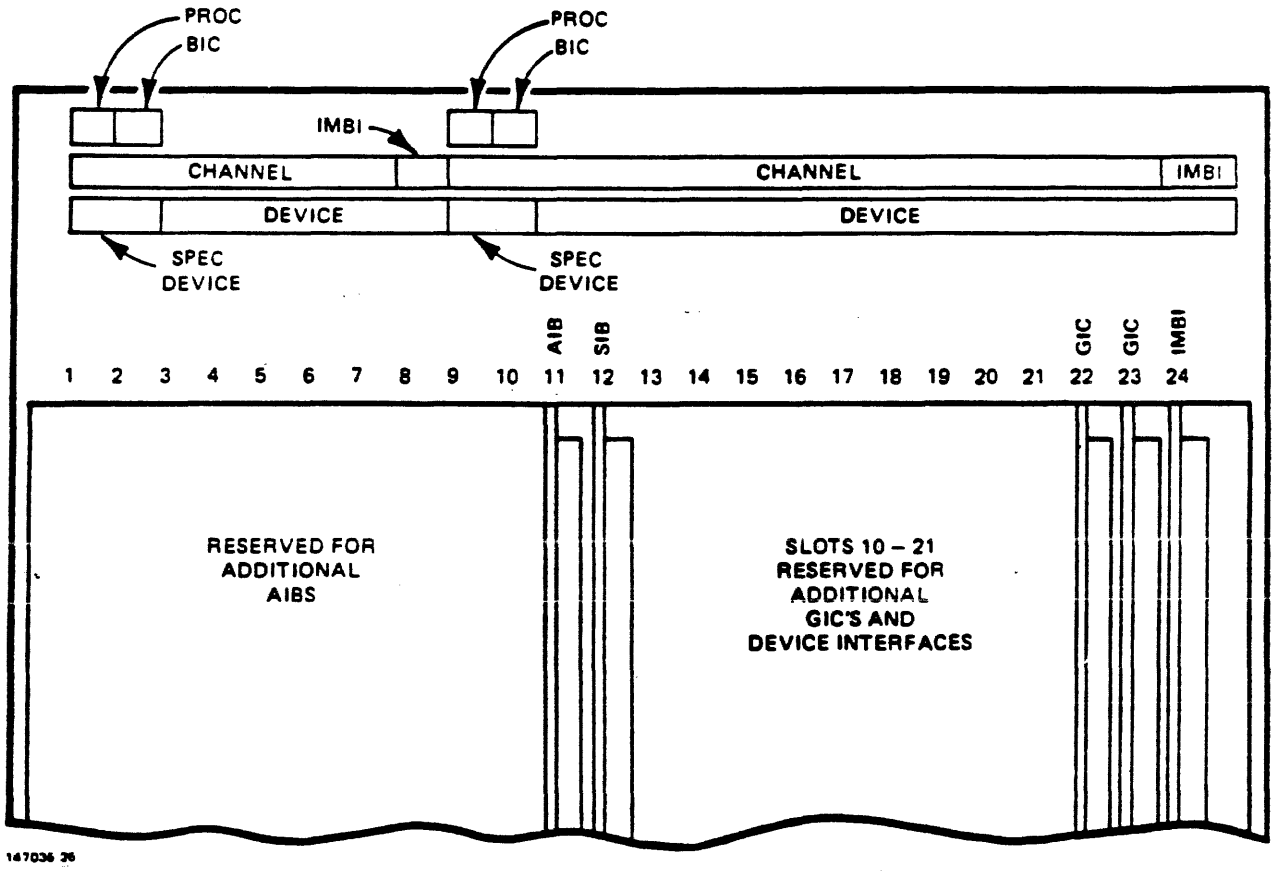


Figure A-4. I/O Card Cage Assignment for Third IMB

WARNING

A GIC PCA or SIB PCA must be installed within every ten physical slots; thus the SIB PCA is configured in slot 12 to ensure standard configuration. If optional GIC PCAs are installed, the SIB PCA should be installed in slot nine, with the AIB PCAs in slots one thru eight. Two INP PCAs should never be installed in slot pairs one and two, or nine and ten. Failure to comply with this warning can result in permanent hardware damage.

HP-IB CABLE CONFIGURATION

Typical HP-IB cable configurations are shown in Figure A-5.

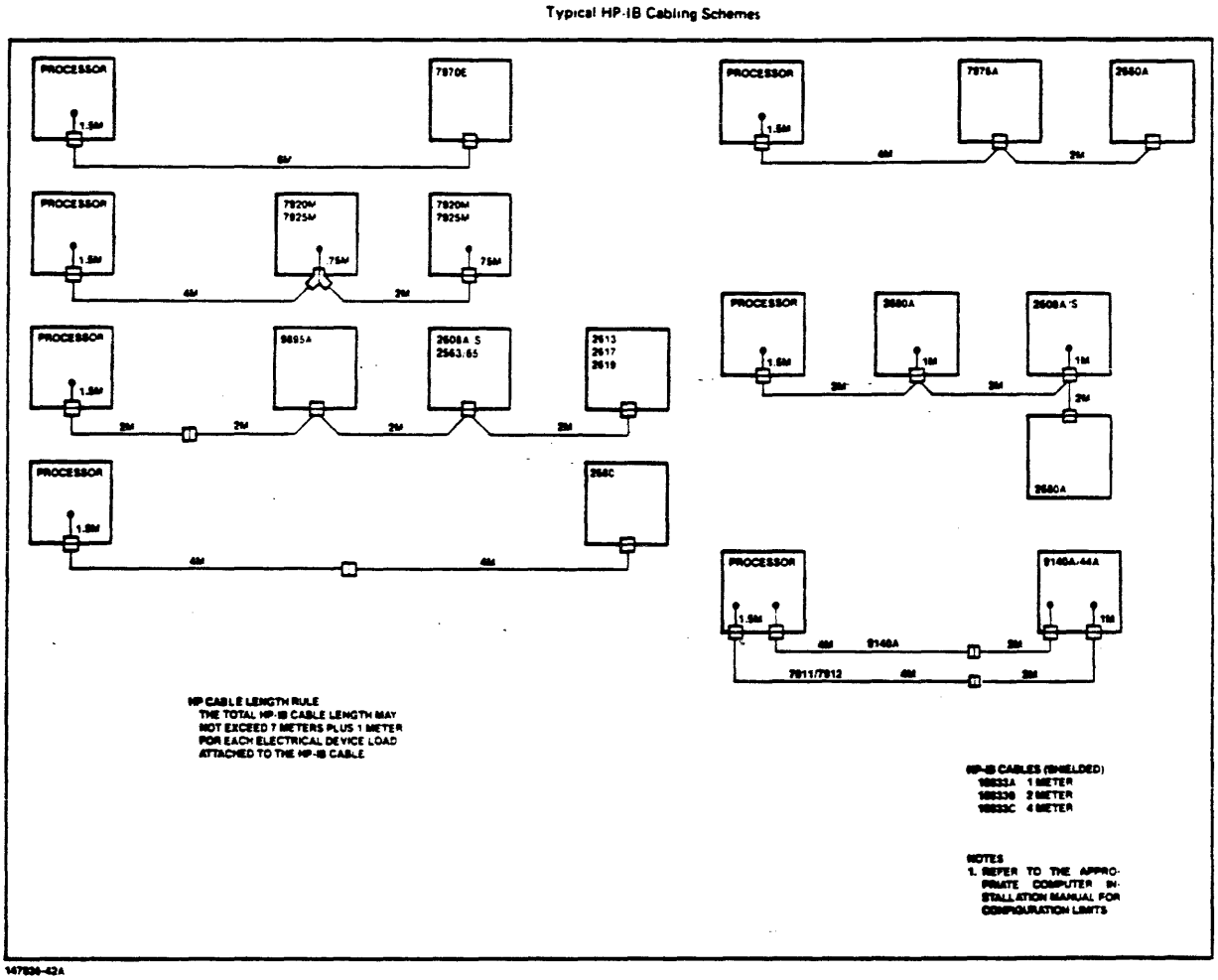


Figure A-5. Typical HP-IB Cable Configurations

NOTE

All internal GIC cables required to configure the system are provided. Do not cut these cables even if their full lengths are not needed presently; they may be needed for larger configurations in the future.

INTERNAL CABLES

Internal cables are listed in Table A-4.

Table A-4. Internal Cables

CABLE Part No.	FROM		TO	
	CONN REF	SLOT	CONN REF	SLOT
Applies to Series 64/68, only:				
30140-60029(Flat)	J5 CPU CAC	CPU 17	J5 CPU CMA	CPU 18
	J5 CPU CMA	CPU 18	J5 CPU CBI5	CPU 19
Applies to Series 70, only:				
30140-60028(Flat)	J5 CPU CBI5	CPU 19	J5 CPU CMAX	CPU 18
Applies to Series 64/68/70:				
30140-60028(Flat)	J5 CPU CBI1	CPU 20	J5 CPU IOB1	CPU 21
30140-60028(Flat)	J5 CPU CBI7	CPU 26	J5 CPU MCS	CPU 27
30140-60082(Long Flat)	J3 CPU IOB1	CPU 21	J1 I/O IMBI1	IO 24
30140-60082(Long Flat)	J4 CPU IOB1	CPU 21	J2 I/O IMBI1	IO 24
30140-60100(Data)	J5 CPU DCU	CPU 1	J3 I/O AIB Remote Junc. Pnl., Key Switch	IO,11
30140-60051	J2 SSDP/J2 SSDP-B		J2 PSC/J2PDM	
30140-60052	J1 SSDP/J1 SSDP-B		CIR BACKPLANE	
5061-2503	IO GIC (Ch.2)	IO 23	JUNC PNL 13 SUB 3	
5061-2503	IO GIC (Ch.3)	IO 22	JUNC PNL 13 SUB 2	
30140-60050	J3 CPU DCU	CPU 1	J1 PSC/J1 PDM	
30170-60021	J1 TO AIB	IO 11	J1 TO SIB	IO 12

EXTERNAL CABLES

External cables are listed in Table A-5.

Table A-5. External Cables

CABLE Part No.	FROM	TO
02640-60131	2647 OPT 890 CONSOLE	JUNCTION 19, PORT 0
8120-3446(HP-IB)	7933/7935 DISC	JUNCT PNL 13, SUB 2
8120-3446(HP-IB)	7974/78 MASTER MAGTAPE	JUNCT PNL 13, SUB 3
13242N (U.S.)	HP 150 CONSOLE	JUNCTION 19, PORT 0
13242M (Europe)	HP 150 CONSOLE	JUNCTION 19, PORT 0
13242P (RS-422)	HP 150 CONSOLE	JUNCTION 19, PORT 0
13242X (RS-232C)	HP 150 CONSOLE	JUNCTION 19, PORT 0

ADD-ONS

Memory Add-Ons

Memory add-ons are installed in slots 31 thru 36 of the CPU Card Cage. Each MMA PCA has a labeled slot as shown in Table A-2; the PCAs must be installed in sequential slots (no slots can be skipped). Refer to the HP 3000 Series 64/68 Memory Add-On Manual (P/N 30142-90001) for more details.

IMB IOA Add-Ons

A second or third IMB IOA can be added to the HP 3000 Series 64/68/70 Computer as shown in Table A-3. Refer to the HP 3000 Series 64/68 IMB IOA Add-On Manual (P/N 30143-90001) for more details.

ATP Add-Ons

For details refer to the DSN/ATP Installation Manual (P/N 30144-90002).

LANIC Controller Add-Ons

Refer to the LANIC Installation and Service Manual (P/N 30242-90001) or the LANIC Cabling and Installation Manual (P/N 30242-90002) for detailed information.

INP Add-Ons

Refer to Section 2 for slot locations. For more details, refer to INP Operation and Installation Manual (P/N 30020-90005).

Device Controller Add-Ons

Device Controllers can be configured in slots 1-21 of the I/O Card Cage and connected to the Junction Panel through a GIC PCA.

GIC Add-Ons

GICs can be configured in slots 10-23 and 1-7 of the I/O Cage and connected to the Junction Panel with an HP-IB cable connector. Refer to Table A-3. Also, refer to the HP 3000 Series 64/68 GIC Add-On Installation Manual (P/N 30079-90003).

UPGRADE INSTALLATION INFORMATION

APPENDIX B

INTRODUCTION TO UPGRADES

This appendix contains procedures for upgrading HP 3000 Pre-Series II, Series II, Series III, 30, 33, 37, 37XE, 39, 40, 42, 42XP, 44, 48, and 58 Computers to the Series 70 Computer.

It also describes the dismantling, and disposition of the existing computer. Procedures for installing the HP 3000 Series 70 Computer are covered in the main body of the manual.

NOTE

This equipment must be de-installed and made ready for shipment to Hewlett-Packard at the same time the upgrade equipment is installed. Hewlett-Packard will arrange for shipment to the appropriate Hewlett-Packard facility immediately after de-installation. The customer should allow the carrier, as scheduled by Hewlett-Packard, to pick-up the equipment so that the equipment can be delivered to Hewlett-Packard within 30 days (U.S. and Canada) and 60 days (ICON and Europe) of installation of the upgrade equipment. Otherwise, Hewlett-Packard shall issue an invoice to recover the amount of credit given for the replaced equipment or cancel the credit order, as appropriate.

UPGRADING TO HP 3000 SERIES 70 FROM HP 3000 PRE-SERIES II, SERIES II, III, 30, 33, 37, 37XE, 39, 40, 42, 42XP, 44, 48, OR 58

The HP Product Number 32471AH is for the Pre-Series II, Series II, III, 30, 33, 37, 37XE, 39, 40, 42, 42XP, 44, 48, or 58. to Series 70 upgrade. There is a specific option for each Series. The upgrade includes: a 208V 60-Hz, three-phase power supply, 8 Mb Fault Control Memory; 1 I/O Adaptor; remote diagnostic capability; system cabinet; fundamental operating software (MPE operating system; EDIT/3000, FCOPY/3000, SORT-MERGE/3000, KSAM/3000, and facility to execute compiled programs without source language compiler on the system (except programs written in APL/3000)), complete manual set, a System Interface Board (SIB) and an Asynchronous Interface Board (AIB) with support for 12 RS-232 modem ports is required and must be ordered separately, a System Console (HP Touchscreen II with 9123D Disc Drive) must be ordered separately, two General I/O Channels (GICs) are required but not included, new cables may be required on GICs transferred from other systems.

TABLE B-1 UPGRADE OPTIONS

HP Product #	Option #	Description
32471AH	015	380V 50 Hz Three Phase operation
	016	415V 50 Hz Three Phase operation
	250	Add Expansion Bay and I/O Adapter (IMB)
	251	Add Junction Panel
	500	Add 4 Mbytes of memory
	601	Upgrade from Pre-Series II
	602	Upgrade from Series II w/128 Kb
	603	Upgrade from Series III w/256 Kb
	605	Upgrade from Series 33A/B w/256 Kb
	606	Upgrade from Series 33C/U w/256 Kb
	607	Upgrade from Series 30A/B w/256 Kb
	608	Upgrade from Series 30C/U w/256 Kb
	609	Upgrade from Series 44 w/1 Mb
	611	Upgrade from Series 40 w/no memory
	613	Upgrade from Series III with 30341A
	614	Upgrade from Series 39 w/no memory
	615	Upgrade from Series 42 w/no memory
	616	Upgrade from Series 48 w/1 Mb
	617	Upgrade from Series 37 w/no memory
	618	Upgrade from Series 37XP w/no memory
	619	Upgrade from Series 42XP w/2 Mb
	621	Upgrade from Series 39HP w/no memory
	622	Upgrade from Series 58 w/2 Mb

30079A	064	General I/O Channel (GIC) Series 70 Internal Cable. (Required when upgrading from Pre-Series II, Series II or III, III L.C., 37, or 37XE)
30022A	064	General I/O Channel Cable Compatible with Series 70. (Required when upgrading from Series 30, 33, 39, 40, 42, or 42XP system. Not required when upgrading from Series 44, 48, or 58)

Before installing the Series 70 Computer, the CE must test the existing system to ensure that it is operational. When peripherals are returned, they should also be tested to ensure they are operational. Equipment can be upgraded and returned to Hewlett-Packard only if it is operational and maintained at the current revision levels. It is the customer's responsibility to maintain the system at the current revision level. To verify the functionality of the returning system and peripherals, the following tests must be performed:

HP 3000 System - Cold Load Self-Test.

Disc Controller - Run the six-month PM procedure in accordance with instructions in the System Support Log.

Mag Tape Unit - Run the four-month PM procedure in accordance with instructions in the System Support Log.

System Console - Perform Terminal Self Test.

An inventory of the equipment for each upgrade option to be returned to Hewlett-Packard must be administered. Refer to the Returned Equipment Verification (R.E.V.) form included in the Notice of Return Packet that was sent to you prior to installation of the new SPU. Notify Finance and Remarketing Division (FRD), Order Processing, if you have not received the Notice of Return Packet. Any damage to the equipment must be noted on the R.E.V. form.

NOTE

Before modifying, de-installing, or installing, be sure to remove AC power from all of the units of the system at the main system power panel. Then disconnect all power and signal cables connected to the processor unit.

UPGRADE INSTALLATION PROCEDURES

To prepare the existing system for upgrade, proceed as follows:

1. Remove all GICs, INPs (30020B) and printer translator PCAs (Series 30, 33, 39, 40, 42, 42XP, 44, 48, and 58 only). Set them aside for installation into the Series 70.

2. Reserve all signal cables.

3. The CE is to complete the appropriate Return Equipment Verification form, and include the CE signatures.

4. After the return unit and/or associated peripherals for which credit has been issued have been prepared for shipment, attach the shipping label along with the Return Equipment Verification form (included in the Notice of Return Packet) to the front of the unit(s). DO NOT ATTACH ANY ADHESIVES TO THE PAINTED SURFACE OF ANY UNIT. Arrange for the return unit(s) to be moved to the customer's shipping area.

   Reference the original system Sales Order Number and Notice-Of-Return (N.O.R.) Number for tracking purposes on the Shipping Label.

5. The CE should then notify the appropriate person (according to their geographic location) in the office listed below and have them arrange for the pickup of the equipment. The CE should also provide the designated person with a customer contact name and telephone number at the customer site, the serial numbers of products being returned, number of pieces, approximate weight, and any non-standard pick-up requirements. Customers will be responsible for the freight charges in ICON. The designated contact for each region are listed below. Please contact these people from the customer's site.

   United States - Finance Remarketing Division, Order Processing.

   Western Canada (British Columbia to Manitoba) Customs and Traffic Department, Vancouver Office.

   Eastern Canada (Ontario, Quebec and the Maritimes) Customs and Traffic Department, Dorval Office.

   ICON Countries - contact your Country Traffic Office.

   Europe (HPSA) - contact your Country Traffic Office.

   All necessary papers required to import/export the returned equipment is the responsibility of the local Country Traffic Office. If there are any problems with an upgrade installation, please contact the appropriate person listed for assistance.

6. Move the new processor unit into place and install the upgrade and associated peripherals in accordance with the instructions in the main body of this manual.

PERIPHERAL UPGRADES

Peripherals that are to be used with the HP 3000 Series 70 must be HP-IB compatible devices. All peripheral devices that are used on Series 30, 33, 39, 40, 42, 42XP, 48, and 58 Computers that are to be upgraded to Series 70 are compatible and require only connecting to the processor in accordance with the instructions in the main body of this manual. However, peripherals that were used with Pre-Series II, Series II, or Series III Computers require either replacement or modification to make them HP-IB compatible.

The following peripherals can be used as is with the Series 70:

7906S/7906M	19.6 Mb Slave/Master Disc Drive
7911P	28 Mb Disc Drive
7912P/14P	65 Mb/132 Mb Disc Drive
7920M/25M	(Opt. 102) System Disc Drive
7920S/20M	50 Mb Slave/Master Disc Drive
7925S/25M	120 Mb Slave/Master Disc Drive
7933/35XP/H	404 Mb Disc Drive
7945A	55 Mb Disc Drive
9895A	Flexible Disc Drive
7914TD/ST/CT	Magnetic Tape Drive
7970E	(Opt. 426) 1600 bpi Slave Magnetic Tape Drive
7971A	(Opt. 340, 343, 344) Magnetic Tape Drive
7974A	1600/800 cpi Magnetic Tape Drive
7978A/78B	6250/1600 cpi Magnetic Tape Drive
9144A	Cartridge Tape Drive
2563A/65A/66A	300/600/900 lpm Line Printer
2601A/02A/03A	Daisywheel Printer
2608A/S	(Opt. 368) 400 lpm Line Printer
2611A/17A/19A	(Opt. 368) 600/600/1000 lpm Line Printer
2680A	(Opt. 368) Intelligent Page Printer
2686A/2687A/2688A	Desktop Page Printers
2631B	Character Printer

2635B	Printing Terminal
2932A/33A/34A	Serial Printer
2382A	Terminal - Display Station
239X	Terminal
262X/4X	Interactive Display Terminals
270X	Color Graphics
2641A	APL Display Station (supported as HP 2645, only)
3075A/76A	Data Capture Terminal
3077A	Time Reporting Terminal
26075A	Multiple System Access Selector
30020B	Intelligent Network Processor
30106A-333	Card Reader, (HP-IB Version)
Touchscreen II	System Console w/9123D Disc Drive

The following peripherals can be upgraded to operate with the Series 70:

7970E	(Opt. 426 and 436) 1600 bpi Master Magnetic Tape Drive
7971A	(Opt. 340) Magnetic Tape Drive
2611A/13A/17A/19A	600/300/600/1000 lpm line printers
30079A	GIC (Series 39/4X/6X)

The following peripherals, which were used on the Series III, Series II, and Pre-Series II systems, are not supported on the Series 70:

2660A	Fixed Head Disc
2888A	47 Mb Disc Drive
7900A	5 Mb Disc Drive
7902A	Flexible Disc Drive
7905A	15 Mb Disc Drive
7970B	800 bpi Magnetic Tape Drive
7970E	1600 bpi Magnetic Tape Drive (high-profile cabinet)

2607A	200 lpm Line Printer
2610A	200 lpm Line Printer
2614A	600 lpm Line Printer
2618A	1250 lpm Line Printer
2631A	180 cps Serial Printer
2641A	Terminal (in APL mode)
2749B	Teleprinter
2672A/B	Printing Terminal
30031A	Clock/Console
30104A	Paper Tape Reader
30105A	Paper Tape Punch
30119A	2894A Card Reader/Punch
30126A	CalComp Plotter Interface
30460A	ATP37 Communication Interface
30459A	PIC (S/37) General I/O Channel