HP 82000 IC Evaluation System

Installing HP 82000 Maxiframes

HP82000 Models D40/50/100/100X/200/400

SERIAL NUMBERS

Affects all Maxiframe systems.

A B C D E

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N o t i c e

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The purpose of this manual is to describe how to install and upgrade HP 82000 Maxiframes.

Target Audience

This manual is targeted at the installation engineer and users of the system.

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Introduction

The HP 82000 is an IC test system for verifying and characterizing ASICs and ICs. There are four models, with maximum vector rates of:

- 40 MHz
- 50 MHz
- 100 MHz
- 100X MHz (model mixable with the D200 and D400 model types)
- 200 MHz
- 400 MHz

Three types of HP 82000 mainframe are available:

- Miniframe
- Standardframe
- Maxiframe

This manual tells you how to install HP 82000 **Maxiframe** systems. The manual is divided into 12 chapters:

1. Unpacking and Placing the System
2. Installing the Controller and Peripherals
3. Installing the System Software
4. Mainframe Assembly
5. Connecting Mains Power
6. Installing System Boards
7. Installing High Speed Width Generators (HSWG)
8. Installing Device Power Supplies (DPS)
9. Installing Instruments
10. Installing the DUT Interface
11. Verifying the System

The structure and information content of this manual are designed for two types of work on Maxiframe systems:

Primary Installation

A primary (or initial) installation is an installation "from scratch". This means that the complete sytem must be unpacked, assembled and verified. If you are performing such an installation you should follow the sequence of the chapters in this manual. The order of the chapters shows the correct sequence for installing a Maxiframe system. Within each chapter, the information is arranged more as reference information, with detailed procedures only where necessary. For most situations (for example, board placement) a list of rules and dependencies is given and from these how to install the particular component should become obvious.

Upgrade Installation

Upgrade installations are installations to already installed systems, such as, adding High Speed Width Generators or new I/O boards. A person carrying-out such an installation does not have to read every chapter. Specific chapters can be picked-out and those that do not apply can be ignored.

Note

Because the Maxiframe offers many different configurations and has many dependencies, we strongly recommend that you read each procedure or list of rules **completely**, before you act on them. This will minimize the chance of installation and configuration errors.

Note

Maxiframe systems are not fully assembled before being shipped to the customer. The system mainframe, with boards, is shipped in one large crate and the other system components are shipped separately.

If you have ordered a Double-Maxiframe (P/N E1202/E1203), two crated Maxiframes are delivered. One of the crates contains a Maxiframe with the DUT interface attached. The other container contains a Maxiframe and the DUT interface cover.

Inspecting Shipment Containers

Inspect the containers for damage. If any are damaged, keep the packing-materials until you have checked the contents mechanically and electrically.

Moving Maxiframes

For short-distance moves, it is possible to push a Maxiframe on its castors. However, you should avoid pushing the Maxiframe over ruts or obstacles, as there is a danger that it could fall over when it hits a rut.

Warning

Push the Maxiframe SLOWLY. If it hits a rut or a seam in the floor at a speed greater than 10 cm/sec it will fall over.

For longer-distance moves, you should leave the Maxiframe on its pallet and use pallet-jacks (the preferred method) or a fork-lift truck.

Warning

When you are moving a container with a fork-lift truck, make sure that the container is stable on the forks and securely fastened. If the container tips over it could cause serious injury to personnel and damage the equipment inside. Move only one crate at a time.

Note

Store all the packing-materials, bolts, screws and the pallet, in case you need them again.

Carry out the following steps **in sequence.**

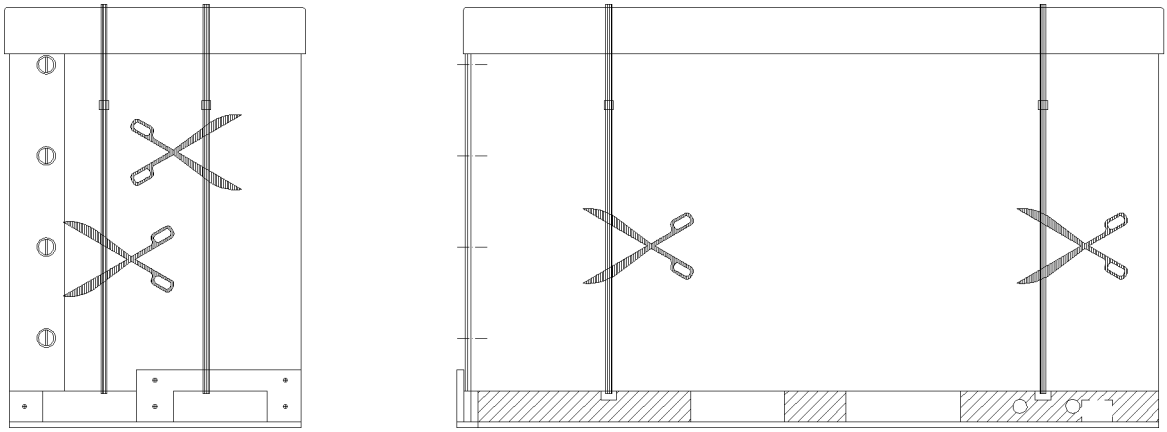

Figure 2-1.

1. Cut the straps holding the container.

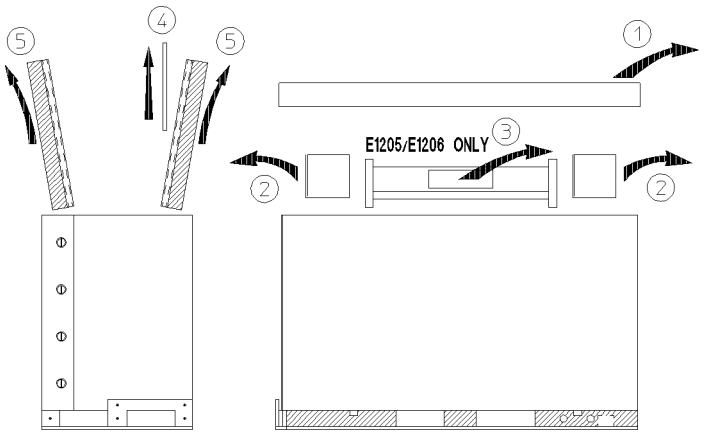

Figure 2-2.

2. Remove the top of the container (1).

Note

If you ordered a Double-Maxiframe (E1202/E1203), two crated Maxiframes are delivered. One of the crates contains a Maxiframe with the DUT interface (E1205A) attached. Another crate contains a Maxiframe and the long DUT interface cover.

3. For **E1202/3**, lift the DUT interface cover out of the box, as shown in Figure 2-2 (3). Otherwise, remove the two cardboard packing-pieces (2).
4. Lift the rear-door of the Maxiframe out of the box (4).
5. Remove the two cardboard packing-pieces from the sides of the Maxiframe (5) and the bar which will be used to lift the Maxiframe.

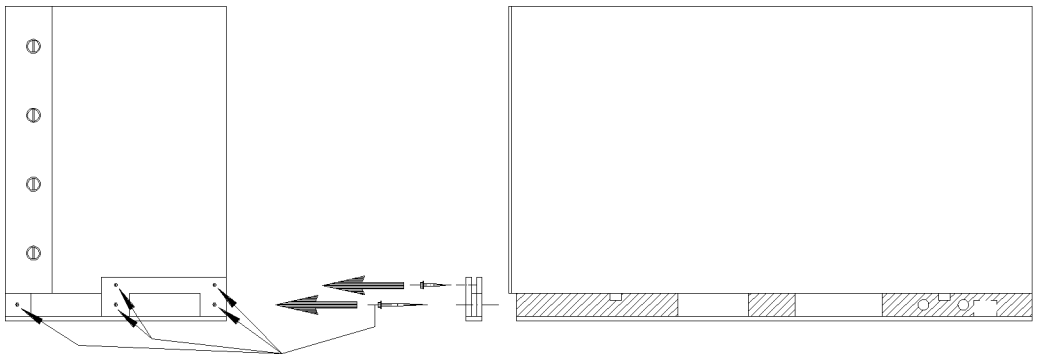

Figure 2-3.

6. Remove the three bolts and two screws holding the wooden-block to the bottom of the pallet and remove the block.

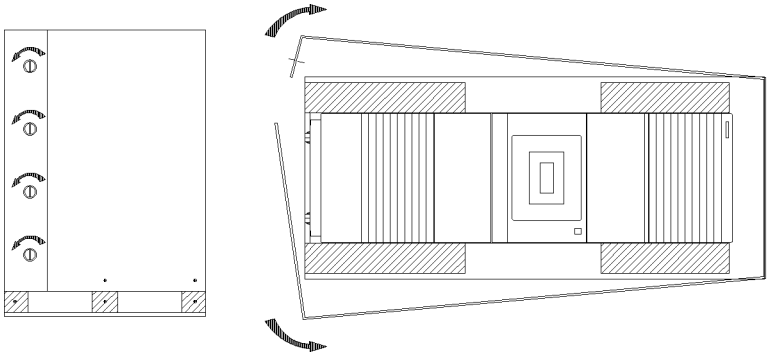

Figure 2-4.

7. Open the four catches holding the card-board carton together, and remove the carton.
8. Adjust the levelling-pads on the bottom of the Maxiframe, so that the Maxiframe will rest on its casters when it is in the upright position.

C a u t i o n

To lift the Maxiframe into the upright position you will need either:

a. a crane, capable of exerting a MINIMUM of 4000 N upwards force

b. **or**, FOUR people, to lift the Maxiframe with the lifting-bar supplied. It is safer to use a crane.

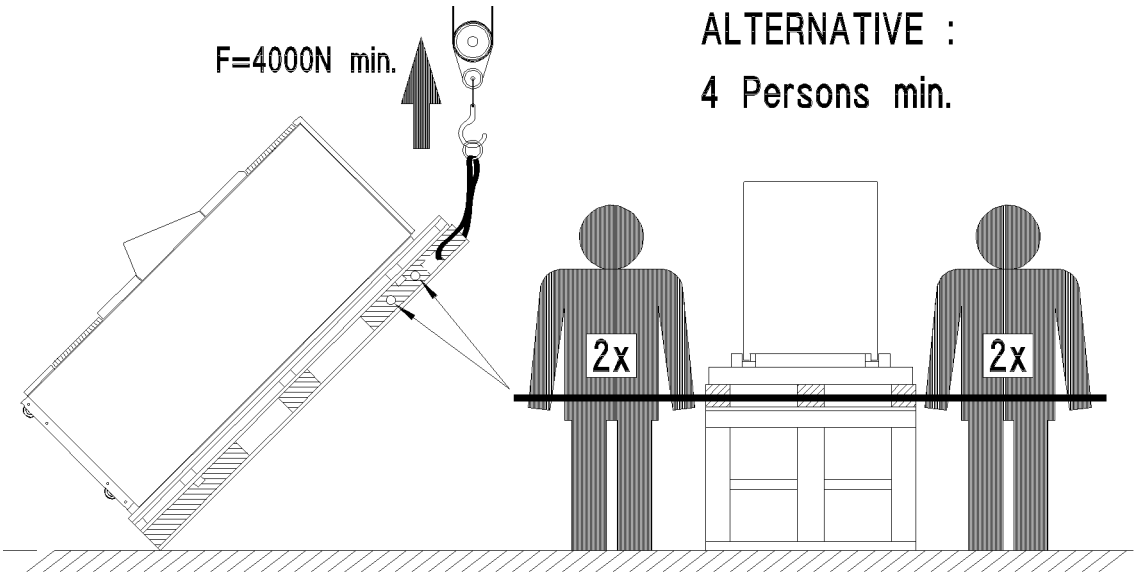

Figure 2-5.

9. Position a crane or the lifting-bar as shown in Figure 2-5. On each side of the lifting-bar the two people must stand face-to-face. As the center-of-gravity of the Maxiframe passes beyond the pallet-edge that it is pivoting on, its weight causes it to fall forwards. Therefore it is necessary to have the people facing each other, to control the lift properly.

Warning

It is safer to use a crane, but if you are using the lifting-bar, remember to BEND YOUR KNEES and KEEP YOUR BACK STRAIGHT when lifting. Lifting heavy weights with your back bent could cause serious injury to your back.

Caution

Make sure that the Maxiframe does not land heavily on its casters.

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10. Lift the Maxiframe (on its pallet) *slowly* into the upright position.

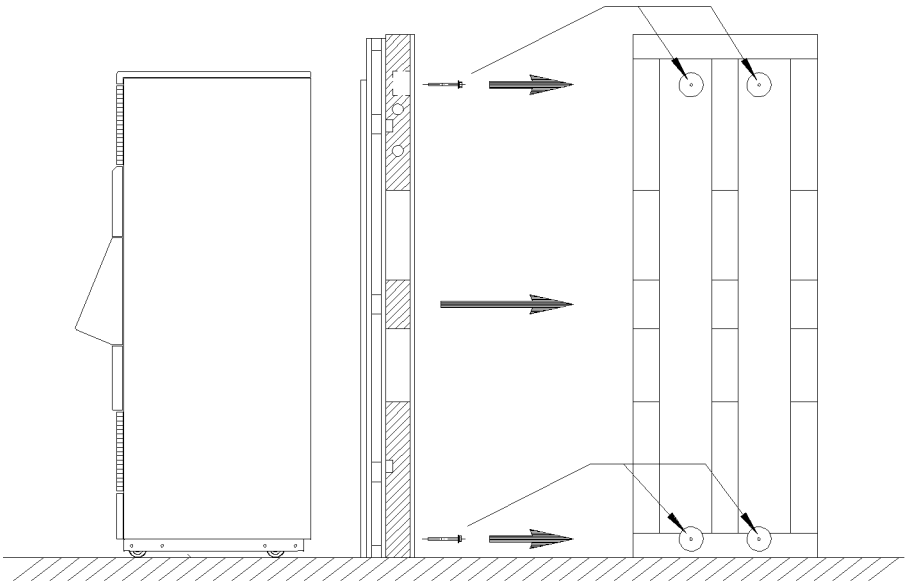

Figure 2-6.

11. Remove the four bolts holding the pallet to the Maxiframe and remove the pallet.

In Case of Loss or Damage

If the equipment is damaged or the shipment is incomplete, do not continue with the installation and notify the nearest Hewlett-Packard Sales/Service Office. The HP Office will arrange for the damaged or missing components to be replaced or repaired, without waiting for the settlement of a claim against the carrier.

Note

Keep the packing materials for inspection by the carrier.

When shipping equipment to a Hewlett-Packard Sales/Service Office, attach a tag showing:

- Owner's name.
- Return address.
- Equipment description.
- Model number.
- Full serial number.
- Type of service required.

If possible, you should use the original packing-materials when returning equipment. If this is not possible, take precautions to ensure that the equipment is not further damaged on the return journey (use enough packing, label the box *FRAGILE*, etc).

Supported Controllers and Peripherals

The HP 82000 IC Evaluation System is controlled by an HP 9000 series controller.

Note

We recommend that you install the controller and software first. The SW installation may take upto 3 hrs, depending on the type of controller to be used. Once you have started the SW install process you will be prompted for answering questions and inserting next media. Therefore, you can continue installing the system hardware to optimize time efficiency. For Series 300/400 controllers all install media are DAT tapes. For Series 700 controllers the HP-UX, UX-Applications and SICL Libraries come on CDROM.

Note

To ease SW installation from scratch on a Series 700 controller only, a customized CDROM comes with the HP82000 system which allows to do the complete install process from one media. Necessary re-boots and kernel configurations are performed automatically without operator intervention.

Controller Requirements

- Supported controllers for the latest SW revision (6.x.x) are listed below:
  - 380
  - 382
  - 425s (VRX Mono and Colour)
  - 425t (VRX Mono and Colour)
  - 725/75 PA-RISC
  - 755 PA-RISC
- Graphics Resolution up to 1280 X 1024 pixels, always high resolution for Series700.
- LAN Interface (if required).
- High Speed Disc Interface (HP-IB or SCSI) with DMA Controller.
- >32 Mbyte RAM recommended

If you have a controller and are unsure of its suitability, check with your local HP representative.

Mass-Storage Devices

You need:

- a disk-drive of at least 600 Mbyte capacity.
- a DDS tape drive to install the software.
- a CDROM drive to install HP-UX and UX applications (Series 700 only).

Display

The displays are already included in the recommended controller bundles. The application software will only support displays with a resolution of up to 1024 by 1280 pixels. For other displays, refer to the *HP9000 Computers Configuration Reference Manual* P/N 98561-90020.

Printer

The following printers are supported:

Description	Product Number
Thinkjet Printer (RS232)	HP 2225D
QuietJet Printer (RS232)	HP 2228A
QuietJet+ Printer (RS232) wide carriage	HP 2227A
Paintjet Color Graphics Printer	HP 3630A 001
PaintJet XL300	HP C1645A
Laserjet Printers	All[1]

1 The entire Laserjet Printer family is supported.

The HP 82000 Application SW does **not** support the HP DeskJet family printers.

System Cables

The cables listed below can be used to connect the system hardware to an HP 9000 Series 300/400/700 controller.

For other cables, refer to the *HP9000 Computers Configuration Reference Manual P/N 98561-90020*.

Description	Product Number
HP-IB cable	
length 1.0 m	HP 10833A
length 2.0 m	HP 10833B
length 4.0 m	HP 10833C

Power Connections

The controller and peripherals are normally connected directly to the local mains.

Caution

Set the power-switches of the controller and peripherals in the OFF position before installing them.

Before switching on mains power, ensure that the voltage-selectors and fuses of the controller and peripherals are correct for the local supply. Refer to the individual manuals for details of power selection.

Power Cable

In accordance with international safety standards, the equipment is supplied with a three-wire power cable. When connected to an appropriate AC power socket, the cable grounds the cabinet of the equipment. The type of power cable shipped with each device depends upon the destination country.

Warning

To prevent possible injury or death, check the following before switching-on the controller or peripherals.

- If the equipment is to be powered via an autotransformer, make sure that the common terminal of the autotransformer is connected to the grounded pole of the mains power source.
- Check that the mains power-socket has a protective-earth. The power cable plug must only be inserted in a socket which has a protective-earth. This protection must not be negated by using an extension-cord which does not have a protective-earth conductor.
- Make sure that the protective-earth terminal of the equipment is connected to the protective-earth conductor of the power cable. To verify this, check that the resistance between the equipment chassis, the front panel and the ground conductor of the power cable is less than 0.1 Ω.
- Check that the plug on the power cable is compatible with the mains socket. If the plug does not fit the socket, or the cable is to be attached to a terminal-block, cut the cable at the plug end and attach a new plug.

Warning

If a new plug must be connected, it must be done by a qualified electrician. The plug must meet local safety requirements and have the following features:

- **Adequate load-carrying capacity.**
- **Ground connection.**
- **Cable-clamp.**

Installing Memory and Interface Cards

If you need to install memory or interface cards in your system controller, refer to the *HP 9000 Series 300 Peripheral Installation Guide* supplied with your controller.

Installing the Keyboard

1. Connect the keyboard to the controller using the HP-HIL cable supplied. Make sure that the dot-markings on plugs and sockets match.
2. If you require an ID module for other applications, connect it to the keyboard.
3. Connect the mouse to the keyboard.

For information on installing other HP-HIL peripherals, refer to the *HP 9000 Series 300 Peripheral Installation Guide*.

Installing the Monitor

Caution

Check that the monitors power-line setting is compatible to that of the local mains supply. If not refer to the User's Manual for power-line settings.

Connect the video and audio inputs of the monitor as described in the manual supplied with it.

Installing the System Disk (Series 300 only)

Note

The system disk should have a minimum capacity of 600 Mbyte. The disk is shipped separately from the controller.

Caution

Check that the disk's power-setting is compatible with the local mains. If not, refer to the *Users Manual* for the correct power-settings.

Set the power switch on the disk in the OFF position before installing the disk.

- Carefully remove the disk from its packaging.
- Set the Address switches on the back of the disk to address 0. Use the switch labeling as reference.

Note

For further information on your system disk refer to the owners manual supplied with the disk (especially for details of how to remove the Shipping-Bolt).

Caution

Check that the printer's power-line setting is compatible to that of the local mains supply. If not refer to the Users Manual for the power-line settings.

- To unpack and install your system printer, refer to the Users Guide supplied with the printer.
- If you are connecting the printer via RS-232, connect an HP12342G cable between the printer and the controller RS-232 interface.
- If you are connecting the printer via the HP-IB connect the printer to an **additional** HP-IB Interface. Do not connect it to the fast HP-IB interface used for the disk or to the HP-IB interface used for the HP82000 hardware.

Installing the DAT Drive

Note

You need a DAT Drive to install the HP 82000 software on the Workstation. This c an be either and internal DAT Drive, or an external stand-alone type, which is c onnected to the Workstation's SCSI bus (not Fast-Wide SCSI). The HP 1.3 GB, 2.0 GB and 8.0 GB (Data Compression) DAT Drives are supported for this installation.

1. Unpack the drive.

Caution

Check that the DAT drives power-setting is compatible with the local mains. If not, refer to the Users Manual for the correct power-settings.

2. Switch-off the controller and DAT drive.
3. Set the address of the tape-drive (preferred SCSI address is 3).
4. Connect one end of the SCSI cable to the SCSI socket on the back of the tape drive. Bring the 2 spring-fasteners in position to secure the connection.
5. If not more SCSI cables have to be attached to the DAT drive, make sure that the SCSI termination block is connected to the second SCSI connector on the back of the tape drive.
6. Connect the other end of the SCSI cable to the SCSI interface on the controller.

For further information refer to the manual supplied with your tape-drive.

Configuring Series 700 Workstations

This procedure tells you how to configure Series700 Workstations for the HP82000 system . This chapter contains information about the installation and configuration of the Workstation, Interfaces and Peripherals required by the HP 82000 IC Verification System. The following topics are covered:

- Supported Workstation Configurations
- Installing an High-Speed HP-IB Interface
- Installing Additional EISA Interfaces
- Installing HP-HIL ID Modules
- Installing Peripherals

Supported Workstation Configurations

Recommended Workstation from the HP9000 Series 700 family:

- 725/75 PA-RISC

Code compatible platforms are:

- 745 PA-RISC
- 755 PA RISC

Note

This Installation Procedure only covers configuring the 725/75 and the 755 Workstations as the common platforms. For configuration and installation of a 745 Workstation please refer to the appropriate manuals.

Table 3-1 and Table 3-2 show which configurations of the 725/75 and 755 Workstations are required/recommended for use with the HP 82000 system.

Table 3-1. 755 Workstation Configuration

	Minimum	Recommended
RAM	64 MB	128 MB
HARD-DISK	600 MB	2 GB Standard Configuration
Monitor		19 inch Color, 1024 x 1280
SCSI DAT Drive		Internal, with Data Compression
CD-ROM Drive		Internal, 600 MB
HP-IB Interface		E2071B

Table 3-2. 725 Workstation Configuration

	Minimum	Recommended
RAM	64 MB	128 MB
HARD-DISK	600 MB	1 GB Standard Configuration
Monitor		19 inch Color, 1024 x 1280
SCSI DAT Drive		External, with Data Compression
CD-ROM Drive		Internal, 600 MB
HP-IB Interface		E2071B

Workstation Interfaces and Ports

The following diagram shows the connection points for standard HP 9000 Series 755 and 725 configurations:

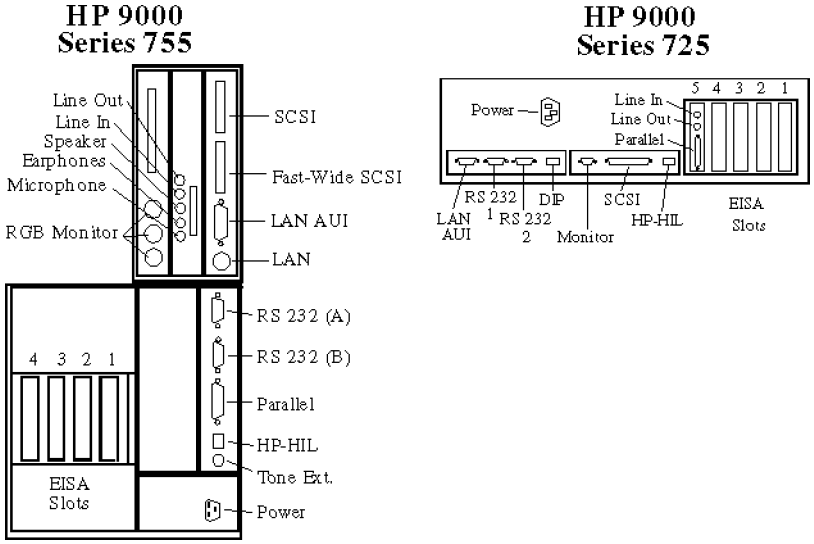

Figure 3-1. HP 9000 Series 755 & 725 Interfaces and Ports

The functions of and connections to these ports and interfaces are described in the documentation supplied with the workstation. This chapter only describes procedures and dependencies which are specific to the HP 82000 system.

Installation Procedure

The detailed procedure for installing an HP 900 Series 700 Workstation is included in the documentation provided with the Workstation. The following is an overview of the steps you should take to configure the Workstation for the HP 82000 IC Verification System:

1. Unpack and install the Workstation, Monitor, Keyboard and Mouse, and install them as described in the documentation provided.
2. Connect the Workstation to mains power, and verify that it boots correctly.
3. Switch the Workstation off again.
4. Remove the cover(s) on the workstation, so that you can access the EISA Slots to install Interface Cards. (See also "Owner's Guide" of your Workstation).

Caution

Take ESD precautions while installing Interface Cards, to prevent damage to the Workstation and the Interface Cards.

5. Install the EISA Interface Cards supplied, as described in the following sections.

Note

Configurations described in this document take precedence over the standard configurations given in the documentation supplied with the EISA Interface Cards. The configuration given here has been tested and works with the HP 82000 software. It can not be guaranteed that other configurations will work first-time.

6. Reboot the Workstation, to verify that the EISA Interface Cards are installed correctly. (Some of the EISA cards like HP-IB and GPIO interface will NOT automatically be recognized by the Workstation. Especially an HP-IB interface card needs to be configured into the kernel).
7. Replace the covers on the Workstation.
8. Install peripherals, such as external drives, printers, etc.

One EISA High-Speed HP-IB Interface is required to control the HP82000 system, HP-IB Device Power Supplies (DPS's) and HP-IB High Speed Width Generators from the Workstation. Supported is only one model of High-Speed HP-IB Interface:

- E2071B High-Speed HP-IB Interface (supported from HP 82000 Software, Revision 6.x.x).

The installation procedure is as follows:

1. Configure the DIP switches on the HP-IB card.
2. Install the HP-IB Interface in the workstation.
3. Configure the HP-IB Card into the HP-UX Kernel. This is described in the chapter 2.

E2071B DIP-Switch Settings

Before you install the E2071B HP-IB Interface in the workstation, configure the DIP switches as shown in the following Diagram:

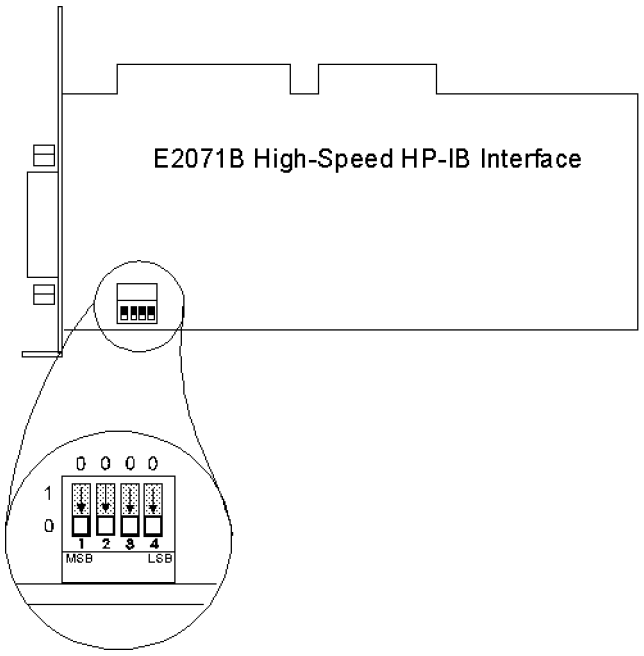

Figure 3-2. DIP Switch Settings - E2071B High-Speed HP-IB Interface

Use the default setting (0000), as shown in Figure 3-2. Other configurations are possible, but we recommend this configuration for the HP 82000 system. (See also HP E2071B Installation Guide).

EISA Address Area

The Address Area of the E2071B HP-IB Interface is set to **0x250-0x257** for the HP 82000 system (corresponds to DIP Switch setting **0000**). When you install other EISA Cards that have a fixed, or hard-configurable Address Area (via e.g. DIP Switches or Jumpers), ensure that there is no conflict with the E2071B.

EISA Slot Number

Install the High-Speed HP-IB Interface in **EISA slot 1** of the Workstation, as shown in the following diagram:

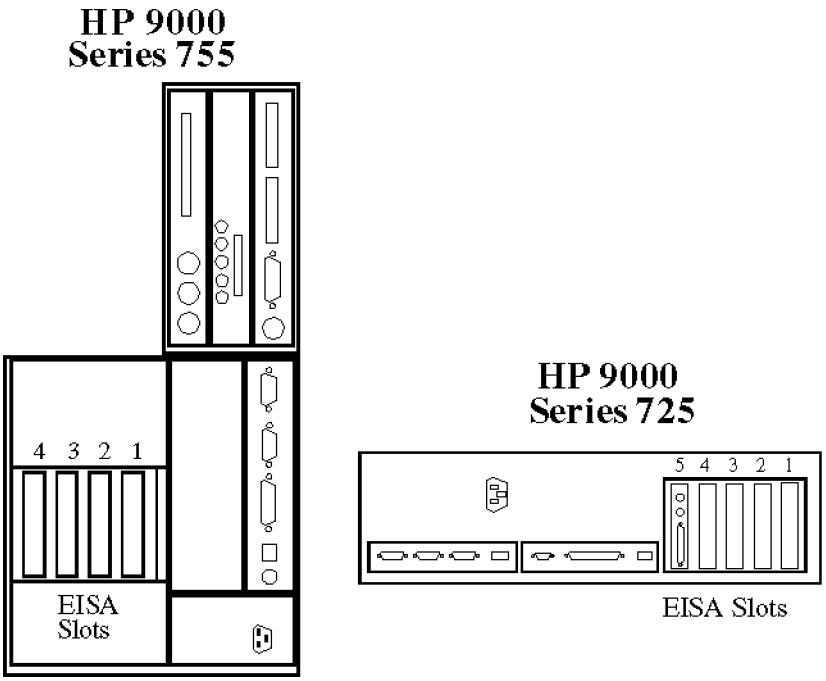

Figure 3-3. EISA Slot Number - E2071B HP-IB Interface

Installing Additional EISA Interfaces

The installation and configuration procedure for each additional EISA Card is supplied with the card. However, you should take care to avoid conflicts with the standard cards.

EISA Slot Assignments

By the definition of EISA, Interface Cards can be installed in any of the EISA slots in the workstation. However, for the HP 82000 system, we recommend that you install EISA Cards in the following order:

Table 3-3. EISA Slot Assignments (HP 9000 Series 725 and 755)

Location	Board Description
Slot 1	E2071B High-Speed HP-IB Interface
Slot 2	empty
Slot 3	Other (Printer HP-IB, Network, etc.)
Slot 4	Parallel (Printer) Interface (preconfigured)[1]

1 HP 9000 Series 725 only

The EISA slot numbering in HP 9000 Series 755 and 725 Workstations is illustrated in Figure 3-3.

Note

It is not possible to install two EISA HP-IB Interfaces (of any kind) in adjacent slots, as the standard HP-IB Connectors are too large to fit beside each other. Take care that you take such physical limitations into account when you install extra EISA Cards.

EISA Interrupt Level

The Interrupt Level of the E2071B High-Speed HP-IB Interface is set to Interrupt Level 3 by default. (See "Configuring the E2071B HP-IB Card into the Kernel"). When you install/configure another interrupt-driven EISA Card, make sure that there is no conflict with the E2071B.

Note

If you are required to change the Interrupt Level of the E2071B, refer to the documentation supplied with the card. Note that you will have to take account of this change when you configure the HP-IB Interface in to the HP-UX kernel (described in chapter 2, Installing the Software).

One HP-HIL Module is delivered with every HP 82000 System:

Module : C/ANSI C Developer's Bundle .

Note the serial and product number of each ID Module. You will need this information when you install the system software.
The installation of HP-HIL Modules is described in the documentation provided with each module. However, you should note the following:

- You must install ID Modules between the workstation and the keyboard, as shown in Figure 3-4. Do not attempt to install them between the keyboard and mouse, as this will cause problems while you are booting the software.
- The C/ANSI C requires a codeword, which is linked to a specific ID Module (referenced by the module's Serial Number). This codeword is not transferable, so check that you have the correct ID Module and that the codeword was generated for this module.

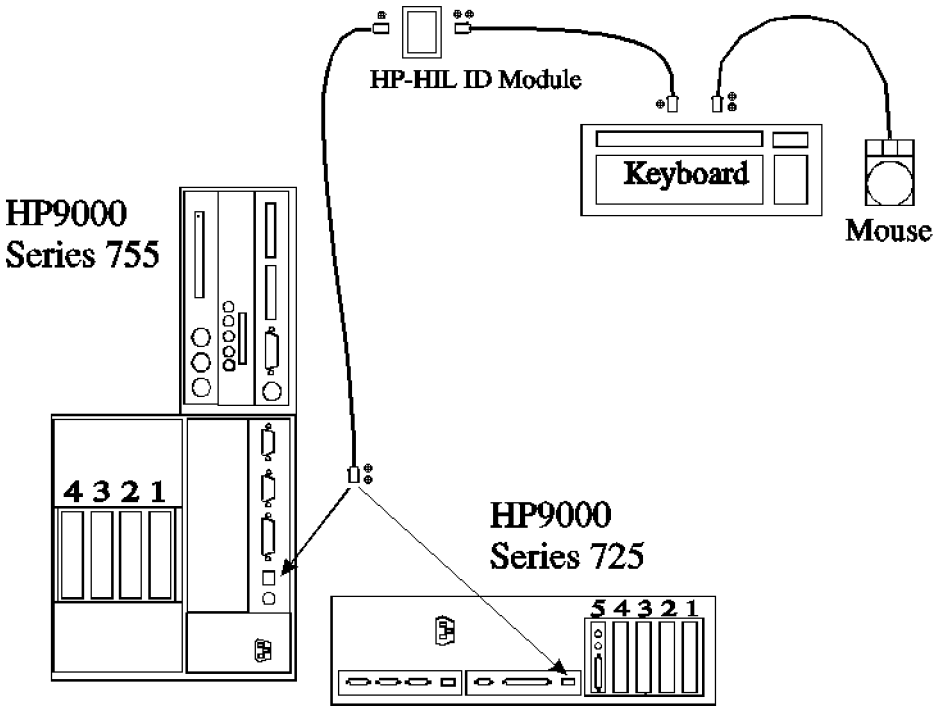

Figure 3-4. Installing HP-HIL Modules

Installing a CD-ROM Drive

You need a CD-ROM Drive to install HP-UX and the SICL Software on the Workstation. This can be either an internal CD-ROM Drive, or an external stand-alone type, which is connected to the Workstation‘s SCSI bus (not Fast-Wide SCSI).

Installing a DAT Drive

You need a DAT Drive to install the HP 82000 software on the Workstation. This can be either and internal DAT Drive, or an external stand-alone type, which is connected to the Workstation‘s SCSI bus (not Fast-Wide SCSI). The HP 1.3 GB, 2.0 GB and 8.0 GB (Data Compression) DAT Drives are supported for this installation.

Installing Printers

The HP 82000 software directly supports a limited set of printers, but it is possible to use any printer which is supported by HP-UX and the xpr command. No hardware modifications to the printer are usually required, but a shell script in the HP 82000 software must be modified for each different type of printer. These modifications are described in Chapter 2, Installing the Software.
Connecting the printer to the Workstation is described in the documentation provided with the printer.

4

This chapter is divided into two main sections:

- See page 4-3 for SW installations on Series 300/400 Workstations
- See page 4-17 for SW installations on Series 700 Workstations

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This part of the chapter describes how to install the SW for the HP 82000 on Series 300/400 workstations. With this procedure, install and configure:

the HP-UX Run-Time Environment

the C/ANSI C Developers's Bundle

HP Basic/UX

the HP 82000 System Software

These procedures describe the installation on HP 9000 Series 300 and Series 400 Computers. A full decription of the computer hardware required by the HP 82000 hardware and software is given in the chapter "Installing the Controller and Peripherals".

You need the following tapes (at least) for this installation:

Tape	Revision	Tape Number	Format
HP-UX Install	9.0.x	1 OF 1	INSTALL FORMAT
HP-UX RUN-TIME, 1-32 USER	9.0.x	1 OF 1	UPDATE FORMAT
C/ANSI C DEVELOPER'S	9.0.x	1 OF 1	UPDATE FORMAT
HP BASIC/UX Software	6.3	1 OF 1	UPDATE FORMAT
HP 82000 System Software	6.0.4	1 OF 1	UPDATE FORMAT

You should also have a copy of the manual *Installing and Updating HP-UX* for HP 9000 Series 300/400 Computers (Part Number: B1862-90002), which you can refer to during the HP-UX installation.

The 1/4 inch cartridge tape-drive you use for the installation should be connected to HP-IB Bus, select code 7, and have bus address 7. This corresponds to the default `/dev/update.src` device file. If you need to change the address of the Tape-Drive, or the HP-IB Bus it's connected to, remember to change the `update.src` device file to correspond with the new address (use the `mknod` command).

This installation is described in five steps:

Step 1. Installing the HP-UX Run-Time Environment

Step 2. Installing the C/ANSI C Developer's Bundle

Step 3. Installing HP Basic/UX

Step 4. Installing the HP 82000 System Software

Step 5. Enabling the HP 82000 System Software Options

The installation procedures in each of these steps are given in the form of four-column tables. In these tables:

The **Time** column indicates the time required for each step so that you can carry on with the hardware installation while the software is loading. Note that the times given are estimations, based on measurements made during an installation.

The **Note** column refers you to the notes at the end of each table. Read these notes **before** performing the step.

The **Input** column indicates what you should input to the computer. In the update utility you can press the `HELP` softkey to get more information on a particular part of the installation process.

The **Action Column** describes the action to be taken, or what a particular input does.

Use the following procedure to install the HP-UX Run-Time Environment. During the installation you can refer to *Installing and Updating HP-UX* for more details about the installation process.

At this stage it is assumed that the Controller, Monitor, Hard-Disc(s) and a 1/4 inch Cartridge Tape-Drive have been installed correctly and are powered-off.

If you want to set up the computer for networking as part of this procedure, you need to know the following information before you start:

The *IP Address* of the Computer. This is a four-digit network address, with each digit separated by a period (for example, `15.133.3.220`).

The system name. This is any name you assign to this Computer's node in the network (for example, `system1`).

Time	Note	Input	Action
▲			Switch-on the Hard-Disk.
⋮			Switch-on the Tape-Drive.
⋮			
⋮			Insert the **HP-UX INSTALL** tape in
⋮			the Tape-Drive, and wait until
⋮			the tape has loaded.
⋮			
5 Min			Switch on the Computer and Monitor.
⋮			
⋮	1	2 Return	Select *Boot Mode Selection*.
⋮	1	2 Return	Select *HP-UX Compatible* Boot Mode.
⋮	1	P Return	Select *Permanent*.
⋮			
⋮	2	Space Bar	Hold the space bar down, until
⋮			"`keyboard`" appears on the screen.
▼		`2h` (for example)	Select `SYSHPUX`, from tape.

Note 1 These steps are only required if you are installing the software on a Series 400 Computer, which has no HP-UX already installed.

Note 2 Note the following differences between what you type on a Series 300 and on a Series 400 Computer.

Series 300: Type all letters in lower-case (as shown in the procedure) and do *not* press Return. The result will be displayed in upper-case at the bottom-right corner of the screen.

Series 400: Type all letters in upper-case (as they are displayed on the screen) and press Return.

If you do not type these characters in this way, the system will not boot correctly.

Time	Note	Input	Action
▲		Return	... to search for destination disk.
⋮		Select Item	Press this softkey.
⋮		(Return)	If the warning message `HP-UX may be on disk` appears, press *Return*.
⋮		Change Filesystem parameters	Highlight this menu item.
10 Min		Select Item	Press this softkey.
⋮	3	122976 Return	Enter the new swap space (60 MB).
⋮		DONE	Press this softkey.
⋮		CONTINUE installation process	Highlighted menu item.
⋮		Select Item	Press this softkey.
⋮		y	... to acknowledge that the new swap space is OK.
▼		y	... to continue the installation.
–	4	y	... to initialize the Hard-Disk.
20 Min			
–			Unload and remove the tape from the Tape-Drive.
▲			
⋮			Insert the first **HP-UX RUN-TIME** tape in the Tape-Drive, and wait until the tape has loaded.
5 Min		Return	... to continue.
⋮		Select All Filesets on the ...	Highlighted menu item.
⋮		Select Item	Press this softkey.
⋮		Start Loading Now...	Highlighted menu item.
⋮		Select Item	Press this softkey.
▼		n	... no extra info required.
–		y Return	... to start loading.
60 Min			
–			Insert the second **HP-UX RUN-TIME** tape in the Tape-Drive, and wait until the tape has loaded.
1 Min			
–			

Note 3 You need at least 60 MBytes (=122976 blocks) of swap space for the HP 82000 Software. Note that when you are using other application software, the swap space may need to be increased.

Note 4 If you have a SCSI hard-disk, enter `n` for this step. That is, *do not* initialise the disk.

Time	Note	Input	Action
–		`y`	... to continue loading data.
60 Min			Wait for the system to customize and reboot
–	5	`y` Return	... to set up networking.
▲			
⋮			Set up the date and time.
⋮			Wait for the system to reboot.
⋮		root Return	Login as *root*.
5 Min		`n` Return	If your console type is not in the list.
⋮		`128` Return (for example)	Enter the number of columns.
⋮		`46` Return (for example)	Enter the number of rows.
⋮		`more /tmp/update.log` Return	Check this file for error messages.
⋮			Unload and remove the tape from the
▼			Tape-Drive.

Note 5 If you want to set up networking enter `y` here. The next steps prompt you for the system hostname, IP address, and the correct time and date.

If you do *not* want to set up networking here, enter `n`, and you will only be prompted for a system name and the correct date and time.

Step 2. Installing the C/ANSI C Programmer's Development Bundle

Use the following procedure to install the C/ANSI C Programmer's Development Bundle. You can refer to *Installing and Updating HP-UX* for more details about the installation process.

Time	Note	Input	Action
▲			Insert the **C/ANSI C** tape in the Tape-Drive, and wait for the tape to load.
5 Min		`/etc/update`	Start the update utility.
		`Select all filesets ...`	Highlighted menu item.
		`Select Item`	Press this softkey.
		`Start Loading Now`	Highlighted menu item.
▼		`Select Item`	Press this softkey.
—		`y`	... to start loading filesets.
50 Min			
—		`more /tmp/update.log` Return	Check this file for error messages.
1 Min			Unload and remove the tape from the
—			Tape-Drive.

Step 3. Installing HP Basic/UX

Use the following procedure to install the HP Basic/UX software.

Time	Note	Input	Action
▲			Insert the **HP BASIC/UX** tape in the Tape-Drive, and wait for the tape to load.
5 Min		`/etc/update`	Start the update utility.
		`Select all filesets ...`	Highlighted menu item.
		`Select Item`	Press this softkey.
		`Start Loading Now`	Highlighted menu item.
▼		`Select Item`	Press this softkey.
—		`y`	... to start loading filesets.
15 Min			
—		`more /tmp/update.log` Return	Check this file for error messages.
1 Min			Unload and remove the tape from the
—			Tape-Drive.

Use the following procedure to install the HP 82000 software.

Time	Note	Input	Action
▲			Insert the **HP 82000 System Software** tape in the Tape-Drive, and wait for the tape to load.
		`/etc/update` Return	Start the update utility.
5 Min		`Select/View Filesets ...`	Highlight this menu item.
		`Select Item`	Press this softkey.
		`View Filesets`	Press this softkey.
	1	`y` Return	... to select the E12000DEM fileset.
	1	`y`	... to select the E12000SYS fileset.
		`Partit'n Screen`	Return to the partitions screen.
▼		`Start Loading`	Press this softkey.
—		`y`	... to start loading filesets.
20 Min			
—		`more /tmp/update.log` Return	Check this file for error messages.
▲			Unload and remove the tape from the Tape-Drive.
5 Min			
		`reboot -r` Return	Reboot the system.
▼		`y` Return	... the date is OK.

Note 1 Select the filesets of the products you ordered. An `n` in the leftmost column indicates that a fileset is deselected, and a `y` means that it is selected. E12000SYS and E12000DEM are the minimum requirement.

If you want to load the E1293A software (HP74200 DCS Link) then, first load HP74200 DCS software. Otherwise you get the error message:

```
/usr/hp74200/etc/eds_config not executable
```

when the update utility customizes the E1293A software.

Use the following procedures to configure the HP 82000 software and some HP-UX parameters.

This section contains four procedures, which:

1. Configure the HP 82000 Software
2. Set Up the Local Default Printer
3. Set Up the Demo User
4. Configure HP-UX
5. Enable the HP 82000 Software

Configuring the HP 82000 Software

Time	Note	Input	Action
▲		`root` Return	Login as root
⋮		`n` Return	If your console is not in the list.
⋮		`128` Return (for example)	Enter the number of columns.
⋮		`46` Return (for example)	Enter the number of rows.
⋮			
20 Min	1	`vi /hp82000/pws/data/model`	Modify the `model` file.
⋮		Return	
⋮	2	`vi /hp82000/pws/data/mainframes`	Modify the `mainframes` file.
⋮		Return	
⋮	3	`vi`	
⋮		`/hp82000/pws/data/offl_tester_co`	Create this file if you have D400
▼		Return	boards in the system.

Note 1 When the system boots, the message `usr/bin/sendmail not executable` may be displayed. To remedy this, you need to edit the file `/etc/netbsdsrc`. Change the first line from `#! /bin/sh` to `#! /bin/ksh`

Note 2 Valid entries are :

`D50,32K`	for E1210A
`D50,128K`	for E1210B
`D50,512K`	for E1210C
`D100,64K`	for E1211A
`D100,256K`	for E1211B
`D100,1024K`	for E1211C
`D200,64K`	for E1212A
`D200,256K`	for E1212B
`D200,1024K`	for E1212C
`D400,64K`	for E1214A or mixed configuration with E1212A
`D400,256K`	for E1214B or mixed configuration with E1212B

Ensure that the entries correspond to your hardware. Do not delete the header line in this file. If you make any changes to this file, remember to save the file afterwards.

Note 3 You must make an entry in this file for every card-cage, DPS and HSWG *channel*. The syntax of these entries is:

- The entry for each **Card Cage** takes the form `Mc,h`, where:

  `c` is the number of the card-cage (1 to 4).

  `h` is the HP-IB address of the clock board in this card-cage.

- The entry for each **HSWG channel** takes the form `HSWG,c,iiiii,hh`, where:

  `c` is the HSWG channel-number (1 or 2).

  `iiiii` is the number of the I/O channel driving this HSWG channel.

  `hh` is the HP-IB address of this HSWG.

- The entry for each **DPS** takes the form **DPSn,h**, where:

  n is the number of the DPS (1 or 2)

  h is the HP-IB address of the DPS.

Ensure that the entries correspond to your hardware. Do not delete the header line in this file. If you make any changes to this file, ensure that you save it afterwards.

Note 4 When working with mixed D200/D400 configurations, this file simulates the system configuration in offline mode. This is necessary, because in offline mode the system cannot determine the hardware configuration. This file is never be used in configurations where only D50, D200 or D400 boards are installed.

Each line of this text file represents one mainframe. The sixteen available slots of the mainframe must each be given a number which represents a 200 MHz board, a 400MHz board, a PMU board or an empty slot. No entry is needed for the clock board and sequencer board in slots 1 and 2, respectively. The numbers are separated by a comma. The complete syntax for one mainframe is:

slot 3, slot 4, slot5,.... .. slot18

where each slot is either:

`400` -representing a 400MHz board

`200` -representing a 200MHz board

`1` -representing a PMU board

`0` -representing an empty slot

For example:

```
400,400,400,400,400,400,400,400,1,0,0,0,0,0,0,0
400,400,400,400,400,400,200,200,1,0,0,0,0,0,0,0
```

This indicates a two mainframe system with

- 200 MHz boards in slots 7 and 8 of the second mainframe.
- 400 MHz boards in slots 1,2,3,4,5,6,7,8 of the first mainframe, and slots 1,2,3,4,5,6 of the second mainframe.
- PMUs in slot 9 of both mainframes.
- all other slots are empty.

Time	Note	Input	Action
▲		`sam` Return	Start the configuration program.
⋮		`Peripheral Devices ->`	Highlighted menu item.
⋮		`Select Item`	Press this softkey.
⋮		`Printers and Plotters ->`	Highlight this menu item.
⋮		`Select Item`	Press this softkey.
⋮		`Add a local printer...`	Highlighted menu item.
⋮		`Select Item`	Press this softkey.
⋮		`lpr` Return	Enter the printer name.
⋮	1	`thinkjet`	Enter the printer model.
⋮		Return	... the device file name is correct.
10 Min		Return	... to set the printer priority to 0.
⋮		`y`	Make this the default printer.
⋮		`Perform Task`	Press this softkey.
⋮	2	`Internal RS-232` Return (for example)	Enter the printer device interface.
⋮	3	`9` (for example))	Enter the select code of the printer interface.
⋮	4	`0` (for example)	Set the channel sub-address.
⋮		`DONE`	Press this softkey.
⋮		`Space Bar`	... to continue.
▼		`Space Bar`	... to continue.

Note 1 To configure the line printer for use by the HP82000 IC Verification System, choose one of the supported printer models.
The printer models which are currently supported are:

```
thinkjet
quietjet
laserjet
paintjet
```

Note 2 To get more information as to which interface to use, move the cursor to the "Interface" menu item and press the `HELP` softkey

Note 3 `9` is the default select code of the internal RS-232 and `8` the default for HP-IB.

Note 4 If you are using an RS-232 printer, enter the sub-address of the RS-232 interface. This should be `00` for a non-multiplexed interface, or, a number in the range 1-4 for the HP 98644A. If you are using an HP-IB printer, enter the HP-IB address set on the printer.

Time	Note	Input	Action
▲		y	... to start the printer test.
⋮		n	... not to repeat the printer test.
⋮		n	... no printer configuration change.
⋮		Previous Menu	Press this softkey.
3 Min		Previous Menu	Press this softkey.
⋮			
⋮		Exit SAM	Press this softkey.
⋮	5	vi /hp82000/com/lbin/hp82000_lp	Modify this file.
▼		Return	

Note 5 To configure the line printer for use by the HP82000 IC Verification System, modify the following lines in this file:

`line_lp=lpr`

Assuming that the printer that has previously been set up is called `lpr`.

`columns=72`

If the text width of the printer is 72 characters. Otherwise modify this number.

`graph_lp=$line_lp`

If the same printer is to be used for text and graphics printout.

`graph_model=thinkjet`

If the printer model is ThinkJet, otherwise substitute for the proper printer model. The printer models which are currently supported are:

```
thinkjet
quietjet
laserjet
paintjet
```

`graph_cmd="lp -d"$graph_lp" -onb -or" line_cmd="lp -d"$line_lp" -onb"`

If a local printer is connected,

or:

`graph_cmd=remsh` rem_system_name `lp -d"$graph_lp" -onb -or" line_cmd=remsh` rem_system_name `lp -d"$line_lp" -onb"`

If the printer is accessible only via LAN. In these lines substitute the name of the remote system for rem_system_name. Note that permission must be granted by this system to start a remote shell (see the `remsh` command).

Time	Note	Input	Action
▲		`sam` (Return)	Start the configuration program.
⋮		`Users ->`	Highlighted menu item.
⋮		`Select Item`	Press this softkey.
⋮		`Add a New User Account`	Highlighted menu item.
⋮		`Select Item`	Press this softkey.
5 Min		`demo` (Return)	Enter the login name.
⋮		`Perform task`	Press this softkey.
⋮		`hp82000` (Return)	Enter the password.
⋮		`hp82000` (Return)	Re-enter the password.
⋮		(Space Bar)	... to continue.
⋮		`Exit Task`	Press this softkey.
⋮		`Previous Menu`	Press this softkey.
▼		`Exit SAM`	Press this softkey.

You only need to follow these steps if you want to set up networking on your system. Some of the entries will already be there if you entered the system name and IP address when you finished installing the HP-UX Run-Time environment.

Time	Note	Input	Action
–	1	`vi /etc/hosts`	Edit the `hosts` file, used for networking.
5 Min			
–	2	`vi /etc/netlinkrc`	Edit the networking shell script.

Note 1 If your system requires another IP Address than `127.0.0.1` (the standalone network address), change this entry to the required address. For example,

`15.3.12.1` (TAB) `system1`

Enter the addresses and hostnames for other remote systems that you will need to access. For example:

`15.3.12.2` (TAB) `system2`
`15.3.12.3` (TAB) `system3`

Note 2 If the system organization and domain name are not the default values, make the following changes to the following two lines:

```
DOMAIN=‘/bin/uname -n‘
ORGANISATION=standalone
```

make the following changes:

```
DOMAIN=your_domain_name
ORGANISATION=your_org_name
```


Time	Note	Input	Action
▲	1	`hp82000/com/bin/hp82000_enable`	Start this program, to enable HP 82000 software options.
		`exit` Return	Logout.
5 Min			
		`demo` Return	Login as `demo`.
		`hp82000` Return	Enter the password for `demo`.
		`n` Return	If your console type is not in the list.
		`300h` Return (for example)	Enter your terminal type.
▼	2		Configure the demo program.

Note 1 If you have ordered optional HP82000 software, such as EDA Interfaces, execute this program. A list of available optional software will be shown, starting with E1296 (Production Shell). If you ordered this software, you enable it by specifying the codeword, as printed on the License Certificate. If you have no license for the E1290A EDA Interface, press RETURN to skip to your EDA Interface and specify it's codeword, or "q" to leave the program.

Note 2 Configure the demo software for the ECL counter and verify the system hardware by using Diagnostics, Calibration and the demo ECL counter (MC10136 or MC10H136). Refer to the chapter "System Verification" for details.

Software Installation on Series 700 Workstations

This part of the chapter describes how to install the software for the HP 82000 on Series 700 Workstations.

Software Information

Caution

READ THIS PROCEDURE COMPLETELY BEFORE YOU START WITH THE INSTALLATION!

Note

This procedure directly refers to a HP-UX Rev. 9.05 installation. The procedure may change slightly as the UX revisions are progressing, and described discs and their contents could be altered.

Documentation Required:
You will require the manual Installing and Updating HP-UX 9.0x for the software installation.

Media Required:
You require the following CD-ROMs and DAT Tapes for the installation:

Table 4-1. Media required for the Installation

Part Number	Media	Description	Revision
B2826-67920	CD	Kit HP-UX Jewel Case (2 CD's: Install Disc, Core OS)	9.05
B2826-67919	CD	Kit HP-UX S700 Application SW Discs (4 CD's)	9.05
E2091-13401	CD	HP SICL Libraries	3.01
E1222-17600	DAT	HP 82000 Software (S700)	6.0.x
	DAT	HP 82000 Calibration Data	

Licences and Codewords Required:
The HP 82000 system is always shipped with a licence for the **C/ANSI C Developer's Bundle**. This licence is shipped in the box with a codeword and the appropriate HP-HIL ID Module. You should locate these items before you continue with the installation. As part of the HP-UX installation, you will be required to enter the codeword which is on the licence sheet.

In HP-UX Rev. 9.05, the **C/ANSI C Developer's Bundle** is located on **disc 3 of 4**.

A licence sheet for HP 82000 software is shipped in a separate box, with the User Documentation for the system. Codewords are only required for the HP82000 SW Options (Memory Test, CAE Links etc.). The codewords are noted on a separate license certificate, included if options had been ordered.

In general, you should locate all licences and certificates and put them in a safe place. After the installation has been completed they must be stored in a safe place.

Before you continue with the software installation, you should verify that the HP-HIL ID Module required by the **C/ANSI C Developer's Bundle**, is installed on the HP-HIL chain. The serial number of the ID Module required is indicated on each licence certificate.

This section refers to Chapter 3 of the manual *Installing and Updating HP-UX*, and only contains notes and information which is relevant for the HP 82000 system. You must read the manual to find out more details about each step, though all steps are listed in this section.

Step 1: Have all Devices Turned OFF

Turn all computer hardware off and go to the next step.

Step 2: Prepare your Installation Media

Ensure that you have the CD-ROMs and DAT Tapes listed in Table 4-1.

Step 3: Start the Drives and Load the Media

If the Workstation has an internal CD-ROM Drive, use the following procedure:

1. Switch the workstation and monitor on.
2. Stop the Boot-Device search, by pressing the ESC key.
3. Insert the HP-UX Install Disc in the Drive. The Workstation will automatically recognize the CD-ROM as a bootable device.
4. Go to **Step 5: Select the Device Having the Source Media.**

If you have an *external* CD-ROM Drive connected to the Workstation, use the following procedure:

1. Switch the CD-ROM Drive on.
2. Insert the HP-UX Install Disc in the Drive.
3. Continue to the next step.

Step 4: Start up the System

Power the Workstation and Monitor on.

Step 5: Select the Device Having the Source Media

Select to boot from the CD-ROM.

Step 6: Account for an EISA Configuration Process

Ignore this step and ignore any error messages from the *eisa_config* routine for the moment. Press `Continue.`

Step 7: The Initial Installation Screen

Step 8: Root Destination Menu

Determine your *root* destination device: System disc.

Step 9: Choose the Type of Filenames for File Systems

Select *LONG FILENAMES*.

Step 11: The Main Menu Continues the Installation

Step 12: Verify the Swap-Space

If the Workstation is equipped with a 1 GByte hard-disk, or bigger, we recommend that you enter a swap-space of 100 MB (102400 1024 Byte blocks). However, if you must save disk-space, the following table shows you what minimum swap-space you will require, which depends on the number of off-line HP 82000 sessions which will be started simultaneously.

Table 4-2. Minimum Swap-Space Requirements

Number of Off-line Sessions	Minimum Swap-Space (MB)	Swap-Space (1024-Byte Blocks)
none	96	98304
1	105	107520
2	120	122880
3	135	138240
4	150	153600

The system will round off the value you enter.

Step 13: A Final View of Destination Devices

Step 14: Initial Loading of Partitions Containing Filesets

After about 2 minutes, the system stops and you are prompted to load the next CD-ROM unit.

1. Remove the Install CD-ROM from the Drive and insert the HP-UX Core OS CD-ROM.
2. Press RETURN to continue.
3. During the load process, you will be asked for parameter settings such as system name, time zone, time, root password (and network address, if applicable). Make the entries accordingly.

   After approximately 40 min. this unit has loaded, the system will then reboot.
4. Check the file **/tmp/update.log** for errors during the installation.
5. Eject the CD-ROM.

Prepare for the Update routines:

6. Login as *root*.
7. Start the X-windoxs by typing *x11start* and press RETURN.
8. In the *hpterm*-window, enter **sam &**.

In the process of installing or updating the SW from a CD-ROM you will have to mount/un-mount the CD-ROM drive any time you want to change the update media in this drive.

Mounting the CD-ROM drive:

1. Insert the CD-ROM from which you want to update.
2. In **SAM** select *Disks and File Systems*.
3. Select *CDROM,Floppy, and Hard Disks*.
4. Click on bar with CD-ROM drive .
5. From the *Actions* menu, select *Add a Hard Disk Drive*.
6. Select *Set Disk Usage and Options*.
7. In the **Mount Directory** field type **/UPDATE_CDROM** and click on OK.
8. Click on YES for *cdfs* file system.
9. Click on OK for *Set Disk Usage and Options*.
10. Click FILE menu and EXIT.

Un-mounting the CD-ROM drive:

After the filesets have loaded, un-mount the CD-ROM with SAM:

1. In **SAM** select *Disks and File Systems*
2. Click on bar with CD-ROM drive .
3. From the Actions menu, select *Remove a Hard Disk Drive*.
4. Eject CD-ROM.

Carry out the following procedure in sequence:

1. If you have an external DAT Drive, check that it is switched-on and connected to the SCSI Bus on the rear of the Workstation.
2. Login as *root*.
3. Enter **sam**.
4. When **SAM** has started, select *Peripheral Devices*.
5. Select **Tape Drives**.
6. Select **DDS Tape Drives**.

   The DAT Drive should now be indicated in the window, with it's address and type. Note the address (for example 2.0.1.3.0).
7. Select **Add** in the *Actions* pulldown menu.
8. Confirm all further steps, until **SAM** creates a new kernel and halts the workstation.
9. Create a device file for the DAT drive, using the **mknod** command, as follows:

   /etc/mknod /dev/dds c 121 0x201307

   Substitute the address for your DAT Drive in the command, instead of 201307 in the example above.

HP-UX Rev. 9.05 comes with 4 CD-ROMS containing UNIX applications. You may choose to install them all, or, if disc space is a concern, you will have to look at the different filesets to make your selection. This procedure assumes that you are loading all filesets. Some of the applications will need a codeword, and installing for the HP82000, only **C/ANSI C Developer's Bundle** is an application where you must enter a codeword.

Unless you enter the correct codeword for the **C/ANSI C Developer's Bundle**, the fileset will remain invisible to the update program and can't be installed. In addition, the HP-HIL ID Module referenced on the licence certificate must already be installed on the HP-HIL chain, otherwise the codeword will not be accepted.

1. Insert the CD-ROM.
2. Mount the CD-ROM drive. (See Chapter 2).
3. In the *hpterm* window, enter **/etc/update**.
4. Select *Change Source of Destination*.
5. Select *From CD-ROM to Local System*.
6. If a codeword is required, type in the codeword and press DONE. Otherwise only press DONE.
7. Select *All Filesets* on the Source Media
8. Start loading.
9. After loading, check the file **/tmp/update.log** for errors during the installation.
10. Un-mount the CD_ROM drive. (See Chapter 2).
11. Eject the CD-ROM from the Drive.

The SICL CD-ROM is **not** mountable. Follow the procedure **exactly** as it is described here. In this procedure, the CD-ROM is treated exactly like a raw tape device, with no filesystem. You do not require a codeword to install the HP SICL Libraries.

1. Login as *root*.
2. Insert the HP SICL CD-ROM in the Drive.
3. In the *hpterm* window, enter **/etc/update** to start the update utility.

Note

Do not attempt to mount the CD-ROM, as it does not have a filesystem.

---

4. Select *Change Source of Destination*.
5. Select *From Tape Drive to Local System*.
6. Change the source device to **/dev/update.src** (the CD-ROM Drive) and press DONE.
7. Select and load all filesets on the source media. The workstation does not reboot after loading.
8. Check the **/tmp/update.log** file for errors during the installation.
9. Eject the CD-ROM from the Drive.

Carry out the following procedure:

1. Login as *root*.
2. Insert the HP 82000 System Software tape in the DAT Drive and wait for it to load.
3. In the *hpterm* window, enter **/etc/update**, to start the update utility.
4. Select *Change Source of Destination*.
5. Select *From Tape Drive to Local System*.
6. Change the source device to **/dev/dds** and press DONE.
7. In the update utility, we recommend to load all filesets. If disc space is a concern, at least the following filesets have to be selected:
   - E1200SYS
   - E1200DEM

   These filesets do not require a codeword.
8. Load the selected filesets. This should take a maximum of about ten minutes and the workstation reboots automatically.
9. Check the **/etc/update.log** file for any errors during the installation.
10. Eject the DAT Tape from the Drive.

Use this procedure to install the HP 82000 Calibration Data supplied with the system. This data consists of the following files:

/hp82000/pws/data/model

/hp82000/pws/data/mainframes

/hp82000/fw/data/bc_cal_dXXX

/hp82000/fw/data/dc_cal_dXXX

/hp82000/dev_tech/cmos/ac_cal_dXXX

/hp82000/dev_tech/ecl/ac_cal_dXXX

where: XXX is the I/O board frequency in MHz (50,100,200,400).

Note

The **model** and **mainframes** file are for the system configuration shipped from the factory, and do not include any entries for DPS's, HSWG's or I/O Boards added on site. Paragraph **11:Configuring the HP 82000 Software** describes how to edit these files for the actual system configuration.

The calibration files were generated by calibrating the system in the configuration it was shipped in. They do not include appropriate entries for HSWG's or any configuration changes made on site. This data should only be regarded as default calibration data, and the system should be fully re-calibrated (Base Cal, DC and AC Cal) once it is in its final configuration. On the basis of the Calibration Data shipped, it can not be guaranteed that the systemwill meet its specifications in the final environment and configuration.

Carry out the following procedure:

1. Login as *root*.
2. Insert the HP 82000 Calibration Data tape in the DAT Drive and wait for it to load.
3. In the *hpterm* window, enter **/etc/update** to start the update utility.
4. Select *Change Source of Destination*.
5. Select *From Tape Drive to Local System*.
6. Change the source device to **/dev/dds** and press DONE.
7. In the update utility, select all filesets.
8. Load the selected filesets.
9. Check the **/etc/update.log** file for any errors during the installation.
10. Eject the DAT Tape from the Drive.

If you have licences for optional HP 82000 software (EDA links, Memory Test Software, etc), you must enter the codewords corresponding to these products.

Just start the file **/hp82000/com/bin/hp82000_enable**. You are asked for codewords for the different SW options. Enter the appropriate codewords and quit the program.

- The codeword consists of a very long ASCII string, so take special care when entering each codeword.
- Type in the codewords exactly as they are listed on the certificates. Note that spaces and character cases (upper, lower) must be retained.

First, configure the printer under HP-UX, using SAM. The docu- mentation supplied with the printer will tell you how to do this. Test that the printer works, either using the printer test in SAM, or by printing a file.

The HP 82000 software has it's own printer script, called *hp82000_lp*.This script enables the HP 82000 software to send screen-dumps and other data to a printer which is configured on the workstation (remote, or local). The following list of printers are pre-configured in this script:

- HP Thinkjet
- HP Quietjet
- HP Laserjet Family
- HP Paintjet
- HP Paintjet XL300

Enabling a Printer Which is on the List of Pre-Configured Printers ...

Carry out the following procedure in sequence:

1. Edit (**vi**) the */hp82000/com/lbin/hp82000_lp* script and locate the following lines:

   Lp=lpr

   Model=thinkjet

   GraphicLp=$Lp

   GraphicModel=$Model

   The configuration shown here is the default configuration, and you must edit it for the printer you want to use.

2. Substitute **lpr** (in **Lp=lpr**) with the name of the printer you want to use to print out listings and ASCII text.
3. If you want to use the same printer to print out text and screen dumps, then you do not have to edit the line **GraphicLp=$Lp**. However, if you want to use a different printer for screen-dumps, you must replace **$Lp** with the name of this printer.
4. Substitute **$Model** (in **GraphicModel=$Model**) with the model name of the printer which will be used for screen-dumps (the one you defined in **GraphicLp=$Lp**).

10: Set up the Demo User

Carry out the following procedure in sequence.

1. Login as *root*.
2. Enter **sam**.
3. Set up a new user, with the following settings:

   User Name: **demo**

   Home Directory: **/users/demo**

   Password: **hp82000**

   The directory **/users/demo** should already exist. It is created when you install the **E1200DEM** fileset of the HP 82000 software.
4. Logout

Carry out the following procedure in sequence:

1. Login as *root*.
2. Edit the file **/hp82000/pws/data/model.** Valid entries in the model file are:

Entry	I/O Board Configuration
`D40,32K`	40 MHz I/O Boards (E1208A)
`D40,128K`	40 MHz I/O Boards (E1208B)
`D40,512K`	40 MHz I/O Boards (E1208C)
`D50,32K`	50 MHz I/O Boards (E1210A)
`D50,128K`	50 MHz I/O Boards (E1210B)
`D50,512K`	50 MHz I/O Boards (E1210C)
`D100,64K`	100 MHz I/O Boards (E1211A)
`D100,256K`	100 MHz I/O Boards (E1211B)
`D100,1024K`	100 MHz I/O Boards (E1211C)
`D100X,64K`	100 MHz I/O Boards mixable (E1209A)
`D100X,256K`	100 MHz I/O Boards mixable (E1209B)
`D100X,1024K`	100 MHz I/O Boards mixable (E1209C)
`D200,64K`	200 MHz I/O Boards (E1212A)
`D200,256K`	200 MHz I/O Boards (E1212B)
`D200,1024K`	200 MHz I/O Boards (E1212C)
`D400,64K`	400 MHz I/O Boards (E1214A)
`D400,256K`	400 MHz I/O Boards (E1214B)
`D400,64K`[1]	mixed 100X/200/400 MHz (E1209A, E1212A and E1214A)
`D400,256K`[1]	mixed 100X/200/400 MHz (E1209B, E1212B and E1214B)

1 For mixed 100X/200/400 MHz configurations, the entry in the models file refers to the highest pattern rate boards.

   Ensure that the entries correspond to your hardware. Do not delete the header line in this file. If you make any changes, remember to save the file afterwards. The file **/hp82000/pws/data/model.def** contains a full list of valid entries for the **model** file.

3. Edit the file **/hp82000/pws/data/mainframes.** You must make an entry in the **mainframes** file for every card-cage, DPS and HSWG channel.

   The entry for each **Card-Cage** takes the form 'Mc,h', where:

   - 'c' is the number of the Card-Cage (1 to 4).
   - 'h' is the HP-IB address of the Clock Board in this Card-Cage.

The entry for each DPS takes the form 'DPSn,h', where:

- 'n' is the number of the DPS.
- 'h' is the HP-IB address of the DPS. (2 and/or 7).

The entry for each HSWG channel takes the form as follows:

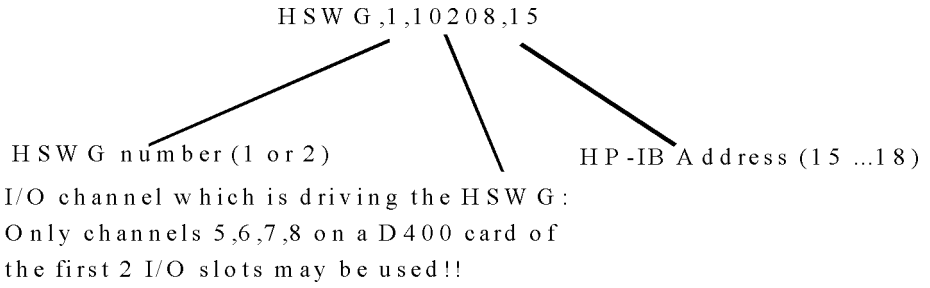


Figure 4-1.

Ensure that the entries correspond to your hardware. Do not delete the header line in this file. If you make any changes, remember to save the file afterwards.

4. When working with mixed D100X,D200/D400 configurations, the file **/hp82000/pws/data/offl_tester_co** simulates the system configuration in Offline mode. This is necessary, because in Offline mode the system cannot determine the hardware configuration. This file is not required in configurations where only D50, D100, D200 or D400 boards are installed.
   Each line of this text file represents one mainframe. The 16 available slots of the mainframe must each be given a number which represents a D100X, a D200 or a D400 board, a PMU or an empty slot. No entry is needed for the Clock Board and Sequencer Board in slots 1 and 2, respectively. The numbers are separated by a comma.

   The complete syntax for one mainframe is:

   slot3, slot4, slot5,..... slot18

   where each slot is either:

   400 - represents a 400 MHz board

   200 - represents a 200 MHz board

   100 - represents a 100X MHz board

   1 - representing a PMU board

   0 - representing an empty slot

For example:

400,400,200,200,100,100,1,0,0,0,0,0,0,0,0,0

400,400,200,200,100,100,1,0,0,0,0,0,0,0,0,0

This indicates a double mainframe system with

- 400 MHz boards in slot 3 and slot4 of both card-cages.
- 200 MHz boards in slot5 and slot6 of both card-cages.
- 100 MHz (D100X) boards in slot7 and slot8 of both card-cages.
- PMU's in the first free slot.
- all other slots are empty.

Carry out the following procedure:

1. Login as *root*.
2. Copy (**cp**) the file **/usr/pil/defaults/hwconfig.cf** to the directory **/usr/pil/etc.**
3. Change directory (**cd**) to **/usr/pil/etc.**
4. Edit (**vi**) the file **/usr/pil/etc/hwconfig.cf**, and locate the following line:

   #7 hpib e2071 1 21 0b0000 1 3

5. Unmask the line, by deleting the hash symbol (#).
6. Modify this line only for additional HP-IB cards. For the HP-IB card in slot 1 leave this line unchanged.

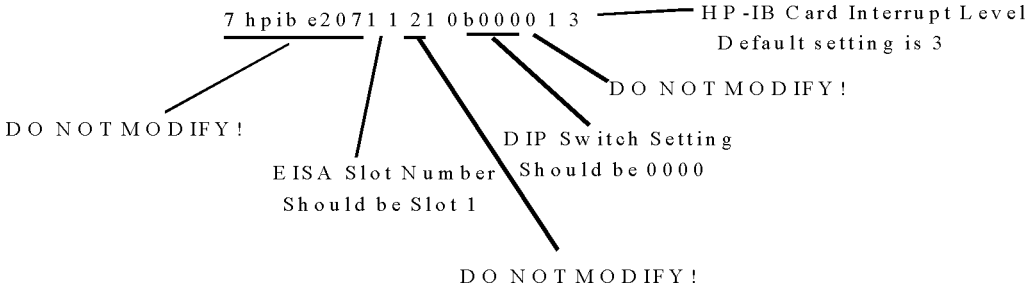


Figure 4-2.

The entry as shown above has our recommended settings and corresponds with the Workstation Configuration described in the chapter **Installing Controller and Peripherals.** With additional EISA cards, the Interrupt Level and the DIP switch setting are the only values which will have to be changed to avoid conflicts with other cards.

Note

EISA Cards which will be used to control instruments may require an entry in the *hwconfig.cf* file. Refer to the Installation Guide for the card for details of how the card should be configured. Note that some EISA Cards do not have to be set up in the *hwconfig.cf* file (for example, the E25560A High-Performance HP-IB Card). If an example configuration entry does not exist in the *hwconfig.cf* file, then **DO NOT CONFIGURE THE CARD!**

---

7. Save the file, and enter **/usr/pil/bin/pilconf**. The *pilconf* utility reconfigures the HP-UX kernel to include the setup data in the *hwconfig.cf* file.
8. Confirm all questions up to the point where you are asked if the workstation should be rebooted now. You can allow the workstation to reboot.

Note

If you should choose to have a look at the 'config.log' file (which is offered during 'pilconf'), ignore the given information about 2071B HP-IB card DIP switch setting. This information is incorrect.

You may need to use a second E2071B HP-IB Card if the HP82000 Workstation is supposed to control other HP-IB devices than HSWG's and supported DPS's. This may especially be required if a Traceable Calibration is done on the system.

A second HP-IB Card must be located in EISA slot 3. Because of the width of the HP-IB connector there is not enough space to locate a second card in slot 2.

Before plugging the the card into EISA slot 3, set the DIP switches on the E2071B HP-IB card to '1000'.

To configure the card into the kernel, carry out the following procedure:

1. Login as *root*.
2. Change directory (**cd**) to **/usr/pil/etc**.
3. Edit (**vi**) the file **/usr/pil/etc/hwconfig.cf**, and locate the following line:

   #9 hpib3 e2071 3 21 0b1000 1 5

4. Unmask the line, by deleting the hash symbol (#).
5. Save the file, and enter **/usr/pil/bin/pilconf**. The *pilconf* utility reconfigures the HP-UX kernel to include the setup data in the **hwconfig.cf** file.
6. Confirm all questions up to the point where you are asked if the workstation should be rebooted now. You can allow the workstation to reboot.

Note

If you should choose to have a look at the 'config.log' file (which is offered during 'pilconf'), ignore the given information about E2071B HP-IB card DIP switch setting. This information is incorrect.

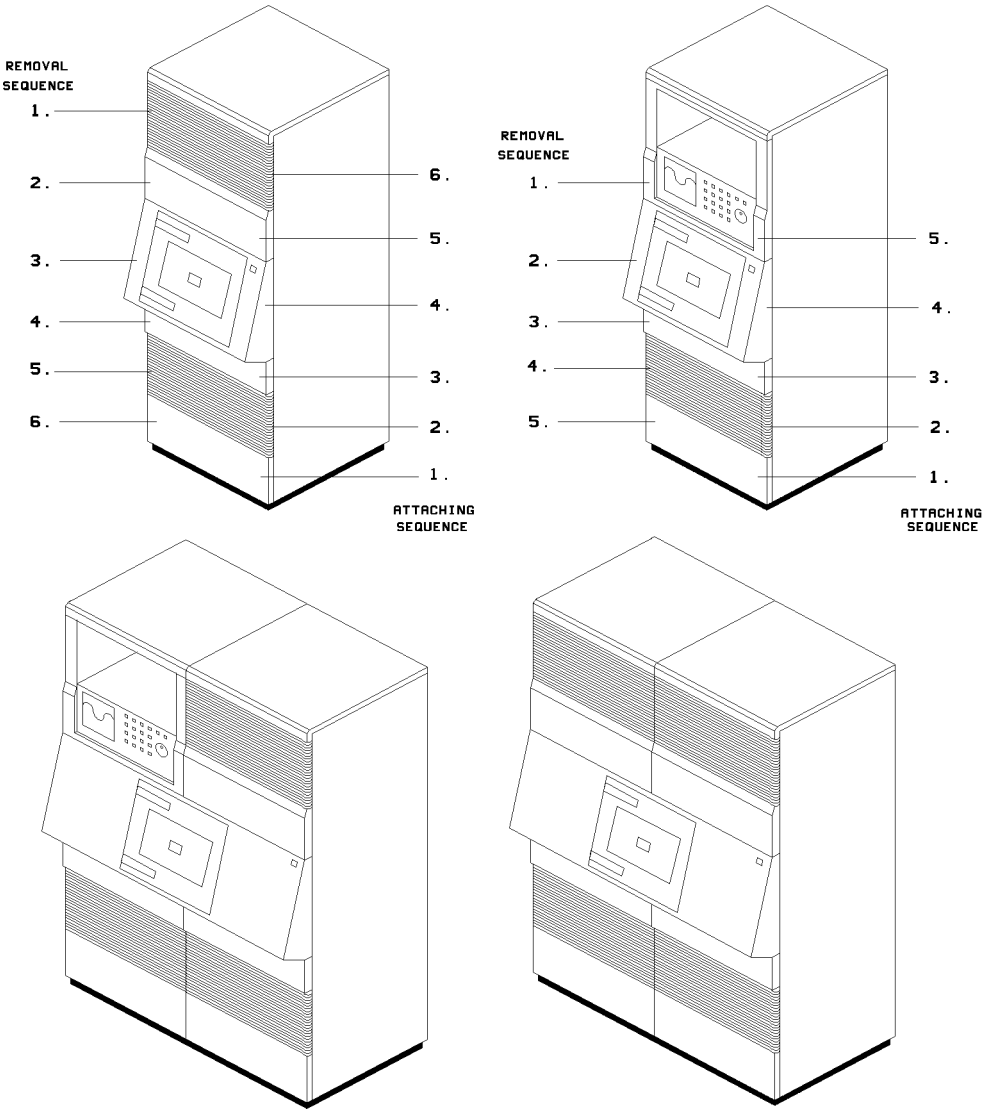


Figure 5-1. Maxiframe Configurations

The possible Maxiframe configurations are shown in Figure 5-1.

The *mainframe* is the frame which contains the:

Card-Cages	hold the system-boards, a maximum of 2 per Maxiframe mainframe is possible.
Instrument Frames	hold measurement equipment and **High Speed Width Generators** (**HSWG**s). In a single card-cage mainframe, the main instrument-frame is above the card-cage. In both single and double card-cage mainframes there is a small instrument-frame below the bottom card-cage, for HSWGs and **Device Power Supplies** (**DPS**s).
Fans	for cooling the system boards.
Power Control Module	provides a connection between the mains supply and the card-cages, fans, instruments, etc.
DUT Interface	holds the DUT board.

Front Covers and Grilles

Figure 5-1 shows the front-covers and grilles for the four possible configurations of Maxiframes.

Front Covers

Front-covers are hooked onto supports at the bottom and clip-in at the top. To remove them, pull them out at the top and lift them out.

The DUT interface cover fits onto four support-screws on the mainframe and is secured by tightening these screws. The two types of DUT interface covers are shown in Figure 5-1.

Caution

Lubricate these screws (grease, oil) before you install them. If they are not lubricated they tend to stick and cannot be removed.

Note

These covers must be attached and removed in the sequence shown in Figure 5-1.

Grilles

Grilles clip-in at their four corners and are just pushed-on.

Rear Door

The Maxiframe rear-door is hinged at the right side (looking from the rear) and has two latches on the left side.

Top And Side Panels

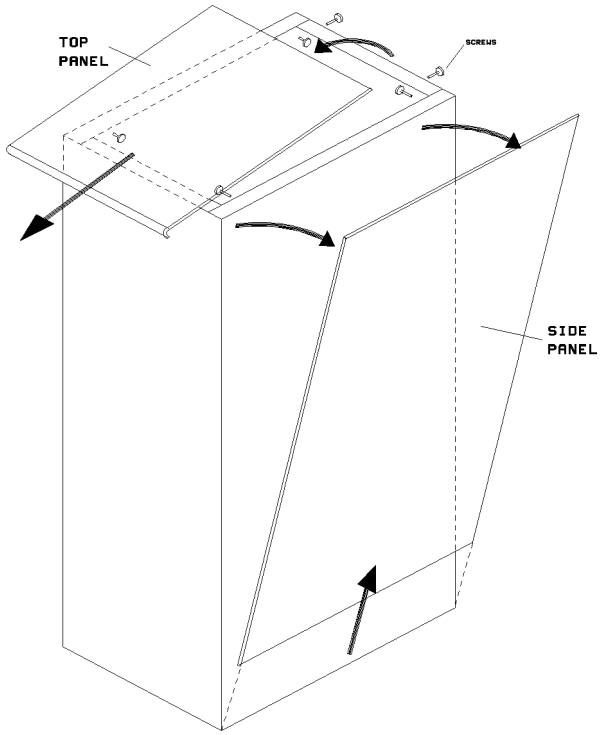


Figure 5-2. Top And Side Panels

Top Panel

Warning

On the top of the Maxiframe there are four loops which are exposed when you remove the top-panel. These loops are for securing the mainframe against earthquakes only. Do not use them for lifting or moving the Maxiframe.

To remove the top-panel:

1. Open the rear-door of the Maxiframe.
2. Remove the two screws at the top of the mainframe (at the back).
3. Lift the back of the top-panel, pull the panel forwards and lift it off (it slots-in at the front).

Side Panels

To remove a side-panel:

1. Remove the top-panel.
2. Remove the two screws at the side of the top cover (these are under the metal edge).
3. Lift the cover up and out (it hooks in at the bottom).

Procedure

1. Decide which Maxiframe is to go on which side (seen from the front) according to these rules:
   - If one of the Maxiframes has only one card-cage then this Maxiframe goes on the left side.
   - If one or both of the Mainframes has boards installed, the Mainframe with the master sequencer in the bottom card-cage goes on the right side.
2. Remove the grilles and front-panels from both Maxiframes.
3. Remove the top-panel and right side-panel of the Maxiframe to go on the left side.
4. Remove the top-panel and left side-panel of the Maxiframe to go on the right side.
5. Remove the DUT interface from the Maxiframe it is attached to.
6. Close the rear doors on both Maxiframes.
7. Push the two Maxiframes together, leaving enough space between them for the connecting-pieces.
8. Position the front and rear connecting-pieces (the front connecting-piece is unpainted) as shown in Figure 5-3, so that the clips are positioned beside the matching slots in the sides of the two mainframes.

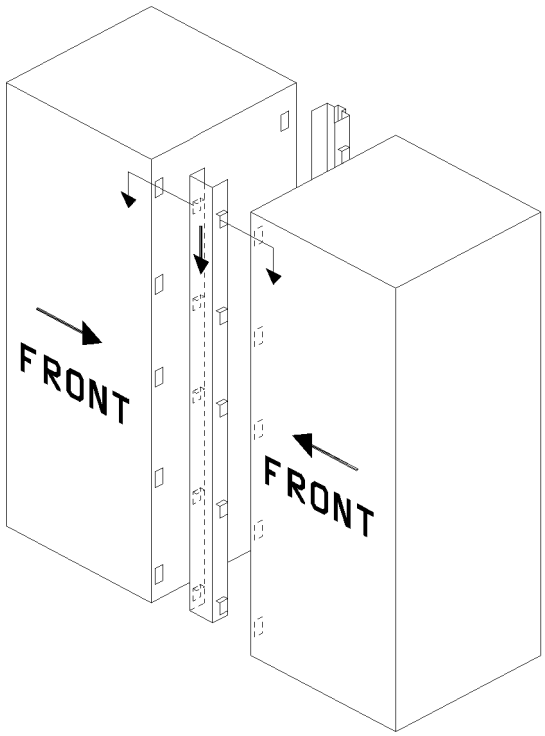


Figure 5-3. Connecting Two Maxiframes

9. Push the mainframes together, so that the clips on the connecting-pieces fit into the slots in the sides of the mainframes.
10. Push the connecting-pieces down into the locking position. The tops of the connecting-pieces should then be in line with the tops of the Maxiframes. If you have difficulty doing this try the following:
    a. Check that you have the correct connecting-pieces at the front and back.
    b. Check that the connecting pieces are positioned correctly.
    c. Hit the top of the connecting pieces with a plastic/wooden mallet (never use a metal object) to tap it into position.
    d. Open out the clips on the connecting pieces by a small amount.

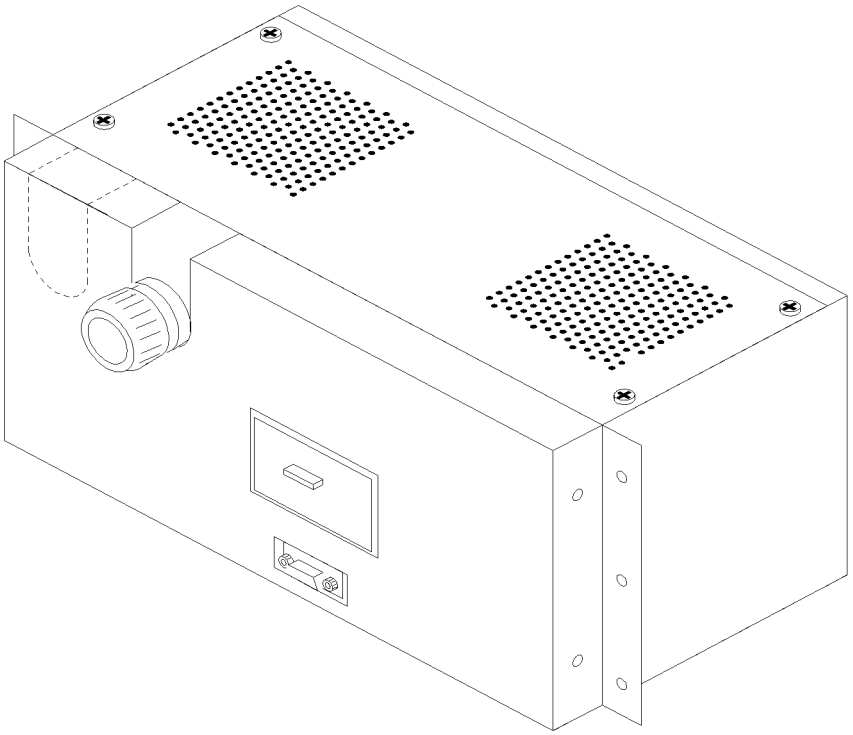


Figure 6-1. Power Control Module (PCM)

Note

The PCM is a **Safety Class 1** device. It has an exposed metal chassis that is directly connected to earth via the protective-earth conductor in the mains power cable. The Maxiframe itself is also connected to protective earth by the mains power cable.

Warning

Do not intentionally disrupt the protective-earth because this could allow a dangerous charge to build up on the mainframe. This would present a shock-hazard which could result in serious injury or death.

The **Power Control Module** (**PCM**) provides a connection between the mains-supply and the system **Power Supply Modules** (**PSM**s), **Parametric Measurement Units** (**PMU**s), fans and instruments installed in the mainframe. It also provides:

- Power-line conditioning - six filters provide mains power filtering.
- Short-circuit and over-current protection for the system. It contains circuit-breakers to disconnect the system from the mains. The circuit-breaker will switch-off if the current on any phase or the neutral line is greater than 40 A.

The PCM is installed at the bottom-rear of the Maxiframe cabinet.

Power Control Module (PCM) Power Options

The three PCM power options are:

- Option 0E5 (Europe)
- Option 0EF (USA)
- Option 0ED (Japan)

Note

See **Changing the PCM Power Option** for details of how to change from one option to another.

Option 0E5 (Europe)

Two mains voltages can be used by this option:

Europe (except UK)

400 V (phase-to-phase voltage).

3 phases + neutral + Protective-Earth.

50 Hz.

UK 415 V (phase-to-phase voltage).

3 phases + neutral + Protective-Earth.

50 Hz.

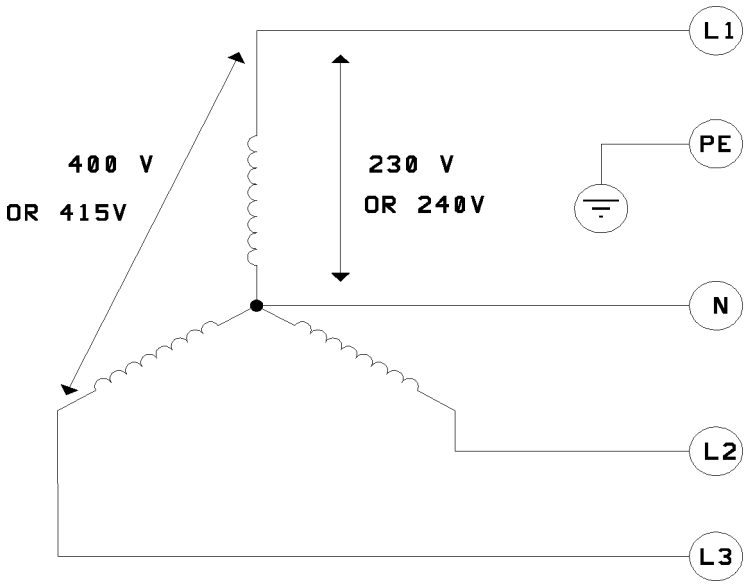


Figure 6-2. Mains for Option 0E5

This option requires:

USA 208 V (phase-to-phase voltage).

3 phases + neutral + Protective-Earth.

60 Hz.

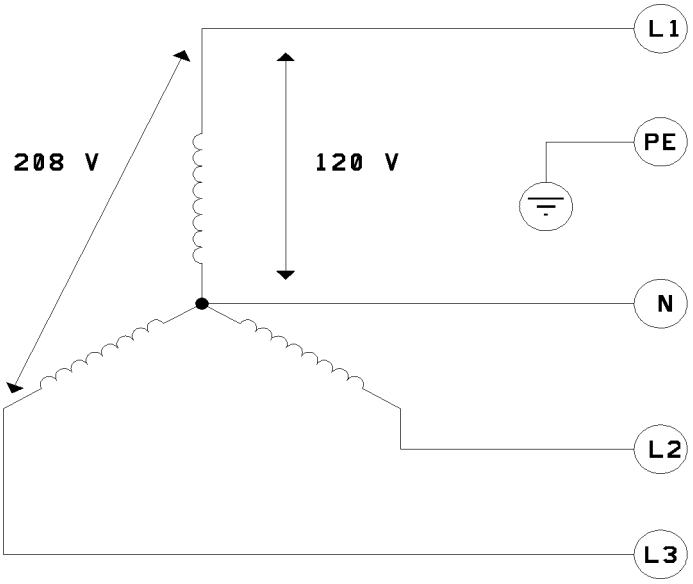


Figure 6-3. Mains for Option 0EF

This option requires two mains-supplies. A 3-phase supply for the fans and system-boards, and a single-phase or split-phase supply for instruments.

Mains 1 200 V (phase-to-phase voltage).

3 phases + Protective-Earth.

50/60 Hz.

This supplies the PSMs, the PMU boards and the fans in the mainframe.

Mains 2 100 V (phase-to-neutral voltage).

2 phases + neutral + Protective-Earth.

50/60 Hz.

This supplies instruments in the mainframe via the Test Equipment Outlets.

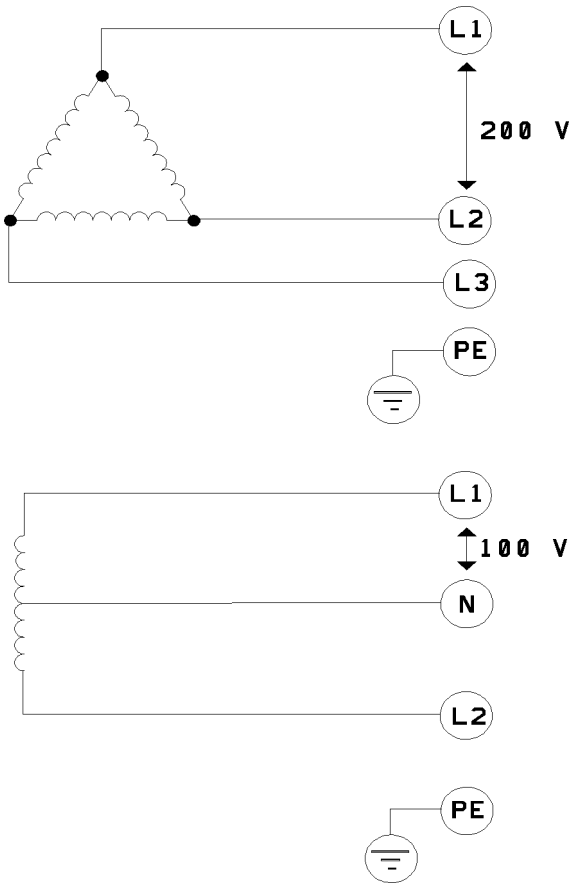


Figure 6-4. Mains for Option 0ED

Note

Generally, we recommend to use wire sizes according to the fuse rating of the mains breaker of the HP82000 Maxiframe. The fuse rating **for all power options** on the Maxiframe mains breaker is **40A**. The tables below give the maximum rated currents of a Single-Maxiframe system in two different configurations. This information is given to separate the real Maxiframe current flow from additionally possible current consumption by instruments connected to the internal power outlets. For partly filled Maxiframe card-cages there will be substantial current flow on the Neutral line, as every phase will supply one third of a card-cage!

Caution

Use delayed-action (slow-blow) fuses.

Table Table 6-1 gives the max. current ratings of a single Maxiframe with two card-cages. Max. current load on the internal power outlets is 20A per phases L1 and L2. (Internally fused).

Option 0E5 and Option 0EF only:
With maximum power outlet load on either phases L1 and/or L2,

- a Neutral current of 20A needs to be added to the Maxiframe Neutral current rate.
- a Phase current of 20A needs to be added to the Maxiframe Phase L1 and/or L2 current rate.

Phase L3 is **not** connected to the internal power outlets.

Table 6-1.

Option	Country	Configuration	Phase to Phase Voltage	Frequency	Rated Current
0E5	Europe	3 phase + neutral	400 **or** 415 V -13% +6%	50 Hz	11 A /phase 11 A
0EF	USA	3 phase + neutral	208 V -13% +6%	60 Hz	21 A /phase 21 A
0ED	Japan	3 phase and 2 phase + neutral	200 V -13% +6% 100 V -13% +6%	50/60 Hz 50/60 Hz	23 A /phase 20 A /phase 20 A

Table 6-2 gives the maximum current ratings of a single HP 82000 Maxiframe with 1 card-cage, 2 DPSs and instrumentation equipment in the upper cabinet.

Caution

Every 2 instruments installed and connected to the PCM may use up to 10 A. The total power consumed by instruments connected to the PCM must not exceed 3200 VA.

Up to 4 HSWGs plus one HP 54120A oscilloscope can be installed without additional cooling. For other instruments, additional cooling may be required.

Table 6-2.

Option	Country	Configuration	Phase to Phase Voltage	Frequency	Rated Current
0E5	Europe	3 phase + neutral	400 **or** 415 V -13% +6%	50 Hz	26 A /phase (L1 and L2 only) 26 A
0EF	USA	3 phase + neutral	208 V -13% +6%	60 Hz	31.5 A /phase (L1 and L2 only) 31.5 A
0ED	Japan	3 phase and 2 phase + neutral	200 V -13% +6% 100 V -13% +6%	50/60 Hz 50/60 Hz	11 A /phase 20 A /phase 20 A

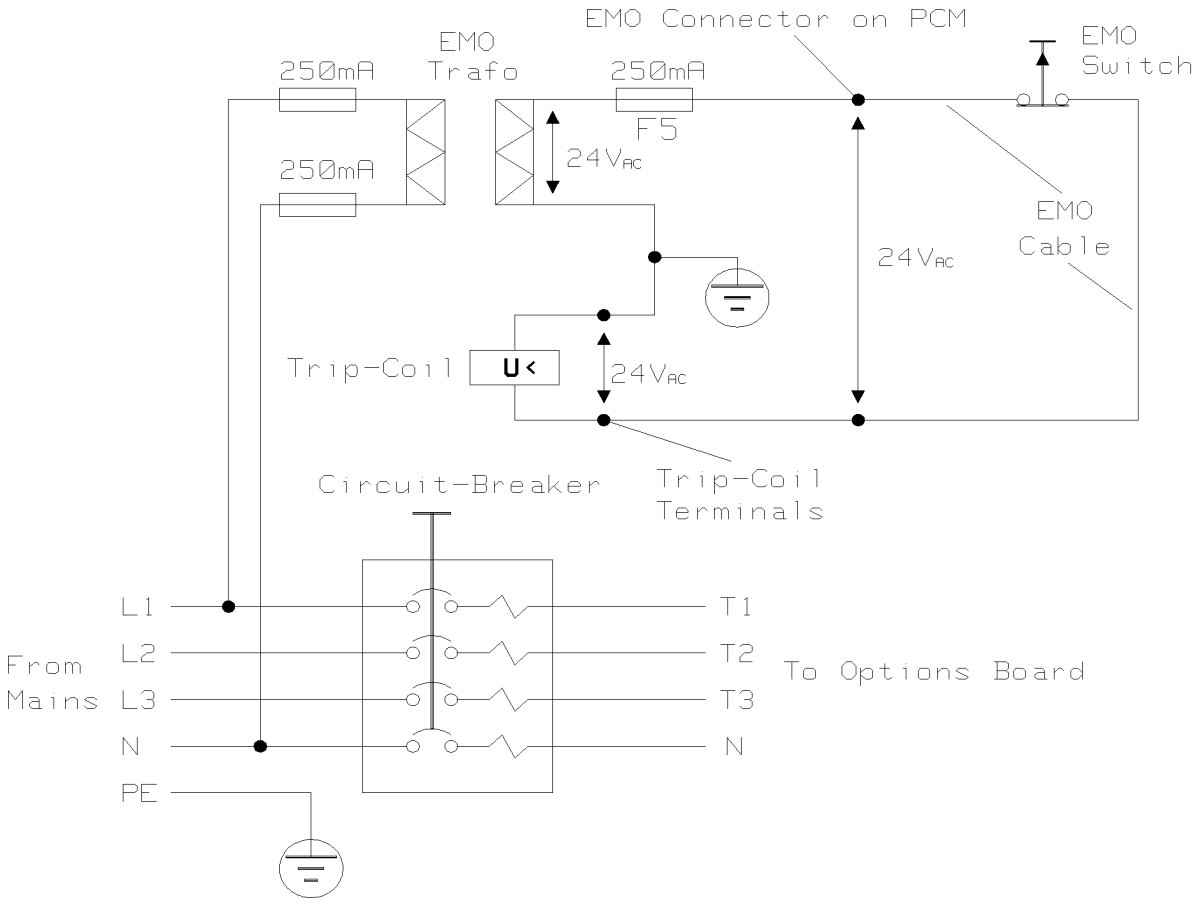


Figure 6-5. EMO for Option 0E5 (Europe)

Note

The EMO in Figure 6-5 is for PCM option 0E5 (Europe) only. For options 0EF (USA) and option 0ED (Japan) the EMO cable is connected across two phases, instead of one phase and neutral.

The PCM is equipped with an **EMergency Off** (**EMO**). Figure 6-5 shows a simplified picture of the EMO circuit for one circuit-breaker. The EMO consists of a trip-coil on each circuit-breaker, which is connected, via a transformer on the options-board, to a switch on the front of the DUT interface cover. While there is 24 V across the terminals of the trip-coil, the circuit-breakers on the PCM can be switched-on. When you press the EMO switch, you break the circuit to the trip-coil and the circuit-breakers switch-off.

Warning

There is mains voltage present across the primary of the EMO transformer when the power-cable is connected to the mains. This voltage is present even when the PCM circuit-breakers are switched-off.

Do not allow the EMO cable to touch a grounded object. This would damage or destroy fuse F5 in the PCM and you will not be able to switch-on the circuit-breaker(s). Remember that the mainframe casing is grounded.

The EMO cable is connected to the EMO socket on the PCM, but, on delivery is not connected to the switch on the DUT interface cover. It is instead shipped with a short-circuit on the switch-end of the cable , so that the PCM can be tested, without having to attach the DUT interface cover and connect the EMO cable to the EMO switch. Details of how to connect the EMO cable to the EMO switch are given in **Installing the DUT Interface.**

Warning

While the short-circuit is on the EMO cable, the system has no Emergency Off. You must remove this short-circuit and connect the EMO cable to the EMO switch when you install the DUT interface. Details of this are given in the chapter *Installing the DUT Interface*.

Note

For power-option 0ED (Japan), the system is equipped with two trip-coils for the two mains connections.

A Double-Maxiframe system has two EMO cables which connect to one EMO switch.

Warning

The following checks must be carried-out by qualified Hewlett Packard service personnel only.

Note

It is the responsibility of the customer to supply the mains power cable and to ensure that this cable meets local regulations.

Before starting, make sure that:

1. The power cable is not connected to the mains.
2. The power cable is long-enough so that you can open the back-door of the Maxiframe when the cable is installed.
3. The insulated protective-earth conductor extends beyond the **outer-**insulation at least 5 cm further than the other conductors. This will mean that if the cable does slip through the cable-clamp, the protective-earth will be the last to be pulled from its terminal.
4. The circuit-breaker on the PCM (two for option 0ED (Japan)) is switched off.
5. The mains power has been fused in accordance with the rated currents for the system (see, Rated Currents).
6. If you are doing a primary-installation, the PCM option is marked on the back-cover of the PCM as one of the following:

Option	Location
OPT.0E5	Europe
OPT.0EF	USA
OPT.0ED	Japan

Refer to the section on **Changing the PCM Power Option** to check that the internal configuration is consistent with the option indicated on the back-cover and that this option is correct for the local mains power. In particular, you must check:

- The configuration of circuit-breaker(s) and barrier-blocks (0EF only) on the circuit-breaker cage.
- The connections between the circuit-breaker(s) and barrier-block and the options-board.
- The positions of the frequency-selector cables (50 or 60 Hz).

Note

For option 0ED (Japan) you may have to change the position of the frequency-selector cables, depending on the frequency of the local mains. Refer to **Changing the PCM Power Option** for details.

- The positions of fuses (F8, F9, F10 and F11).
- The positions of the cables to the Option Y and Option D connectors.

The following procedure tells you how to connect mains power cables to the Power Control Module (PCM).

Warning

The following procedure must be carried out in sequence by a qualified electrician.

Do not continue with this procedure until the configuration of the PCM has been checked by qualified Hewlett Packard service personnel.

Local safety-codes and regulations must be adhered to.

Procedure

1. Remove the six screws securing the PCM to the mainframe and slide the PCM out of the mainframe.

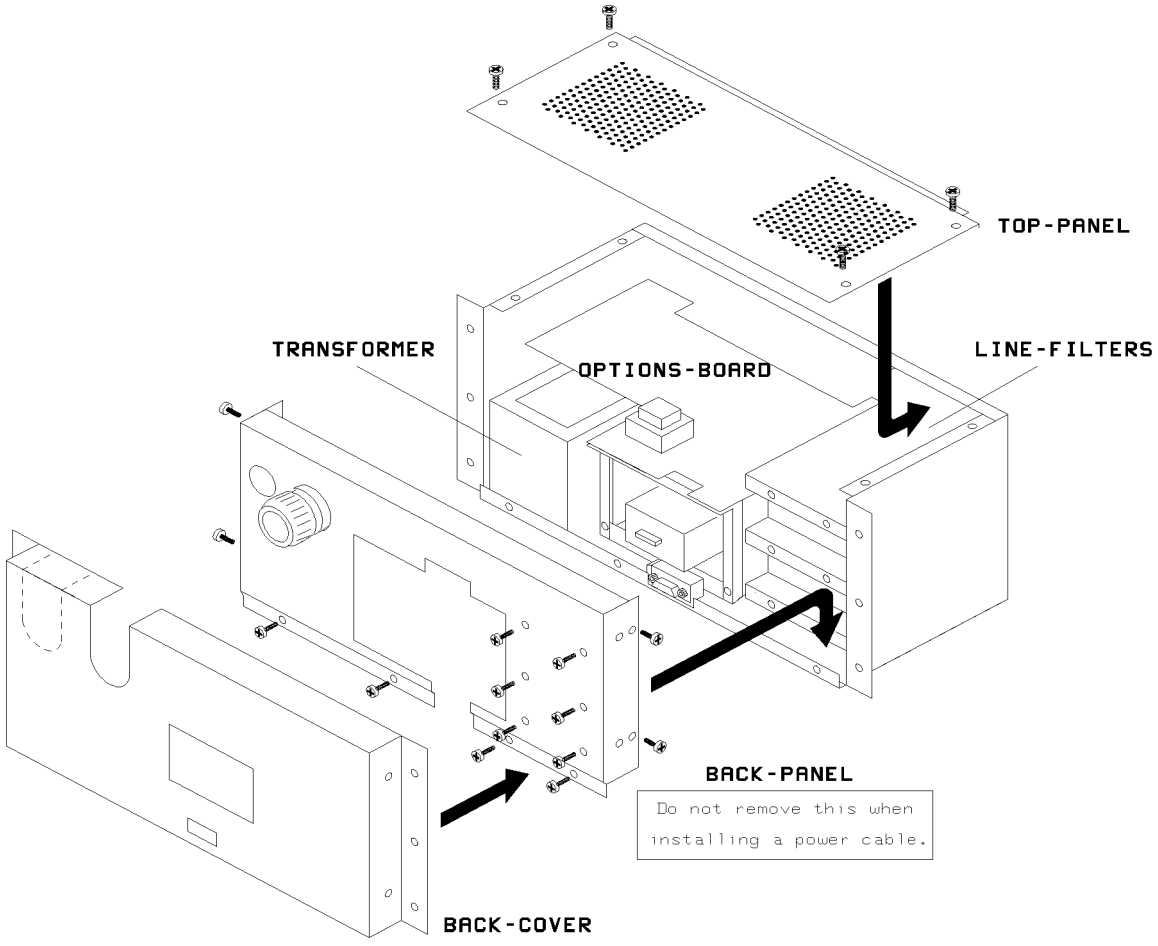


Figure 6-6. PCM Assembly

2. Remove the back-cover of the PCM. Do not remove the back-panel.
3. Remove the top-cover of the PCM (one screw at each corner). The options board is shown in Figure 6-7.

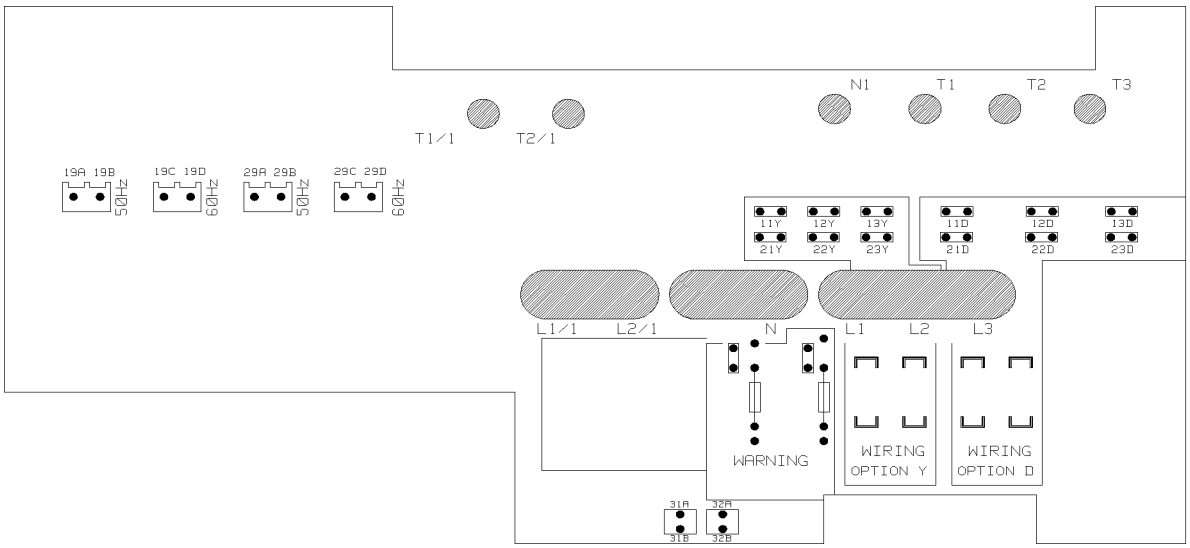


Figure 6-7. Options Board

4. Carry out one of the following three procedures, depending on the PCM option.

Note

The PCM circuit-breaker is below the options-board. Once the back-cover is removed, you can access the cross-head screws for tightening the cable-clamps in the circuit-breaker from the back of the PCM, through a slot in the back-panel. You do not need to remove the back-panel.

Procedure

415/400 V (phase-to-phase)	3 phase + neutral

For this option the PCM has a four-pole circuit-breaker so that all phases and the neutral line can be disconnected from the mains.

1. Loosen the cable-clamp on the back of the PCM.
2. Pass the mains power cable through the cable-clamp and into the PCM.
3. Connect the protective-earth conductor to one of the protective-earth studs fixed to the casing of the PCM.

Warning

If you do not connect the protective-earth conductor inside or outside the PCM a dangerous charge could be allowed to build up on the mainframe cabinet. This shock-hazard could result in serious injury or death.

Connect the protective-earth before any other connections are made.

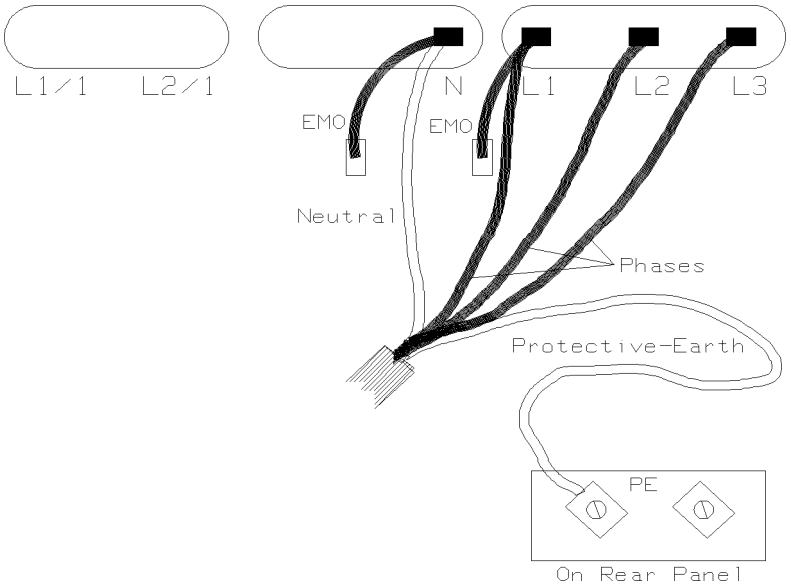


Figure 6-8. Power Cable Connections (0E5)

4. Connect two of the phases to terminals **L2** and **L3** on the circuit-breaker. The labels for the terminals are marked on the options-board.
5. Connect the third phase and one (purple) EMO cable to **L1**.
6. Connect the neutral conductor and one (purple) EMO cable to **N**.
7. Check that the connections you have made are good, by pulling firmly on each cable.

Note

The sheath of the cable must extend beyond the cable-clamp (into the PCM) by at least half the diameter of the cable.

8. Feed enough of the mains power cable into the PCM to eliminate strain on the circuit-breaker connections, and tighten the cable-clamp.
9. Replace the top and back covers of the PCM.
10. Before replacing the PCM in the mainframe, read the section on **Verifying the Operation of The PCM** and carry out the instructions for this power option.

Procedure

208 V (phase-to-phase)	3 phase + neutral

For this option the PCM has a three-pole breaker, and a separate barrier-block for the Neutral conductor. This means that all phases can be disconnected from the mains, but not the Neutral line.

1. loosen the cable-clamp on the back of the PCM.

Note

Check that the cable-clamp is the correct size for the mains power cable you are using. If not, replace it with the second clamp supplied with the system.

If you are using AWG 10 cable then you will not be able to push the cable into the PCM, because the sheathed cable will not fit through the inner opening of the cable-clamp.

2. Pass the mains power cable through the cable-clamp and into the PCM.
3. Connect the protective-earth conductor to one of the protective-earth studs fixed to the casing of the PCM.

Warning

If you do not connect the protective-earth conductor inside or outside the PCM a dangerous charge could be allowed to build up on the mainframe cabinet. This shock-hazard could result in serious injury or death.

Connect the protective-earth before any other connections are made.

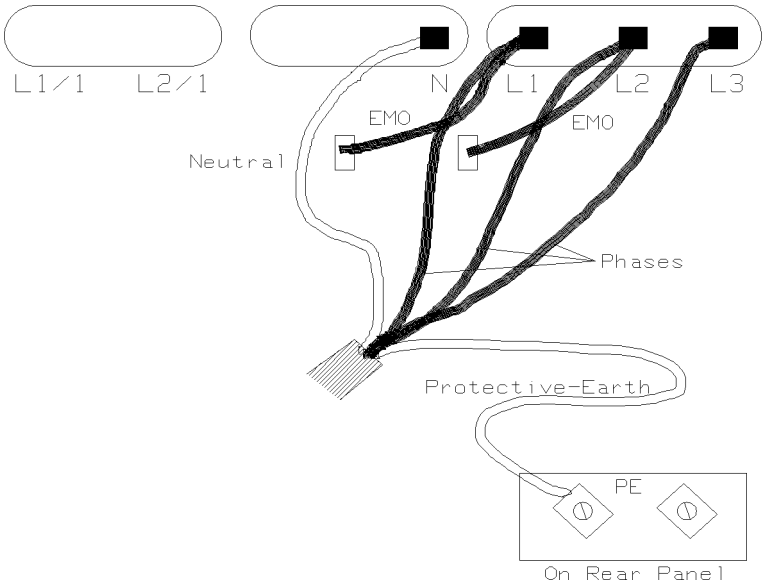


Figure 6-9. Power Cable Connections (0EF)

4. Connect one phase and one (purple) EMO cable to terminal **L1** on the circuit-breaker.
5. Connect a second phase and one (purple) EMO cable to **L2**.
6. Connect the third phase to **L3**.
7. Connect the Neutral conductor to terminal **N** on the barrier-block.
8. Check that the connections you have made are good, by pulling firmly on each cable.

Caution

Except when you are using AWG 10 cable, you must extend the cable sheath beyond the cable-clamp by at least half the diameter of the cable.

---

9. Feed enough of the mains power cable into the PCM to eliminate strain on the circuit-breaker connections, and tighten the cable clamp.
10. Replace the top and back covers of the PCM.
11. Before replacing the PCM in the mainframe, read the section on **Verifying the Operation of The PCM** and carry out the instructions for this power option.

Procedure

200 V (phase-to-phase) **and** 100 V (phase-to-neutral)	3 phase (no neutral) 2 phase + neutral.

For this option the PCM has two circuit-breakers; one for each mains supply used by the PCM.

1. loosen the two cable-clamps on the back of the PCM.
2. Feed the three-phase cable through the clamp on the right, and into the PCM.
3. Connect the protective-earth conductor to one of the protective-earth studs fixed to the casing of the PCM.

Warning

If you do not connect the protective-earth conductor inside or outside the PCM a dangerous charge could be allowed to build up on the mainframe cabinet. This shock-hazard could result in serious injury or death.

Connect the protective-earth before any other connections are made.

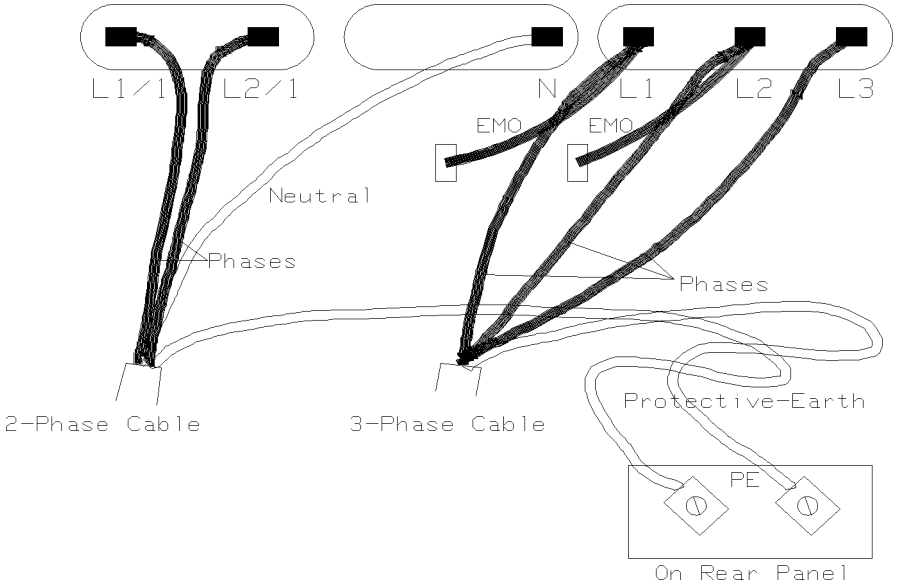


Figure 6-10. Power Cable Connections (0ED)

4. Connect one of the phases of the *three-phase cable* to terminal **L3** on the circuit-breaker.
5. Connect a second phase of the *three-phase cable* and one of the (purple) EMO cables to **L1**.
6. Connect the third phase of the *three-phase cable* and one of the (purple) EMO cables to **L2**.

7. Feed the *two-phase cable* through the clamp on the left, and into the PCM.
8. Connect the protective-earth conductor to one of the protective-earth studs fixed to the casing of the PCM.

Warning

Failure to connect the protective-earth conductors inside or outside the PCM could allow a lethal charge to build up on the mainframe cabinet.

---

9. Connect the two phases to **L1/1** and **L2/1.**
10. Connect the Neutral conductor to **N.**
11. Check that the connections you have made are good, by pulling firmly on each cable.

Caution

The sheath of the cable must extend beyond the cable-clamp (into the PCM) by at least half the diameter of the cable.

---

12. Feed enough of the mains cables into the PCM to eliminate strain on the circuit-breaker connections, and tighten the cable-clamps.
13. Check that the frequency-selector cables are in the correct positions for the local mains frequency. If they are not, move them to the correct positions. Details of this are given in **Changing the PCM Power Option.**
14. Replace the top and back covers of the PCM.
15. Before replacing the PCM in the mainframe, read the section on **Verifying the Operation of The PCM** and carry out the instructions for this power option.

Warning

The following procedure must be carried out by qualified Hewlett Packard service personnel only.

Procedure

Note

If you are verifying a PCM with power option 0ED (Japan), then you must check the earth-connection of both mains-cables independently. When you are checking one cable, disconnect the other cable from the mains.

1. Set the circuit-breaker(s) at the back of the PCM to the OFF position.
2. Remove the six screws securing the PCM to the mainframe and slide the PCM out of the mainframe.
3. Make sure that the protective-earth cable between the PCM and the mainframe is connected.

Note

Before you remove any cables, note the positions of these cables at the front of the PCM. This will make it easier to replace them in their original positions.

4. Disconnect all cables, except the protective-earth, from the front of the PCM.
5. Connect the mains-cable to the mains-socket.
6. Measuring at another mains-socket, check that the resistance between the mainframe casing and the protective-earth at the mains is less than 0.1 Ω.
   If this test fails:
   a. Make sure that the mains-plug and cable are correctly wired.
   b. Make sure that the protective-earth conductor of the mains-cable is connected to one of the protective-earth studs on the casing of the PCM.
   c. Make sure that the protective-earth cable is connected between the PCM casing and the mainframe cabinet.
   d. Measure again the resistance between the mainframe cabinet and the protective-earth at the mains.

When you have verified that the mainframe cabinet is properly earthed you can continue with this procedure.

Note

If any of the following tests fail, refer to the *HP 82000 Troubleshooting Manual*.

7. Connect the mains power cable(s) to the mains.

8. Measure the voltage across the terminals on the EMO connector. This must be 24 - 30 V (AC).
9. Reconnect the EMO cable and make sure that the switch-end is short-circuited, **or** connected to the EMO switch on the DUT interface cover.

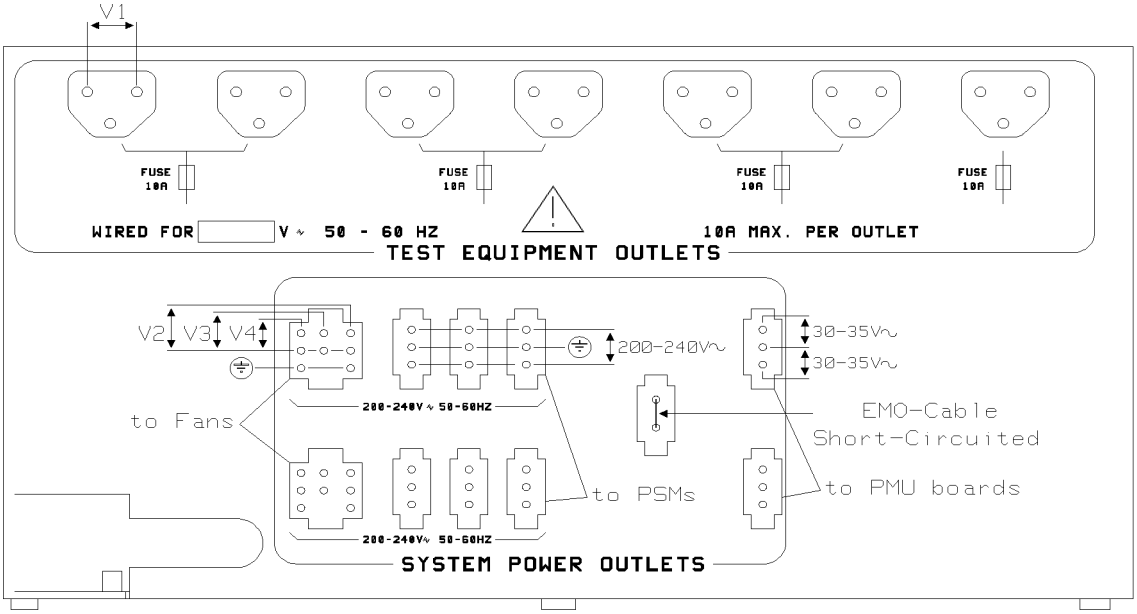
Note

You will not be able to switch-on the PCM unless the terminals on the EMO connector are short-circuited and the trip-coil has 24 V across it.

When switching-on Double-Maxiframes you must switch-on the mainframe containing the master-sequencer first. Switch-on the second mainframe within a few seconds of the first.

---

10. Switch on the circuit-breaker(s) at the back of the PCM.



OPTION	COUNTRY	V1
0E5	EUROPE (EXCEPT UK)	230 V ~
0E5	UK	240 V ~
0EF	USA	120 V ~
0ED	JAPAN	100 V ~

FREQUENCY	V2	V3	V4
50 HZ	200-240 V~	200-240 V~	200-240 V~
60 HZ	100-130 V~	200-240 V~	130-160 V~

Figure 6-11. PCM Output Voltages

11. Figure 6-11 shows the voltages which are present at the connectors at the front of the PCM if the PCM is working correctly.
12. If all the voltages measured in the last step were correct, the PCM is working correctly. Switch the circuit-breakers off and reconnect the cables at the front of the PCM.

The function of the **Power Supply Modules** (**PSMs**) is to convert the voltage from the PCM to the voltages needed by the system-boards (+15 V, -12 V, +5 V, -2 V, -5.2 V). The PSMs are installed behind the card-cages as shown in Figure 6-12.

Warning **PSMs must be installed by qualified service personnel only.**

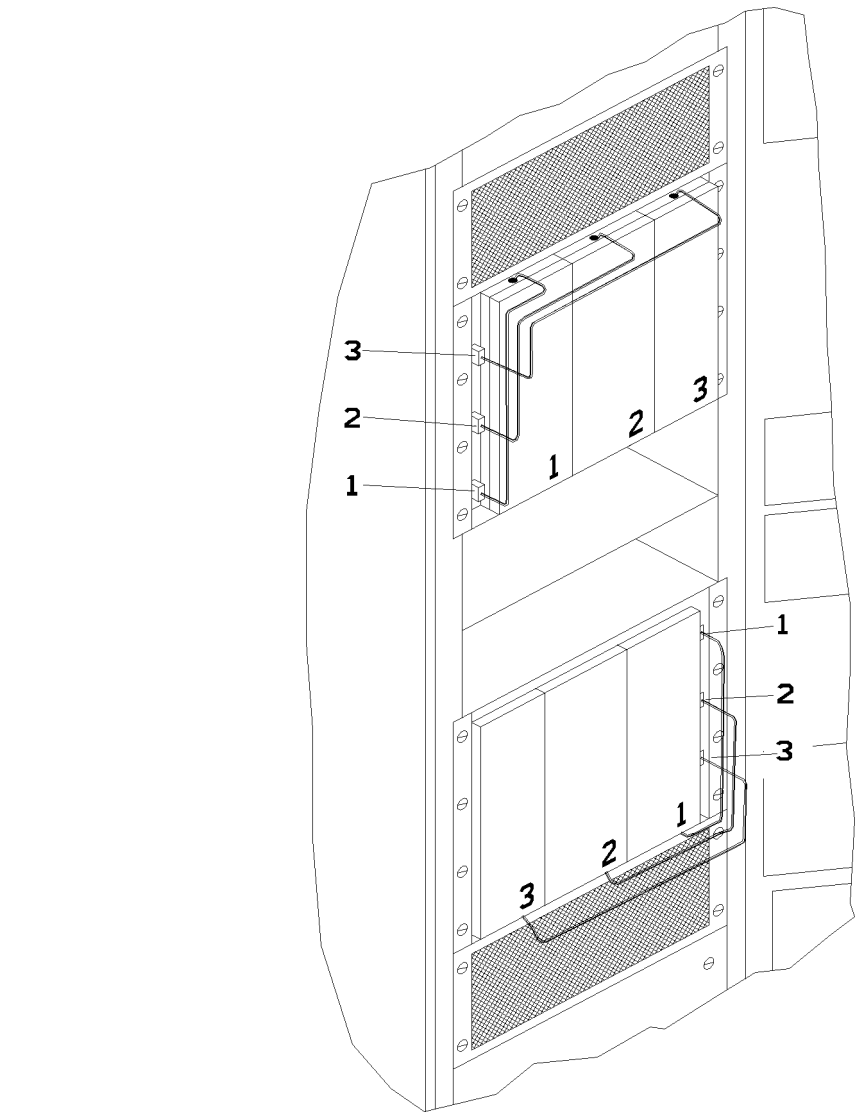


Figure 6-12. Installing PSMs

Rules for installing PSMs are:

Rules

1. If you are doing a primary-installation, you must remove the PSM blank from behind each card-cage. Maxiframes are shipped without PSMs, so this metal blank is installed to support the weight of the system-boards. To remove a blank:
   a. Open the back-door.
   b. Remove the three screws holding the blank to each side of the card-cage.
   c. Remove the blank.
   d. Replace the three screws on both sides of the card-cage. These screws secure the card-cage to the mainframe.

Caution

If you are shipping a Maxiframe, with the boards installed, you must have a blank at the back of each card-cage to support the weight of the boards. Otherwise the weight of the system-boards could break the motherboard.

---

2. The system-power (PCM) must be switched-off when you are installing a PSM.

Warning

You may receive an electric shock if the PCM is switched-on.

---

3. If there are boards in the slots in front of the PSM you are installing, slide these boards out a few cm's. Otherwise, you could damage the connectors on the boards or on the PSM.

Caution

If you try to install a PSM while system-boards are fully in position, you could cause damage to the connectors on the system-boards and on the PSM.

---

4. In an upper card-cage the first PSM goes in the leftmost position (seen from behind the mainframe), with the PSM cables pointing up. Each PSM can supply six system-boards.
5. In a lower card-cage the first PSM goes in the rightmost position, with the PSM cables pointing down.
6. PSM cables are connected as shown in Figure 6-12. Route the cables around the backs of the PSMs (as shown), otherwise you will not be able to close the back-door.
7. PSMs are held in position by two spring-loaded screws above and below the PSM.

Warning

This procedure must be carried out by qualified Hewlett Packard service personnel only.

Do not attempt to use the PCM until you have verified that it is working correctly.

The standard procedure to change the PCM power option is to simply exchange the complete PCM. This is the easiest way and avoids a complex procedure. If you still should decide to change the PCM power option on a component basis, you need some additional parts:

Note

For safety reasons, the factory no longer supports PCM power option change on a component basis. Thus, the former option kits are no longer available.

PCM Option 0E5 (Europe)

- One 4-pole circuit-breaker.
- One E1202-00201 back-panel.
- One cable-clamp.

PCM Option 0EF (USA)

- One 3-pole circuit-breaker.
- One 0360-1755 barrier-block.
- One 0360-1094 barrier-block end.
- One E1202-00203 back-cover.
- One cable-clamp.

PCM Option 0ED (Japan)

- Two 3-pole circuit-breakers.
- One E1202-00202 back-cover.
- One cable-clamp.

Procedure

1. Remove the six screws securing the PCM to the mainframe and slide the PCM out of the mainframe.

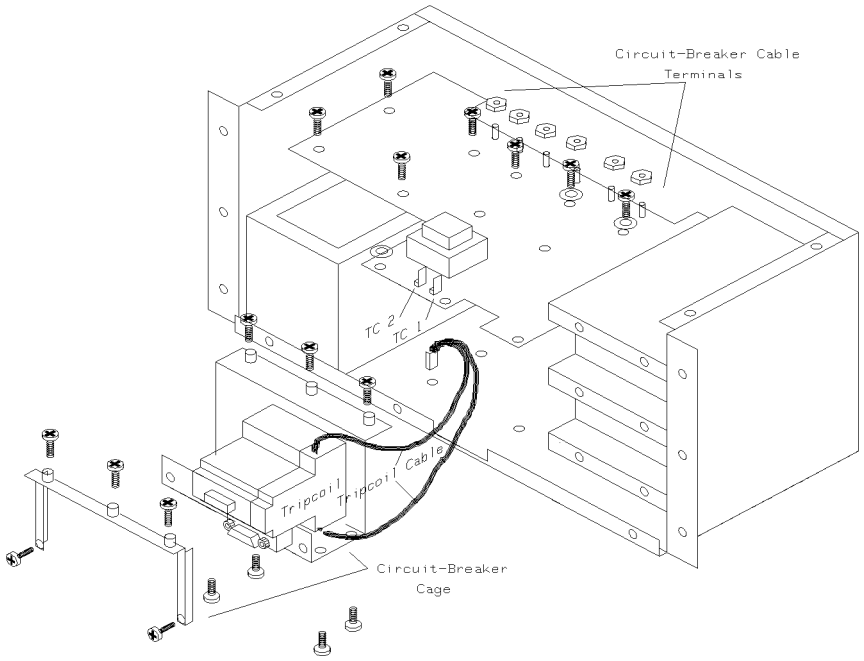


Figure 6-13. Changing the PCM Power Option

2. Remove the top-plate. See Figure 6-13 for a PCM assembly diagram.
3. Remove the back-cover.
4. Remove the power cable(s).
5. Unscrew the cable-clamp(s) from the back-panel of the PCM (unscrew anti-clockwise).
6. Attach the new cable-clamp(s) to the back-panel.
7. Remove the back-plate.
8. Disconnect the six circuit-breaker cables from the options-board. These are fixed with bolts to studs on the options-board (see Figure 6-13) and are labeled **T1/1**, **T2/1**, **N1**, **T1**, **T2**, **T3**.

Note

It makes it easier to reattach these cables if you attach a piece of wire (or strong string) to each cable-connector as you disconnect it. Later in this procedure you will have to remove the circuit-breaker cage and some of the circuit-breaker cables will be pulled under the options-board. If you have attached a piece of cable to the end-connectors, it is easy to pull these cables back into position when you want to reconnect them to the options-board.

---

9. Remove the front of the circuit-breaker cage (3 screws on the options-board and two screws at the front).
10. Disconnect the black cable(s) from the EMO(s) from the options-board.

11. Remove all remaining screws from the options-board.
12. Remove the four screws under the PCM which fix the circuit-breaker cage to the PCM.
13. Disconnect the black trip-coil cable(s) from the options-board. The connectors for these cables are located in front of the EMO transformer on the options-board, and are labeled TC 1 and TC 2 in Figure 6-13.
14. Lift-up the options-board (as far as the cables will allow) and remove the circuit-breaker cage.
15. If you are changing from option 0E5 (Europe) to options 0EF or 0ED, disconnect the two ends of the trip-coil cable from the trip-coil attached to the right side of the circuit-breaker.
16. Use Figure 6-14 to change the configuration of the circuit-breaker cage.

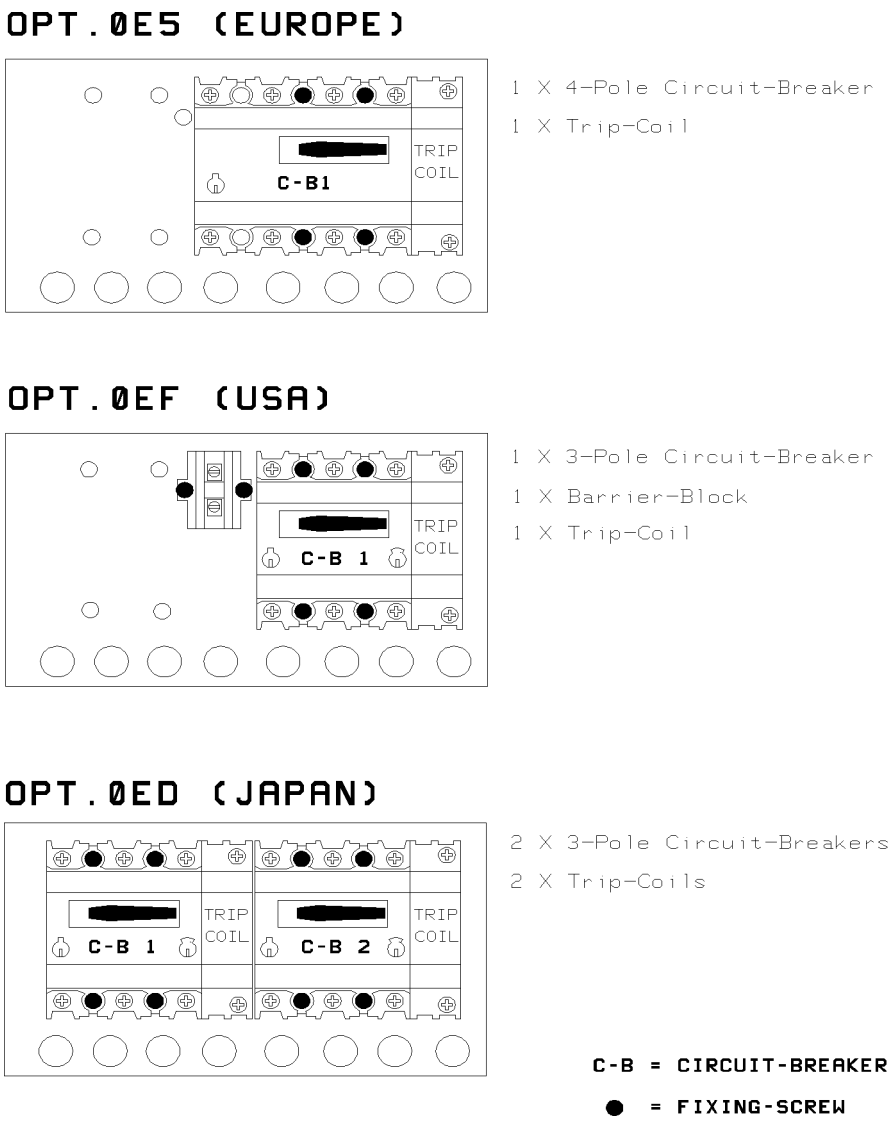


Figure 6-14. Circuit-Breaker Cage Configurations

Warning

Figure 6-14 shows the positions of the fixing-screws and the corresponding holes on the circuit-breaker cage. You must install the circuit-breakers exactly as shown in this diagram, otherwise the positions of the terminals on the circuit-breaker will not match the markings on the options-board.

17. Connect the trip-coil cable(s) to the trip-coil(s), as shown in Figure 6-13. This shows one trip-coil only.
18. Connect the circuit-breaker cables to the underside of the circuit-breaker(s) (barrier-block) as follows:

Note

For option 0ED, the left circuit-breaker is referred to as C-B 1 and the right circuit-breaker as C-B 2, as in Figure 6-14.

The terminals on the circuit-breakers are labeled **T1**, **T2**, **T3** and **N**.

Option 0E5 (Europe)

Connect Cable	To Terminal
T1	T1
T2	T2
T1/1	T1
T2/1	T2
N1	N

Option 0EF (USA)

Connect Cable	To Terminal
T1	T1
T2	T2
T1/1	T1
T2/1	T2
N1	Bottom of barrier-block

Connect Cable	To Terminal
T1/1	T1 (C-B 1)
T2/1	T2 (C-B 1)
N1	T3 (C-B 1)
T1	T1 (C-B 2)
T2	T2 (C-B 2)
T3	T3 (C-B 2)

19. Replace the circuit-breaker cage in the PCM.
20. Attach the (black) trip-coil cables to the connectors on the options-board (TC 1 and TC 2 in Figure 6-13). The order you connect them in is not important.
21. Reattach the front of the circuit-breaker cage.
22. Replace all the screws in the options-board.
23. Reattach the circuit-breaker cables to the studs on the options-board.
24. Replace the back-panel.
25. Carry out the steps listed in one of the following sections, depending on which power option you are configuring.

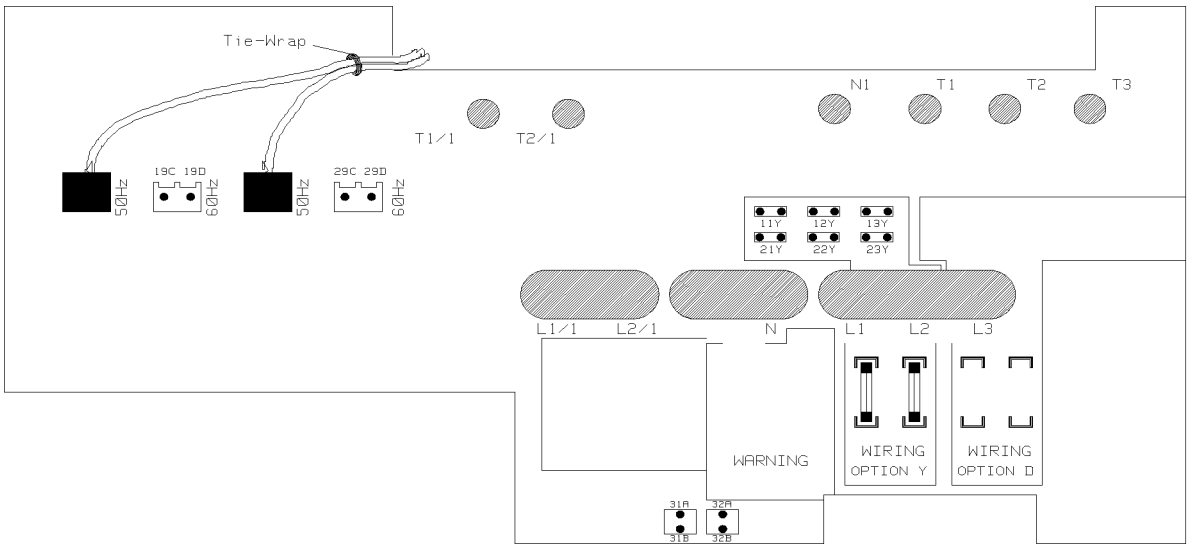


Figure 6-15. Option 0E5 (Europe)

1. Connect the cables from the line-filters (blue) to the terminals on the options-board as follows:

Connect Cable	To Terminal
11D/Y	11Y
12D/Y	12Y
13D/Y	13Y
21D/Y	21Y
22D/Y	22Y
23D/Y	23Y

2. Move the fuses **F8** and **F9** (2 A FER) to the positions for **option Y**, as shown in Figure 6-15.
3. Attach a mains power cable, as described in **Connecting the Mains Power Cable.**
4. Replace the back-cover.
5. Replace the top-cover.
6. Verify that the PCM is working correctly, as described in **Verifying the Operation of The PCM.**

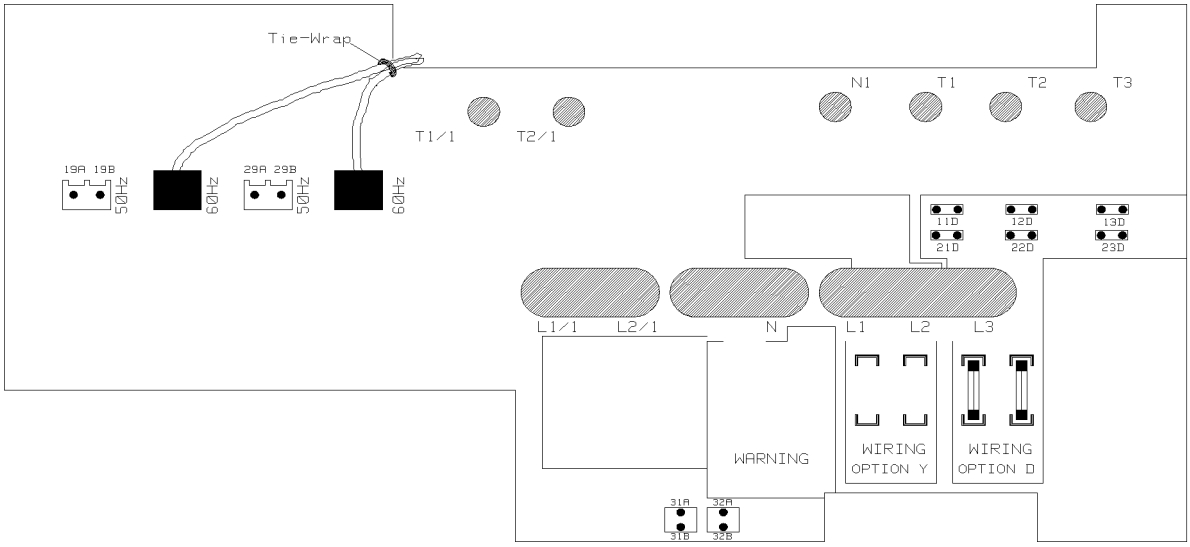


Figure 6-16. Option 0EF (USA)

1. Connect the cables from the line-filters (blue) to the terminals on the options-board as follows:

Connect Cable	To Terminal
11D/Y	11D
12D/Y	12D
13D/Y	13D
21D/Y	21D
22D/Y	22D
23D/Y	23D

2. Move the fuses **F10** and **F11** (2 A FER) to the positions for **option D**, as shown in Figure 6-16.
3. Move the two frequency-selector cables to the **60 Hz** positions, as shown in Figure 6-16.
4. Attach a mains power cable, as described in **Connecting the Mains Power Cable.**
5. Replace the back-cover.
6. Replace the top-cover.
7. Verify that the PCM is working correctly, as described in **Verifying the Operation of The PCM.**

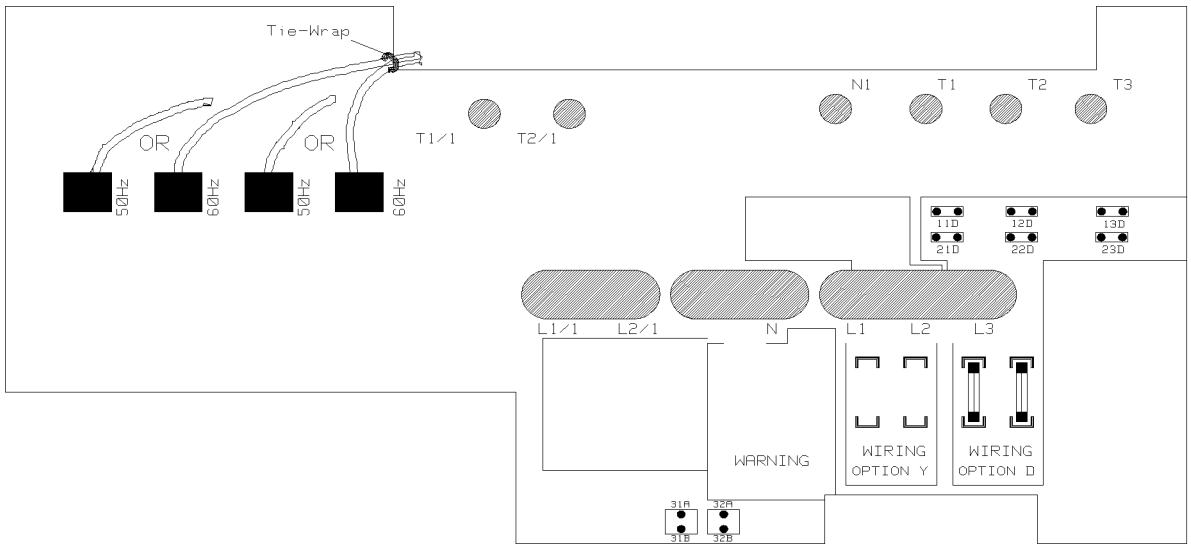


Figure 6-17. Option 0ED (Japan)

1. Connect the cables from the line-filters (blue) to the terminals on the options-board as follows:

Connect Cable	To Terminal
11D/Y	11D
12D/Y	12D
13D/Y	13D
21D/Y	21D
22D/Y	22D
23D/Y	23D

2. Move the fuses **F10** and **F11** (2 A FER) to the positions for **option D**, as shown in Figure 6-17.
3. Depending on the frequency of the local mains power, move the two frequency-selector cables to the **50 Hz** or **60 Hz** positions, as shown in Figure 6-17.
4. Attach a mains power cable, as described in **Connecting the Mains Power Cable.**
5. Replace the back-cover.
6. Replace the top-cover.
7. Verify that the PCM is working correctly, as described in **Verifying the Operation of The PCM.**

This section gives you the information necessary to install system-boards in a Maxiframe system.

Warning

Switch-off the PCM before you install or remove system-boards.

Caution

System-boards must be installed by qualified Hewlett Packard service personnel.

Before installing the system-boards you must install the PSMs which supply the boards. Do not install PSMs while boards are in the card-cage, because this could cause damage to the connectors on the back of the boards.

Take precautions against Electrostatic Discharge when handling system boards.

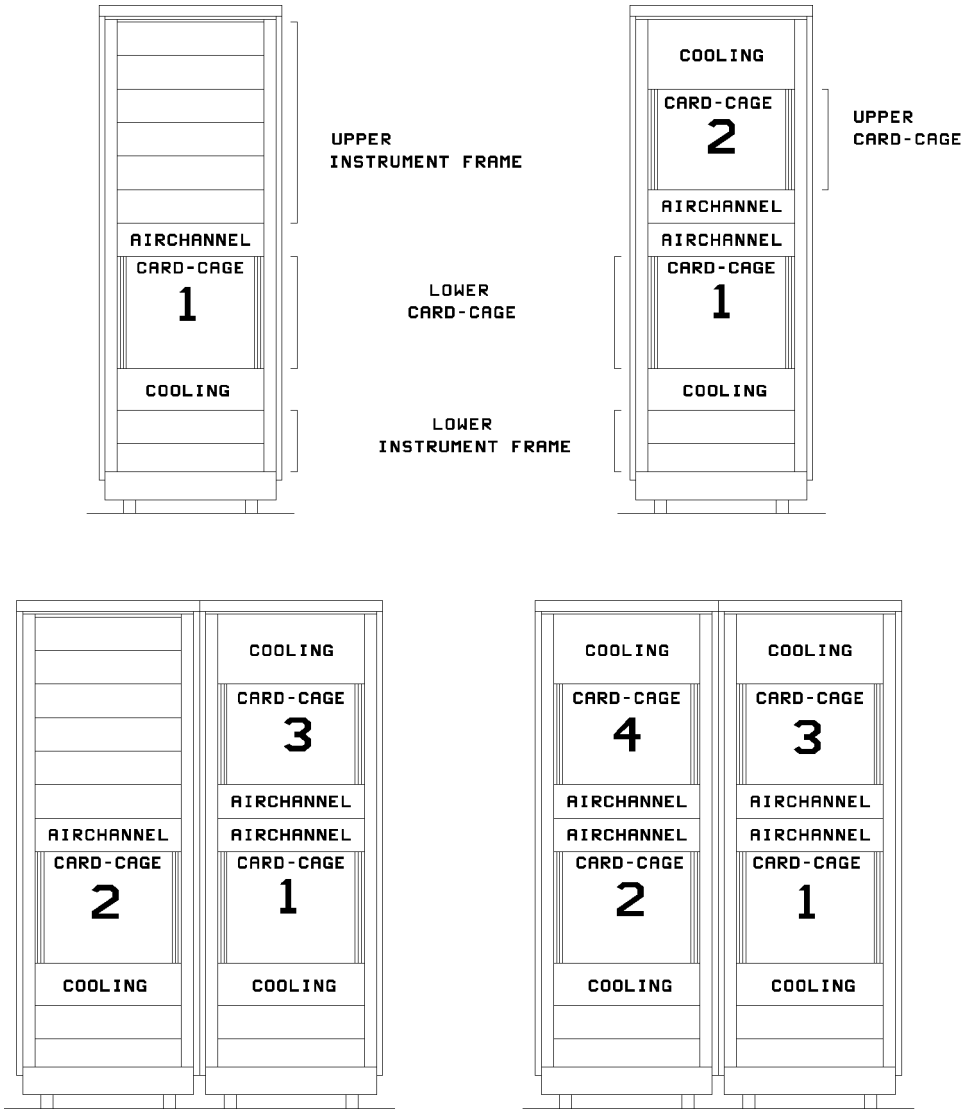


Figure 7-1. Maxiframe Configurations

The various possible Maxiframe configurations are shown in Figure 7-1.

Note

The card-cage numbering shown here is used consistently throughout this manual.

System boards are located in the card-cages of the Maxiframe. Each Maxiframe can have a maximum of two card-cages (a maximum of four in a Double-Maxiframe system). The upper card-cage differs from the lower card-cage by the following:

- The slot-numbering in lower card-cages is 1 to 18, from left to right. In upper card-cages the numbering runs from right to left.

- Boards must be installed upside-down in an upper card-cage:
  - In a lower card-cage, system boards must be installed with the component-side on the right. In an upper card-cage, the component-side must be on the left.
  - There must be an entry for each card-cage in the file `/hp82000/pws/data/mainframes`. These entries take the form:

    ```
    Mc,h
    ```

    Where:

    `c` is the number of the card-cage. See Figure 7-1.

    `h` is the HP-IB address of the Clock board in this card-cage. See the section **Clock Boards.**

Caution

Inserting boards the wrong way up could damage the connectors on the board, or, the backplane connectors in the card-cage.

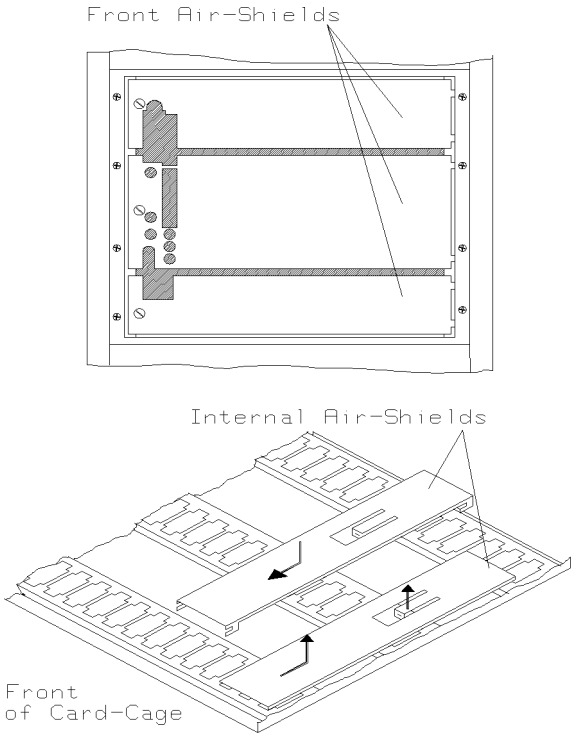


Figure 7-2. Card-Cage Air-Shields

Figure 7-2 shows the air-shields for the lower card-cage in a Maxiframe.

The air-shields direct the flow of cooling-air over the system boards. There are two types of air-shields for card-cages:

1. **Front air-shields -** These are attached in front of the card-cage (as in the diagram). On a lower card-cage, the air-shields slot into position on the right and are held in position by a spring-loaded screw on the left. On an upper card-cage, the air-shields slot into position on the left and are held in position by a spring-loaded screw on the right.

Caution

Lubricate these screws (grease, oil) before you install them. If they are not lubricated, they tend to stick and can not be removed.

Note

Do not install the front air-shields until you have installed all system-boards and HSWGs (see Installing HSWGS).

The I/O cables and PMU cable must be passed through the gaps between the air-shields.

Caution

Take care not to pinch or crush the I/O cables when you are installing the air-shields. These cables are very easily damaged.

2. **Internal air-shields -** These are attached inside the card-cage, to cover empty slots and redirect the flow of cooling-air to the boards. One air-shield is needed for every two empty board-slots and they are attached as shown in Figure 7-2.

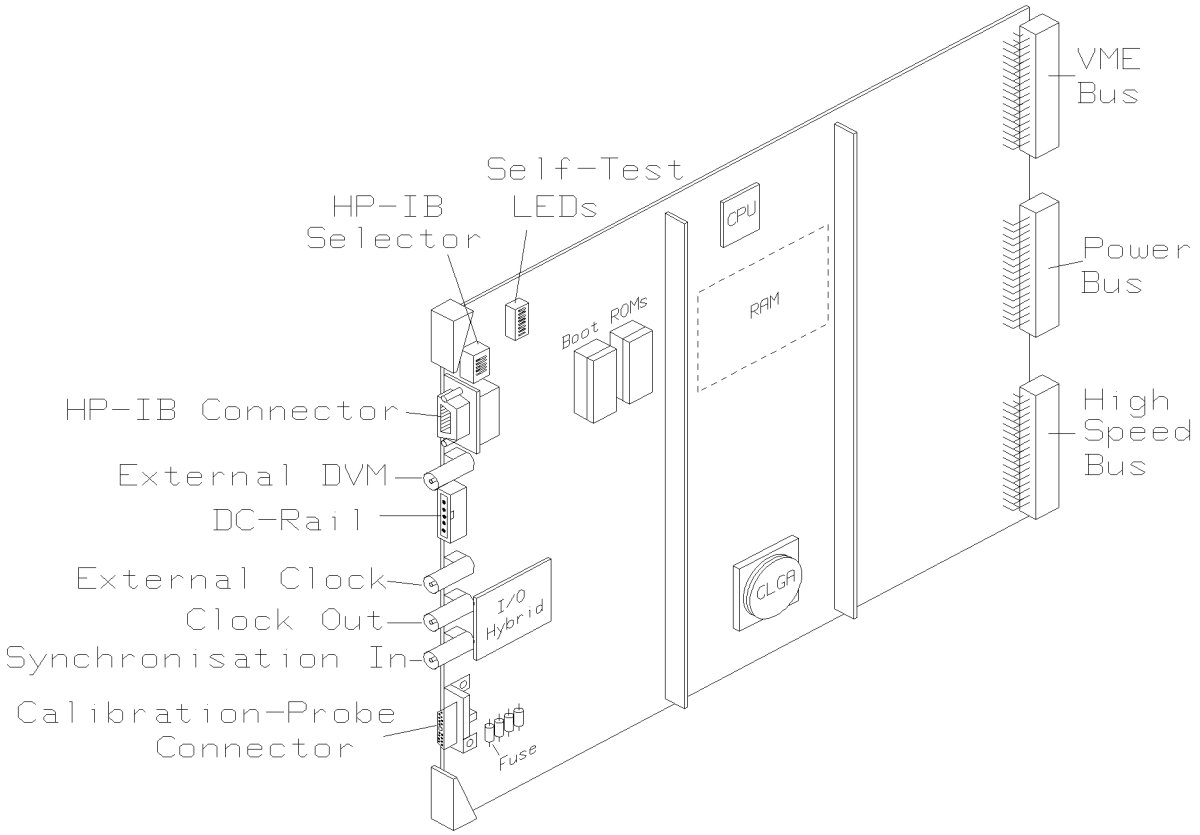


Figure 7-3. Clock Board

The Clock Board in Figure 7-3 is shown as it would be installed in a lower card-cage. This board would be installed upside-down in an upper card-cage.

Rules

1. One Clock Board is needed in each card-cage.
2. The Clock Board must be put in **slot 1** of a card-cage.
3. The Clock Board in each card-cage must be connected to the HP-IB Bus Select-Code 7 . The HP-IB cable for the Clock Boards is installed in the factory and is routed to the card-cage.

4. The HP-IB address of each card-cage is set on its Clock Board, using the DIP-switches shown in Figure 7-3. The addresses for each card-cage are:

card-cage	HP-IB address
1	3
2	4
3	5
4	6

   On the DIP-switches the LSB is closest to the HP-IB connector.

5. There must be an entry for each card-cage in the file `/hp82000/pws/data/mainframes`. These entries take the form:

   ```
   Mc,h
   ```

   Where:

   `c` is the number of the card-cage.

   `h` is the HP-IB address of the Clock Board in this card-cage.

Note

Card-cage numbering is shown in Figure 7-1.

---

6. The system calibration-probe must be connected to the D-type connector on the Clock Board in card-cage 1.

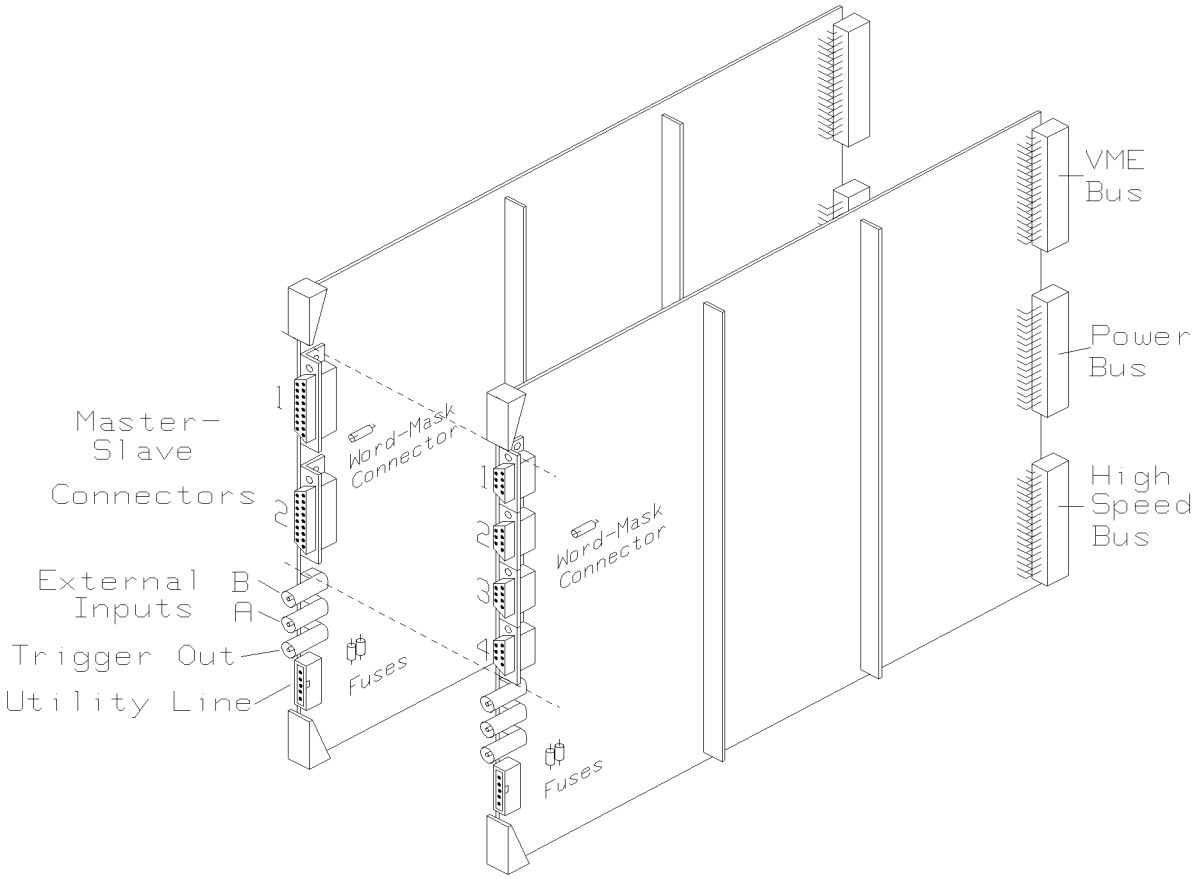


Figure 7-4. Sequencer Board

The Sequencer Boards in Figure 7-4 are shown as they would be installed in a lower card-cage. These boards would be installed upside-down in an upper card-cage.

Rules

1. One Sequencer Board is needed for every card-cage.
2. The Sequencer Board must be put in **slot 2** of each card-cage.
3. If you have four card-cages, the Sequencer in card-cage 1 must be a **Master-Sequencer** (E1216-66574). All other sequencers must be Standard Sequencers (E1222-66574).
4. If you have less than four card-cages, you can use **either** a Master- **or** a Standard-Sequencer in card-cage 1.
5. The Sequencer in card-cage 1 must be connected to the other sequencers by a **Sequencer-Cable**. There are two types of Sequencer cable, one for a Master-Sequencer and another for a Standard-Sequencer. These cables are not interchangeable.

Master-Sequencer Cable	E1216-61601
Standard-Sequencer Cable	E1222-61606

6. The D-type slave-connectors on a **Master-Sequencer** are numbered 1 to 4 in Figure 7-4, and are connected to the other Sequencers as follows:

   a. **Connector 1** to the Sequencer in **card-cage 2.**

   b. **Connector 2** to the Sequencer in **card-cage 3.**

   c. **Connector 3** to the Sequencer in **card-cage 4.**

Note

This manual supports only up to four card-cages. The addition of a fifth card-cage is also possible. In this case, Connector 4 on the Master Sequencer must be connected to the Sequencer in card-cage 5.

Card-cage numbering is shown in Figure 7-1 in Mainframe Assembly.

The sequencer-cable must be connected to Connector 1 on the Slave-Sequencers.

7. The D-type slave-connectors on a **Standard-Sequencer** (in card-cage 1) are numbered 1 to 2 in Figure 7-4, and are connected to **Connector 1** on the other (Slave) Sequencers, as follows:

   a. Connector 1 to the Sequencer in card-cage 2.

   b. Connector 2 to the Sequencer in card-cage 3.

   The connectors on the ends of this cable are labeled *Master* and *Slave*. The *Master* side must be connected to the Sequencer in card-cage 1. The other side of this cable must be connected to connector 1 on the other (Slave) Sequencers.

8. The Sequencer in card-cage 1 must be connected to the I/O board in slot 3 by the word-mask cable (see **Installing The Word-Mask Cable**).

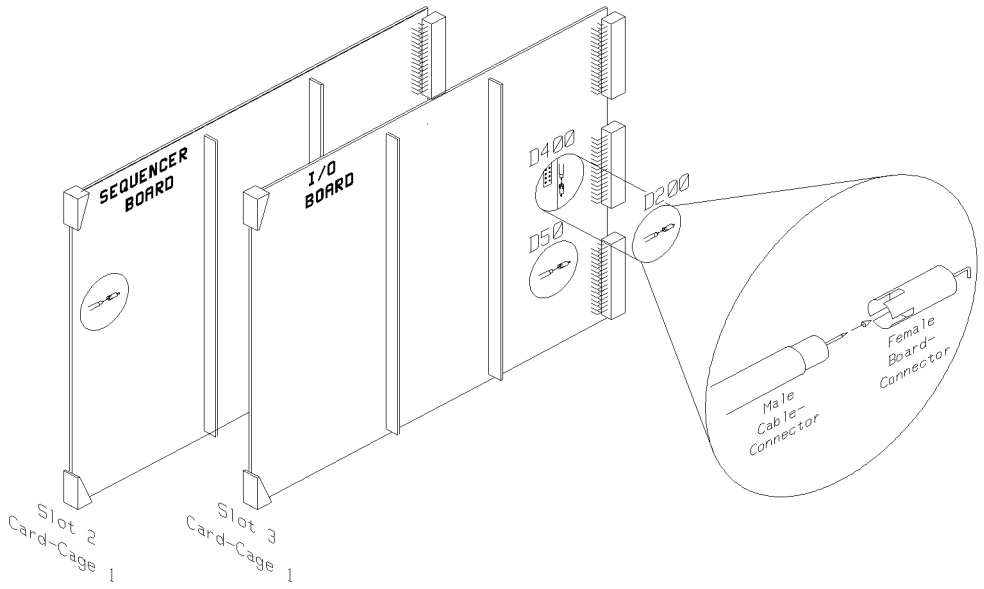


Figure 7-5. Word-Mask Cable

Procedure

1. Slide the Master-Sequencer out of slot 2.

Caution

The connectors on the word-mask cable, and the matching sockets on the boards are fragile, so be careful when connecting them.

When pushing the connector on the word-mask cable into the socket on each board, it is possible to push the spike into the soft insulating material. Make sure that the word-mask plug goes into the connector straight.

Be careful not to pinch the word-mask cable between the card-cage and the boards.

---

2. Push one end of the word-mask cable into the socket on the Sequencer, as shown in Figure 7-5.
3. Slide the Sequencer back into position.
4. Slide the first I/O board out of slot 3.
5. Push the remaining end of the word-mask cable into the socket on the I/O board, as shown in Figure 7-5.
6. Slide the I/O board fully into position.
7. Connect the master-slave cables between the Sequencer in card-cage 1 and the Sequencers in other card-cages (see the list of rules on the next page).
8. Use a tie-wrap to attach the coiled word-mask cable to the rear of the BNC-rail just above the lower card-cage on the front of the mainframe.

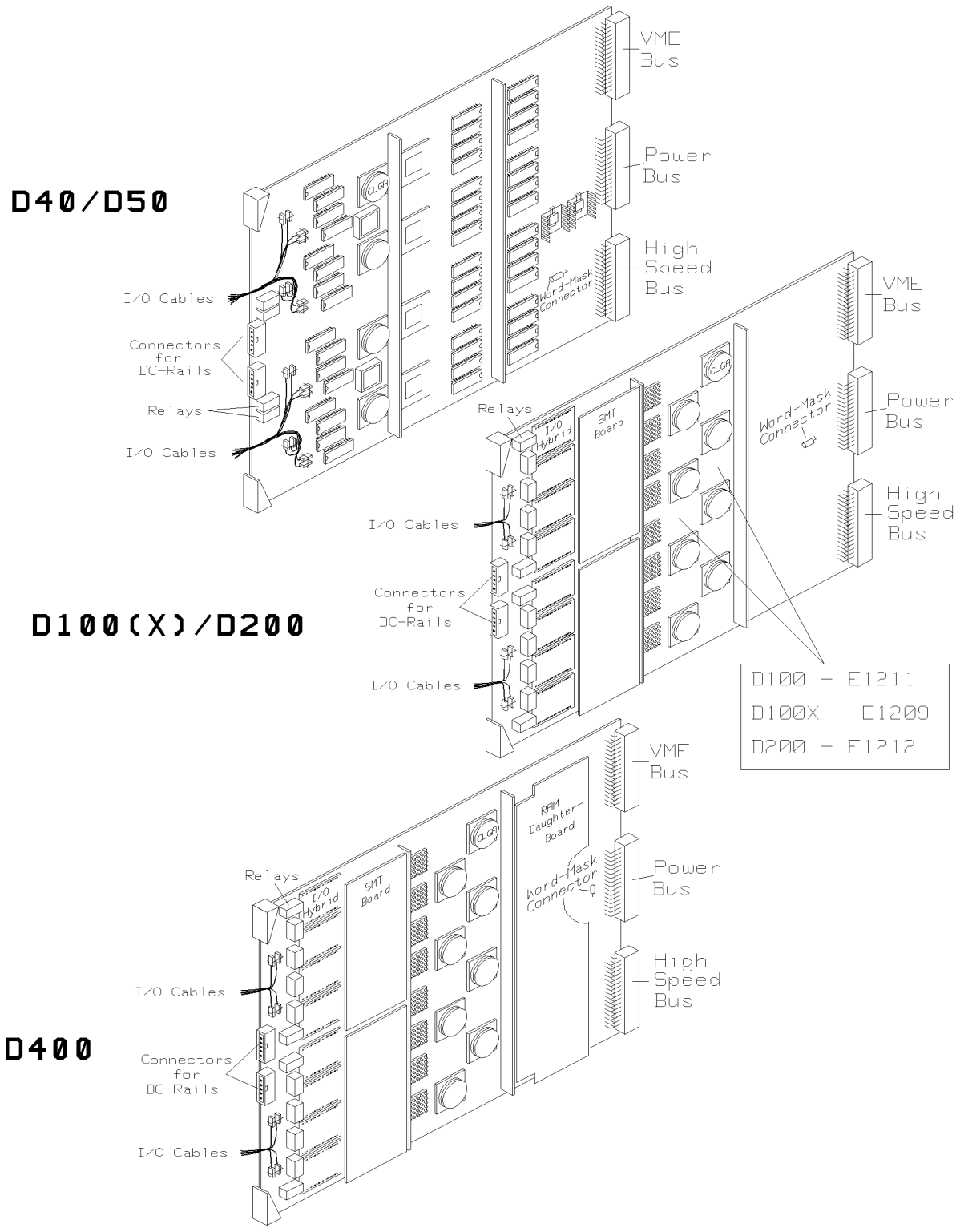


Figure 7-6. I/O Boards

The I/O boards in Figure 7-6 are shown as they would be installed in a lower card-cage. These boards would be installed upside-down in an upper card-cage.

Following is a list of general rules for installing I/O boards:

Rules

1. I/O Boards can be installed in slots 3 to 18.
2. Slots 3 to 18 must be filled in sequence. That is, from left to right in a lower card-cage and from right to left in an upper card-cage.
3. If a card-cage is not completely filled with I/O boards, the last slot in the card-cage must contain a PMU board or a Serializing Board, if you want to perform scan-path testing.
4. I/O boards must be connected in a chain using the DC-Rails (flat ribbon-cables).
5. The top connector of the first I/O board (slot 3) must be connected to the connector on the Clock Board by the DC-Calibration Cable (flat ribbon-cable).
6. The first I/O board (slot 3) in card-cage 1, must be connected to the Sequencer Board in card-cage 1 (slot 2) via the Word-Mask cable. Read **Installing the Word-Mask Cable**, in the section **Installing Sequencer Boards**.
7. In Maxiframes, all I/O boards must have the extra-long (P/N E1256A) I/O cable-set (90 cm).
8. 100 MHz mixable and 200 MHz boards can be combined with 400 MHz boards in a system. See **Mixed 100X, 200, 400 MHz Configuration**.
9. The E1211A,B,C 100 MHz I/O boards can not be mixed with other types of I/O boards.
10. 50 MHz boards can not be mixed with other types of I/O boards.
11. A maximum of two *400 MHz boards with HSWGs* is allowed.
12. 400 MHz boards with HSWGs have to sit in slots 3 and 4 of card-cage 1 (see **Installing HSWGs**).

13. The file `/hp82000/pws/data/model` must contain an entry which shows the type of I/O boards in the system. The possible entries for the different configurations are:

Entry	I/O Board Configuration
`D40,32K`	40 MHz I/O Boards (E1208A)
`D40,128K`	40 MHz I/O Boards (E1208B)
`D40,512K`	40 MHz I/O Boards (E1208C)
`D50,32K`	50 MHz I/O Boards (E1210A)
`D50,128K`	50 MHz I/O Boards (E1210B)
`D50,512K`	50 MHz I/O Boards (E1210C)
`D100,64K`	100 MHz I/O Boards (E1211A)
`D100,256K`	100 MHz I/O Boards (E1211B)
`D100,1024K`	100 MHz I/O Boards (E1211C)
`D100X,64K`	100 MHz I/O Boards mixable (E1209A)
`D100X,256K`	100 MHz I/O Boards mixable (E1209B)
`D100X,1024K`	100 MHz I/O Boards mixable (E1209C)
`D200,64K`	200 MHz I/O Boards (E1212A)
`D200,256K`	200 MHz I/O Boards (E1212B)
`D200,1024K`	200 MHz I/O Boards (E1212C)
`D400,64K`	400 MHz I/O Boards (E1214A)
`D400,256K`	400 MHz I/O Boards (E1214B)
`D400,64K`[1]	mixed 100X/200/400 MHz (E1209A, E1212A and E1214A)
`D400,256K`[1]	mixed 100X/200/400 MHz (E1209B, E1212B and E1214B)

1 For mixed 100X/200/400 MHz configurations, the entry in the models file refers to the highest pattern rate boards.

Mixed 100X, 200, 400 MHz Configuration

Following are rules specifically for mixed 100X/200/400 MHz systems:

Rules

1. The following combinations of 100, 200 and 400 MHz boards are allowed:
   - E1209A, E1212A and E1214A.
   - E1209B, E1212B and E1214B.
2. The card-cage must be filled first with 400 MHz boards, then the 200 MHz boards should follow before the 100X boards.

For example, if you have a single Maxiframe with two card-cages, and:

- Two Clock Boards
- Two Sequencer Boards (1 slave and 1 master)
- Eighteen 400 MHz I/O boards
- Fourteen 200 MHz I/O boards

the card-cages are filled as follows:

Card-Cage	Slot	Board
1 (lower)	1	Clock Board
	2	Master-Sequencer
	3 to 18	400 MHz I/O boards
2 (upper)	1	Clock Board
	2	Slave-Sequencer
	3 and 4	400 MHz I/O boards
	5 to 18	200 MHz I/O boards

3. The `/hp82000/pws/data/model` file must contain the entry `D400,64K` or `D400,256K`, depending on the combination of the boards.

Entry	Board Combination
`D400,64K`	E1209A, E1212A and E1214A
`D400,256K`	E1209B, E1212B and E1214B

4. The file `/hp82000/pws/data/offl_tester_co` must contain an entry for each card-cage, which shows the model of the I/O board in each slot. The syntax of this entry is:

   `slot 3,slot 4,slot 5,..... ,slot 18`

   Where `slot` *number*, can be one of the following:

   `100` - for a 100 MHz board.

   `200` - for a 200 MHz board.

   `400` - for a 400 MHz board.

   `1` - for a PMU board.

   `0` - for an empty slot.

   Each line of the file represents one card-cage. The first entry is card-cage 1, the second entry card-cage 2, and so-on.

   For example

   ```
   400,400,400,400,400,400,400,1,0,0,0,0,0,0,0,0
   400,400,400,400,200,200,1,0,0,0,0,0,0,0,0,0
   ```

   This indicates a two card-cage system, with:

   - 400 MHz boards in slots 3 to 9 of card-cage 1 and slots 3 to 4 of card-cage 2.
   - 200 MHz boards in slots 5 and 6 of card-cage 2.
   - A PMU board in slot 10 of card-cage 1 and slot 9 of card-cage 2.

Note

This file is only necessary for mixed 100X/200/400 MHz systems if you want to run the system software in offline mode. Refer to the manual *Using the HP 82000* for more details.

Channel Numbering Scheme

I/O channels are identified by a single number of the form **MBBCC**, where:

M	is the card-cage number (see Figure 7-1).
BB	is the I/O board number (the I/O board in slot 3 is 01).
CC	is the number of the channel on the I/O board (marked beside each I/O cable socket on the I/O board).

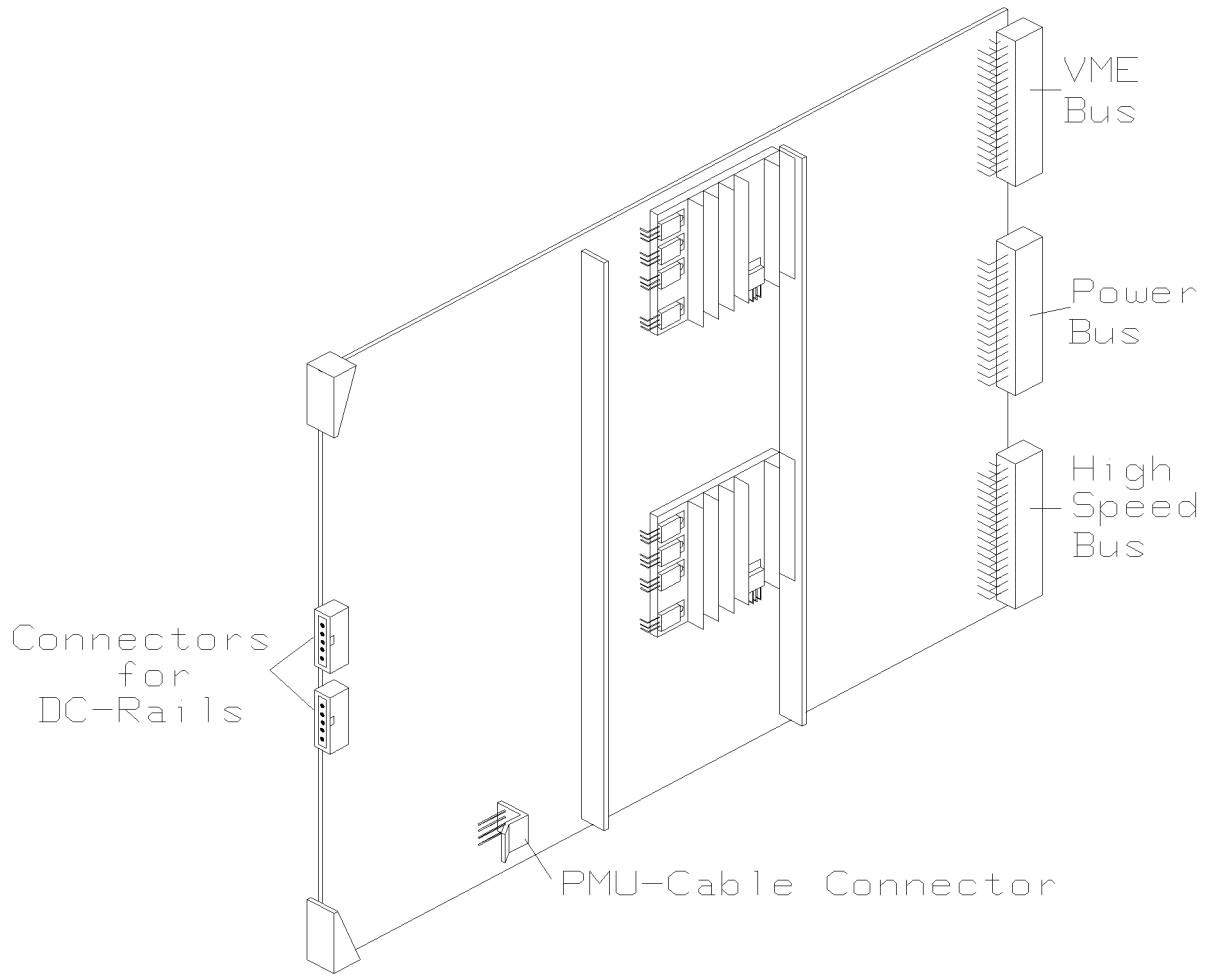


Figure 7-7. PMU Board

The PMU board in Figure 7-7 is shown as it would be installed in a lower card-cage. This board would be installed upside-down in an upper card-cage.

Rules

1. One PMU board (2 PMUs) is allowed in each card-cage.
2. In each card-cage the PMU board must be installed in the next slot after the last I/O board.
3. A PMU cable from the PCM must be connected to each PMU board. This cable supplies the PMU with a 28-34 Vac supply. This cable is installed in the factory and routed to the card-cage. The connector on the PMU board for the PMU cable is labeled *PMU-Cable Connector* in Figure 7-7.

Take precautions against Electrostatic Discharge when handling I/O cables which are connected to I/O boards.

The I/O cables connect the channels on the I/O board to the DUT board. They are coaxial cables with a soft foam-dielectric between the inner-conductor and the outer shield. Using this type of dielectric improves the propagation characteristics of the cable but also makes it sensitive for damage. In general, crushing or pinching the cable can cause the following:

- The outer shield touches the inner-conductor, giving a short-circuit.
- The impedance of the transmission-line decreases at the damaged point and causes a locally higher capacitive load affecting signal performance.
- The impedance of the transmission-line increases at the damaged point and thus causes reflections.

The characteristic impedance of the I/O cables on D100/200/400 I/O boards is 50 Ω. On D50 boards it is 100 Ω.

I/O cables are terminated at one end with three pogo-pins. The outer pins are connected to the outer shield of the I/O cable. This shields the inner I/O pin as far as the DUT board. The pogo-pins from each I/O channel are fitted in pogo-blocks which can then be mounted in pogo-frames.

The other end of the I/O cable is terminated with a right-angled plug which connects to a matching socket on an I/O board.

Note

In Maxiframes, all I/O boards must be equipped with the extra-long (P/N E1256A) cable-set.

All I/O cables must be within 1 ns electrical length of each other, otherwise the system can not be calibrated properly.

Warning **Switch-off the PCM before carrying-out this procedure.**

This procedure tells you how to change I/O cables.

Procedure

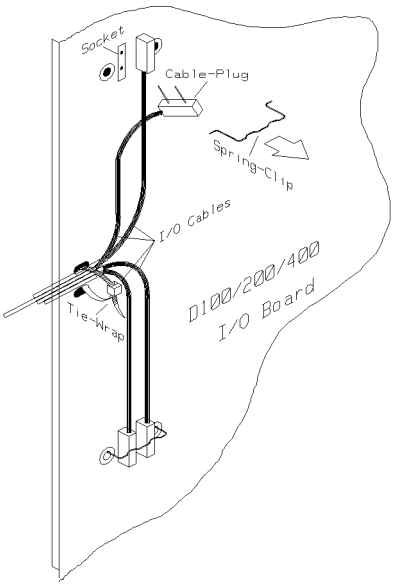


Figure 7-8. Changing I/O Cables

1. Take the I/O board out of the card-cage.
2. Starting with the top set of I/O cables, remove the metal spring-clips holding the black I/O cable connectors in place. See Figure 7-8
3. Pull the I/O cable-plugs out of the sockets on the I/O board.
4. Cut the tie-wraps holding the I/O cables to the board and remove the I/O cables.
5. Repeat the last three steps for all the I/O cables you want to change.
6. Starting at the bottom of the I/O board, connect the new cables to the sockets on the I/O board and replace the spring-clips.

Caution Be careful not to pinch or crush the I/O cables.

7. Secure the cables to the I/O board with new tie-wraps.

Figure 7-9 shows how pogo-pins must be inserted in pogo-blocks.

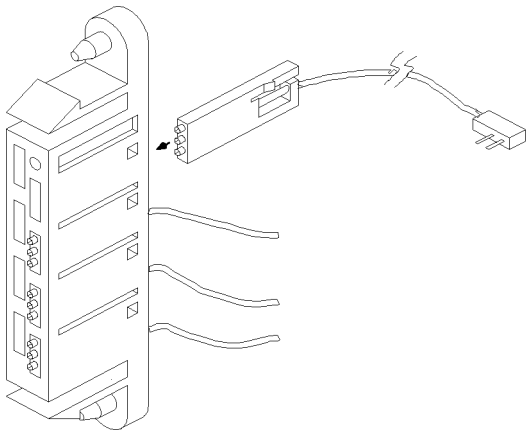


Figure 7-9. I/O Pogo-Pins and Pogo Block

Note

There is a clip on one side of the pogo-pins and a corresponding notch on one side of the slots in the pogo-blocks. The pins must be oriented correctly so that they lock into position. If they are not inserted correctly they will not lock in position, and will be pushed out of the pogo-block when the DUT board is pressed against the pogo-pins.

Pogo-pins are arranged differently in the pogo-blocks according to the type of I/O board (50/100/200/400 MHz). The next diagram shows the correct pogo-pin configurations for the different types of I/O boards. It does not show the positions of RZ 400 MHz channels (with HSWGs). For this information, read **Installing HSWGs.**

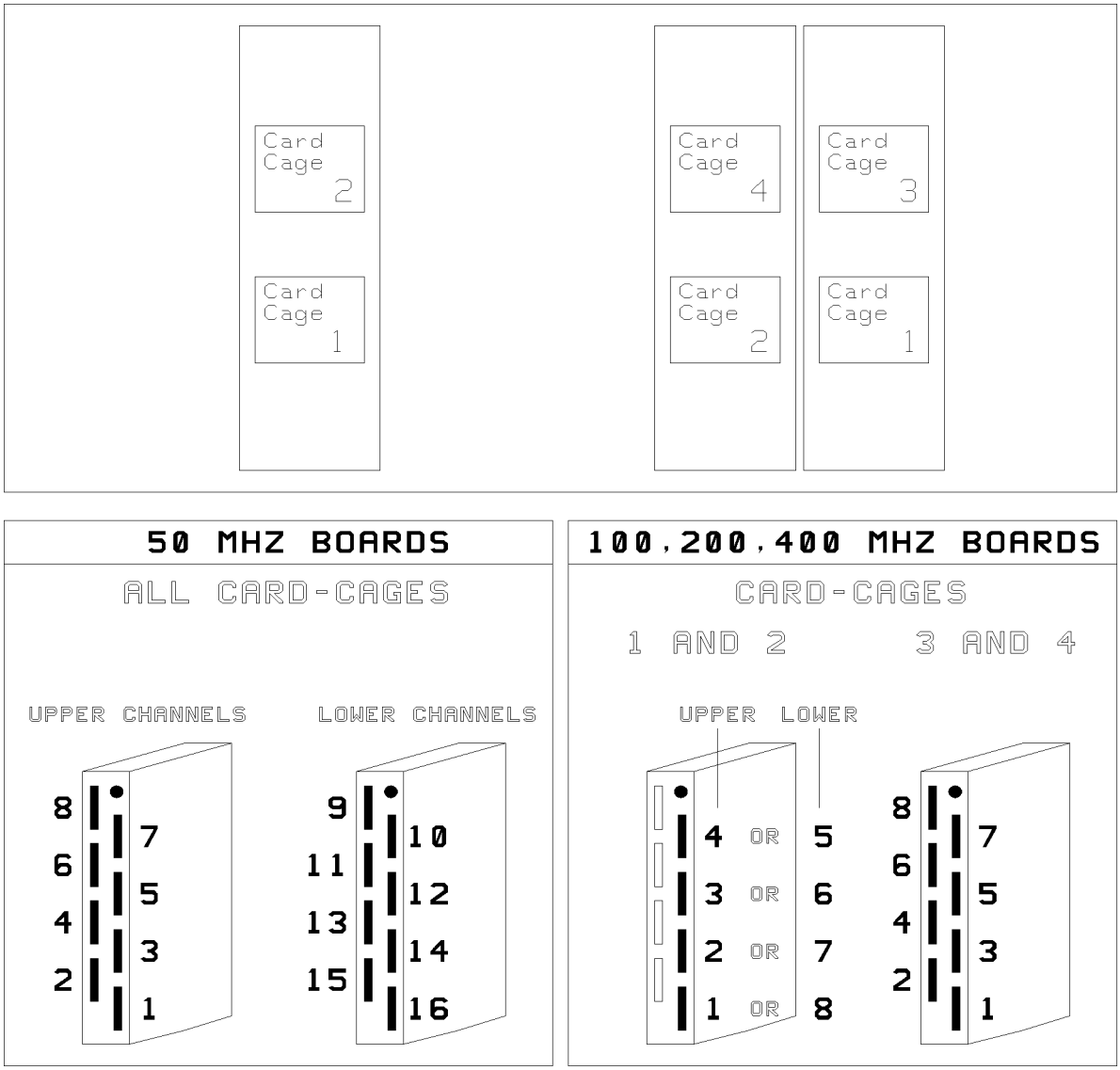


Figure 7-10. Pogo-Pin Configurations

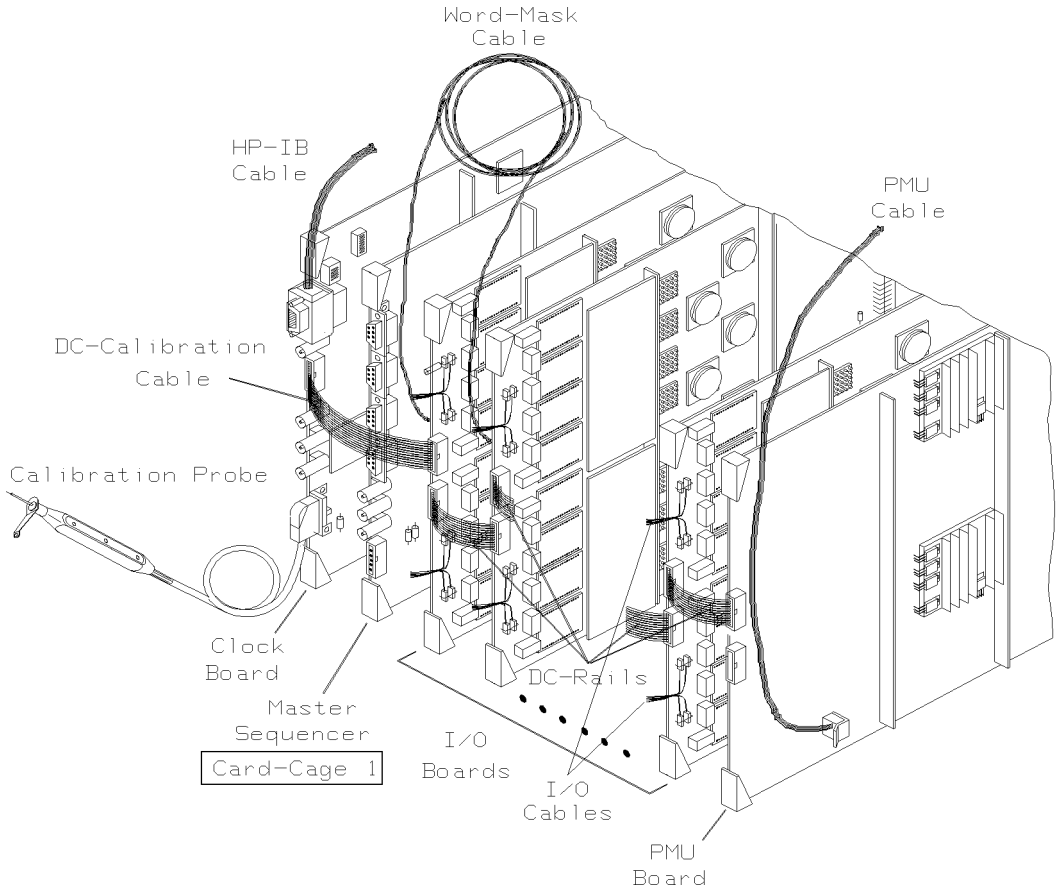


Figure 7-11. Board Interconnections

Figure 7-11 shows the board interconnections for card-cage 1.

DC-Calibration Cable - a flat ribbon-cable, connected between the Clock Board and the top connector on the first I/O board.

DC-Rails - a chain of flat ribbon-cables which runs between the I/O boards as far as the PMU board (if installed). The top and bottom connectors on each board are equivalent, so a board can be connected to the top or bottom connector of the next board.

Word-Mask Cable - a coaxial cable, connected between the Master-Sequencer and the first I/O board in card-cage 1. This cable is needed for masking-out I/O channels during testing. Read **Installing the Word-Mask Cable** in the section **Installing Sequencer Boards.**

Sequencer Cable - connects the Sequencer in card-cage 1 to the sequencers in the other card-cages. These cables are not shown in Figure 7-11. Read the section **Installing Sequencer Boards.**

PMU Cable connected between the PCM and the PMU board. It delivers a 28-34 Vac supply to the PMU board.

HP-IB Cable - the Clock Board in each card-cage must be connected to the HP-IB bus (Select-Code 7) via a HP-IB cable.

L

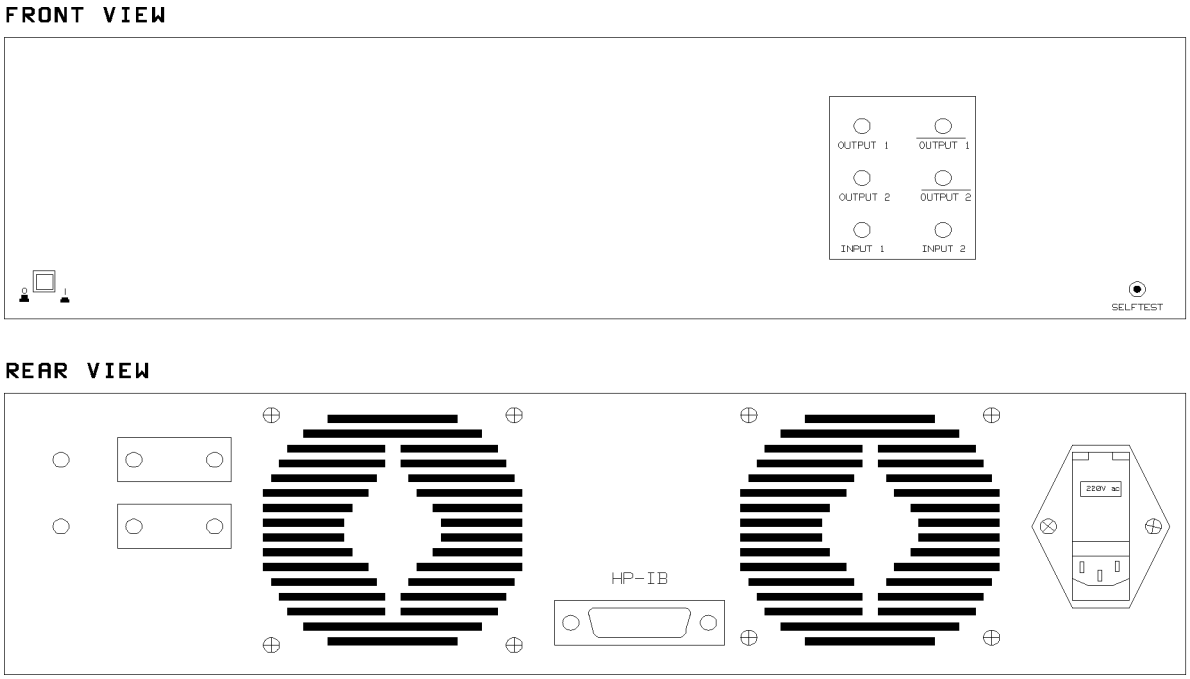


Figure 8-1. High Speed Width Generator

The **HP E1215 High Speed Width Generator** (**HSWG**) uses the edges from a 400 MHz board to generate RZ format pulses.

Following are the rules for installing HSWGs:

Rules

ATTENTION
Static Sensitive

Take precautions against Electrostatic Discharge when handling HSWGs, especially when making connections to the SMA sockets on the front.

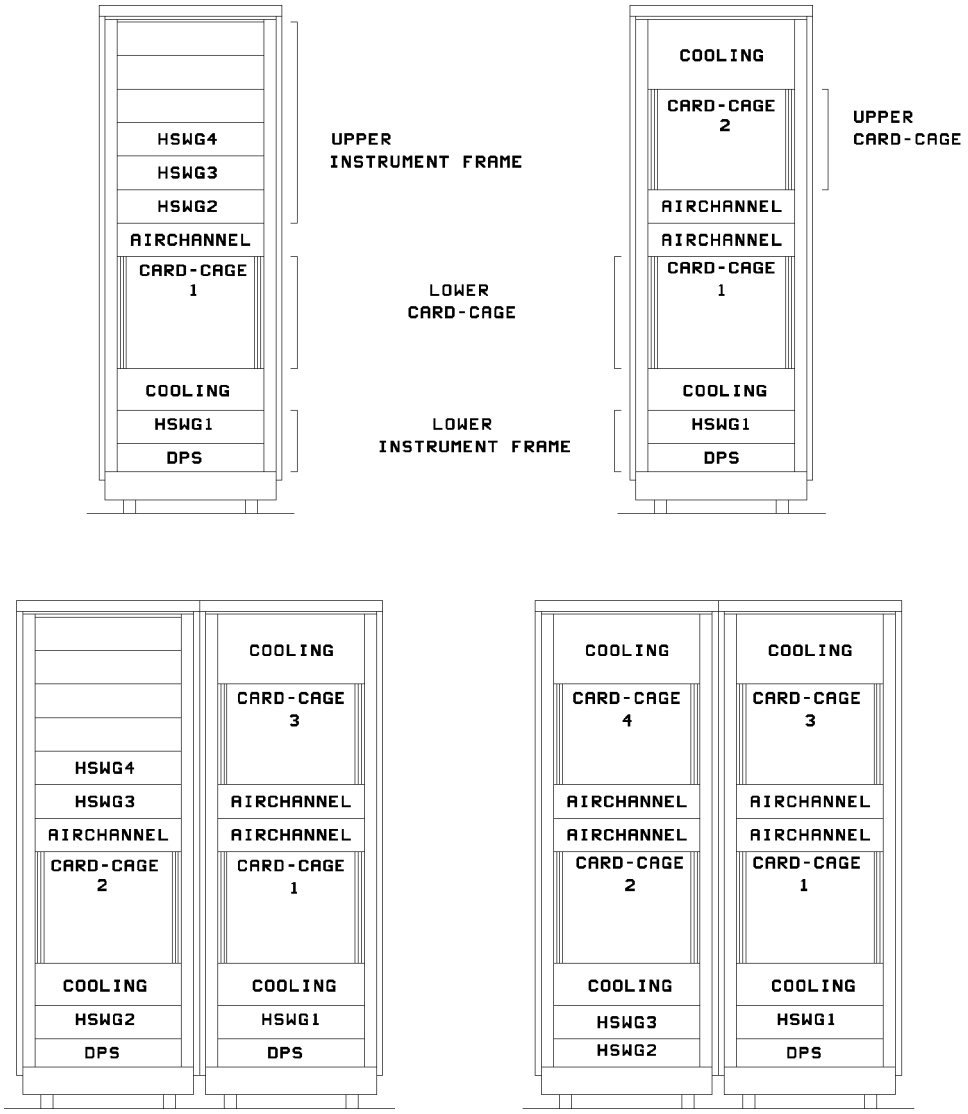


Figure 8-2. HSWG Locations

1. An HSWG fits in a 3-unit instrument-slot.
2. Before installing a HSWG in a mainframe, you must remove the *feet* on the underside and rear of the HSWG.

Caution

If you do not remove these feet, you could damage the HSWG when you push it into the mainframe.

3. You must attach the rack-mount flanges to the sides of the HSWG, with the screws provided.
4. HSWGs can be installed in:
   - The bottom three (3-unit) slots of an upper instrument-rack.
   - The two slots in the instrument-rack under the lower card-cage.

   See Figure 8-2.
5. The HSWG must be connected to one of the Test Equipment Outlets on the PCM. Read HSWG Power for details of how to change the setting of the voltage-selector switch on the back of the HSWG.

Note

HSWGs must be connected to the same protective-earth as the Maxiframe and PCM.

---

6. A maximum of four HSWGs is allowed in a system. Each HSWG has two channels.
7. Channels 5, 6, 7 and 8 on a 400 MHz board can be used to drive an HSWG. Therefore a 400 MHz board can drive 2 HSWGs (2 channels per HSWG).
8. The 400 MHz boards connected to HSWGs must be installed in slots 3 and 4 of card-cage 1 (the bottom-right card-cage). The I/O channels which can drive HSWGs are:

   Channels 10105 to 10108

   Channels 10205 to 10208
9. HSWGs must be connected to HP-IB Select Code 7. The HP-IB connector is on the rear of the HSWG. HP-IB addresses 15, 16, 17, and 18 are reserved for HSWGs. These addresses are allocated to individual HSWGs depending on which I/O channels are used to drive the HSWG.

HSWG	HP-IB Address	driven by channel
1	15	10105 and 10106
2	16	10107 and 10108
3	17	10207 and 10208
4	18	10205 and 10206

10. For each HSWG channel you must put an entry in the file `/hp82000/pws/data/mainframes`. This entry takes the form:

    ```
    HSWG,c,iiiii,hh
    ```

    Where:

    `c` is the HSWG channel-number (1 or 2).

    `iiiii` is the number of the I/O channel driving this HSWG channel.

    `hh` is the HP-IB address of this HSWG.

11. An HP-IB cable is already installed for an HSWG or a DPS in the upper slot in the instrument-rack under the lower card-cage. You will have to install and route HP-IB cables (1 m long) for any other HSWGs.
12. In a system with HSWGs, all I/O boards must have the extra-long (P/N E1256A) (900 mm) cable-set.
13. Special I/O cables are needed for HSWGs. There are three cable-sets for this purpose. These cable-sets are colour-coded and which cable-set you use depends on where you install the HSWG in the Maxiframe. The cable-sets are:

Part Number	Colour Code	Location of HSWG
E1215A#001	Red	lowest three slots, upper instrument-rack
E1215A#002	White	highest slot, lower instrument-rack (under lower card-cage)
E1215A#003	Blue	lowest slot, lower instrument-rack

14. You must always connect both the outputs (normal and complement) of each HSWG channel to HSWG output cables. Both outputs must be loaded for the HSWG channel to operate correctly.

These rules are summarized in Figure 8-2 which shows the allowed locations of HSWGs in different Maxiframe configurations.

Note

The I/O channels and HSWGs **must** be installed in the configurations shown in the diagram, or subsets of these.

After you have installed a HSWG, write the following information on the label on each HSWG cable:

- HSWG number.
- Channel number.
- Input, output or $\overline{\text{output}}$.

This makes it easier to identify each cable and trace problems, if they arise.

Note

The HSWG is a Safety Class 1 instrument, that is, an instrument with an exposed metal chassis that is directly connected to earth via its power cable. This power cable must be connected to one of the Test Equipment Outlets on the PCM.

Before connecting a HSWG to the PCM:

- Make sure that the voltage-selector switch on the HSWG is at the correct setting for the PCM power option.
- Make sure that the correct fuse is installed in the HSWG.

Country	Option	Set	Fuse
Europe (except UK)	0E5	230 V	1.5 A 250 V
UK	0E5	240 V	1.5 A 250 V
USA	0EF	120 V	3 A 250 V
Japan	0ED	100 V	3 A 250 V

Note

Use delayed-action (slow-blow) fuses.

The procedure for changing the setting of the voltage-selector switch and the fuse, is:

Procedure

1. Switch off the HSWG and remove the power cable.

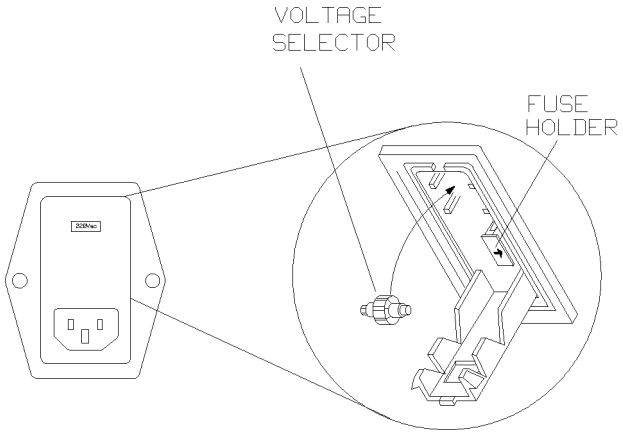


Figure 8-3. Voltage Selector Switch

2. Use a screwdriver to open the cover of the voltage selector switch.

Caution

If you do not complete the following steps correctly you could damage the HSWG when you try to use it.

3. Remove the voltage selector and replace it with the correct voltage visible through the slot in the cover.
4. If necessary, change the fuse in accordance with the new voltage setting.
5. Replace the cover on the HSWG.

If the 400 MHz I/O board(s) to be used with the HSWG(s) are not equipped with the cable-set shown in Figure 8-4 then you must replace the old I/O cables on the relevant channels with the new HSWG I/O cables.

ATTENTION
Static Sensitive

Take precautions against Electrostatic Discharge when handling I/O boards and cables attached to I/O boards and when connecting cables to the HSWG inputs and outputs.

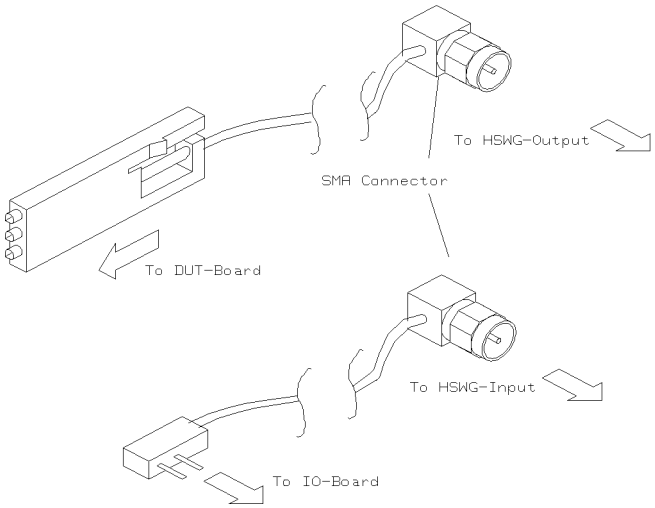


Figure 8-4. HSWG I/O Cables

Figure 8-4 shows the cables for one HSWG channel only. Each cable-set (two channels) consists of:

- 2 HSWG input-cables.
- 4 HSWG output-cables.

Caution

This procedure must be carried out by qualified service personnel only.

Handle the I/O cables with care. They are coaxial cables with a soft foam-dielectric between the inner-conductor and the outer shield. Using this type of dielectric improves the propagation characteristics of the cable but makes it very easy to damage. In general, crushing or pinching the cable can cause the following:

- The outer shield touches the inner-conductor, giving a short-circuit.
- The impedance of the transmission-line increases at the damaged point and this causes reflections.

Procedure

1. Remove the I/O board from the card-cage.
2. Select a HSWG cable-set according to the rules given earlier in this section. The cable set you choose depends on the location of the HSWG in the mainframe.
3. Connect the HSWG channels on the I/O boards in order, as follows:

Connect channel	to	of
10105	input 1	HSWG1
10106	input 2	HSWG1
10107	input 1	HSWG2
10108	input 2	HSWG2
10207	input 1	HSWG3
10208	input 2	HSWG3
10205	input 1	HSWG4
10206	input 2	HSWG4

The next steps describe how to remove a normal I/O cable and replace it with the HSWG I/O cable.

4. Remove the spring-clip holding the I/O cable plug.
5. Pull the plug out of its socket and cut the tie-wrap securing it (and the other three I/O cables) to the I/O board.
6. Remove the pogo-pin end of the I/O cable from the pogo-pin block.
7. Connect the HSWG input-cable to the empty socket on the I/O board.
8. Re-attach the spring-clip.

Caution

Always use a torque-spanner (HP Part Number 8710-1582) to tighten SMA-connectors.

---

9. Connect the SMA-end of the HSWG input-cable to one of the inputs on the HSWG (call this input X, where X is either 1 or 2).
10. Connect the SMA-ends of the two HSWG output-cables to the outputs labeled output X and $\overline{\text{output X}}$ (where X is the same as in the last step).

Caution

Be careful not to crush or pinch the I/O cables.

---

11. If you have finished with this bundle of I/O cables, attach a new tie-wrap to secure the cables to the I/O board.

Note

Remember to connect **both** the outputs of each HSWG channel to an HSWG output cable.

Setting HSWG HP-IB Addresses

Note

HSWGs must be connected to HP-IB select-code 7.

The HP-IB addresses 15,16,17 and 18 on HP-IB select-code 7 are reserved for HSWGs. No other addresses can be used by HSWGs and these addresses must not be used by other devices.

The procedure for setting HSWG HP-IB addresses is:

Procedure

1. Switch-on the PCM.
2. Switch-on the disc-drive.
3. Switch-on the controller and monitor.
4. Login to the system.
5. Type `cd /hp82000/fw/bin` and press Return.
6. Type `./hswg_conf` and press Return.

   Message: `Turn off all High Speed Width Generators then press Return`

Note

Do not run the `hswg_conf` configuration program in an HP-UX shell started from the HP 82000 software. The HP 82000 software must not be running at the same time as this program.

---

7. Make sure that all HSWGs are switched off, then press Return.

   Message: `Turn on the High Speed Width Generator to configure. then press Return.`

8. Switch on HSWG1 and press Return.

Note

When you switch-on a HSWG, a self-test program runs. If it runs correctly and finds no faults, the LED on the front-right of the HSWG lights for approximately two seconds and then switches-off. If this LED remains lit or does not light, there is a fault. Refer to the *HP 82000 Troubleshooting Manual*.

If no HSWG can be found:
Message: `Error: No High Speed Width Generator found on address 15`
The program then stops, and you should refer to the *HP 82000 Troubleshooting Manual* for troubleshooting details.

Otherwise:
Message: `High Speed Width Generator found on address X` (X some number)
`New address ?`

9. Type `15` and press Return.

   Message: `Address set to 15`

   Message: `More High Speed Width Generators (Y/N) ?`

10. Press `y` to go through the same procedure as before and set the HP-IB address of HSWG2 to 16. Repeat the procedure for HSWG3 and HSWG4.

    When all HSWG HP-IB addresses have been set, press `n`.

    Message: `Turn off all High Speed Width Generators`

11. Turn off all HSWGs.

    Message: `Turn on all High Speed Width Generators.`

12. Do this and the program stops automatically, returning the HP-UX prompt. Turning the HSWGs off and on again caused them to retain the HP-IB addresses set.

Next, you must modify the `mainframes` file to tell the software which HSWG channels are at which HP-IB address, and what I/O channels are driving these HSWG channels.

13. On the HP-UX command-line, type `vi /hp82000/pws/data/mainframes`.

14. For each HSWG, add a line to this file (mainframes) like the following:

    `HSWG,`*HSWG channel*`,`*driver channel*`,`*HP-IB address*

    Where:

    HSWG channel - is the number of the HSWG channel (1 or 2) being driven by *driver channel*.
    driver channel - is the number of the driver channel driving *HSWG channel*.
    HP-IB address - is the HP-IB address you set in the last part of this procedure.

    For Example:

    ```
    HSWG,1,10105,15
    HSWG,2,10106,15
    ```

15. Press ESC, type `:wq` and press Return, to save the modifications and end the editing session.

Putting HSWG Pogo-Pins In Pogo-Blocks

The following two diagrams show in which pogo-blocks you must put the HSWG pogo-pins. In these diagrams:

- Lines are drawn through the channels which drive the HSWGs (10105-10108 and 10205-10208). You remove these pogo-pins when Installing the HSWG I/O cables, so some of these positions should be empty, depending on how many HSWGs are being installed.
- If the I/O boards corresponding to some of the channels indicated in the diagrams are not installed, install the HSWG pogo-pins in an empty pogo-block (supplied).
- The standard I/O channel numbering-scheme used in these diagrams is explained in the section *I/O Boards*, in the chapter *Installing System Boards*.
- The positions of the pogo-blocks in the DUT interface are shown in the chapter *Installing the DUT Interface*.

Install the HSWG pogo-pins in the appropriate pogo-blocks, according to the following two diagrams.

Caution

Be careful not to pinch or crush the I/O cables.

Note

Make sure that the pogo-pins are oriented correctly when being put in pogo-blocks so that the pogo-pins lock into position.

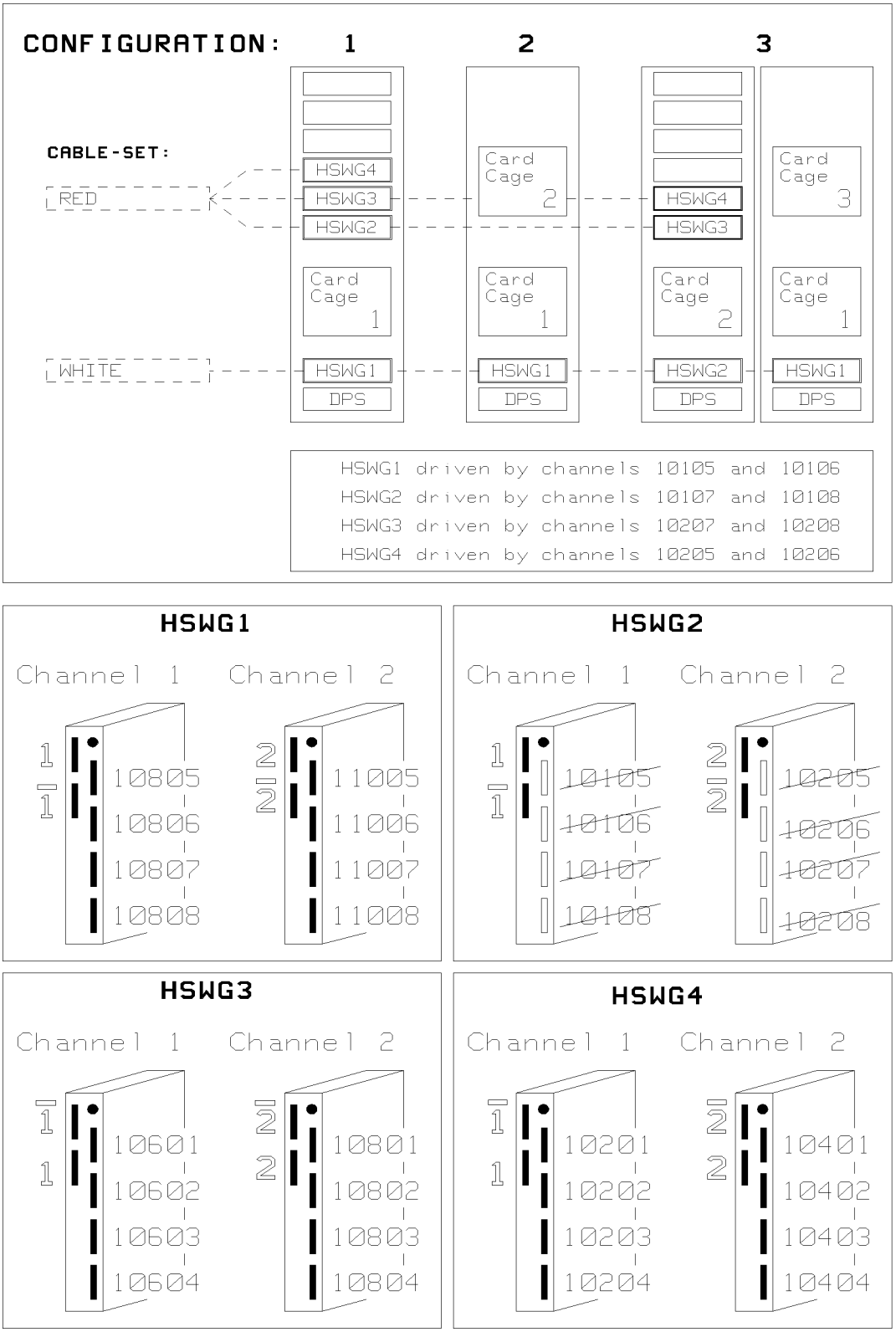


Figure 8-5. Configurations 1, 2 and 3

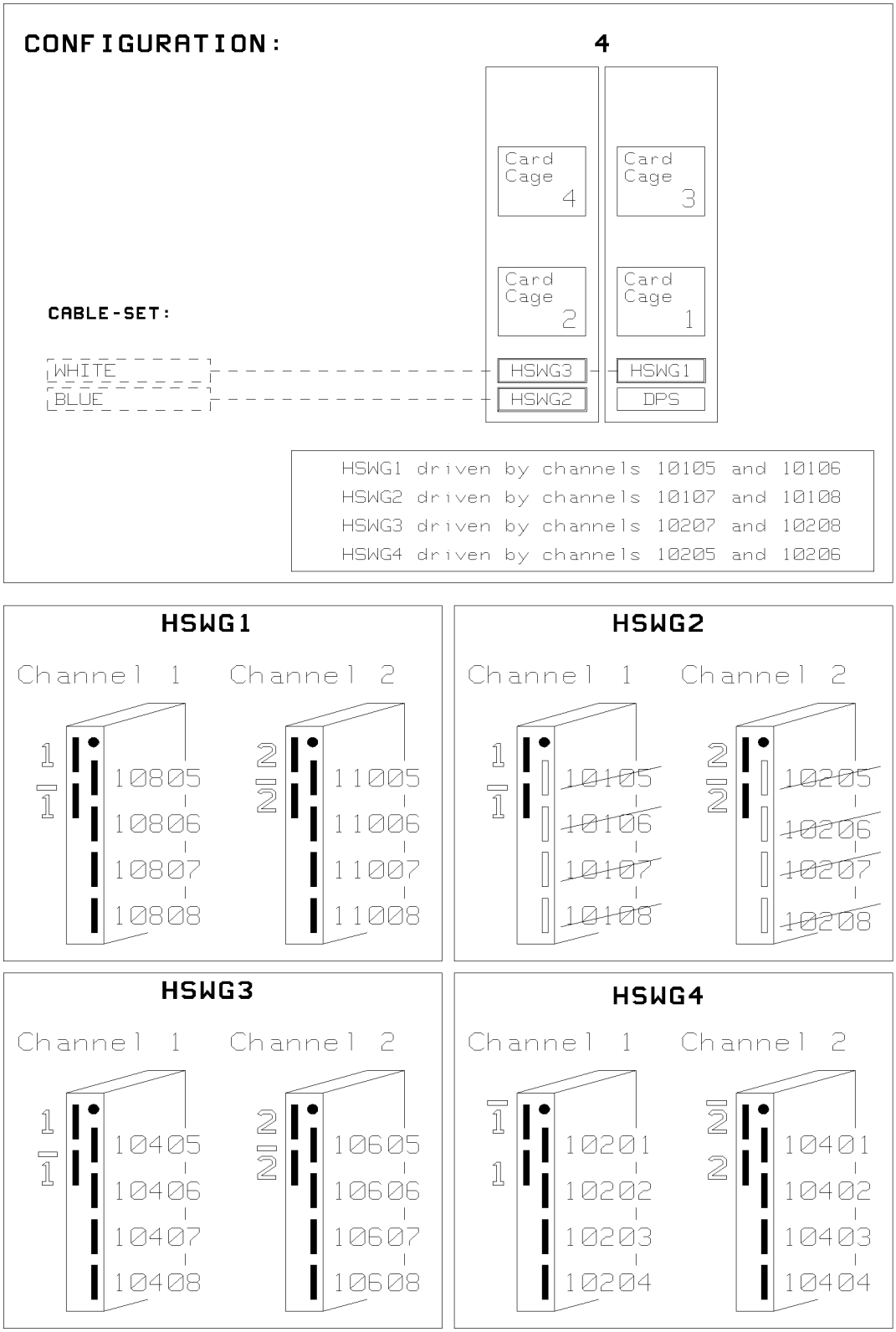
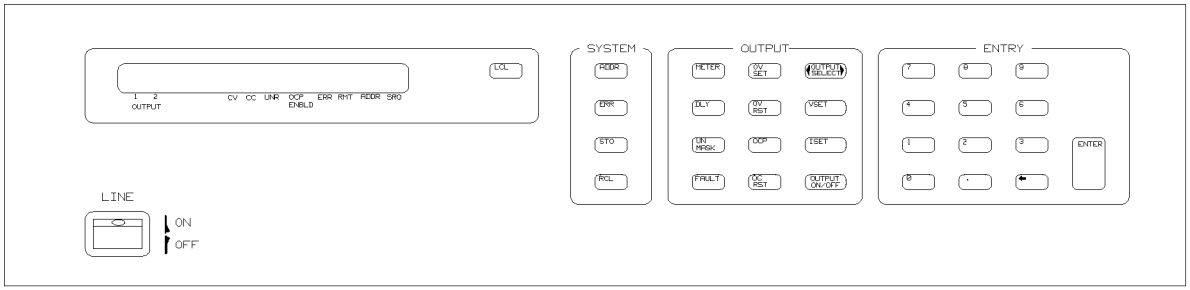


Figure 8-6. Configuration 4

FRONT VIEW



REAR VIEW

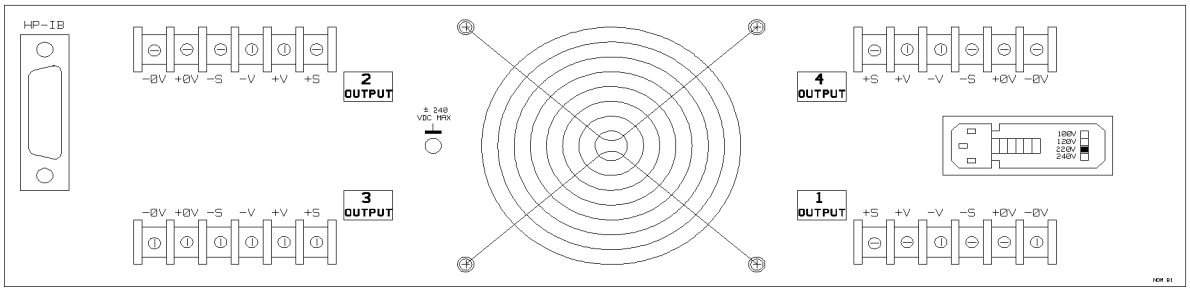


Figure 9-1. Device Power Supply

The **Device Power Supply** (**DPS**) provides programmable DC voltage and current to the device under test.

The following Device Power Supplies are supported by the HP 82000:

- HP 6621A, HP 6622A, HP 6623A, HP 6624A
- HP 6625A, HP 6626A, HP 6628A, HP 6629A
- HP 6651A, HP 6652A, HP 6653A, HP 6654A

DPSs can be installed in the lowest instrument-slot of each Maxiframe, as shown in Figure 9-2. This slot already has a DPS cable and an HP-IB cable routed to it.

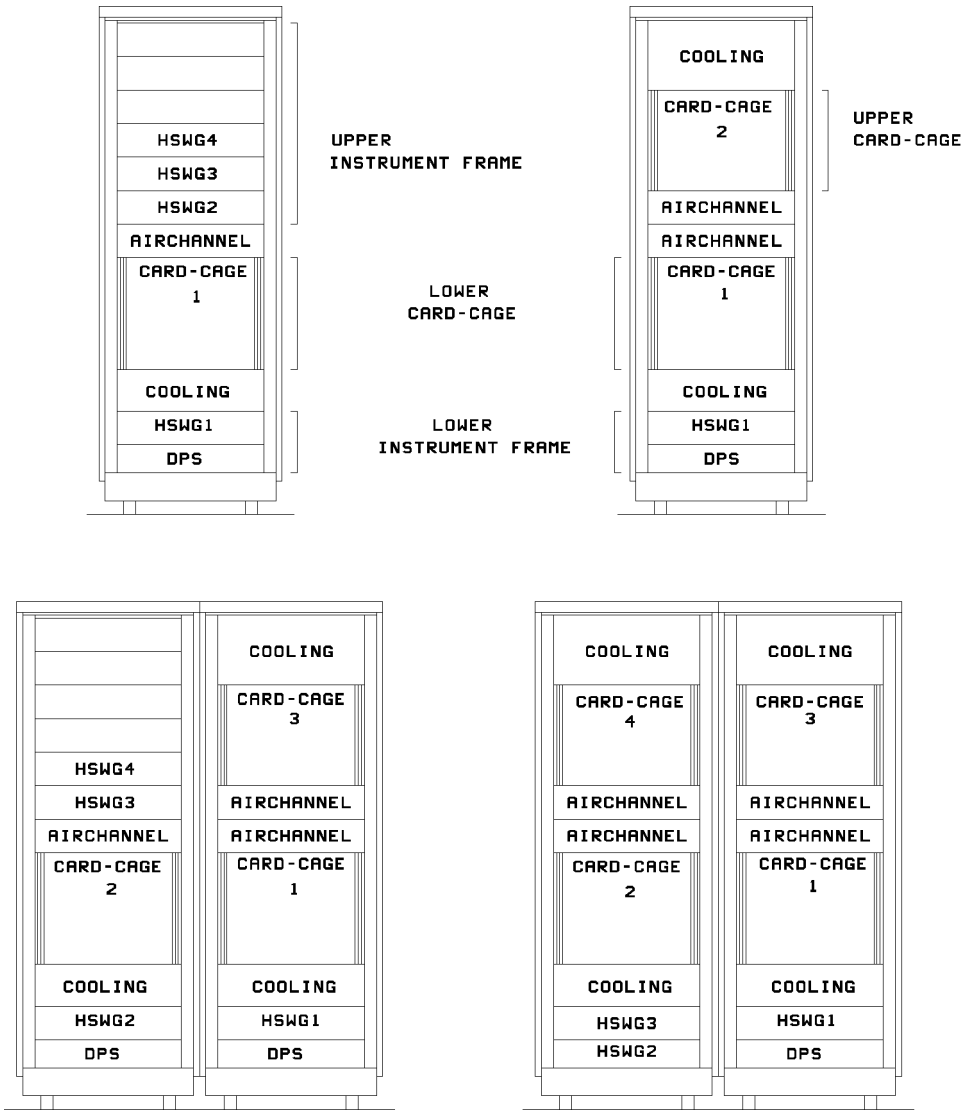


Figure 9-2. DPS locations

When installing DPSs:

1. Make sure that the voltage selector switch on the DPS is set correctly for the PCM power option. See the DPS Using Manual for details of how to change the voltage setting and the fuse. The following table gives the correct settings.

Country	Option	Set
Europe (except UK)	0E5	230 V
UK	0E5	240 V
USA	0EF	120 V
Japan	0ED	100 V

Note

Use delayed-action (slow-blow) fuses.

The DPS is a Safety Class 1 instrument, that is, an instrument with an exposed metal chassis that is directly connected to earth via its power cable.

2. Remove the shorting-links between the Sense and Output connectors on the DPS barrier-blocks.

Caution

If you do not remove these shorting-links, the DPS will not supply the correct voltages at the DUT, only at the DPS outputs.

3. Attach the rack-mount flanges (Option 908 Rack Mount Flange Kit P/N 5061-9677) to the sides of the DPS with the screws provided.
4. Connect the DPS cable spade-connectors to the barrier-blocks on the rear of the DPS.

Note

The DPS1 and DPS4 barrier-blocks are labeled:

-0V +0V -S -V +V +S

The DPS2 and DPS3 barrier-blocks are labeled:

+S +V -V -S +0V -0V (the reverse of DPS1 and DPS4):

The cables that make up the DPS cable are labeled as follows:

- Each cable is labeled either DPS1, DPS2, DPS3 or DPS4, according to the DPS barrier-block it must be connected to.
- Sense lines are twisted-pairs, where the positive sense-line is red (+S) and the negative sense-line is black (-S).
- Supply-lines consist of two identical cables attached to one spade-connector. Positive supply-lines are red (+V) and negative supply-lines are black (-V).

5. Connect the DPS to the HP-IB cable already installed at the equipment-slot. This is HP-IB Select Code 7.
6. Connect the DPS to one of the Test Equipment Outlets on the PCM.
7. When you switch-on a DPS (LINE switch), the DPS performs a self-test which lasts approximately 3 seconds. The self-test checks the HP-IB interface, DPS ROM and RAM, and the output power-control circuits.

   If the self-test passes:

   a. All segments of the LCD display "light".

   b. The DPS HP-IB address is briefly shown on the LCD display.

   c. The output voltage on DPS channel 1 is shown (approximately 0 V).

If the self-test fails and one of these error-messages appears, refer to the DPS Manual for details of how to troubleshoot DPS problems.

DPS Error-Messages:

a. HDW ERR CH "N".

b. 8291 FAILED.

c. TIMER FAILED.

d. RAM FAILED.

e. CV DAC CH "N".

f. CC DAC CH "N".

g. OV DAC CH "N".

h. FUSE CH "N".

Where "N" is the failed output channel-number.

Setting DPS HP-IB Addresses

Note

DPSs must be connected to HP-IB Select Code 7.

Addresses 2 and 7 on HP-IB Select Code 7 are reserved for DPSs. These addresses must not be used by any other instrument.

Procedure

1. Switch on the PCM and the DPS.
2. Press the ADDR SYSTEM button.
3. Type the HP-IB address for this DPS (2 or 7) using the ENTRY buttons and press ENTER.
4. Press ADDR again to check that the new address has been set.

Note

There must be an entry in the `/hp82000/pws/data/mainframes` file for each DPS. This entry takes the form:

DPSn,h

Where:

n	is the number of the DPS (1 or 2)
h	is the HP-IB address of the DPS.

D P S P o g o - B l o c k

The DPS cable is routed with the HP-IB cable to card-cage 1, and emerges at the same point (at the upper right-hand corner of the card-cage). This end of the cable is terminated with a connector which fits in a DPS pogo-block as shown in Figure 9-3. This pogo-block can then be installed in the DUT interface.

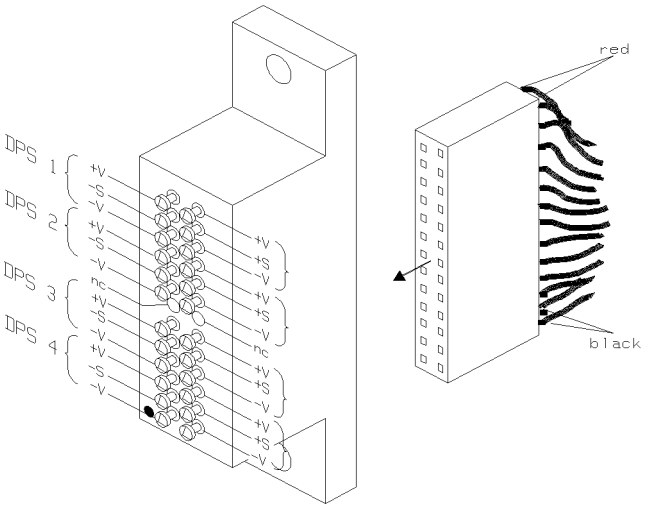


Figure 9-3. DPS Pogo-Block

N o t e

When you push the DPS connector into the DPS pogo-block, the pogo pins will be pushed-out of the block. Remember to push these in again.

Make sure that the two black DPS cables are at the same side as the dimple on the DPS pogo-block (see Figure 9-3). This dimple shows which way the pogo-block must be oriented in the DUT interface.

When installing instrument equipment in the instrument-frames of the Maxiframe note the following (does not include DPSs or HSWGs):

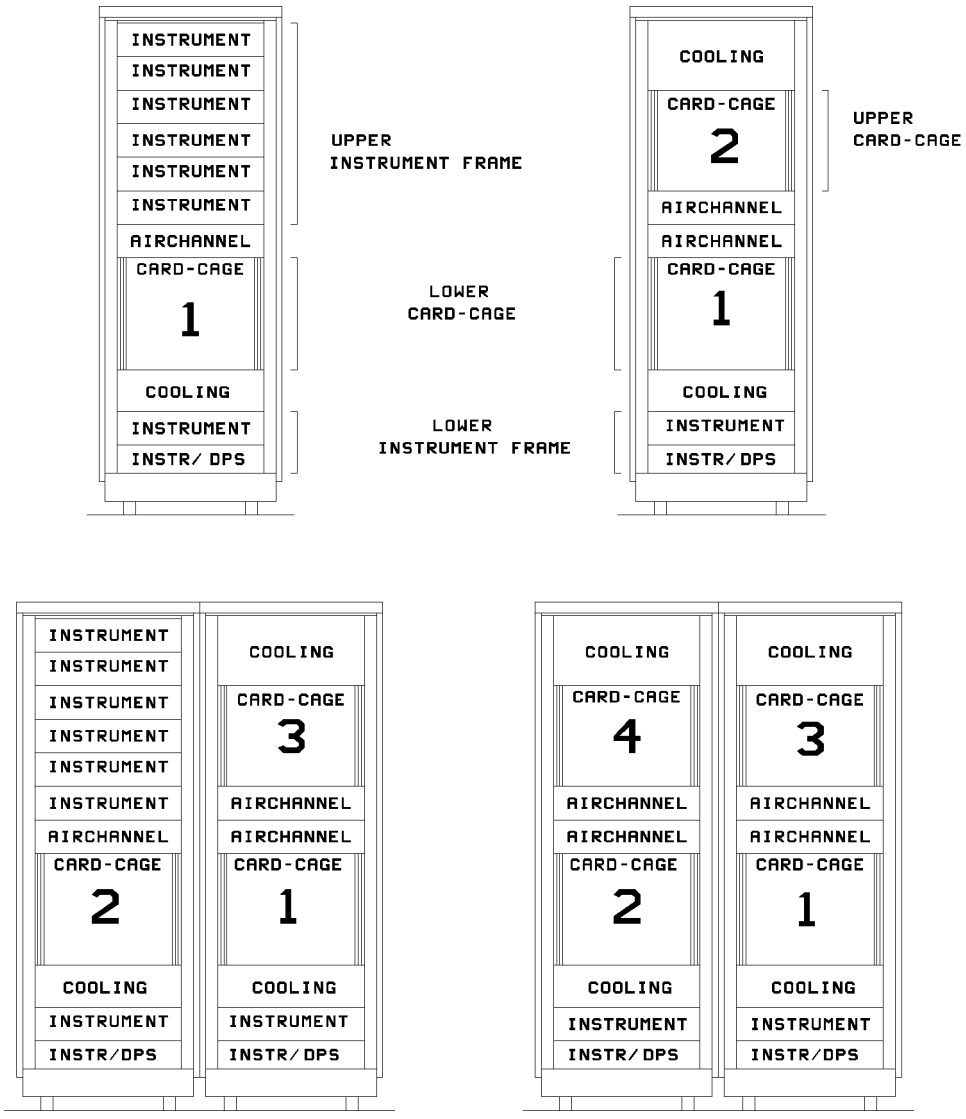


Figure 10-1. Instrument Locations

1. Instruments can be installed in:
   - The instrument-frame under the lower card-cage.
   - The upper instrument-frame (when two card-cages are not installed).

2. The instrument-shelves are attached to the sides of the instrument-frame with two screws.
3. You may have to change the setting of the voltage selector switch of the instrument, if it is to be connected to one of the Test Equipment Outlets on the PCM. The correct settings for the different PCM power options are as follows:

Country	PCM Option	Set
Europe (except UK)	0E5	230 V
UK	0E5	240 V
USA	0EF	120 V
Japan	0ED	100 V

Note

Use delayed-action (slow-blow) fuses.

4. Instruments should be connected to the same protective-earth as the mainframe and PCM.
5. You must install a separate HP-IB card for instrument equipment. Instruments must **not** be installed on either HP-IB Select Codes 7 or 21. These HP-IB cards are reserved for HP 82000 hardware and controller hardware respectively.
6. The mounting-block for the HP-IB connector for instruments is located at the bottom-left at the back of the instrument-frame. There is also a matching hole in the rear-door, so that this connector can be accessed from the rear of the Maxiframe.

L

Caution

When removing a DUT interface, first disconnect all HSWG SMA connectors from the HSWGs. The HSWG cables are shorter than the I/O cables and may be damaged if you do not remove them before lifting-off the DUT interface.

Use a torgue-spanner (HP Part Number 8710-1582) when loosening or tightening SMA connectors.

Take precautions against Electrostatic Discharge when handling HSWGs, especially when making connections to the SMA sockets on the front.

The DUT interface comprises two main mechanical parts:

- **Bottom Frame -** holding blocks of pogo-pins in pogo-pin frames. These pogo-pins carry the signals for the DUT. The bottom frame has four mounting-posts for positioning the DUT board in the interface.
- **Top Frame -** holds the DUT board pads firmly against the pogo-pins, ensuring a good electrical contact. The top frame is hinged at the right side and has two clamps at the other side.

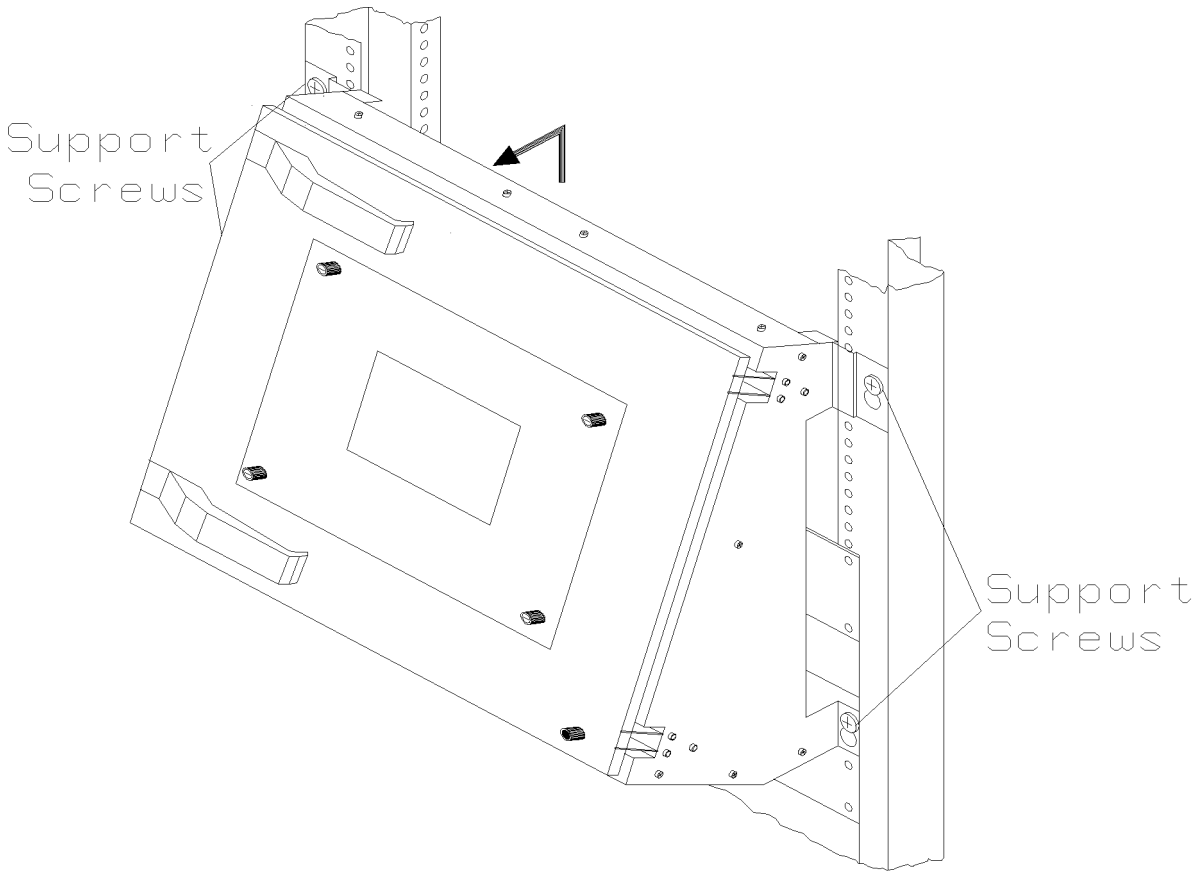


Figure 11-1. Single-Maxiframe DUT Interface

The standard DUT interface (P/N E1204A) is attached to a Single-Maxiframe as shown in Figure 11-1.

Note

Remember to tighten the four support-screws when you have mounted the DUT interface on them.

Double-Maxiframe DUT Interface

For a Double-Maxiframe the DUT interface and the positions of the support screws on the mainframes must be modified. There are two procedures for this:

1. Initial installation of a Double-Maxiframe system (Double-Maxiframe ordered).

2. Upgrade from a Single- to Double-Maxiframe system.

If a Double-Maxiframe system was ordered, the system is shipped with the DUT interface (P/N E1205A) attached to one of the mainframes (which are shipped separately). You must modify this DUT interface so that it can be attached to a Double-Maxiframe.

If you are upgrading a Single-Maxiframe to a Double-Maxiframe system, then you must modify the standard Single-Maxiframe DUT interface. These modifications are different to those on the special Double-Maxiframe DUT interface and require a modification-kit (P/N E1206A).

Procedure

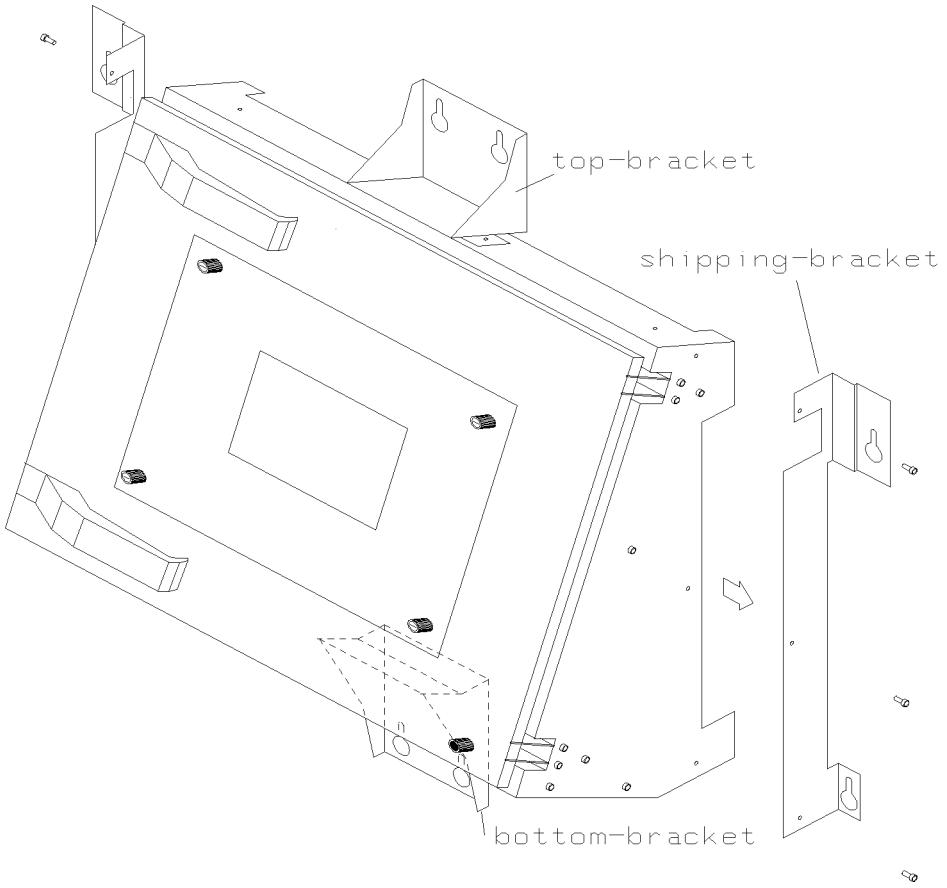


Figure 11-2. Modifying The DUT Interface

1. Loosen the four support-screws on the mainframe and remove the DUT Interface.
2. Remove the two shipping-brackets from the sides of the DUT interface (3 Hex-Bolts each). These brackets were included so that the DUT interface could be attached to one of the Maxiframes for shipping.
3. Remove the top-panel (4 screws).
4. Attach the new top-panel with the new top-bracket.
5. Attach the bottom-bracket (4 screws).

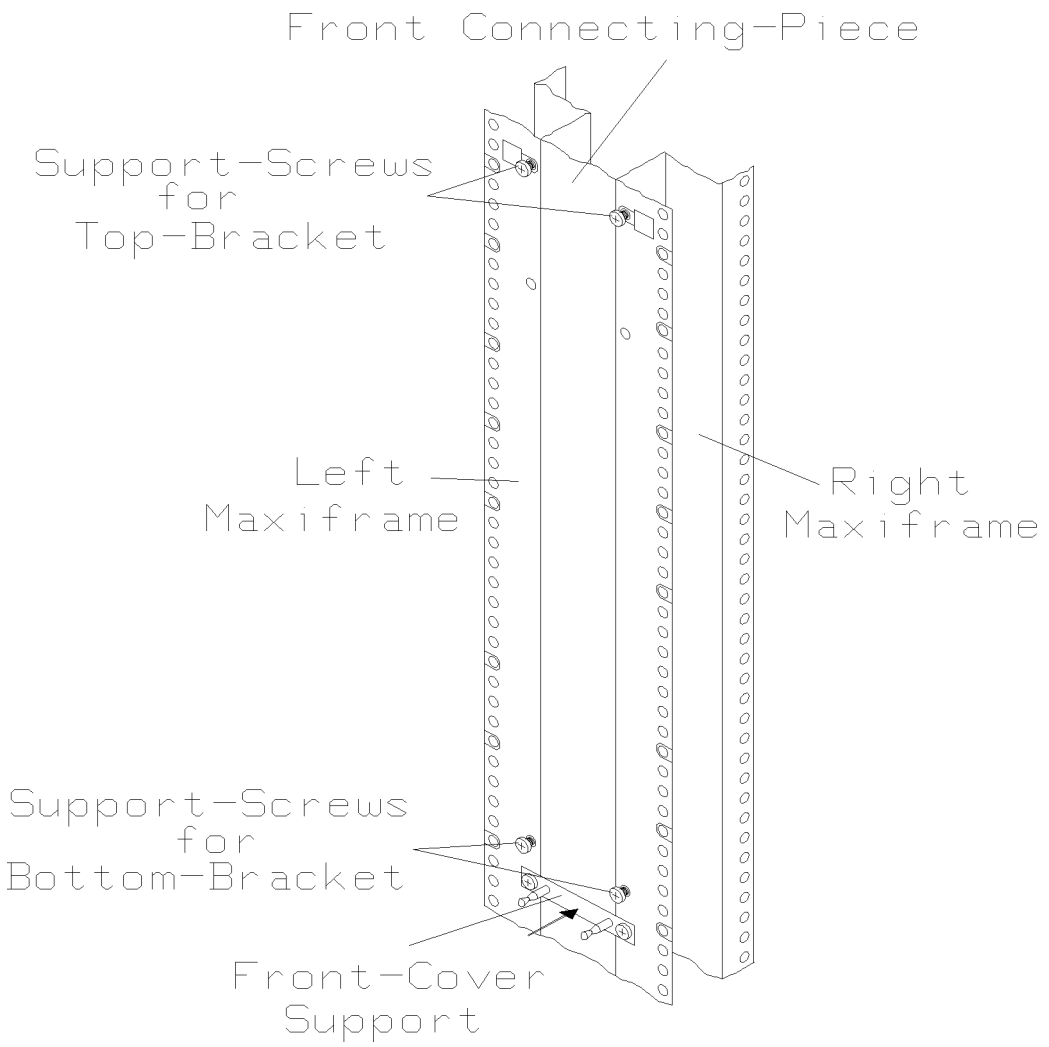


Figure 11-3. Mainframe Modifications (Initial)

6. Attach the front-cover support as shown in Figure 11-3.

Caution

Lubricate these screws (grease, oil) before you install them. If they are not lubricated, they tend to stick and can not be removed.

---

7. Attach the front-cover support, as shown in Figure 11-3.
8. Attach the modified DUT interface to the support-screws on the Double-Maxiframe. See Figure 11-3.

Note

This procedure requires two people.

The following is the procedure for modifying the Single-Maxiframe DUT interface so that it can be attached to a Double-Maxiframe.

Procedure

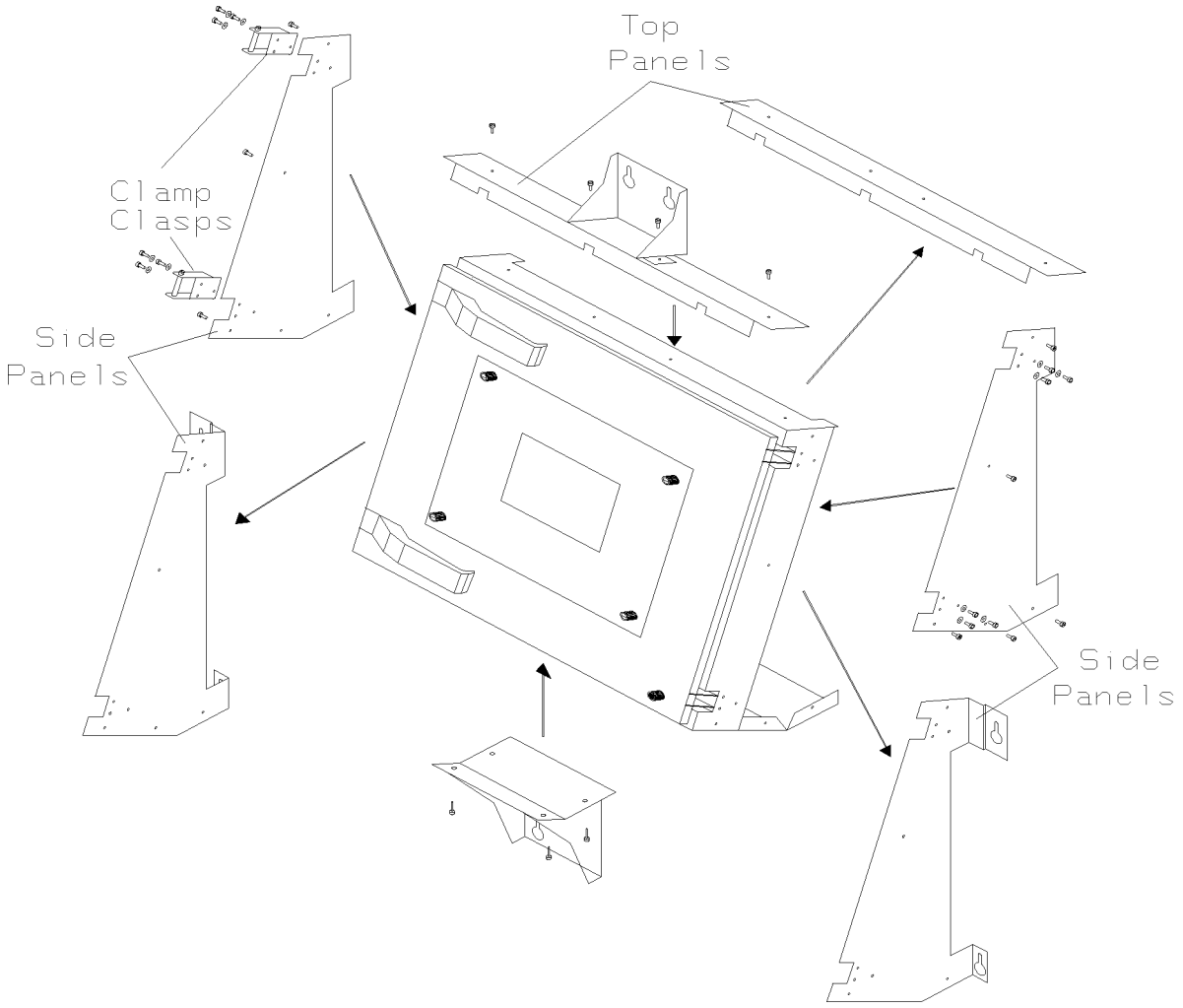


Figure 11-4. Modifying The DUT Interface

1. Remove the pogo-frames from the DUT interface.
2. Loosen the four support-screws on the mainframe and remove the DUT interface.
3. Remove the top-frame (door) of the DUT interface. To do this, you must:
   a. Unscrew the hinges on the right side-panel (3 Hex-Bolts for each hinge).

Note

You will not be able to remove the top-frame (door) completely just by removing these Hex-Bolts. Leave the top-frame resting on the bottom-frame and do not allow it to fall off, because this could damage the hinges.

b. Unscrew the clamp-clasps on the left side-panel (3 Hex-Bolts for each hinge) .

4. Remove the two side-panels (8 screws for each panel).
5. Attach the two new side-panels.
6. Reattach the clamp-clasps and the top-frame hinges to the side-panels. Do not tighten these Hex-Bolts fully yet, because you will have to adjust the gap between the top- and bottom-frame for the DUT board.
7. Remove the top-panel of the DUT interface (4 screws), and replace it with the new top-panel (with bracket).
8. Attach the bottom-bracket to the underside of the DUT interface (4 screws).

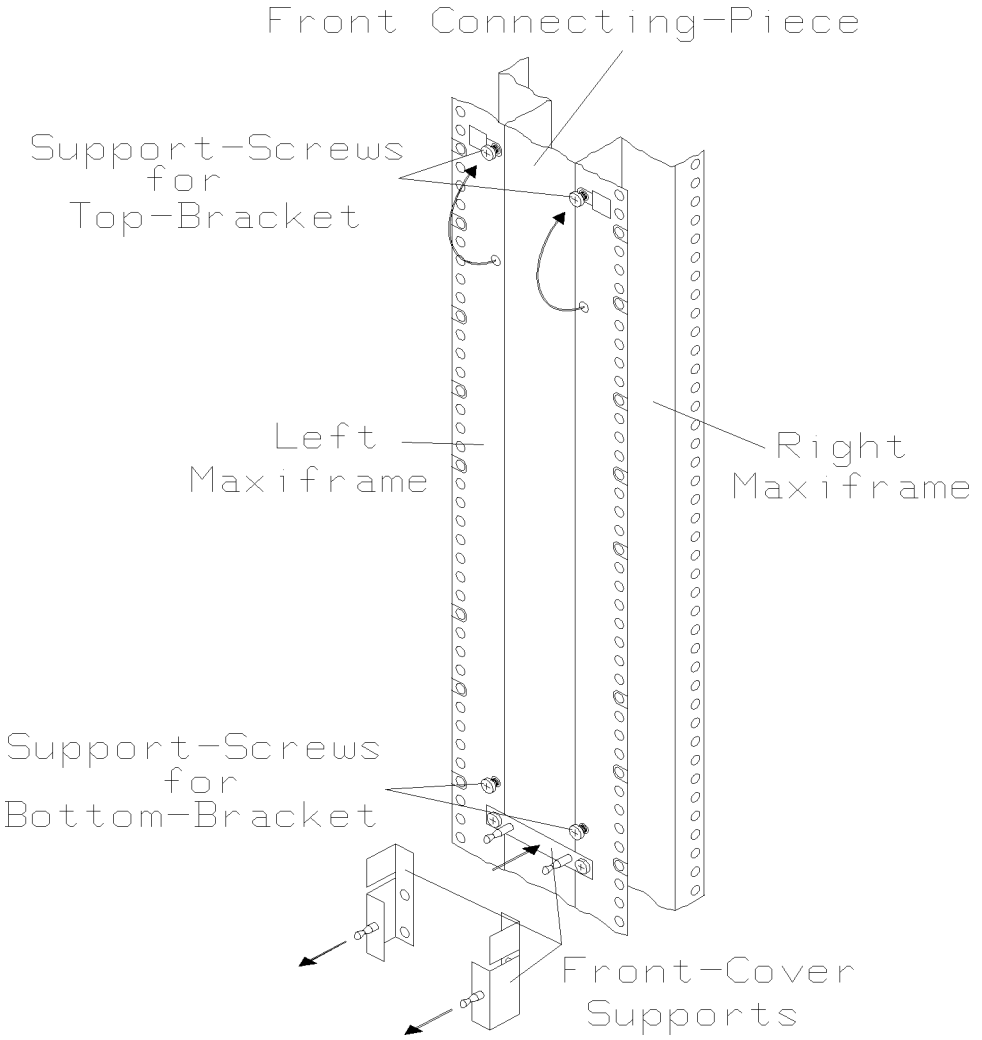


Figure 11-5. Mainframe Modifications

9. Move the DUT interface mounting-screws, as shown in Figure 11-5.

Caution

Lubricate these screws (grease, oil) before you install them. If they are not lubricated, they tend to stick and can not be removed.

---

10. Remove the two front-cover supports shown in Figure 11-5.
11. Attach the new front-cover support (2 screws). Replace the two screws which are not used by the new support. These two screws are now used to support the DUT interface.
12. Attach the modified DUT interface to the support-screws on the Double-Maxiframe. See Figure 11-5.

Note

The gap between the top- and bottom-frame must be adjusted for the thickness of the DUT board.

---

13. Insert the DUT board to be used, and close the top frame.
14. While one person presses the top-frame against the DUT board, the second person must:
    a. Tighten the Hex-Bolts securing the top frame hinges.
    b. Push the clamp-clasps back until they meet the clamps, then secure them by tightening the Hex-Bolts.
15. Open the top frame and remove the DUT board.
16. Replace the pogo-frames.
17. Replace the DUT board and close the top frame.

Caution

Take care not to crush or pinch the I/O cables.

ATTENTION
Static Sensitive

Take ESD precautions when handling pogo-pins and pogo-pin blocks, as the I/O boards are susceptible to damage by electrostatic discharge.

The following two diagrams show where pogo-pins (pogo-pin blocks) are positioned in the DUT interface. The configurations are different for 40 MHz/50 MHz or 100/200/400 MHz systems.

50 MHz Systems

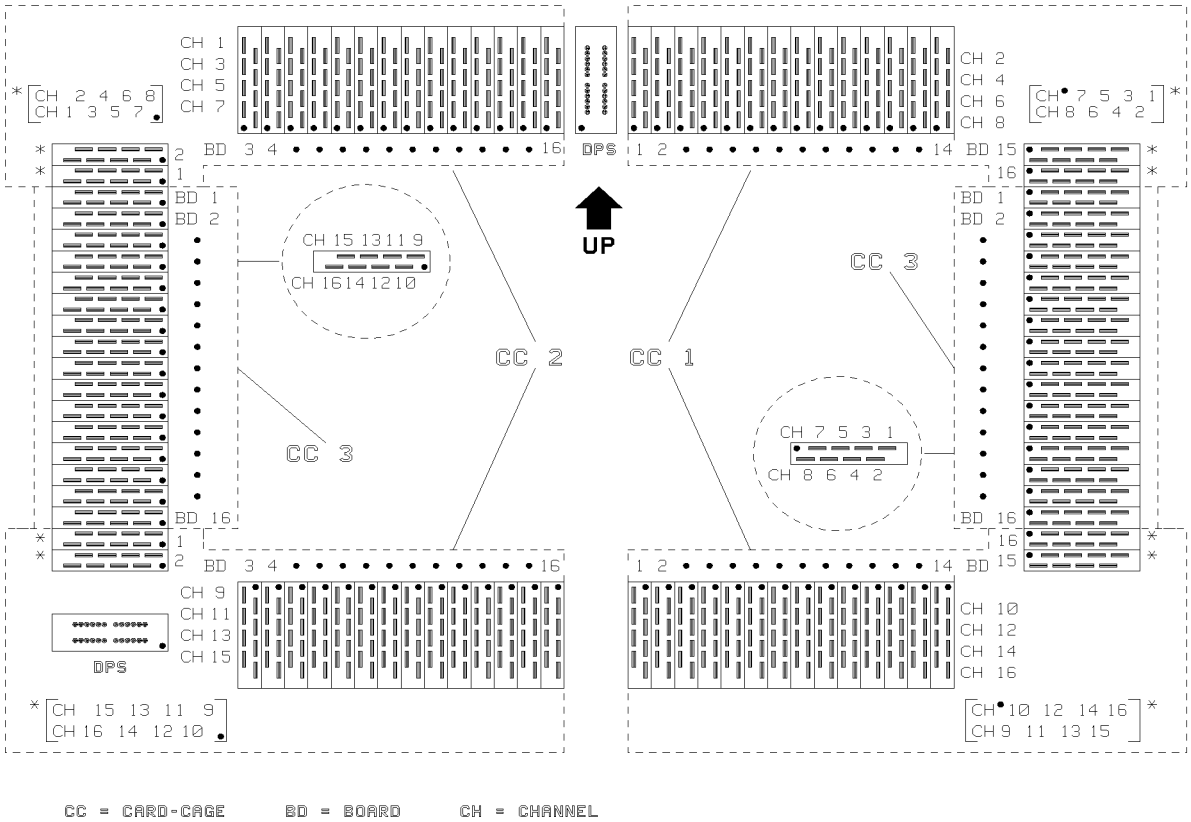


Figure 11-6. 50 MHz Systems

Note

- Note that the pogo-blocks should be oriented so that the *dimples* are at the centre.
- There are two positions for DPS pogo-blocks. One DPS pogo-block fits in the middle of the top pogo-frame. A second DPS pogo-block fits directly to the bottom frame (bottom-left corner).

100/200/400 MHz Systems

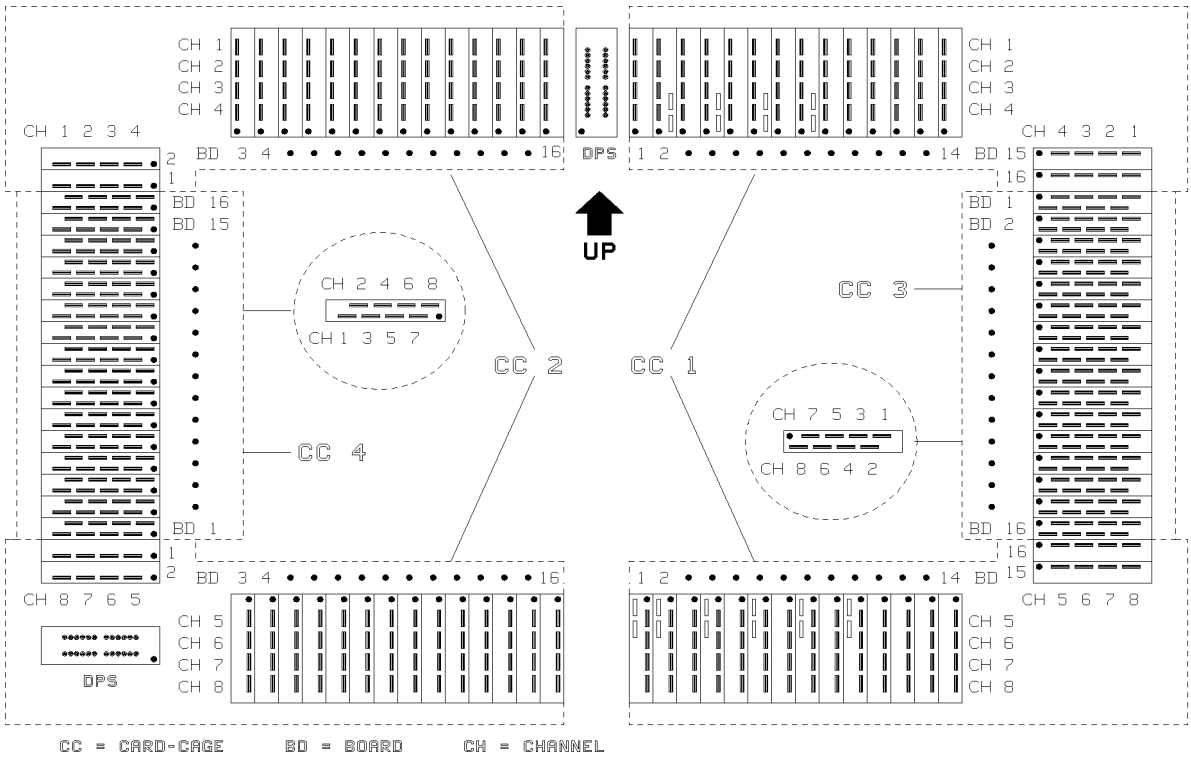


Figure 11-7. 100/200/400 MHz Systems

Note

- Note that the pogo-blocks should be oriented so that the *dimples* are at the centre.
- There are two positions for DPS pogo-blocks. One DPS pogo-block fits in the top pogo-frame. A second DPS pogo-block fits directly to the DUT interface bottom frame (bottom-left corner).
- Read Installing HSWGs for details of where to install HSWG pogo-pins.

Adjusting For Different DUT Board Thicknesses

The gap between the top and bottom frames of the DUT interface can be adjusted for different thicknesses of DUT boards.

Note

This procedure requires two people.

Procedure

1. Open the top frame and remove pogo-blocks (pogo-frames).
2. Insert the DUT board and close the top frame.
3. Loosen the Hex-Bolts securing the top frame hinges and the clamp-clasps to the bottom frame (these are the only Hex-Bolts on the sides of the DUT interface).
4. While one person presses the top-frame against the DUT board, the second person must:
   a. Tighten the Hex-Bolts securing the top frame hinges.
   b. Push the clamp-clasps back until they meet the clamps, then secure them by tightening the Hex-Bolts.
5. Open the top frame and remove the DUT board.
6. Replace the pogo-frames in their original positions.
7. Replace the DUT board and close the top frame.

Note

Do not install the DUT interface cover until you have read **Connecting The EMO Switch.**

Installing the DUT Interface Cover and EMO Switch

Before installing the DUT interface cover, you should read the chapter **Installation Verification** and carry-out the instructions there.

Warning

Do not allow the EMO cable to touch a grounded object. This would damage or destroy fuse F5 in the PCM and you will not be able to switch-on the circuit-breaker(s). Remember that the mainframe casing is grounded.

Procedure

1. Switch-off the system power.
2. Disconnect the power-cable from the mains, or switch-off the power at the mains. Otherwise there will be 30 V present across the ends of the EMO cable.
3. Remove the short-circuit on the switch-end of the EMO cable(s).
4. Lift the DUT interface cover onto its supports on the Maxiframe(s).

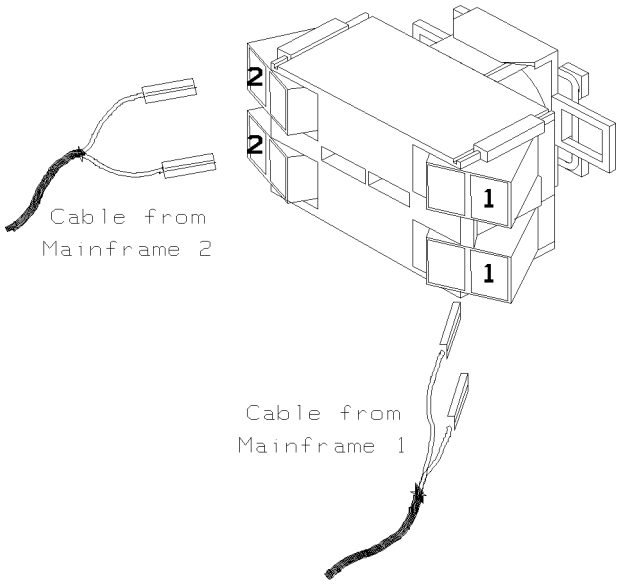


Figure 11-8. EMO Connection

5. Connect the EMO cable(s) to the EMO switch on the DUT interface, as shown in Figure 11-8.
6. Push the DUT interface into position and tighten the two screws at the top corners.

Caution

Lubricate these screws (grease, oil) before you install them. If they are not lubricated, they tend to stick and can not be removed.

---

7. Reconnect the power-cable(s) to the mains or switch-on the power at the mains.

This chapter tells you how to:

- Verify a DPS.
- Run Diagnostics.
- Run Extended Diagnostics.
- Run Calibration.
- Test the functions of the system with a Demo Device.

Verifying a DPS

If the DPS powers-up correctly and passes its self-test, as described in **Installing Device Power Supplies**, you can carry-out some further tests using local control.

The following procedures use the display and keys on the front panel to check each of the DPS outputs. No test equipment, other than a jumper-wire, is required. Both procedures must be carried-out for each DPS output.

Note

The following procedures are identical for all models and for all outputs. If an output fails any of the tests, refer to the manual supplied with the DPS for troubleshooting details.

Voltage Test

1. Press (VSET) (1) (0) (ENTER) to set the voltage of the selected output to 10 V.
2. Check that the display reads approximately 10 V and 0 A and the CV annunciator indicates that the supply is in the constant-voltage mode of operation.
3. Press (OVSET) (1) (9) (ENTER) to set the over-voltage to 19 V.
4. Press (VSET) (1) (6) (ENTER) to set the voltage to 16 V.
5. The display should read approximately 16 V and 0 A.
6. Press (VSET) (2) (0) (ENTER) to set the voltage to 20 V.
7. The display should read “OVERVOLTAGE”.
8. Press (VSET) (1) (6) (ENTER) (OVRST) to reset the supply.
9. The display should read approximately 16 V and 0 A.

Current Test

1. Switch-off the supply.
2. Remove the barrier-block cover from the output to be tested and connect a short-circuit (jumper-wire) between the +V and -V terminals of the output.
3. Switch-on the supply.
4. Use the [OUTPUT SELECT] key to select the output to be tested.
5. The display should read approximately 0 V and 0 A and the CC annunciator should be on, indicating that the DPS is in the constant current mode of operation.
6. Press [VSET] [5] [ENTER] to set the voltage to 5.
7. The display should read the same as in step 5.
8. Press [ISET] [1] [.] [5] [ENTER] to set the current to 1.5 A.
9. The display should read approximately 0V and 1.5A.
10. Press [OCP] to enable the over-current protection.
11. The OCP ENBLD annunciator should indicate that the over-current protection is enabled and the display should read "OVERCURRENT". When in over-current mode,the output is disabled.
12. Press [OCP] to disable the over-current protection.

    Because the output terminals are shorted, this step prevents the output from going into over-current immediately after you reset the supply.
13. Press [OCPRST] to reset the output.
14. The display should read the same as in step 9.
15. Switch-off the supply and remove the short-circuit from the output terminals.
16. Repeat steps 9 through to 11 for the next output to be tested.

For further information refer to the manual supplied with the DPS.

DPS Cable Connection Test

Once you have installed the DPS in the mainframe and connected the DPS cable, you can carry out the following test to verify that the DPS cable has been connected properly.

1. Use [OUTPUT SELECT] to select output 1.
2. Press [VSET] [1] [ENTER] to set the voltage to 1 V.
3. Use [OUTPUT SELECT] to select output 2.
4. Press [VSET] [2] [ENTER] to set the voltage to 2 V.
5. Use [OUTPUT SELECT] to select output 3.
6. Press [VSET] [3] [ENTER] to set the voltage to 3 V.
7. Use [OUTPUT SELECT] to select output 4.
8. Press [VSET] [4] [ENTER] to set the voltage to 4 V.

9. Using a DPS, for each output measure the voltages at the DPS pogo-pins, between:

   +V and -V

   +V and -S

   +S and -S

   +S and -V

   Use the following diagram to identify the where to measure these voltages at the DPS pogo block.

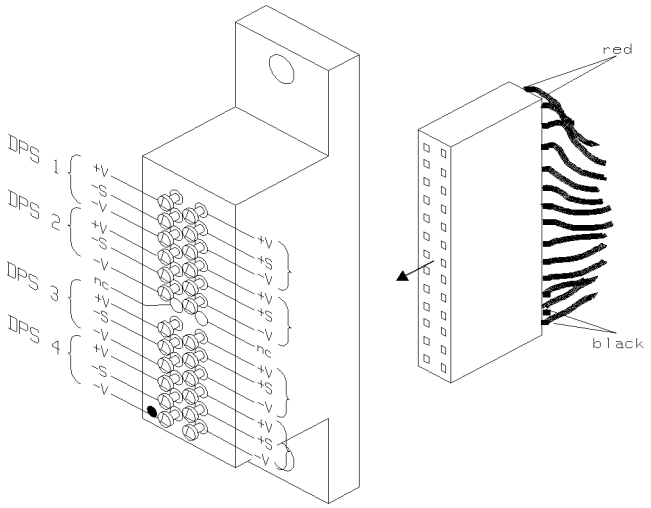


Figure 12-1. DPS Pogo Block

If the DPS cable is connected properly, these voltages will be (approximately):

Output 1	all voltages 1 V
Output 2	all voltages 2 V
Output 3	all voltages 3 V
Output 4	all voltages 4 V

ATTENTION
Static Sensitive

Take precautions against electrostatic discharge when working with the DUT interface and when making connections to system boards.

Procedure

1. At the HP-UX prompt, type `hp82000 &` and press (Return), to start the HP 82000 software. The option `&` retains the original UX-SHELL to work in.
2. Check the Report Area and confirm that no errors have been reported.
3. Start Diagnostics by clicking (Diagnostics) in the (AUX) menu.

   Figure 12-2 shows an example of the Diagnostic Window.

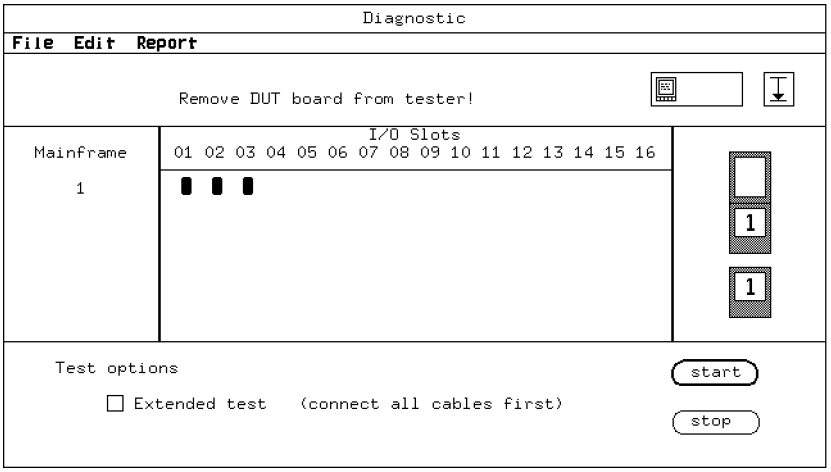


Figure 12-2. Diagnostic Window.

4. Remove the DUT Board.
5. If you intend to run extended diagnostics (only needed if you intend to use the external sequencer inputs) make the following connections and then click the `Extended Diagnostics` box:

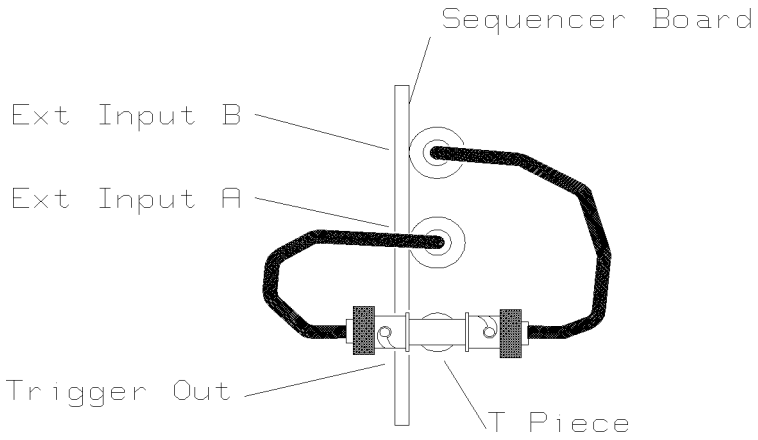


Figure 12-3. Extended Diagnostics - Connections Required.

a. Fit the BNC Tee piece (P/N 1250-0781) to the **TRIG OUT** socket on the Sequencer Board.

b. Connect a BNC cable (P/N HP10502A) between one end of the Tee piece and the **EXT A** socket.

c. Connect a BNC cable (P/N HP10502A) between the other end of the Tee piece and the **EXT B** socket.

6. Start Diagnostics by clicking (start).

7. Confirm that nothing is attached to the DUT interface by pressing (continue).

8. When you see the message `Diagnostics finished with no errors` in the Diagnostics Window, close the Diagnostics Window by double-clicking the `X11` button in the top left corner.

   If errors are reported refer to the *HP 82000 Troubleshooting Manual*.

Note

The HP 82000 hardware must be running for at least 30 minutes before you run calibration.

ATTENTION
Static Sensitive

Take precautions against electrostatic discharge when using the calibration probe and working with the DUT interface.

Connecting the Calibration Probe

Single Channel Calibration Probe

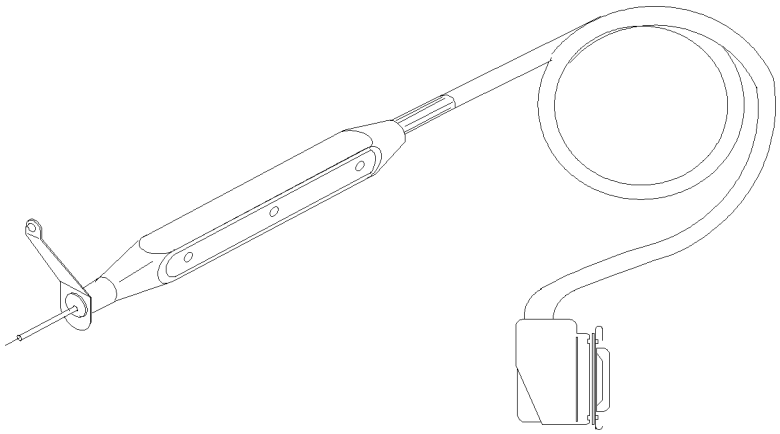


Figure 12-4. Single Channel Calibration Probe

Connect the calibration probe to the connector on the Clock Board in card-cage 1. The single channel calibration probe is used in conjunction with the standard DUT Boards to perform an AC Calibration on one channel at a time.

Extender Cable and Multiplexed Calibration Probe

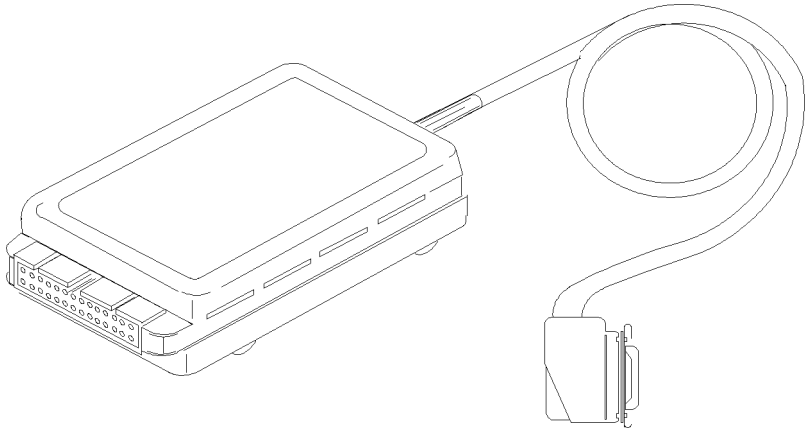


Figure 12-5. MUX Calibration Probe

The E1262A and E1263A Calibration Matrix products consist of a Calibration Board, a 16 channel Multiplexed (MUX) Calibration Probe and a Calibration Extender Cable.

Plug one end of the extender-cable into the calibration socket on the Clock Board and fit the other end to the slot in the BNC-rail above card-cage 1.

Connect the MUX Calibration Probe to the connector now on the BNC rail. The Calibration Board's only purpose is to interface with the MUX Calibration Probe. The MUX Calibration Probe can calibrate 16 channels at a time, without having to move the probe.

Note

For greater accuracy use the Single Channel Calibration Probe.

Base Calibration

Take precautions against electrostatic discharge when making connections to system boards.

Base Calibration checks the accuracy of the system timing-reference and measures the gain of the ADCs on the Clock Board and any PMU Boards.

Equipment Required

- A Power Supply capable of delivering -12 V to +12 V
- A HP3456A DVM
- A HP5370B Time Interval Counter
- Three BNC cables
- One BNC TEE-piece (P/N 1250-0781)
- Two BNC to dual banana-plugs (P/N 1251-2277)

Base Calibration Procedure

1. Remove the DUT Interface.
2. Switch on the HP 82000 Mainframe.
3. Type `hp82000` and press (Return), to start the HP 82000 software.
4. Click (AUX) and (HP-UX Shell), to open an HP-UX window.
5. Connect the test-equipment as shown in Figure 12-6.

Caution

Before connecting the power supply, check that the output voltage does not exceed the limits −20 V and +20 V.

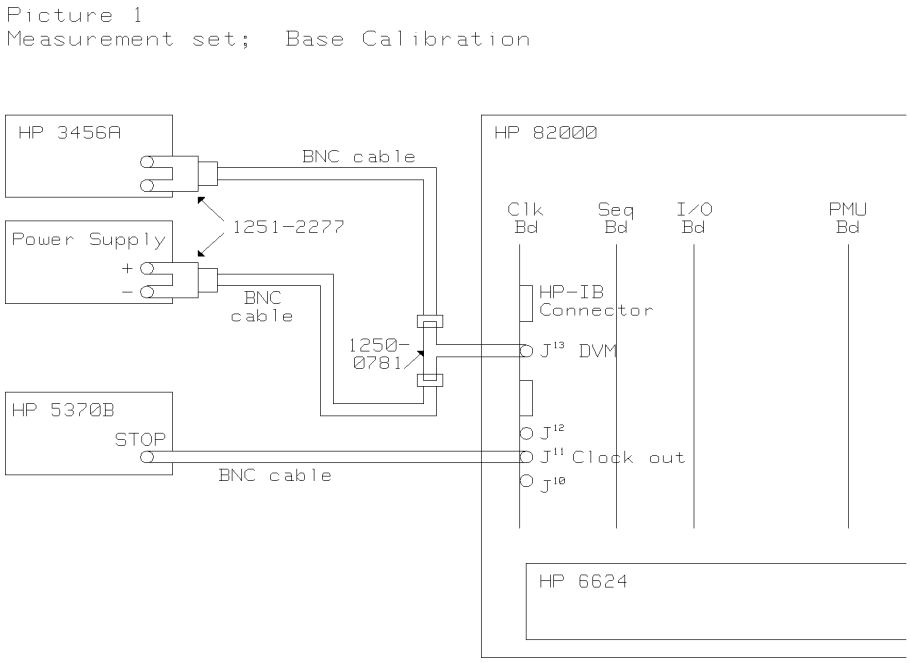


Figure 12-6. Base Calibration - Measurement Set Up

Note

Allow a warm-up time of 30 minutes before continuing with the calibration.

Make sure that you connect the banana-plug to the DVM with the correct orientation. These banana-plugs have a dedicated GND terminal.

In the first part of the test, you measure the accuracy of the timing reference on the Clock Board in Card-Cage 1.

6. Type `/hp82000/pws/bin/hpt` and press (Return), to start the HP-IB driver.
7. Type `*rst` and press (Return).
8. Type `sqst off` and press (Return).
9. Type `sclk int,100,` and press (Return). This sets the operating frequency to 10 MHz. Notice that *two* commas are required in this command.

10. Type `sqst run` and press Return.
11. Program the counter as follows:

Gate Time	: 0.1 seconds
Statistics	: mean
Input Amp	: 50Ω
Level	: preset
Start Com/Separate	: Separate
AC/DC	: AC

12. Read the frequency from the display of the counter. The frequency should be within the range 10 MHz ±10 kHz.

    If the timing reference does not operate within the specified range, then the Clock Board must be replaced. There is no adjustment procedure for this reference. Remember to check the timing reference on the new Clock Board.

    In systems with more than one card-cage, only the Clock Board in **Card-Cage 1** must be checked. This is the timing reference for the whole system.

In the next part of the procedure, you calculate the gain of the ADC on the Clock Board.

13. Type `*rst` and press Return.
14. Type `sqst off` and press Return.
15. Set the power supply output to approximately 7 V. Read the voltage from the DVM, and record it as *V1*, in μV. Retain the + or - sign, indicating the polarity of the voltage.
16. Type `adcm? 1` and press Return.

    The syntax of this command is:

    `adcm?` *card_cage*

    Where *card_cage* is the number of the Card-Cage with the Clock Board which is being calibrated.

    The system responds by returning the ADC bit pattern (close to 4000). Record this value as *adc_value_1*.

17. Set the power supply output to approximately −3 V. Read the voltage from the DVM, and record it as *V2*, in μV. Retain the + or - sign, indicating the polarity of the voltage.
18. Type `adcm? 1` and press Return

    The system responds by returning the ADC bit pattern (close to 500). Record this value as *adc_value_2*, in μV.

19. Calculate the gain using this formula:

$$gain = \frac{(V1 - V2)}{(adc\_value\_1 - adc\_value\_2)}$$

Note

Typically, the value should be around 3200.

Remember that *V1* and *V2* must be in **microvolts**.

If there is one or more PMU Boards installed in the system, you must perform the following part of the procedure for each PMU Board. These steps describe how to calibrate the ADC in the *two* PMU's on each I/O Board.

20. Type `*rst` and press Return.
21. Type `sqst off` and press Return.
22. Set the power supply output to approximately +11 V. Read the voltage from the DVM, and record this value as *V1*, in μV. Retain the + or - sign, indicating the polarity of the voltage.
23. Type `pmbc? p11` and press Return.

    The syntax of this command is `pmbc? p`*card_cage*`pmu_no`
    Where:

    card_cage is the number of the Card-Cage with the PMU Board installed.

    `pmu_no` is the number of the PMU on the PMU Board being calibrated. Remember that there are two PMU's on each PMU Board.

    The system responds by returning the ADC bit-pattern, which looks like the following example:

    ```
    PMBC P11,850,2669.6,2172,2109,0,2046.7....
    ```

    Record the first value in the string (850) as *adc_value_1*.
24. Set the external power supply to approximately -11 V. Read the voltage from the DVM, and record this value as *V2*, in μV. Retain the + or - sign, indicating the polarity of the voltage.
25. Type `pmbc? p11` and press Return.

    The system responds by returning the ADC bit pattern. Record this value as *adc_value_2*.
26. Calculate the gain using the following formula:

$$gain = \frac{(V1 - V2)}{(adc\_value\_2 - adc\_value\_1)}$$

Note

Typically the gain should be around 10000.

Remember that the voltages *V1* and *V2* must be in μV.

27. Repeat steps **20 to 26** for the next PMU on this PMU Board. Remember to change the *pmu_no* parameter in the `pmbc?` query, as follows:

    ```
    pmbc? p12
    ```

Now the calibration values for Card-Cage 1 have been determined, you must repeat the Clock Board ADC procedures and the PMU Board ADC procedures for every Card-Cage. You do

not need to repeat the measurement on the timing reference, because the timing reference on the Clock Board in Card-Cage 1 is the reference for the whole system. The following steps describe the procedure in general terms.

28. Move the BNC TEE connector to the `EXT DC` connector on the Clock Board in the next Card-Cage to be calibrated.
29. Calculate the gain of the Clock Board ADC as described before.
30. If there is a PMU installed in this Card-Cage, calculate the gain of the two PMU ADC's as described before.
31. Repeat the last three steps for every Card-Cage and PMU Board. Remember to change the *card_cage* parameter in the `adcm?` and `pmbc?` queries, to match the Card-Cage you are working on.

Once you have calibrated all Card-Cages, you will have to determine the temperature in Card-Cage 1. The following steps show you how to do this.

32. Type `temp?` and press Return.

    The system returns the temperature measured in each Card-Cage, with a line like the following:

    ```
    TEMP 1,270
    ```

    Where `1` is the number of the Card-Cage, and `270` is the temperature measured in Kelvin.

    Record the temperature in Card-Cage 1 as *temp_1*.

Now that all calibration values have been determined, you can stop the `hpt` driver, and you will have to enter the gain values in a calibration file in order to make them accessible for the HP 82000 software.

33. Press CTRL and D simultaneously, to stop the HP-IB driver.
34. Use the HP-UX `vi` editor to edit the file: `/hp82000/fw/data/bc_cal_d`*model*

    Where *model* is either `40, 40X, 50, 100, 100X, 200 or 400.`

Note

Do not make any changes to the file header, `hp82000,calibration,0.1`

---

35. Add one line like the following:

    `CALI` *card_cage*`,BC,"`*date*`",`*temp_1*

    Where:

card_cage	is the number of the Card-Cage.
date	is today's date, in the format *mm/dd/yy*.
temp_1	is the temperature (in Kelvin) measured in Card-Cage 1.

    Example:

    ```
    CALI 1,BC,"02/12/95",299
    ```

36. Add one line for each Clock Board, as follows:

`MCLD` *card_cage*`,`*gain*`,,,,,,,`

Where *card_cage* is the number of the Card-Cage with the calibrated Clock Board, and *gain* is the calculated ADC gain for that board.

Example:

```
MLCD 1,3212,,,,,,,
```

Note

You must have exactly 8 commas after the gain value.

---

37. Add two lines for each PMU Board, as follows:

    `PBCD P`*card_cage*`1,`*gain*`,,,,,,,,,,`
    `PBCD P`*card_cage*`2,`*gain*`,,,,,,,,,,`

    Where *card_cage* is the number of the Card-Cage containing the calibrated PMU, and *gain* is the calculated PMU ADC gain.

    Example:

```
PBCD P11,10011,,,,,,,,,,
PBCD P12,10015,,,,,,,,,,
```

Note

You must have exactly 11 commas after the gain value.

The following example shows how a completed Base Calibration file should look. This example is for a single Card-Cage system:

```
hp82000,calibration,0.1
CALI 1,BC,"02/12/95",299
MLCD 1,3212,,,,,,,
PBCD P11,10011,,,,,,,,,,
PBCD P11,10012,,,,,,,,,,
```

You must now download the new Base Calibration values into the hardware:

38. Quit the HP 82000 system software by clicking QUIT in the MAIN menu.
39. At the HP-UX prompt, type `hp82000` and press Return, to restart.

    When the system restarts, the calibration file has been downloaded.

Take precautions against electrostatic discharge when handling the calibration probe.

Note

Before starting the DC Calibration Routine:

- make sure that the Calibration Probe is connected to the system. This can be either a Single Channel Probe or the Multiplexed Probe.
- ensure that the DUT Board has been removed from the DUT Interface.
- make sure that you have a valid Base Calibration file. If there is no Base Calibration file, the DC Calibration will not run. If the values in the Base Calibration file are not valid, the DC Calibration results will not be valid.

Note

The procedure is the same on a single or a multi card-cage system. Note that in a multi card-cage system, the gain and offset values for the DACs on the I/O Boards are determined by the ADC on the Clock Board in the same card-cage. There is no DC link between card-cages.

---

1. At the HP-UX prompt, type `hp82000` and press (Return).
2. Click (Calibration) in the (AUX) menu.
3. Click `Select` and select `DC-Cal` from the pull-down menu. The DC Calibration screen will be displayed, as shown in Figure 12-7.

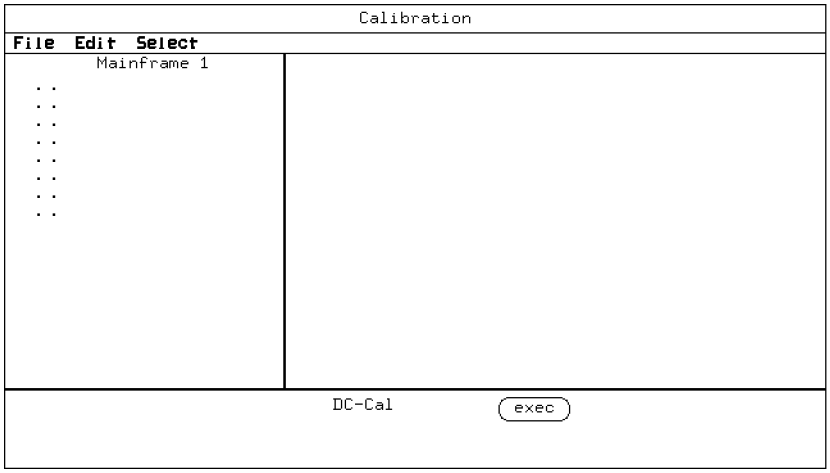


Figure 12-7. DC Calibration Window

This example is from a single card-cage system with two D200 I/O boards.

In this window:

- `Mainframe` *number* indicates the card-cage number.
- The dots represent I/O channels.
- Each column of dots represents one I/O board (8 or 16 dots per column, depending on the type of I/O board). Check that the number of columns corresponds to the number of I/O boards in each card-cage.

4. Click (exec), to start the DC Calibration routine.

   You will hear relays clicking as the routine executes.

   When the DC Calibration routine has finished (exec) reappears in the Calibration window.

   If any errors are detected during DC Calibration they will be listed in the Report window after the DC Calibration has finished. (Any error messages will be generated during the download of new correction values into the hardware.)

   If any errors are reported. Refer to the *HP 82000 Troubleshooting Manual*.

5. If no errors were reported, save the correction values by clicking `File` and selecting `Save` in the pull-down menu.

ATTENTION
Static Sensitive

Take precautions against electrostatic discharge when using the calibration probe and working with the DUT interface.

Note

Before starting the Standard AC Calibration Routine:

- make sure that the Calibration Probe is connected to the system. This can be either a Single Channel Probe or the Multiplexed Probe.
- make sure that you have valid Base and DC Calibration files. If either of these files is missing the Standard AC Calibration will not run. If the values in either file are not valid, the AC Calibration results will not be valid.

1. Click (Calibration) in the (AUX) menu.
2. Click `Select` and select `Standard AC_Cal` in the pull-down menu. The Standard AC Calibration screen will be displayed as shown in Figure 12-8.

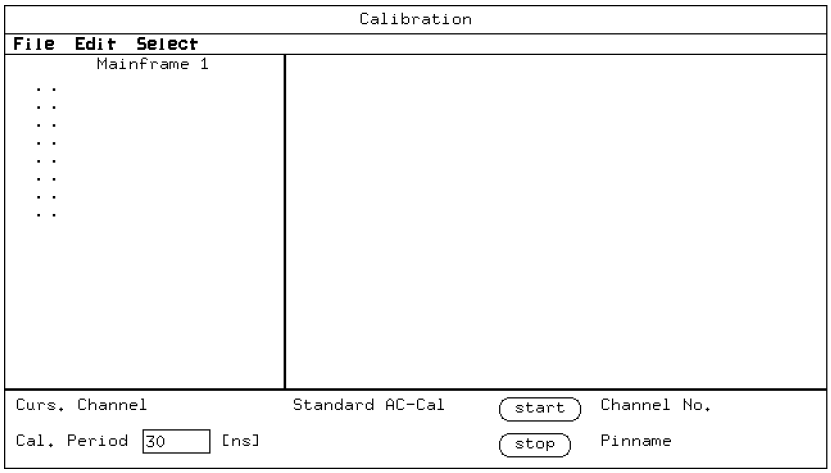


Figure 12-8. Standard AC Calibration Window

This example is of a single card-cage system with two D200 I/O boards.

3. Before starting the Standard AC Calibration routine, install the Calibration DUT Board or the DUT board to be used by the system. **Do not insert a DUT.**
4. Connect the Calibration Probe to the system. Do not connect the Calibration Probe tip(s) to the system channels until you are told to do so.
5. Ensure that there are no loads connected to the DUT Board.
6. Click (start) to start the Standard AC Calibration.

   A message will appear telling you not to connect the Calibration Probe yet. Click (start) again and wait for the Calibration Probe measurements to finish. When the LED on the Calibration Probe goes off and the message

`cal probe measurement is finished`

appears, you can start to calibrate the system channels.

Note

It can take several minutes for this message to appear.

---

7. Connect the tip of the Single Channel Calibration Probe to the end of a Transmission Line (TML) on the DUT Board. Contact the probe to a point as close as possible to the end of the TML or at the DUT socket. Hold the probe in this position until the LED on the probe switches on and off twice.

Note

Always connect the GND contact to the DUT Interface Ground Shield first. Take great care to maintain this contact while the channel is being calibrated. Not doing so will affect signal performance of the calibrated edges and will thus have a substantial impact on the calibration result.

If you are using the MUX Calibration Probe, connect the probe to one of the connectors on the Calibration board. The 16 channels connected are then calibrated. When the LED on the probe switches-off and stays off, there will be some relay switching noise. Then move the probe to the next connector.

While the tester is identifying each system channel the `Channel No.` and `Pinname` fields show the system channel number and pin name (only shown if a pin configuration has been downloaded). When the channel has been calibrated, the corresponding small dot changes to a large filled dot.

8. When all channels have been calibrated click (stop). After a while the calibrated channels are shown as large empty dots.
9. Click (file). Select the `save_as` function in the pull-down menu.
10. Type one of the following into the entry field of the `save` sub-window:

    ac_cal_d40 : for a 40 MHz system.
    ac_cal_d40X : for a 40 MHz mixable system.
    ac_cal_d50 : for a 50 MHz system.
    ac_cal_d100 : for a 100 MHz system.
    ac_cal_d100X : for a 100 MHz mixable system.
    ac_cal_d200 : for a 200 MHz or a mixed 100X/200 MHz system.
    ac_cal_d400 : for a 400 MHz or a mixed 100X/200/400 MHz system.

11. Click (save_as) to save the AC calibration data.
12. Click (HP-UX) in the (AUX) menu, to open a HP-UX window.

13. At the HP-UX prompt, type `cd /users/demo/mc10136/calibration` and press Return.
14. Type `cp ac_cal_dxxx /hp82000/dev_tech/ecl/calibration/ac_cal_dxxx` and press Return. (`xxx` is 40, 40X, 50, 100, 100X, 200 or 400, as above)
15. Type `cp ac_cal_dxxx /hp82000/dev_tech/cmos/calibration/ac_cal_dxxx` and press Return.
16. Type `cd ../calib_raw` and press Return.
17. Type `cp ac_cal_dxxx /hp82000/dev_tech/ecl/calib_raw/ac_cal_dxxx` and press Return.
18. Type `cp ac_cal_dxxx /hp82000/dev_tech/cmos/calib_raw/ac_cal_dxxx` and press Return.
19. Click the box in the top-left corner of the HP-UX window to close the window. The AC calibration files are now *global* calibration files.

Demo Device

A Demo Device on a pre-wired Demo DUT Board is supplied with the system. For D40, D50, D100, D100X and D200 systems the demo device is a MC10136 4-bit ECL counter. For D400 (with and without HSWGs) or mixed D200/400 systems, the Demo Device is an MC10H136. This is a faster version of the MC10136.

Take precautions against electrostatic discharge when handling the demo device and working with the DUT interface.

The wiring on the Demo DUT Board is different for the different types of I/O boards and when HSWGs are installed. This means that different I/O channels are connected to the pins of the Demo Device, depending on which I/O board you have. For the four types of I/O boards, the channels are connected as follows:

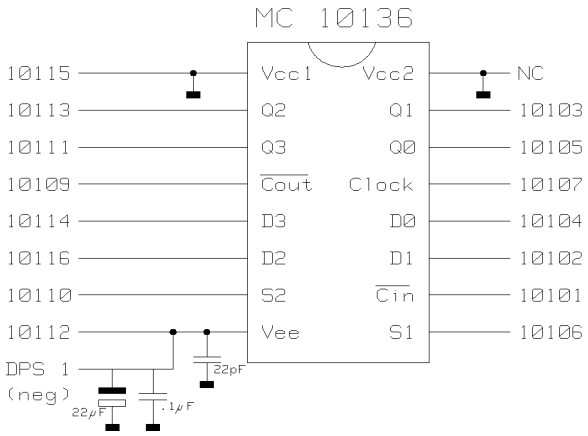


Figure 12-9. D40, D50

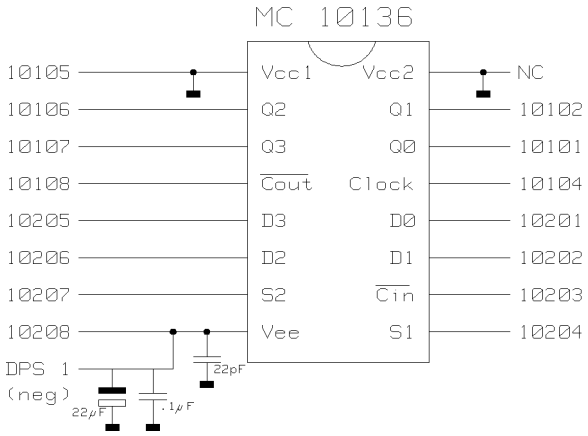


Figure 12-10. D100, D100X and D200

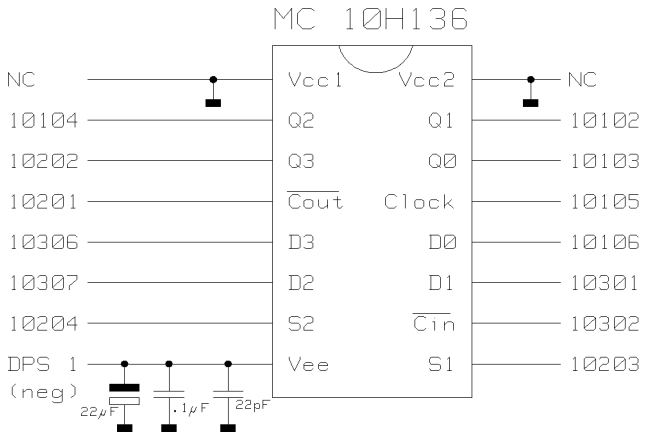


Figure 12-11. D400 and mixed D200 and D400

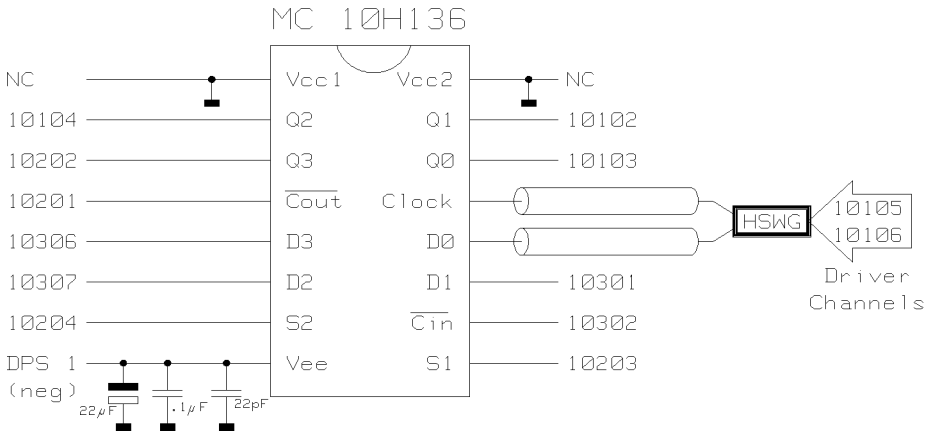


Figure 12-12. D400 with HSWG

There are also pre-programmed setups and tests for the Demo Device. You can use these tests to verify that the system is functioning correctly.

Note

Before you can run any tests on the device, you must calibrate for the Demo Device (Standard AC Calibration).

Note

At configurations with D100X boards and just 1 D400 board the demo device testing cannot be performed, as a D400 does not provide the 100 MHz mode necessary for the test. With 2 D400 boards in I/O slot 1 and 2 the fast demo device can be tested according Figure 12-11.

Take precautions against electrostatic discharge when using the calibration probe and working with the DUT interface.

This procedure describes how to run Standard AC calibration for the Demo Device.

1. Install the Demo DUT board in the DUT interface and remove the Demo Device.
2. Click (Change Dev) in the (AUX) menu.
3. Click (enter) in the `System Administrator` window.
4. Click the `path name` box.
5. Type the path-name `/users/demo` over the current path-name and press (Return).
6. Use the scroll-bar to move along the list of files in the browser, and find the file `mc10136`.
7. Click `mc10136` and (enter device), to select the Demo Device.
8. Click (continue) in the `store "LAST_SETTING"` window. The files for the Demo Device load.
9. Click (Calibration) in the (AUX) menu.
10. Click `Select` and select `Standard AC_Cal` in the pull-down menu.

    Depending on the types of I/O boards in the system, you must calibrate the channels given in the following tables.

Note

Calibrate at the pins of the socket for the Demo Device without having the Demo Device inserted.

D40, D50

10101	10109
10102	10110
10103	10111
10104	
10105	10113
10106	10114
10107	
10108	10116

Note

Channels 10115 and 10112 are connected to pins on the Demo Device, but can not be calibrated, because:

- 10115 is connected to ground.
- 10112 is connected to a DPS output.

D100, D100X and D200

10101	10201
10102	10202
	10203
10104	10204
	10205
10106	10206
10107	10207
10108	

Note

Channels 10105 and 10208 are connected to pins on the Demo Device, but can not be calibrated, because:

- 10105 is connected to ground.
- 10208 is connected to a DPS output.

D400 and mixed D100X/D200/D400

	10201	10301
10102	10202	10302
10103	10203	
10104	10204	
10105		
10106		10306
		10307

Note

If you have HSWGs installed, channels 10105 and 10106 are HSWG channels. Calibrate these two channels in the same way as ordinary I/O channels.

11. Click start twice, to start the AC calibration.

    Wait until the following message appears in the Report window:

    ```
    Cal probe measurement is finished, contact cal probe to channel.
    ```

12. Press the "grounding-clip" of the calibration probe against the ground-plate on the front of the DUT interface.
13. Press the probe-tip against the socket-pin corresponding to the I/O channel you want to calibrate.

    If the contact is good, then the LED on the probe will be on and the channel number will be displayed in the Calibration window.

Hold the probe in position until the dot representing the channel being calibrated, changes to a large filled dot.

14. Repeat this procedure for all remaining pins.
15. Click (stop) when you have calibrated all the necessary channels.
16. Click `File` and select `save_as` in the pull-down menu.
17. Type `cal_10136` and press (Return).
18. Click (save_as), to save the AC calibration data for the Demo Device.

Running Demo Tests

In order to verify that your system operates correctly, test the Demo Device using the pre-programmed Demo Tests.

1. Install the Demo DUT Board and Demo Device in the DUT interface.
2. Click (HP-UX) in the (AUX) menu, to open a HP-UX window.
3. At the HP-UX prompt, type `cd /users/demo/configs/lbin`.
4. At the HP-UX prompt, type `./config_demo` and press (Return). This runs the `config_demo` program, which reads the system configuration from the `mainframes` and `models` files and modifies the set-ups for the Demo Device accordingly.

Note

If you change the system configuration and you want to use the Demo Device to verify the functions of the system:

- Make sure that you have updated the `mainframes` and `model` files correctly.
- Check that the Demo Device and DUT Board are correct for the new configuration.
- Run the `config_demo` program, with the `-newconfig` option specified.

---

5. Click (TestControl) in the (MAIN) menu.
6. In the `Test Control` window, click `File`, and select `load` in the pull-down menu.
7. Find the file `dl_demo` in the browser and click it.
8. Click (load). The pin configuration and vectors for the Demo Device load.
9. Click (exec). The tester configuration for the Demo Device is activated.
10. Click `File`, and select `load` in the pull-down menu.
11. Find the file `ac_func_test` and click it.
12. Click (load) to load the funtional test file.
13. Click (exec) to run the functional test.

    The message:

    ```
    functional      = passed
    ```

    should appear in the Report window.

14. Click (Error Map) in the (MAIN) menu. An Error Map screen is shown in Figure 12-13. An Error Map shows marks at cycle addresses where the expected data pattern differs from the received data pattern.

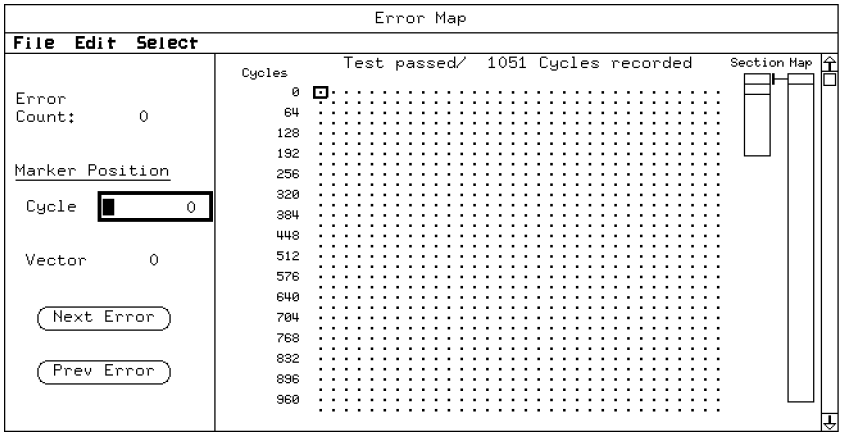


Figure 12-13. Error Map

15. Click `File` in the `Test Control` window and select `load` in the pull-down menu.
16. Find the file `ac-aquire_data` in the browser and click it.
17. Click (load).
18. Click (exec) to run the aquire-data test.

    The message:

    ```
    aquire data      = done
    ```

    should appear in the Report window.
19. Click (Tim.Diagram) in the (MAIN) menu. A Timing Diagram is shown in Figure 12-14. A Timing Diagram shows the received signal status per cycle at the sampling point.

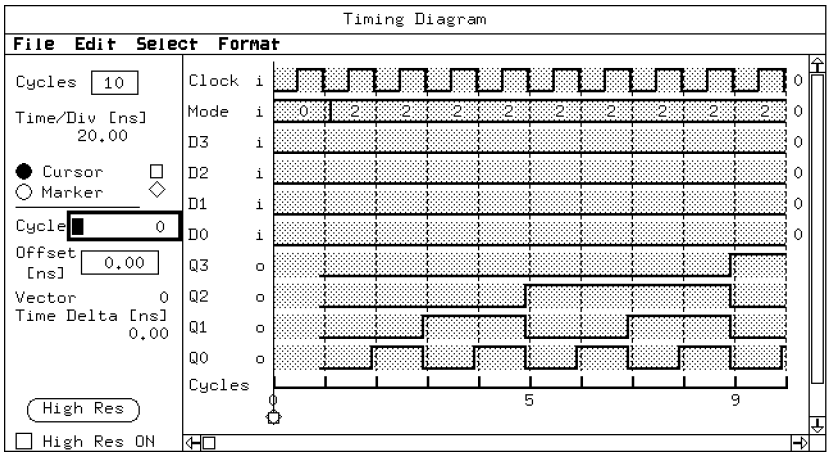


Figure 12-14. Timing Diagram

Note

You now have the choice of running the other pre-programmed tests:

- Manually, by selecting and running them as before.
- Automatically, from **Rocky Mountain Basic** (**RMB**).

The procedure for running these tests automatically is described in the following three steps.

20. Click (BASIC) in the (Main) menu.
21. At the RMB prompt, type `LOAD "DEMO"` and press (Return). The demo program loads.
22. Type `RUN` and press (Return). All the pre-programmed tests run automatically.

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