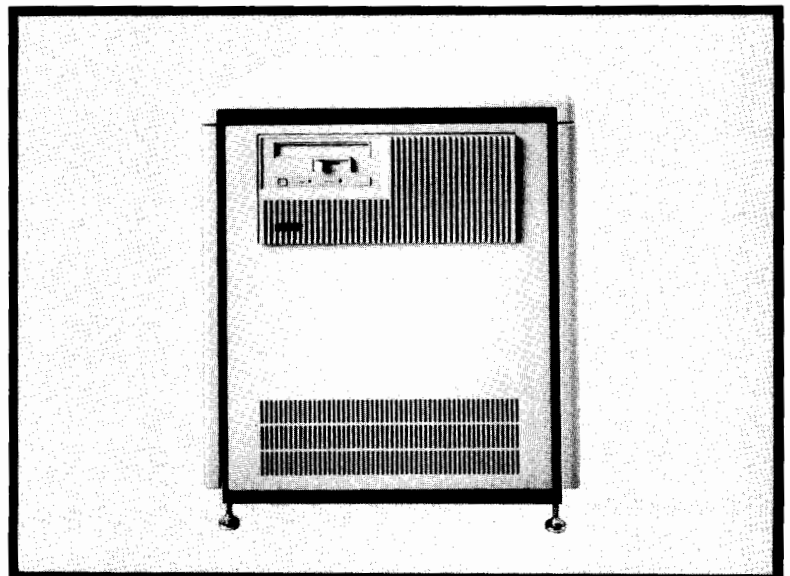
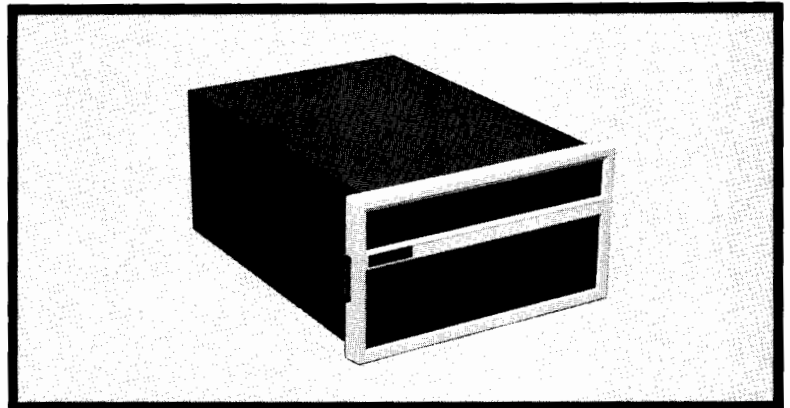
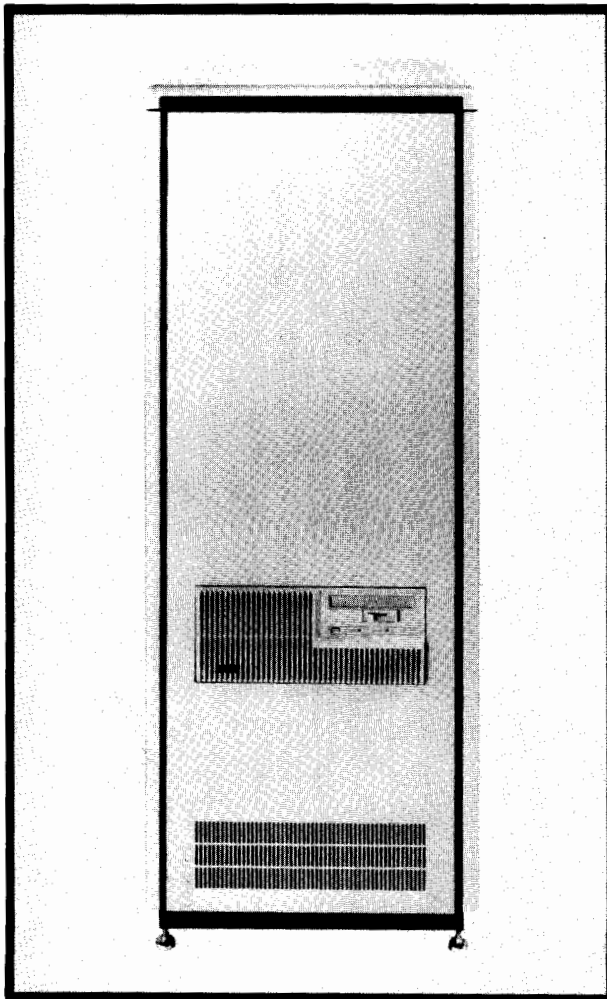


HP 12156A Floating Point Processor Kit

Installation and Reference Manual

HP 10000 A-Series



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HP 12156A Floating Point Processor Kit

Installation and Reference Manual

PRINTING HISTORY

The Printing History below identifies the Edition of this Manual and any Updates that are included. Periodically, Update packages are distributed which contain replacement pages to be merged into the manual, including an updated copy of this Printing History page. Also, the update may contain write-in instructions.

Each reprinting of this manual will incorporate all past Updates, however, no new information will be added. Thus, the reprinted copy will be identical in content to prior printings of the same edition with its user-inserted update information. New editions of this manual will contain new information, as well as all Updates.

To determine what software manual edition and update is compatible with your current software revision code, refer to the appropriate Software Numbering Catalog, Software Product Catalog, or Diagnostic Configurator Manual.

First Edition April 1982

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SAFETY CONSIDERATIONS

GENERAL - This product and relation documentation must be reviewed for familiarization with safety markings and instructions before operation.

SAFETY SYMBOLS



Instruction manual symbol: the product will be marked with this symbol when it is necessary for the user to refer to the instruction manual in order to protect the product against damage.



Indicates hazardous voltages.



Indicates earth (ground) terminal (sometimes used in manual to indicate circuit common connected to grounded chassis).

WARNING

The **WARNING** sign denotes a hazard. It calls attention to a procedure, practice, or the like, which, if not correctly performed or adhered to, could result in injury. Do not proceed beyond a **WARNING** sign until the indicated conditions are fully understood and met.

CAUTION

The **CAUTION** sign denotes a hazard. It calls attention to an operating procedure, practice, or the like, which, if not correctly performed or adhered to, could result in damage to or destruction of part or all of the product. Do not proceed beyond a **CAUTION** sign until the indicated conditions are fully understood and met.

CAUTION

STATIC SENSITIVE DEVICES

Some of the semiconductor devices used in this equipment are susceptible to damage by static discharge. Depending on the magnitude of the charge, device substrates can be punctured or destroyed by contact or mere proximity to a static charge. These charges are generated in numerous ways such as simple contact, separation of materials, and normal motions of persons working with static sensitive devices.

When handling or servicing equipment containing static sensitive devices, adequate precautions must be taken to prevent device damage or destruction. Only those who are thoroughly familiar with industry accepted techniques for handling static sensitive devices should attempt to service the cards with these devices. In all instances, measures must be taken to prevent static charge buildup on work surfaces and persons handling the devices. Cautions are included through this manual where handling and maintenance involve static sensitive devices.

SAFETY EARTH GROUND - This is a safety class I product and is provided with a protective earthing terminal. An uninteruptible safety earth ground must be provided from the main power source to the product input wiring terminals, power cord, or supplied power cord set. Whenever it is likely that the protection has been impaired, the product must be made inoperative and be secured against any unintended operation.

BEFORE APPLYING POWER - Verify that the product is configured to match the available main power source per the input power configuration instructions provided in this manual.

If this product is to be energized via an auto-transformer (for voltage reduction) make sure the common terminal is connected to the earth terminal of the main power source.

SERVICING

WARNING

Any servicing, adjustment, maintenance, or repair of this product must be performed only by qualified personnel.

Adjustments described in this manual may be performed with power supplied to the product while protective covers are removed. Energy available at many points may, if contacted, result in personal injury.

Capacitors inside this product may still be charged even when disconnected from its power source.

To avoid a fire hazard, only fuses with the required current rating and of the specified type (normal blow, time delay, etc.) are to be used for replacement.

WARNING

EYE HAZARD

Eye protection must be worn when removing or inserting integrated circuits held in place with retaining clips.

GENERAL INFORMATION

SECTION

I

1-1. INTRODUCTION

This manual provides general information and installation procedures for the HP 12156A Floating Point Processor Kit.

1-2. DESCRIPTION

The HP 12156A Floating Point Processor (FPP) Card provides rapid hardware execution of both single and double precision floating point instructions for the HP A700 computers. When installed and enabled, all floating point operations are performed by hardware logic on the FPP card, replacing the software or firmware execution by the central processor. The 12156A also executes the instructions in the A700 Scientific Instruction Set (SIS) and Vector Instruction Set (VIS).

On the FPP card are PROMs containing the microcode required to execute all floating point, SIS, and VIS instructions. This microcode becomes part of the control store priority and address scheme when the 12156A is installed.

The FPP card also contains four sockets for either 2k or 4k of optional user PROM containing user microprograms prepared with the HP 92045A Microprogramming Software Package.

1-3. EQUIPMENT SUPPLIED

The HP 12156A Floating Point Processor Card is shipped from the factory with all required microcode PROMs in place, and includes the following equipment (see Figure 1-1):

- HP 12156A Floating Point Processor Card, part no. 12156-60001.
- Floating Point Processor Frontplane, part no. 12156-60002.
- HP 12156A Floating Point Processor Kit Installation and Reference Manual, part no. 12156-90001.

1-4. SPECIFICATIONS

Table 1-1 provides the specifications of the HP 12156A Floating Point Card.

Refer to the *HP 1000 A700 Computer Reference Manual*, part no. 02137-90001, for the descriptions and execution times of the floating point, SIS, and VIS instructions.

Table 1-1. HP 12156A Floating Point Processor Card Specifications

TYPICAL POWER REQUIREMENTS	
Without User PROMs 4.3 Amps	With User PROMs* 4.8 Amps
PHYSICAL DIMENSIONS	
Length: 28.91 cm (11.38 in.)	
Width: 17.15 cm (6.75 in.)	
*PROMs suitable for user microprograms are listed in the HP 92045A Reference Manual.	

1-5. CARD IDENTIFICATION

The FPP card part number is located in a corner on the component side of the card (see Figure 1-2). Reference this part number in all correspondence concerning the FPP card.

1-6. ADDITIONAL INFORMATION

For additional information on programming and use of the floating point card, refer to the following:

- HP 1000 A700 Computer Reference Manual, part no. 02137-90001
- HP 92045A Microprogramming Package Reference Manual, part no. 92045-90001
- Microprogramming Quick Reference Pocket Guide, part no. 92045-90003
- HP 12824A Vector Instruction Set User's Manual, part no. 12824-90001

1-7. SERVICE INFORMATION

A system failure can be isolated to the FPP card by running the Floating Point Card Diagnostic Program, as referenced in the A-Series Computer Kernel Diagnostic Reference Manual, part no. 24612-90003. For service and repair or replacement of the floating point card, contact the nearest Hewlett-Packard Sales and Service Office listed in the rear of this manual.

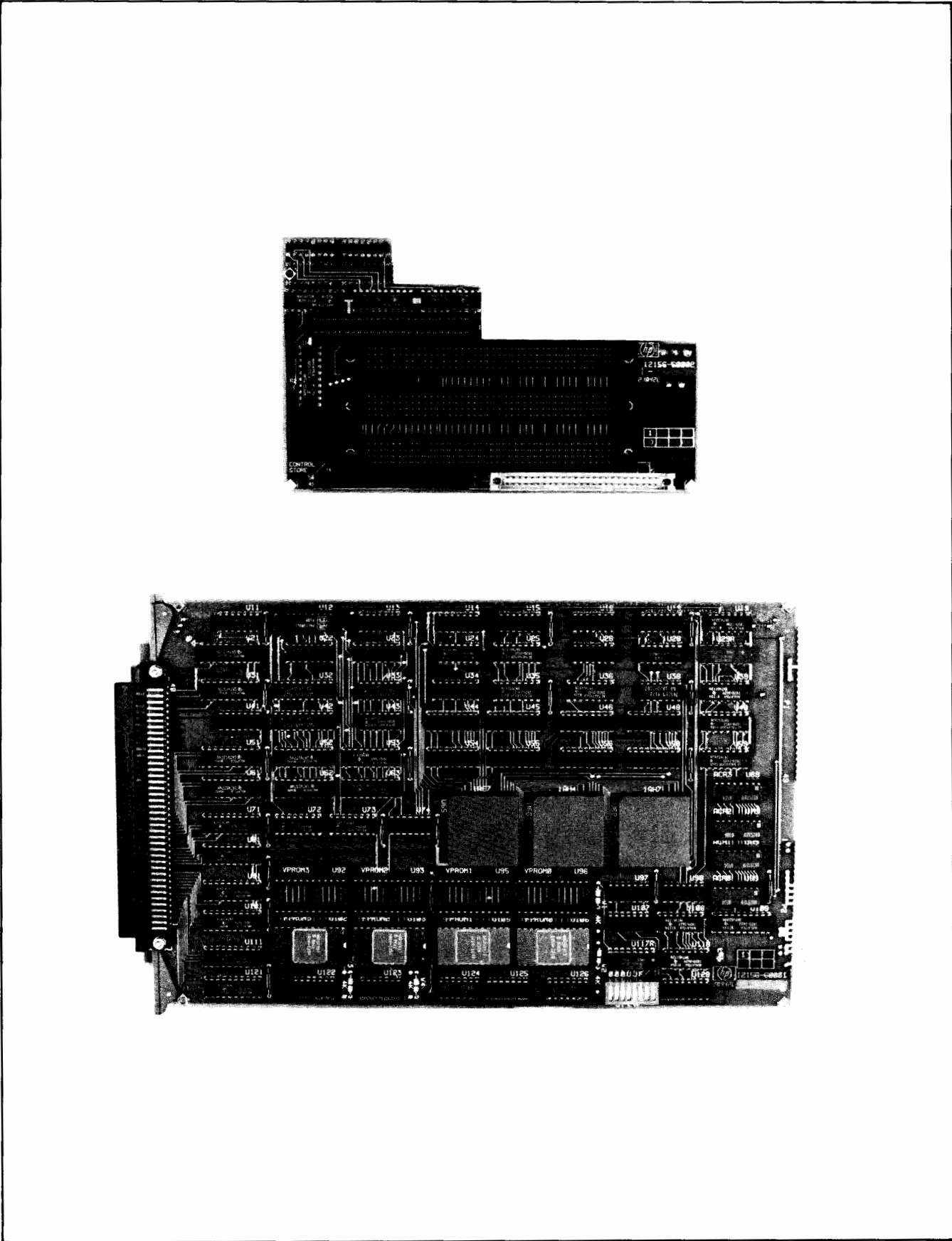


Figure 1-1. HP 12156A Floating Point Processor Kit

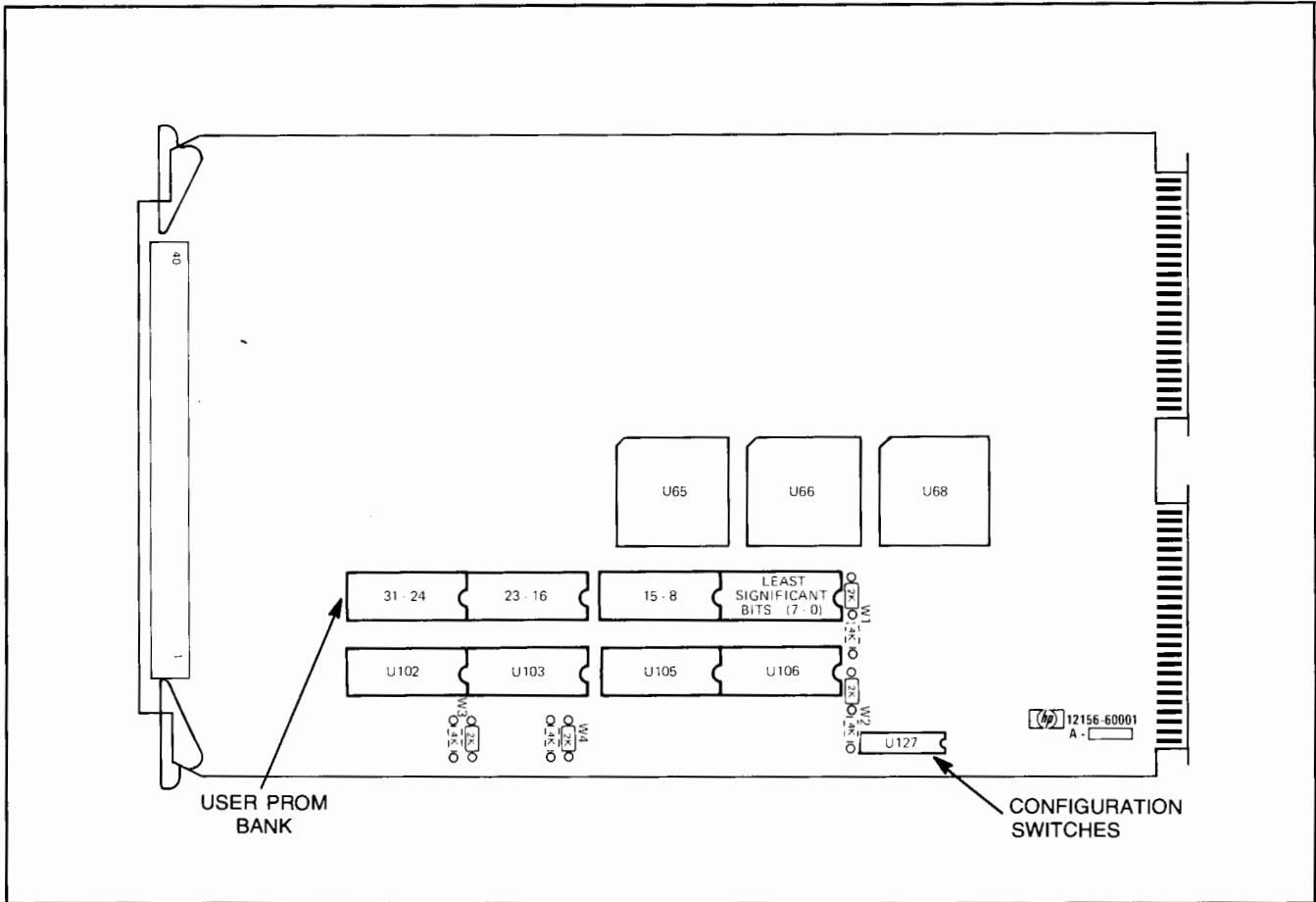


Figure 1-2. Floating Point Processor Card Diagram

1-8. RESHIPMENT

Prior to returning the FPP card to Hewlett-Packard for repair or replacement, attach a tag to the card identifying the owner and indicating the service to be performed.

Pack the FPP card in the original factory shipping container and packing material, if available, or use equivalent commercial packing materials.

CAUTION

To prevent circuit damage, use antistatic procedures when handling printed circuit assemblies.

UNPACKING AND INSTALLATION

SECTION

II

2-1. INTRODUCTION

The HP 12156A Floating Point Processor (FPP) Card, when ordered separate from the computer, is shipped from the factory as a complete kit, ready for field installation in the computer.

2-2. UNPACKING AND INSPECTION

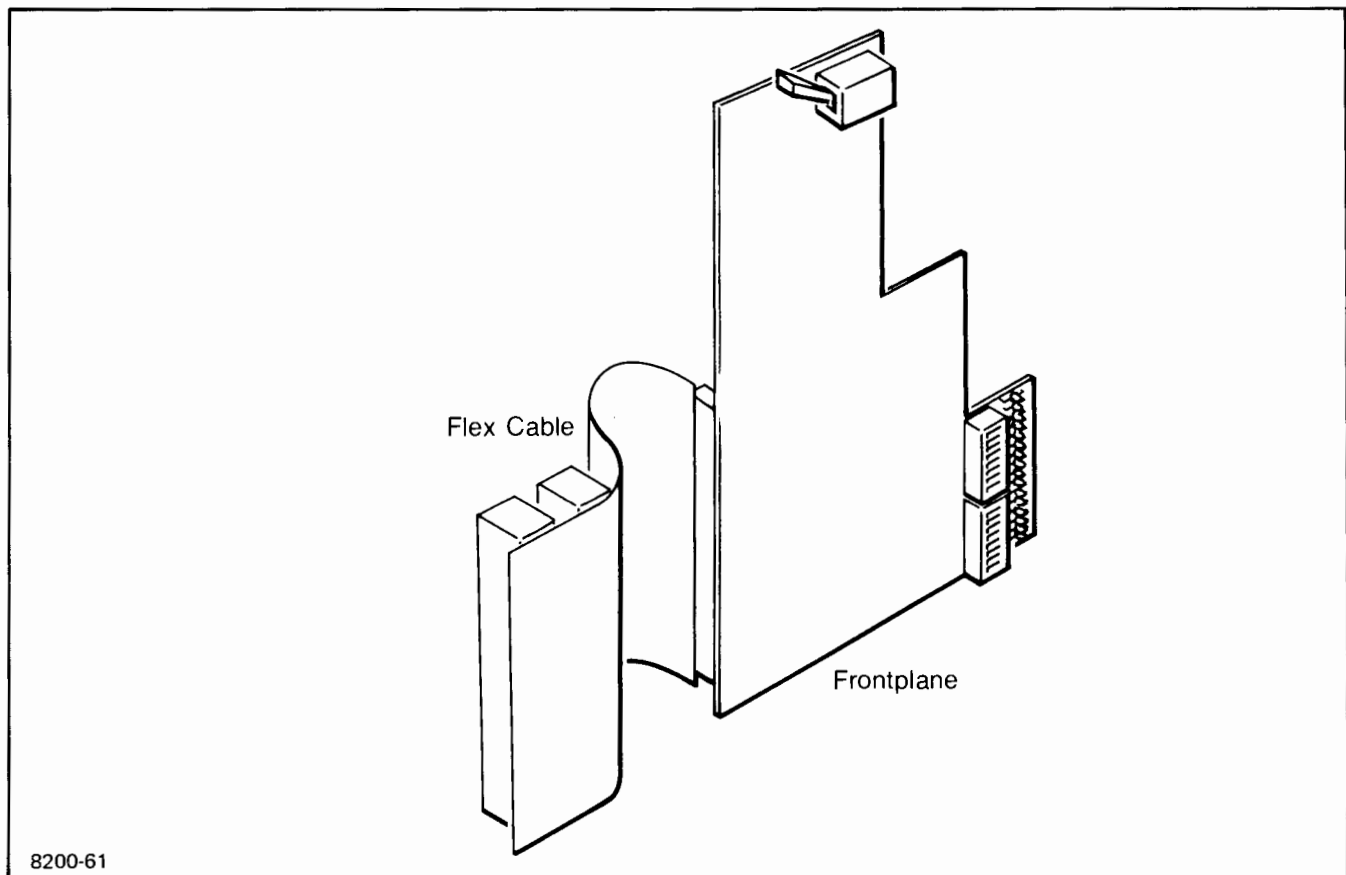
CAUTION

To prevent circuit damage, use antistatic procedures when handling printed circuit assemblies.

Inspect the floating point kit items upon receipt for possible shipping damage. If there are signs of damage to any of the items in the kit, contact the responsible shipping agent for damage claims procedures, and the nearest Hewlett-Packard sales representative for replacement of damaged items.

2-3. PROM ENABLE AND ADDRESS CONFIGURATION

The FPP card contains two banks of sockets for microcode PROM, and each bank can contain either 2k or 4k of microcode. The first bank contains the standard floating point/SIS/VIS 2k PROMs, and its address block is hard wired to start at 1000 (hex). The second bank is for optional user PROMs (2k or 4k), and its address block must start at the starting address of the microprogram in the user PROMs. The address block is set by three switches on the FPP card and must be assigned by the user before the card is installed in the computer. The user bank is also associated with two wire jumpers (W1 and W3) that must be placed to agree with the type of PROM used (2k or 4k). (Jumpers W1 through W4 are set for 2k PROMs at the factory.) Each bank of PROMs must also be enabled or disabled by setting FPP card switches before the card is installed. The switch and jumper locations are shown in Figure 1-2; the switch positions are tabulated in Tables 2-1 and 2-2.



8200-61

Figure 2-1. Processor Frontplane and Flexible Control-Store Cable

Table 2-1. PROM Address Select and Enable Switch Settings

USER PROM BANK ADDRESS ASSIGNMENT:		
Switches 000 set to block address of the user PROM bank (open = 1; closed = 0). (See Table 2-2.)		
USER BANK ENABLE: Switch U:		
Open	= disable user bank (this setting is required when user PROMs are not installed)	
Closed	= enable user bank	
JUMP TABLE ENABLE: Switch J:		
Open	= disable Jump Table overlay	
Closed	= enable Jump Table overlay (this is the normal* setting)	
FLOATING POINT BANK ENABLE: Switch F:		
Open	= disable floating-point, SIS, and VIS PROMs	
Closed	= enable floating-point, SIS, and VIS PROMs (this is the normal* setting)	
*This switch setting is required in order for the computer floating point/SIS/VIS instructions to be processed by the floating point hardware.		
NOTE: Switches 7 and 8 are not used.		

Table 2-2. User PROM Address Selection

PROM ADDRESS SWITCHES* 000			ADDRESS BLOCK		
1	2	3	HEX	OCTAL	DECIMAL
FOR 2K PROMS					
0	0	0	0-7FF	0-3777	0-2047
0	0	1	800-FFF	4000-7777	2048-4095
0	1	0	1000-17FF	10000-13777	4096-6143
0	1	1	1800-1FFF	14000-17777	6144-8191
1	0	0	2000-27FF	20000-23777	8192-10239
1	0	1	2800-2FFF	24000-27777	10240-12287
1	1	0	3000-37FF	30000-33777	12288-14335
1	1	1	3800-3FFF	34000-37777	14336-16383
FOR 4K PROMS					
0	0	x	0-FFF	0-7777	0-4095
0	1	x	1000-1FFF	10000-17777	4096-8191
1	0	x	2000-2FFF	20000-27777	8192-12287
1	1	x	3000-3FFF	30000-37777	12288-16383
*Open = 1; Closed = 0 x = don't care.					

Using Tables 2-1 and 2-2, set the FPP card switches as required before installing the card.

2-4. PROCESSOR JUMP TABLE OVERLAY

Floating point card PROM address locations 1180 (hex) through 11C0 (hex) can be enabled to overlay processor microinstruction base set locations 0180 (hex) through 01C0 (hex), the 64-microword section of the processor Jump Table that decodes floating-point dependent macro instructions.

To enable the floating point Jump Table overlay function, close switch J before installing the FPP card.

NOTE

Switch J *must* be closed in order for the floating-point hardware to process floating-point instructions.

2-5. INSTALLATION

Before installing the FPP card, ensure that both PROM banks have been enabled or disabled, the address block of the user PROM bank has been assigned, and the processor Jump Table overlay logic has been enabled or disabled, as required (refer to paragraph 2-3 and 2-4).

To install the FPP card, complete the following steps:

- a. Ensure that all computer power is off, and open the computer card cage covers.
- b. Remove the processor frontplane (see Figure 2-1). If the flexible control-store cable is present, disconnect it from the processor frontplane and the control store cards.
- c. Move the Lower Processor Card, and any other cards required, one card slot to the left (as you face the rear of the computer), leaving one open card slot between the Upper and Lower Processor Cards.
- d. Insert the FPP card in the open card slot between the two processor cards, with the component side to the right.
- e. If the flexible control-store cable was installed, connect it to the processor/floating point frontplane supplied with the floating point kit.
- f. Ensure that all cards engage the backplane connector firmly, and connect the processor/floating point frontplane. Also connect the control store cable, if present.
- g. Turn on computer power and perform the computer self test.
- h. Close the computer card cage covers, and resume normal computer operation.

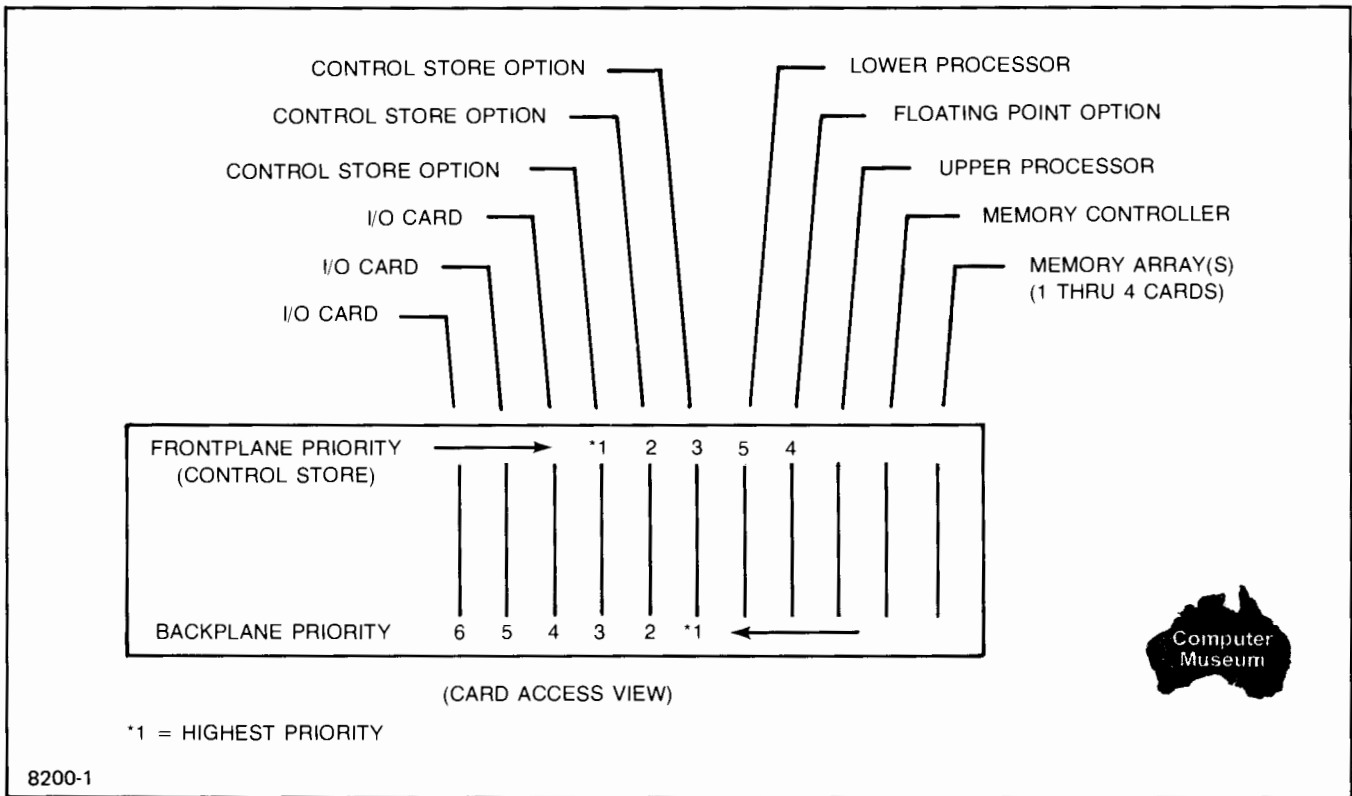


Figure 2-2. Card Cage Loading Diagram

Figure 2-2 is a card cage loading diagram. Note that there can be no empty card slots between the Lower Processor card, control store cards, and any I/O cards. This is required in order to maintain computer backplane I/O interrupt integrity.

2-6. OPERATIONAL CHECKOUT

Load and run the floating point diagnostic program as described in the A-Series Computer Kernel Diagnostic Reference Manual, part no. 24612-90003.

REPLACEABLE PARTS

SECTION

III

3-1. INTRODUCTION

This section provides information on field-replaceable parts of the HP 12156A Floating Point Processor Kit. Replaceable parts are listed in Table 3-1.

3-2. ORDERING INFORMATION

To order replaceable parts, address the order to the nearest Hewlett-Packard Sales and Service Office listed at the back of this manual. The following information should be included in the order for each replaceable part:

- a. Complete model number and serial number.
- b. Hewlett-Packard part number for each part.
- c. Complete description of each part.

3-3. REPAIR ALTERNATIVES

A defective floating point processor card can be exchanged for an operative card. For the cost and other details of the exchange program, contact your nearest HP Sales and Service Office.

Table 3-1. Replaceable Parts

DESCRIPTION	HP PART NO.
Floating Point Processor Card (w/o chips)	12156-60001
IC Chip U68 (Divide)	1AH7-6001
IC Chip U66 (Multiply)	1AH4-6001
IC CHIP U65 (Add/Subtract)	1AE7-6001
SIS/VIS PROM Chip U106	12156-80005
SIS/VIS PROM Chip U105	12156-80006
SIS/VIS PROM Chip U103	12156-80007
SIS/VIS PROM Chip U102	12156-80008
Floating Point Processor Frontplane	12156-60002

