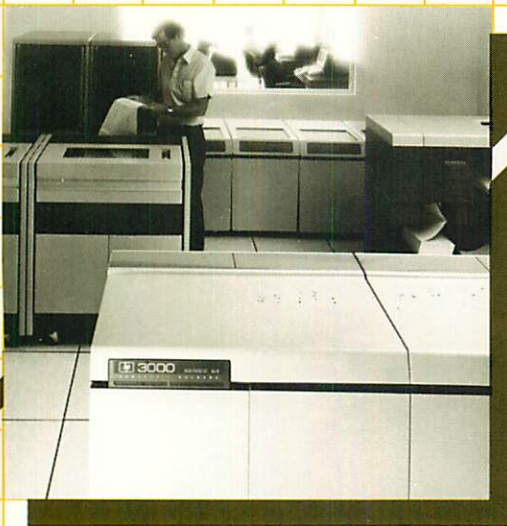
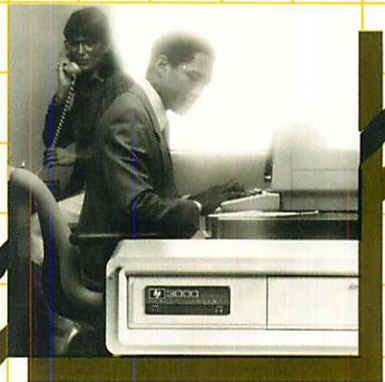
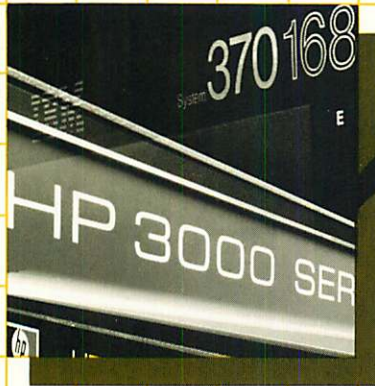


Distributed Systems Network



Advanced Terminal Processor (DSN/ATP) Installation Manual



DISTRIBUTED SYSTEMS NETWORK

Advanced Terminal Processor (DSN/ATP) Installation Manual



**INFORMATION NETWORKS DIVISION
19420 HOMESTEAD ROAD, CUPERTINO, CALIFORNIA 95014**

**Part No. 30144-90002
E0584**

Printed in U.S.A. 5/84

NOTICE

The information contained in this document is subject to change without notice.

HEWLETT-PACKARD MAKES NO WARRANTY OF ANY KIND WITH REGARD TO THIS MATERIAL, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. Hewlett-Packard shall not be liable for errors contained herein or for incidental or consequential damages in connection with the furnishing, performance or use of this material.

Hewlett-Packard assumes no responsibility for the use or reliability of its software on equipment that is not furnished by Hewlett-Packard.

This document contains proprietary information which is protected by copyright. All rights are reserved. No part of this document may be photocopied, reproduced or translated to another language without the prior written consent of Hewlett-Packard Company.

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 dates on the title page change only when a new edition or a new update is published. No information is incorporated into a reprinting unless it appears as a prior update; the edition does not change when an update is incorporated.

The software code printed alongside the date indicates the version level of the software product at the time the manual or update was issued. Many product updates and fixes do not require manual changes and, conversely, manual corrections may be done without accompanying product changes. Therefore, do not expect a one to one correspondence between product updates and manual updates.

First Edition.....March 1982
Second Edition..... May 1984



LIST OF EFFECTIVE PAGES

The List of Effective Pages gives the date of the most recent version of each page of the manual. Within the manual, changes since the most recent edition are indicated by printing the date of the update on the bottom of the page, and by marking the changes with a vertical bar in the margin. If an update is incorporated when an edition is reprinted, these bars are removed but the dates are retained. No information is incorporated into a reprinting unless it appears as a prior update. To verify that your manual contains the most current information, check that the date printed at the bottom of the page matches the date listed below for that page.

Effective Pages	Date
First Edition.....	March 1982
Second Edition.....	May 1984



PREFACE

This manual contains installation and servicing information for the Advanced Terminal Processor (ATP).

This manual was written for the HP Customer Engineer (CE) and System Engineer (SE) with the assumption that the reader has a good working knowledge of the HP 3000 System environment, and is specifically trained in installing HP 3000 products. This manual may be used in conjunction with related documentation for the HP 3000 Series 44 and 64 Computer Systems. Related documents include the following technical manuals:

- *HP 3000 Computer Systems, Console Operator's Guide, (for series II/III/30/33/40/44/64), (32002-90004)*
- *HP 3000 Computer Systems, Communications Handbook, (30000-90105)*
- *HP 3000 Computer Systems, System Manager/System Supervisor Reference Manual, (30000-90014)*
- *MPE V System Operation & Resource Management Reference Manual, (32033-90005)*
- *HP 3000 Distributed Systems Network/Advanced Terminal Processor Off-line Diagnostic Procedures Manual, (30144-90004)*
- *HP 3000 Distributed Systems Network/Advanced Terminal Processor On-line Diagnostic Procedures Manual, (30144-90004)*
- *HP 3000 Distributed Systems Network/Asynchronous Serial I/O Reference Manual, (30000-90250)*
- *HP 3000 Series 64/68 Installation Manual, (30140-90007)*
- *Point-to-Point Workstation I/O Reference Manual, (30000-90250)*

This manual is organized as follows:

Section 1, **GENERAL INFORMATION**, briefly describes the main features of the ATP and how it operates. This section also contains a list of the equipment supplied as well as the interconnecting cable assemblies. Since this is a brief overview, intended only to give the reader a better understanding of how the ATP functions, certain operational details have been omitted.

Section 2, **INSTALLATION**, contains instructions for installing the hardware and software components of the ATP and its connecting cables. Specifically discussed are installation of the System Interface Board (SIB), the Asynchronous Interface Board (AIB) and the Port Connector Assembly. This section also describes the software installation procedures and the installation verification procedures.

Section 3, **TROUBLESHOOTING TOOLS and TIPS**, contains general servicing information, repair procedures and reshipment instructions. Also included is a description of applicable maintenance aids, and a troubleshooting flow chart.

PREFACE (continued)

Appendix A, **WIRING DIAGRAMS**, contains information and specifications for building HP-DC A and HP-DC B cables.

Appendix B, **ATP JUNCTION BOX INSTALLATION**, contains instructions for installing the ATP Remote Junction Box, and information for installing additional direct-connect and modem ports.

CONVENTIONS USED IN THIS MANUAL

NOTATION

DESCRIPTION

nonitalics

Words in syntax statements which are not in italics must be entered exactly as shown. Punctuation characters other than brackets, braces and ellipses must also be entered exactly as shown. For example:

EXIT;

italics

Words in syntax statements which are in italics denote a parameter which must be replaced by a user-supplied variable. For example:

CLOSE *filename*

[]

An element inside brackets in a syntax statement is optional. Several elements stacked inside brackets means the user may select any one or none of these elements. For example:

$\left[\begin{array}{l} A \\ B \end{array} \right]$ User *may* select A or B or neither.

{ }

When several elements are stacked within braces in a syntax statement, the user must select one of those elements. For example:

$\left\{ \begin{array}{l} A \\ B \\ C \end{array} \right\}$ User *must* select A or B or C.

...

A horizontal ellipsis in a syntax statement indicates that a previous element may be repeated. For example:

[, *itemname*]...;

In addition, vertical and horizontal ellipses may be used in examples to indicate that portions of the example have been omitted.

⋮

A shaded delimiter preceding a parameter in a syntax statement indicates that the delimiter *must* be supplied whenever (a) that parameter is included or (b) that parameter is omitted and any *other* parameter which follows is included. For example:

itema [⋮*itemb*] [⋮*itemc*]

means that the following are allowed:

itema
itema, itemb
itema, itemb, itemc
itema, , itemc

CONVENTIONS (continued)

Δ When necessary for clarity, the symbol Δ may be used in a syntax statement to indicate a required blank or an exact number of blanks. For example:

```
SET[(modifier)] $\Delta$ (variable);
```

underlining When necessary for clarity in an example, user input may be underlined. For example:


```
NEW NAME? ALPHA
```


In addition, brackets, braces or ellipses appearing in syntax or format statements which must be entered as shown will be underlined. For example:

```
LET var[[subscript]] = value
```

shading

Shading represents inverse video on the terminal's screen. In addition, it is used to emphasize key portions of an example.



The symbol  may be used to indicate a key on the terminal's keyboard. For example, **(RETURN)** indicates the carriage return key.

(CONTROL) *char*

Control characters are indicated by **(CONTROL)** followed by the character. For example, **(CONTROL)Y** means the user presses the control key and the character Y simultaneously.

Section 1 GENERAL INFORMATION

Theory of Operation.....	1-1
Features.....	1-1
Functional Description.....	1-2
ATP Driver.....	1-4
Port Controllers.....	1-4
System Interface Board.....	1-5
Hardware Module Interconnection.....	1-5
Equipment Supplied.....	1-6
Specifications	1-12

Section 2 INSTALLATION

Unpacking and Initial Inspection.....	2-1
Preparation for Installation.....	2-1
System Backup (Add-on Installation Only).....	2-1
Power Requirement Verification.....	2-2
ATP Thumbwheel Switch Settings.....	2-3
SIB Thumbwheel Switch Settings.....	2-3
AIB Thumbwheel Switch Settings.....	2-4
Hardware Installation Procedures for the Series 44/48.....	2-6
Installing the SIB	2-6
Installing the AIB.....	2-7
Installing the Direct Connect Port Connector Assembly.....	2-10
Hardware Installation Procedures for the Series 64/68.....	2-14
Installing the SIB.....	2-14
Installing the AIB.....	2-17
Installing the Direct Connect Port Connector Assembly.....	2-19
Installing the Modem Connect Port Connector Assembly.....	2-23
Installation of Junction Panels.....	2-25
Hardware Installation Verification.....	2-27
Software Installation Procedures for Series 44/48.....	2-28
Software Installation Procedures for Series 64/68.....	2-30
ATP I/O Configuration Considerations.....	2-33
Installation Verification Procedures.....	2-33
Multiple ATP Installations.....	2-34
List of Supported Terminals	2-34
Label Installation.....	2-34

CONTENTS (continued)

Section 3 TROUBLESHOOTING TOOLS AND TIPS

Safety Precautions.....	3-1
Repair Philosophy.....	3-1
Maintenance Aids.....	3-2
Field Level Repair.....	3-6
Replacement of the SIB and AIB Boards.....	3-6
Replacement of Mother Boards, Mini Boards and Port Connectors.....	3-7
Reshipment Instructions.....	3-7

Appendix A WIRING DIAGRAMS

Appendix B ATP JUNCTION BOX INSTALLATION

Introduction.....	B-1
Configuration Information.....	B-1
Configuration Limitations.....	B-2
Installing the ATP Junction Panel.....	B-2
Adding Direct-Connect/Modem Ports to the Junction Box.....	B-7
Configuring the Series 44/48 for 120 Terminals.....	B-9

INDEX.....	Index-1.
------------	----------

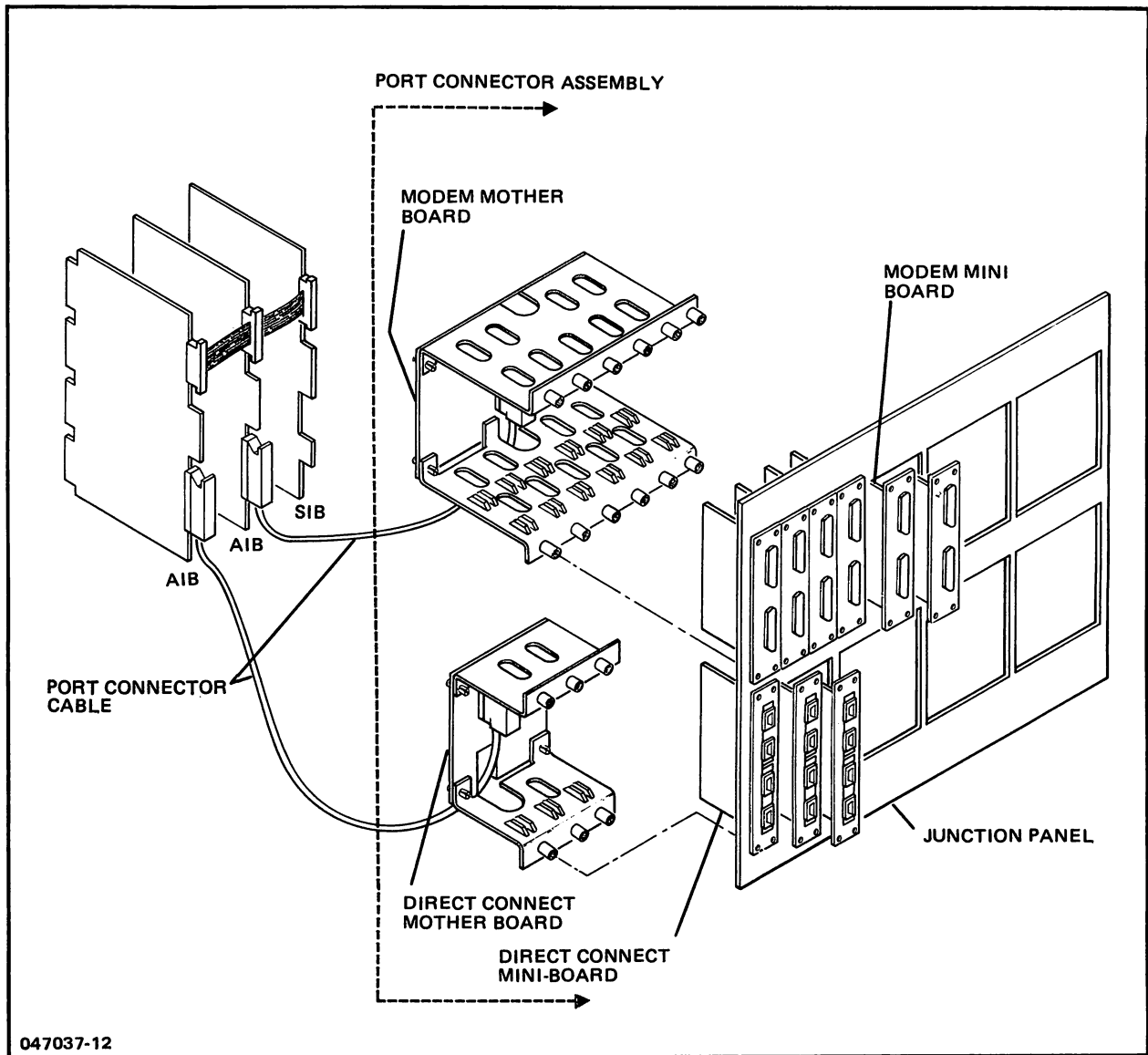
FIGURES AND TABLES

LIST OF FIGURES

Figure 1-1. Advanced Terminal Processor & Related Cabling.....	1-0
Figure 1-2. System Interface Board Block Diagram.....	1-2
Figure 1-3. Asynchronous Interface Block Diagram.....	1-3
Figure 1-4. Typical Interface to System for Series 44.....	1-10
Figure 1-5. Typical Interface to System for Series 64.....	1-11
Figure 2-1. SIB/AIB Switch Location.....	2-5
Figure 2-2. Ribbon Cable Location.....	2-8
Figure 2-3. Series 44 Slot Locations.....	2-9
Figure 2-4. Location of PROCESSOR Switch on HP 3000/44/48.....	2-11
Figure 2-5. Series 44/48 Junction Panels.....	2-12
Figure 2-6. Series 44/48 Mainframe (Rear View).....	2-13
Figure 2-7. Location of Power Breaker Switch & I/O Cage.....	2-16
Figure 2-8. Location of DCU Cable.....	2-18
Figure 2-9. Dir. Connect Port Connector & Junction Panel.....	2-20
Figure 2-10. Junction Panel & Mounting Plates.....	2-21
Figure 2-11. Junction Panel Layout.....	2-22
Figure 2-12. Modem Connect Port Connector Assembly & Jun. Pan.....	2-24
Figure 2-13. Direct Connect or Modem Connect Junction Panel.....	2-26
Figure 2-14. Self-test Switch & LED Indicators.....	2-28
Figure A-1. Wiring Diagrams for HP-DC B Adapter Cable.....	A-3
Figure A-2. Cable Wiring for HP-DC A & HP-DC B.....	A-4
Figure B-1. Remote Junction Box.....	B-3
Figure B-2. Series 39/40/42 Cabling.....	B-5
Figure B-3. Series 44/48 Cabling.....	B-6
Figure B-4. Junction Box Disassembled.....	B-8

LIST OF TABLES

Table 1-1. Interconnecting Cable Assemblies.....	1-8
Table 1-2. Specifications.....	1-12
Table 2-1. ATP Power Requirements Series 44/48/64/68.....	2-2
Table 2-2. Thumbwheel Switch Settings.....	2-3
Table 2-3. I/O Configuration for Series 44/48.....	2-29
Table 2-4. I/O Configuration for Series 64.....	2-31
Table 3-1. Troubleshooting Flow Chart.....	3-3



047037-12

Figure 1-1. Advanced Terminal Processor and Related Cabling

THEORY OF OPERATION

The Advanced Terminal Processor (ATP) provides the HP 3000 Series 44/48 and 64/68 Computer Systems with an intelligent controller for asynchronous data communication. The ATP removes the "per character" interrupt to the CPU by providing direct memory access (DMA) for bit serial data transfers. An ATP subsystem can support up to 96 asynchronous ports directly connected or through a modem link, and supports the data bit rate range of 110 to 19.2K thus providing data communication capabilities in high-speed as well as low speed environments. On the Series 64/68, it allows asynchronous devices to be attached directly or through full duplex modems. On the Series 44/48, only direct connection is available.

A minimum ATP subsystem consists of one System Interface Board (SIB), one Asynchronous Interface Board (AIB), and one Hardwired Port Controller or one Modem Port Controller. It requires two I/O slots, uses one IMB channel address and can support twelve terminal ports. A maximum subsystem uses one System Interface Board (SIB) and eight Asynchronous Interface Boards (AIB's), requires nine slots, uses one IMB channel address, and can support 96 terminal ports. An HP 3000 Series 64 computer may have one maximum and one partial ATP subsystem installed, which support up to 144 terminals. A Series 68 computer may have 3 maximum and 1 partial ATP subsystems installed, which supports up to 336 point-to-point terminals or 400 multipoint terminals. Each ATP subsystem requires one unique IMB channel address.

FEATURES

Important features of the ATP are:

- Data Communication data transfer rates up to 19.2K bits per second.
- Full-duplex modem support which is compatible with EIA RS-232-C and CCITT V.28.
- Modem Support compatible with Bell 103 and 202T (full duplex) and 212 modems.
- Single Chip Microcomputer per port.

FUNCTIONAL DESCRIPTION

The Advanced Terminal Processor includes the following major functional components.

- ATP Driver
- Port Controllers (Modem or Direct Connect)
- System Interface Board
- Asynchronous Interface Board

Block diagrams of the major functional components of the SIB and AIB are shown in figure 1-2 and 1-3. The solid interconnecting lines in the block diagrams represent data paths while the broken lines indicate service request paths.

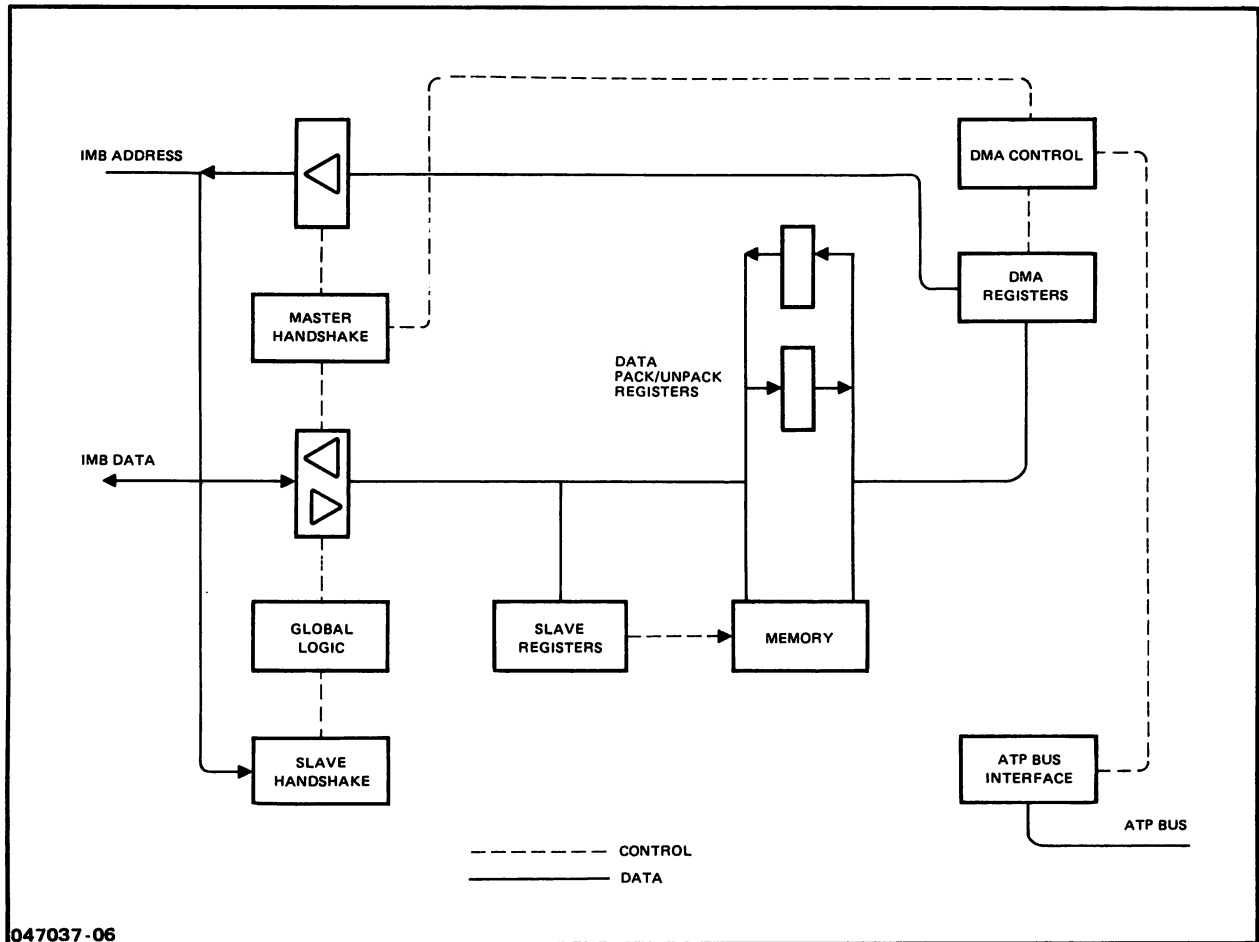


Figure 1-2. System Interface Board Block Diagram

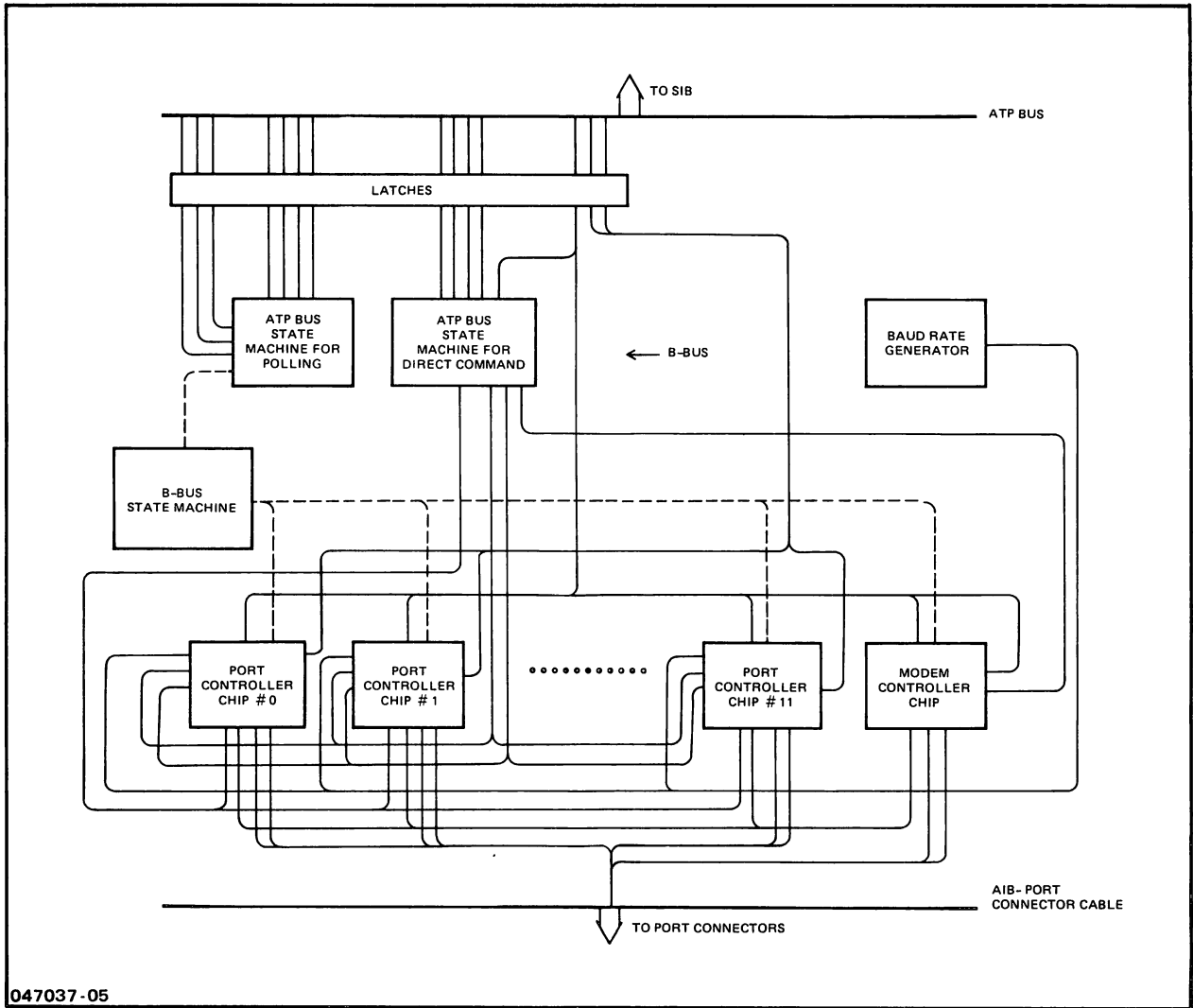


Figure 1-3. Asynchronous Interface Board Block Diagram

ATP DRIVER

The ATP Driver provides the software interface to the MultiProgramming Executive (MPE) file system. It receives requests from multiple sources to initiate terminal I/O functions. It handles the port controller interrupts, which report completion of the current function, the detection of a terminal action or error requiring software intervention. The software driver also manages the terminal buffer pool and system I/O tables.

PORT CONTROLLERS

The Port Controllers consist of an Asynchronous Interface Board, cable, and Port Connector Assembly, either Modem or Direct Connect.

Each Asynchronous Interface Board (AIB) provides an ATP subsystem with 12 terminal ports, an ATP bus interface, and an interface to the port connectors. The AIB is built around a single chip microcomputer, of which there is one for each terminal port. The chip performs most of the protocol functions of a terminal port and is referred to as the Port Controller Chip (PCC). The PCC contains a Serial Communications Interface which allows the chip to be efficiently interfaced with a variety of devices which require an asynchronous serial data format. The AIB also contains another microcomputer, a Modem Controller Chip (MCC), which is shared by all the PCC's and communicates with the modem Scanner Chip (MSC) on the Modem Mother Board, in order to perform multiplexing of the modem control lines. The MCC also performs diagnostics for the board.

The Advanced Terminal Processor offers a variety of Port Connections which allow terminals and modems to be connected to the HP 3000 Series 64/68. On the Series 44/48, only terminal direct connection is available.

Each Port Connector assembly consists of a Mother Board, which interfaces with the AIB, Mini-boards which interface with the terminal/modem connections, and associated internal cabling. The Port Connectors are available in two basic types: Modem and Direct Connect. The direct connect port connector offers the HP-DC A or HP-DC B hardwire terminal interface. The the HP-DC A interface uses RS-422 type data signals only and the HP-DC B interface uses RS-232-C type data signals only. Both are intended to allow terminals to be connected to an HP 3000 without the use of a modem, line driver or other external "box". The ATP modem interface supports only full duplex modems and conforms to the HP-Modem B standard, which is a version of RS-232-C.

SYSTEM INTERFACE BOARD

The System Interface Board (SIB) provides the hardware interface to the Intermodule Bus (IMB) and controls the ATP bus. It controls the direct memory access (DMA) path into three areas of memory--an input buffer, an output buffer, and a control program area--for each port. It also causes software interrupts via the IMB interrupt line, and performs byte packing and unpacking.

HARDWARE MODULE INTERCONNECTION

The System Interface Board (SIB) of the ATP is backplane compatible with the HP 3000 Series 44/48 and Series 64/68 Computer Systems. It is installed in the Intermodule Bus channel section of the I/O card cage. The SIB communicates with the CPU and memory via the IMB through the use of IMB protocol. The SIB receives signals and power from the system via connectors P2, P3 and P4. P1 is not used. The AIB receives power from the system via connectors P2 and P4. Connector P4 is also used for power-on reset, P1 and P3 are not used. Frontplane connector J1 on both the SIB and AIB is used for the ATP bus connection. Connector J2 on the SIB is used for test signals. Connector J2 on the AIB connects to the Mother Board assembly and includes power for the Port Connectors.

EQUIPMENT SUPPLIED

In order to purchase an ATP subsystem, the customer orders (1) HP 30144A (which is the HP 3000 System Interface Board (SIB) , and any combination of the 30145A's and/or 30155A's (Direct Connect or Modem Connect Port Controllers, respectively).

Each of the Port Controller products (PCP) (30145A or 30155A) contain:

- One (1) Asynchronous Interface Board (AIB)
- One (1) Mother Board (either Direct Connect or Modem Connect)
- Three (3) or six (6) Mini Boards
- One (1) AIB to Junction Panel Cable

The SIB and the AIB's are installed in the I/O Card Cage of the Series 64/68. The Mother Boards and Mini Boards are installed in the Junction Panel which is sheet metal composed of several cutouts, and is removable from the I/O Card Cage. The AIB/JP cable connects the Junction panel hardware (Mother and Mini boards) to their respective AIB.

For ATP add-ons, all of these parts arrive individually boxed and must be assembled on site using the procedure found in this manual.

For HP 3000 64/68 installations, the SIB and the AIB will still arrive boxed separately. However, the Mother Board and Mini Boards and the AIB/JP cable will be pre-assembled into the Junction Panel, in the factory, then boxed as an assembled unit. Therefore, what is actually shipped to the customer's site will be the SIB, the AIB's and a pre-assembled Junction Panel containing the number of Mother and Mini boards ordered under products 30145A and 30155A.

Also included with the pre-assembled Junction Panel will be a cable which should be attached once the Junction Panels are installed.

NOTE

The mother board and mini boards assembled for AIB #0 on the main I/O Bay will not have an AIB/JP cable attached. The cable for this AIB is special and is shipped with the Series 64/68. Instructions for its attachment are included in this manual.

The minimum Advanced Terminal Processor subsystem consists of the following:

- One System Interface Board (SIB), Product Number 30144A which consists of:

One System Interface Board, Part Number 30144-60001,

Three SIB to AIB Cables, Part Numbers 30000-93053 Short (3)
 30000-93056 Medium (6)
 30094-60002 Long (9)

- One Direct Connect Port Controller, Product Number 30145A which consists of:

One Asynchronous Interface Board (AIB), Part Number 30145-60001,

One AIB to Port Connector Cable, Part Number 30145-60004,

One Direct Connect Mother Board, Part Number 30145-60003.

Three HP-DC A Mini-Boards and two Card Guides, Part Number 30147-60001 (provides 12 ports).*

Label Sheets, Part Numbers 7121-2439 (6 each)
 7121-2440 (1 each)
 7121-2442 (opt 1 & 3)

AND/OR

- One Modem Port Controller, Product Number 30155A which consists of:

One Asynchronous Interface Board (AIB), Part Number 30145-60001,

One AIB to Port Connector Cable, Part Number 30145-60004,

One Modem Mother Board, Part Number 30145-60002,

Six HP-Modem B Mini-Boards and two Card Guides, Part Number 30146-60001 (provides 12 ports).

Four Label Sheets, Part Number 7121-2438 (12 each)
 7121-2439 (1 each)
 7121-2442 (opt 1 & 3)

Option 001 Deletes AIB to Mother Board Cable, 30145-60004 Series 64 only. This cable is replaced by DCU/AIB cable, which is part of the Series 64. Adds Junction Panel sheet metal.

*Option 002 Customer can choose to replace HP-DC A ports with HP-DC B ports (p/n 30148-60001) in increments of 4 ports at a time.

Option 003 Adds Junction Panel sheet metal.

General Information

The following table lists the interconnecting cable assemblies available for installation of the ATP.

Table 1-1. Interconnecting Cable Assemblies

Product Number	Description	Part Number
	SIB to AIB Cable 3-connector 6-connector 9-connector	30000-93053 30000-93056 30094-60002
	AIB Port Connector Cable	30145-60004
30062B Option 001	Modem Cable (7.6 Meters) Modem Cable (15 Meters)	30062-60022 30062-60023
30062C Option 001 Option 002	Modem Extension Cable Modem Extension Cable (15 Meters) Modem Extension Cable (30 Meters)	30062-60006 30062-60009 30062-60012
30152A	HP-DC B Adapter Cable, 3 Pin Male to 25 Pin Female (5 Meters)	30152-60001
30153A	HP-DC B Extension Cable, 3 Pin Male to 3 Pin Female (15 Meters)	30153-60001
30154A	HP-DC A Extension Cable, 5 Pin Male to 5 Pin Female (30 Meters)	30154-60001
13222P	262x HP-DC A Adapter Cable on Data Port 1, 50 Pin Micro-Ribbon to 5 Pin Male (15 Meters)	
13222X	262x HP-DC B Adapter Cable on Data Port 1, 50 Pin Micro-Ribbon to 3 Pin Male, (5 Meters)	
13242X	262x HP-DC B Adapter Cable on Data Port 2, 25 Pin Male to 3 Pin Male (5 Meters)	
13232I	264x HP-DC A Adapter Cable, 30 Pin Edge Connector to 5 Pin Male, (5 Meters)	
13232X	264x HP-DC B Adapter Cable, 30 Pin Edge Connector to 3 Pin Male (5 Meters)	

Table 1-1. Interconnecting Cable Assemblies (cont.)

Product Number	Description	Part Number
	HP-DC A Loopback Connector (5 Pin Male)	30147-60002
	HP-DC B Loopback Connector (3 Pin Male)	30148-60002
	HP Modem B Loopback Connector (25 Pin Male)	30146-60002
	AIB Loopback Connector (72 Pin Edge Connector)	30145-60005

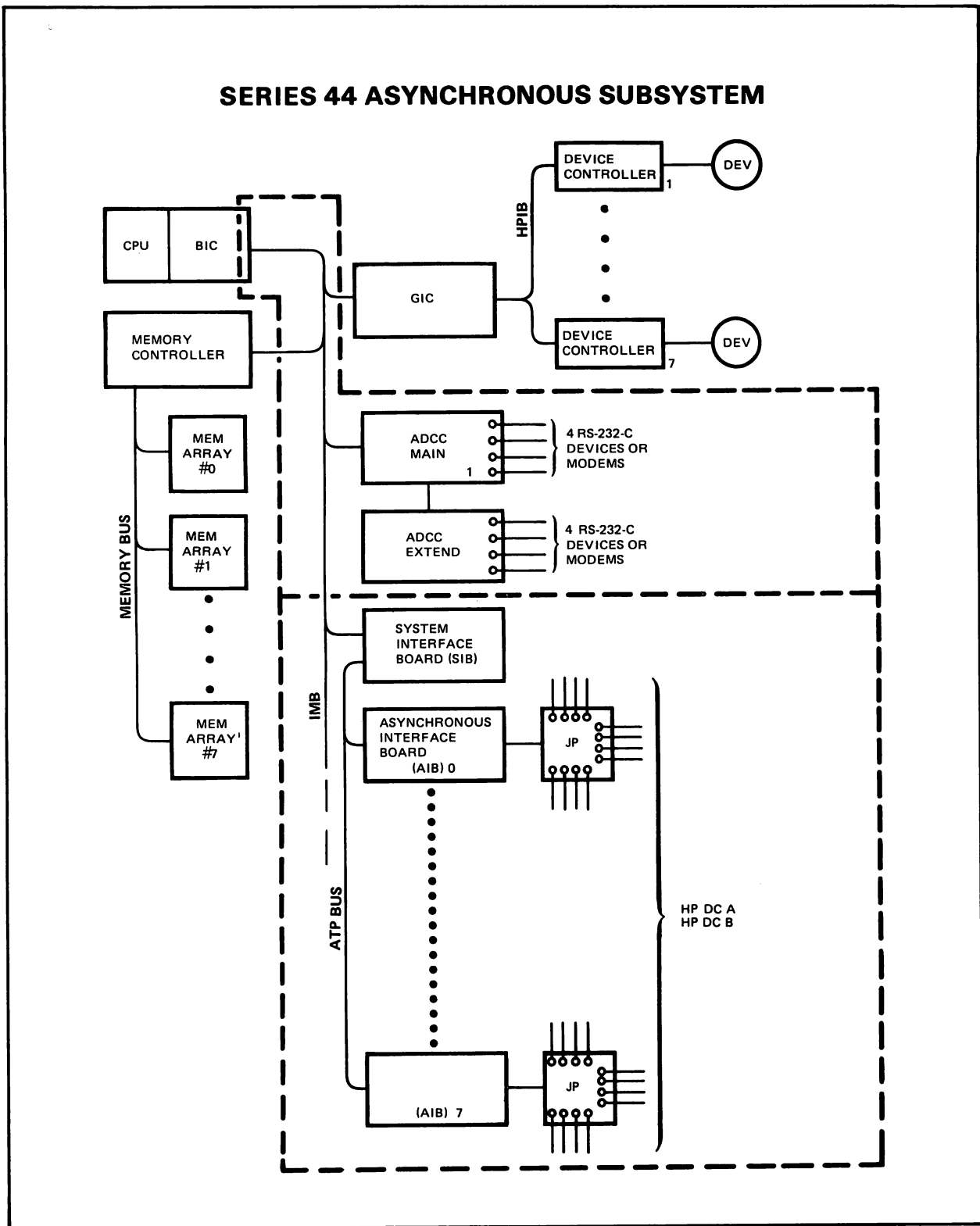


Figure 1-4. Typical Interface to System for Series 44

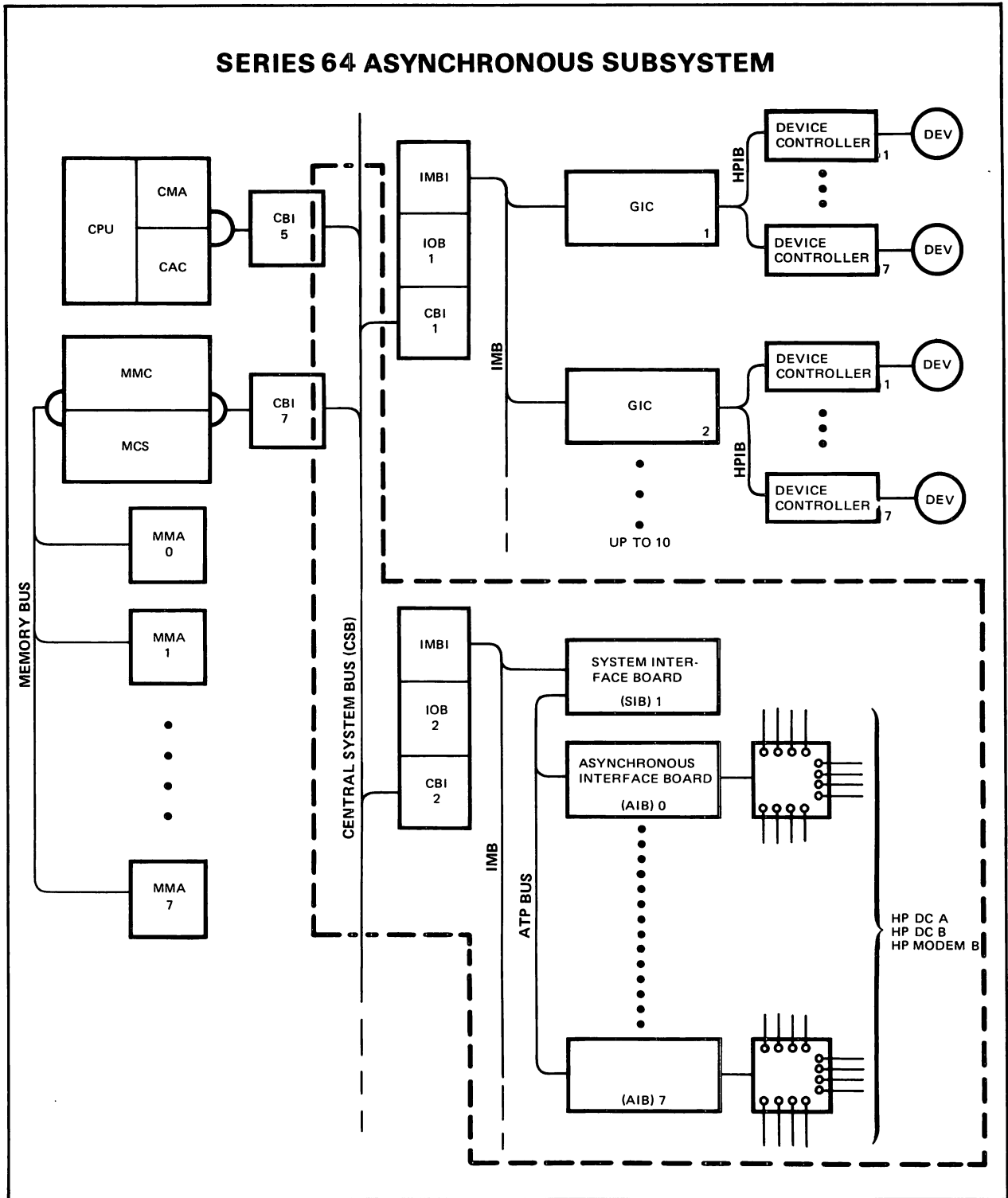


Figure 1-5. Typical Interface to System for Series 64

SPECIFICATIONS

The specifications for the Advanced Terminal Processor are presented in Table 1-2.

Table 1-2. Specifications

Model:	Advanced Terminal Processor
Interface:	Compatible with EIA RS-232-C and CCITT V.28 for modem connection. Direct connection is either 3 wire or 5 wire, RS-232-C type-signals or RS-422.
Data Rate:	Modem - Up to 1200 bits per second in full-duplex mode. Directly Connected - Up to 9600 bits per second for each port.
Modems supported:	Bell 103, 202T (Full Duplex) and 212
Multiplexer Supported:	HP Fiber Optic Multiplexer
Number of Terminals supported in one ATP Subsystem environment	Series 44: 60 Series 64: 96* Series 48: 96 Series 68: 96

*Series 64 can have two ATP subsystems and can support 144 terminals, 96 on the first subsystem, 48 on the second subsystem or a combination totalling no more than 144 terminals.

This section contains information for unpacking, inspecting, installing, and initially testing an ATP subsystem.

CAUTION

ATP PCA's are ESD sensitive. All the actual work on the system or junction panel hardware must be done with some form of ESD protection. You must be grounded to the system with a wrist strap or other form of grounding to prevent ESD damage.

UNPACKING AND INITIAL INSPECTION

If the ATP printed circuit assemblies (PCA's) and associated cable assemblies are received separately from the computer system, inspect the cartons containing the items before opening. If there is evidence of external damage to the carton, notify the nearest HP Sales and Service Office and request that the carrier's agent be present when the carton is opened. ATP's are now in boxes with a warning stating that only HP personnel should open and install the boards.

Inspect each item as the carton is unpacked. If the PCA's or cable assemblies are damaged or fail to match the packing list notify the carrier and the nearest HP Sales and Service Office immediately. Retain the shipping carton and packing material for the carrier's inspection. The HP Sales and Service Office will arrange for repair or replacement of the damaged item without waiting for any claims against the carrier to be settled.

PREPARATION FOR INSTALLATION

System Backup (Add-on Installation Only)

Before beginning ATP installation activities, ensure that the system operator has backed up the user's system environment, including his files. This precaution will prevent the possible inadvertent loss of the data residing on disc.

POWER REQUIREMENT VERIFICATION

The ATP PCA's obtain their operating power directly from the IMB backplane of all HP 3000 44/64 computing systems which have adequate power to accommodate an ATP subsystem or multiple ATP subsystems without the need for any power supply modification.

On the IMB backplane, verify that the power requirements for the ATP subsystem meet the specifications shown below in Table 2-1.

Table 2-1. ATP Power Requirements Series 44/48/64/68

	Voltage Requirements	Amps
System Interface Board (SIB)	+5 VDC	at 3.8A
Asynchronous Interface Board (AIB)	+5 VDC	at 4.1A
HP-DC B Junction Panel Assembly	+12 VDC -12 VDC	at 0.8A at 0.8A
HP-DC A Port Connector Assembly	None	
Modem B Junction Panel Assembly	+5 VDC +12 VDC -12 VDC	at 1.2A at 0.55A at 0.55A

ATP THUMBWHEEL SWITCH SETTINGS

The thumbwheel switches on the ATP PCA boards must be manually set to configure the ATP subsystem for your specific system and application. The following paragraphs provide guidelines for the different system environments.

Set the switches as follows before installing the PCA board in the computer card cage, (see Figure 2-1).

SIB Thumbwheel Switch Settings

- a. The thumbwheel switch for the SIB is an address switch with sixteen numbered positions (0 through 15). The setting of this switch identifies the IMB channel number assigned to the SIB and is used by the system to determine channel interrupt priority. Rotate the switch until the number desired is displayed. (Refer to Table 2-2 for appropriate settings).

WARNING

This switch must be set to a unique number not used by any other IMB channel such as another SIB, a GIC, or an ADCC. Damage to one or more of the PCA's could result.

Table 2-2. Thumbwheel Switch Settings

SIB Installed	Number to be set into Channel Address of the SIB		
	Series 44	Series 64	Series 68
First	2 or 3 or 4	1	1
Second	NA	*	*
First Aux	NA	NA	*
Second Aux	NA	NA	*

* means any unused IMB channel address.

NOTE

For the Series 64, the console is to be attached to Channel 1, Port 0.

AIB Thumbwheel Switch Settings

- b. The thumbwheel switch for the AIB is an address switch with eight numbered positions (0 through 7). The SIB polls the AIBs in the sequence designated by the thumbwheel settings, not by the AIB's physical location in the card cage, (see Figure 2-1).

NOTE

Each AIB associated with a particular SIB must have a unique thumbwheel setting of 0-7.

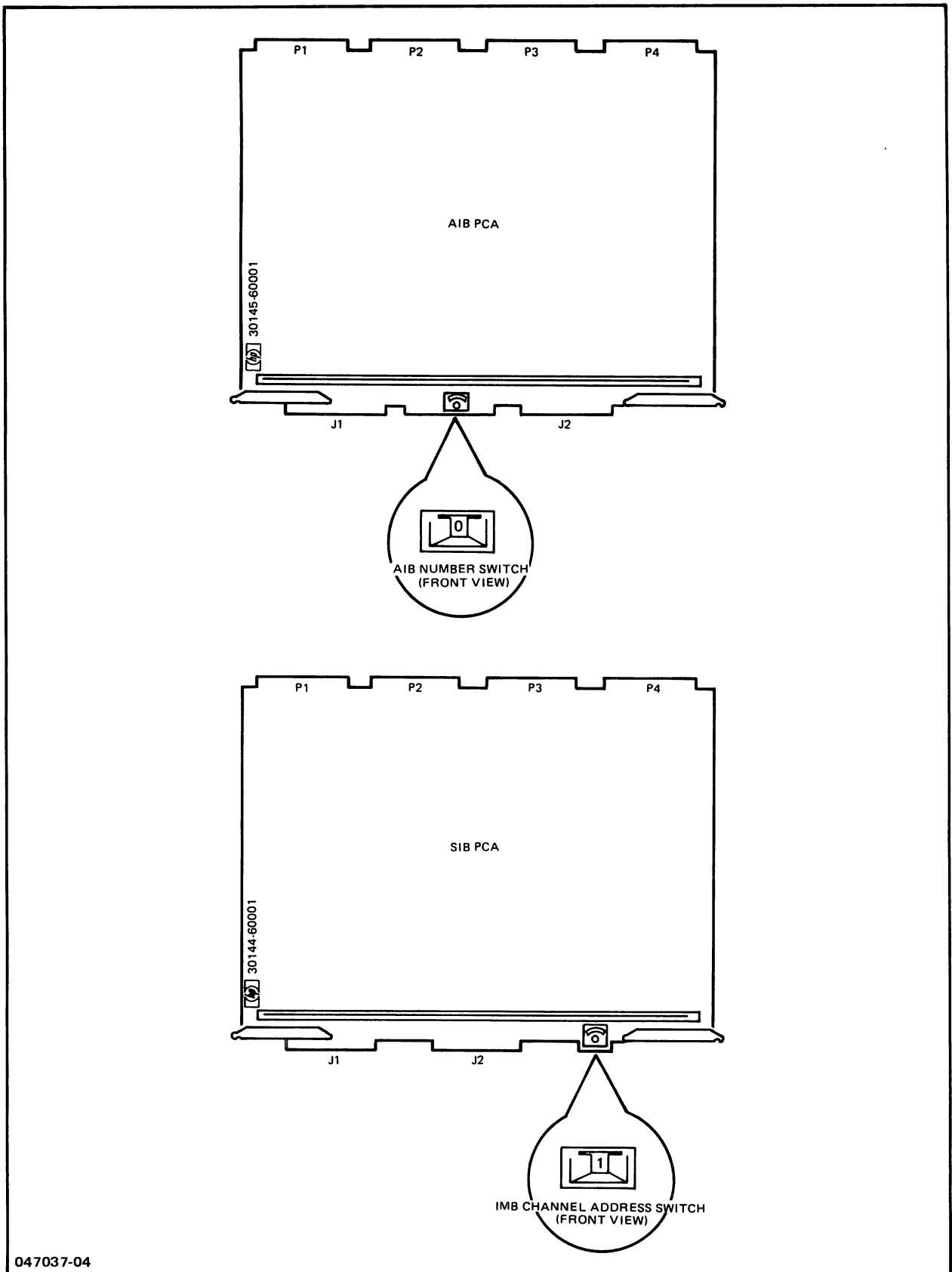


Figure 2-1. SIB/AIB Switch Location

HARDWARE INSTALLATION PROCEDURES FOR THE SERIES 44/48

The following procedures describe the installation of the ATP subsystem hardware in a Series 44/48 system environment.

Installing the SIB

NOTE

The user's files should have been backed up by the System Manager prior to beginning the installation.

- a. Ensure that all thumbwheel settings on the SIB and AIB's are properly configured. (Refer to the paragraph on ATP thumbwheel switch settings).
- b. Power down the card cage by placing the PROCESSOR switch in the off position. (See Figure 2-4 for location of the switch).

CAUTION

All power must be off when inserting or removing PCA boards from the Series 44 card cages.

- c. Open the door of the second card cage on the back of the HP 3000/44/48 mainframe.
- d. Insert the SIB into slot E6 within the "channel" range. The recommended slots for the SIB in a typical installation are E6 or E7. (See Figure 2-3)

On the HP 3000 Series 44/48, the SIB can be installed in any convenient slot in the range of E1 through E7 where the Flat Ribbon Cable will reach all needed connectors.

Installing the AIB

NOTE

Be sure that each AIB installed for a particular SIB has unique thumbwheel switch setting.

- a. Insert the AIB boards into vacant card cage slots adjacent to the SIB, slots E1 through E5. (See Figure 2-3).
- b. Attach the appropriate gray Flat Ribbon Cable, either 3 connector, 5 connector or 9 connector, from the SIB to all installed AIB'S.
- c. Make sure the power switch to the Port Connectors (a toggle switch on the front of the AIB board) is in the OFF position.

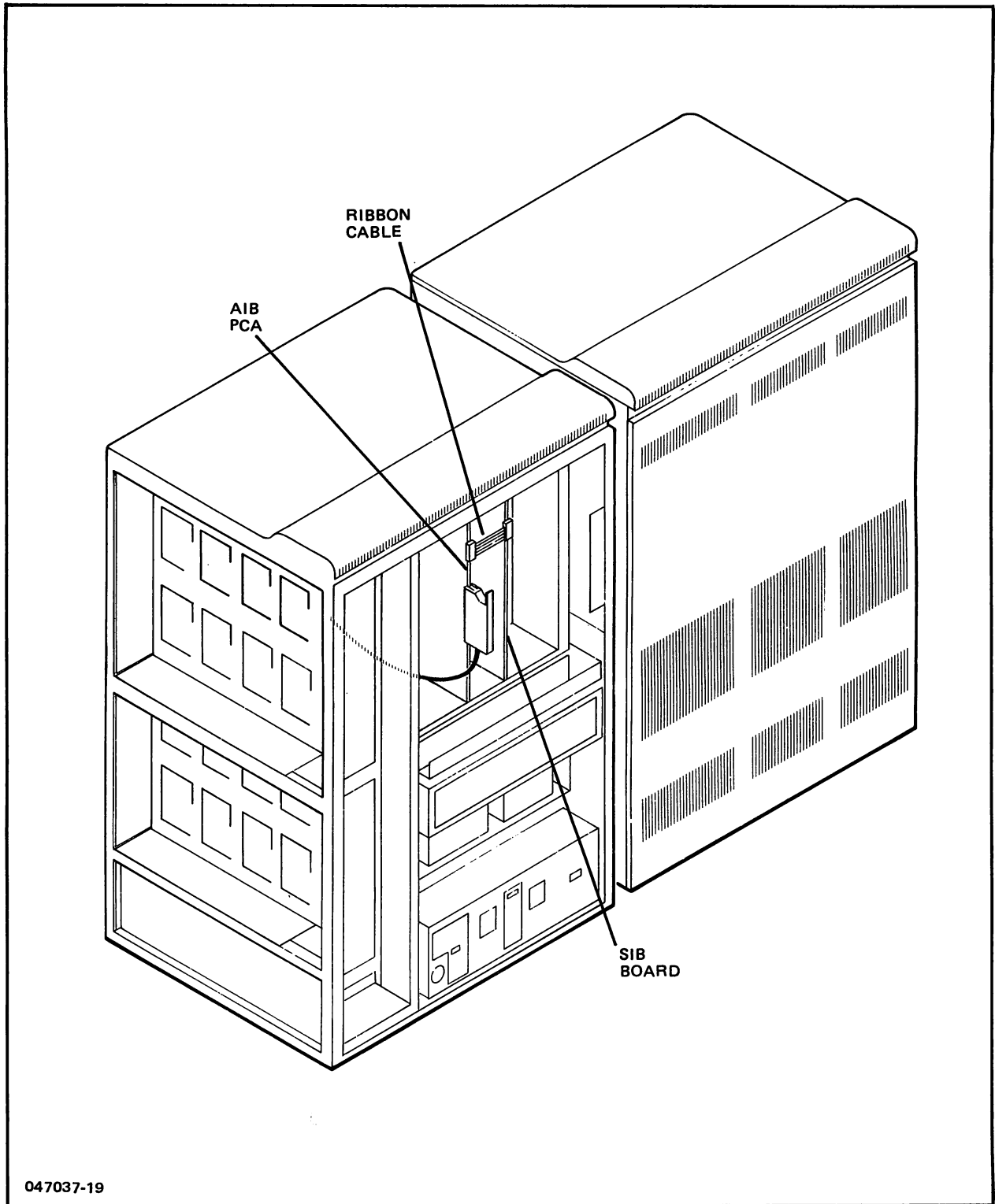


Figure 2-2. Ribbon Cable Location for Series 64/68

CARD CAGE 1	
SLOT NO.	
1	MEMORY ARRAY (0-256 KB)
2	MEMORY ARRAY 256-512 KB)
3	MEMORY ARRAY (512-768 KB)
4	MEMORY ARRAY (768-1024 KB)
5	MEMORY ARRAY (1024-1280 KB)
6	MEMORY ARRAY (1280-1536 KB)
7	MEMORY ARRAY (1536-1792 KB)
8	MEMORY ARRAY (1792-2048 KB)
9	MEMORY CONTROL & LOGGING
10	CMP
11	CTL
12	ALU
13	PCS
14	ADCC (M) (CH 1)
15	ADCC (E) (CH 11, DEV 5)
16	GIC (CH 11)
17	ADCC (M) / INP
18	ADCC (E) / INP
19	ADCC (M) / INP
20	ADCC (E)
21	ADCC (M)
22	ADCC (E) / GIC (CH 9)
23	ADCC (M) / GIC (CH 10)
24	GIC (CH 13)

CARD CAGE 2	
SLOT NO.	
1	E
2	E
3	E
4	E
5	E
6	E
7	E
8	E
9	E
10	E
11	E
12	E
13	E
14	E
15	E
16	E
17	E
18	E
19	E
20	E
21	E
22	E
23	E
24	E

ADCC (M) (CH2)
ADCC (E)
ADCC (M) (CH3)
ADCC (E)
ADCC (M) (CH4)
ADCC (E)
ADCC (M) / GIC (CH 12)
MEMORY CONTROL & LOGGING
MEMORY ARRAY (3840-4096 KB)
MEMORY ARRAY (3584-3840 KB)
MEMORY ARRAY (3328-3584 KB)
MEMORY ARRAY (3072-3328 KB)
MEMORY ARRAY (2816-3072 KB)
MEMORY ARRAY (2560-2816 KB)
MEMORY ARRAY (2304-2560 KB)
MEMORY ARRAY (2048-2304 KB)
INP (CH 12, DEV 4)
INP (CH 12, DEV 5)
INP (CH 12, DEV 6)
INP (CH 12, DEV 7)
PTR (CH 12, DEV 3)
PTR (CH 12, DEV 2)
PTR (CH 12, DEV 1)
PTR (CH 12, DEV 0)

Recommended
ATP Location

NOTE:
SLOTS IN CARD CAGE 2 ARE DESIGNATED E1, E2, etc.,
TO CORRESPOND WITH ASSOCIATED CABLE DESIGNATIONS

147022-16

Figure 2-3. Series 44 Slot Locations

Installing the Direct Connect Port Connector Assembly

One Direct Connect Port Connector Assembly consists of the following:

One top card guide (p/n 30145-00001) with three flathead screws (2360-0182)

One bottom card guide (p/n 30145-00003) with cable relief slot and three flathead screws

One Mother Board (p/n 30145-60003) with four plastic fasteners

Three Mini-Boards and 12 screws (p/n 2360-0115)

One AIB to Port Connector Assembly cable and two screws.

Install the Port Connector assembly onto the Junction Panels as follows: (see Figure 2-9).

CAUTION

The ATP can only be installed in the side junction panel slots on the Series 44/48. ATP port connectors cannot be installed in the slots in the back of the system. (See Figures 2-5, 2-6).

CAUTION

The ATP can only be installed in the center and right port cut-outs on the Series 44/48. Only 6 of the 8 cut-outs can be used for the ATP. See Figures 2-5, and 2-6 for exact placement.

- a. Remove the plate covering the junction panel port cut-out where you plan to install the Port Connector. The recommended cut-out to begin with is in the upper right corner.
- b. Install the 78 pin connector end of the Port Connector cable (p/n 30145-60004) to the Mother Board connector J-1 and attach it with screws from the circuit side of the board.
- c. Attach the top card guide to the top of the Mother Board with two of the plastic fasteners. The top is marked on the Mother Board.
- d. Attach the bottom card guide to the Mother Board with two of the plastic fasteners. Make sure that the cable is inserted through the cable relief slot.
- e. Attach the Mother Board assembly, with the arrow pointing upward, to the port cut-out opening. The recommended procedure is to face the port cut-out and slide the Mother Board assembly through the cut-out making sure that the cable is hanging inside the junction panel. Hold the assembly in place by grasping the cable hood. Place the enclosed flathead screws into the counter sunk holes and tighten.

- f. Slide the Mini-Boards into the card guides and secure to the junction panel cut-out with the enclosed screws.
- g. Attach the Port Connector cable to connector J2 on the AIB. (see Figure 1-1).
- h. When you have completed installing the ATP subsystem, power on the mainframe, and ensure that the PROCESSOR switch is on.
- i. Power on the Port Connectors via the power switch on the appropriate AIB. (see Figure 2-13).

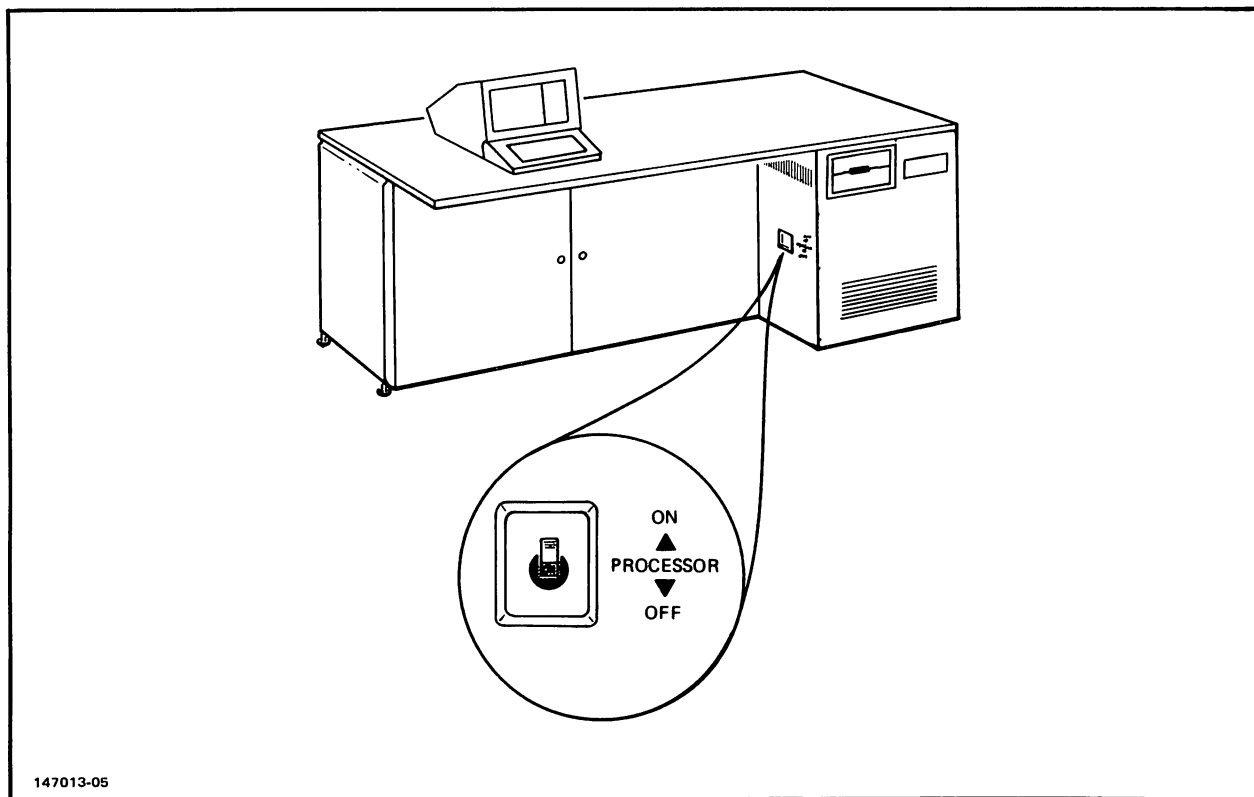


Figure 2-4. Location of PROCESSOR Switch on HP 3000/44/48

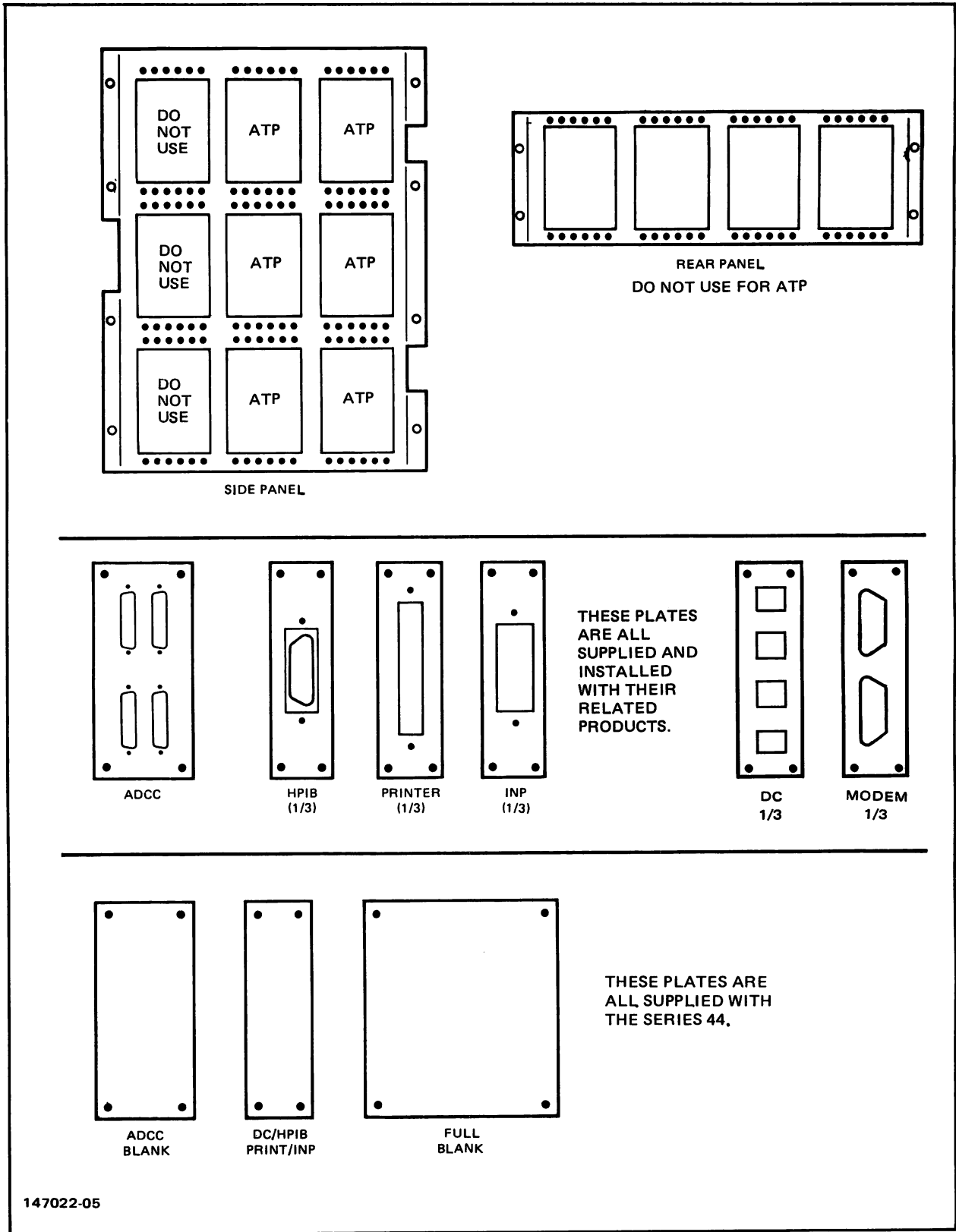


Figure 2-5. Series 44/48 Junction Panels

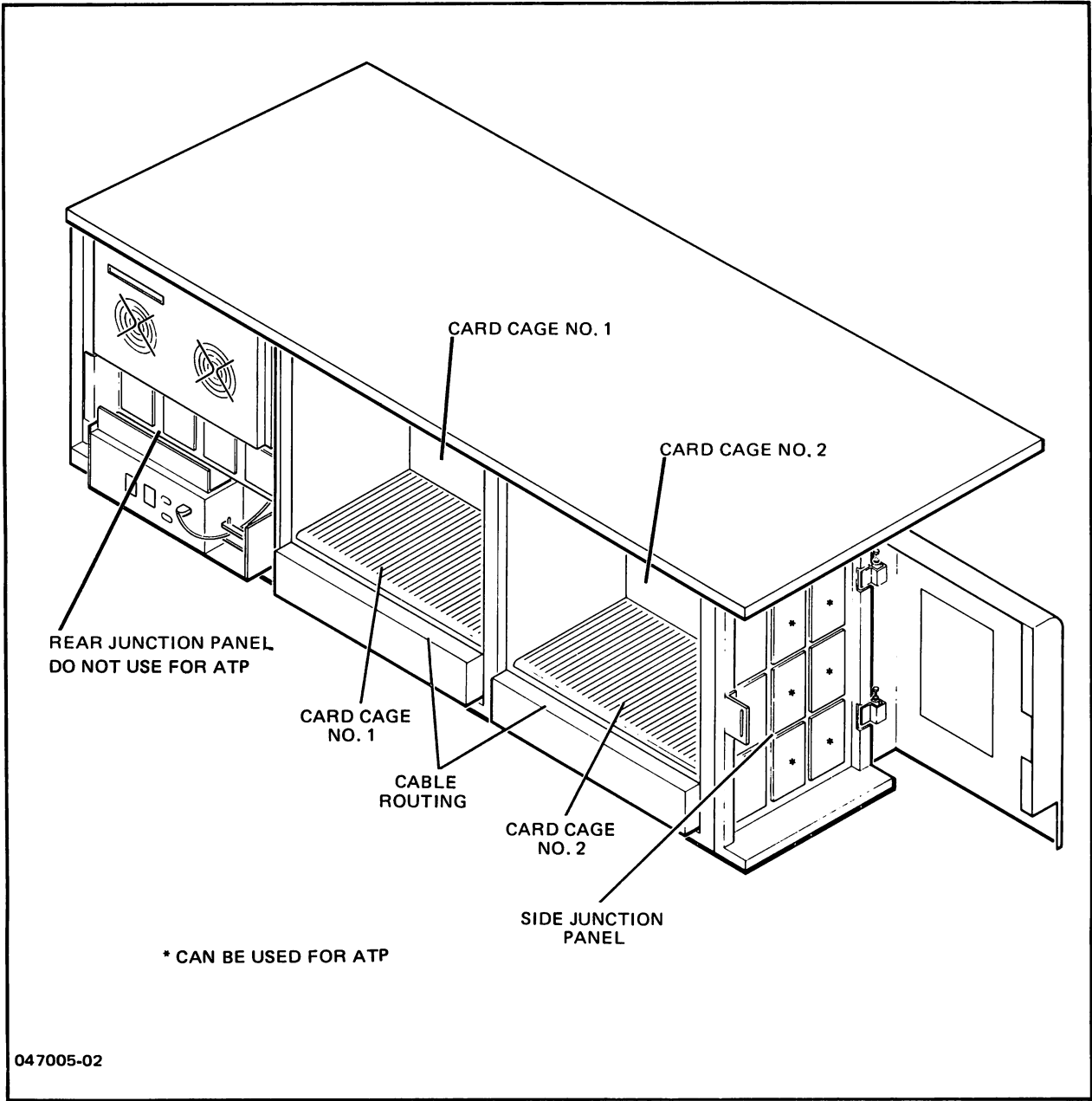


Figure 2-6. Series 44/48 Mainframe (Rear View)

HARDWARE INSTALLATION PROCEDURES FOR THE SERIES 64/68

The following procedures describe the installation of the ATP subsystem hardware in a Series 64/68 system environment.

The following major components are to be installed:

- System Interface Board (SIB) (either 1 or 2 per I/O Bay) - to be installed in the Series 64/68 I/O Card Cage.
- Asynchronous Interface Board (AIB) (1 or more up to 12 per I/O Bay) - to be installed in the Series 6X I/O Card Cage.
- Junction Panel - to be installed in the side opening of the I/O Card Cage.
- Cable Troughs - to be attached to the Junction Panels.

Installing the SIB

In the Series 64/68 environment there can be more than one ATP subsystem, thus, there can be more than one SIB. Since the SIB must be able to communicate with the CPU via the Inter-Module Bus (IMB) it must be physically inserted in a slot of an active IMB (the I/O card cage of a Series 64 has two IMB's). The AIB's, on the other hand, only require power from the I/O card cage backplane. Therefore, if more than one (1) SIB is to be shipped to the customer's site, the factory takes the liberty of assuming that both SIB's are to reside in IMB #1. In this instance, SIB #1 will only have four (4) AIB's associated with it and SIB #4 will have the remaining AIB's associated with it. Making this assumption allows for a variety of combinations of GIC's, INP's, Transactor PCA's, SIB's and AIB's, such that both SIB's can communicate using IMB #1.

This configuration of SIB's holds true for both the Main and Aux I/O Bay's.

NOTE

The user's files should have been backed up by the system manager prior to the beginning of installation.

- a. Ensure that all thumbwheel settings on the SIB(s) and AIB(s) are properly configured. (Refer to the paragraph on ATP thumbwheel switch settings).
- b. Remove the back panel covering the I/O section of the card cage and the far right front panel as shown in the Series 64 Installation Manual, p/n 30140-90007. (see Figure 2-7).
- c. Power down the card cage by setting the POWER SUPPLY BREAKER switch to the OFF position. (See Figure 2-7 for the location of the switch).

WARNING

Power must be OFF in the Card Cage area when inserting or removing PCA boards from the Series 64/68 card cages.

- d. Insert the System Interface Board into a vacant card cage slot within the "channel" range.

On the HP 3000/64/68, the SIB can be installed in any convenient I/O Channel slot where the Flat Ribbon Cable will reach all needed AIB's. The SIB should be placed to the left of all the GIC's installed in the backplane. It also needs to be within 10 slots of another SIB or GIC. The recommended slot for the SIB in a typical installation is slot 12. On a two IMB system, the recommended slot is 17.

- e. Select the channel number according to the configuration matrix in Table 2-2.

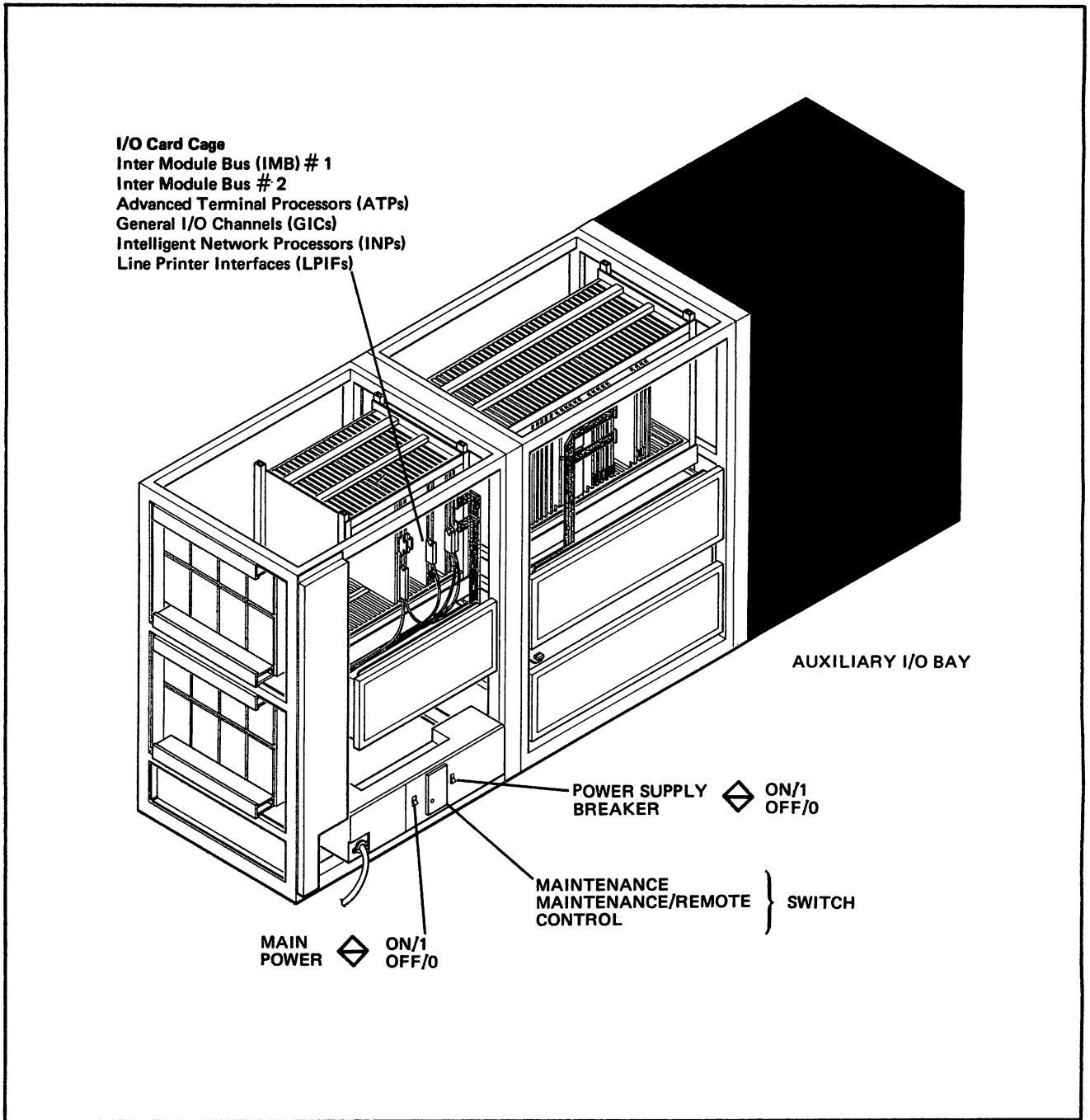


Figure 2-7. Location of Power Breaker Switch and I/O Cage

Installing the AIB

NOTE

Be sure each AIB installed for a particular SIB has a unique thumbwheel switch setting.

- a. Insert the AIB board(s) into a vacant card cage I/O channel slot(s) left of and immediately adjacent to the SIB.
- b. Attach the appropriate gray Flat Ribbon Cable, either 3 connector, 5 connector or 9 connector, from the SIB to all installed AIB's, (see Figure 2-2).
- c. Make sure that the power switch to the Port Connectors is in the OFF position.

NOTE

The first AIB will be cabled differently than subsequently installed AIB's. The cabling is provided by the Series 64/68 and is for the maintenance console and remote diagnostics. (See Series 64 Installation Manual for details). The cabling will originate from the DCU hood connector (see Figure 2-8) and should be installed as follows:

1. Ensure that the small three-pin connector is attached to J18 on the Inter Card Cage Panel. Be aware of this connection when installing the cable to the Port Connector assembly. Too much tension may dislodge and damage the connector.
2. Attach the DCU to AIB cable to the AIB and run the port connector cable out to the port connector assembly.
3. The Remote Diagnostic Interface connector to the remote Junction Panel slot, which is recessed and to the right of the main junction panel array, is factory installed.
4. Detach the AIB Hood Connector from the AIB and proceed to the section on "Installing the Port Connector Assembly".
5. After installing the first Port Connector Assembly, install Console 2642 option 964, to Port 0 of Junction Panel 1 (see Figure 2-11) and run Console self test.

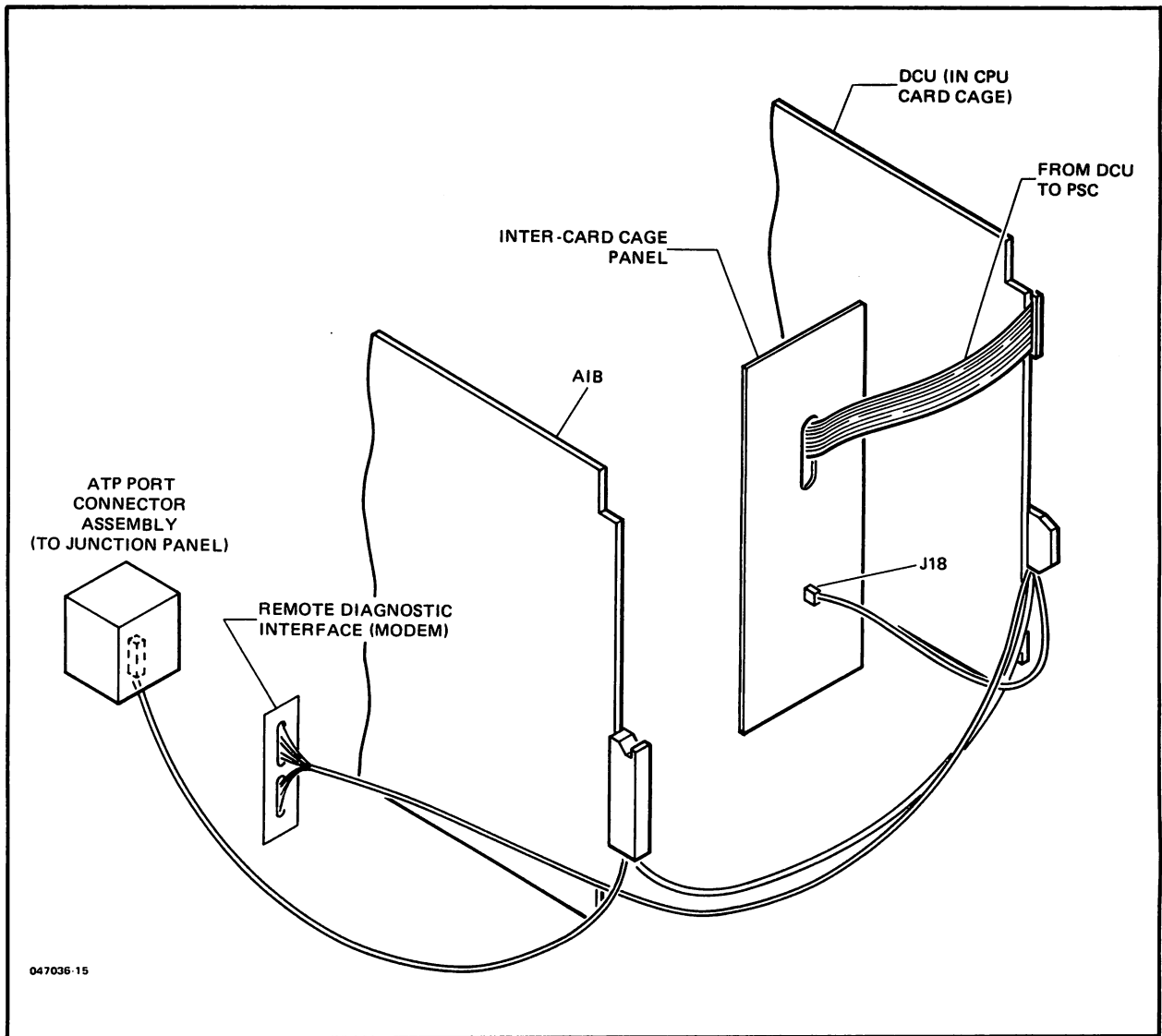


Figure 2-8. Location of DCU Cabling

Installing the Direct Connect Port Connector Assembly

One Direct Connect Port Connector assembly consists of the following:

One top card guide (p/n 30145-00001) with three flathead screws (2360-0182)

One bottom card guide (p/n 30145-00003) with cable relief slot and three flathead screws

One Mother Board (p/n 30145-60003) with four plastic fasteners

Three Mini-Boards and 12 washers and screws (p/n 2360-0115)

One AIB to Port Connector assembly cable and two screws

Install the Port Connector assembly onto the Junction Panels as follows: (see Figure 2-9),

- a. Remove the plate covering the junction panel port cut-out where you plan to install the Port Connector, (See Figure 2-10).
- b. Install the 78 pin connector end of the Port Connector cable (p/n 30145-60004) to Mother Board connector J-1 and attach it with screws from the circuit side of the board.
- c. Attach the top card guide to the top of the Mother Board with two of the plastic fasteners. The top is marked on the Mother Board.
- d. Attach the bottom card guide to the Mother Board with two of the plastic fasteners. Make sure that the cable is inserted through the cable relief slot.
- e. Attach the Mother Board assembly, with the arrow pointing upward, to the port cut-out opening. The recommended procedure is to face the port cut-out and slide the Mother Board assembly through the cut-out making sure that the cable is hanging inside the junction panel. Hold the assembly in place by grasping the cable hood. Place the enclosed flathead screws into the counter sunk holes and tighten.
- f. Slide the Mini-Boards into the card guides and secure to the junction panel cut-out with the enclosed screws and washers.
- g. Attach the Port Connector cable to connector J2 on the AIB, (see Figure 1-1).

Installation

- h. When you have completed installing the ATP subsystem, power on the mainframe, and ensure that the **POWER SUPPLY BREAKER** switch is on.
- i. Power on the Port Connectors via the power switch on the appropriate AIB (see Figure 2-13). On Port 0 on Junction Panel 1, attach Console 2642, option 964 (see Figure 2-11) and run Console self test.

NOTE

For the Auxiliary I/O Bay on the Series 68, Slot 13 is for the INP, Slot 14 is for the INP, Slot 15 is **FULL BLANK**, and Slot 16 is **Three 1/3 BLANKS**. The Auxiliary I/O Bay is rotated 180° from the first I/O Bay.

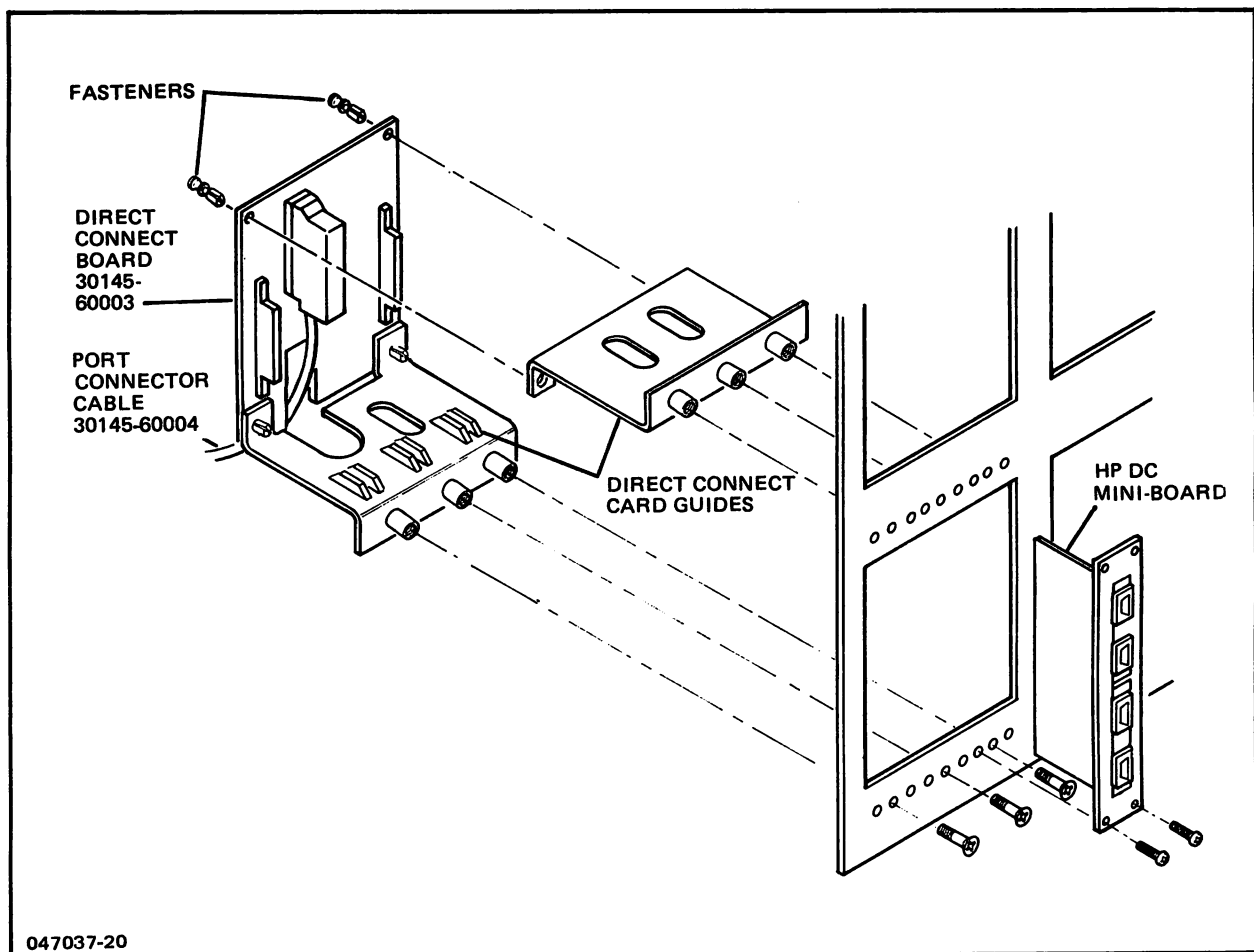


Figure 2-9. Direct Connect Port Connector Assembly and Junction Panel

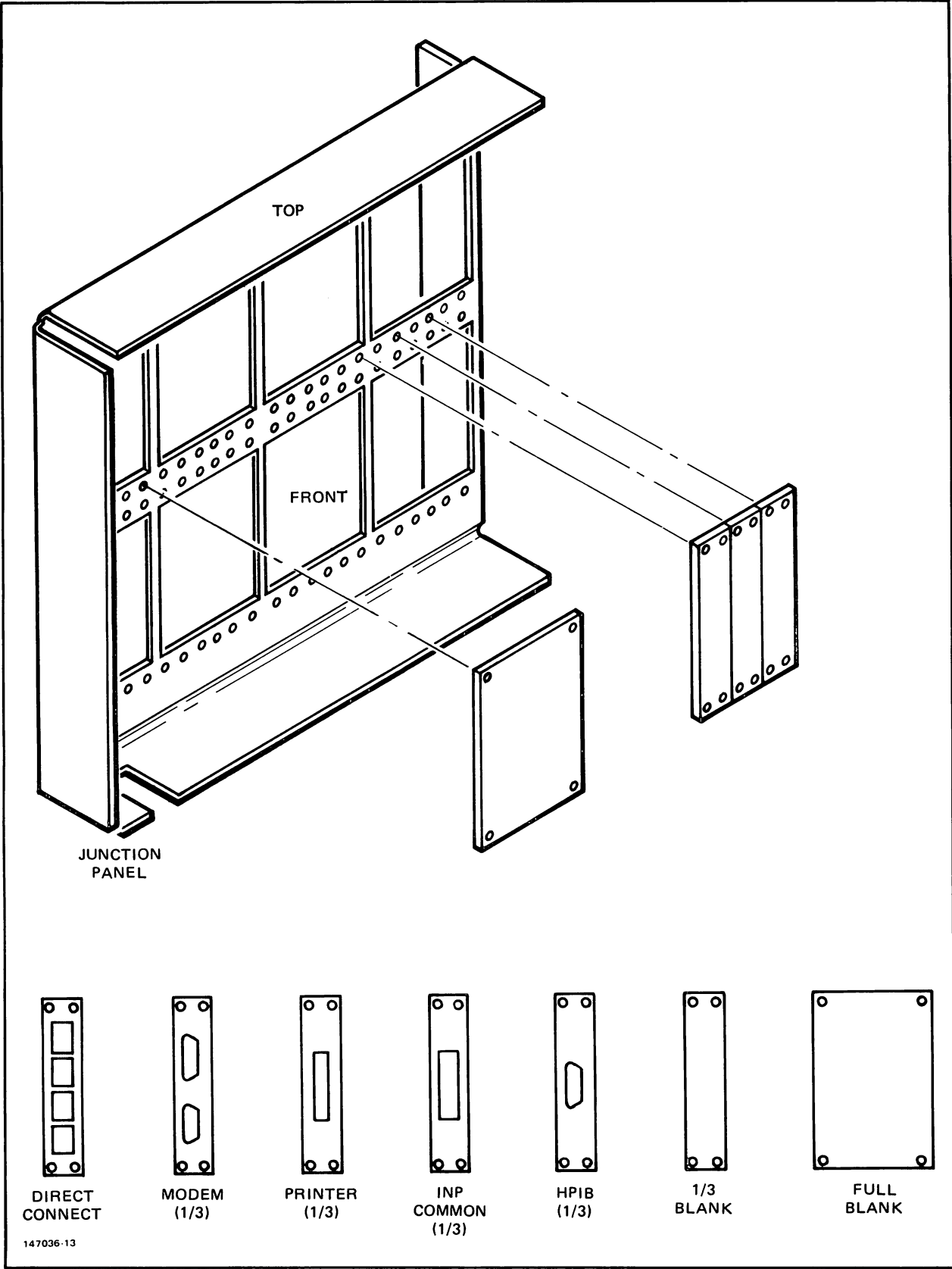


Figure 2-10. Junction Panel and Mounting Plates

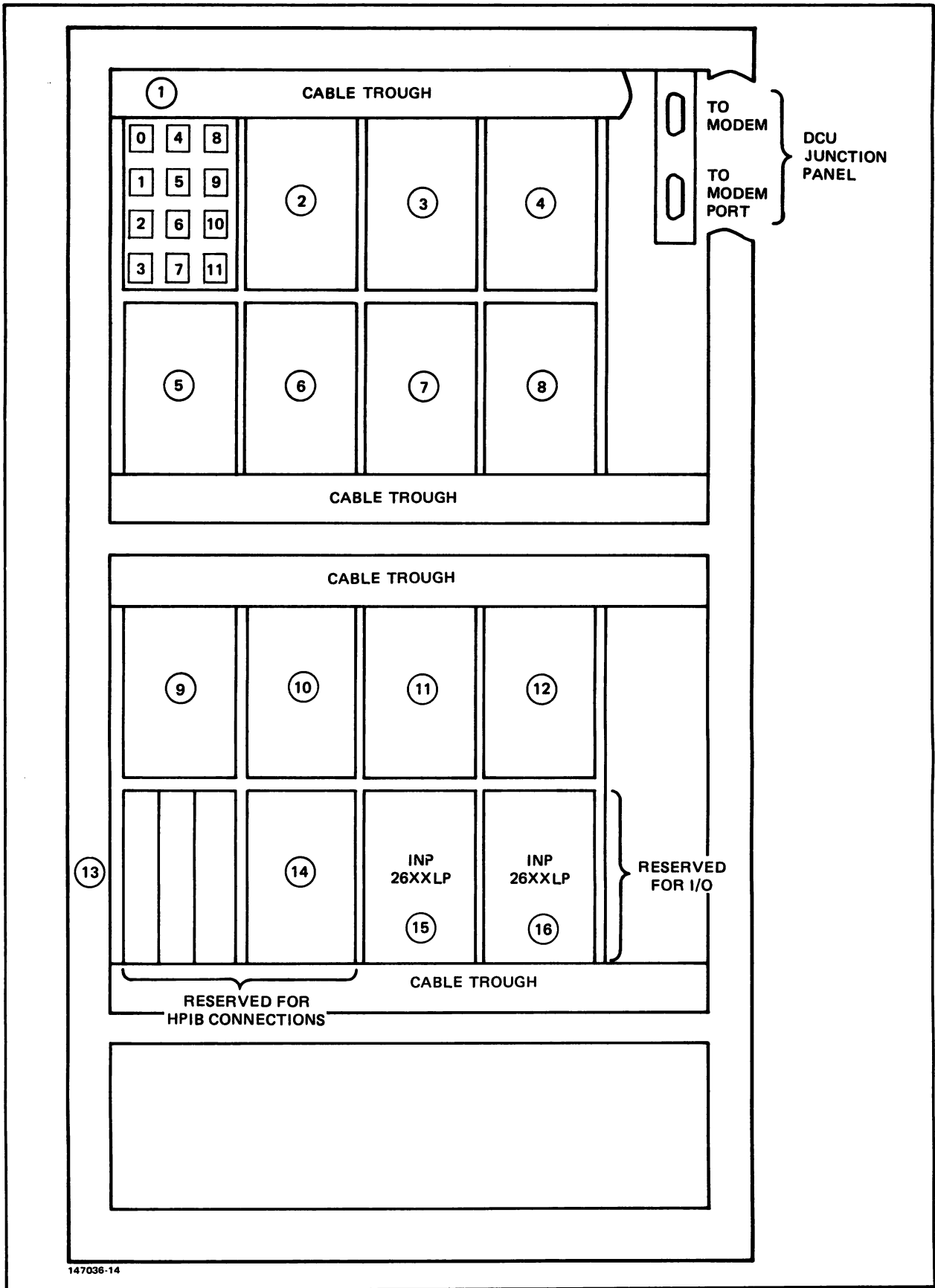


Figure 2-11. Junction Panel Layout

Installing the Modem Connect Port Connector Assembly

One Modem Connect Port Connector assembly consists of the following:

Two identical card guides (p/n 30145-00002) and twelve flathead screws (2360-0182)

One Mother Board (p/n 30145-60002) with eight plastic fasteners

Six Mini-Boards and 24 panhead screws (p/n 2360-0115)

One AIB to Modem Port Connector assembly cable (p/n 30145-60004) and two screws

Install the Port Connector Assembly onto the junction panels as follows: (see Figure 2-12)

- a. Remove two full side-by-side plates covering the port cut outs where you plan to install the Port Connector Assembly, (see Figure 2-10).
- b. Install the 78 pin connector end of the Port Connector cable (p/n 30145-60004) to Mother Board connector J-1 and attach it with screws from the circuit side of the board.
- c. Attach the first card guide to the Mother Board with four of the plastic fasteners.
- d. Attach the second card guide to the Mother Board with four of the plastic fasteners.

NOTE

The Modem Connect Assembly cannot be installed in the same manner as the Direct Conect Assemblies. The Modem Connect Assemblies cannot be placed through the junction panel cut-out and attached. They must be installed as described below:

- e. Remove the right front cover of the mainframe so you can place the Mother Board assembly inside of and flush against the junction panel. Attach the Mother Board assembly, with the cable facing downward through the cable relief slot, to the junction panel port opening. Hold the assembly in place by grasping the cable hood. Place the enclosed flathead screws into the counter sunk holes and tighten.
- f. Slide the Mini-Boards into the card guides and secure to the junction panel cut-out with the enclosed screws.
- g. Attach the Port Connector cable to connector J2 on the AIB, (see Figure 1-1).

Installation

- h. When you have completed installing the ATP subsystem, power on the mainframe and ensure that the **POWER SUPPLY BREAKER** is on.
- i. Power on the Port Connectors via the power switch on the appropriate AIB, (see Figure 2-13).

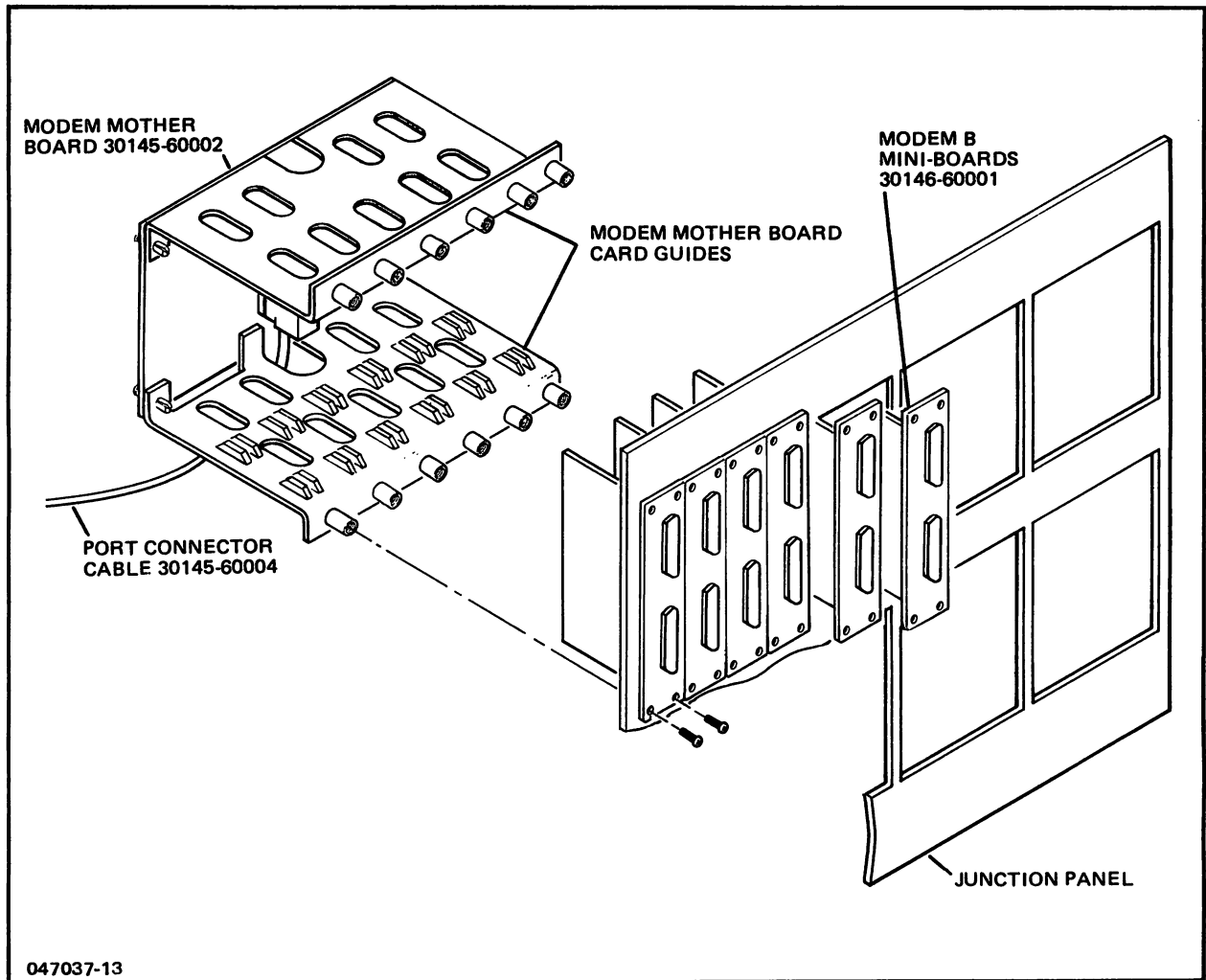


Figure 2-12. Modem Connect Port Connector Assembly and Junction Panel

Installation of Junction Panels

There are two Junction Panels to be installed per I/O Bay; where the first junction panel is to be placed in the lower opening of the side of the I/O card cage and the second side panel is to be placed in the upper opening of the side of the I/O card cage (refer to Figure 2-10 for orientation). Figure 2-11 provides a view of Junction Panel with the correct orientation previous to inserting into the I/O card cage openings. (Note that for the Auxiliary I/O Bay, the junction panels are rotated 180°). Keeping these two figures in mind, perform the following procedure:

1. Determine which of the two junction panels is the first side panel by:
 - Locating the system console ATP junction panel which will have the first mini board (located top left) marked as shown below, (Figure 2-13),
 - assuring that the AIB/JP cable is not attached for this junction panel assembly (this junction panel will be using the DCU AIB/JP cable shipped with the Series 64/68),
 - assuring that the bottom row of cutouts contain "1/3 BLANK" cover plates and "FULL BLANK" cover plates, which will be removed later in order to insert HP-IB junction panel connections.

NOTE

All junction panel assemblies must have an AIB/JP cable connected to them on the AUX I/O side panels, otherwise they are identical to the main I/O side panels.

2. Run AIB/JP cables through the I/O card cage lower opening and then to the right such that the AIB/JP cables now protrude out the rear of the Series 64 I/O card cage (refer to Figure 2-7).
3. Seat the Junction Panel appropriately and attach to the opening with the 12 screws provided (P/N 2680-0274) (3 for the top, 3 for the left side, 3 for the right side, and 3 for the bottom).
4. Remove the mini boards for the system console (junction panel). If the console junction panel is a Direct Connect then remove the left most and the middle mini boards. If it is a Modem Connect then remove the mini boards marked "PORTS" 4/5, and 6/7.
5. Locate the mother board end of the DCU AIB/JP cable (it should be already attached to the DCU and to the rear of the Remote Console Modem port (see Figure 2-8)).
6. Insert the mother board end (78-pin subminiature D) of the DCU AIB/JP cable through the cable opening made by the bottom of the Mother Board and the lower card guide and attach with the screws provided (2200-0514).
7. Re-insert the system console junction panel mini boards and attach with the earlier removed screws.

NOTE

It is possible that there will be no ATP junction panels pre-assembled into the top junction panel opening in the I/O Bay, or into the second set of junction panels if an Option 003 is ordered. If so, merely install the rest of the junction panels as per step 3.

8. Run the AIB/JP cables of the Second Junction Panel through the upper opening of the side of the I/O card cage and then to the right such that these cables also protrude out the rear of the I/O card cage.
9. Attach the second Junction Panel as in step 3.
10. Locate the AIB end of the DCU AIB/JP cable for the system console junction panel and attach it to the AIB #0 that is connected to SIB #1.
11. Attach the Cable Troughs (quantity 4, 2/panel) in the locations shown in Figure 2-1 with the screws (4/trough) P/N 2510-0301 and washers P/N 3050-0139 provided.

NOTE

The AIB/JP cables should not have been connected yet. This omission is necessary to facilitate the following verification procedures.

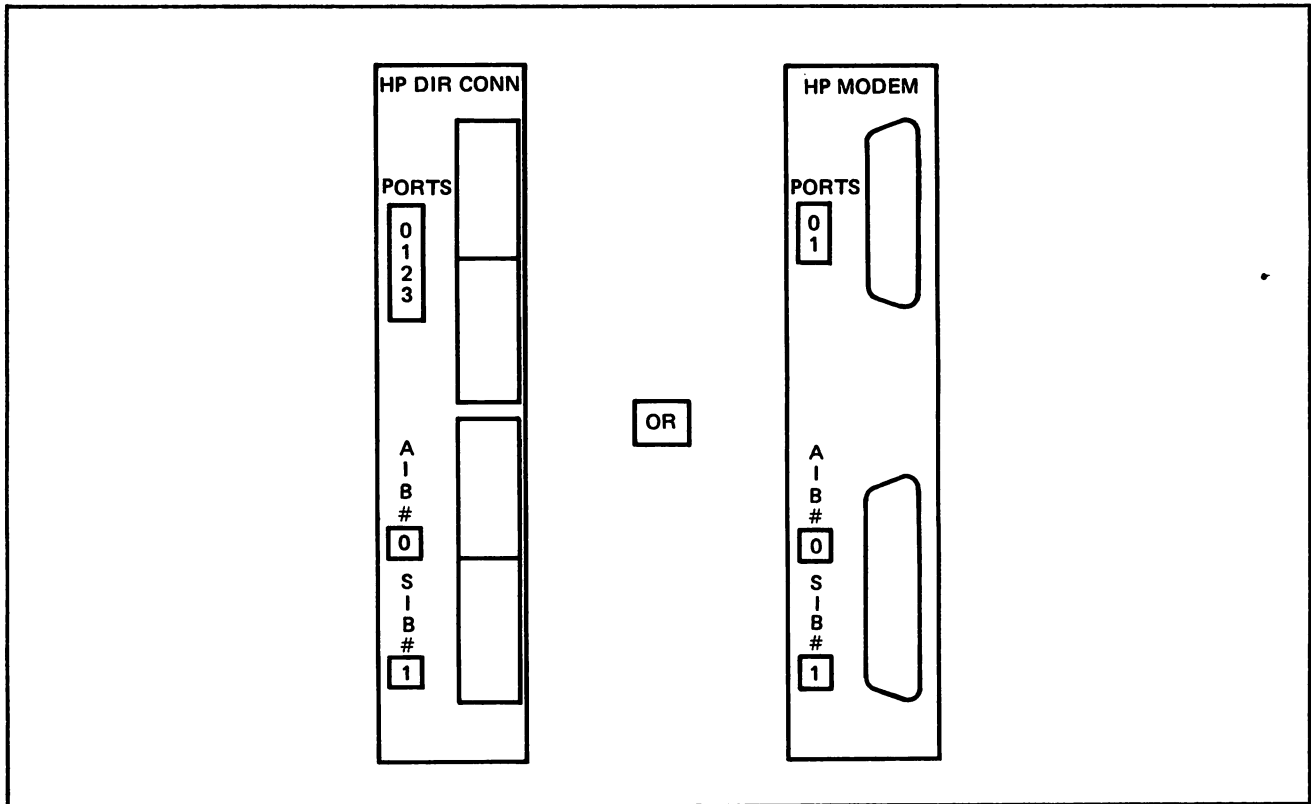


Figure 2-13. Direct Connect or Modem Connect Junction Panel

HARDWARE INSTALLATION VERIFICATION

To verify that the ATP has been correctly installed and that it now functions properly:

- a. Turn on the power.

On the HP 3000 Series 44/48, return the PROCESSOR switch to the ON position.

On the HP 3000 Series 64/68, return the POWER SUPPLY BREAKER switch to the ON position.

Power on the Port Connectors via the AIB power switch.

- b. Flip the reset test switch on the edge of the AIB to manually reset the AIB so that the self test can be initiated. All LEDs should be off and if any remain on, the board is malfunctioning. To initiate the self test, use a screwdriver or a similar tool to short together Test Point 5 and Test Point 7, (see Figure 2-14).
- c. All the light-emitting-diode (LED) indicators (Figure 2-13) on the front plane will blink on and off in sequence. If no LEDs remain lit, then no errors have been detected. If any LEDs remain lit, the AIB is malfunctioning.
- d. If the self-test is unsuccessful, replace the AIB.
- e. If the self-test is successful, screw the back panel onto the computer. The system is now ready for operation.
- f. Plug the console into port 0 of AIB 0 on Junction Panel 1, (see Figure 2-11).
- g. Load the Diagnostic Utility System (DUS) and run I/O MAP and ATP diagnostic ATPDIAG. On the Series 64/68, run the Fault Locating Diagnostic's I/O Map, (refer to Series 64 DUS manual, Part Number 32342-60001, Series 44 DUS manual, Part Number 30070-90043 and ATP Off-Line Diagnostic Manual, Part Number 30144-90003).

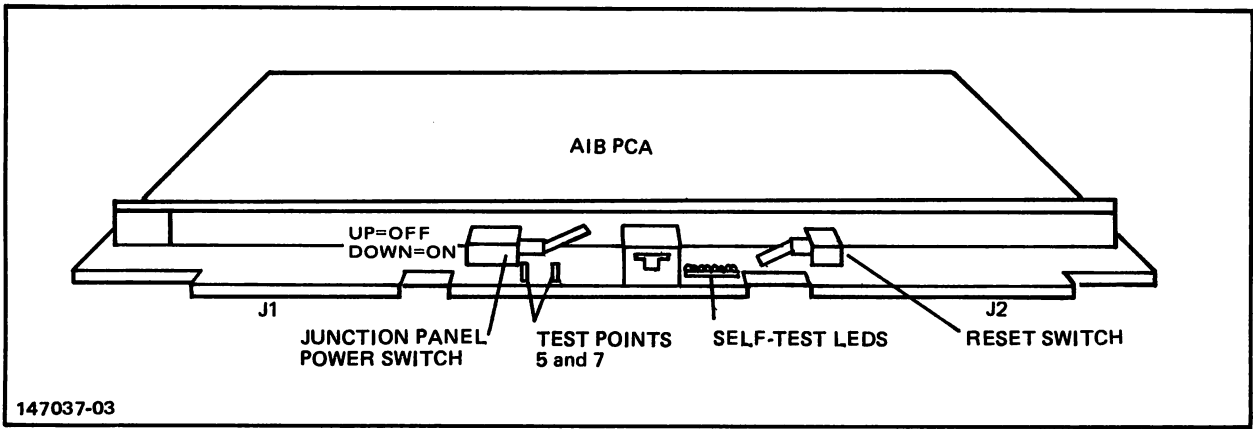


Figure 2-14. Self-test Switch and LED Indicators

SOFTWARE INSTALLATION PROCEDURES FOR SERIES 44/48

Load the operating system as per instructions in the Console Operator's Guide, part number 32002-90004. After the ATP hardware has been installed, all that needs to be done is to configure the appropriate number of ports for the user's requirements during a RELOAD or a cool start from the MIT. Once this has been completed, have the customer perform a 0 date SYSDUMP to permanently protect his I/O configuration and initial software installation.

Table 2-3. I/O Configuration For Series 44/48

LOG DEV #	DRT #	UNIT	CNT	TYPE	SUBTYPE	TERMINAL TYP	SPE	PRO	REC WIDTH	OUTPUT DEV	MODE	DRIVER NAME	DEVICE CLASSES
1	89	0	0	0	9				128	0		HIOMDSC1	SYSDISC DISC
3	89	1	0	0	9				128	0		HIOMDSC1	SPOOL SYSDISC DISC SPOOL
6	82	0	0	32	2				66	0	S	HIOLPRT2	LP FASTLP SLOWLP SMALLPAP
7	73	0	0	24	0				128	0		HIOTAPE0	TAPE DDUMP
8	73	1	0	24	0				128	0		HIOTAPE0	TAPE
9	73	2	0	24	0				128	0		HIOTAPE0	TAPE
10	73	3	0	24	0				128	LP	JA	HIOTAPE0	JOBTAPE
20	32	0	0	16	0	10	960	0	40	20	JAID	HIOTERMO	TERM
21	33	0	0	16	0	10	240	0	40	21	JAID	HIOTERMO	TERM
22	34	0	0	16	0	10	240	0	40	22	JAID	HIOTERMO	TERM
23	35	0	0	16	0	10	240	0	40	23	JAID	HIOTERMO	TERM
24	36	0	0	16	0	10	240	0	40	24	JAID	HIOTERMO	TERM
25	37	0	0	16	0	10	240	0	40	25	JAID	HIOTERMO	TERM
26	38	0	0	16	0	10	240	0	40	26	JAID	HIOTERMO	TERM
27	39	0	0	16	0	10	240	0	40	27	JAID	HIOTERMO	TERM
28	16	0	0	16	4	10	960	0	40	28	JAID	HIOTERMO	TERM
29	17	0	0	16	0	10	240	0	40	29	JAID	HIOTERMO	TERM
30	18	0	0	16	4	10	960	0	40	30	JAID	HIOTERMO	TERM
31	19	0	0	16	1	10	120	0	40	31	JAID	HIOTERMO	TERM
32	20	0	0	16	4	10	960	0	40	32	JAID	HIOTERMO	TERM
33	21	0	0	16	4	10	960	0	40	33	JAID	HIOTERMO	TERM
34	22	0	0	16	0	13	120	0	40	34	JAID	HIOTERMO	HP2601 PRINTER
61	86	0	0	17	3				0	0		IOINPO	INP1
62	87	0	0	17	1				0	0		IOINPO	INP2
70	#61	0	0	41	0				128	0	I	IODSO	PIRANHA PIR
71	#61	0	0	16	0	??	240	0	40	71	J ID	IODSTRMO	DSHTERM
72	#61	0	0	16	0	??	240	0	40	72	J ID	IODSTRMO	DSHTERM
73	#61	0	0	16	0	??	240	0	40	73	J ID	IODSTRMO	DSHTERM
74	#61	0	0	16	0	??	240	0	40	74	J ID	IODSTRMO	DSHTERM
75	#61	0	0	16	0	??	240	0	40	75	J ID	IODSTRMO	DSHTERM
76	#61	0	0	16	0	??	240	0	40	76	J ID	IODSTRMO	DSHTERM
77	#61	0	0	16	0	??	240	0	40	77	J ID	IODSTRMO	DSHTERM
78	#61	0	0	16	0	??	240	0	40	78	J ID	IODSTRMO	DSHTERM
80	#62	0	0	41	0				128	0	I	IODSO	MORK
81	#62	0	0	16	0	??	240	0	40	81	J ID	IODSTRMO	DSHTERM
82	#62	0	0	16	0	??	240	0	40	82	J ID	IODSTRMO	DSHTERM
83	#62	0	0	16	0	??	240	0	40	83	J ID	IODSTRMO	DSHTERM
84	#62	0	0	16	0	??	240	0	40	84	J ID	IODSTRMO	DSHTERM
85	#62	0	0	16	0	??	240	0	40	85	J ID	IODSTRMO	DSHTERM
86	#62	0	0	16	0	??	240	0	40	86	J ID	IODSTRMO	DSHTERM
87	#62	0	0	16	0	??	240	0	40	87	J ID	IODSTRMO	DSHTERM
88	#62	0	0	16	0	??	240	0	40	88	J ID	IODSTRMO	DSHTERM
100	8	0	0	16	0	10	960	0	40	100	JAID	HIOTERM1	ATPTERM
101	8	1	0	16	0	10	960	0	40	101	JAID	HIOTERM1	ATPTERM
102	8	2	0	16	0	10	960	0	40	102	JAID	HIOTERM1	ATPTERM
103	8	3	0	16	0	10	960	0	40	103	JAID	HIOTERM1	ATPTERM
104	8	4	0	16	0	10	960	0	40	104	JAID	HIOTERM1	ATPTERM
105	8	5	0	16	0	10	960	0	40	105	JAID	HIOTERM1	ATPTERM
106	8	6	0	16	0	10	960	0	40	106	JAID	HIOTERM1	ATPTERM
107	8	7	0	16	0	10	960	0	40	107	JAID	HIOTERM1	ATPTERM
108	8	8	0	16	0	10	960	0	40	108	JAID	HIOTERM1	ATPTERM
109	8	9	0	16	0	10	960	0	40	109	JAID	HIOTERM1	ATPTERM
110	8	10	0	16	0	10	960	0	40	110	JAID	HIOTERM1	ATPTERM
111	8	11	0	16	0	10	960	0	40	111	JAID	HIOTERM1	ATPTERM
112	8	12	0	16	1	10	960	0	40	112	JAID	HIOTERM1	MODEM
113	8	13	0	16	0	10	960	0	40	113	JAID	HIOTERM1	ATPTERM
114	8	14	0	16	0	10	960	0	40	114	JAID	HIOTERM1	ATPTERM
115	8	15	0	16	0	10	960	0	40	115	JAID	HIOTERM1	ATPTERM
116	8	16	0	16	0	10	960	0	40	116	JAID	HIOTERM1	ATPTERM
117	8	17	0	16	0	10	960	0	40	117	JAID	HIOTERM1	ATPTERM
118	8	18	0	16	0	10	960	0	40	118	JAID	HIOTERM1	ATPTERM
119	8	19	0	16	0	10	960	0	40	119	JAID	HIOTERM1	ATPTERM
120	8	20	0	16	0	10	960	0	40	120	JAID	HIOTERM1	ATPTERM
121	8	21	0	16	0	10	960	0	40	121	JAID	HIOTERM1	ATPTERM
122	8	22	0	16	0	10	960	0	40	122	JAID	HIOTERM1	ATPTERM
123	8	23	0	16	0	10	960	0	40	123	JAID	HIOTERM1	ATPTERM

047037-11

SOFTWARE INSTALLATION PROCEDURES FOR SERIES 64/68

NOTE

The following procedures assume that the ATP software has been integrated into the Series 64/68 Master Installation Tape (MIT).

After the ATP hardware has been installed, all that needs to be done is to configure the appropriate number of ports for the user's requirements during a RELOAD or a COOLSTART from the MIT. Once this has been completed, have the customer perform a 0 date SYSDUMP to protect his I/O configuration and initial software installation.

Insert the appropriate key into the Key Switch and turn it to the CONTROL position on the PCM (see Figure 2-7). For detailed information, see Series 64 Installation Manual, p/n 30140-90007.

- a. Enter CONTROL B. The system will respond with a (C>) prompt.
- b. Verify the banner for the correct IMB number, CHANNEL number, and DEVICE number of the magnetic tape drive. It is the top line, inverse video (LOAD X,XX,X).
- c. Enter LOAD. The system will respond with the following messages:
LOADING INIT/IDENT MICROCODE
LOADING DEVICE MICROCODE
LOADING SYSTEM MICROCODE
(SYSTEM IDENTIFICATION)
WHICH OPTION-COLDSTART/RELOAD/UPDATE? (RELOAD)
WHICH OPTION SPREAD/COMPACT/RESTORE/ACCOUNTS/
NULL? (CR)
- d. Answer the following questions as indicated: (For more information, see System Supervisor/System Manager Reference Manual (p/n 30000-90014), or MPE V System Operation and Resource Management Reference Manual (p/n 32033-90005)).

NOTE

Answers are in parenthesis. Also, the DRT# is calculated as follows: $(IMBI \times 128) + (CHANNEL\# \times 8) + DEVICE\# = DRT$. Where: IMBI = 0 or 1 (first IMBI always 0) CHAN# = 1 or 4 (1 is the first ATP subsystem and 4 is the second ATP subsystem installed) DEVICE# = always 0.

Table 2-4. I/O Configuration for Series 64

LOG DEV #	DRT #	U . N I T	C H A P T E R	T Y P E	SUB	TERMINAL TYP	SPE	PRO	REC WIDTH	OUTPUT DEV	MODE	DRIVER NAME	DEVICE CLASSES
1	25	0	0	0	9				128	0		HIOMDSC1	DISC SPOOL SYSDISC
2	26	0	0	0	9				128	0		HIOMDSC1	DISC SPOOL SDISC
3	25	1	0	0	9				128	0		HIOMDSC1	DISC SPOOL
4	26	1	0	0	9				128	0		HIOMDSC1	DISC SPOOL
5	26	2	0	0	8				128	0		HIOMDSC1	DISC SPOOL SDISC PVDISC
6	24	0	0	32	2				66	0	S	HIOLPRT2	LP EPOC PP SMALLPAP SLOWLP
7	17	0	0	24	0				128	0		HIOTAPE0	TAPE DDUMP
8	17	1	0	24	0				128	0		HIOTAPE0	TAPE
9	17	2	0	24	15				128	0		HIOTAPE0	TAPE TAPE9
10	17	3	0	24	0				40	LP	J	HIOTAPE0	JOBTAPE
20	8	0	0	16	0	10	960	0	40	20	JAID	HIOTERM1	ATPTERM
21	8	1	0	16	0	10	960	0	40	21	JAID	HIOTERM1	ATPTERM
22	8	2	0	16	0	10	960	0	40	22	JAID	HIOTERM1	ATPTERM
23	8	3	0	16	0	10	960	0	40	23	JAID	HIOTERM1	ATPTERM
24	8	24	0	16	0	10	960	0	40	24	JAID	HIOTERM1	ATPTERM
25	8	4	0	16	0	10	960	0	40	25	JAID	HIOTERM1	ATPTERM
26	8	6	0	16	0	10	960	0	40	26	JAID	HIOTERM1	ATPTERM
27	8	7	0	16	0	10	960	0	40	27	JAID	HIOTERM1	ATPTERM
28	8	8	0	16	0	10	960	0	40	28	JAID	HIOTERM1	ATPTERM
29	8	9	0	16	0	10	960	0	40	29	JAID	HIOTERM1	ATPTERM
30	8	10	0	16	0	10	960	0	40	30	JAID	HIOTERM1	ATPTERM
31	8	11	0	16	0	10	960	0	40	31	JAID	HIOTERM1	ATPTERM
32	8	12	0	16	0	10	960	0	40	32	JAID	HIOTERM1	ATPTERM
33	8	13	0	16	0	10	960	0	40	33	JAID	HIOTERM1	ATPTERM
34	8	14	0	16	0	10	960	0	40	34	JAID	HIOTERM1	ATPTERM
35	8	15	0	16	0	10	960	0	40	35	JAID	HIOTERM1	ATPTERM
36	8	16	0	16	0	10	960	0	40	36	JAID	HIOTERM1	ATPTERM
37	8	17	0	16	0	10	960	0	40	37	JAID	HIOTERM1	ATPTERM
38	8	18	0	16	0	10	960	0	40	38	JAID	HIOTERM1	ATPTERM
39	8	19	0	16	0	10	960	0	40	39	JAID	HIOTERM1	ATPTERM
40	8	20	0	16	0	10	960	0	40	40	JAID	HIOTERM1	ATPTERM
41	8	21	0	16	0	10	960	0	40	41	JAID	HIOTERM1	ATPTERM
42	8	22	0	16	0	10	960	0	40	42	JAID	HIOTERM1	ATPTERM
43	8	23	0	16	0	10	960	0	40	43	JAID	HIOTERM1	ATPTERM
44	8	24	0	16	0	10	960	0	40	44	JAID	HIOTERM1	ATPTERM
45	8	25	0	16	0	10	960	0	40	45	JAID	HIOTERM1	ATPTERM
46	8	26	0	16	0	10	960	0	40	46	JAID	HIOTERM1	ATPTERM
47	8	27	0	16	0	10	960	0	40	47	JAID	HIOTERM1	ATPTERM
48	8	28	0	16	0	10	960	0	40	48	JAID	HIOTERM1	ATPTERM
49	8	29	0	16	0	10	960	0	40	49	JAID	HIOTERM1	ATPTERM
50	8	30	0	16	0	10	960	0	40	50	JAID	HIOTERM1	ATPTERM
51	8	31	0	16	0	10	960	0	40	51	JAID	HIOTERM1	ATPTERM
52	8	32	0	16	0	10	960	0	40	52	JAID	HIOTERM1	ATPTERM
100	27	0	0	17	3				0			IOINPO	INP1
101#100	0	0	41	0					128	0	I	IODSO	DAG DAGGWOOD
102#100	0	0	16	0		10	240	0	40	102	JAID	IODSTRMO	DAGTERM
103#100	0	0	16	0		10	240	0	40	103	JAID	IODSTRMO	DAGTERM
104#100	0	0	16	0		10	240	0	40	104	JAID	IODSTRMO	DAGTERM
105#100	0	0	16	0		10	240	0	40	105	JAID	IODSTRMO	DAGTERM
106#100	0	0	16	0		10	240	0	40	106	JAID	IODSTRMO	DAGTERM
107#100	0	0	16	0		10	240	0	40	107	JAID	IODSTRMO	DAGTERM
108#100	0	0	16	0		10	240	0	40	108	JAID	IODSTRMO	DAGTERM
109#100	0	0	16	0		10	240	0	40	109	JAID	IODSTRMO	DAGTERM
110#100	0	0	16	0		10	240	0	40	110	JAID	IODSTRMO	DAGTERM
111#100	0	0	16	0		10	240	0	40	111	JAID	IODSTRMO	DAGTERM
112#100	0	0	16	0		10	240	0	40	112	JAID	IODSTRMO	DAGTERM
113#100	0	0	16	0		10	240	0	40	113	JAID	IODSTRMO	DAGTERM
114#100	0	0	16	0		10	240	0	40	114	JAID	IODSTRMO	DAGTERM
115#100	0	0	16	0		10	240	0	40	115	JAID	IODSTRMO	DAGTERM
116#100	0	0	16	0		10	240	0	40	116	JAID	IODSTRMO	DAGTERM

047037-10

Installation

ANY CHANGES? (YES)
LOAD MAP? (CR)
SYSTEM ID=ICF/55 C.XX.XX? (CR)
MEMORY SIZE=512.? (CR)
I/O CONFIGURATION CHANGES? (YES)
LIST I/O DEVICES? (YES)
LIST CS DEVICES? (CR)
HIGHEST DRT=127. (CR)
* LOGICAL DEVICE NUMBER? (ENTER UNIQUE LDEV#)
DRT NUMBER? (ENTER APPROPRIATE DRT#)
UNIT NUMBER? (ENTER A UNIQUE UNIT NUMBER FROM 0-95)
SOFTWARE CHANNEL NUMBER? (0)
TYPE? (16 (Terminal) OR 32 (Remote) (REMOTE SPOOLED
PRINTER))
SUB TYPE? (0)
TERM TYPE? (PICK APPROPRIATE TERM TYPE (For systems running
on MPE V (Version G.00.00 or later) the prompt
will be:
ENTER [TERMTYPE #], [DESCRIPTOR FILENAME] ?
SPEED IN CHARACTERS PER SECOND? (ENTER APPROPRIATE SPEED)
PROTOCOL? (CR) (NOT APPLICABLE FOR ASYNCHRONOUS DEVICES
AS INDICATED BY TYPE ENTRY)
RECORD WIDTH? (40 OR 66 (REMOTE SPOOLED PRINTER))
OUTPUT DEVICE? (ENTER SAME LDEV AS ABOVE OR "0" FOR
PRINTERS)
ACCEPT JOB/SESSIONS? (YES)
ACCEPT DATA? (YES)
INTERACTIVE? (YES)
DUPLICATIVE? (YES)
INITIALLY SPOOLED? (CR)
DRIVER NAME? HIO ?
DEVICE CLASSES? (ENTER ANY 8 CHARACTER NAME)

- * Once you have completed entering the I/O Configuration information for all devices, ensure that the maximum data segment size is large enough to accommodate the required number of TBUFS/LDEVs configured. Use the following algorithm to compute the maximum data segment size:

$$\text{MAXDATASEG} - (\text{TDSOVRHD} + (\#\text{LDEV} * 26) + (\#\text{PORTS} * 138)) =$$
$$\text{TBUFAREA} / 69 = \#\text{TBUF ENTRIES POSSIBLE}$$

MAXDATASEG - Initialization procedure automatically obtains an extra data segment size of 32760. If memory is fragmented, the ATP initialization procedure will obtain something smaller but not necessarily large enough to contain all requested TBUFS. In this instance, a message is outputted to the console informing the user of this situation.

TDSOVRHD - THE TERMINAL DATA SEGMENT (TDS) OVERHEAD IN WORDS
CURRENTLY = 1249 WORDS.

TBUFAREA - THE AREA REMAINING IN THE TDS THAT MAY BE ASSIGNED
TO THE TBUF ENTRIES OF 69 WORDS EACH.

ATP I/O CONFIGURATION CONSIDERATIONS

The following considerations support the maximum performance of an ATP subsystem in a Series 44/64 operating system environment:

- a. Configure in 1 timer per port. Not enough timers will cause hangs or halts after date and time.
- b. Configure 5 TBUFS per port for a minimum of 24 ports to support faster data transfer rates within the system. Four TBUFS per port are recommended for configured ports 24 through 50; 3 TBUFS per port are recommended for over 50 ports configured. The default automatically configured is 24 TBUFS.

INSTALLATION VERIFICATION PROCEDURES

The following procedures are applicable for the Series 44/48 and the Series 64/68. (TERMDSM.PUB.SYS should be used with systems that are currently running with MPE V (version G.00.00 or later) operating system. If you are on MPE V (version E.00.00 or F.00.00 or earlier) refer to ATPDSM.PUB.SYS).

- a. Run the ATPDSM/TERMDSM diagnostic program by entering the following:

```
RUN ATPDSM.PUB.SYS or RUN TERMDSM.PUB.SYS
```

The system responds with a (->) prompt.

- b. Enter BROKEN (cr). The system responds by outputting all LDEV numbers which have their BROKEN or UNFIXABLE bit set in their associated Logical Monitor DIT.

If an LDEV has its UNFIXABLE bit set, there is probably an I/O configuration problem (i.e, unit # is greater than 127, wrong driver name configured, more than one LDEV configured for a particular port (unit #), non responding modem port MSC).

If an LDEV has its BROKEN bit set, one of the following problems may have occurred:

- Port configured on a missing AIB, unfixable
- ATP initiator program can't build the ATP data segment, unfixable
- Self test on PCC failed, unfixable
- Can't get to the speed sense state for this port, not enough timers. Correct this problem by adding more timers.

- c. If UNFIXABLE bit set, re-verify and correct the I/O configuration for terminal I/O.

MULTIPLE ATP INSTALLATIONS

For additional data communication capability, two ATP subsystems can be installed in an HP 3000 Series 64 Computer System. Due to space limitations within the card cage, only a partial ATP subsystem (one SIB and five AIB's) can be installed in the HP 3000 Series 44.

After the first ATP subsystem has been installed, subsequent ATP subsystems are installed by following the same procedures as outlined in the previous paragraphs in this section. Any available card slot within the specified range can be used, since each ATP's address is determined by the setting of its thumbwheel switch, rather than by the card slot it occupies.

LIST OF SUPPORTED TERMINALS

- 2382
- 262x series
- 2631B
- 2635 series
- 264x series (except 2641 APL)
- 375x series

LABEL INSTALLATION

Packaged with the AIB are sheets of labels which are to be attached to the Port Connector cable hood and the Mini-Boards. Each label is to be placed on a specific piece of hardware as is explained below.

"ATP-AIB/Junction Panel Cable" is printed onto the port connector cable hood which is on the AIB.

AIB# 0, CH. UNIT# 0-11 label, (p/n 7121-2442) is to be placed below the above mentioned label on the port connector cable hood. This designates which AIB number the thumbwheel is set on and which channels it controls.

The three remaining sheets, (p/n's 7121-2438, 7121-2439, 7121-2440) are to be placed on the mini-boards to correspond to the SIB number, the AIB number and the port numbers being used.

This section contains general servicing information for the Advanced Terminal Processor. This information includes safety precautions, repair philosophy, maintenance aids, use of the self-test capability, troubleshooting, and field-level repair.

SAFETY PRECAUTIONS

Whenever the ATP printed circuit assemblies are installed or removed, ensure that the computer system's **PROCESSOR/POWER SUPPLY BREAKER** switch is set to **OFF**.

Whenever the ATP boards are being connected or disconnected to the Modem Port Connector Assembly (by attaching or removing the AIB to Modem Port Connector interconnecting cable), ensure that the Port Connector power-switch is set to **OFF** and that the modem power is also turned off.

Be particularly cautious when selecting the routing for the longer lengths of the interconnecting data cables. **DO NOT** run these cables outdoors! Indoor routing must be planned to avoid sources of electrical "noise", such as arc welders.

Failure to observe these precautions could result in damage to the components of the computer system, the ATP, and/or the modem.

REPAIR PHILOSOPHY

Field repair of the ATP is done by replacing the AIB, SIB, Port Connector Assembly boards, and associated cabling. When troubleshooting procedures have verified a board malfunction, remove the defective board from the system and replace the board as described in the field replacement section. The AIB and SIB are exchange assemblies, the remaining ATP components are throw away assemblies. To exchange an ATP component, remove it from the system and prepare it for reshipment to Hewlett-Packard in accordance with the reshipment instructions section of this manual.

MAINTENANCE AIDS

The ATP consists of more than just the apparent hardware. It is actually a sophisticated system of both hardware and software. To support such a system, a support package has been provided for verification and troubleshooting. This support package (p/n 30144-67801) consists of the following:

- 1 AIB Loopback Test Hood Part Number 31045-60005
- 12 HP-DC A Loopback Test Hoods Part Number 30147-60002
- 12 HP-DC B Loopback Hoods Part Number 30148-60002
- 12 HP Modem B Loopback Test Hoods Part Number 30146-60002

Table 3-1. Troubleshooting Flow Chart

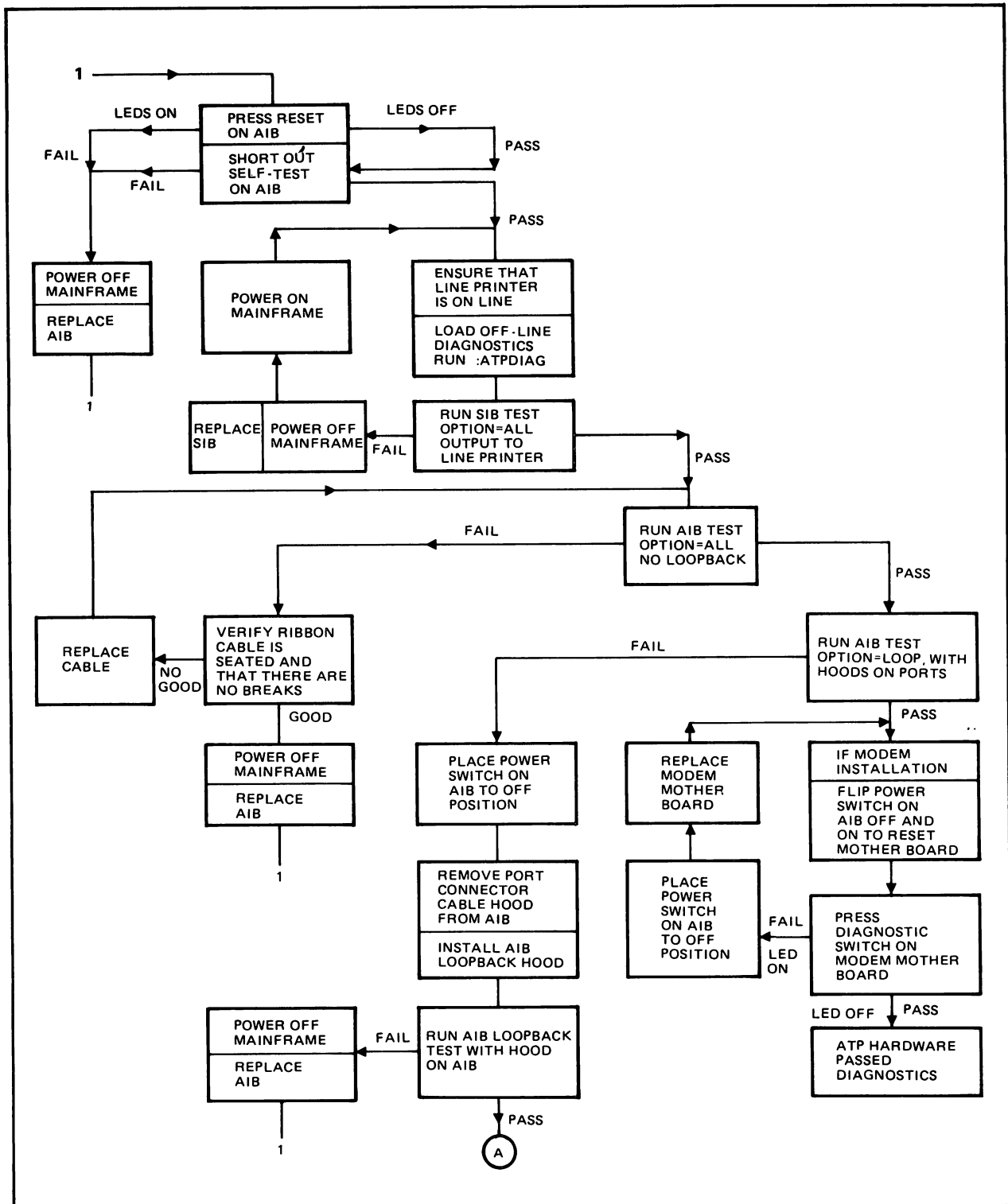


Table 3-1. Troubleshooting Flow Chart (cont.)

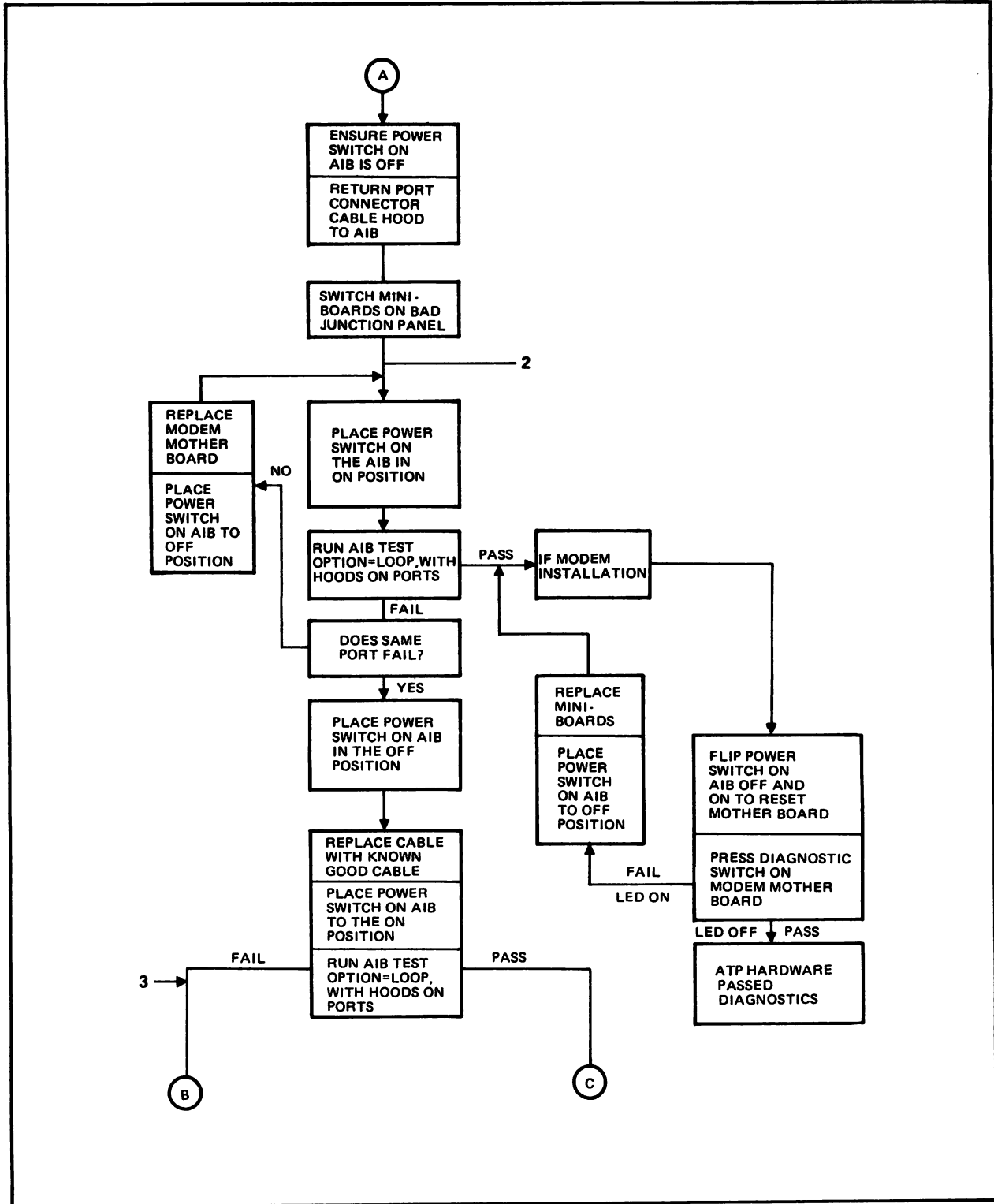
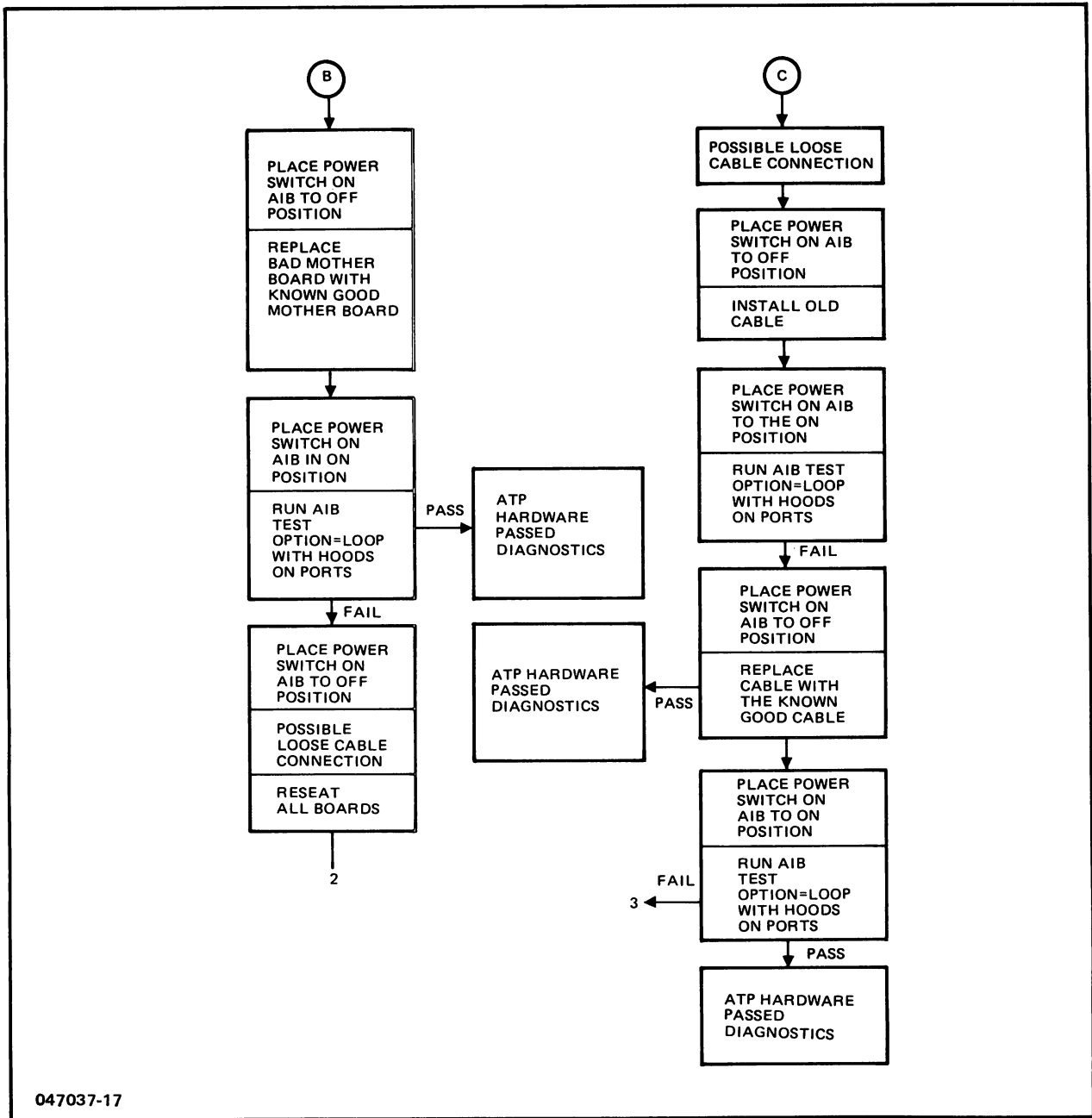


Table 3-1. Troubleshooting Flow Chart (cont.)



047037-17

FIELD LEVEL REPAIR

Replacement of the SIB and AIB Boards

When the troubleshooting procedures indicate the need for replacement of the ATP boards, proceed as follows:

- a. Ensure that the system operator has backed up the system files before beginning this procedure.
- b. Turn off the power.

On the HP 3000 Series 44/48, set the PROCESSOR switch (located on the side panel beneath the desk-top of the mainframe, as shown in Figure 2-4) to the OFF position.

On the HP 3000, Series 64/68, set the POWER SUPPLY BREAKER switch as shown in Figure 2-7) to the OFF position.

CAUTION

Power must be off when inserting or removing any device or card in the system.

- c. When replacing the Ribbon Cable, disconnect both ends from the edge of SIB and AIB board.
- d. When replacing the SIB or AIB, disconnect the cable hood connector and the Ribbon Cable connector from the edge of the SIB or AIB board.
- e. Remove the SIB (p/n 30144-60001) or the AIB (p/n 30145-60001), from the computer card cage.
- f. Install the factory replacement SIB or AIB board in the same slot in the computer card cage, using the procedure described under "Hardware Installation Procedures" in Section II. Make sure that the replacement board switch settings are identical to those being replaced. Install the new Ribbon Cable in the same manner.
- g. Verify that the ATP subsystem is now working properly as described under "Hardware Installation Verification" in Section II.

Replacement of Mother Boards, Mini Boards and Port Connector Cables

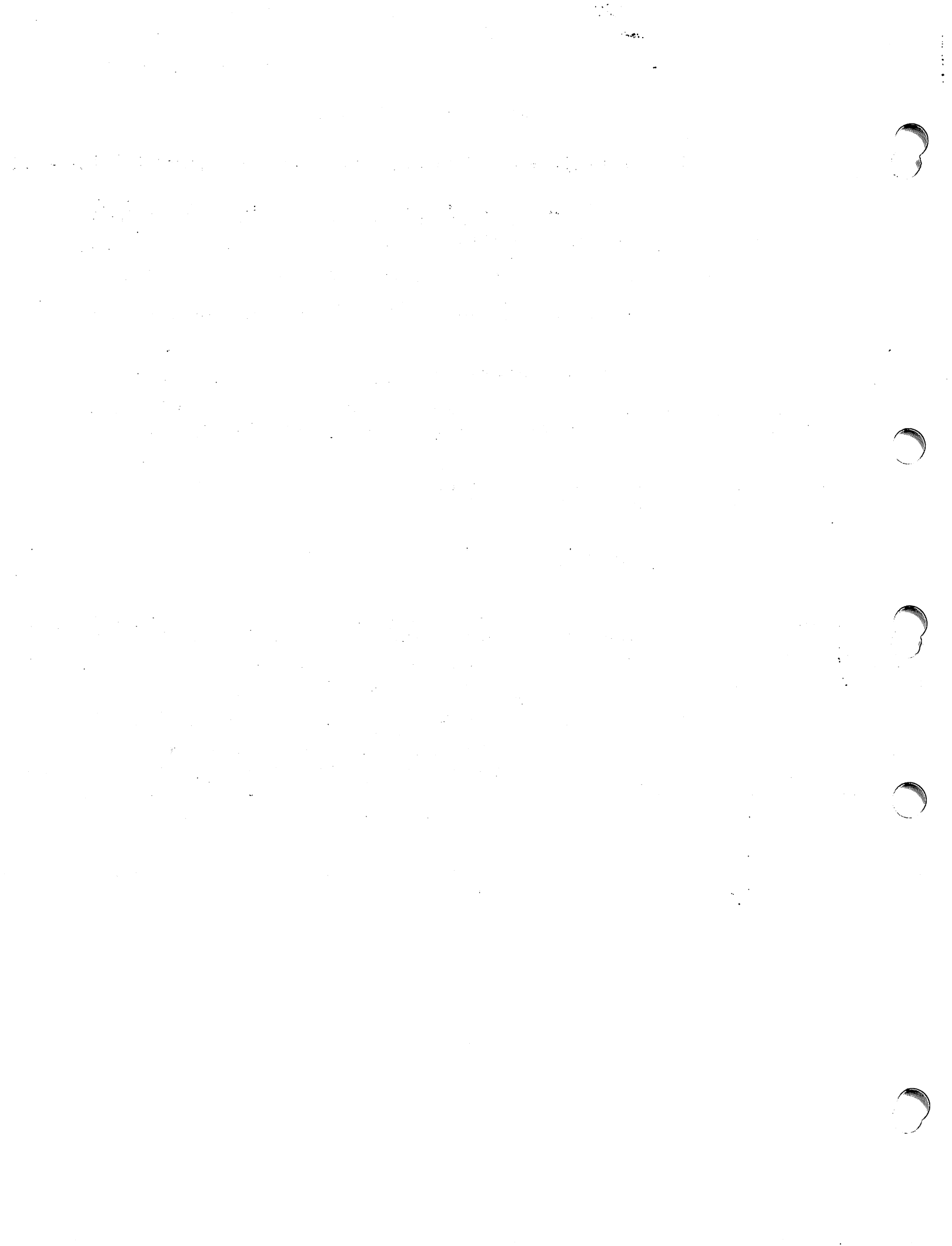
When the troubleshooting procedures indicate the need for replacement of the Mother Board, Mini-Board or Port Connector cable, proceed as follows:

- a. Ensure that the system operator has backed up the system files before beginning this procedure.
- b. Power OFF the Port Connector Assemblies via the power switch on the appropriate AIB(s), (see Figure 2-14).
- c. Remove the malfunctioning component from the junction panel.
- d. Install the factory replacement Mother Board, Mini-Board, or Port Connector cable into the same location from where it was removed, using the procedure described under "Hardware Installation Procedures" in Section II.
- e. Verify that the ATP subsystem is now working properly as described under "Hardware Installation Verification" in Section II.

RESHIPMENT INSTRUCTIONS

When shipping the ATP boards to Hewlett-Packard for service or repair, attach a tag to each item identifying the owner and indicating the type of service or repair to be accomplished. Include the part number and date code of each item.

Package the item(s) in the original factory packaging material, if available. If the original packaging material is not available, standard factory packaging material can be obtained from the nearest Hewlett-Packard Sales and Service Office. If standard packaging material is not available, wrap the item(s) in suitable cushioning material (ESD protected bags only-nickel plated or pink polyurethane) and place the item(s) in a corrugated carton (200 pound test material). Seal the carton securely and mark it FRAGILE to ensure careful handling.



The specification requirements for building a RS-232-C three conductor shielded and jacketed cable are listed below:

Third Party Compliance

- (1) U. L. Style 2464
- (2) U. L. Style 1061 VW-1, individual conductors
- (3) CSA AWM-SR PVC, individual conductors

Electrical

- (1) Voltage Rating: 300V at 80 degrees C (1000 V rms test between conductors and conductors to shield).

Mechanical

- (1) Singles: Three, 24 (7x32) AWG tinned copper.
Insulation: PVC, 0.009 in. minimum average wall thickness.
Colors: Blue, gray, white.
Cable Lay: Twist Singles in above sequence for flexibility.

Shield

- (1) Metallized polyester, metallization facing out.
- (2) Braid from 36 AWG tinned copper for 85% minimum coverage.

Jacket

- (1) PVC, 30 mil minimum wall thickness rated at 80 degrees C.

Wiring Diagrams

The specification requirements for building a RS-422 five conductor shielded cable:

Third Party Compliance

- (1) This cable shall meet the requirements of U. L. Style 2464 and EIA STD RS-422.

Electrical

- (1) Conductor resistance dc: <30 ohms/1000 ft.
- (2) Mutual Pair Capacitance: ≤ 20 pF/ft. between one wire, in a pair, to the other.
- (3) Stray Capacitance: ≤ 40 pF/ft. between one wire and all others in the cable with all others grounded.
- (4) Pair-to-Pair Balanced Crosstalk: >40 dB of attenuation at 150 kHz between one pair of wires and any other pair.
- (5) Voltage Rating: 300V rms @ 80 degrees C (1000V rms test between conductors and conductors to shield).

Mechanical

- (1) Singles: Two twisted pairs plus one single AWG 24 (7x32) tinned, stranded copper.
- (2) Insulation: Foamed polyethylene.
- (3) Colors: One conductor of each twisted pair shall be WHT, the other conductors to be BLK, BRN. The single conductor shall be RED.
- (4) Cable Lay: Twist the twisted pairs around the single for maximum flexibility.
- (5) Shield (Inner): Metallized polyester; metallization facing outward.
- (6) Shield (Outer): Braid from AWG 36 tinned copper for 85% minimum thickness.
- (7) Jacket: Polyvinyl chloride, 0.035 in. minimum wall thickness.

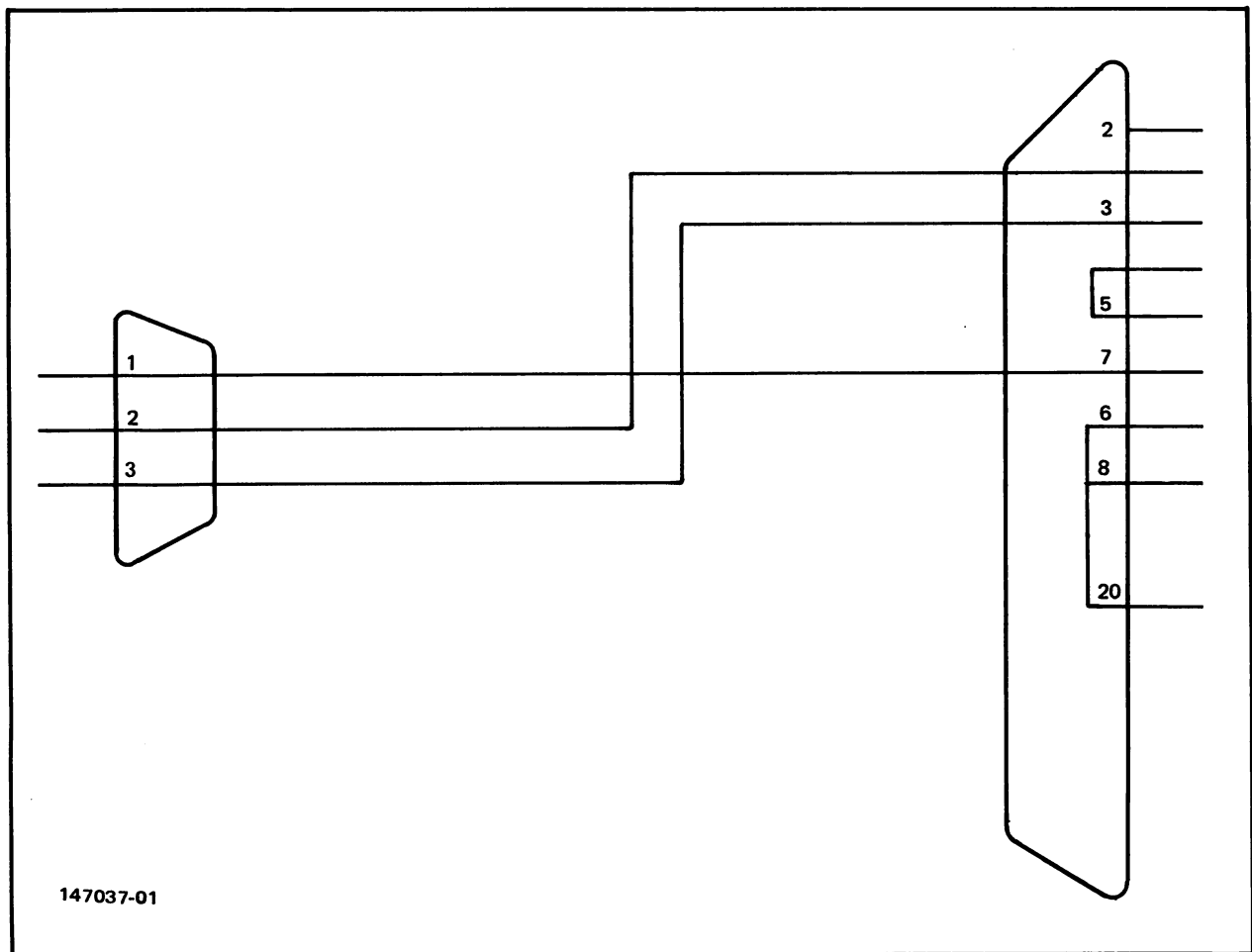


Figure A-1. Wiring Diagram for HP-DC B Adapter Cable

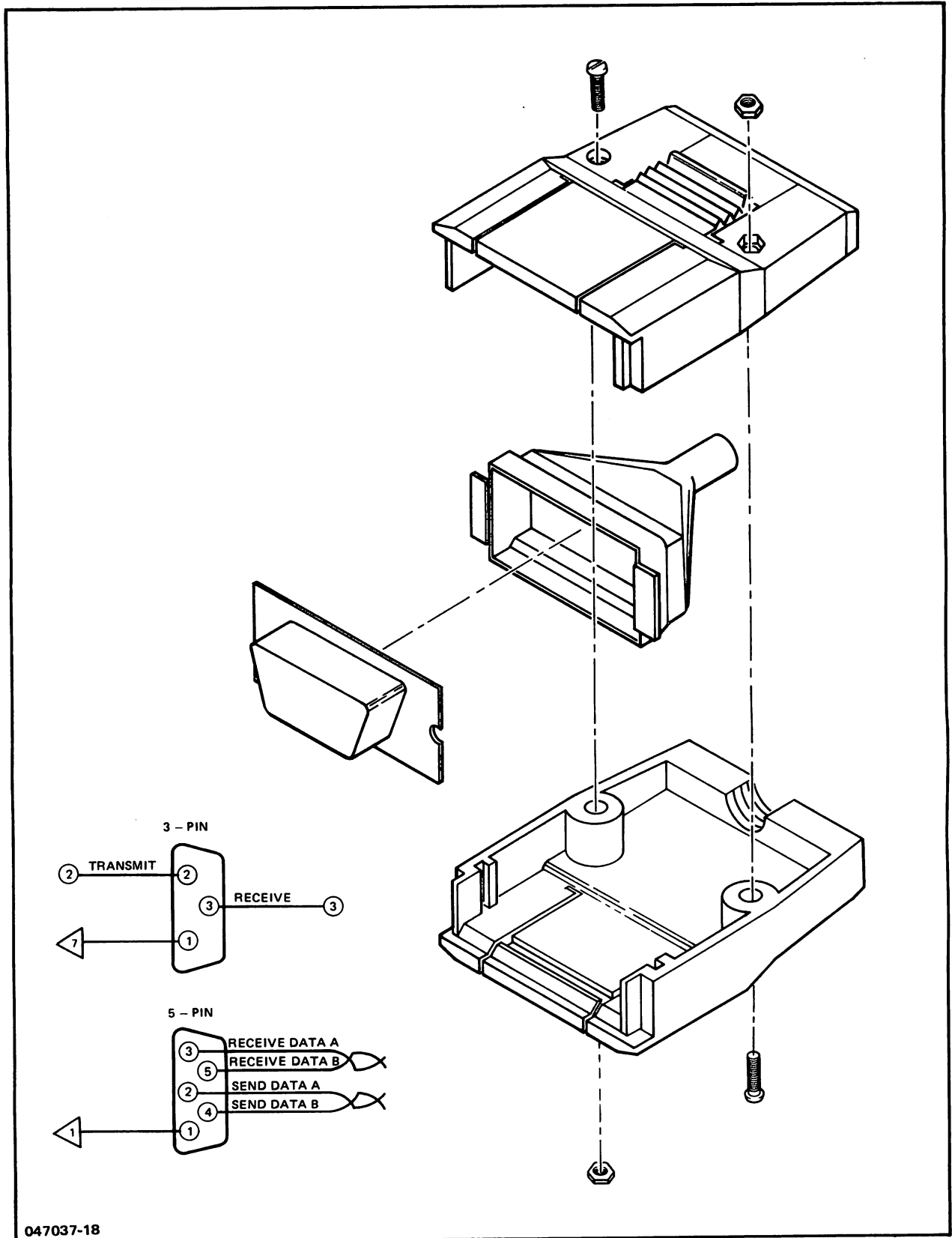


Figure A-2. Cable Wiring for HP-DC A and HP-DC B

INTRODUCTION

The ATP Remote Junction Box adds support of the ATP on the HP 3000 Series 39/40/42 and expands the ATP on HP 3000 Series 44/48 to include modems. This appendix provides installation information for installing the the junction box and for installing additional direct-connect and modem ports. In addition, by adding ADCCs and the junction box, up to 120 terminals may be configured on the Series 44/48.

The product structure is as follows:

30273A D.C. ATP Expansion Subsystem

- 001 Delete SIB (Series 44/48 only)
- 002 Replaces an RS-422 mini-board with an RS-232 mini-board
- 042 Series 39/40/42 Subsystem*
- 048 Series 44/48 Subsystem*

30274A Modem ATP Expansion Subsystem

- 001 Delete SIB (Series 44/48 only)
- 042 Series 39/40/42 Subsystem*
- 048 Series 44/48 Subsystem*

Options added to the existing AIB products

- 30145A and 30155A
- 042 Series 39/40/42 Subsystem*
- 048 Series 44/48 Subsystem*

*Defines the correct cable for the system that the unit is being installed on (must be specified).

CONFIGURATION INFORMATION

The ATP Remote Junction Box provides the capability of adding up to 48 ATP direct-connect ports or up to 24 modem ports per junction box. For the Series 48, two junction boxes may be installed, thereby doubling the direct-connect or modem capabilities.

Each junction box may be shipped with either all direct-connect ports, all modem ports, or a combination of the two. Direct-connect ports are packaged in modules of 12 and are mounted in a single cutout of the panel. Modem ports are packaged in modules of 12 but take up two cutout spaces on the panel.

CONFIGURATION LIMITATIONS

The following configurations are in addition to existing limitations imposed upon the HP 3000.

Series 39/40/42

- No more than four (4) AIB's may be installed.
- No more than two (2) AIB's may be installed for modem ports.

Series 44/48

- No more than eight (8) AIB's may be installed.
- No more than four (4) AIB's may be dedicated to modem ports.
- All of the ATP hardware must be in the first card cage.
- All of the system's memory must be installed in the second card cage.

+5V Power Supply Tolerance

The present tolerance for the +5V power supplies in the SPUs is +5(+/-0.10) volts. When a junction box is installed, the voltage must be adjusted to +5(+/-0.05)volts.

INSTALLING THE JUNCTION PANEL

To install the ATP Remote Junction Box (figure B-1), proceed as follows:

1. Inspect and unpack the junction box. (Refer to Section 2 of this manual for details.)
2. Remove the front panel of the junction box and verify that the correct number of direct-connect/modem ports are installed as ordered.

NOTE

You may receive ports that have been installed at the factory and also receive some ordered modules that are separately packaged and must be installed on site. If this occurs, refer to the add-on installation procedure before proceeding.

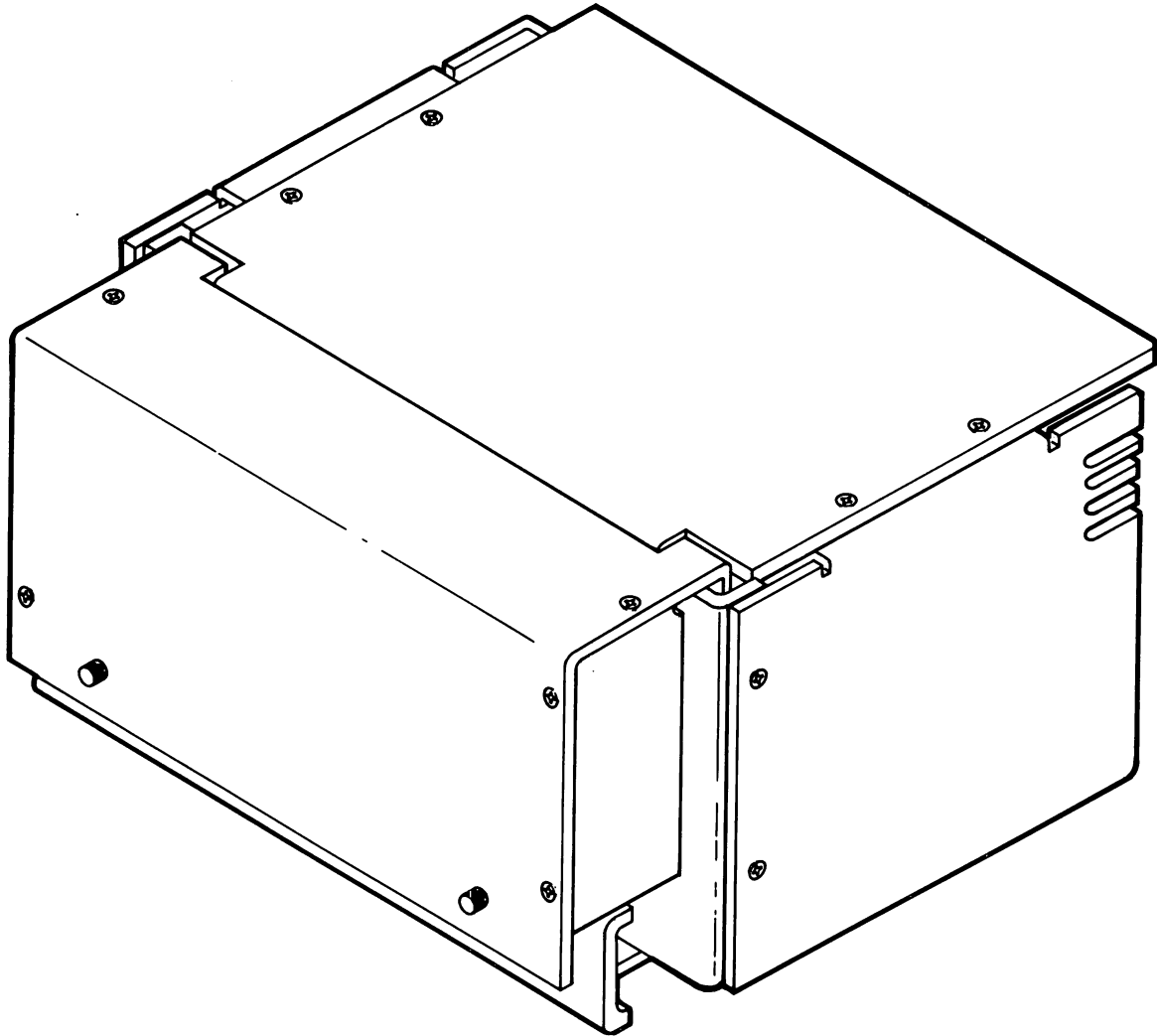


Figure B-1. Remote Junction Box

ATP Junction Box Installation

3. Shut power off on the SPU.
4. Route cable(s) from junction box to AIB(s) as appropriate.

For the Series 39/40/42, proceed as follows:

- a. On the SPU, set the POWER switch to off (0).
- b. Remove the rear cover of the SPU.
- c. Route the cable from the bottom up to the AIB(s). The card cage assignments may vary with each installation. Refer to the current configuration to determine the location of new board assignments or existing board relocation.
- d. Connect the cable to the AIB and then securely connect the grounding clamp to the ground bar on the bottom of the SPU. (See figure B-2.)
- e. Remove the front cover of the SPU.

For the Series 44/48, proceed as follows:

- a. On the SPU, set the power switch to off (0).
- b. Open the side junction panel door and rear card cage doors.
- c. Route the junction box cable(s) through a blank cutout, then under the card cage to the designated AIBs. (See figure B-3.)
- d. Connect the ground plate assembly securely to the screw holes at the cutout.

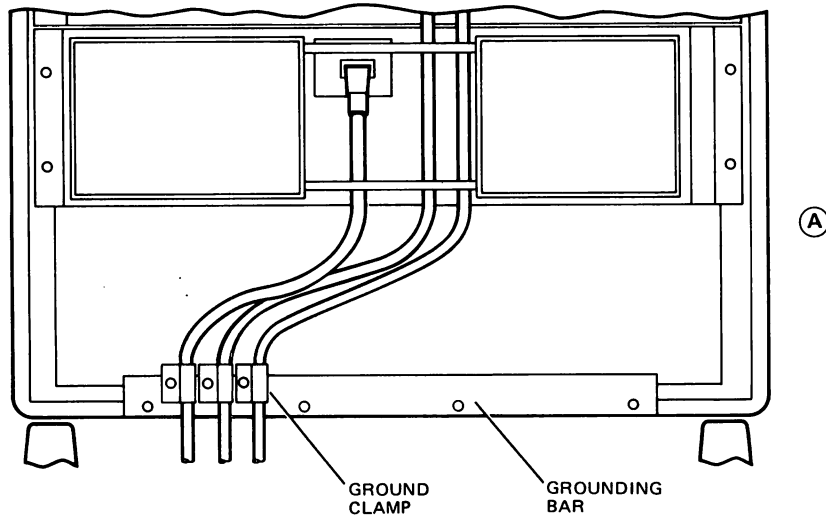
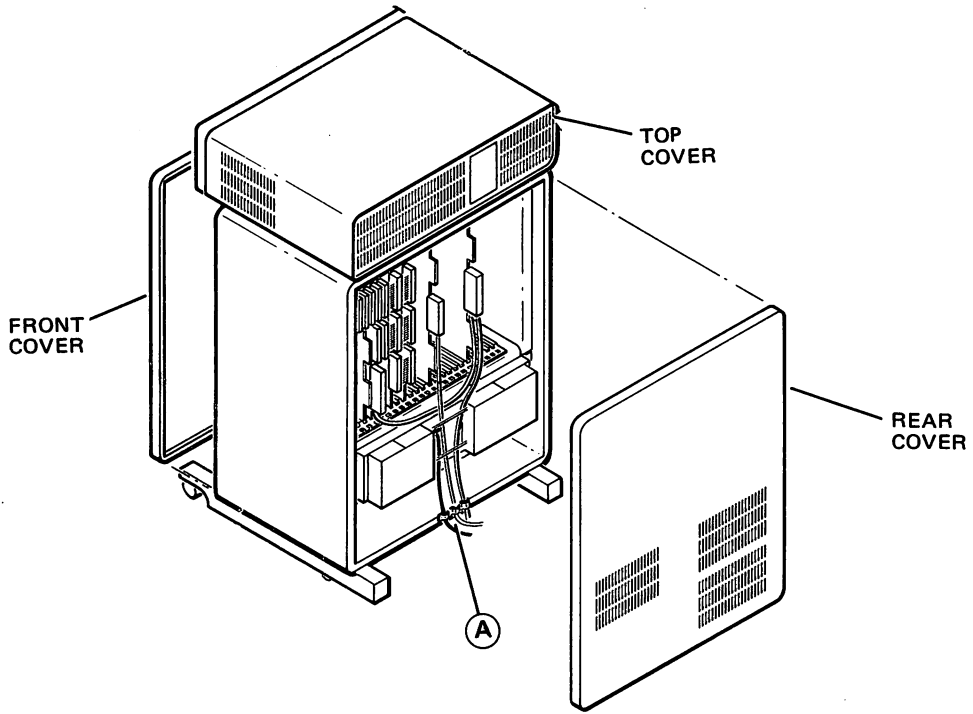


Figure B-2. Series 39/40/42 Cabling

ATP Junction Box Installation

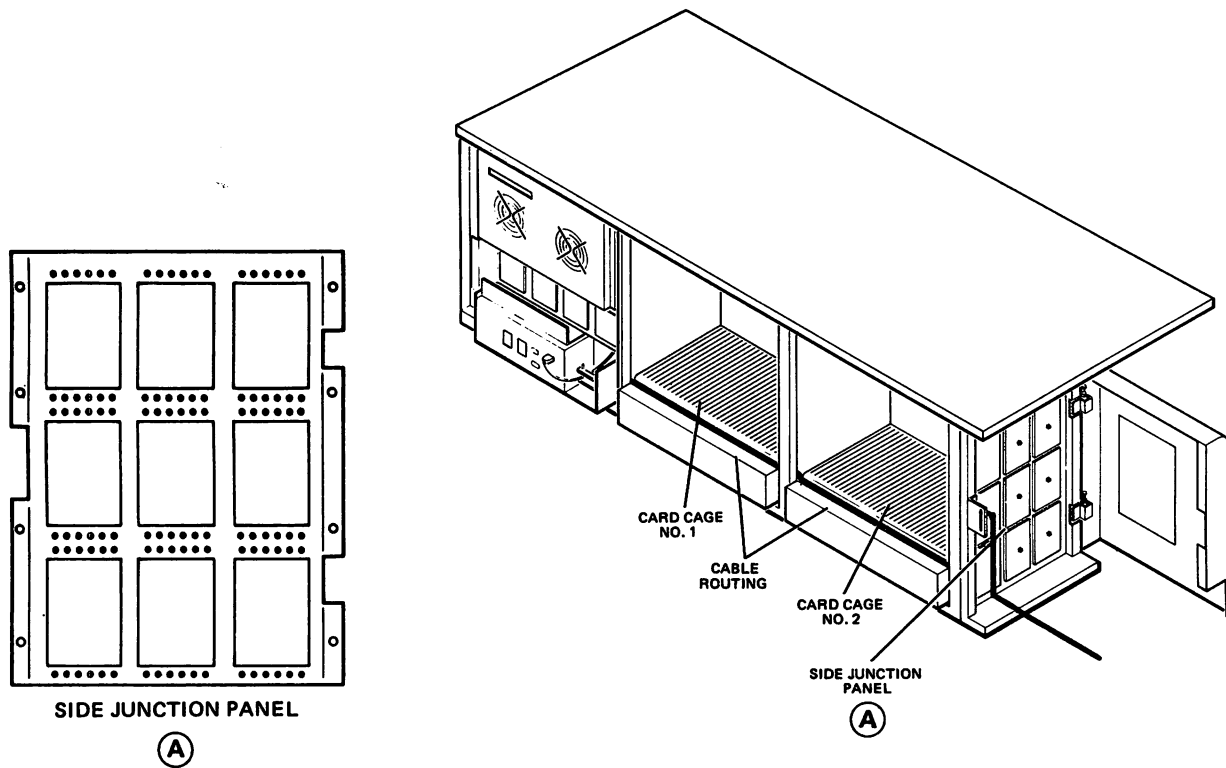


Figure B-3. Series 44/48 Cabling.

NOTE

When less than three cables are routed through a single cutout, the remaining blank space(s) must be closed with 1/3-size blank plates. Refer to Section 2.

- f. Set the POWER switch to on (1).

NOTE

To make the following measurement, an HP 3435 or HP 3436 multimeter, or an equivalent with an accuracy of 0.1% must be used.

5. On the backplane, measure the +5V. Adjust, as required, to +5 (+/-0.05) volts.
6. Configure all new devices so that newly installed terminals are operational.

ADDING DIRECT-CONNECT/MODEM PORTS TO THE JUNCTION BOX

Additional ports may be added to blank cutouts in the junction box. There are three possible arrangements in which ports are installed at the factory:

- All direct-connect ports
- All modem ports
- A combination of direct-connect and modem ports

For direct-connect ports, the first module is installed in the left-most cutout and additional modules are installed from the next blank left-side cutout. Four direct-connect modules can be installed per junction box. For modem ports, the first module is installed in the left-side two cutouts, and a second module in the right-side two cutouts. If there is a combination of the two, a direct-connect module would be installed in the left-side port and the modem module would be installed in the right two ports. This would leave the second cutout from the left blank and be available for one additional direct-connect module. As a general rule, all add-on direct-connect ports are mounted on the left side and the modem ports on the right side. This will avoid confusion that might arise from intermixing the port types. When the junction box is dedicated to one type of port or the other, the only rule that would apply is that all modules are installed beginning from the left.

NOTE

Before proceeding with an add-on installation of ports, review Section 2 of this manual. Installation procedures are given for mounting modules in the junction panels of the SPU's. This installation is the same as that for the junction box.

To install an additional module in the junction box, proceed as follows:

1. Shut power off to the SPU.
2. Inspect and unpack the module to be installed. (Refer to Section 2.)
3. Remove the front cover, top and rear panels of the junction box. (See figure B-4.)
4. Install the module in the appropriate slot as given in Section 2.
5. Route the cable out the rear of the junction box through the cable access slot, then securely connect the ground clamp to the bottom of the junction box.
6. Install the free end of the cable to the SPU as given in the the preceding installation procedure.
7. Replace the rear, top and front covers of the junction box.
8. Set the SPU POWER switch to on (1).

ATP Junction Box Installation

9. Measure and adjust the +5V supply, as necessary, to ensure that it reads is $+5(+/- 0.05)$ volts.
10. Configure the newly added terminals to ensure that they are operational.

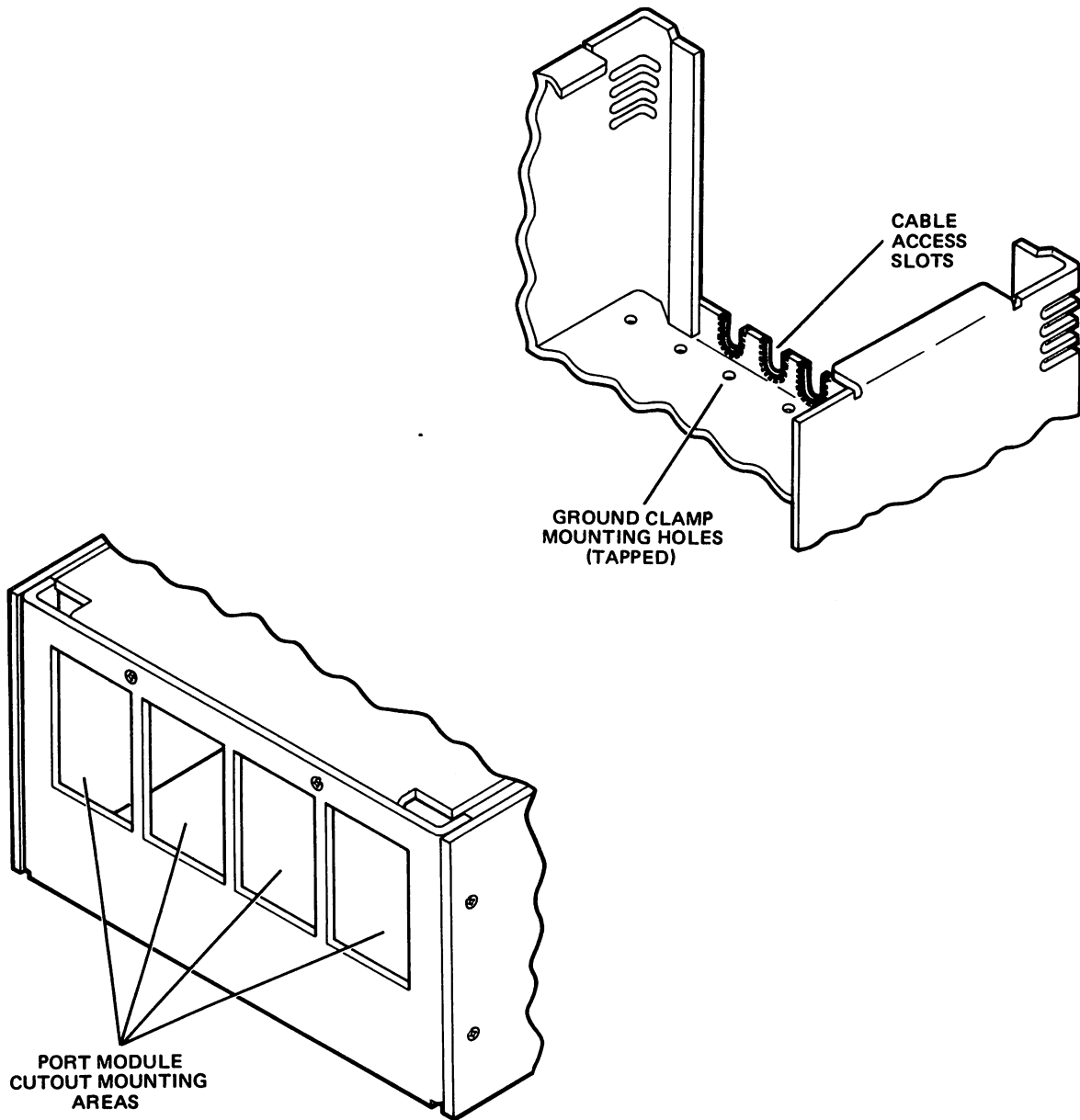


Figure B-4. Junction Box, Disassembled

CONFIGURING THE SERIES 44/48 FOR 120 TERMINALS

When configuring for 120 terminals, the PCAs must be properly configured in card cages 1 and 2. To relocate the PCAs, proceed as follows:

1. Whenever an AIB PCA with modem ports is installed, the memory controller and memory arrays must be moved from card cage 1 to card cage 2, as follows:

Memory Controller - memory slot 8, card cage 2

Memory Arrays - memory slot 9 through 16, card cage 2

2. For this configuration, there must be four ADCC MAINs and two ADCC EXTENDs (there cannot be three each). Install the ADCCs as follows:

ADCC MAIN - slot 14, card cage 1

ADCC MAIN - slot 2, card cage 2

ADCC EXTEND - slot 3, card cage 2

ADCC MAIN - slot 4, card cage 2

ADCC EXTEND - slot 5, card cage 2

ADCC MAIN - slot 6, card cage 2

NOTE

When GIC's are installed with the ADCC's in card cage 2, they must be installed in any order, except that the ADCC EXTEND's must be installed adjacent to the ADCC MAIN.

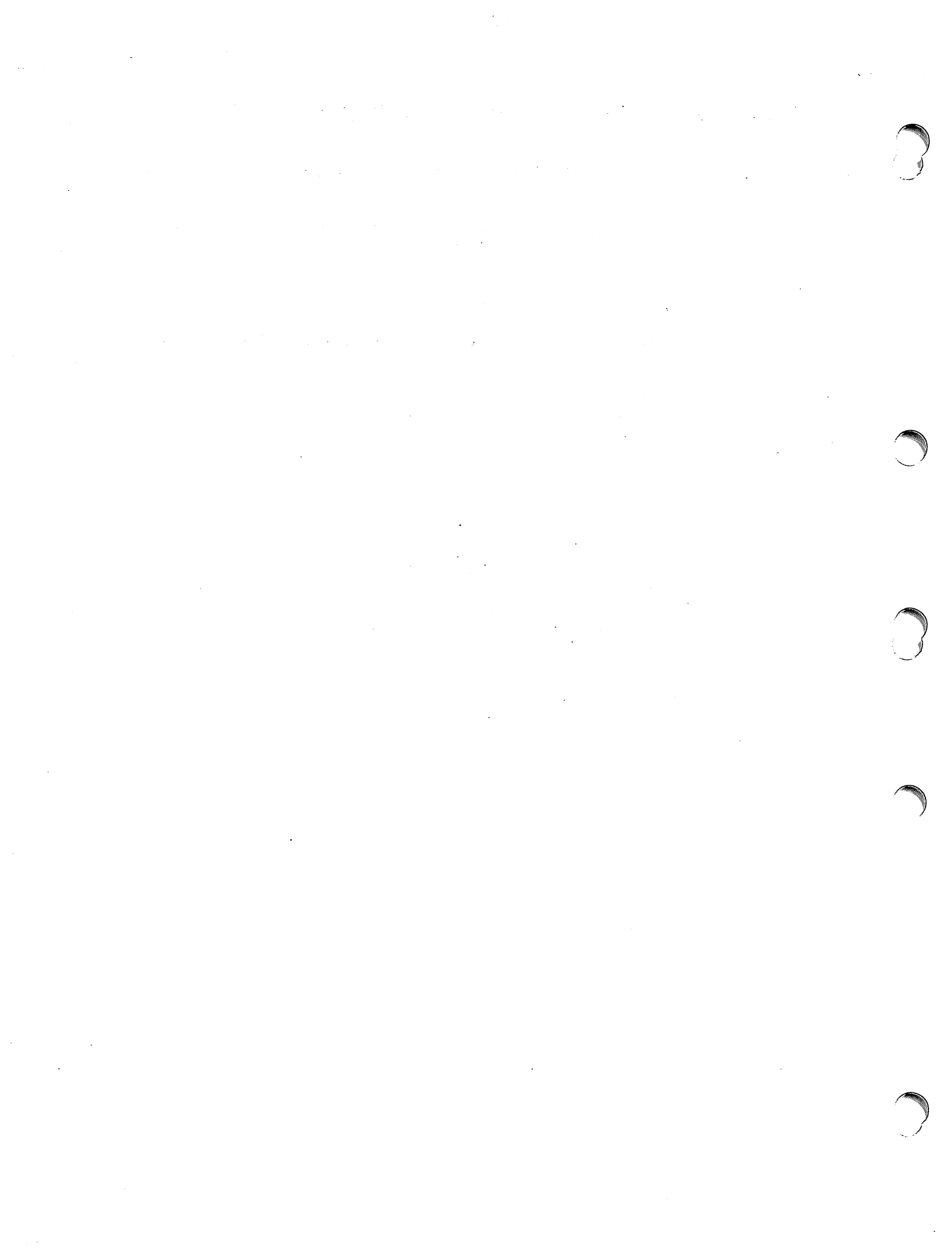
3. In card cage 1, install PCAs as follows:

ADCC MAIN - slot 14

GIC - - - - slot 15

SIB - - - - slot 16

AIB - - - slots 17-24



A

- AIB, Block Diagram, 1-3
- AIB Board Replacement, 3-6
- AIB, Installation of, Series 44, 2-7
- AIB Reset Test Switch, 2-28
- AIB Thumbwheel Switch Settings, 2-3
- Aids, Maintenance 3-2
- ATP Boards, Reshipment Instructions, 3-7
- ATP Driver, 1-2, 1-4
- ATP, Features of, 1-1
- ATP, Functional Description, 1-2
- ATP, Installation of, 2-1
- ATP Port Controllers, 1-2, 1-4, 1-6
- ATP Subsystems, Multiple Installation of, 2-34
- ATP, System Interface Board, 1-5
- ATP, Theory of operation, 1-1
- ATP, Thumbwheel Switch Settings, 2-3

B

- Block Diagram, AIB, 1-3
- Block Diagram, SIB, 1-2

C

- Cables, Interconnecting assemblies, 1-8, 1-9
- Cables, List of, 1-8
- Configuration Considerations, I/O, 2-33
- Configuration Dialogue, Series 64, 2-30, 2-32
- Contents of this manual, xi

D

- Data Rate, 1-12
- Direct Connect Port Connector Assembly, Components, 1-6, 1-7
- Direct Connect Port Connector Assembly, Installation of, Series 44, 2-6
- Direct Memory Access, (DMA), 1-6
- Driver, ATP, 1-4
- DUS, Loading for Verification, 2-24

E

- Equipment supplied, 1-6

F

Features of the ATP, 1-1
Field Level Repair, 3-6
Flow chart, troubleshooting, 3-3
Functional Description, 1-2

H

Hardware Installation Procedure for Series 44, 2-6
Hardware Installation Procedure for Series 64, 2-14
Hardware Installation Verification, 2-27
Hardware Module Interconnection, 1-5
Hoods, Loopback, 3-2

I

Installation, 2-1
Initial Inspection, 2-1
Installation of Direct Connect Port Connector Assembly, Series 44, 2-10
Installation of Direct Connect Port Connector Assembly, Series 64, 2-19
Installation of Junction Panels, 2-25
Installation of Modem Connect Port Connector Assembly, 2-23
Installation of Multiple Subsystems, 2-34
Installation of SIB, Series 44, 2-6
Installation of SIB, Series 64, 2-14
Installation of Software, Series 44, 2-28
Installation of Software, Series 64, 2-30
Installation, preparation for, 2-1
Installation Procedure, Hardware for Series 44, 2-6
Installation Verification, Hardware, 2-27
Installation Verification Procedures, 2-33
Interconnecting Cable assemblies, 1-8, 1-9
Interface Specifications, 1-10, 1-11
I/O Configuration Considerations, 2-33
I/O Configuration, Series 44, 2-29
Installation of AIB, Series 44, 2-7
Installation of AIB, Series 64, 2-17
I/O Configuration, Series 64, 2-31

J

Junction Panel, Installation of Port Connector Assembly, Series 44, 2-12
Junction Panel, Installation of Port Connector Assembly, Series 64, 2-20

L

Label installation, 2-34
 LED Indicators self-test, location of, 2-28
 List of illustrations, viii
 List of interconnecting cables, 1-8, 1-9
 List of items that comprise ATP, 1-7
 List of supported terminals, 2-34
 List of Tables, viii
 Location of AIB Self-Test Initiating Test Points, 2-28
 Location of POWER SUPPLY BREAKER switch on Series 64, 2-16
 Location of Processor switch on Series 44, 2-11
 Location of Self-Test LED indicators, 2-28
 Loopback Test Hoods, 3-2

M

Maintenance Aids, 3-2
 Manually initiating the self test, 2-27
 Meanings of self-test LED indicator patterns, 2-27
 Method of Field Level Repair, 3-6
 Mini-board, replacement of, 3-7
 Modem Connect Port Connector Assembly, Installation of, 2-2 4
 Modem Controller Chip, 1-4
 Modem Port Controller, components, 1-6
 Modem Scanner Chip, 1-4
 Modems supported, 1-13
 Mother Board, replacement of, 3-7
 Multiple ATP Installations, 2-34
 Multiplexor supported, 1-13

O

Operating Power, 2-2
 Organization of this manual, vii
 Overview of ATP operation, 1-1

P

Part numbers of ATP components, 1-7, 1-8
 Part numbers of interconnecting cables, 1-9, 1-10
 Part numbers of loopback hoods, 3-2
 Part numbers of referenced manuals, v
 Patterns, lighted self-test LEDs, meanings of, 2-28
 Philosophy, repair, 3-1
 Port Controller Cable, 1-4
 Port Controller Chip, 1-4
 Port Controllers, 1-5
 Power requirements, 2-2
 Power Supply Breaker Switch, Location of, 2-16
 Precautions, safety, 3-1
 Preparation for installation, 2-1
 PROCESSOR switch on HP 3000/44, location of, 2-11

R

Recommended sequence of troubleshooting procedures, 3-3
Recommended Thumbwheel switch settings, 2-3
Repairs, in the field, 3-6
Repair Philosophy, 3-1
Replacement of AIB, 3-6
Replacement of Mother Board, Mini-board, Port Controller Cable,
3-7
Replacement of SIB, 3-6
Requirements, power, 2-2
Reset Test Switch, AIB 2-24
Reshipment instructions, 3-7
Returning PCA boards to the factory, 3-7

S

Safety precautions, 3-1
Self-test initiating switch, location of, 2-5
Self-test LEDs, location of, 2-28
Sequence of troubleshooting procedures, recommended, 3-3
Setting the PCA thumbwheel switches, 2-3
Series 44, AIB Installation, 2-7
Series 44, Direct Connect Port Connector Assembly, Installation
of, 2-10
Series 44, Direct Connect Port Connector Assembly, parts, 2-10
Switch settings, AIB/SIB 2-6
Series 44 Hardware Installation Procedures, 2-6
Series 44, Processor Switch, location of 2-11
Series 44 Software Installation Procedure, 2-28
Series 44, SIB Installation, 2-6
Series 64, AIB Installation, 2-17
Series 64, Direct Connect Port Connector Assembly, Installation
2-19
Software Installation Procedure, Series 44, 2-28
Series 64 I/O Configuration, 2-29
Series 64, Modem Connect Port Connector Assembly, Installation,
2-24
Series 64, Power Supply Breaker switch, location of 2-16
Series 64, SIB Installation, 2-14
Series 64 Software Installation Procedure, 2-30
Shipping instructions, 3-7
SIB, Block Diagram, 1-3
SIB Board Replacement, 3-6
SIB Installation, Series 44, 2-6
SIB Thumbwheel Switch Settings, 2-4
Software Installation, 44: 2-28, 64: 2-30
Software Installation Procedure, Series 64, 2-30
Specifications of the ATP, 1-13
Supplemental manuals, vii
Supported Terminals, list of, 2-34
System Backup, Series 44 add-on only, 2-11
System Interface Board, 1-6

T

Theory of operation, 1-1
Thumbwheel Switch Settings, 2-3
Thumbwheel Switch Setting, AIB, 2-3
Thumbwheel Switch Setting, SIB, 2-4
Troubleshooting, 3-3
Troubleshooting flow chart, 3-3
Troubleshooting procedures, 3-3
Troubleshooting procedures, recommended sequence, 3-3
Troubleshooting, tools and tips, 3-1

U

Unpacking, 2-1

V

Verification, Installation Procedures, 2-27
Verification of Hardware Installation, 2-27
Verifying proper installation, 2-27
Voltage Requirements, 2-2



READER COMMENT SHEET

Distributed Systems Network

ADVANCED TERMINAL PROCESSOR (DSN/ATP) Installation Manual

30144-90002 May 1984

We welcome your evaluation of this manual. Your comments and suggestions help us to improve our publications. Please explain your answers under Comments, below, and use additional pages if necessary.

Is this manual technically accurate?

Yes No

Are the concepts and wording easy to understand?

Yes No

Is the format of this manual convenient in size, arrangement, and readability?

Yes No

Comments:

This form requires no postage stamp if mailed in the U.S. For locations outside the U.S., your local HP representative will ensure that your comments are forwarded.

FROM:

Date _____

Name _____

Company _____

Address _____

FOLD

FOLD



NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 1070 CUPERTINO, CA

POSTAGE WILL BE PAID BY ADDRESSEE

Publications Manager
Hewlett-Packard Company
Information Networks Division
19420 Homestead Road
Cupertino, Ca. 95014

FOLD

FOLD

SALES & SUPPORT OFFICES

Arranged alphabetically by country

1



Product Line Sales/Support Key

Key Product Line

- A** Analytical
- CM** Components
- C** Computer Systems Sales only
- CH** Computer Systems Hardware Sales and Services
- CS** Computer Systems Software Sales and Services
- E** Electronic Instruments & Measurement Systems
- M** Medical Products
- P** Personal Computation Products
- * Sales only for specific product line
- ** Support only for specific product line

IMPORTANT: These symbols designate general product line capability. They do not insure sales or support availability for all products within a line, at all locations. Contact your local sales office for information regarding locations where HP support is available for specific products.

HP distributors are printed in italics.

HEADQUARTERS OFFICES

If there is no sales office listed for your area, contact one of these headquarters offices.

AFRICA AND MIDDLE EAST

Hewlett-Packard S.A.
Mediterranean and Middle East
Operations
Atrina Centre
32 Kifissias Ave.
Paradissos-Amarousion, **ATHENS**
Greece
Tel: 682 88 11
Telex: 21-6588 HPAT GR
Cable: HEWPACKSA Athens

NORTH/CENTRAL AFRICA

Hewlett-Packard S.A.
7, Rue du Bois-du-Lan
CH-1217 **MEYRIN 2**, Switzerland
Tel: (022) 83 12 12
Telex: 27835 hpse
Cable: HEWPACKSA Geneve

ASIA

Hewlett-Packard Asia Ltd.
47/F, 26 Harbour Rd.,
Wanchai, **HONG KONG**
G.P.O. Box 863, Hong Kong
Tel: 5-8330833
Telex: 76793 HPA HX
Cable: HPASIAL TD

CANADA

Hewlett-Packard (Canada) Ltd.
6877 Goreway Drive
MISSISSAUGA, Ontario L4V 1M8
Tel: (416) 678-9430
Telex: 610-492-4246

EASTERN EUROPE

Hewlett-Packard Ges.m.b.h.
Lieblgasse 1
P.O.Box 72
A-1222 **VIENNA**, Austria
Tel: (222) 2365110
Telex: 13 4425 HEPA A

NORTHERN EUROPE

Hewlett-Packard S.A.
Uilenstede 475
P.O.Box 999
NL-1180 **AZ AMSTELVEEN**
The Netherlands
Tel: 20 437771

SOUTH EAST EUROPE

Hewlett-Packard S.A.
World Trade Center
110 Avenue Louis Carol
1215 Cointrin, **GENEVA**, Switzerland
Tel: (022) 98 96 51
Telex: 27225 hpse.

EASTERN USA

Hewlett-Packard Co.
4 Choke Cherry Road
ROCKVILLE, MD 20850
Tel: (301) 258-2000

MIDWESTERN USA

Hewlett-Packard Co.
5201 Tollview Drive
ROLLING MEADOWS, IL 60008
Tel: (312) 255-9800

SOUTHERN USA

Hewlett-Packard Co.
2000 South Park Place
P.O. Box 105005
ATLANTA, GA 30348
Tel: (404) 955-1500

WESTERN USA

Hewlett-Packard Co.
3939 Lankershim Blvd.
P.O. Box 3919
LOS ANGELES, CA 91604
Tel: (213) 506-3700

OTHER INTERNATIONAL AREAS

Hewlett-Packard Co.
Intercontinental Headquarters
3495 Deer Creek Road
PALO ALTO, CA 94304
Tel: (415) 857-1501
Telex: 034-8300
Cable: HEWPACK

ANGOLA

Telectra
Empresa TAECnica de Equipamentos
R. Barbosa Rodrigues, 41-I DT.
Caixa Postal 6487

LUANDA

Tel: 35515,35516
E,P

ARGENTINA

Hewlett-Packard Argentina S.A.
Avenida Santa Fe 2035
Martinez 1640 **BUENOS AIRES**
Tel: 798-5735, 792-1293
Cable: HEWPACKARG
A,E,CH,CS,P

AUSTRALIA

Adelaide, South Australia Office

Hewlett-Packard Australia Ltd.
153 Greenhill Road
PARKSIDE, S.A. 5063
Tel: 272-5911
Telex: 82536
Cable: HEWPARD Adelaide
A*,CH,CM,CS,E,M,P

Brisbane, Queensland Office

Hewlett-Packard Australia Ltd.
10 Payne Road
THE GAP, Queensland 4061
Tel: 30-4133
Telex: 42133
Cable: HEWPARD Brisbane
A,CH,CS,CM,E,M,P

Canberra, Australia Capital Territory Office

Hewlett-Packard Australia Ltd.
121 Wollongong Street
FYSHWICK, A.C.T. 2609
Tel: 80 4244
Telex: 62650
Cable: HEWPARD Canberra
C,CH,CM,CS,E,P

Melbourne, Victoria Office

Hewlett-Packard Australia Ltd.
31-41 Joseph Street
BLACKBURN, Victoria 3130
Tel: 895-2895
Telex: 31-024
Cable: HEWPARD Melbourne
A,CH,CM,CS,E,M,P

Perth, Western Australia Office

Hewlett-Packard Australia Ltd.
261 Stirling Highway
CLAREMONT, W.A. 6010
Tel: 383-2188
Telex: 93859
Cable: HEWPARD Perth
A,CH,CM,CS,E,M,P

Sydney, New South Wales Office

Hewlett-Packard Australia Ltd.
17-23 Talavera Road
P.O. Box 308
NORTH RYDE, N.S.W. 2113
Tel: 888-4444
Telex: 21561
Cable: HEWPARD Sydney
A,CH,CM,CS,E,M,P

AUSTRIA

Hewlett-Packard Ges.m.b.h.
Grottenhofstrasse 94
A-8052 **GRAZ**
Tel: (0316) 291 5 66
Telex: 32375
CH,E

Hewlett-Packard Ges.m.b.h.

Lieblgasse 1
P.O. Box 72
A-1222 **VIENNA**
Tel: (0222) 23 65 11-0
Telex: 134425 HEPA A
A,CH,CM,CS,E,M,P

BAHRAIN

Green Salon
P.O. Box 557
Manama
BAHRAIN
Tel: 255503-255950
Telex: 84419
P

Wael Pharmacy

P.O. Box 648

BAHRAIN

Tel: 256123
Telex: 8550 WAEI BN
E,M

BELGIUM

Hewlett-Packard Belgium S.A./N.V.
Blvd de la Woluwe, 100
Woluwedal
B-1200 **BRUSSELS**
Tel: (02) 762-32-00
Telex: 23-494 paloben bru
A,CH,CM,CS,E,M,P

BERMUDA

Applied Computer Technologies
Atlantic House Building
Par-La-Ville Road
Hamilton 5
Tel: 295-1616
P

BRAZIL

Hewlett-Packard do Brasil
I.e.C. Ltda.
Alameda Rio Negro, 750
Alphaville
06400 **BARUERI SP**
Tel: (011) 421.1311
Telex: (011) 33872 HPBR-BR
Cable: HEWPACK Sao Paulo
A,CH,CM,CS,E,M,P



SALES & SUPPORT OFFICES

Arranged alphabetically by country

BRAZIL (Cont'd)

Hewlett-Packard do Brasil
I.e.C. Ltda.
Avenida Epitacio Pessoa, 4664
22471 **RIO DE JANEIRO-RJ**
Tel: (021) 286.0237
Telex: 021-21905 HPBR-BR
Cable: HEWPACK Rio de Janeiro
A,CH,CM,E,M,P*
Convex/Van Den
Rua Jose Bonifacio
458 Todos Os Santos
CEP 20771
RIO DE JANEIRO, RJ
Tel: 249-7121, 591-4946
Telex: 33487

ANAMED I.C.E.I. Ltda.
Rua Bage, 103
04012 SAO PAULO
Tel: (011) 570-5726
Telex: 021-21905 HPBR-BR
M

CANADA

Alberta

Hewlett-Packard (Canada) Ltd.
3030 3rd Avenue N.E.
CALGARY, Alberta T2A 6T7
Tel: (403) 235-3100
A,CH,CM,E*,M,P*
Hewlett-Packard (Canada) Ltd.
11120-178th Street
EDMONTON, Alberta T5S 1P2
Tel: (403) 486-6666
A,CH,CM,CS,E,M,P

British Columbia

Hewlett-Packard (Canada) Ltd.
10691 Shellbridge Way
RICHMOND,
British Columbia V6X 2W7
Tel: (604) 270-2277
Telex: 610-922-5059
A,CH,CM,CS,E*,M,P*
Hewlett-Packard (Canada) Ltd.
121 - 3350 Douglas Street
VICTORIA, British Columbia V8Z 3L1
Tel: (604) 381-6616
CH,CS

Manitoba

Hewlett-Packard (Canada) Ltd.
1825 Inkster Blvd.
WINNIPEG, Manitoba R3H 0Y1
Tel: (204) 786-6701
A,CH,CM,E,M,P*

New Brunswick

Hewlett-Packard (Canada) Ltd.
37 Shediac Road
MONCTON, New Brunswick E1A 2R6
Tel: (506) 855-2841
CH,CS

Nova Scotia

Hewlett-Packard (Canada) Ltd.
Suite 111
900 Windmill Road
DARTMOUTH, Nova Scotia B2Y 3Z6
Tel: (902) 469-7820
CH,CM,CS,E*,M,P*

Ontario

Hewlett-Packard (Canada) Ltd.
3325 N. Service Rd., Unit 6
BURLINGTON, Ontario P3A 2A3
Tel: (416) 335-8644
CS,M*

Hewlett-Packard (Canada) Ltd.
496 Days Road
KINGSTON, Ontario K7M 5R4
Tel: (613) 384-2088
CH,CS

Hewlett-Packard (Canada) Ltd.
552 Newbold Street
LONDON, Ontario N6E 2S5
Tel: (519) 686-9181
A,CH,CM,E*,M,P*

Hewlett-Packard (Canada) Ltd.
6877 Goreway Drive
MISSISSAUGA, Ontario L4V 1M8
Tel: (416) 678-9430
A,CH,CM,CS,E,M,P

Hewlett-Packard (Canada) Ltd.
2670 Queensview Dr.
OTTAWA, Ontario K2B 8K1
Tel: (613) 820-6483
A,CH,CM,CS,E*,MS,P*

Hewlett-Packard (Canada) Ltd.
1855 Lasalle Boulevard
SUDBURY, Ontario, P3A 2A3
Tel: (705) 560-5450
CH

Hewlett-Packard (Canada) Ltd.
220 Yorkland Blvd. Unit #11
WILLOWDALE, Ontario M2J 1R5
Tel: (416) 499-9333
CH

Quebec

Hewlett-Packard (Canada) Ltd.
17500 South Service Road
Trans-Canada Highway
KIRKLAND, Quebec H9J 2M5
Tel: (514) 697-4232
A,CH,CM,CS,E,M,P*
Hewlett-Packard (Canada) Ltd.
1150 Rue Claire Fontaine
QUEBEC CITY, Quebec G1R 5G4
Tel: (418) 648-0726
CH,CS

Hewlett-Packard (Canada) Ltd.
#7-130 Robin Crescent
SASKATOON, Saskatchewan S7L 6M7
Tel: (306) 242-3702
CH,CS

CHILE

ASC Ltda.
Austria 2041
SANTIAGO
Tel: 223-5946, 223-6148
Telex: 340192 ASC CK
P,C

Jorge Calcagni y Cia. Ltda.
Av. Italia 634 Santiago
Casilla 16475
SANTIAGO 9
Tel: 222-0222
Telex: 440283 JCYCL CZ
CM,E,M

Metrolab S.A.
Monjitas 454 of. 206
SANTIAGO
Tel: 395752, 398296
Telex: 340866 METLAB CK
A

Olympia (Chile) Ltda.
Av. Rodrigo de Araya 1045
Casilla 256-V
SANTIAGO 21
Tel: 225-5044
Telex: 340892 OLYMP
Cable: Olympiachile Santiagochile
CH,CS,P

CHINA, People's Republic of

China Hewlett-Packard Co., Ltd.
6th Floor, Sun Hung Kai Centre
30 Harbour Road
HONG KONG
Tel: 5-8323211
Telex: 36678 HEWPA HX
A,C,CH,CS,E,M,P

China Hewlett-Packard Rep. Office
P.O. Box 418
1A Lane 2, Luchang St.
Beiwei Rd., Xuanwu District
BEIJING

Tel: 33-1947, 33-7426
Telex: 22601 CTSHP CN
Cable: 1920
A,CH,CM,CS,E,P

COLOMBIA

InstrumentaciOn
H. A. Langebaek & Kier S.A.
Carrera 4A No. 52A-26
Apartado Aereo 6287
BOGOTA 1, D.E.
Tel: 212-1466
Telex: 44400 INST CO
Cable: AARIS Bogota
CM,E,M

Nefromedicas Ltda.
Calle 123 No. 9B-31
Apartado Aereo 100-958
BOGOTA D.E., 10
Tel: 213-5267, 213-1615
Telex: 43415 HEGAS CO
A

Procesa, S.A.
CRA 7 No. 24-89 Piso 25
Torre Colpatría
Apartado Aereo No. 49667
BOGOTA D.E.
Tel: 2344925, 2344958, 2344742
Telex: 43127 COVER CO
C,P

Compumundo
Avenida 15 # 107-80
BOGOTA D.E.
Tel: 214-4458
Telex: 45466 MARICO
P

COSTA RICA

Cientifica Costarricense S.A.
Avenida 2, Calle 5
San Pedro de Montes de Oca
Apartado 10159
SAN JOSÉ

Tel: 24-38-20, 24-08-19
Telex: 2367 GALGUR CR
CM,E,M

CYPRUS

Telerexa Ltd.
P.O. Box 4809
14C Stassinou Avenue
NICOSIA
Tel: 62698
Telex: 2894 LEVIDO CY
E,M,P

DENMARK

Hewlett-Packard A/S
Datavej 52
DK-3460 **BIRKEROD**
Tel: (02) 81-66-40
Telex: 37409 hpas dk
A,CH,CM,CS,E,M,P
Hewlett-Packard A/S
Rolighedsvej 32
DK-8240 **RISSKOV**, Aarhus
Tel: (06) 17-60-00
Telex: 37409 hpas dk
CH,E

DOMINICAN REPUBLIC

Microprog S.A.
Juan Tomás Mejía y Cotes No. 60
Arroyo Hondo
SANTO DOMINGO
Tel: 565-6268
Telex: 4510 ARENTA DR (RCA)
P

ECUADOR

CYEDE Cia. Ltda.
Avenida Eloy Alfaro 1749
y Bélgica
Casilla 6423 CCI
QUITO
Tel: 450-975, 243-052
Telex: 2548 CYEDE ED
CM,E,P

Hospitalar S.A.
Robles 625
Casilla 3590
QUITO
Tel: 545-250, 545-122
Telex: 2485 HOSPTEL ED
Cable: HOSPITALAR-Quito
M

QUITO
Tel: 2-238-951
Telex: 2298 ECUAME ED

EGYPT

Egyptian International
Office for Foreign Trade
P.O. Box 2558
42 El-Zahraa Street
Dokki, CAIRO
Tel: 712230
Telex: 93337 EGPOR UN
Cable: EGYPOR
P,A



EGYPT (Cont'd)

INFORMATIC FOR SYSTEMS
22 Talaat Harb Street
CAIRO,
Tel: 759006
Telex: 93697 SAFLM UN
CS

International Engineering Associates
24 Hussein Hegazi Street
Kasr-el-Aini
CAIRO,
Tel: 23829, 21641
Telex: 93830 IEA UN
Cable: INTEGASSO
E

S.S.C. Medical
40 Gezerat El Arab Street
Mohandessin
CAIRO,
Tel: 803844, 805998, 810263
Telex: 20503 SSC UN
M*

EL SALVADOR

IPESA de El Salvador S.A.
29 Avenida Norte 1216
SAN SALVADOR
Tel: 26-6858, 26-6868
Telex: 20539 IPESASAL
A,CH,CM,CS,E,P

FINLAND

Hewlett-Packard Oy
Piispankalliontie 17
02200 **ESPOO**
Tel: 00358-0-88721
Telex: 121563 HEWPA SF
CH,CM,SS,P

Hewlett-Packard Oy
(Olarinluoma 7)
PL 24
02101 **ESPOO** 10
Tel: (90) 4521022
A,E,M

Hewlett-Packard Oy
Aatoksenkatu 10-C
SF-40720-72 **JYVASKYLA**
Tel: (941) 216318
CH

Hewlett-Packard Oy
Kainvuntie 1-C
SF-90140-14 **OULU**
Tel: (981) 338785
CH

FRANCE

Hewlett-Packard France
Z.I. Mercure B
Rue Berthelot
F-13763 Les Milles Cedex
AIX-EN-PROVENCE
Tel: (42) 59-41-02
Telex: 410770F
A,CH,E,M,P*

Hewlett-Packard France
64, rue Marchand Saillant
F-61000 **ALENCON**
Tel: (33) 29 04 42

Hewlett-Packard France
Boite Postale 503
F-25026 **BESANCON**
28 rue de la Republique
F-25000 **BESANCON**
Tel: (81) 83-16-22
Telex: 361157
CH,M

Hewlett-Packard France
13, Place Napoleon III
F-29000 **BREST**
Tel: (98) 03-38-35

Hewlett-Packard France
Chemin des Mouilles
Boite Postale 162
F-69130 **CULLY** Cedex (Lyon)
Tel: (78) 833-81-25
Telex: 310617F
A,CH,CS,E,M

Hewlett-Packard France
Parc d'Activite du Bois Briard
Ave. du Lac
F-91040 **EVRY** Cedex
Tel: 6 077-5-23
Telex: C923 5F
E

Hewlett-Packard France
5, Avenue Raymond Chanas
F-38320 **EYBENS** (Grenoble)
Tel: (76) 62-67-98
Telex: 980124 HP GRENOB EYBE
CH

Hewlett-Packard France
Centre d'Affaire Paris-Nord
Bâtiment Ampère 5 étage
Rue de la Commune de Paris
Boite Postale 300
F-93153 **LE BLANC MESNIL**
Tel: (1) 865-44-52
Telex: 211032F
CH,CS,E,M

Hewlett-Packard France
Parc d'Activités Cadera
Quartier Jean Mermoz
Avenue du Président JF Kennedy
F-33700 **MERIGNAC** (Bordeaux)
Tel: (56) 34-00-84
Telex: 550105F
CH,E,M

Hewlett-Packard France
Immuable "Les 3 B"
Nouveau Chemin de la Garde
ZAC de Bois Briand
F-44085 **NANTES** Cedex
Tel: (40) 50-32-22
Telex: 711085F
CH**

Hewlett-Packard France
125, rue du Faubourg Bannier
F-45000 **ORLEANS**
Tel: (38) 68 01 63

Hewlett-Packard France
Zone Industrielle de Courtaboeuf
Avenue des Tropiques
F-91947 Les Ulis Cedex **ORSAY**
Tel: (6) 907-78-25
Telex: 600048F
A,CH,CM,CS,E,M,P

Hewlett-Packard France
Paris Porte-Maillot
15, Avenue de L'Amiral Bruix
F-75782 **PARIS** CEDEX 16
Tel: (1) 502-12-20
Telex: 613663F
CH,M,P

Hewlett-Packard France
124, Boulevard Tourasse
F-64000 **PAU**
Tel: (59) 80 38 02

Hewlett-Packard France
2 AllAEE de la Bourgonnette
F-35100 **RENNES**
Tel: (99) 51-42-44
Telex: 740912F
CH,CM,E,M,P*

Hewlett-Packard France
98 Avenue de Bretagne
F-76100 **ROUEN**
Tel: (35) 63-57-66
Telex: 770035F
CH**,CS

Hewlett-Packard France
4 Rue Thomas Mann
Boite Postale 56
F-67033 **STRASBOURG** Cedex
Tel: (88) 28-56-46
Telex: 890141F
CH,E,M,P*

Hewlett-Packard France
Le PAEripole
20, Chemin du Pigeonnier de la
CAEpiGEere
F-31083 **TOULOUSE** Cedex
Tel: (61) 40-11-12
Telex: 531639F
A,CH,CS,E,P*

Hewlett-Packard France
9, rue Baudin
F-26000 **VALENCE**
Tel: (75) 42 76 16

Hewlett-Packard France
Carolor
ZAC de Bois Briand
F-57640 **VIGY** (Metz)
Tel: (8) 771 20 22
CH

Hewlett-Packard France
Immeuble PERicentre
F-59658 **VILLENEUVE D'ASCQ** Cedex
Tel: (20) 91-41-25
Telex: 160124F
CH,E,M,P*

GERMAN FEDERAL REPUBLIC

Hewlett-Packard GmbH
Geschäftsstelle
Keithstrasse 2-4
D-1000 **BERLIN** 30
Tel: (030) 24-90-86
Telex: 018 3405 hpbln d
A,CH,E,M,P

Hewlett-Packard GmbH
Geschäftsstelle
Herrenberger Strasse 130
D-7030 **BÖBLINGEN**
Tel: (7031) 14-0
Telex: 07265739
A,CH,CM,CS,E,M,P

Hewlett-Packard GmbH
Geschäftsstelle
Emanuel-Leutze-Strasse 1
D-4000 **DUSSELDORF**
Tel: (0211) 5971-1
Telex: 085/86 533 hpdd d
A,CH,CS,E,M,P

Hewlett-Packard GmbH
Geschäftsstelle
Schlieffstr. 28a
D-4600 **DORTMUND**-Aplerbeck
Tel: (0231) 45001

Hewlett-Packard GmbH
Vertriebszentrale Frankfurt
Bernier Strasse 117
Postfach 560 140
D-6000 **FRANKFURT** 56
Tel: (0611) 50-04-1
Telex: 04 13249 hpffm d
A,CH,CM,CS,E,M,P

Hewlett-Packard GmbH
Geschäftsstelle
Aussenstelle Bad Homburg
Louisenstrasse 115
D-6380 **BAD HOMBURG**
Tel: (06172) 109-0

Hewlett-Packard GmbH
Geschäftsstelle
Kapstadtring 5
D-2000 **HAMBURG** 60
Tel: (040) 63804-1
Telex: 021 63 032 hphh d
A,CH,CS,E,M,P

Hewlett-Packard GmbH
Geschäftsstelle
Heidering 37-39
D-3000 **HANNOVER** 61
Tel: (0511) 5706-0
Telex: 092 3259
A,CH,CM,E,M,P

Hewlett-Packard GmbH
Geschäftsstelle
Rosslauer Weg 2-4
D-6800 **MANNHEIM**
Tel: (0621) 70050
Telex: 0462105
A,C,E

Hewlett-Packard GmbH
Geschäftsstelle
Messerschmittstrasse 7
D-7910 **NEU ULM**
Tel: 0731-70241
Telex: 0712816 HP ULM-D
A,C,E*

Hewlett-Packard GmbH
Geschäftsstelle
Ehhericherstr. 13
D-8500 **NÜRNBERG** 10
Tel: (0911) 5205-0
Telex: 0623 860
CH,CM,E,M,P

Hewlett-Packard GmbH
Geschäftsstelle
Eschenstrasse 5
D-8028 **TAUFKIRCHEN**
Tel: (089) 6117-1
Telex: 0524985
A,CH,CM,E,M,P

GREAT BRITAIN
See United Kingdom



SALES & SUPPORT OFFICES

Arranged alphabetically by country

GREECE

Hewlett-Packard A.E.
178, Kifissias Avenue
6th Floor
Halandri-ATHENS
Greece
Tel: 6471673, 6471543, 6472971
A,CH,CM**,CS**,E,M,P

Kostas Karayannis S.A.
8 Omirou Street
ATHENS 133

Tel: 32 30 303, 32 37 371
Telex: 215962 RKAR GR
A,CH,CM,CS,E,M,P

PLAISIOS S.A.
Eliopoulos Brohers Ltd.
11854

ATHENS
Tel: 34-51-911
Telex: 216286
P

GUATEMALA

IPESA
Avenida Reforma 3-48, Zona 9
GUATEMALA CITY
Tel: 316627, 314786
Telex: 4192 TELTRO GU
A,CH,CM,CS,E,M,P

HONG KONG

Hewlett-Packard Hong Kong, Ltd.
G.P.O. Box 795
5th Floor, Sun Hung Kai Centre
30 Harbour Road
HONG KONG
Tel: 5-8323211
Telex: 66678 HEWPA HX
Cable: HEWPACK HONG KONG
E,CH,CS,P

CET Ltd.
10th Floor, Hua Asia
Bldg. Gloucester
64-66 Gloucester Road
HONG KONG
Tel: (5) 200922
Telex: 85148 CET HX
CM

Schmidt & Co. (Hong Kong) Ltd.
18th Floor, Great Eagle Centre
23 Harbour Road, Wanchai

HONG KONG
Tel: 5-8330222
Telex: 74766 SCHMC HX
A,M

ICELAND

Elding Trading Company Inc.
Hafnarmvoli-Tryggvagotu
P.O. Box 895
IS-REYKJAVIK
Tel: 1-58-20, 1-63-03
M

INDIA

Computer products are sold through
Blue Star Ltd. All computer repairs and
maintenance service is done through
Computer Maintenance Corp.

Blue Star Ltd.
Sabri Complex II Floor
24 Residency Rd.

BANGALORE 560 025
Tel: 55660
Telex: 0845-430
Cable: BLUESTAR
A,CH*,CM,CS*,E

Blue Star Ltd.
Band Box House
Prabhadevi

BOMBAY 400 025
Tel: 422-3101
Telex: 011-3751
Cable: BLUESTAR
A,M

Blue Star Ltd.
Sahas
414/2 Vir Savarkar Marg
Prabhadevi

BOMBAY 400 025
Tel: 422-6155
Telex: 011-71193
Cable: FROSTBLUE
A,CH*,CM,CS*,E,M

Blue Star Ltd.
Kaiyan, 19 Vishwas Colony
Alkapuri, BORDA, 390 005
Tel: 65235

Cable: BLUE STAR
A

Blue Star Ltd.
7 Hare Street
CALCUTTA 700 001
Tel: 12-01-31
Telex: 021-7655
Cable: BLUESTAR
A,M

Blue Star Ltd.
133 Kodambakkam High Road
MADRAS 600 034
Tel: 82057
Telex: 041-379
Cable: BLUESTAR
A,M

Blue Star Ltd.
Bhandari House, 7th/8th Floors
91 Nehru Place
NEW DELHI 110 024
Tel: 682547

Telex: 031-2463
Cable: BLUESTAR
A,CH*,CM,CS*,E,M

Blue Star Ltd.
15/16:C Wellesley Rd.
PUNE 411 011
Tel: 22775
Cable: BLUE STAR
A

Blue Star Ltd.
2-2-47/1108 Bolarum Rd.
SECUNDERABAD 500 003
Tel: 72057
Telex: 0155-459
Cable: BLUEFROST
A,E

Blue Star Ltd.
T.C. 7/603 Poornima
Maruthankuzhi
TRIVANDRUM 695 013
Tel: 65799
Telex: 0884-259
Cable: BLUESTAR
E

Computer Maintenance Corporation Ltd.
115, Sarojini Devi Road
SECUNDERABAD 500 003
Tel: 310-184, 345-774
Telex: 031-2960
CH**

INDONESIA

BERCA Indonesia P.T.
P.O.Box 496/Jkt
Jl. Abdul Muis 62
JAKARTA
Tel: 21-373009
Telex: 46748 BERSAL IA
Cable: BERSAL JAKARTA
P

BERCA Indonesia P.T.
P.O.Box 2497/Jkt
Antara Bldg., 17th Floor
Jl. Medan Merdeka Selatan 17
JAKARTA-PUSAT
Tel: 21-344-181
Telex: BERSAL IA
A,CS,E,M

BERCA Indonesia P.T.
P.O. Box 174/SBY.
Jl. Kutei No. 11
SURABAYA
Tel: 68172
Telex: 31146 BERSAL SB
Cable: BERSAL-SURABAYA
A*,E,M,P

IRAQ

Hewlett-Packard Trading S.A.
Service Operation
Al Mansoor City 9B/3/7
BAGHDAD
Tel: 551-49-73
Telex: 212-455 HEPAIRAQ IK
CH,CS

IRELAND

Hewlett-Packard Ireland Ltd.
82/83 Lower Leeson Street
DUBLIN 2
Tel: 0001 608800
Telex: 30439
A,CH,CM,CS,E,M,P
Cardiac Services Ltd.
Kilmore Road
Artane
DUBLIN 5
Tel: (01) 351820
Telex: 30439
M

ISRAEL

Eldan Electronic Instrument Ltd.
P.O.Box 1270
JERUSALEM 91000
16, Ohaliav St.
JERUSALEM 94467
Tel: 533 221, 553 242
Telex: 25231 AB/PAKRD IL
A,M

Computation and Measurement
Systems (CMS) Ltd.
11 Masad Street
67060

TEL-AVIV
Tel: 388 388
Telex: 33569 Motil IL
CH,CM,CS,E,P

ITALY

Hewlett-Packard Italiana S.p.A.
Traversa 99C
Via Giulio Petroni, 19
I-70124 BARI
Tel: (080) 41-07-44
M,CH

Hewlett-Packard Italiana S.p.A.
Via Martin Luther King, 38/III
I-40132 BOLOGNA
Tel: (051) 402394
Telex: 511630
CH,CS,E,M

Hewlett-Packard Italiana S.p.A.
Via Principe Nicola 43G/C
I-95126 CATANIA
Tel: (095) 37-10-87
Telex: 970291
CH

Hewlett-Packard Italiana S.p.A.
Via G. Di Vittorio 9
I-20063 CERNUSCO SUL
NAVIGLIO

(Milano)
Tel: (02) 923691
Telex: 334632
A,CH,CM,CS,E,M,P

Hewlett-Packard Italiana S.p.A.
Via C. Colombo 49
I-20090 TREZZANO SUL
NAVIGLIO
(Milano)
Tel: (02) 4459041
Telex: 322116
CH,CS

Hewlett-Packard Italiana S.p.A.
Via Nuova San Rocco a
Capodimonte, 62/A
I-80131 NAPOLI
Tel: (081) 7413544
Telex: 710698
A**,CH,CS,E,M

Hewlett-Packard Italiana S.p.A.
Viale G. Modugno 33
I-16156 GENOVA PEGLI
Tel: (010) 68-37-07
Telex: 215238
E,C

Hewlett-Packard Italiana S.p.A.
Via Pelizzo 15
I-35128 PADOVA
Tel: (049) 664888
Telex: 430315
A,CH,CS,E,M

Hewlett-Packard Italiana S.p.A.
Viale C. Pavese 340
I-00144 ROMA EUR
Tel: (06) 54831
Telex: 610514
A,CH,CS,E,M,P*

ITALY (Cont'd)

Hewlett-Packard Italiana S.p.A.
Via di Casellina 57/C
I-50018 **SCANDICCI-FIRENZE**
Tel: (055) 753863
CH,E,M

Hewlett-Packard Italiana S.p.A.
Corso Svizzera, 185
I-10144 **TORINO**
Tel: (011) 74 4044
Telex: 221079
A*,CS,CH,E

JAPAN

Yokogawa-Hewlett-Packard Ltd.
152-1, Onna
ATSUGI, Kanagawa, 243
Tel: (0462) 28-0451
CM,C*,E

Yokogawa-Hewlett-Packard Ltd.
Meiji-Seimei Bldg. 6F
3-1 Hon Chiba-Cho
CHIBA, 280
Tel: 472 25 7701
E,CH,CS

Yokogawa-Hewlett-Packard Ltd.
Yasuda-Seimei Hiroshima Bldg.
6-11, Hon-dori, Naka-ku
HIROSHIMA, 730
Tel: 82-241-0611

Yokogawa-Hewlett-Packard Ltd.
Towa Building
2-3, Kaigan-dori, 2 Chome Chuo-ku
KOBE, 650
Tel: (078) 392-4791
C,E

Yokogawa-Hewlett-Packard Ltd.
Kumagaya Asahi 82 Bldg
3-4 Tsukuba
KUMAGAYA, Saitama 360
Tel: (0485) 24-6563
CH,CM,E

Yokogawa-Hewlett-Packard Ltd.
Asahi Shinbun Daiichi Seimei Bldg.
4-7, Hanabata-cho
KUMAMOTO, 860
Tel: (0963) 54-7311
CH,E

Yokogawa-Hewlett-Packard Ltd.
Shin-Kyoto Center Bldg.
614, Higashi-Shiokoji-cho
Karasuma-Nishiiru
Shiokoji-dori, Shimogyo-ku
KYOTO, 600
Tel: 075-343-0921
CH,E

Yokogawa-Hewlett-Packard Ltd.
Mito Mitsui Bldg
4-73, Sanno-maru, 1 Chome
MITO, Ibaraki 310
Tel: (0292) 25-7470
CH,CM,E

Yokogawa-Hewlett-Packard Ltd.
Meiji-Seimei Kokubun Bldg. 7-8
Kokubun, 1 Chome, Sendai
MIYAGI, 980
Tel: (0222) 25-1011
Telex:
C,E

Yokogawa-Hewlett-Packard Ltd.
Sumitomo Seimei 14-9 Bldg.
Meieki-Minami, 2 Chome
Nakamura-ku
NAGOYA, 450
Tel: (052) 571-5171
CH,CM,CS,E,M

Yokogawa-Hewlett-Packard Ltd.
Chuo Bldg.,
4-20 Nishinakajima, 5 Chome
Yodogawa-ku
OSAKA, 532
Tel: (06) 304-6021
Telex: YHPOSA 523-3624
A,CH,CM,CS,E,M,P*

Yokogawa-Hewlett-Packard Ltd.
27-15, Yabe, 1 Chome
SAGAMIHARA Kanagawa, 229
Tel: 0427 59-1311

Yokogawa-Hewlett-Packard Ltd.
Daiichi Seimei Bldg.
7-1, Nishi Shinjuku, 2 Chome
Shinjuku-ku, **TOKYO** 160
Tel: 03-348-4611
CH,E

Yokogawa-Hewlett-Packard Ltd.
29-21 Takaide-Higashi, 3 Chome
Suginami-ku **TOKYO** 168
Tel: (03) 331-6111
Telex: 232-2024 YHPTOK
A,CH,CM,CS,E,M,P*

Yokogawa-Hewlett-Packard Ltd.
Daiichi Asano Building
2-8, Odori, 5 Chome
UTSUNOMIYA, Tochigi 320
Tel: (0286) 25-7155
CH,CS,E

Yokogawa-Hewlett-Packard Ltd.
Yasuda Seimei Nishiguchi Bldg.
30-4 Tsuruya-cho, 3 Chome
YOKOHAMA 221
Tel: (045) 312-1252
CH,CM,E

JORDAN

Scientific and Medical Supplies Co.
P.O. Box 1387
AMMAN
Tel: 24907, 39907
Telex: 21456 SABCO JO
CH,E,M,P

KENYA

ADCOM Ltd., Inc., Kenya
P.O. Box 30070
NAIROBI
Tel: 331955
Telex: 22639
E,M

KOREA

Samsung Hewlett-Packard Co. Ltd.
12 Fl. Kinam Bldg.
San 75-31, Yeoksam-Dong
Kangnam-Ku
Yeongdong P.O. Box 72
SEOUL
Tel: 555-7555, 555-5447
Telex: K27364 SAMSAN
A,CH,CM,CS,E,M,P

KUWAIT

Al-Khaldiya Trading & Contracting
P.O. Box 830
SAFAT
Tel: 424910, 411726
Telex: 22481 AREEG KT
Cable: VISCO/UNT
E,M,A

Photo & Cine Equipment
P.O. Box 270
SAFAT
Tel: 2445111
Telex: 22247 MATIN KT
Cable: MATIN KUWAIT
P

W.J. Towell Computer Services
P.O. Box 75
SAFAT
Tel: 2462640/1
Telex: 30336 TOWELL KT
C

LEBANON

Computer Information Systems
P.O. Box 11-6274
BEIRUT
Tel: 89 40 73
Telex: 42309
C,E,M,P

LUXEMBOURG

Hewlett-Packard Belgium S.A./N.V.
Blvd de la Woluwe, 100
Woluwedal
B-1200 **BRUSSELS**
Tel: (02) 762-32-00
Telex: 23-494 paloben bru
A,CH,CM,CS,E,M,P

MALAYSIA

Hewlett-Packard Sales (Malaysia)
Sdn. Bhd.
1st Floor, Bangunan British
American
Jalan Semantan, Damansara Heights
KUALA LUMPUR 23-03
Tel: 943022
Telex: MA31011
A,CH,E,M,P*

Protel Engineering
P.O. Box 1917
Lot 6624, Section 64
23/4 Pending Road
Kuching, **SARAWAK**
Tel: 36299
Telex: MA 70904 PROMAL
Cable: PROTELENG
A,E,M

MALTA

Phillip Toledo Ltd.
Notabile Rd.
MRIEHEL
Tel: 447 47, 455 66
Telex: Media MW 649
E,P,M

MEXICO

Hewlett-Packard Mexicana, S.A.
de C.V.
Av. Periferico Sur No. 6501
Tepepan, Xochimilco
16020 **MEXICO D.F.**
Tel: 6-76-46-00
Telex: 17-74-507 HEWPACK MEX
A,CH,CS,E,M,P

Hewlett-Packard Mexicana, S.A.
de C.V.
Czda. del Valle
409 Ote. 1 °Piso
Colonia del Valle
Municipio de Garza García
66220 **MONTERREY**, Nuevo LeAOn
Tel: 78 42 41
Telex: 038 410
CH

Equipos Cientificos de Occidente, S.A.
Av. Lazaro Cardenas 3540
GUADALAJARA
Tel: 21-66-91
Telex: 0684186 ECOMÉ
A

Infograficas y Sistemas del Noreste, S.A.
Rio Orinoco #171 Oriente
Despacho 2001
Colonia Del Valle
MONTERREY
Tel: 782499, 781259A
A

MOROCCO

Dolbeau
81 rue Karatchi
CASABLANCA
Tel: 3041-82, 3068-38
Telex: 23051, 22822
E

Gerep
2 rue d'Agadir
Boite Postale 156
CASABLANCA
Tel: 272093, 272095
Telex: 23 739
P

Sema-Maroc
Rue Lapebie
CASABLANCA
Tel: 26.09.80
CH,CS,P

NETHERLANDS

Hewlett-Packard Nederland B.V.
Van Heuven Goedhartlaan 121
NL 1181KK **AMSTELVEEN**
P.O. Box 667
NL1180 AR **AMSTELVEEN**
Tel: (020) 47-20-21
Telex: 13 216 HEPA NL
A,CH,CM,CS,E,M,P

Hewlett-Packard Nederland B.V.
Bongerd 2
NL 2906VK **CAPELLE A/D IJSSEL**
P.O. Box 41
NL 2900AA **CAPELLE A/D IJSSEL**
Tel: (10) 51-64-44
Telex: 21261 HEPAC NL
A,CH,CS,E

Hewlett-Packard Nederland B.V.
Pastoor Petersstraat 134-136
NL 5612 LV **EINDHOVEN**
P.O. Box 2342
NL 5600 CH **EINDHOVEN**
Tel: (040) 326911
Telex: 51484 hepae nl
A,CH*,E,M



SALES & SUPPORT OFFICES

Arranged alphabetically by country

NEW ZEALAND

Hewlett-Packard (N.Z.) Ltd.
5 Owens Road
P.O. Box 26-189
Epsom, **AUCKLAND**
Tel: 687-159
Cable: HEWPAK Auckland
CH,CS,CM,E,P*

Hewlett-Packard (N.Z.) Ltd.
4-12 Cruickshank Street
Kilbirnie, **WELLINGTON 3**
P.O. Box 9443
Courtenay Place, **WELLINGTON 3**
Tel: 877-199
Cable: HEWPAK Wellington
CH,CS,CM,E,P

Northrop Instruments & Systems Ltd.
369 Khyber Pass Road
P.O. Box 8602

AUCKLAND
Tel: 794-091
Telex: 60605
A,M

Northrop Instruments & Systems Ltd.
110 Mandeville St.
P.O. Box 8388

CHRISTCHURCH
Tel: 488-873
Telex: 4203
A,M

Northrop Instruments & Systems Ltd.
Sturdee House
85-87 Ghuznee Street
P.O. Box 2406
WELLINGTON
Tel: 850-091
Telex: NZ 3380
A,M

NORTHERN IRELAND
See United Kingdom

NORWAY
Hewlett-Packard Norge A/S
Folke Bernadottes vei 50
P.O. Box 3558

N-5033 **FYLLINGSDALEN** (Bergen)
Tel: 0047/5/16 55 40
Telex: 16621 hpnas n
CH,CS,E,M

Hewlett-Packard Norge A/S
UCOsterndalen 16-18
P.O. Box 34
N-1345 **OCUSTERÅS**
Tel: 0047/2/17 11 80
Telex: 16621 hpnas n
A,CH,CM,CS,E,M,P

OMAN
Khimjil Ramdas
P.O. Box 19

MUSCAT
Tel: 722225, 745601
Telex: 3289 **BROKER MB MUSCAT**
P

Suhail & Saud Bahwan
P.O. Box 169

MUSCAT
Tel: 734 201-3
Telex: 3274 **BAHWAN MB**
E

Intac LLC
P.O. Box 8676
MUTRAH
Tel: 601695
Telex: 5741 Tawoos On
A,C,M

PAKISTAN
Mushko & Company Ltd.
House No. 16, Street No. 14
Sector F-6/3
ISLAMABAD
Tel: 824545
Cable: FEMUS Islamabad
A,E,M,P*

Mushko & Company Ltd.
Oosman Chambers
Abdullah Haroon Road
KARACHI 0302
Tel: 524131, 524132
Telex: 2894 MUSKO PK
Cable: COOPERATOR Karachi
A,E,M,P*

PANAMA
ElectroOnico Balboa, S.A.
Calle Samuel Lewis, Ed. Alfa
Apartado 4929
PANAMA 5
Tel: 63-6613, 63-6748
Telex: 3483 ELECTRON PG
A,CM,E,M,P

PERU
Cía Electro Médica S.A.
Los Flamencos 145, San Isidro
Casilla 1030
LIMA 1
Tel: 41-4325, 41-3703
Telex: Pub. Booth 25306
CM,E,M,P

SAMS
Rio De La Plata 305
SAN ISIDRO
Tel: 419928
Telex: 394 20450 **PELIBERTAD**
P

PHILIPPINES
The Online Advanced Systems
Corporation
Rico House, Amorsolo Cor. Herrera
Street
Legaspi Village, Makati
P.O. Box 1510
Metro **MANILA**
Tel: 815-38-11 (up to 16)
Telex: 63274 Online PN
A,CH,CS,E,M

Electronic Specialists and
Proponents Inc.
690-B Epifanio de los Santos
Avenue
Cubao, **QUEZON CITY**
P.O. Box 2649 Manila
Tel: 98-96-81, 98-96-82, 98-96-83
Telex: 40018, 42000 ITT **GLOBE MAC-**
KAY BOOTH
P

PORTUGAL
Mundinter
Intercambio Mundial de ComAercio
S.A.R.L.
P.O. Box 2761
Av. Antonio Augusto de Aguiar 138
P-LISBON
Tel: (19) 53-21-31, 53-21-37
Telex: 16691 munter p
M
Soquimica
Av. da Liberdade, 220-2
1298 LISBOA Codex
Tel: 56 21 81/2/3
Telex: 13316 SABASA
P

Telectra-Empresa Técnica de
Equipmentos Eléctricos S.A.R.L.
Rua Rodrigo da Fonseca 103
P.O. Box 2531
P-LISBON 1
Tel: (19) 68-60-72
Telex: 12598
CM,E

Rarcentro Ltda
R. Costa Cabral 575
4200 PORTO
Tel: 499174/495173
Telex: 26054
CH,CS

PUERTO RICO
Hewlett-Packard Puerto Rico
101 MuANoz Rivera Av
Esu. Calle Ochoa
HATO REY, Puerto Rico 00918
Tel: (809) 754-7800
A,CH,CS,CM,M,E,P

QATAR
Computer Arabia
P.O. Box 2750
DOHA
Tel: 883555
Telex: 4806 **CHPARB**
P

Nasser Trading & Contracting
P.O. Box 1563
DOHA
Tel: 422170
Telex: 4439 **NASSER DH**
M

SAUDI ARABIA
Modern Electronic Establishment
Hewlett-Packard Division
P.O. Box 281
Thuobah
AL-KHOBAR
Tel: 895-1760, 895-1764
Telex: 671 106 **HPMEEK SJ**
Cable: ELECTA AL-KHOBAR
CH,CS,E,M

Modern Electronic Establishment
Hewlett-Packard Division
P.O. Box 1228
Redec Plaza, 6th Floor
JEDDAH
Tel: 644 38 48
Telex: 4027 12 **FARNAS SJ**
Cable: ELECTA JEDDAH
A,CH,CS,CM,E,M,P

Modern Electronic Establishment
Hewlett-Packard Division
P.O. Box 22015

RIYADH
Tel: 491-97 15, 491-63 87
Telex: 202049 **MEERYD SJ**
CH,CS,E,M
Abdul Ghani El Ajou
P.O. Box 78
RIYADH
Tel: 40 41 717
Telex: 200 932 **EL AJOU**
P

SCOTLAND
See United Kingdom

SINGAPORE
Hewlett-Packard Singapore (Sales)
Pte. Ltd.
#08-00 Inchcape House
450-2 Alexandra Road
P.O. Box 58 Alexandra Rd. Post
Office
SINGAPORE, 9115
Tel: 631788
Telex: HPSGSO RS 34209
Cable: HEWPAK, Singapore
A,CH,CS,E,MS,P

Dynamar International Ltd.
Unit 05-11 Block 6
Kolam Ayer Industrial Estate
SINGAPORE 1334
Tel: 747-6188
Telex: RS 26283
CM

SOUTH AFRICA
Hewlett-Packard So Africa (Pty.) Ltd.
P.O. Box 120
Howard Place **CAPE PROVINCE 7450**
Pine Park Center, Forest Drive, Pine-
lands
CAPE PROVINCE 7405
Tel: 53-7954
Telex: 57-20006
A,CH,CM,E,M,P

Hewlett-Packard So Africa (Pty.) Ltd.
P.O. Box 37099
Overport Drive 92
DURBAN 4067
Tel: 28-4178
Telex: 6-22954
CH,CM

Hewlett-Packard So Africa (Pty.) Ltd.
6 Linton Arcade
511 Cape Road
Linton Grange
PORT ELIZABETH 6001
Tel: 041-301201
CH

Hewlett-Packard So Africa (Pty.) Ltd.
Fountain Center
Kalkden Str.
Monument Park
Ext 2
PRETORIA 0105
Tel: 45-5723
Telex: 32163
CH,E

SOUTH AFRICA (Cont'd)

Hewlett-Packard So Africa (Pty.) Ltd.
Private Bag Wendywood
SANDTON 2144
Tel: 802-5111, 802-5125
Telex: 4-20877
Cable: HEWPACK Johannesburg
A,CH,CM,CS,E,M,P

SPAIN

Hewlett-Packard Española S.A.
Calle Entenza, 321
E-BARCELONA 29
Tel: 322.24.51, 321.73.54
Telex: 52603 hpbee
A,CH,CS,E,M,P

Hewlett-Packard Española S.A.
Calle San Vicente S/No
Edificio Albia II 7B
E-BILBAO 1
Tel: 423.83.06
A,CH,E,M

Hewlett-Packard Española S.A.
Crta. de la Coruña, Km. 16, 400
Las Rozas
E-MADRID
Tel: (1) 637.00.11
Telex: 23515 HPE
CH,CS,M

Hewlett-Packard Española S.A.
Avda. S. Francisco Javier, S/no
Planta 10. Edificio Sevilla 2,
E-SEVILLA 5
Tel: 64.44.54
Telex: 72933
A,CS,M,P

Hewlett-Packard Española S.A.
C/Isabel La Católica, 8
E-46004 VALENCIA
Tel: 0034/6/351 59 44
CH,P

SWEDEN

Hewlett-Packard Sverige AB
Sunnarvagen 14K
S-22226 LUND
Tel: (046) 13-69-79
Telex: (854) 17886 (via Spånga office)
CH

Hewlett-Packard Sverige AB
Östra Tullgatan 3
S-21128 MALMÖ
Tel: (040) 70270
Telex: (854) 17886 (via Spånga office)

Hewlett-Packard Sverige AB
Västra Vintergatan 9
S-70344 ÖREBRO
Tel: (19) 10-48-80
Telex: (854) 17886 (via Spånga office)
CH

Hewlett-Packard Sverige AB
Skalholtsgatan 9, Kista
Box 19
S-16393 SPÅNGA
Tel: (08) 750-2000
Telex: (854) 17886
Telefax: (08) 7527781
A,CH,CM,CS,E,M,P

Hewlett-Packard Sverige AB
Fröttaligsgatan 30
S-42132 VÄSTRA-FRÖLUNDA
Tel: (031) 49-09-50
Telex: (854) 17886 (via Spånga office)
CH,E,P

SWITZERLAND

Hewlett-Packard (Schweiz) AG
Clarastrasse 12
CH-4058 BASEL
Tel: (61) 33-59-20
A

Hewlett-Packard (Schweiz) AG
7, rue du Bois-du-Lan
Case Postale 365
CH-1217 MEYRIN 2
Tel: (0041) 22-83-11-11
Telex: 27333 HPAG CH
CH,CM,CS

Hewlett-Packard (Schweiz) AG
Allmend 2
CH-8967 WIDEN
Tel: (0041) 57 31 21 11
Telex: 5393 HPAG CH
Cable: HPA
A,CH,CM,CS,E,M,P

SYRIA

General Electronic Inc.
Nuri Basha Ahnaf Ebn Kays Street
P.O. Box 5781

DAMASCUS
Tel: 33-24-87
Telex: 411 215
Cable: ELECTROBOR DAMASCUS
E

Middle East Electronics
P.O.Box 2308
Abu Rummaneh
DAMASCUS
Tel: 33 45 92
Telex: 411 304
M

TAIWAN

Hewlett-Packard Taiwan
Kaohsiung Office
11/F 456, Chung Hsiao 1st Road
KAOHSIUNG
Tel: (07) 2412318
CH,CS,E

Hewlett-Packard Taiwan
8th Floor Hewlett-Packard Building
337 Fu Hsing North Road
TAIPEI

Tel: (02) 712-0404
Telex: 24439 HEWPACK
Cable: HEWPACK Taipei
A,CH,CM,CS,E,M,P
Ing Lih Trading Co.
3rd Floor, 7 Jen-Ai Road, Sec. 2
TAIPEI 100
Tel: (02) 3948191
Cable: INGLIH TAIPEI
A

THAILAND

Unimesa
30 Patpong Ave., Suriwong
BANGKOK 5
Tel: 235-5727
Telex: 84439 Simonco TH
Cable: UNIMESA Bangkok
A,CH,CS,E,M
Bangkok Business Equipment Ltd.
5/5-6 Dejo Road
BANGKOK
Tel: 234-8670, 234-8671
Telex: 87669-BEQUIPT TH
Cable: BUSIQUIPT Bangkok
P

TOGO

Societe Africaine De
Promotion
B.P. 12271
LOME
Tel: 21-62-88
Telex: 5304
P

TRINIDAD & TOBAGO

Caribbean Telecoms Ltd.
Corner McAllister Street &
Eastern Main Road, Laventille
P.O. Box 732
PORT-OF-SPAIN
Tel: 624-4213
Telex: 22561 CARTEL WG
Cable: CARTEL, PORT OF SPAIN
CM,E,M,P

Computer and Controls Ltd.
P.O. Box 51
66 Independence Square
PORT-OF-SPAIN
Tel: 623-4472
Telex: 3000 POSTLX WG
P

TUNISIA

Tunisie Electronique
31 Avenue de la Liberte
TUNIS
Tel: 280-144
CH,CS,E,P

Corema
1 ter. Av. de Carthage
TUNIS
Tel: 253-821
Telex: 12319 CABAM TN
M

TURKEY

E.M.A
Mediha Eldem Sokak No. 41/6
Yenisehir
ANKARA
Tel: 319175
Telex: 42321 KTX TR
Cable: EMATRADE ANKARA
M
Kurt & Kurt A.S.
Mithatpasa Caddesi No. 75
Kat 4 Kizilay
ANKARA
Tel: 318875/6/7/8
Telex: 42490 MESR TR
A

Saniva Bilgisayar Sistemleri A.S.
Buyukdere Caddesi 103/6
Gayrettepe
ISTANBUL
Tel: 1673180
Telex: 26345 SANI TR
C,P

Teknim Company Ltd.
Iran Caddesi No. 7
Kavaklidere
ANKARA
Tel: 275800
Telex: 42155 TKNM TR
E,CM

UNITED ARAB EMIRATES

Emitac Ltd.
P.O. Box 1641
SHARJAH,
Tel: 591181
Telex: 68136 EMITAC EM
Cable: EMITAC SHARJAH
E,C,M,P,A

Emitac Ltd.
P.O. Box 2711
ABU DHABI,
Tel: 820419-20
Cable: EMITACH ABUDHABI

Emitac Ltd.
P.O. Box 8391
DUBAI,
Tel: 377951

Emitac Ltd.
P.O. Box 473
RAS AL KHAIMAH,
Tel: 28133, 21270

UNITED KINGDOM

GREAT BRITAIN
Hewlett-Packard Ltd.
Trafalgar House
Navigation Road
ALTRINCHAM
Cheshire WA14 1NU
Tel: 061 928 6422
Telex: 668068
A,CH,CS,E,M,M,P
Hewlett-Packard Ltd.
Miller House
The Ring, **BRACKNELL**
Berks RG12 1XN
Tel: 44344 424898
Telex: 848733
E

Hewlett-Packard Ltd.
Elstree House, Elstree Way
BOREHAMWOOD, Herts WD6 1SG
Tel: 01 207 5000
Telex: 8952716
E,CH,CS,P
Hewlett-Packard Ltd.
Oakfield House, Oakfield Grove
Clifton **BRISTOL,** Avon BS8 2BN
Tel: 0272 736806
Telex: 444302
CH,CS,E,P



SALES & SUPPORT OFFICES

Arranged alphabetically by country

GREAT BRITAIN (Cont'd)

Hewlett-Packard Ltd.
Bridewell House
Bridewell Place
LONDON EC4V 6BS
Tel: 01 583 6565
Telex: 298163
CH,CS,P

Hewlett-Packard Ltd.
Fourier House
257-263 High Street
LONDON COLNEY
Herts. AL2 1HA, St. Albans
Tel: 0727 24400
Telex: 1-8952716
CH,CS

Hewlett-Packard Ltd.
Pontefract Road
NORMANTON, West Yorkshire WF6 1RN
Tel: 0924 895566
Telex: 557355
CH,CS,P

Hewlett-Packard Ltd.
The Quadrangle
106-118 Station Road
REDHILL, Surrey RH1 1PS
Tel: 0737 68655
Telex: 947234
CH,CS,E,P

Hewlett-Packard Ltd.
Avon House
435 Stratford Road
Shirley, SOLIHULL, West Midlands
B90 4BL
Tel: 021 745 8800
Telex: 339105
CH,CS,E,P

Hewlett-Packard Ltd.
West End House
41 High Street, West End
SOUTHAMPTON
Hampshire SO3 3DQ
Tel: 04218 6767
Telex: 477138
CH,CS,P

Hewlett-Packard Ltd.
King Street Lane
Winnersh, WOKINGHAM
Berkshire RG11 5AR
Tel: 0734 784774
Telex: 847178
A,CH,CS,E,M,P

Hewlett-Packard Ltd.
Nine Mile Ride
Easthampstead, WOKINGHAM
Berkshire, 3RG11 3LL
Tel: 0344 773100
Telex: 848805
CH,CS,E,P

IRELAND

NORTHERN IRELAND

Hewlett-Packard Ltd.
Cardiac Services Building
95A Finaghy Road South
BELFAST BT10 OBY
Tel: 0232 625-566
Telex: 747626
CH,CS

SCOTLAND

Hewlett-Packard Ltd.
SOUTH QUEENSFERRY
West Lothian, EH30 9TG
Tel: 031 331 1188
Telex: 72682
CH,CM,CS,E,M,P

UNITED STATES

Alabama

Hewlett-Packard Co.
700 Century Park South, Suite 128
BIRMINGHAM, AL 35226
Tel: (205) 822-6802
C,CH,CS,P*

Hewlett-Packard Co.
420 Wynn Drive
P.O. Box 7700
HUNTSVILLE, AL 35807
Tel: (205) 830-2000
C,CH,CM,CS,E,M*

Alaska

Hewlett-Packard Co.
3601 C St., Suite 1234
ANCHORAGE, AK 99503
Tel: (907) 563-8855
CH,CS,E

Arizona

Hewlett-Packard Co.
8080 Pointe Parkway West
PHOENIX, AZ 85044
Tel: (602) 273-8000
A,CH,CM,CS,E,M

Hewlett-Packard Co.
2424 East Aragon Road
TUCSON, AZ 85706
Tel: (602) 573-7400
CH,E,M**

California

Hewlett-Packard Co.
99 South Hill Dr.
BRISBANE, CA 94005
Tel: (415) 330-2500
CH,CS

Hewlett-Packard Co.
P.O. Box 7830 (93747)
5060 E. Clinton Avenue, Suite 102
FRESNO, CA 93727
Tel: (209) 252-9652
CH,CS,M

Hewlett-Packard Co.
1421 S. Manhattan Av.
FULLERTON, CA 92631
Tel: (714) 999-6700
CH,CM,CS,E,M

Hewlett-Packard Co.
320 S. Kellogg, Suite B
GOLETA, CA 93117
Tel: (805) 967-3405
CH

Hewlett-Packard Co.
5400 W. Rosecrans Blvd.
LAWDALE, CA 90260
P.O. Box 92105
LOS ANGELES, CA 90009
Tel: (213) 643-7500
Telex: 9 10-325-6608
CH,CM,CS,M

Hewlett-Packard Co.
3155 Porter Drive
PALO ALTO, CA 94304
Tel: (415) 857-8000
CH,CS,E

Hewlett-Packard Co.
4244 So. Market Court, Suite A
P.O. Box 15976
SACRAMENTO, CA 95813
Tel: (916) 929-7222
A*,CH,CS,E,M

Hewlett-Packard Co.
9606 Aero Drive
P.O. Box 23333
SAN DIEGO, CA 92123
Tel: (619) 279-3200
CH,CM,CS,E,M

Hewlett-Packard Co.
2305 Camino Ramon 'C'
SAN RAMON, CA 94583
Tel: (415) 838-5900
CH,CS

Hewlett-Packard Co.
3005 Scott Boulevard
SANTA CLARA, CA 95050
Tel: (408) 988-7000
Telex: 910-338-0586
A,CH,CM,CS,E,M

Hewlett-Packard Co.
5703 Corsa Avenue
WESTLAKE VILLAGE, CA 91362
Tel: (213) 706-6800
E*,CH*,CS*

Colorado

Hewlett-Packard Co.
24 Inverness Place, East
ENGLEWOOD, CO 80112
Tel: (303) 649-5000
A,CH,CM,CS,E,M

Connecticut

Eff. Dec. 1, 1994
Hewlett-Packard Co.
500 Sylvan Av.
BRIDGEPORT, CT 06606
Tel: (203) 371-6454
CH,CS,E

Hewlett-Packard Co.
47 Barnes Industrial Road South
P.O. Box 5007
WALLINGFORD, CT 06492
Tel: (203) 265-7801
A,CH,CM,CS,E,M

Florida

Hewlett-Packard Co.
2901 N.W. 62nd Street
P.O. Box 24210
FORT LAUDERDALE, FL 33307
Tel: (305) 973-2600
CH,CS,E,M,P*

Hewlett-Packard Co.
4080 Woodcock Drive, Suite 132
JACKSONVILLE, FL 32207
Tel: (904) 398-0663
C*,CH*,M**

Hewlett-Packard Co.
6177 Lake Ellenor Drive
P.O. Box 13910

ORLANDO, FL 32859
Tel: (305) 859-2900
A,C,CH,CM,CS,E,P*

Hewlett-Packard Co.
4700 Bayoue Blvd.
Building 5
PENSACOLA, FL 32505
Tel: (904) 476-8422
A,C,CH,CM,CS,M

Hewlett-Packard Co.
5550 Idlewild, #150
P.O. Box 15200
TAMPA, FL 33684
Tel: (813) 884-3282
A*,C,CH,CS,E*,M*,P*

Georgia

Hewlett-Packard Co.
2000 South Park Place
P.O. Box 105005
ATLANTA, GA 30348
Tel: (404) 955-1500
Telex: 810-766-4890
A,C,CH,CM,CS,E,M,P*

Hawaii

Hewlett-Packard Co.
Kawaiahao Plaza, Suite 190
567 South King Street
HONOLULU, HI 96813
Tel: (808) 526-1555
A,CH,E,M

Illinois

Hewlett-Packard Co.
304 Eldorado Road
P.O. Box 1607
BLOOMINGTON, IL 61701
Tel: (309) 662-9411
CH,M**

Hewlett-Packard Co.
525 W. Monroe, #1300
CHICAGO, IL 60606
Tel: (312) 930-0010
CH,CS

Hewlett-Packard Co.
1200 Diehl
NAPERVILLE, IL 60566
Tel: (312) 357-8800
CH*,CS

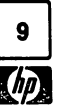
Hewlett-Packard Co.
5201 Tollview Drive
ROLLING MEADOWS, IL 60008
Tel: (312) 255-9800
Telex: 910-687-1066
A,CH,CM,CS,E,M

Indiana

Hewlett-Packard Co.
11911 N. Meridian St.
CARMEL, IN 46032
Tel: (317) 844-4100
A,CH,CM,CS,E,M

Iowa

Hewlett-Packard Co.
4070 22nd Av. SW
CEDAR RAPIDS, IA 52404
Tel: (319) 390-4250
CH,CS,E,M



UNITED STATES (Cont'd)

Hewlett-Packard Co.
4201 Corporate Dr.
WEST DES MOINES, IA 50265
Tel: (515) 224-1435
A**,CH,M**

Kentucky
Hewlett-Packard Co.
10300 Linn Station Road, #100
LOUISVILLE, KY 40223
Tel: (502) 426-0100
A,CH,CS,M

Louisiana
Hewlett-Packard Co.
160 James Drive East
ST. ROSE, LA 70087
P.O. Box 1449
KENNER, LA 70063
Tel: (504) 467-4100
A,C,CH,E,M,P*

Maryland
Hewlett-Packard Co.
3701 Koppers Street
BALTIMORE, MD 21227
Tel: (301) 644-5800
Telex: 710-862-1943
A,CH,CM,CS,E,M
Hewlett-Packard Co.
2 Choke Cherry Road
ROCKVILLE, MD 20850
Tel: (301) 948-6370
A,CH,CM,CS,E,M

Massachusetts
Hewlett-Packard Co.
1775 Minuteman Road
ANDOVER, MA 01810
Tel: (617) 682-1500
A,C,CH,CS,CM,E,M,P*
Hewlett-Packard Co.
32 Hartwell Avenue
LINGTON, MA 02173
Tel: (617) 861-8960
CH,CS,E

Michigan
Hewlett-Packard Co.
4326 Cascade Road S.E.
GRAND RAPIDS, MI 49506
Tel: (616) 957-1970
CH,CS,M
Hewlett-Packard Co.
39550 Orchard Hill Place Drive
NOVI, MI 48050
Tel: (313) 349-9200
A,CH,CS,E,M
Hewlett-Packard Co.
1771 W. Big Beaver Road
TROY, MI 48084
Tel: (313) 643-6474
CH,CS

Minnesota
Hewlett-Packard Co.
2025 W. Larpentour Ave.
ST. PAUL, MN 55113
Tel: (612) 644-1100
A,CH,CM,CS,E,M

Missouri
Hewlett-Packard Co.
1001 E. 101st Terrace
KANSAS CITY, MO 64131
Tel: (816) 941-0411
A,CH,CM,CS,E,M

Hewlett-Packard Co.
13001 Hollenberg Drive
BRIDGETON, MO 63044
Tel: (314) 344-5100
A,CH,CS,E,M

Nebraska
Hewlett-Packard
10824 Old Mill Rd., Suite 3
OMAHA, NE 68154
Tel: (402) 334-1813
CM,M

New Jersey
Hewlett-Packard Co.
120 W. Century Road
PARAMUS, NJ 07652
Tel: (201) 265-5000
A,CH,CM,CS,E,M
Hewlett-Packard Co.
20 New England Av. West
PISCATAWAY, NJ 08854
Tel: (201) 981-1199
A,CH,CM,CS,E

New Mexico
Hewlett-Packard Co.
11300 Lomas Blvd., N.E.
P.O. Box 11634
ALBUQUERQUE, NM 87112
Tel: (505) 292-1330
CH,CS,E,M

New York
Hewlett-Packard Co.
5 Computer Drive South
ALBANY, NY 12205
Tel: (518) 458-1550
A,CH,E,M
Hewlett-Packard Co.
9600 Main Street
P.O. Box AC
CLARENCE, NY 14031
Tel: (716) 759-8621
CH,CS,E

Hewlett-Packard Co.
200 Cross Keys Office Park
FAIRPORT, NY 14450
Tel: (716) 223-9950
A,CH,CM,CS,E,M
Hewlett-Packard Co.
7641 Henry Clay Blvd.
LIVERPOOL, NY 13088
Tel: (315) 451-1820
A,CH,CM,CS,E,M
Hewlett-Packard Co.
No. 1 Pennsylvania Plaza
55th Floor
34th Street & 8th Avenue
MANHATTAN NY 10119
Tel: (212) 971-0800
CH,CS,M*

Hewlett-Packard Co.
15 Myers Corner Rd.
WAPPINGER FALLS, NY 12590
CM,E

Hewlett-Packard Co.
250 Westchester Avenue
WHITE PLAINS, NY 10604
Tel: (914) 684-6100
CM,CH,CS,E

Hewlett-Packard Co.
3 Crossways Park West
WOODBURY, NY 11797
Tel: (516) 921-0300
A,CH,CM,CS,E,M

North Carolina
Hewlett-Packard Co.
305 Gregson Dr.
CARY, NC 27511
Tel: (919) 467-6600
C,CH,CM,CS,E,M,P*
Hewlett-Packard Co.
9600-H Southern Pine Blvd.
CHARLOTTE, NC 28210
Tel: (704) 527-8780
CH*,CS*

Hewlett-Packard Co.
5605 Roanne Way
P.O. Box 26500
GREENSBORO, NC 27420
Tel: (919) 852-1800
A,C,CH,CM,CS,E,M,P*

Ohio
Hewlett-Packard Co.
9920 Carver Road
CINCINNATI, OH 45242
Tel: (513) 891-9870
CH,CS,M

Hewlett-Packard Co.
16500 Sprague Road
CLEVELAND, OH 44130
Tel: (216) 243-7300
A,CH,CM,CS,E,M

Hewlett-Packard Co.
980 Springboro Pike
MIAMISBURG, OH 45343
Tel: (513) 859-8202
A,CH,CM,E*,M

Hewlett-Packard Co.
675 Brooksedge Blvd.
WESTERVILLE, OH 43081
Tel: (614) 436-1041
CH,CM,CS,E*

Oklahoma
Hewlett-Packard Co.
304 N. Meridian, Suite A
P.O. Box 75609
OKLAHOMA CITY, OK 73147
Tel: (405) 946-9499
C,CH,CS,E*,M
Hewlett-Packard Co.
3840 S. 103rd E. Ave., #100
P.O. Box 35747
TULSA, OK 74153
Tel: (918) 665-3300
A**,C,CH,CS,M*,E,P*

Oregon
Hewlett-Packard Co.
9255 S. W. Pioneer Court
P.O. Box 328
WILSONVILLE, OR 97070
Tel: (503) 682-8000
A,CH,CS,E*,M

Pennsylvania
Hewlett-Packard Co.
50 Dorchester Rd.
P.O. Box 6080
HARRISBURG, PA 17111
Tel: (717) 657-5900
C

Hewlett-Packard Co.
111 Zeta Drive
PITTSBURGH, PA 15238
Tel: (412) 782-0400
A,CH,CS,E,M
Hewlett-Packard Co.
2750 Monroe Boulevard
P.O. Box 713
VALLEY FORGE, PA 19482
Tel: (215) 666-9000
A,CH,CM,CS,E,M

South Carolina
Hewlett-Packard Co.
Brookside Park, Suite 122
1 Harbison Way
P.O. Box 21708
COLUMBIA, SC 29221
Tel: (803) 732-0400
A,C,CH,CS,M
Hewlett-Packard Co.
100 Executive Cntr. Dr.
Koger Executive Center
Chesterfield Bldg., Suite 124
GREENVILLE, SC 29615
Tel: (803) 297-4120
C

Tennessee
Hewlett-Packard Co.
One Energy Centr. #200
Pellissippi Pkwy.
P.O. Box 22490
KNOXVILLE, TN 37933
Tel: (615) 966-4747
A,C,CH,CS,M
Hewlett-Packard Co.
3070 Directors Row
MEMPHIS, TN 38131
Tel: (901) 346-8370
A,C,M
Hewlett-Packard Co.
220 Great Circle Road, Suite 1*
NASHVILLE, TN 37228
Tel: (615) 255-1271
C,M,P*

Texas
Hewlett-Packard Co.
11002-B Metric Boulevard
AUSTIN, TX 78758
Tel: (512) 835-6771
C,CM,E,P*
Hewlett-Packard Co.
5700 Cromo Dr
P.O. Box 12903
EL PASO, TX 79913
Tel: (915) 833-4400
CH,E*,M**



SALES & SUPPORT OFFICES

Arranged alphabetically by country

UNITED STATES (Cont'd)

Hewlett-Packard Co.
3952 Sand Shell St
FORT WORTH, TX 76137
Tel: (817) 232-9500
A,C,CH,E,M

Hewlett-Packard Co.
10535 Harwin Drive
P.O. Box 42816
HOUSTON, TX 77042
Tel: (713) 776-6400
A,C,CH,CS,E,M,P*

Hewlett-Packard Co.
511 W. John W. Carpenter Fwy.
Royal Tech. Center #100
IRVINE, TX 75062
Tel: (214) 556-1950
C,CH,CS,E

Hewlett-Packard Co.
930 E. Campbell Rd.
P.O. Box 83/1270
RICHARDSON, TX 75083-1270
Tel: (214) 231-6101
A,CH,CM,CS,E,M,P*

Hewlett-Packard Co.
1020 Central Parkway South
P.O. Box 32993
SAN ANTONIO, TX 78232
Tel: (512) 494-9336
A,C,CH,CS,E,M,P*

Utah

Hewlett-Packard Co.
3530 W. 2100 South
P.O. Box 26626
SALT LAKE CITY, UT 84126
Tel: (801) 974-1700
A,CH,CS,E,M

Virginia

Hewlett-Packard Co.
4305 Cox Road
GLEN ALLEN, VA 23060
P.O. Box 9669
RICHMOND, VA 23228
Tel: (804) 747-7750
A,C,CH,CS,E,M,P*

Washington

Hewlett-Packard Co.
15815 S.E. 37th Street
BELLEVUE, WA 98006
Tel: (206) 643-4000
A,CH,CM,CS,E,M

Hewlett-Packard Co.
708 North Argonne Road
P.O. Box 3808
SPOKANE, WA 99220-3808
Tel: (509) 922-7000
CH,CS

West Virginia

Hewlett-Packard Co.
4604 MacCorkle Ave.
CHARLESTON, WV 25304
Tel: (304) 925-0492
A,M

Wisconsin

Hewlett-Packard Co.
275 N. Corporate Dr.
BROOKFIELD, WI 53005
Tel: (414) 784-8800
A,CH,CS,E*,M

URUGUAY

Pablo Ferrando S.A.C. e I.
Avenida Italia 2877
Casilla de Correo 370
MONTEVIDEO
Tel: 80-2586
Telex: Public Booth 901
A,CM,E,M

Mini Computadores, Ltda.
Avda. del Libertador 1997
Gral Lavalleja 2071
Local 007

MONTEVIDEO

Tel: 29-55-22
Telex: 901 P BOOTH UY
P

Olympia de Uruguay S.A.
Maquinas de Oficina
Avda. del Libertador 1997
Casilla de Correos 6644

MONTEVIDEO

Tel: 91-1809, 98.-3807
Telex: 6342 OROU UY
P

VENEZUELA

Hewlett-Packard de Venezuela C.A.
3RA Transversal Los Ruices Norte
Edificio Segre 1, 2 & 3
Apartado 50933

CARACAS 1071

Tel: 239-4133
Telex: 251046 HEWPACK
A,CH,CS,E,M,P

Hewlett-Packard de Venezuela C.A.

Residencias Tia Betty Local 1
Avenida 3 y con calle 75

MARACAIBO, Estado Zulia
Apartado 2646

Tel: (061) 75801-75805-75806-80304
Telex: 62464 HPMAR
C,E*

Hewlett-Packard de Venezuela C.A.

Urb. Lomas de Este
Torre Trebol — Piso 11
VALENCIA, Estado Carabobo
Apartado 3347

Tel: (041) 222992/223024
CH,CS,P

Albis Venezolana S.R.L.
Av. Las Marias, Ota. Alix,
El Pedregal

Apartado 81025

CARACAS 1080A

Tel: 747984, 742146
Telex: 24009 ALBIS VC
A

Tecnologica Medica del Caribe, C.A.
Multicentro Empresarial del Este
Ave. Libertador
Edif. Libertador
Nucleo "C" - Oficina 51-52

CARACAS

Tel: 339867/333780
M

CIZUCA

Cientifica Zulia C.A.
Calle 70, Los Olivos
No. 66-86

Apartado 1843

MARACAIBO

Tel: 54-64-37, 54-63-85, 54-64-94
Telex: 62144

A

YUGOSLAVIA

Do Hermes

General Zdanova 4

Telex: YU-11000 BEOGRAD

A,CH,E,P

Hermes

Titova 50

Telex: YU-61000 LJUBLJANA

CH,CS,E,M,P

Elektrotehna

Titova 51

Telex: YU-61000 LJUBLJANA

CM

ZAMBIA

R.J. Tilbury (Zambia) Ltd.

P.O. Box 32792

LUSAKA

Tel: 215590

Telex: 40128

E

ZIMBABWE

Field Technical Sales

45 Kelvin Road, North

P.B. 3458

SALISBURY

Tel: 705 231

Telex: 4-122 RH

E,P

August 1984

HP distributors are printed in italics.

Part No. 30144-90002
B0584
Printed in U.S.A. 5/84

