

**HP 4062UX Semiconductor Process Control System
HP 4062F Semiconductor Parametric Test System**

Installation Manual



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Printing History

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

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

Edition 1

For System Software Revision X.08.00, F.08.00, October 1998

Safety Summary

The following general safety precautions must be observed during all phases of operation, service, and repair of this instrument. Failure to comply with these precautions or with specific warnings elsewhere in this manual may impair the protections provided by the equipment. In addition, it violates safety standards of design, manufacture, and intended use of the instrument. Hewlett-Packard Company assumes no liability for customer's failure to comply with these requirements.

Note



HP 4062UX/F complies with INSTALLATION CATEGORY II and POLLUTION DEGREE 2 defined in IEC 1010-1.
HP 4062UX/F is INDOOR USE product.

GROUND THE INSTRUMENT

To minimize shock hazard, the instrument chassis and cabinet must be connected to an electrical ground. The power terminal and the power cable must meet International Electrotechnical Commission (IEC) safety standards.

DO NOT OPERATE IN AN EXPLOSIVE ATMOSPHERE

Do not operate the instrument in the presence of flammable gases or fumes. Operation of any electrical instrument in such an environment constitutes a definite safety hazard.

KEEP AWAY FROM LIVE CIRCUITS

Operation personnel must not remove instrument covers. Component replacement and internal adjustments must be made by qualified maintenance personnel. Do not replace components with power cable connected. Under certain conditions, dangerous voltages may exist even with the power cable removed. To avoid injuries, always disconnect power and discharge circuits before touching them.

DO NOT SERVICE OR ADJUST ALONE

Do not attempt internal service or adjustment unless another person, capable of rendering first aid and resuscitation, is present.

DO NOT SUBSTITUTE PARTS OR MODIFY INSTRUMENT

Because of the danger of introducing additional hazards, do not install substitute parts or perform any unauthorized modification to the instrument. Return the instrument to a Hewlett-Packard Sales and Service Office for services and repair to ensure that safety features are maintained.

DANGEROUS PROCEDURE WARNINGS

Warnings, such as example below, precede potentially dangerous procedures throughout this manual. Instructions contained in the warnings must be followed.

Warning



Dangerous voltages, capable of causing death, are present in this instrument. Use extreme caution when handling, testing, and adjusting.

Safety Symbols

The general definitions of safety symbols used on equipment or in manuals are listed below.



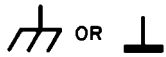
Instruction manual symbol: the product will be marked with this symbol when it is necessary for the user to refer to the instruction manual in order to protect against damage to the instrument.



Indicates dangerous voltage (terminals fed from the interior by voltage exceeding 1000 volts must be so marked).



Protective conductor terminal. For protection against electrical shock in case of a fault. Used with field wiring terminals to indicate the terminal which must be connected to ground before operating equipment.



Frame or chassis terminal. A connection to the frame (chassis) of the equipment which normally includes all exposed metal structures.



Alternating current.



Direct current.



ON (Supply).



OFF (Supply).



STANDBY (Supply).

Warning



The warning sign denotes a hazard. It calls attention to a procedure, practice, condition or the like, which, if not correctly performed or adhered to, could result in injury or death to personnel.

Caution



The caution sign denotes a hazard. It calls attention to an operating procedure, practice, condition or the like, which, if not correctly performed or adhered to, could result in damage to or destruction of part or all of the product.

Note



The note sign denotes important information. It calls attention to a procedure, practice, condition or the like, which is essential to highlight.

Preface

Purpose

This manual contains the installation information for both HP 4062UX and HP 4062F system. Refer to the *Pre-installation Manual* for the information about the site-preparation of the customers.

Audience

This manual is intended for the HP Customer Engineers who perform the installation of the HP 4062UX/F system. System administrator and maintenance personnel can refer to this manual when the HP 4062UX/F system is updated or reinstalled at the new place.

Contents

Chapter 1, General Information, covers the installation sequence, required reference material, and equipment required to install the HP 4062UX/F.

Chapter 2, System Controller Installation, covers the procedures for system controller installation.

Chapter 3, Switching Matrix Installation, covers the procedures for switching matrix installation.

Chapter 4, System Installation, explains how to integrate the system controller, switching matrix, and cabinet-mounted instruments into a system.

Chapter 5, Software Installation, covers the procedures for software installation and customization. This chapter also includes information for the HP IMA software.

Chapter 6, System Verification, provides instructions for verifying proper system operation.

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General Information

Introduction

This manual provides the procedures and information necessary to install and verify both the HP 4062UX Semiconductor Process Control System and the HP 4062F Semiconductor Parametric Test System.

This chapter covers the installation sequence, required reference material, and equipment required to install the HP 4062UX/F. Chapter 2 covers system controller installation. Chapter 3 covers switching matrix installation. Chapter 4 explains how to integrate the system controller, switching matrix, and cabinet-mounted instruments into a system. Chapter 5 covers software installation and customization. Finally, chapter 6 provides instructions for verifying proper system operation.

Use this manual after the *Pre-installation Manual*, which contains site preparation information for Hewlett-Packard Customer Engineers who perform the installation. Figure 1-1 shows a flow diagram of the installation sequence.

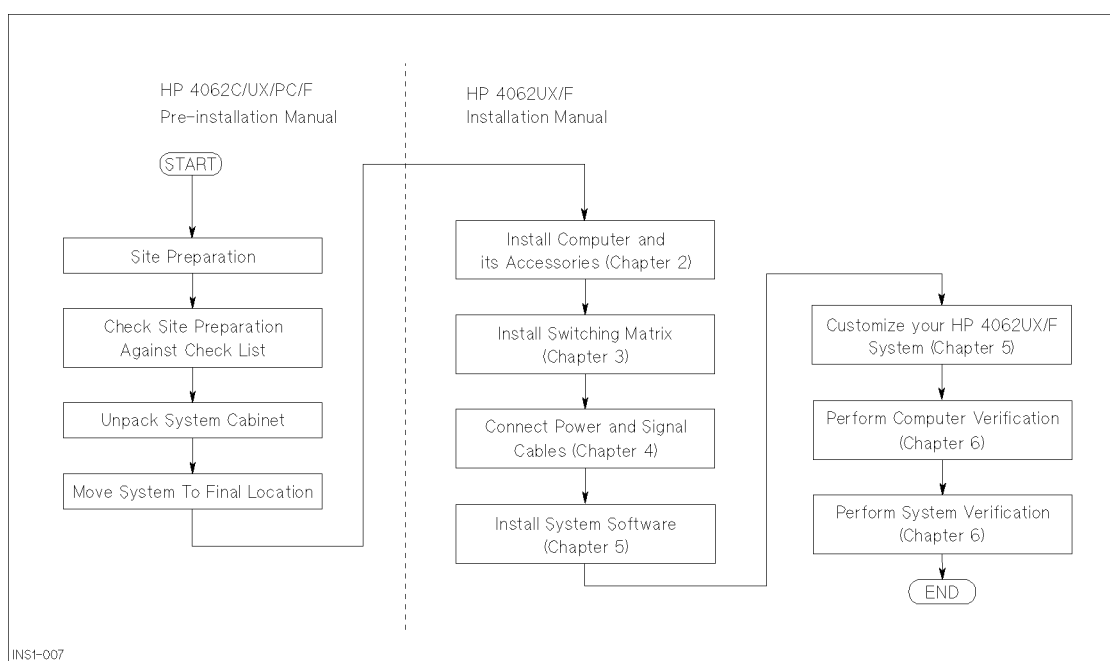


Figure 1-1. System Installation Flow Diagram

Installation Sequence

This section can help you arrange the installation process of the HP 4062UX/F to get the effective use of your time. For example, Figure 1-2 shows examples of efficient installation sequences.

To install the HP 4062UX/F system on a new hard disk, you must install the HP-UX system files. It takes about one or two hours to load the HP-UX system files from the CD-ROM. Meanwhile, you can install system hardware, such as the switching matrix, system instruments, and so forth. If the HP-UX system software is already installed on the hard disk, you can save hard disk initialization time and HP-UX software installation time.

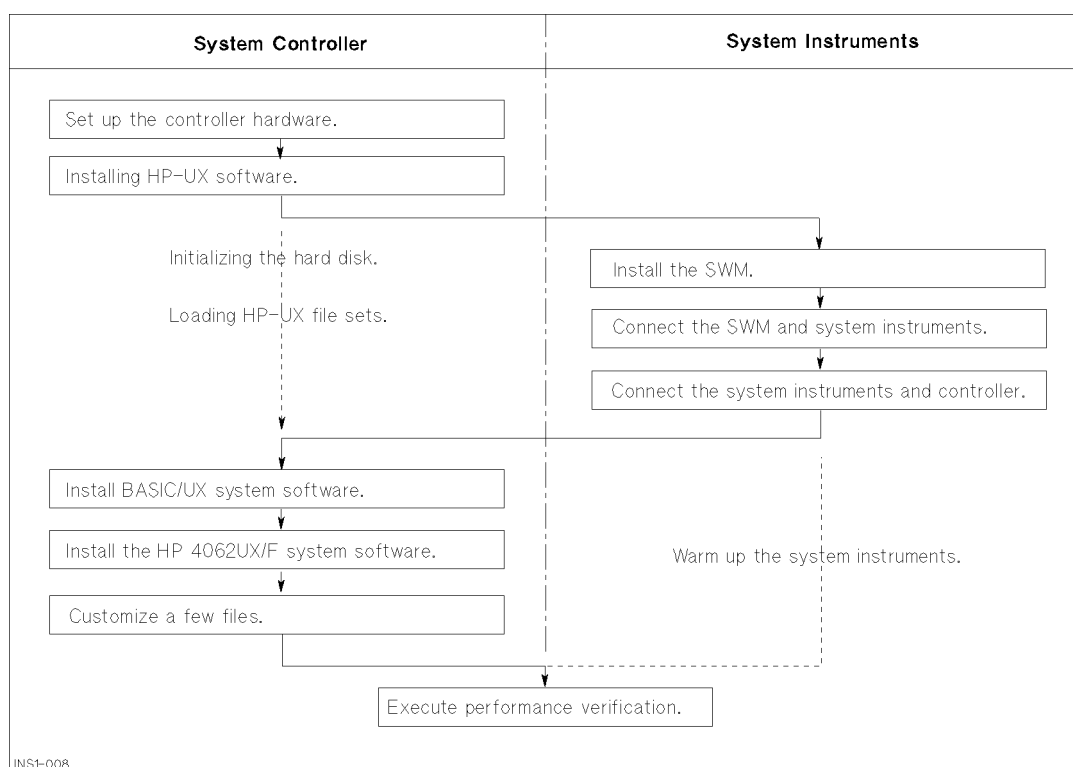


Figure 1-2. Arranged Installation Sequences for HP 4062UX/F

Required Equipment

The equipment needed to install the HP 4062 follows:

- Standard Screwdriver (one large, one small)
- Phillips Screwdriver
- Wire Strippers
- Slip-joint Pliers
- Battery-powered Voltmeter

Utility Software

The system software contains the following utilities for checking the installation process:

PROBER program Checks your prober operations after installing the HP 4062UX/F system.
For details, see the following files:

`/usr/pcs/etc/prober_check/READ_ME`

check62ux A shell procedure that checks the system software installation of the HP 4062UX/F.

Abbreviations

Throughout the HP 4062UX/F documentation, the following abbreviations are used to identify the subsystems and instruments in the HP 4062UX/F system.

Abbreviation	Term
--------------	------

SMS	Switching Matrix Subsystem: consists of SWC and SWM
SWC	HP 4084B Switching Matrix Controller
SWM	HP 4085B, HP 4089B, or HP 4085F Switching Matrix
DCS	DC Measurement Subsystem: HP 4142B Modular DC Source/Monitor
CMS	Capacitance Measurement Subsystem
CMU	Capacitance Measurement Subsystem: HP 4280A 1 MHz C Meter/C-V Plotter
CMU84	Capacitance Measurement Subsystem: HP 4284A 20 Hz–1 MHz Precision LCR Meter
PCS	Process Control System
PDU	Power Distribution Unit
BASIC/UX	BASIC on HP-UX: the HP BASIC coordinated to execute on HP-UX system

System Controller Installation

This chapter provides system controller and accessories installation information for the HP 4062UX/F system. The HP 4062UX/F system includes a system controller as follows:

HP 9000 Series 700 Model 745/132L, 745i, 747i, and 725.

For more information on each computer or supported computer, contact your nearest HP Sales Office.

The following accessories are installed in your system controller, depending on the system configuration:

- For instrument control
 - Series 745i/747i Internal HP-IB Interface Card
 - HP E2071 High Speed HP-IB Interface Card
- For peripheral control
 - HP 25560A EISA HP-IB Interface Card

For complete controller and accessory installation information, refer to the *Installation Reference* and *Notes* for each item.

You can install your system controller in standard system cabinet (1600 mm height) with rack mount kits. Installing the system controller in the system cabinet is described in this chapter.

Unpacking

Remove the computer from its carton and check the computer accessories against the packing list of the carton. Accessory items (add-on RAM cards, interface cards, etc.) are shipped separately. Do not remove these accessories from their antistatic envelopes until you are ready to install them into the computer.

Line Voltage Switch and Line Fuse

The computer is shipped from the factory with its line voltage selector switch set to the line voltage in your area, and the correct line fuse installed. Before you plug the computer in, however, check the switch setting and line fuse (both are located at the rear of the computer) to ensure that they are correct. For more complete line voltage selector switch and line fuse information, refer to the *Installation Reference* manual of the computer.

HP 9000 Series 700 Hardware Installation

The following paragraphs briefly describe the accessories and installation. For any accessories that are not described in the following paragraphs, see the *Installation Guide* of the accessories.

Caution



Before you install or remove any computer accessory, turn the computer OFF and unplug its power cord. Failure to do so may result in computer or accessory damage.

HP-IB Interface Cards

This section explains how to install HP-IB interface cards. You need to install HP-IB interface cards in the following cases:

- When you use Series 700 Model 745/132L computer.
- When you use Series 700 Model 725 computer.
- When you use Series 700 Model 745i or 747i computer with a prober, a printer, or a plotter, which are controlled via HP-IB from HP 4062UX/F.

Each HP-IB interface is reserved for a specific system function, as listed in Table 2-1.

Table 2-1. HP-IB Interface Supported for Series 700 Computers

Interface	Description
HP 25560A	For communicating with computer peripherals
745i/747i built-in HP-IB or HP E2071 (725 or 745/132L)	For controlling the system instruments: HP 4084B, HP 4142B, HP 4280A, HP 4284A, and HP 8110As
HP E2071	For controlling wafer probers via HP-IB from the HP 4062UX/F system or controlling other instruments

The configuration switches on the interface card set the HP-IB interface's I/O base address. If you use two or more external interface cards in your computer, you must set the configuration switches of the cards not to conflict other interface cards' switch settings, including other manufacturer's cards.

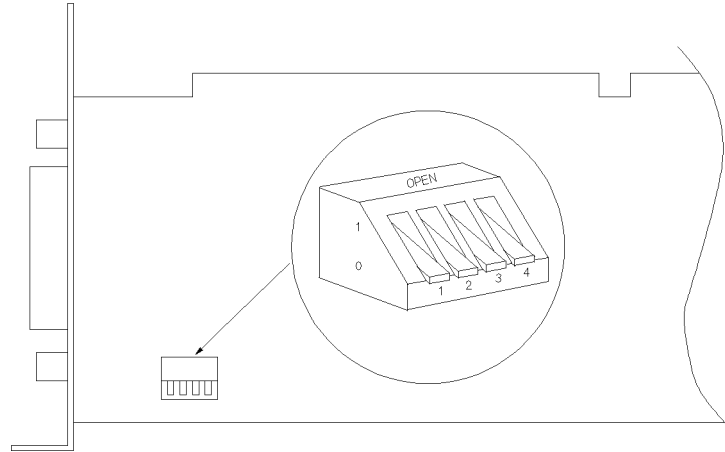


Figure 2-1. HP E2071 HP-IB Interface Card Switches

After setting the switches, install the cards into the slots of your computer.

For details of the configuration switch setting and the card installation, refer to the *HP E2071 Installation Guide* and *User's Guide* of each computer.

For HP 25560A HP-IB interface installation, see the *HP 25560A Installation Guide*.

Rack Mounting Instructions

To rack mount the controller in the standard system cabinet (1600 mm height) of the HP 4062UX/F, the HP 4062UX/F must be equipped with option 705, 706, or 707 for rack mounting the controller. The following paragraphs provide controller rack mounting information.

If the HP 4062UX/F is still in its shipping container, refer to chapter 4, “Receiving,” in the HP 4062UX/F *Pre-installation Manual* and unpack the cartons before continuing with this chapter.

Note



You cannot mount the controller or mass storage unit in the small system cabinet (1000 mm height) of the HP 4062UX. There is no space for mounting any instruments other than system instruments.

Installing Controller (Option 705, 706, or 707)

The rack mount kit is installed in the system cabinet at the factory. Before rack mounting, remove the rack mount kit from the system cabinet.

Table 2-2 lists option 705, 706, and 707 rack mount kit contents for rack mounting the system controller. Check the contents of the kit against Table 2-2 before you proceed.

Table 2-2. Option 705 and 706 Rack Mount Kit Contents

Description	HP Part Number	Quantity		
		Option 705	Option 706	Option 707
Rail Guide	04062-01271	2	2	2
Washer	2190-0577	4	4	4
Screw 10-32	2680-0103	4	4	4
Washer	3050-0226	4	4	4
Rack Flange	5062-3978	1	—	1
Rack Flange	5062-3981	—	1	—

Controller Installation Procedure (Option 705, 706, and 707):

1. Remove the side strips from each side of the controller.
2. Attach the rack flange to each side of the controller using the furnished screws.
3. Slide the controller into the lower empty space of the system cabinet.
4. Secure the rack flanges of the controller to the system cabinet using the furnished screws.

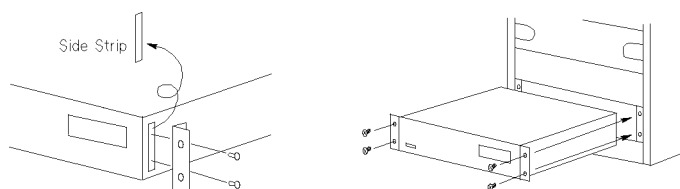


Figure 2-2. Rack Mounting the Controller (Option 705 and 706)

Mass Storage Unit

Table 2-3 lists option 720, and 740 rack mount kit contents for rack mounting the hard disk or cartridge tape drive. Check the contents of the kit against Table 2-3 before proceeding.

Table 2-3. Options 720, and 740 Rack Mount Kit Contents

Item	Description	HP Part Number	Quantity
(1)	Support Shelf	04062-00198 ¹	1
(2)	Strap	9223-0678	1
(3)	Front Panel for 9133H, 7957A/B, 7958A/B/S, 7959A/B/S, 7962B, 7963B, C2212A, and C2213A	04062-00252 ¹	1
(4)	Cup Washer	3050-0007	4
(5)	Insert Washer	3050-0248	4
(6)	Screw	2680-0119	4

¹ Option 720 part number.

Assemble the rack mount kit and install the hard disk or cartridge tape drive into the top blank space of the system cabinet as described in the following procedure. Refer to Figure 2-3. Note that the parenthetical numbers in the following procedure are keyed to the Item column in Table 2-3 and to the parenthetical numbers in Figure 2-3.

Mass Storage Installation Procedure:

1. Lay the support shelf (1) on a flat surface.
2. Thread the strap (2) as follows:
 - a. Position the buckle, with the protective pad facing down and the free end of the strap to the right, near the left-hand strap hole on the support shelf. Make sure the strap is not twisted.
 - b. Feed the free end of the strap into the right-hand strap hole of the support shelf, then out the left-hand strap hole.
 - c. Lay each end of the strap over the sides of the support shelf.
3. Place the mass storage unit on the support shelf, making sure the four feet of the unit fit into their holes on the shelf.
4. Fasten the strap as follows:
 - a. Thread the free end of the strap through the strap buckle.
 - b. Position the strap buckle on one side of the hard disk or cartridge tape drive.
 - c. Tighten the strap around the mass storage unit, but not too tightly. There should be enough slack to lift the buckle approximately 12.7 mm (0.5 in) away from the mass storage unit.
 - d. Close the buckle, securing the strap.
5. Place the mass storage unit and support shelf assembly on the side rails of the cabinet and push the assembly into the cabinet.
6. Place a cup washer (4), then an insert washer (5) on each flat-head screw (6).

7. Place the front panel (3) over the mass storage unit and secure the front panel to the support shelf of the mass storage unit, then to the system cabinet, using the furnished flat-head screws and washers.

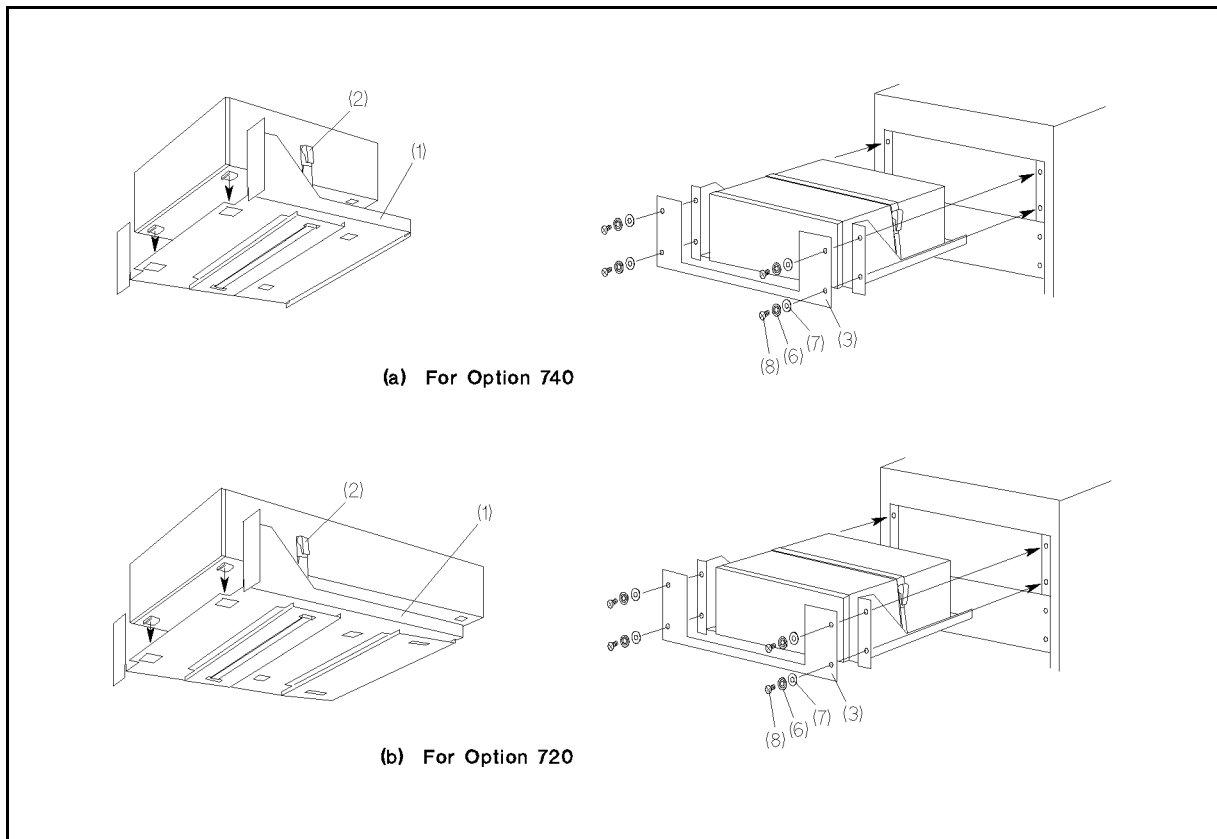


Figure 2-3. Rack Mounting the Mass Storage Unit

Switching Matrix Installation

Introduction

This chapter provides the information required to install the switching matrix (SWM) of the HP 4062UX—either the HP 4085B/F 48-pin SWM (“HP 4085B/F (48-pin) SWM Installation”) or the HP 4089B 96-pin SWM (“HP 4089B (96-pin) SWM Installation (HP 4062UX Only)”)—, onto your wafer prober. Other relevant SWM installation information is also included.

Because so many different wafer probers are available, and because it is impossible to predict what type of prober you (the customer) will use and what your measurement applications will be, SWM installation is your responsibility.

HP 4085B/F (48-pin) SWM Installation

This section provides HP 4085B/F SWM installation information and includes information on unpacking, installing additional pin boards, and connecting test fixtures.

Unpacking

Warning



The HP 4085B/F weighs about 22 kg (48.4 lb) and is wrapped in vinyl, making it difficult to lift and carry. Be very careful when handling the SWM.

Remove the SWM from its shipping carton and check the cables and accessories against the check list of the carton. If the shipment is incomplete or if anything is damaged, contact the nearest HP Sales Office.

When shipped from the factory, the SWM is wrapped in two separate sheets of vinyl. After you remove the SWM from its carton, remove the outer vinyl sheet. Do not remove the inner vinyl sheet from the SWM until you move the SWM to the installation site; and do not remove the Personality Board (HP 16072A/B for HP 4085B or HP 16072F for HP 4085F) or any additional pin boards from their antistatic envelopes until you are ready to install them.

Caution



Do not remove the SWM or its accessories from their protective covers in any area besides the installation site. Exposure to dust and other airborne contaminants degrades insulation and reduces measurement accuracy.

Installing Additional Pin Boards

To install additional HP 16320B Pin Boards in your SWM, refer to Figure 3-1 and perform the following procedure:

Caution



Install pin boards at the installation site only. Wear rubber gloves and a lint free cloth cap and gown. Oil, perspiration, hair, fibrous dust, and dirt degrade board insulation and reduce measurement accuracy.

-
1. Remove the protective vinyl cover from the SWM.
 2. Remove the protective plate covering the measurement pins.
 3. Remove the bottom panel screws, then the bottom panel of the SWM.
 4. Remove the required board struts and pin board control cables.

Caution



When removing pin board control cables, disconnect each connector from each pin board separately. Do *not* remove a cable by disconnecting one end and *peeling off* the cable all at once.

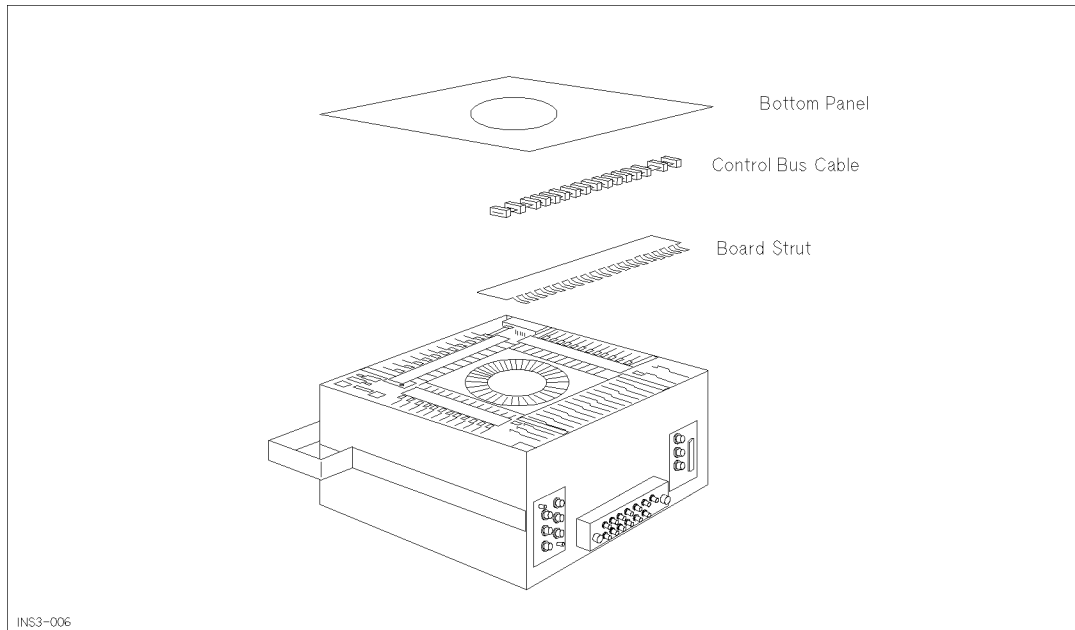


Figure 3-1. Accessing Pin Boards

5. Remove additional pin boards from their antistatic envelopes.

Caution



Wear rubber gloves when handling pin boards. If rubber gloves are not available, hold the board by its edges as shown in Figure 3-2.

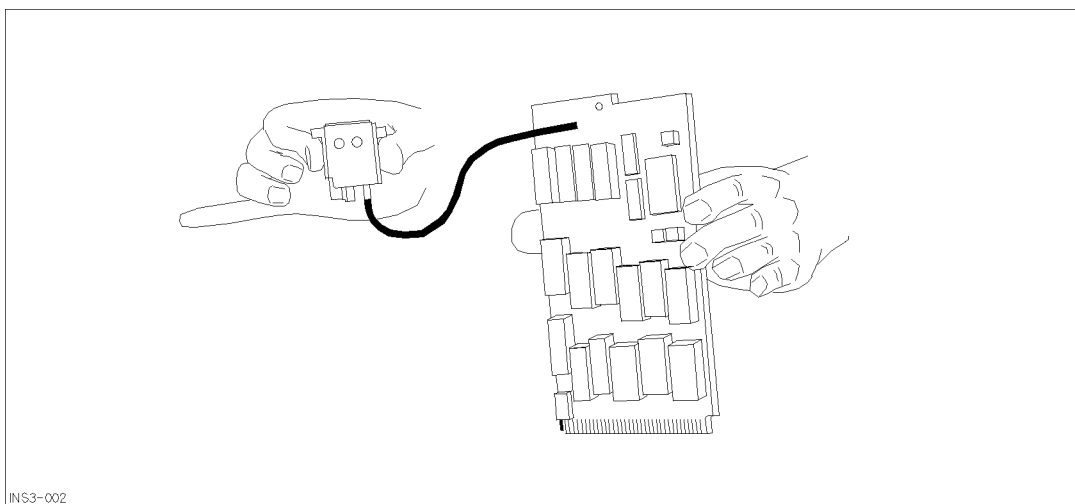


Figure 3-2. Handling Pin Boards

6. Insert each pin board into the desired slot and connect the cable assembly of the board to the corresponding position on the measurement pin mounting ring.
7. Reconnect the pin board control cables, reinstall the board struts, and replace the bottom panel.

Installing the SWM on a Wafer Prober

The prober manufacturer and the customer are responsible for mounting the HP 4085B/F onto your wafer prober, and subsequent adjustment and service. Hewlett-Packard will, however, provide technical assistance regarding SWM installation upon request. Contact your nearest HP Service Office for assistance.

Automatic Wafer Probers

Before you can install your SWM and HP 16072 Personality Board onto your wafer prober, mounting hardware—hinge, head plate, and so on—must be fabricated. For this purpose, the dimensions and other mechanical specifications for the SWM and the personality boards are provided in the *Pre-installation Manual*.



Warning



Keep hands clear of the SWM, hinge, and wafer prober when lowering the SWM into position on your wafer prober.

Caution



Do not touch the measurement pins of the SWM or the printed patterns of the personality board. Oil, perspiration and dirt prevent good electric contact, deteriorate insulation, and degrade measurement accuracy.

Note



After you have installed the HP 16072F Personality Board on your wafer prober, adjust the position of the personality board so the pin board numbers printed on the personality board line up with the corresponding numbers on the SWM. Confirm that all the measurement pins of the SWM are making good electric contact with the pin contacts of the personality board.

Manual and Small Automatic Wafer Probers

Because the SWM cannot be installed directly on the manual wafer probers or small automatic wafer probers, you need the Extension Cable Fixture (HP 16077A for HP 4085B SWM or HP 16077F for HP 4085F SWM) to connect the SWM to the manipulator or probe card of the prober.

The extension cable fixture installs onto the SWM and is secured in place by four thumb screws. Wires from the manipulator or probe card of the prober can then be soldered to the measurement pins of the extension cables fixture. Figure 3-3 shows the extension cable fixture with its protective cover plate installed.

For more information on the HP 16077A/F Extension Cable Fixture, refer to the HP 16077A/F *Operation Manual*.



Warning



Potentially hazardous voltages may be present at the measurement pins of the extension cable fixture when the output enabled lamp on the SWM is lit. Make sure the protective cover plate of the extension cable fixture is installed before you operate the system.

Caution



Do not touch the measurement pins of the SWM or the extension cable fixture. Oil, perspiration, and dirt prevent good electric contact and degrade measurement accuracy.

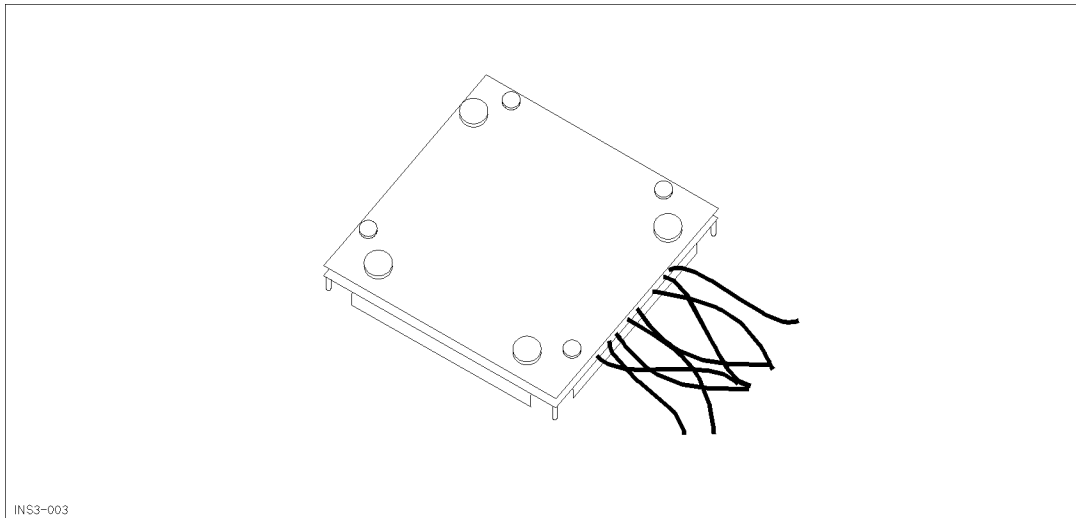


Figure 3-3. HP 16077A/F Extension Cable Fixture

Connecting Test Fixtures

If you specify test fixtures, your HP 4062 includes the HP 16066A Test Fixture Adapter and the following two test fixtures to satisfy virtually any measurement application.

■ HP 4062UX

- HP 16067A 24-pin DIP Low Leakage Fixture
- HP 16068A 48-pin DIP Low Leakage Fixture
- HP 16069A Universal Low Leakage Fixture
- HP 16070A General Purpose DIP Fixture
- HP 16071A/B Universal Fixture

■ HP 4062F

- HP 16068F 48-pin DIP Low Leakage Fixture
- HP 16071F Universal Fixture

The following procedure tells how to connect test fixtures to the SWM. Refer to Figure 3-4.

1. Install the test fixture adapter on the SWM and tighten the thumb screws of the adapter.

Caution



Do not touch the measurement pins of the SWM or the test fixture. Oil, perspiration, and dirt prevent good electrical contact and degrade measurement accuracy.

2. Install the desired test fixture in the test fixture adapter and tighten the thumb screws of the fixture.

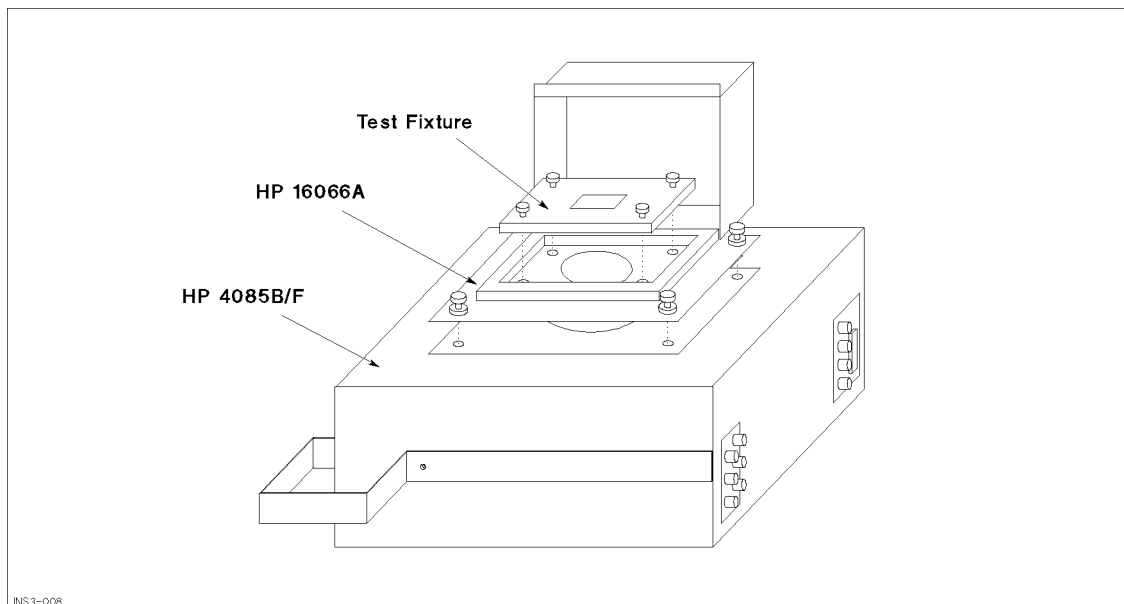


Figure 3-4. Mounting Test Fixtures

For complete information on a specific test fixture, refer to the *Operation Manual* for that test fixture.

3-6 Switching Matrix Installation

HP 4089B (96-pin) SWM Installation (HP 4062UX Only)

This section provides HP 4089B SWM installation information and includes information on unpacking, installing additional pin boards, and connecting test fixtures.

Unpacking

Warning



The HP 4089B weighs about 55 kg (121 lb) and is wrapped in vinyl, making it difficult to lift and carry. Be very careful when handling the HP 4089B SWM.

Remove the SWM from its shipping carton and check the cables and accessories against the carton check list. If the shipment is incomplete or if anything is damaged, contact the nearest HP Sales Office.

When shipped from the factory, the SWM is wrapped in two separate sheets of vinyl. After you remove the SWM from its carton, remove the outer vinyl sheet. Do not remove the inner vinyl sheet from the SWM until you move the SWM to the installation site. Do not remove the HP 16377A/B Personality Board or any additional pin boards from their antistatic envelopes until you are ready to install them.

Caution



Do not remove the SWM or its accessories from their protective covers in any area besides the installation site. Exposure to dust and other airborne contaminants degrades insulation and reduces measurement accuracy.

Installing Additional Pin Boards

To install additional HP 16320D Pin Boards in your SWM, perform the following procedure:

Caution



Install pin boards at the installation site only. Wear rubber gloves and a lint free cloth cap and gown. Oil, perspiration, hair, fibrous dust, and dirt degrade board insulation and reduce measurement accuracy.

-
1. Remove the protective vinyl cover from the SWM.
 2. Remove the protective plate covering the measurement pins.
 3. Loosen the hexhead screw at each corner of the bottom panel using a hexhead wrench, then carefully lift the bottom panel from the SWM.
 4. Remove the required board struts and pin board control cables.

Caution



When removing pin board control cables, disconnect each connector from each pin board separately. Do *not* remove a cable by disconnecting one end and *peeling off* the cable all at once.

-
5. Remove additional pin boards from their antistatic envelopes.

Caution

Wear rubber gloves when handling pin boards. If rubber gloves are not available, hold the board by its edges as shown in Figure 3-2.

6. Insert each pin board into the desired slot and connect the cable assembly of the board to the corresponding position on the measurement pin mounting ring.
7. Reconnect the pin board control cables, reinstall the board struts, and replace the bottom panel.

Installing a Port Expander

To install a port expander (Option 340), perform the following procedure:

1. Remove the port expander from its antistatic envelopes.
2. Attach the port expander on the SWM as shown in Figure 3-5.
3. Tighten the four thumb screws of the port expander.

Ten BNC shorting caps are installed on the coaxial connectors of the port expander at the factory. Leave the shorting caps on the connectors until the connectors are used. When you use the port expander connectors, remove the shorting caps and keep them in a safe place because the caps may be used later.

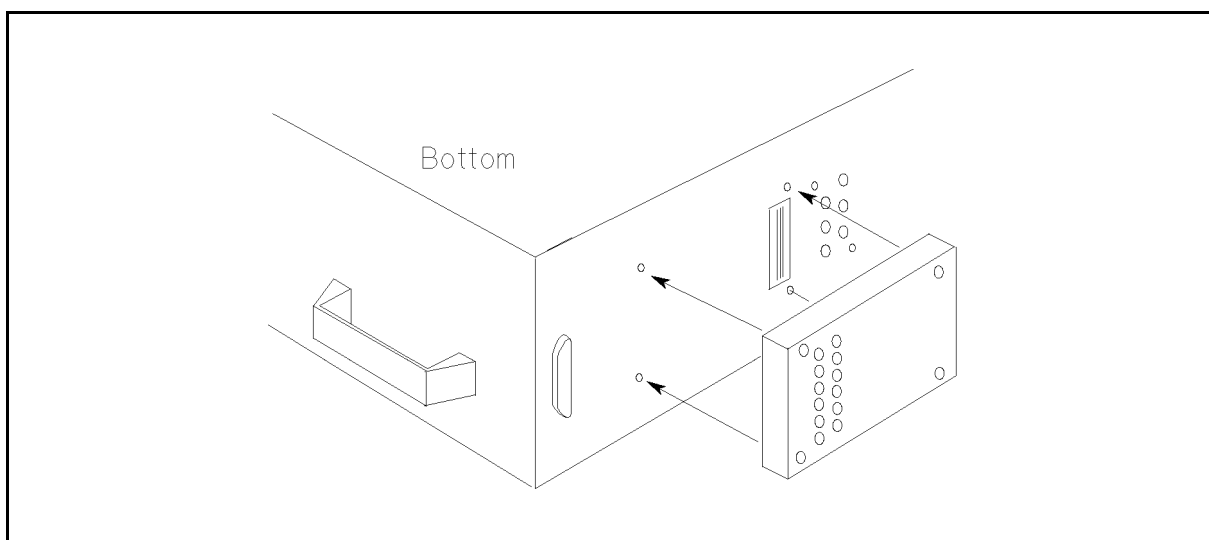


Figure 3-5. Installing a Port Expander

Installing the SWM on a Wafer Prober

The prober manufacturer and the customer are responsible for mounting the HP 4089B onto your wafer prober, and subsequent adjustment and service. Hewlett-Packard will, however, provide technical assistance regarding SWM installation upon request. Contact your nearest HP Service Office for assistance.

Automatic Wafer Probers

Before you can install the SWM and HP 16377A/B Personality Board onto the wafer prober, mounting hardware—hinge, head plate, and so on—must be fabricated. For this purpose, the dimensions and other mechanical specifications for the SWM and the personality board are provided in the *Pre-installation Manual*.



Warning



Keep hands clear of the SWM, hinge, and wafer prober when lowering the SWM into position on your wafer prober.

Caution



Do not touch the measurement pins of the SWM or the printed patterns on the personality board. Oil, perspiration and dirt prevent good electrical contact, deteriorate insulation, and degrade measurement accuracy.

Note



After you have installed the HP 16377A/B Personality Board on the wafer prober, adjust the position of the personality board so the pin board numbers printed on the personality board line up with the corresponding numbers on the SWM. Confirm that all the SWM measurement pins are making good electrical contact with the pin contacts of the personality board.

Manual and Small Automatic Wafer Probers

Because the SWM cannot be installed directly on the manual wafer probers or small automatic wafer probers, you need the HP 16378B Extension Cable Fixture to connect the SWM to the manipulator or probe card of the prober.

The extension cable fixture installs onto the SWM, and secures by pushing the right and left side levers down, similar to the HP 16370A Test Fixture Adapter. Wires from the manipulator or the probe card of the prober can then be soldered to the measurement pins of the extension cable fixture.

Refer to the HP 16378B *Operating Note* for more information on the extension cable fixture.



Warning



Potentially hazardous voltages may be present at the measurement pins of the extension cable fixture when the SWM output enabled lamp is lit. Make sure the protective cover of the cable fixture is installed before you operate the system.

Caution



Do not touch the measurement pins of the SWM or the extension cable fixture. Oil, perspiration, and dirt prevent good electrical contact and degrade measurement accuracy.

Connecting Test Fixtures

If you specified test fixtures, your HP 4062C or HP 4062UX includes the HP 16370A Test Fixture Adapter and the following test fixtures to satisfy virtually any measurement application.

- HP 16371A 24-pin DIP Low Leakage Fixture
- HP 16372A 48-pin DIP Low Leakage Fixture
- HP 16373A 64-pin DIP Low Leakage Fixture
- HP 16374A Universal Low leakage Fixture
- HP 16375A General Purpose DIP Fixture
- HP 16376A/B Universal Fixture

Use the following procedure to connect test fixtures to the SWM.

1. Turn the test fixture adapter and the test fixture upside down.
2. Position the test fixture in the test fixture adapter and push the black push-to-lock fasteners on the test fixture to lock the test fixture onto the test fixture adapter.
3. Turn the adapter over again (topside up).
4. Position the adapter on the SWM.
5. Push the right and left side levers of the test fixture adapter down to secure the adapter on the SWM.

Caution



Do not touch the measurement pins of the SWM or the test fixture. Oil, perspiration, and dirt prevent good electrical contact and degrade measurement accuracy.

For complete information on a specific test fixture, refer to *Operating Note* for that test fixture.

System Installation

Introduction

This chapter provides instructions for final hardware installation and setup of the HP 4062 system. Included is information on system cabinet installation, power cables, instrument settings, signal cable installation, and removing instruments from the system cabinet.

Installing the System Cabinet

If the HP 4062 is still in its shipping container, unpack the system and move it to its final location. Refer to the HP 4062 *Pre-installation Manual* to unpack and move the system.

Warning



When moving the HP 4062 system on its casters, do not allow the casters to become caught on cables or debris, or in cracks in the floor. The high center of gravity and the momentum caused by pushing or pulling can cause the HP 4062 system to tip over, resulting in serious injury to personnel and damage to equipment.

Caution



Fully raise the leveling feet if the cabinet must be moved, or the leveling feet may be damaged.

Note



After the HP 4062 system is moved to its final location and before performing any other installation steps, lower the leveling feet until they are in contact with the floor.

Stabilizing the System Cabinet

After the HP 4062 system is moved to its final location, install four antitip legs (HP part number 04062-29001) in the system cabinet. Once installed, the antitip legs and leveling feet stabilize and immobilize the system cabinet.



Warning



After you install the antitip legs, do not remove them unless absolutely necessary. If the antitip legs are removed, do not extend any HP 4062 instruments from the cabinet. Failure to observe this warning can result in serious injury to personnel and damage to equipment.

Install antitip legs as follows:

1. Remove the four antitip legs from the cabinet crate.
2. Raise the leveling feet on the antitip legs as high as possible.
3. Install two antitip legs at the lower front sides of the cabinet using four screws (HP part number 0515-0963).
4. In the same manner, install two antitip legs at the lower rear sides of the cabinet using four screws.
5. Lower the leveling feet until they are in contact with the floor.

Installing Power Cables

If the line voltage in your area is 100 Vac, the HP 4062 includes a 3-meter power cable. The cable has a 30 A rating with a NEMA L5-30P plug. For Japan, however, the cable has a NEMA L6-30P plug.

If the line voltage in your area is 120 Vac, the HP 4062 includes a 3-meter power cable. The cable has a 30 A rating with a NEMA L5-30P plug. For Japan, however, the HP 4062F does not include a main power cable. The customer must provide a power cable and plug that satisfies the Electrical Appliance and Material Control Law, and provides a means of earth grounding.

When your site has a proper outlet for the HP 4062 system, insert the plug of the power cable into the outlet, and go to the next step.

If the line voltage in your area is between 220 Vac and 240 Vac, the HP 4062 will *not* include a main power cable. The customer must provide a power cable and plug that satisfies the local installation code safety requirements, and provides a means of earth grounding. For Japan, however, the customer must provide a power cable and plug that satisfies the Electrical Appliance and Material Control Law. The power cable must have a 15 A rating when the system cabinet is furnished with an emergency off unit; the power cable must have a 10 A rating when the system cabinet is not furnished with an emergency off unit.

The following table shows the allowable diameter range of the power cable:

Table 4-1. Allowable Diameter Range of the Power Cable

Line Voltage	Diameter (unit: mm)
100 Vac / 120 Vac	16.5 to 18.5
220 Vac / 240 Vac	6.5 to 10.0

The small system cabinet (1000 mm height) cannot be furnished with an emergency off unit because of space availability in the system cabinet.

The Power Distribution Unit (PDU) is the primary unit for controlling and distributing ac power. The PDU must be connected to the power source using the power cable. The following describes how to make this connection.

When an Emergency Off Unit is Furnished

The PDU is located at the bottom of the rear panel. The LINE switch, which is on the emergency off unit, is located at the top of the front side. The emergency off unit is connected to the PDU at the factory. You must connect the PDU to the power source at your site by using your power cable.

Power source requirements depend on the electrical option installed in your system. The PDU can accommodate one of four types of power: 100 Vac, 120 Vac, 220 Vac, and 240 Vac. The maximum current for each PDU is shown in Table 4-2.

Table 4-2. Maximum Current for PDU with Emergency Off Unit

Line Voltage	HP Part Number	Total Maximum Current	Maximum Current of Each Outlet
100 Vac	04062-60203	30 A	10 A
120 Vac	04062-60204	24 A	10 A
220 Vac	04062-60205	15 A	6 A
240 Vac	04062-60206	15 A	6 A

Warning



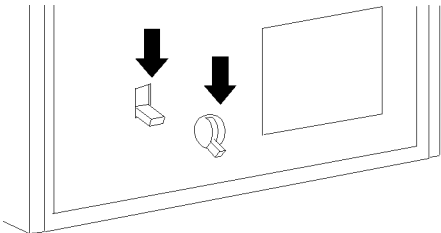
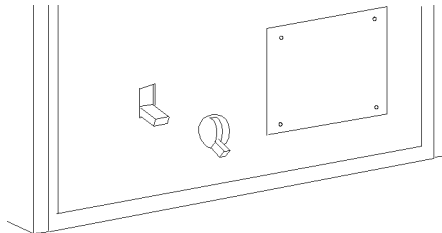
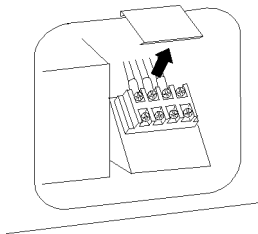
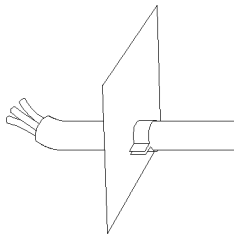
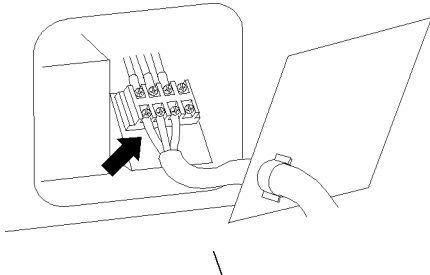
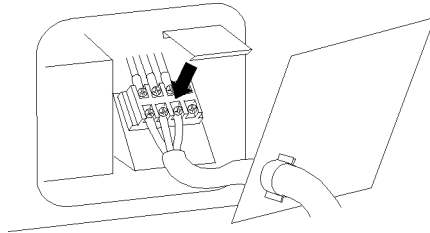
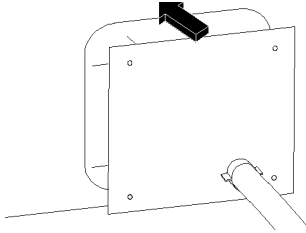
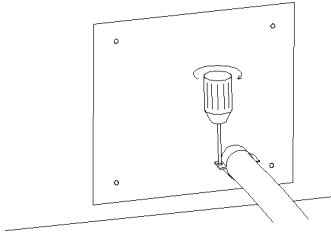
Main power cable installation must be performed by trained service personnel or electrician only. Incorrect installation will result in serious injury to operating personnel and damage to equipment.

Caution



Do *not* connect the main power cable to the outlet at your site until after the inspection of all system instruments to protect the system instruments from damage and service personnel from injury. Refer to “Testing Each Instrument”.

Use the following instructions for installing the main power cable:

	
1. Set the two circuit breaker switches to OFF.	2. Remove the rear opening cover of the PDU by removing the four screws.
	
3. Remove the clear plastic cover of the power cable terminal unit.	4. Pass the power cable through the hole of the rear opening cover.
	
5. Connect the power cable to the terminals of the power cable terminal unit.	6. Reinstall the clear plastic cover on the power cable terminal unit.
	
7. Reinstall the rear opening cover.	8. Fasten the power cable to the cover by turning the cable clamp screw clockwise.

When an Emergency Off Unit is NOT Furnished

The PDU is located at the bottom of the cabinet. The SYSTEM ON/OFF power switch is located at the right-front of the PDU. You must connect the PDU to the power source at your site by using your power cable.

Power source requirements depend on the electrical option installed in your system. The PDU can accommodate one of four types of power: 100 Vac, 120 Vac, 220 Vac, and 240 Vac. The maximum current for each PDU is shown in Table 4-3.

Table 4-3. Maximum Current for PDU

Line Voltage	HP Part Number	Total Maximum Current	Maximum Current of Each Outlet
100 Vac or 120 Vac	04062-60201	20 A	10 A
220 Vac or 240 Vac	04062-60202	10 A	6 A

Warning



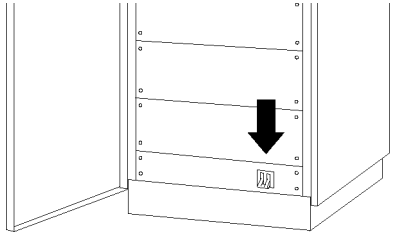
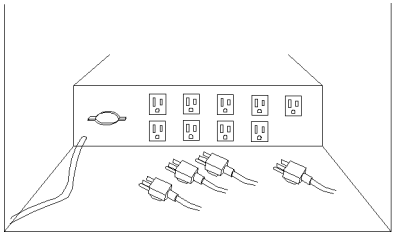
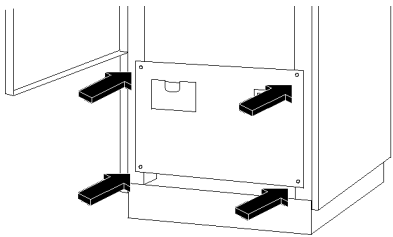
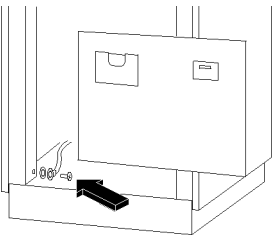
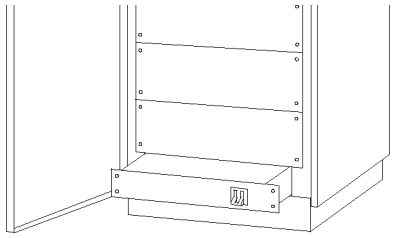
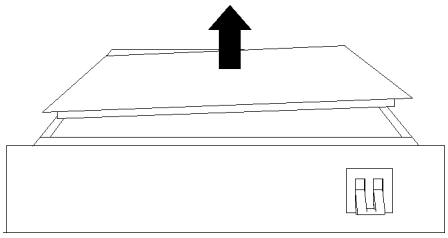
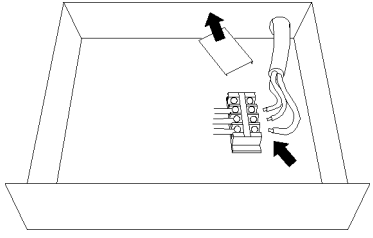
Main power cable installation must be performed by trained service personnel or electrician only. Incorrect installation will result in serious injury to operating personnel and damage to equipment.

Caution



Do *not* connect the main power cable to the outlet at your site until after the inspection of all system instruments. This will protect the system instruments from damage and service personnel from injury. Refer to “Testing Each Instrument”.

Use the following instructions for installing the main power cable:

	
1. Set the main power switch of the PDU to OFF.	2. Open the rear door and disconnect all the power cables of the instruments and hour meter.
	
3. Remove the rear panel by removing the four screws.	4. Remove the chassis ground cable of the PDU from the cabinet frame.
	
5. Remove the PDU from the cabinet.	6. Remove the top cover of the PDU.
	7. Pass the main power cable through the rear opening of the PDU. 8. Remove the clear plastic cover from the power cable terminal unit. 9. Connect the power cables to the terminals of the power cable terminal unit.
10. Reinstall the clear plastic cover on the power cable terminal unit. 11. Fasten the cable clamp securely. 12. Reinstall the top cover of the PDU. 13. Reinstall the PDU in the cabinet.	14. Connect the chassis ground cable of the PDU to the cabinet frame. 15. Reinstall the rear plate. 16. Connect the power cables of the instruments and the hour meter to the PDU. 17. Close the rear door.

Installing Power Cables for Each Instrument

Power cables for each rack mounted instrument are installed before the HP 4062 system is shipped from the factory. Before you turn the HP 4062 on, however, make sure that all power plugs are completely inserted into the outlets of the PDU.

Note

Before you turn the HP 4062 on, make sure that the line voltage selector switch of each instrument is set correctly. Refer to the *Operation Manual* of each instrument for instructions on how to set these switches.

Note

According to the system configuration, you may not be able to supply electric power from the PDU to other instruments, controllers, and peripherals. See the *Pre-installation Manual* on the power requirements.

Note

If the line voltage in your area is between 220 Vac and 240 Vac, connect each instrument, controller, or peripheral to the PDU via the power cable (HP part number 8120-1763) when you want to supply the power from the PDU.

Changing the Line Voltage

When the line voltage of the system is changed, you must replace the PDU, power cables, and line fuse in each instrument with the proper parts, and you must also move the line voltage select switch into the correct setting. The proper PDU for the new line voltage is shown in Table 4-2. Power cable (HP part number 8120-1378), which has NEMA 5-15P plug, can be connected to the PDU (HP part number 04062-60203 or 04062-60204) for 100 Vac or 120 Vac line voltage; power cable (HP part number 8120-1763), which has CEE 22-VI plug, can be connected to the PDU (HP part number 04062-60205 and 04062-60206) for 220 Vac or 240 Vac line voltage. Table 4-4 shows the proper rating and HP part number of the fuse for each instrument.

Table 4-4. Fuse Rating for System Instruments

Instrument	Line Voltage: 100 Vac or 120 Vac	Line Voltage: 220 Vac or 240 Vac
HP 4084B (SWC)	1.5 A, 250 V, Time Delay (HP part number 2110-0304)	750 mA, 250 V, Time Delay (HP part number 2110-0360)
HP 4142B (DCS)	8 A, 250 V, Non-Time delay (HP part number 2110-0342)	4 A, 250 V, Non-Time delay (HP part number 2110-0055)
HP 4280A (CMU)	1.5 A, 250 V, Time Delay (HP part number 2110-0304)	750 mA, 250 V, Time Delay (HP part number 2110-0360)
HP 4284A (CMU84)	3 A, 250 V, Time Delay (HP part number 2110-0381)	2 A, 250 V, Time Delay (HP part number 2110-0303)
HP 8110A (PG)	3 A, 350 V, Time Delay (HP part number 2110-0029)	
PDU	2.5 A, 250 V, Time Delay (HP part number 2110-0015)	



Note

Use UL/CSA type fuse.



Installation of HP 4142B DC Subsystem (DCS)

This section covers hardware installation of the HP 4142B DCS into the system cabinet. For HP 4062UX/F systems equipped with Option 405 (rack mount kit for the HP 4142B DCS), the HP 4142B is not installed in the system cabinet, so you need to perform this installation. Otherwise, skip the next procedure and go to “HP 4142B DCS Settings”.

Installing the Customer's HP 4142B

Use this paragraph to prepare and install the HP 4142B into the HP 4062 system cabinet. Table 4-5 shows the accessories furnished with Option 405. This table does not include the accessories furnished with your HP 4142B.

Table 4-5. Contents of Rack Mount Kit for the HP 4142B

Item	Description	HP Part Number	Quantity
(1)	Flange	04062-01281	2
(2)	Screw M4	0515-1013	6
(3)	Flathead Screw	2680-0119	4
(4)	Insert Washer	3050-0248	4
(5)	Cup Washer	3050-0007	4
(6)	Stopper	09480-06051	2
(7)	Screw M3.5	0515-1232	2
(8)	Interconnection Cable	04085-61684	1

Installation Preparation

To prepare the HP 4142B for installation into the HP 4062 cabinet, refer to the Figure 4-1 and perform the following procedure:

1. Remove the side strips from each side of the HP 4142B.
2. Attach the rack flanges (1) to each side of the HP 4142B using the screws (2) furnished with Option 405.
3. Remove the 4 feet and 2 tilt stands from the bottom panel of the HP 4142B.

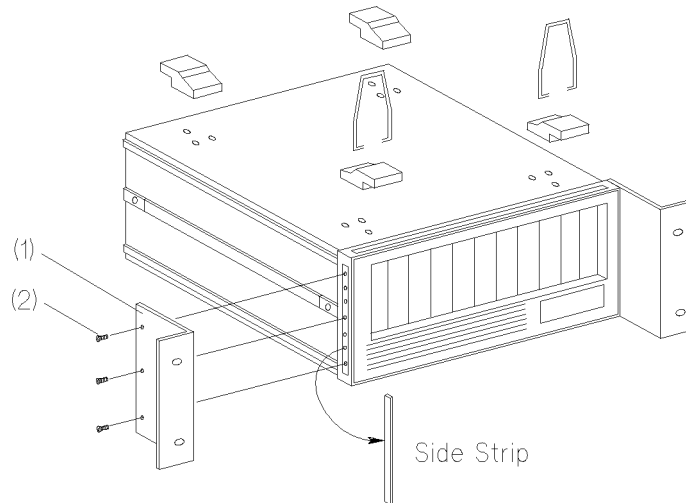


Figure 4-1. Attaching Rack Flanges to the HP 4142B

Installing the HP 4142B

To install the HP 4142B into the HP 4062UX/F system cabinet, refer to Figure 4-2 and perform the following procedure:

1. Slide the HP 4142B into the system cabinet.
2. Secure the rack flanges of the HP 4142B to the cabinet using the furnished washers (4) and (5) and screw (3).
3. Secure the rear panel of the HP 4142B to the cabinet using the furnished stoppers (6) and screws (7).
4. Connect the HP 4142B to the PDU with the power cable.

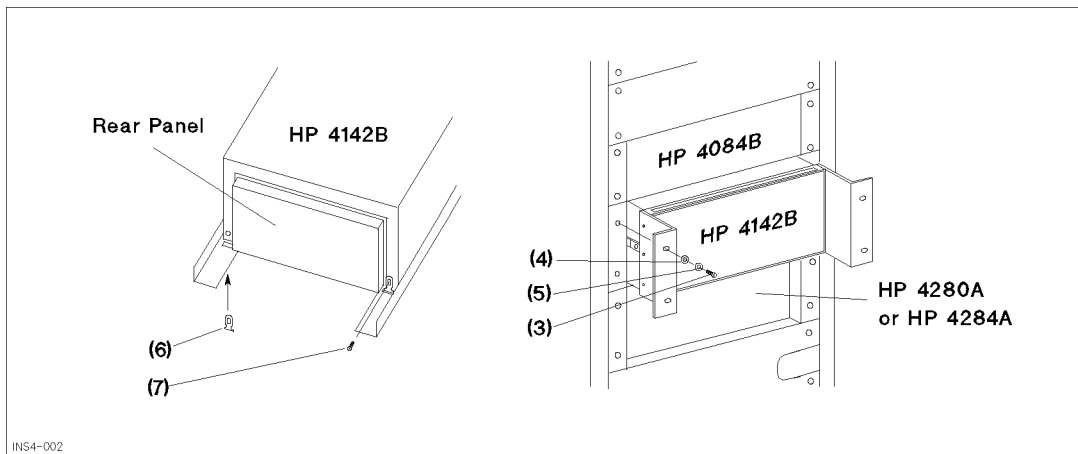


Figure 4-2. Installing the HP 4142B

HP 4142B DCS Settings

When the HP 4142B DCS is installed into the HP 4062 at the factory, the HP 4142B is set as shown in Figure 4-3. Confirm these settings.

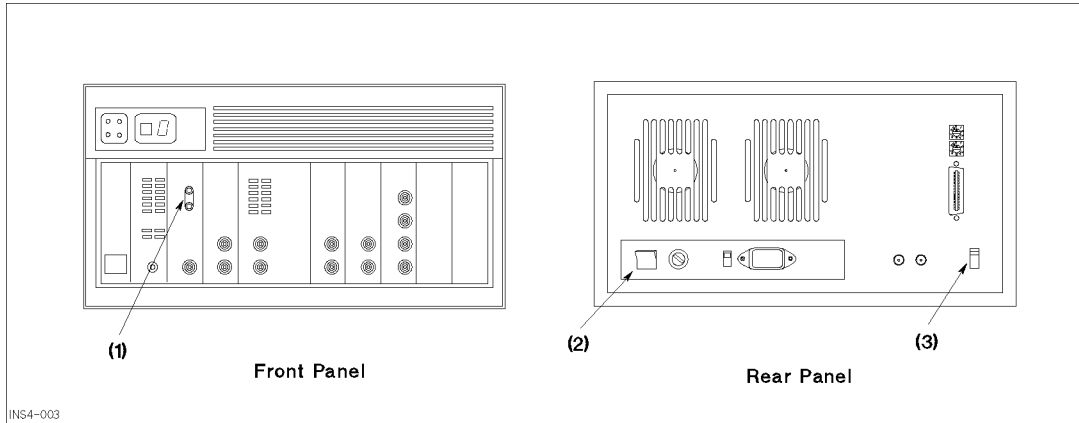


Figure 4-3. HP 4142B Settings

(1) CIRCUIT COMMON (∇) – CHASSIS GROUND ($\perp$) terminals:

For floating measurements, the HP 4142B is equipped with CIRCUIT COMMON (∇) – CHASSIS GROUND ($\perp$) terminals. When operating the HP 4142B in an HP 4062 environment, however, the HP 4142B can perform grounded measurements only. These two terminals, therefore, must be connected with the furnished shorting bar.

If used as a standalone instrument, the CIRCUIT COMMON (∇) – CHASSIS GROUND ($\perp$) terminals of the HP 4142B can be disconnected to perform floating measurements.

Warning



A potential shock hazard exists when CIRCUIT COMMON (∇) is not connected to CHASSIS GROUND ($\perp$) on the HP 4142B (shorting bar disconnected). Regardless of the output voltage, do not touch the COMMON terminal of the SMU, GNDU, VS, or VM connectors during a floating measurement (shorting bar disconnected).

(2) LINE ON/OFF switch:

The LINE ON/OFF switch located at the lower-left side of the HP 4142B rear panel must be set to ON for the HP 4062 system. Power is supplied to the HP 4142B using the POWER ON/OFF switch, located at the front panel of the HP 4142B.

(3) FILTER switch:

The FILTER switch on the rear panel of the HP 4142B sets the measurement integration period to a multiple of the line frequency period to reduce the effects of line frequency noise. Set this switch to the line frequency of the ac power source.

Installation of HP 4280A Capacitance Measurement Subsystem (CMU)

This section covers hardware installation of the HP 4280A CMU into the system cabinet. For HP 4062UX/F systems equipped with Option 515 (rack mount kit for the HP 4280A CMU), the HP 4280A is not installed in the system cabinet, so you need to perform this installation. Otherwise, skip the next procedure and go to “HP 4280A CMU Settings”.

Installing the Customer's HP 4280A

Use this section to prepare and install the HP 4280A into the HP 4062 system cabinet. Table 4-6 shows the accessories furnished with Option 515. This table does not include the accessories furnished with your HP 4280A.

Table 4-6. Contents of Rack Mount Kit for the HP 4280A

Item	Description	Model / HP Part Number	Quantity
(1)	Flange	04062-01283	2
(2)	Screw M4	0515-1013	8
(3)	Flathead Screw	2680-0119	4
(4)	Insert Washer	3050-0248	4
(5)	Cup Washer	3050-0007	4
(6)	Tie Mount	1400-1531	2
(7)	Cable Tie	1400-1448	2
(8)	1 m HP-IB Cable	HP 10833A	1
(9)	Test Lead Assembly	04062-61601	1
(10)	4 m Cable Assembly (CMH)	04085-61661	1
(11)	4 m Cable Assembly (CML)	04085-61662	1
(12)	Triaxial-Triaxial Connector	1250-1838	2

Installation Preparation

To prepare the HP 4280A for installation into the HP 4062 cabinet, refer to Figure 4-4 and perform the following procedure:

1. Remove the side strips from each side of the HP 4280A.
2. Attach the rack flanges (1) to each side of the HP 4280A using the screws (2) furnished with Option 515.
3. Remove the 4 feet and 2 tilt stands from the bottom panel of the HP 4280A.

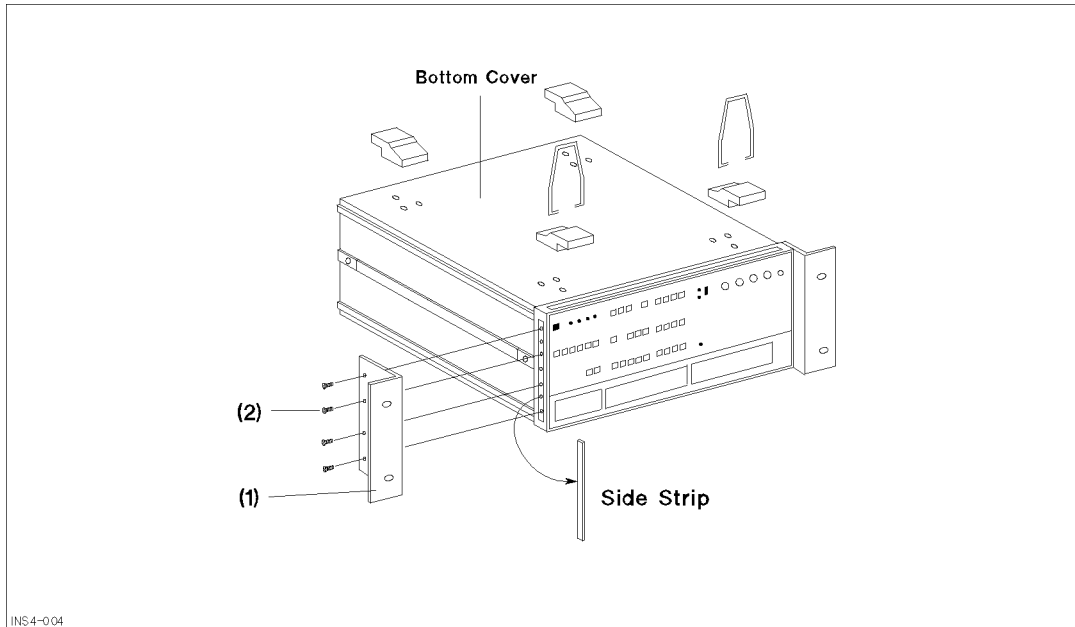


Figure 4-4. Attaching Rack Flanges to the HP 4280A

Installing the HP 4280A

To install the HP 4280A into the HP 4062 system cabinet, refer to Figure 4-5 and perform the following procedure:

1. Slide the HP 4280A into the system cabinet.
2. Secure the left rack flange of the HP 4280A to the system cabinet using the furnished washers (4) and (5) and screw (3).
3. Secure the right rack flange of the HP 4280A to the system cabinet using the furnished tie mounts (6) and screw (3), and install the cable ties through the tie mounts.
4. Connect the HP 4280A to the PDU with the power cable.

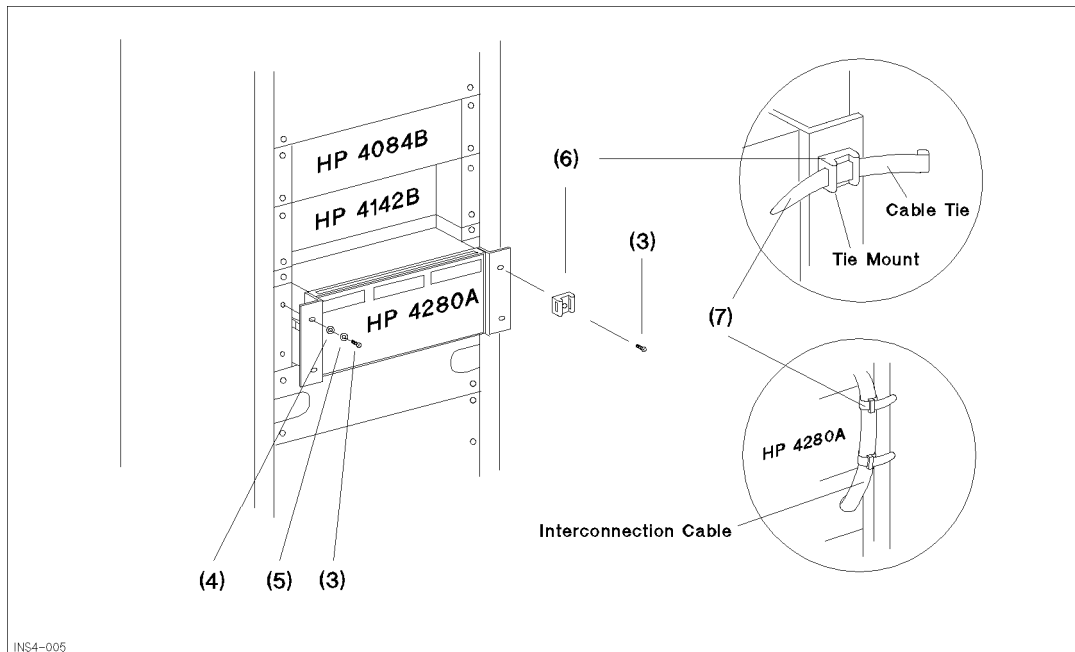


Figure 4-5. Installing the HP 4280A

HP 4280A CMU Settings

When the HP 4280A CMU is installed into the HP 4062 at the factory, the HP 4280A is set as shown in Figure 4-6. Confirm these settings.

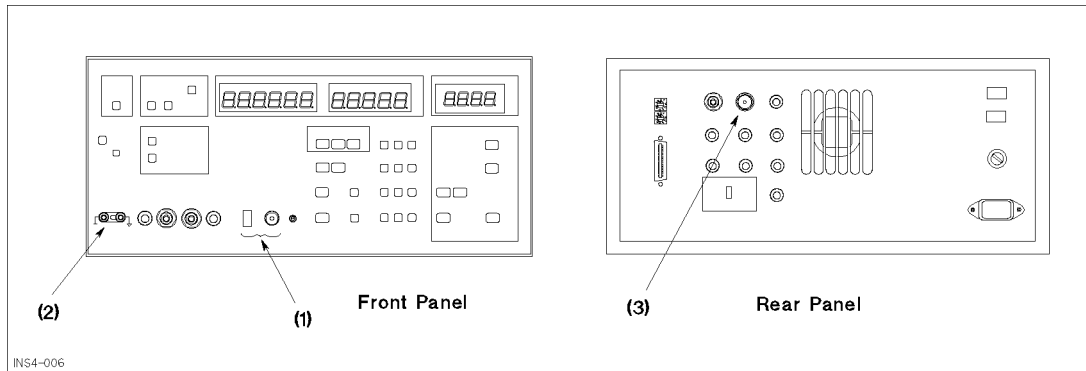


Figure 4-6. HP 4280A Settings on the Front and Rear Panels

(1) INT BIAS switch:

The INT BIAS limit switch must be set to ± 100 V MAX and the REMOTE ON/OFF connector must be terminated with the furnished shorting cap.

Warning



To use the HP 4280A as a standalone instrument, remove the shorting cap from the REMOTE ON/OFF connector. Refer to section 3 of the HP 4280A *Operation Manual*.

(2) CIRCUIT COMMON (∇) – CHASSIS GROUND($\perp$) Terminals:

These two terminals must be connected using the furnished shorting bar.

Warning



The ground-reference potential on the exposed outer shields of the UNKNOWN TERMINALS and on the CIRCUIT COMMON (∇) terminal can become dangerously high when the CHASSIS GROUND ($\perp$) and CIRCUIT COMMON (∇) terminals on the HP 4280A are not connected.

(3) SLOW terminal of EXT BIAS:

The SLOW terminal of EXT BIAS on the HP 4280A rear panel must be terminated with the furnished BNC shorting cap.

Installation of HP 4284A Capacitance Measurement Subsystem (CMU84)

This section covers hardware installation of the HP 4284A CMU84 into the system cabinet. For HP 4062UX/F systems equipped with Option 535 (rack mount kit for the HP 4284A CMU84), the HP 4284A is not installed in the system cabinet, so you need to perform this installation. Otherwise, skip the next procedure and go to “HP 4284A CMU84 Settings”.

Installing the Customer's HP 4284A

Use this paragraph to prepare and install the HP 4284A into the HP 4062 system cabinet. Table 4-7 shows the accessories furnished with Option 535. This table does not include the accessories furnished with your HP 4284A.

Table 4-7. Contents of Rack Mount Kit for the HP 4284A

Item	Description	Model / HP Part Number	Quantity
(1)	Flange	04062-01283	2
(2)	Screw M4	0515-1013	8
(3)	Flathead Screw	2680-0119	4
(4)	Insert Washer	3050-0248	4
(5)	Cup Washer	3050-0007	4
(6)	Tie Mount	1400-1531	2
(7)	Cable Tie	1400-1448	2
(8)	4 m HP-IB Cable	HP 10833C	1
(9)	Test Leads	HP 16048E / 16048-60002	1
(10)	BNC-T Adapter	1250-0781	2
(11)	BNC f-to-f Adapter	1250-0080	2
(12)	BNC Cable (30 cm)	8120-1838	2

Installation Preparation

To prepare the HP 4284A for installation in the HP 4062 cabinet, refer to Figure 4-7 and perform the following procedure:

1. Remove the side strips from each side of the HP 4284A.
2. Attach the rack flanges (1) to each side of the HP 4284A using the screws (2) furnished with Option 535.
3. Remove the 4 feet and 2 tilt stands from the bottom panel of the HP 4284A.

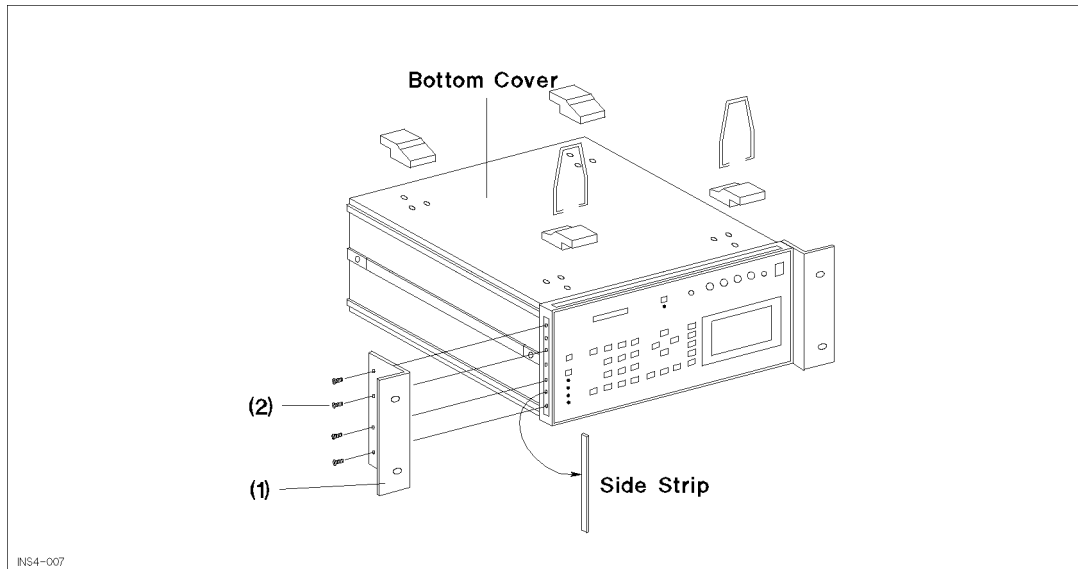


Figure 4-7. Attaching Rack Flanges for HP 4284A

Installing the HP 4284A

To install the HP 4284A into the HP 4062 system cabinet, refer to Figure 4-8 and perform the following procedure:

1. Slide the HP 4284A into the system cabinet.
2. Secure the left rack flange of the HP 4284A to the system cabinet using the furnished washers (4) and (5) and screw (3).
3. Secure the right rack flange of the HP 4284A to the system cabinet using the furnished tie mounts (6) and screw (3), and install the cable ties through the tie mounts.
4. Connect the HP 4284A to the PDU with the power cable.

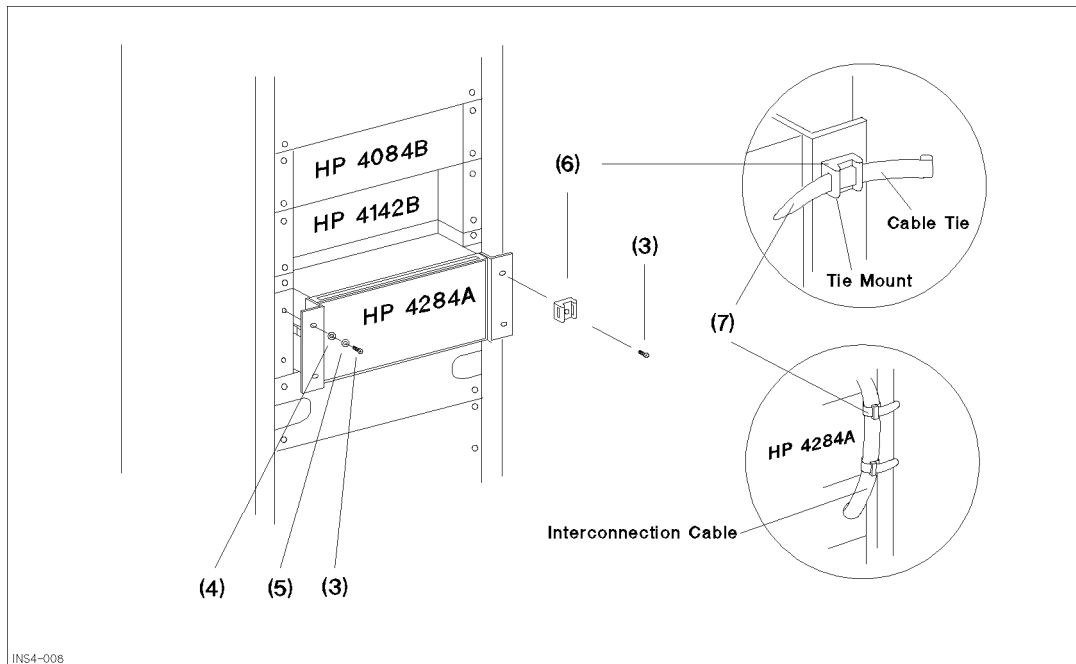


Figure 4-8. Installing the HP 4284A

HP 4284A CMU84 Settings

When the HP 4284A CMU84 is installed in the HP 4062 at the factory, the HP 4284A comes with Option 001 (power amplifier) and Option 006 (2 m and 4 m cable length operation) and the label “OPTION 001” and “OPTION 006” is attached to the rear panel. If the HP 4284A is not equipped with Option 001 and 006, contact the nearest HP Sales Office.

Installation of HP 8110A Pulse Source Subsystem (PSS) (HP 4062F Only)

This section covers hardware installation of the HP 8110A pulse generator(s) into the system cabinet. For HP 4062F systems ordered with Option 555 (rack mount kit for the HP 8110A PG), the HP 8110A is not installed in the system cabinet, so you need to perform this installation. If you do not need to perform this installation, skip the next procedure.

Installing the Customer's HP 8110A

To use HP 8110A as a pulse source subsystem of the HP 4062F system, the requirements listed in Table 4-8 must be met. This table also describes how to check if the requirements are met.

Table 4-8. Requirements of HP 8110A for the HP 4062F

Requirements	How to Check
HP 8110A Option UN2 "Rear Panel Connectors" must be used. This moves the input and output connectors from front panel to rear panel.	See the rear panel of the HP 8110A. The HP 8110A has the BNC female connectors on the rear panel.
One or two HP 81103A "10 V/2 ns Output Channel" must be installed in the HP 8110A.	Turn your HP 8110A on, press Help , then select SERIAL # . Installed HP 81103A(s) are listed.
An HP 81106A "PLL/External Clock" must be installed in the HP 8110A.	Turn your HP 8110A on, press Help , then select SERIAL # . Installed HP 81106A is listed.
Firmware revision of the HP 8110A must be <i>01.05.00</i> .	Turn your HP 8110A on, press Help , then select SERIAL # . The firmware revision number is shown.

Table 4-9 shows the accessories furnished with Option 555. This table does not include the accessories furnished with your HP 8110A.

Table 4-9. Contents of Rack Mount Kit for the HP 8110A

Item	Description	Model/HP Part No.	Quantity ¹
(1)	Flange kit ²	5062-3974	1 to 5
(2)	Flathead screw	2680-0119	4, 8, 12, 16, or 20
(3)	Insert washer	3050-0248	4, 8, 12, 16, or 20
(4)	Cup washer	3050-0007	4, 8, 12, 16, or 20
(5)	Power cable	8120-1378 or 8120-1763 ³	1 to 5
(6)	BNC T-adapter (m-f-f)	1250-2486	1
(7)	Probe tip-to-BNC Adapter	10218A	1
(8)	Resistive probe (10:1)	10020-67703	1
(9)	BNC(f)-to-SMA(m) cable assembly	04062-61606	1
(10)	50 Ω SMA terminator	1250-2151	1
(11)	Pulse Adder/Splitter	15104A	0, 1, 3, or 5 ⁴
(12)	BNC(f)-to-BNC(m) cable assembly, 200 mm, yellow	04062-61603	0 or 1 ⁴
(13)	BNC(f)-to-BNC(m) cable assembly, 1150 mm, yellow	04062-61604	0, 2, or 3 ⁴
(14)	BNC(f)-to-BNC(m) cable assembly, 1450 mm, blue	04062-61605	0 or 1 ⁴
(15)	BNC(f)-to-BNC(m) cable assembly, 200 mm, blue	04062-61607	0 or 1 ⁴
(16)	BNC(f)-to-BNC(m) cable assembly, 1150 mm, blue	04062-61608	0, 2, 3, or 4 ⁴
(17)	BNC(f)-to-BNC(m) cable assembly, 1450 mm, yellow	04062-61609	0 or 1 ⁴

1 Quantity depends on total number of option 555 specified.

2 A flange kit contains two flanges and four flathead screws.

3 The 8120-1378 is for 100/120 Vac line voltage and the 8120-1763 is for 220/240 Vac line voltage.

4 Quantity depends on total number of HP 8110As to install in HP 4062F.

Installation Preparation

To prepare the HP 8110A for installation in the HP 4062F cabinet, refer to Figure 4-9 and perform the following procedure:

1. Remove the side strips from each side of the HP 8110A.
2. Attach the rack flanges to each side of the HP 8110A using the screws. The flanges and screws are contained in the flange kit (1).
3. Remove the 4 feet and 2 tilt stands from the bottom panel of the HP 8110A.

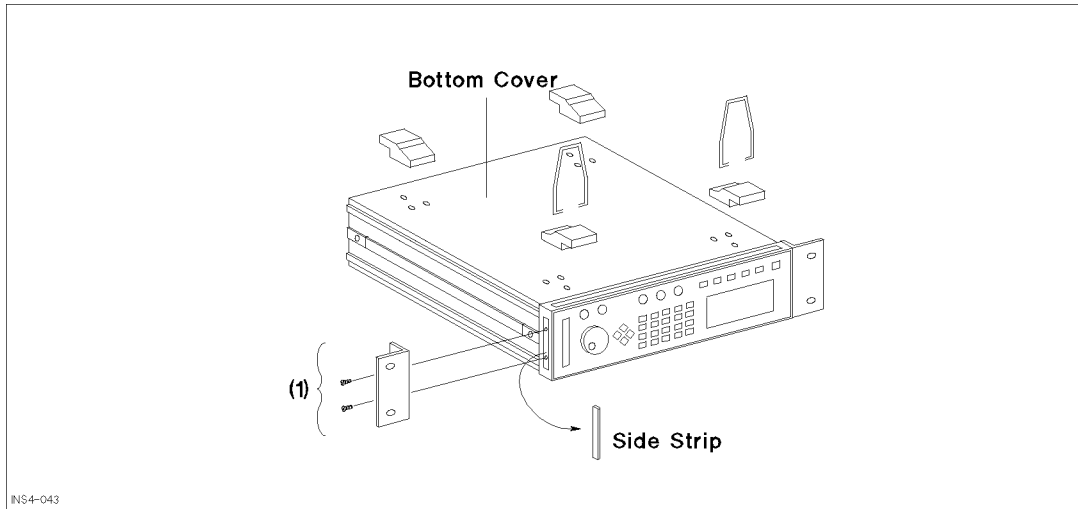


Figure 4-9. Attaching Rack Flanges to HP 8110A

Installing the HP 8110A

To install the HP 8110A into the HP 4062F system cabinet, refer to Figure 4-10 and perform the following procedure:

1. Slide the HP 8110A into the system cabinet, and fit to the inside panel.
2. Secure the rack flanges of the HP 8110A to the system cabinet using the furnished washers (3) and (4) and screws (2).

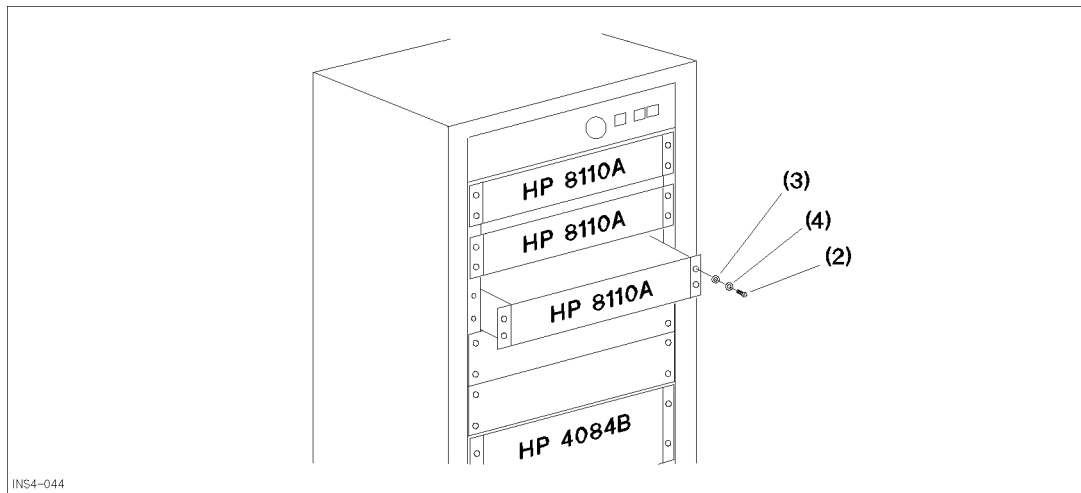


Figure 4-10. Installing the HP 8110A

3. Connect the HP 8110A to the PDU with the power cable (5).

4. Connect the trigger cables between the installed HP 8110As. Figure 4-11 shows the trigger cable connections.

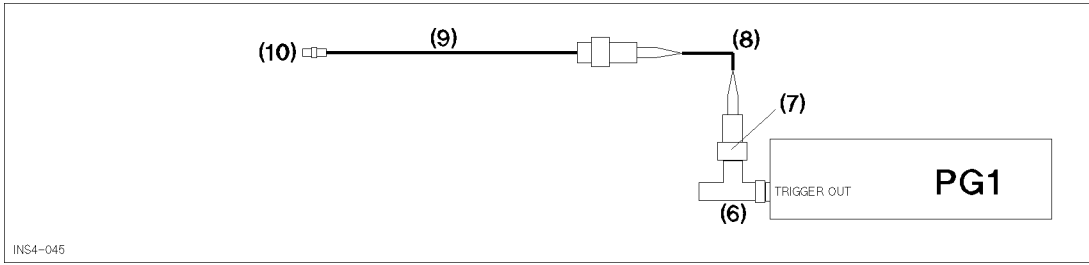
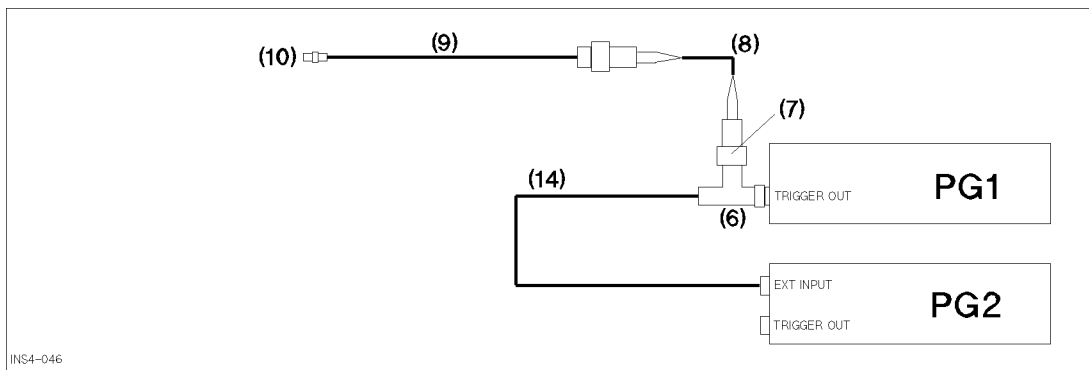
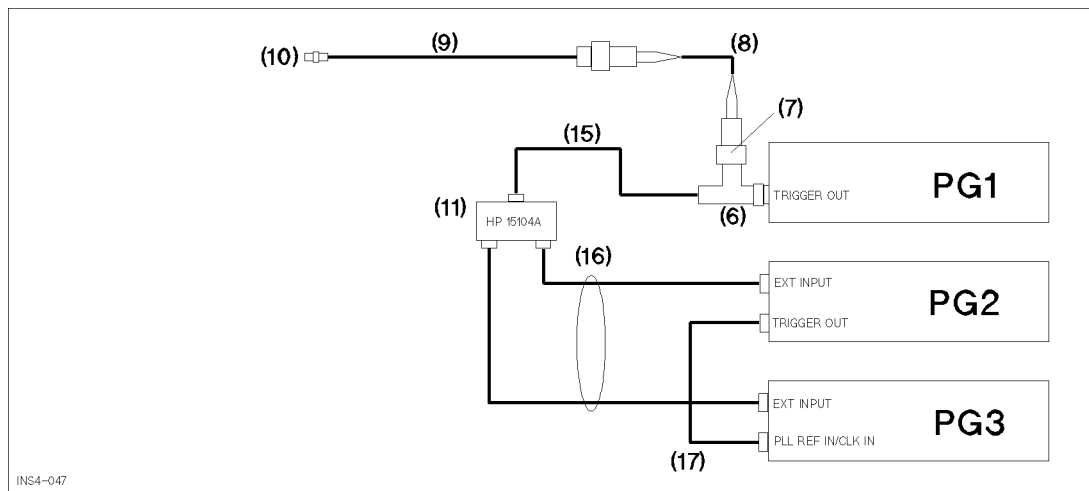


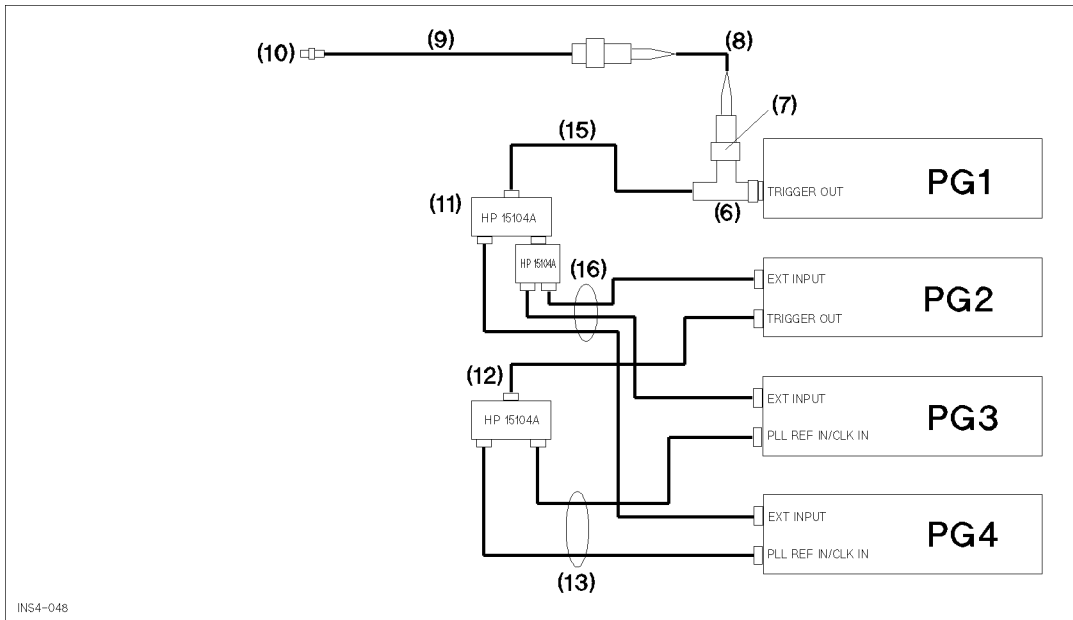
Figure 4-11. Trigger Cable Connections of One HP 8110A



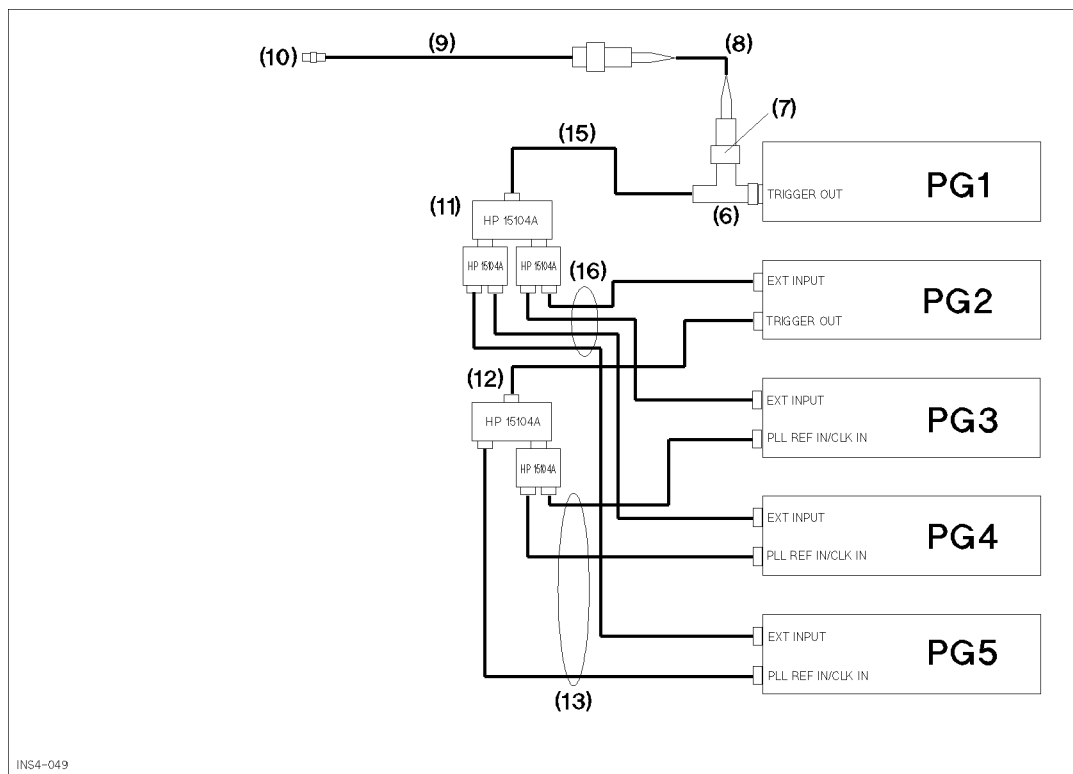
Trigger Cable Connections of Two HP 8110As (Continued)



Trigger Cable Connections of Three HP 8110As (Continued)



Trigger Cable Connections of Four HP 8110As (Continued)



Trigger Cable Connections of Five HP 8110As (Continued)

If the BNC-to-SMA cable assembly (9) is not installed in the system cabinet, use the following procedure to install:

- Attach a BNC T-adapter (6) to the TRIGGER OUT terminal on the rear panel of the top HP 8110A (PG1).
- Attach a probe tip-to-BNC adapter (7) to the BNC T-adapter (6).
- Connect a resistive probe (8) to the probe tip-to-BNC adapter.
- Connect a BNC-to-SMA cable assembly (9) to the resistive probe.
- Connect a 50 Ω SMA terminator (10) to the BNC-to-SMA cable assembly.
- Fix the resistive probe to the support rail with a cable tie (see Figure 4-12).
- Fix the BNC-to-SMA cable assembly to the cabinet frame with three cable ties (see Figure 4-12).
- Pass the BNC-to-SMA cable assembly through the right opening of the front panel of cabinet.
- Wind the cable assembly around the two knobs (see Figure 4-12).
- Fix the wound cable with a cable tie at the center of two knobs.

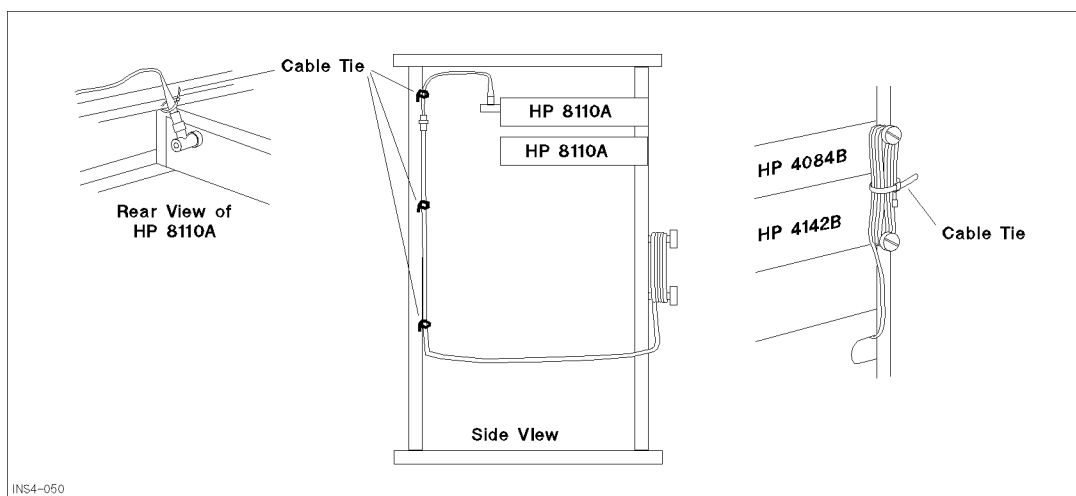


Figure 4-12. Installing the BNC-to-SMA cable assembly

If the pulse adder/splitters (11) are not fixed to the support rail of the HP 8110A, fix with cable ties as shown in Figure 4-13.

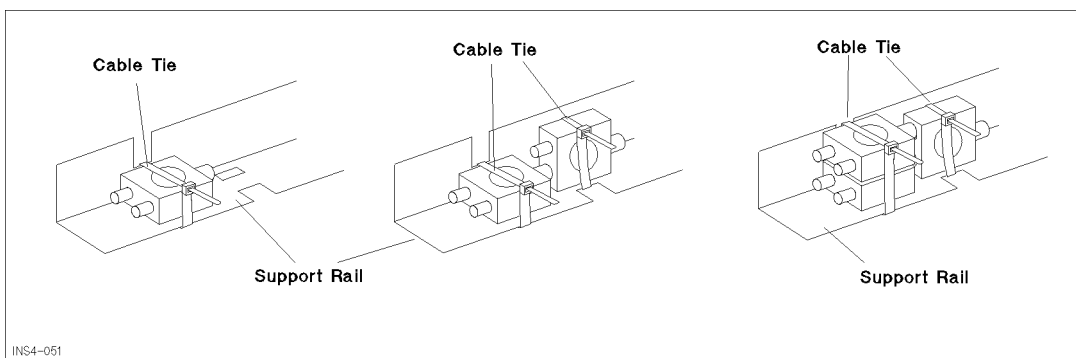


Figure 4-13. Pulse Adder/Splitters Fixed on the Support Rail

HP-IB Cables and Addresses

HP-IB Addresses and Connections of the Rack Mounted Instruments

The HP-IB addresses of rack mounted instruments—the HP 4084B SWC, HP 4142B DCS, HP 4280A CMU or HP 4284A CMU84, and HP 8110A PG(s)—are set when installed in the HP 4062UX/F system cabinet at the factory. Make sure the HP-IB address of each instrument is set correctly, as shown in Table 4-10. Refer to the *Operation Manual* of each instrument to check the HP-IB address settings.

Table 4-10. HP-IB Address Settings

Instrument	HP-IB Address	How to Check
HP 4084B SWC ¹	22	Mini-rotary switches on the rear panel
HP 4084B SWC ²	19	Mini-rotary switches on the rear panel
HP 4142B DCS	23	Mini-rotary switches on the rear panel
HP 4280A CMU ²	24	Mini-rotary switches on the rear panel
HP 4284A CMU84 ²	17	Press CATALOG/SYSTEM key and select SYSTEM CONFIG softkey. The HP-IB address setting is shown in the screen.
HP 8110A PG	25 to 29 ³	Press MORE key, then select CONFIG softkey. HP-IB address setting is shown on the screen. You can use the rotary knob to change the address setting.

1 For 96-pin SWM system, two SWCs are provided, the lowermost SWC in the system cabinet is SWC1, and the uppermost SWC is SWC2.

2 An HP 4280A and an HP 4284A cannot both be installed in the HP 4062F system at the same time.

3 Depends on number of installed HP 8110As. If one HP 8110A is installed, it has HP-IB address 25. If two HP 8110As are installed, they have HP-IB addresses 25 and 26, and so on.

Table 4-11 shows how to connect the system instruments to the HP-IB interface cards in the system controller.

Table 4-11. Connections between the Controller and the System Instruments

Interface	Description
HP 25560A	For communicating with computer peripherals
745i/747i internal HP-IB or HP E2071 (725 or 745/132L)	For controlling the system instruments: HP 4084B, HP 4142B, HP 4280A, HP 4284A, and HP 8110As
HP E2071	For controlling the HP-IB controlled wafer probers on the HP 4062UX/F system or controlling other instruments

The rack mounted instruments of the system are connected by 1 m HP-IB cables when installed at the factory. You must connect the system instruments to the controller using the HP-IB cables.

You must configure the HP-IB connections as shown in Figure 4-14. To complete the interface connections, connect the HP 4280A or HP 4284A to the following interface card using the furnished HP 10833C 4 m HP-IB cable.

- Model 745/132L computer
 - HP E2071 high speed HP-IB interface
- Model 745i/747i computer
 - 745i/745i internal HP-IB interface card
- Model 725 computer
 - HP E2071 HP-IB interface card

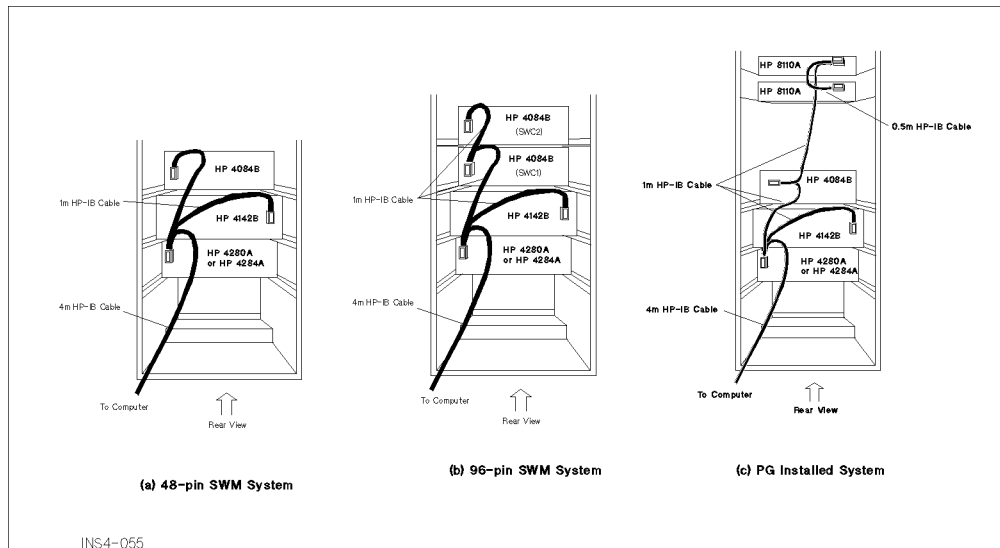


Figure 4-14. Connections of the HP-IB Cables

If the system controller is installed in the standard system cabinet (Option 705 or 706), the controller is connected to the HP-IB of the system instruments using the 1 m HP-IB cable furnished with the controller rack mount kit. See Figure 4-15.

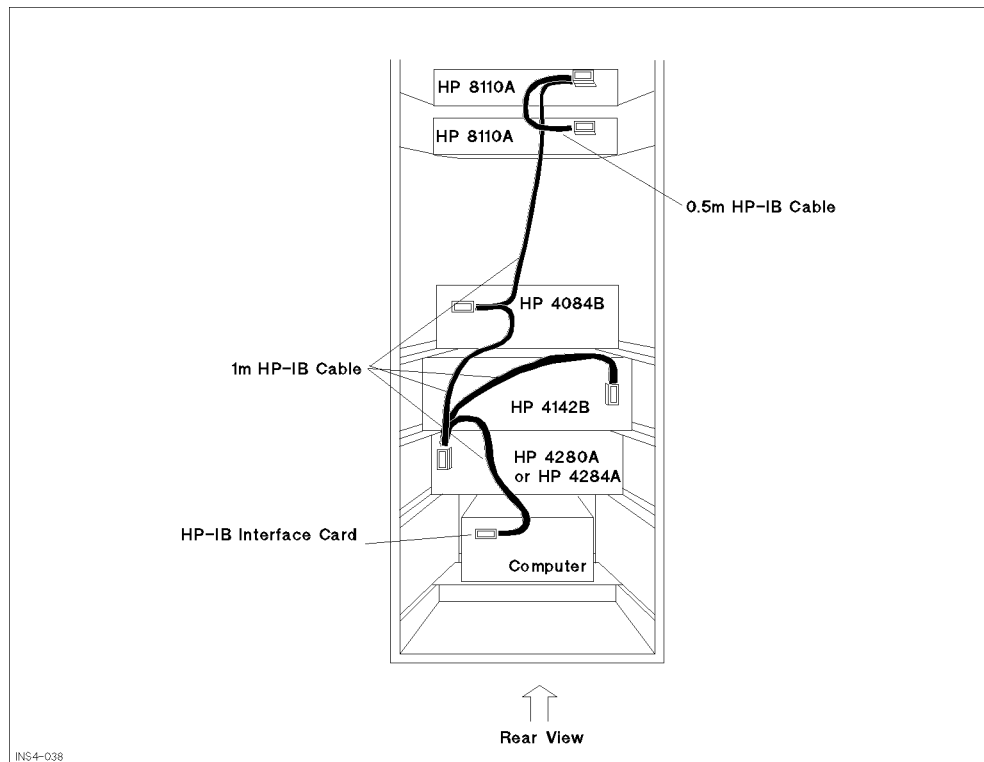


Figure 4-15. Connections of the HP-IB Cables with Controller

HP-IB Address and Connection of the Wafer Prober

The user is responsible for determining the HP-IB address of the wafer prober, if a wafer prober is installed in the HP 4062 system. Hewlett-Packard, however, recommends setting the HP-IB address of the wafer prober to the default address included in the SYSCONFIG file (refer to the “Customizing Wafer Prober” in Chapter 5). See the documentation of the wafer prober for information about HP-IB remote controlling.

If the wafer prober is not listed in the SYSCONFIG file, the wafer prober is not supported.

After setting the HP-IB address of the wafer prober, connect the wafer prober to the HP-IB interface card of the controller using the HP-IB cable.

Use 25 for logical unit number. Logical unit number are set in the SYSCONFIG file. The default setting of the logical unit number in the SYSCONFIG file is 25. For details about wafer prober setting, see “Customizing Wafer Prober” in Chapter 5.

Installing Signal Cables

When Your System is HP 4062UX

This section provides procedures to install the cables and cable assemblies to the system instruments—the SWM, SWC(s), DCS, and CMU or CMU84. Note that all the signal cables must be connected from the SWM to the instruments through the cable entry opening of the rear panel of the system cabinet.

Figure 4-16 shows the cable connections between the SWC and the SWM. Use the following procedure to install the cables:

1. Connect the control cable (HP part number 04085-61671) to the TO SWITCHING MATRIX terminal on the rear panel of SWC (SWC1 for 96-pin SWM systems). For 96-pin SWM systems, connect another control cable to the TO SWITCHING MATRIX terminal on the rear panel of SWC2. Note that the HP-IB address of SWC or SWC1 is set to 22 and the HP-IB address of SWC2 is set to 19.
2. Connect the other control cable terminal to the TO SWITCHING MATRIX CONTROLLER terminal of the HP 4085B SWM.

For 96-pin SWM systems, connect the other control cable terminal from SWC1 to the TO SWITCHING MATRIX CONTROLLER 1 terminal of the HP 4089B SWM, and connect the other control cable terminal from SWC2 to the TO SWITCHING MATRIX CONTROLLER 2 terminal of the HP 4089B SWM.

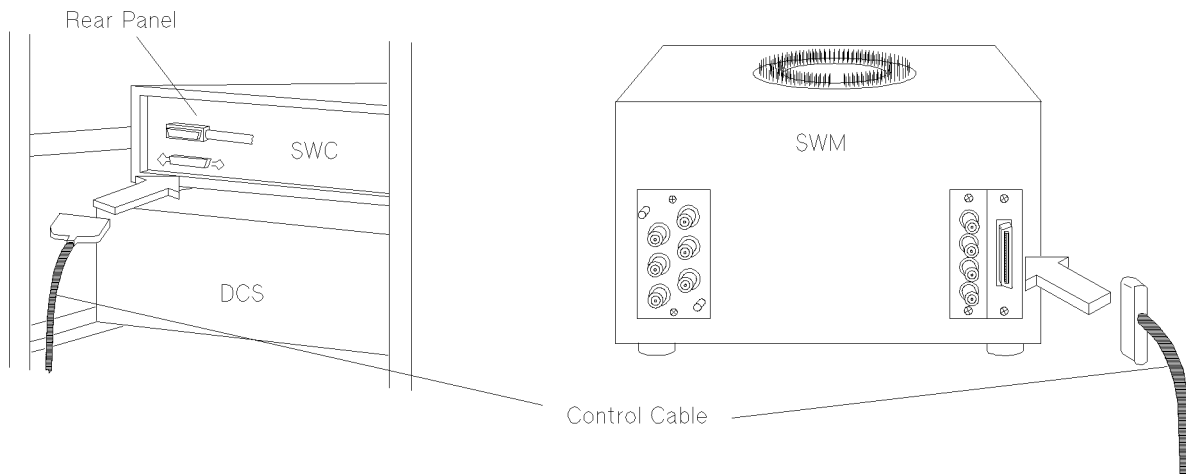


Figure 4-16. Connecting the SWC to the SWM

Figure 4-17 shows the cable connections between the DCS and SWM. Use the following procedure to install the cables:

1. Thread the interconnection cable (HP part number 04085-61684) through the right-hand cable entry opening (below the CMU or CMU84) on the front panel of the cabinet.
2. Connect the SMU Port 1 through SMU Port 4 cables to the SMUs (HP 41420As and HP 41421Bs) of DCS.
3. Connect the INTLK cable to the INTLK terminal of DCS.
4. Connect the GNDU cable to the GNDU terminal of DCS.
5. Connect the AUX1 through AUX4 cables to the VS and VM terminals of DCS.
6. Connect the interconnection cable terminal box to the TO MODULAR DC SOURCE/MONITOR terminal of SWM.
7. Connect any two AUX cables from the VS or VM terminals of DCS to SWM AUX PORT 1 and 2 in any desired combination.

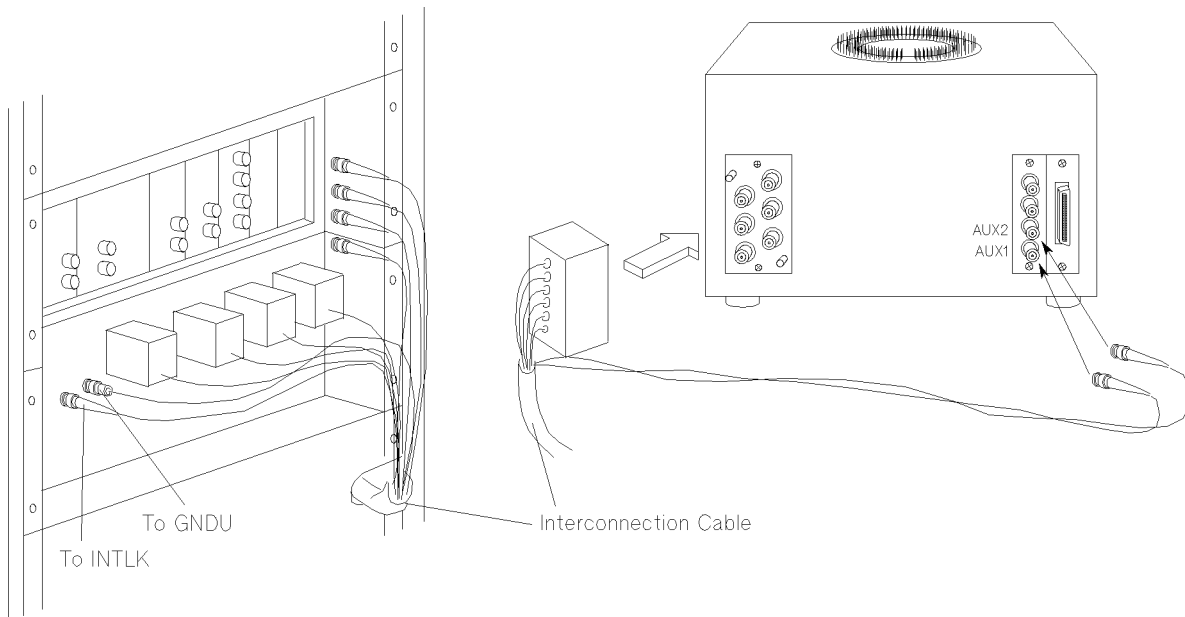


Figure 4-17. Connecting the DCS to the SWM

Figure 4-18 shows the cable connections between the CMU and SWM. Use the following procedure to install the cables:

1. Connect the cable assembly (HP part number 04062-61601) to the UNKNOWN terminals of the CMU.
2. Connect a triaxial-triaxial adapter (HP part number 1250-1838) to the cable assembly CMH connector and one to the CML connector.
3. Thread the CMH cable (HP part number 04085-61661) and CML cable (HP part number 04085-61662) through the left-hand cable entry opening (below the CMU) on the front panel of the cabinet.
4. Connect the CMH cable to the triaxial-triaxial adapter connected to the cable assembly CMH connector.
5. Connect the CML cable to the triaxial-triaxial adapter connected to the cable assembly CML connector.
6. Connect the CMH and CML cables to the AUX PORT 3 and 4 connectors, respectively, of SWM.

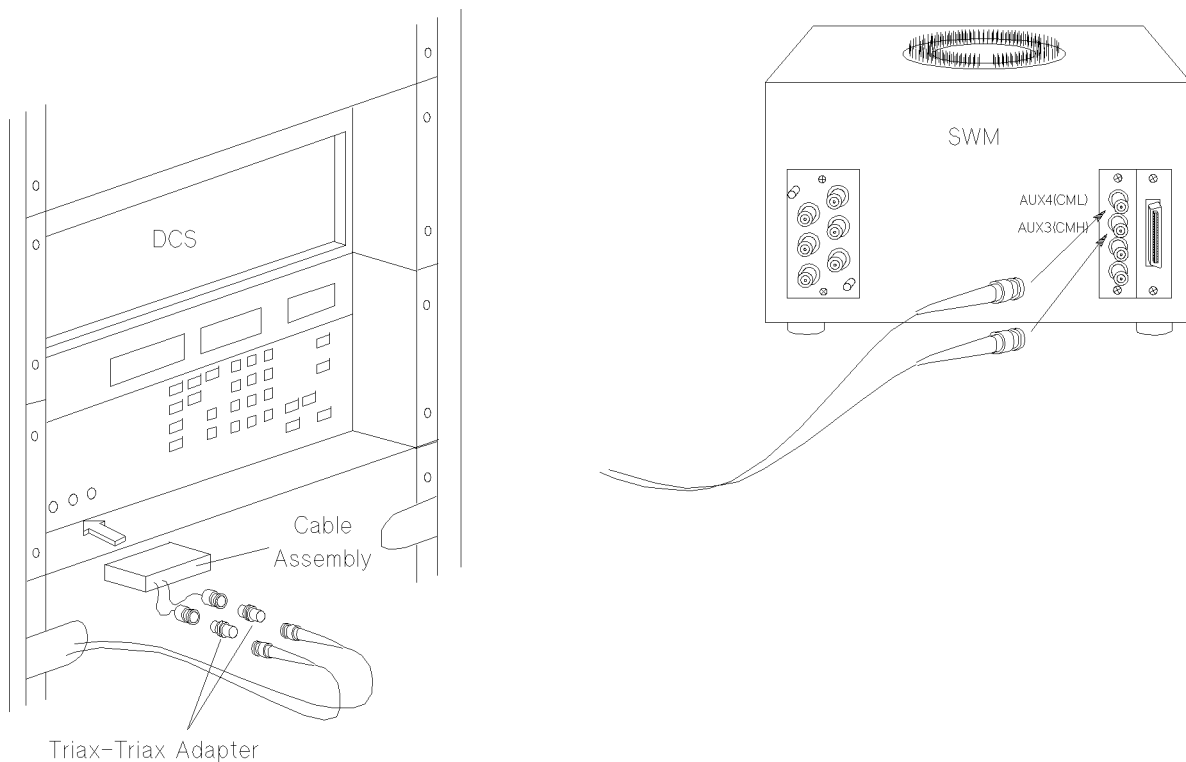


Figure 4-18. Connecting the CMU to the SWM

Figure 4-19 shows the cable connections between the CMU84 and SWM. Use the following procedures to install the cables:

1. Thread the HP 16048E Test Leads through the left-hand cable entry opening (below the CMU84) on the front panel of the cabinet.
2. Connect the test leads to the UNKNOWN terminals on the front panel of the CMU84.
3. Insert the banana terminal of the test leads into the ground terminal ($\perp$) left side of the UNKNOWN terminal.
4. Connect the red and orange leads from the test leads using a BNC-T adapter (HP part number 1250-0781). Connect the BNC-T adapter to the AUX3 (CMH) terminal of the SWM using a BNC f-to-f adapter (HP part number 1250-0080) and 23 cm BNC cable (HP part number 8120-1838).
5. Interconnect the gray and black leads from the test leads using a BNC-T adapter. Connect the BNC-T adapter to the AUX4 (CML) terminal of the SWM using a BNC f-to-f adapter and 23 cm BNC cable.

Note

The blue lead of the test lead connected to the ground terminal is *not* necessary for any terminal. Do not connect the terminal of the blue lead to any terminal.

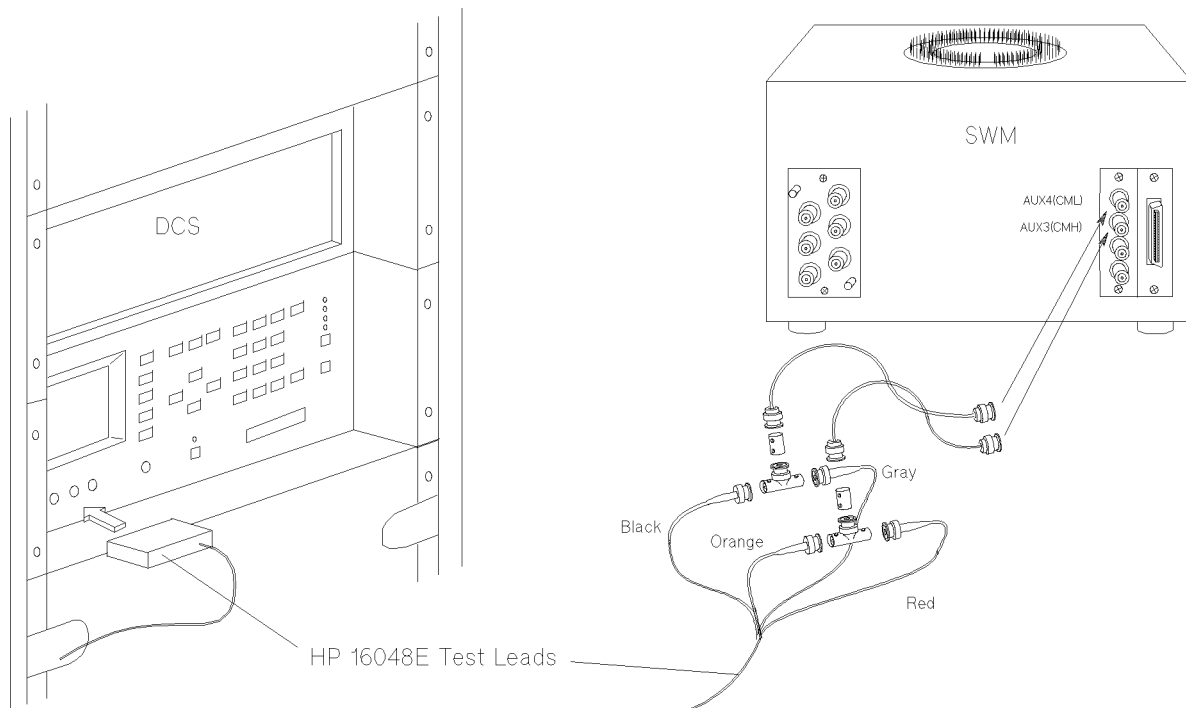


Figure 4-19. Connecting the CMU84 to the SWM

If the SWM has a port expander, the signal cables are connected to the AUX ports on the port expander as shown in Figure 4-20. When the port expander is shipped from the factory, ten BNC shorting caps (HP part number 1250-0929) are put on the coaxial connectors, which are named AUX11, 12, 13, 21, 22, 23, 31, 32, 41, and 42. After installing the signal cables, which are connected to the VSs, VMs, CMU, or CMU84, keep the unused BNC shorting caps in a safe place. The BNC shorting caps are used to check relay operations in the port expander.

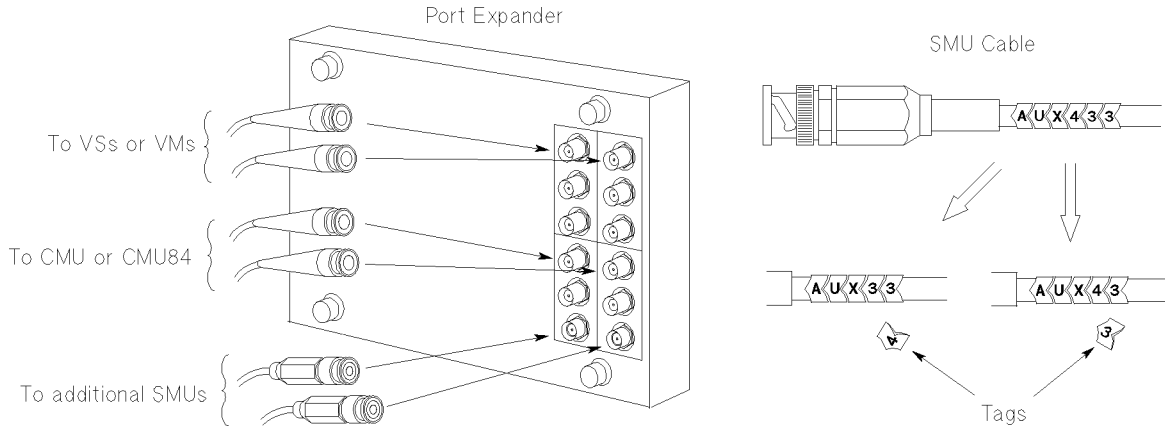


Figure 4-20. Connecting Signal Cables to the Port Expander

When you connect additional SMU cables (Option 341) to the AUX33 or AUX43 ports, an unnecessary tag must be removed from the SMU cable. For example, if an SMU cable is connected to the AUX33 port, you must remove the tag labeled “4” from the cable.

The SMU cable must be connected to the FORCE terminal of the SMU. A triax cover (HP part number 1250-1708) must be put on the SENSE terminal of the SMU.

Although the cables from the system cabinet are about 4 m long, position the SWM less than 2 m from the system cabinet. Also, if the SWM is installed on a wafer prober, make sure there is enough slack in the cables so that the SWM can be easily raised and lowered.

Caution

Do not use cables or cable assemblies other than those supplied with the system. Use of other cables may damage the instruments or may make it impossible to obtain specified measurement accuracy.

After installing all the signal cables, fasten the interconnection cables connected to DCS together using cable ties shown in Figure 4-21.

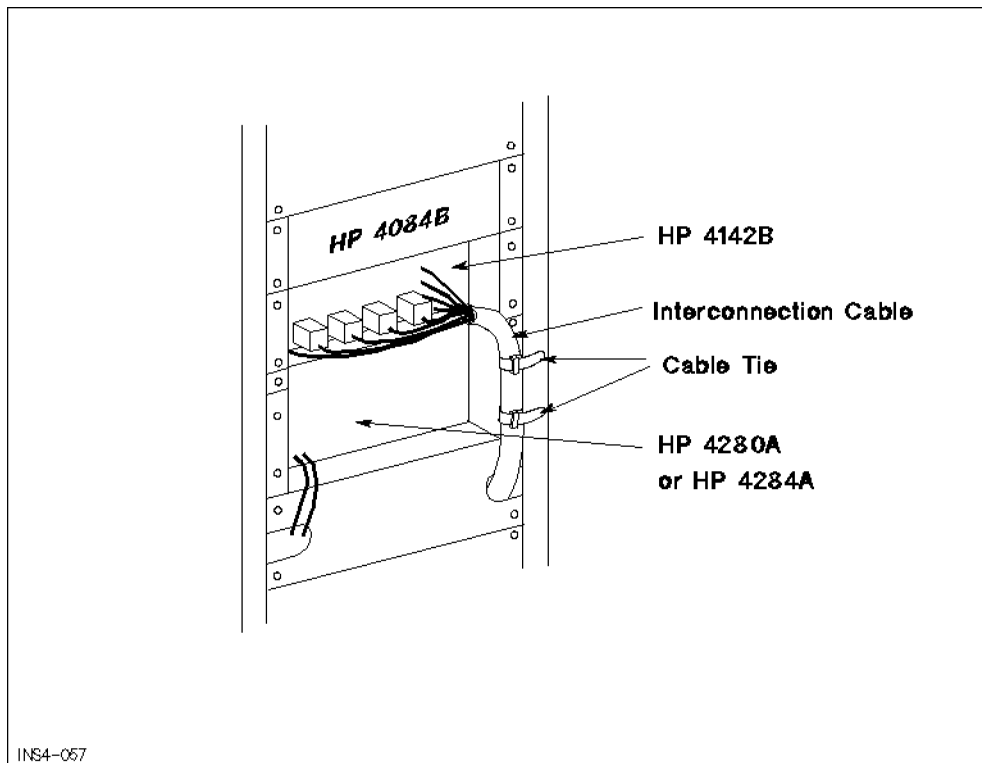


Figure 4-21. Fastening the Interconnection Cables with Cable Ties

When Your System is HP 4062F

This section provides procedures to install the cables and cable assemblies to the system instruments—the HP 4085F SWM, HP 4084B SWC, HP 4142B DCS, HP 4280A CMU or HP 4284A CMU84, and HP 8110A PG(s). Note that all the signal cables must be connected from the SWM to the instruments through the cable entry opening of the rear panel of the system cabinet.

Figure 4-16 shows the cable connections between the HP 4084B and the HP 4085F. Use the following procedure to install the cables:

1. Connect the control cable (HP part number 04085-61671) to the TO SWITCHING MATRIX terminal on the rear panel of HP 4084B. Note that the HP-IB address of HP 4084B is set to 22.
2. Connect the other control cable terminal to the TO SWITCHING MATRIX CONTROLLER terminal of the HP 4085F SWM.

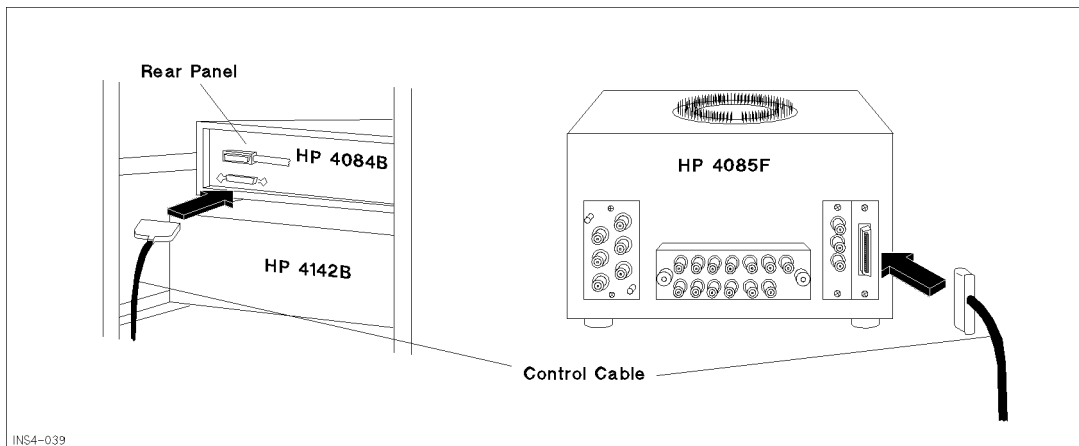


Figure 4-22. Connecting the HP 4084B SWC to the HP 4085F SWM

Figure 4-17 shows the cable connections between the HP 4142B DCS and HP 4085F SWM. Use the following procedure to install the cables:

1. Thread the interconnection cable (HP part number 04085-61684) through the right-hand cable entry opening (below the HP 4280A or HP 4284A) on the front panel of the cabinet.
2. Connect the SMU Port 1 through SMU Port 4 cables to the SMUs (HP 41420As and HP 41421Bs) of HP 4142B.
3. Connect the INTLK cable to the INTLK terminal of HP 4142B.
4. Connect the GNDU cable to the GNDU terminal of HP 4142B.
5. Connect the AUX1 through AUX4 cables to the VS and VM terminals of HP 4142B.
6. Connect the interconnection cable terminal box to the TO MODULAR DC SOURCE/MONITOR terminal of HP 4085F SWM.
7. Connect any one AUX cable from the VS or VM terminals of HP 4142B to SWM AUX PORT 2 in any desired combination.

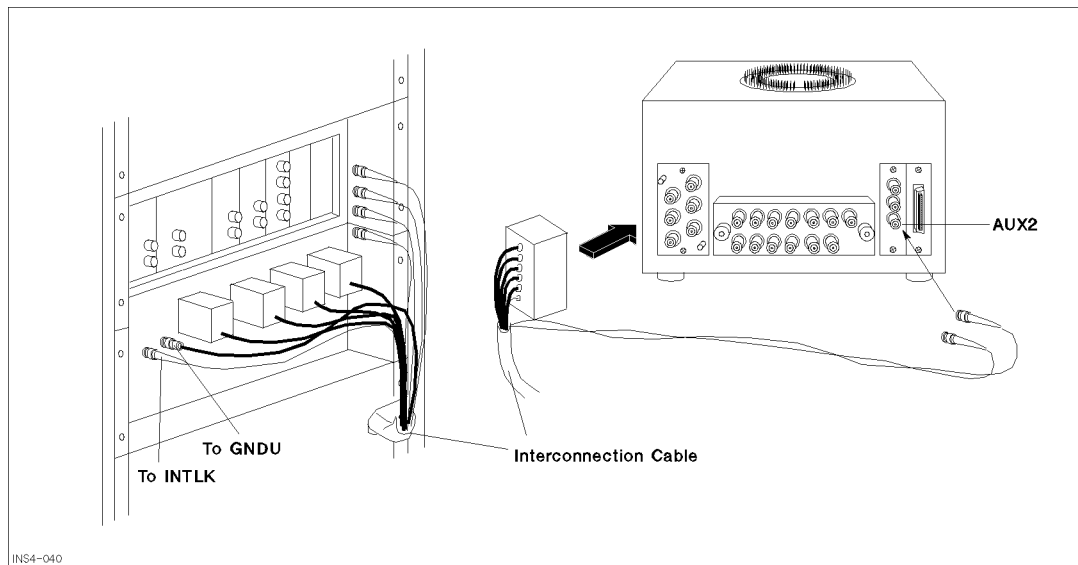


Figure 4-23. Connecting the HP 4142B DCS to the HP 4085F SWM

Figure 4-18 shows the cable connections between the HP 4280A CMU and HP 4085F SWM. Use the following procedure to install the cables:

1. Connect the cable assembly (HP part number 04062-61601) to the UNKNOWN terminals of the HP 4280A CMU.
2. Connect a triaxial-triaxial adapter (HP part number 1250-1838) to the cable assembly CMH connector and one to the CML connector.
3. Thread the CMH cable (HP part number 04085-61661) and CML cable (HP part number 04085-61662) through the left-hand cable entry opening (below the HP 4280A) on the front panel of the cabinet.
4. Connect the CMH cable to the triaxial-triaxial adapter connected to the cable assembly CMH connector.
5. Connect the CML cable to the triaxial-triaxial adapter connected to the cable assembly CML connector.
6. Connect the CMH and CML cables to the AUX PORT 3 and 4 connectors, respectively, of HP 4085F SWM.

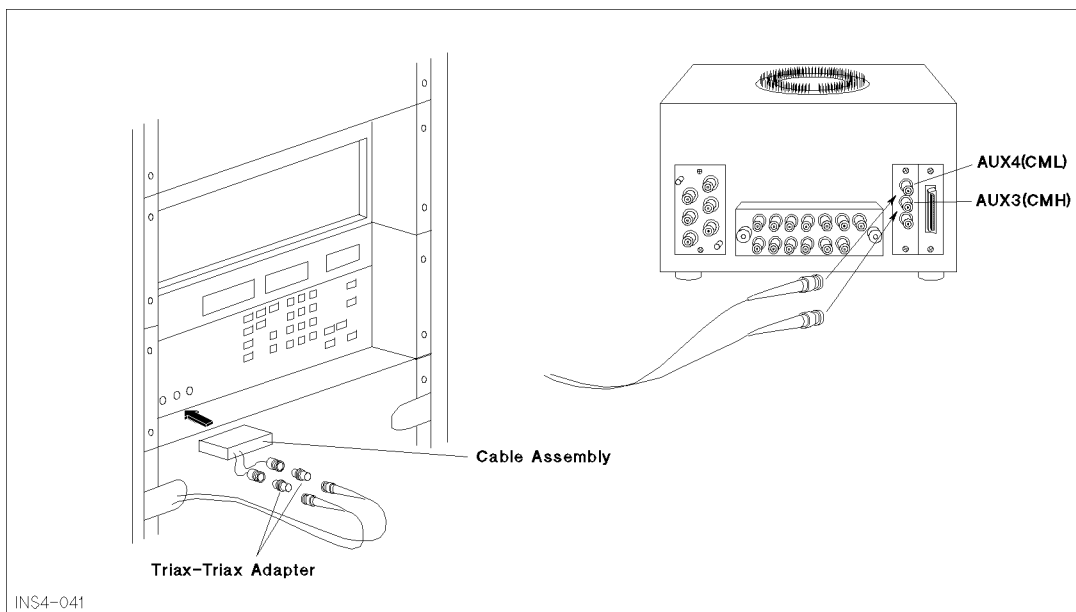


Figure 4-24. Connecting the HP 4280A CMU to the HP 4085F SWM

Figure 4-19 shows the cable connections between the HP 4284A CMU84 and HP 4085F SWM. Use the following procedures to install the cables:

1. Thread the HP 16048E Test Leads through the left-hand cable entry opening (below the HP 4284A) on the front panel of the cabinet.
2. Connect the test leads to the UNKNOWN terminals on the front panel of the HP 4284A.
3. Insert the banana terminal of the test leads into the ground terminal ($\perp$) left side of the UNKNOWN terminal.
4. Connect the red and orange leads from the test leads using a BNC-T adapter (HP part number 1250-0781). Connect the BNC-T adapter to the AUX3 (CMH) terminal of the HP 4085F SWM using a BNC f-to-f adapter (HP part number 1250-0080) and 23 cm BNC cable (HP part number 8120-1838).
5. Interconnect the gray and black leads from the test leads using a BNC-T adapter. Connect the BNC-T adapter to the AUX4 (CML) terminal of the HP 4085F SWM using a BNC f-to-f adapter and 23 cm BNC cable.

Note

The blue lead of the test lead connected to the ground terminal is *not* necessary for any terminal. Do not connect the terminal of the blue lead to any terminal.

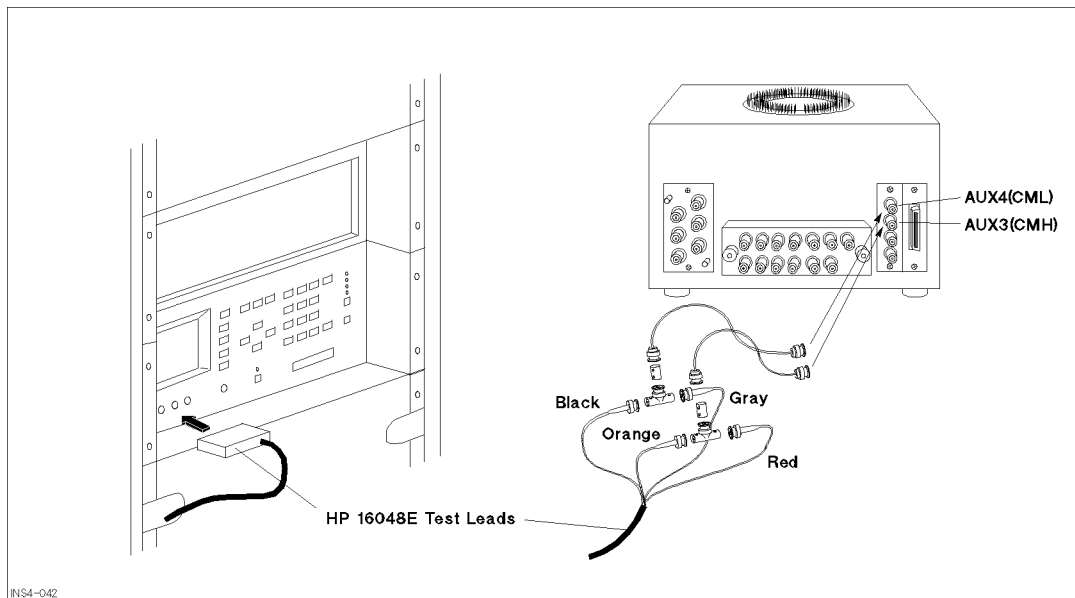


Figure 4-25. Connecting the HP 4284A CMU84 to the HP 4085F SWM

Although the cables from the system cabinet are about 4 m long, position the HP 4085F SWM less than 2 m from the system cabinet. Also, if the HP 4085F SWM is installed on a wafer prober, make sure there is enough slack in the cables so that the HP 4085F SWM can be easily raised and lowered.

Caution

Do not use cables or cable assemblies other than those supplied with the system. Use of other cables may damage the instruments or may make it impossible to obtain specified measurement accuracy.

After installing all the signal cables, fasten the interconnection cables connected to HP 4142B together using cable ties shown in Figure 4-26.

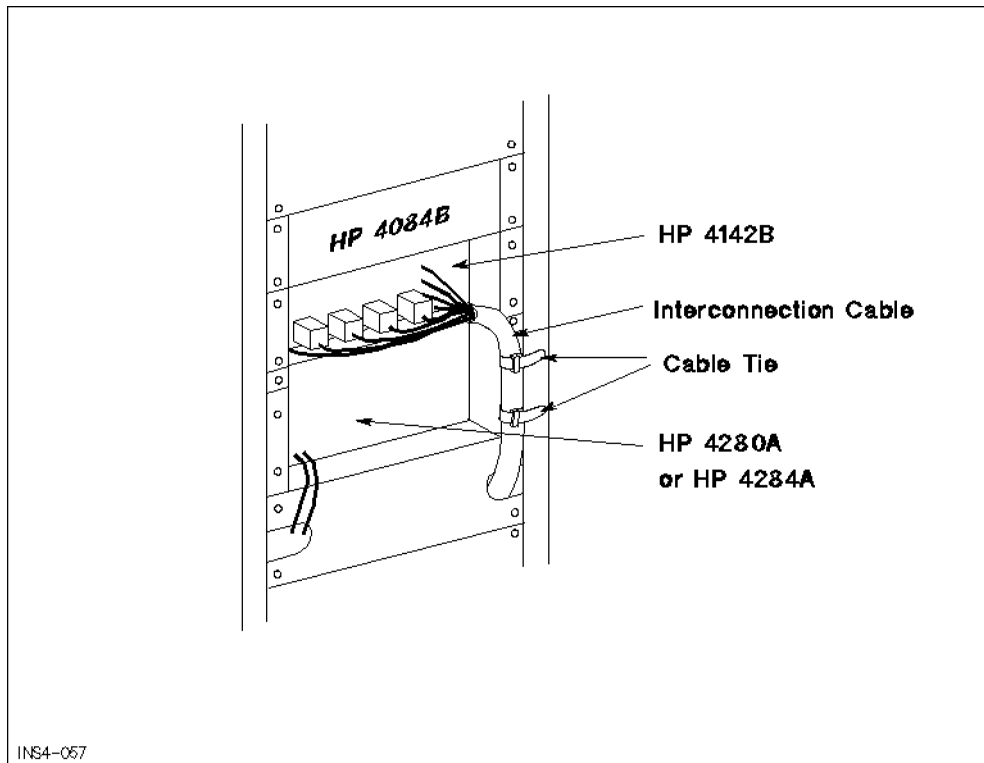


Figure 4-26. Fastening the Interconnection Cables with Cable Ties

Figure 4-27 shows the cable connections between the HP 8110A PGs and HP 4085F SWM. The PG cables are wrapped in a zipper tube and fixed on the cabinet frame with cable ties at the factory. Use the following procedure to connect the PG cables:

1. Attach the cable adapter (HP part number 04085-61066) to the HP 4085F SWM.
2. On rear panel of HP 8110A, connect BNC connector of each PG cable to corresponding OUTPUT 1 or OUTPUT 2 terminal. Each PG cable has a tag that indicates the OUTPUT terminal of HP 8110A to which you should connect the cable. For example, if cable has tag “PG31”, connect it to OUTPUT 1 terminal of the HP 8110A (PG3).
3. Pass the PG cables through the opening of the rear panel.
4. On the cable adapter that is attached to HP 4085F SWM, connect BNC connector of each PG cable to corresponding HF port. Hewlett-Packard recommends that when you install the HP 4062F system, you connect the PG cables to the HF ports as shown in Table 4-12.

Table 4-12.
Connections Between Output Terminals of the HP 8110A and HF Ports

HP 8110A Name	Output Terminal	PG Cable	HF Port
PG1	OUTPUT 1	PG11	HF1
	OUTPUT 2	PG12	HF2
PG2	OUTPUT 1	PG21	HF3
	OUTPUT 2	PG22	HF4
PG3	OUTPUT 1	PG31	HF5
	OUTPUT 2	PG32	HF6
PG4	OUTPUT 1	PG41	HF7
	OUTPUT 2	PG42	HF8
PG5	OUTPUT 1	PG51	HF9
	OUTPUT 2	PG52	HF10

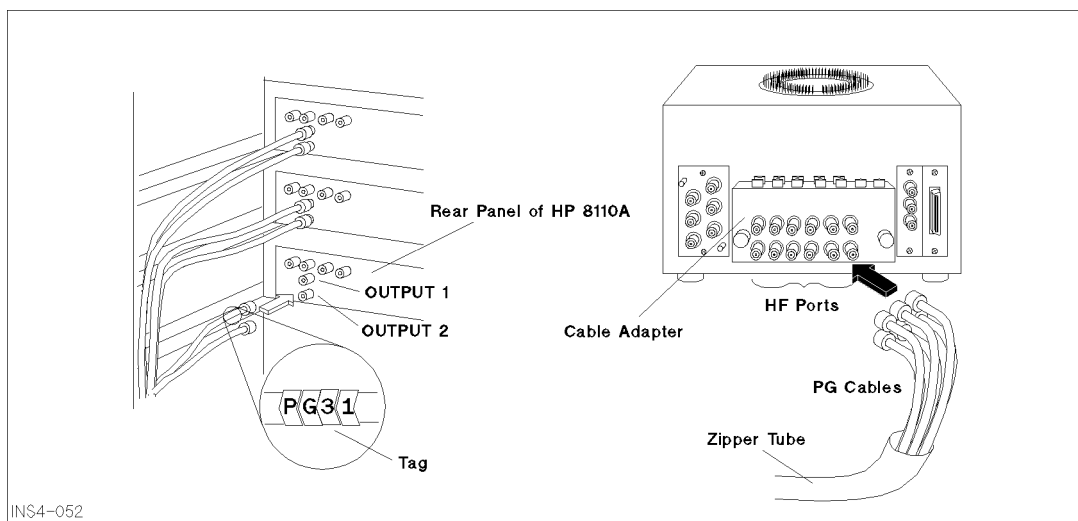


Figure 4-27. Connecting the HP 8110A PGs to the HP 4085F SWM

Removing System Instruments

To remove or extend a system instrument from the cabinet, remove the screws from the rack flanges of that instrument.

The HP 4142B, HP 4280A, HP 4284A, or HP 8110As are mounted on instrument support rails. These instruments can be extended or removed from the cabinet for servicing or for standalone use.

The HP 4084B SWC is mounted on standard slides. The HP 4084B SWC, therefore, cannot be extended from the cabinet, but can easily be removed from the cabinet.

System instruments should be removed from the system cabinet by trained service personnel only.

HP 4142B's plug-in modules can also be easily removed. To do so, loosen the screws in the lower left and right corners of the front panel, gently remove the front panel, and disconnect the flat cable from the mainframe module connector. Turn the upper and lower quick-disconnect screws of the desired module 90° to unlock the module. Gently pull the module free from its mainframe connector and remove the module. Figure 4-28 shows a plug-in module extended from the HP 4142B.

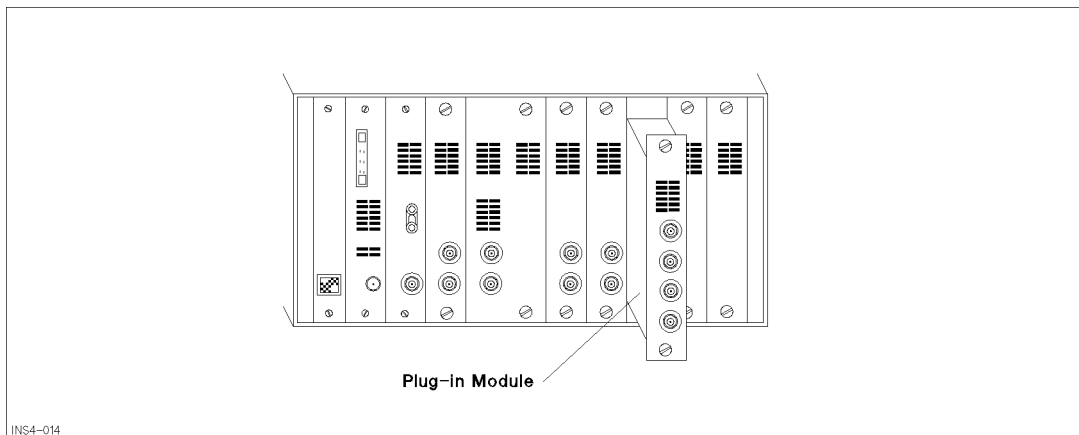


Figure 4-28. Removing HP 4142B's Plug-in Modules

Testing Each Instrument

After installing all the system instruments, inspect each instrument before applying power. Complete the following procedure and refer to the *Operation Manual* of the each instrument.

If any failures are detected, see the HP 4062C/UX *Service Manual*, the HP 4062F *Manual Supplement for Service Manual*, or the *Service Manual* of the instrument that failed.

Testing Emergency Off Unit and Power Distribution Unit (PDU)

If your system is not furnished with an emergency off unit, skip this test.

This test checks the following items:

- ☐ Operation of the ground-fault circuit interrupter (GFCI)
- ☐ Operation of BREAKER ON indicator
- ☐ Operation of LINE switches
- ☐ Operation of EMERGENCY OFF switch
- ☐ Operation of Ext In terminals
- ☐ Operation of Ext Out 1 and 2 terminals

Use the following procedure to check the test items above:

1. Confirm the main circuit breaker or GFCI in the system cabinet and the line switches of all the system instruments are set to OFF. The main circuit breaker or GFCI is located at the bottom of the rear panel. See the *Operation Manual* of each instrument for the location of each line switch.
2. Connect the main power cable to the power source at your site.
3. Turn on the main circuit breaker or GFCI in the system cabinet.
4. If your PDU is furnished with a GFCI, press the red push switch labeled “Breaker Test Switch” to force earth leakage current. The GFCI indicator should extend out to show the earth leakage condition.

To reset the GFCI indicator, use the following procedure:

- a. Move the switch lever to OFF. The GFCI indicator should retract.
 - b. Move the switch lever to ON.
5. Turn on the circuit breaker for the emergency off unit. The “BREAKER ON” indicator (white) should turn on.
 6. Turn on and off one of the system instruments. Note that the selected instrument must originally function properly. The instrument should not turn on.
 7. Press the LINE  switch. The LINE “1” indicator (green) should turn on.
 8. Turn on one of the system instruments. Note that the selected instrument must originally function properly. The instrument should turn on.
 9. Check conductivity of the Ext Out 1 and 2 terminals by using a resistance meter. The resistance between the Ext Out 1 terminals should be near 0 Ω , and the resistance between the Ext Out 2 terminals should indicate infinity.

10. Press the LINE **0** switch after turning on a system instrument. The instrument should turn off.
11. Press the LINE **1** switch. The instrument should turn on.
12. Press the EMERGENCY OFF switch. The instrument should turn off.
13. Check conductivity of the Ext Out 1 and 2 terminals in the emergency off condition by using a resistance meter. The resistance between the Ext Out 1 terminals should indicate infinity, and the resistance between the Ext Out 2 terminals should be near 0 Ω .
14. Press the LINE **1** switch. Check that the green indicator of the LINE **1** switch does not turn on.
15. Set the LINE switch of the instrument to the OFF condition.
16. Release the lock of the EMERGENCY OFF switch by using the key.
17. Turn on and off one of the system instruments. Note that the selected instrument must originally function properly. The instrument should not turn on.
18. Press the LINE **1** switch and turn on one of the system instruments.
19. Loosen the Ext In terminals and remove the shorting lead connected between the Ext In terminals. The instrument should turn off.
20. Turn off the instrument and the circuit breaker for the emergency off unit.
21. Reinstall the shorting lead to the Ext In terminals.
22. Turn on the circuit breaker for the emergency off unit.
23. Press the LINE **1** switch.

Testing Power Distribution Unit (PDU) (HP 4062UX Only)

If your system is furnished with an emergency off unit, skip this test.

This test checks the following item:

- ☐ Operation of circuit breaker

Use the following procedure to check the test item above:

1. Confirm the power switch of the system cabinet and the line switches of all the system instruments are set to OFF. The power switch of the system cabinet is located at the right-front of the PDU. See the *Operation Manual* of each instrument for the location of each line switch.
2. Connect the main power cable to the power source at your site.
3. Turn on and off one of the system instruments. Note that the selected instrument must originally function properly. The instrument should not turn on.
4. Set the SYSTEM ON/OFF switch of the system cabinet to ON.
5. Turn on one of the system instruments. Note that the selected instrument must originally function properly. The instrument normally should turn on.

Testing Each System Instrument

This test checks the following items:

- ☐ Self-test result of HP 4084B Switching Matrix Controller(s)
- ☐ Self-test result of HP 4142B Modular DC Source/Monitor
- ☐ Self-test result of HP 4280A 1 MHz C Meter/C-V Plotter, if it exists.
- ☐ Self-test result of HP 4284A Precision LCR Meter, if exists.
- ☐ Self-test results of HP 8110A 150 MHz Pulse Generator(s) (HP 4062F only).

Use the following procedure to check the test items above:

1. Set the LINE ON/OFF or POWER ON/OFF switch of each instrument, located on the front panel of each instrument, to ON, and inspect each instrument for any errors or failures.

Note



After the inspection, leave the LINE ON/OFF or POWER ON/OFF switch of each instrument to ON to warm up the system instruments.

Cleaning

To prevent electrical shock, never use a wet cloth when cleaning the HP 4062UX/F. Always use a slightly damp or dry cloth to clean HP 4062UX/F.

Software Installation

Introduction

This chapter describes HP 4062UX/F system software installation procedures, and includes software customization and other relevant software installation information. Specifically, this chapter covers the information for first time installation and for upgrade installation.

Information on customizing the wafer prober is also provided.

If the system has the HP Interactive Measurement and Analysis (IMA) software, refer to this chapter to install the HP IMA/UX software.

Caution



If you are installing the new software on a hard disk that has been used, Hewlett-Packard recommends that you back up the user's programs and data.

Software Installation Overview

This section covers the installation procedure of the HP 4062UX/F system software and HP IMA/UX. See *Read Me Before Installing the HP 4062UX/F Revision 8.00 System Software* to confirm the software compatibility before going to the following procedure.

The HP-UX run-time environment, HP BASIC/UX, HP SICL, and HP 4062UX/F system software are required as a minimum environment for the HP 4062UX/F system.

Note



The HP 4062UX/F system software revision 8.00 and later does not support diskless cluster configuration. If the diskless cluster is configured on system software revision 7.11 or earlier, set up the hard disk drive for each diskless cluster.

The software installation for HP 4062UX/F involves the following tasks. Figure 5-1 is an installation procedure flowchart.

- Installing HP-UX, patches, and system configuration tools
- Installing C/ANSI C (if needed)
- Installing HP SICL
- Installing HP BASIC/UX
- Installing HP 4062UX/F system software
- Installing HP IMA/UX (if needed)
- Customizing HP-UX
- Customizing HP SICL
- Customizing HP BASIC/UX
- Customizing HP 4062UX/F system software
- Customizing HP IMA/UX (if needed)
- Customizing for wafer prober (if needed)
- Creating a new user account (if needed)

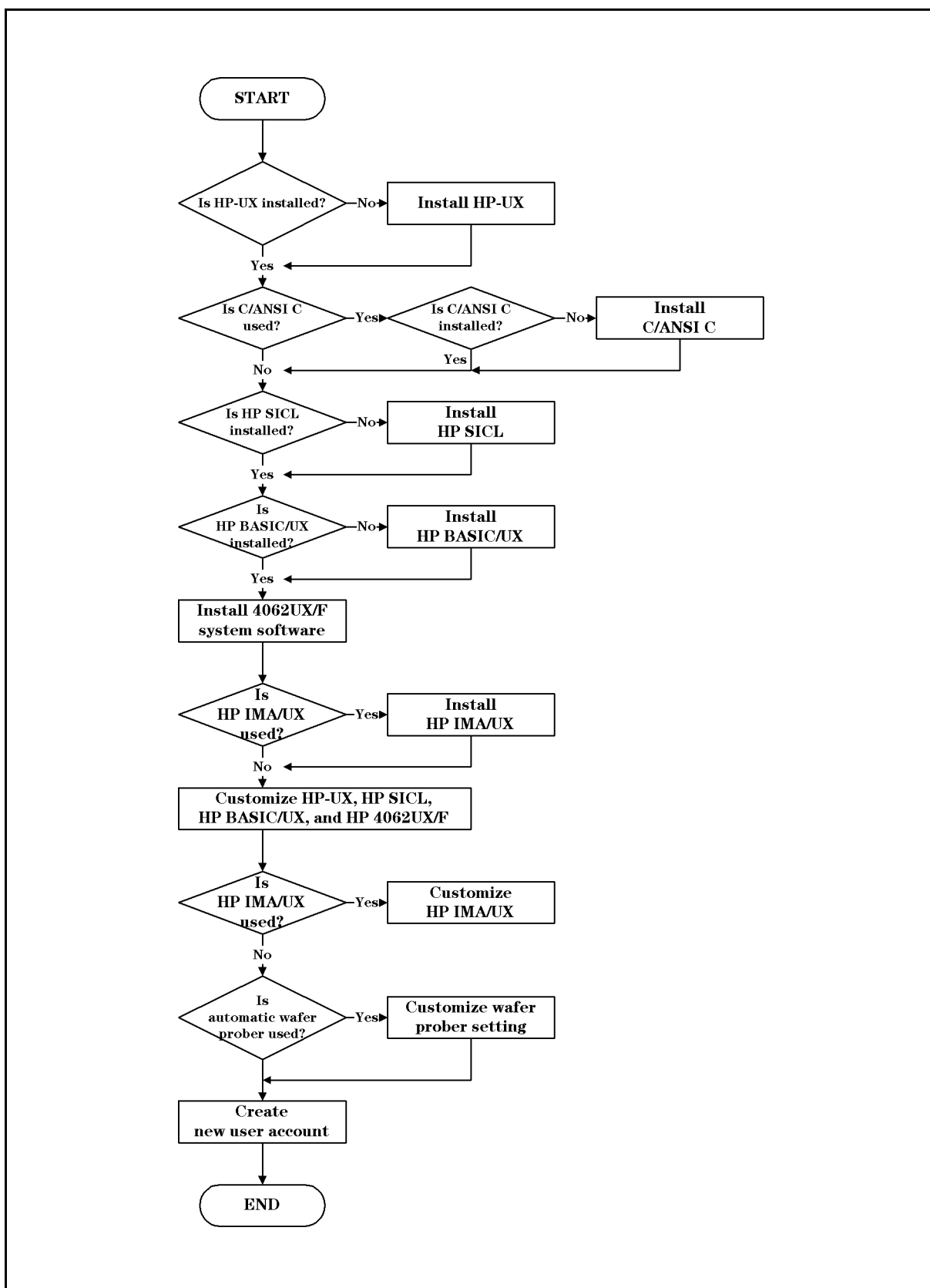


Figure 5-1. Installation Flowchart for HP 4062UX/F System Software

Installing HP-UX and Other Application Software

Minimum and Recommended Requirements

The minimum requirements for the 4062 operation are as follows. If the system controller does not meet the following conditions, modify the hardware or software conditions.

■ Hardware requirements

System controller:	Model 745i (minimum) Model 747i (minimum) Model 725 (minimum) Model 745/132L (recommended)
Memory:	64 Mbyte (minimum) 128 Mbyte (recommended)
HDD:	2 Gbyte (minimum) 4 Gbyte (recommended)
Display:	1024 × 768 1280 × 1024

■ Software requirements

Swap size:	400 Mbyte
System configuration:	Standard LVM
Software selection:	CDE runtime environment
File name length:	Long
Logical volume size:	/opt 1024 Mbyte (recommended) /usr 400 Mbyte (minimum), 640 Mbyte (recommended) /var 400 Mbyte (minimum), 1024 Mbyte (recommended)
Kernel parameter:	shmmax 0x08000000 maxdsize 0x08000000 maxuprc 200 msgtql 256

Installing HP-UX

Start up from the HP-UX install and core OS CD-ROM, and install HP-UX. For the details, refer to the *Installing and Updating Additional Core Enhancements (ACE) for HP-UX 10.20* manual.

If C/ANSI C is used for measurement program development, also install all C/ANSI C filesets.

Installing Patches and Software Configuration Tools

After loading HP-UX, install the patches and software configuration tool. The following filesets are required for HP 4062 system software.

- Quality pack (XSW700QPK1020) included in the HP-UX diagnostics/IPR CD-ROM
- Extension software patch bundle (XSW700HW1020) included in the HP-UX diagnostics/IPR CD-ROM
- HP-UX extension software general release patch bundle (XSW700GR1020) included in the software configuration tool CD-ROM
- Additional HP-UX patch bundle (NET-1020S700) included in the software configuration tool CD-ROM
- HP-UX core OS year 2000 patch bundle (Y2K-1020S700) included in the software configuration tool CD-ROM
- HP software configuration tool (HPCONFIG.UPD) included in the software configuration tool CD-ROM

To install these patches and software configuration tool, use the `/usr/sbin/swinstall` command.

Installing HP SICL

To install HP SICL, use the `/usr/sbin/swinstall` command. For the details, refer to the *HP I/O Libraries Installation and Configuration Guide for HP-UX* or *Installing and Using HP BASIC/UX 8.0*.

Installing HP BASIC/UX

To install HP BASIC/UX software, use the `/usr/sbin/swinstall` command. For the details, refer to the *Installing and Using HP BASIC/UX 8.0* manual.

Note



Before installing HP BASIC/UX, go to the *Read Me Before Installing HP BASIC/UX* manual, which contains some important information for the currently released HP BASIC/UX.

Installing HP 4062UX/F System Software

Note



When installing the HP 4062UX/F system software and the HP IMA/UX software, you must install the HP 4062UX/F system software prior to the HP IMA/UX software.

1. Insert the software media (CD-ROM) in the CD-ROM drive.
2. Log in as a superuser (`root`).
3. Mount the CD-ROM drive on the HP 4062UX system controller using the `/sbin/mount` command, as shown in the following example.

Example: (mounting device file `/dev/dsk/c0t2d0` to `/SD-CDROM`)

```
# /sbin/mount /dev/dsk/c0t2d0 /SD_CDR0M
```

4. Load the HP 4062UX/F system software filesets using the `/usr/sbin/swinstall` command, as follows.

- a. Type the `/usr/sbin/swinstall` command as a superuser.

```
# /usr/sbin/swinstall
```

The SD install and specify source window appear as shown in Figure 5-2.

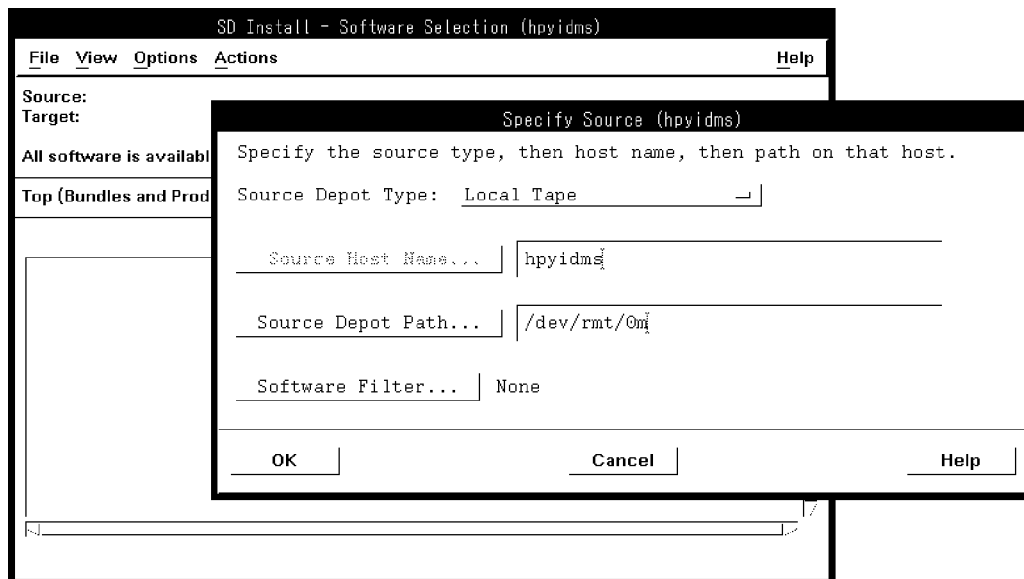


Figure 5-2. SD Install and Specify Source Window

- b. Choose `Local Directory` on the specify source window.
- c. Type the source path name in `Source Depot Path...`. For example, if the CD-ROM drive is mounted in `/SD_CDR0M`, type the name as follows:

```
/SD_CDR0M/HP4062UX.UPD;1  ⇐ for installing 4062UX system software
/SD_CDR0M/HP4062UC.UPD;1  ⇐ for installing 4062UX C library
/SD_CDR0M/HP4062F.UPD;1   ⇐ for installing 4062F system software
```

5-6 Software Installation

- d. Press **OK** on the specify source window. The specify source window disappears, and HP 4062UX/F system software is displayed in SD install window as shown in Figure 5-3.

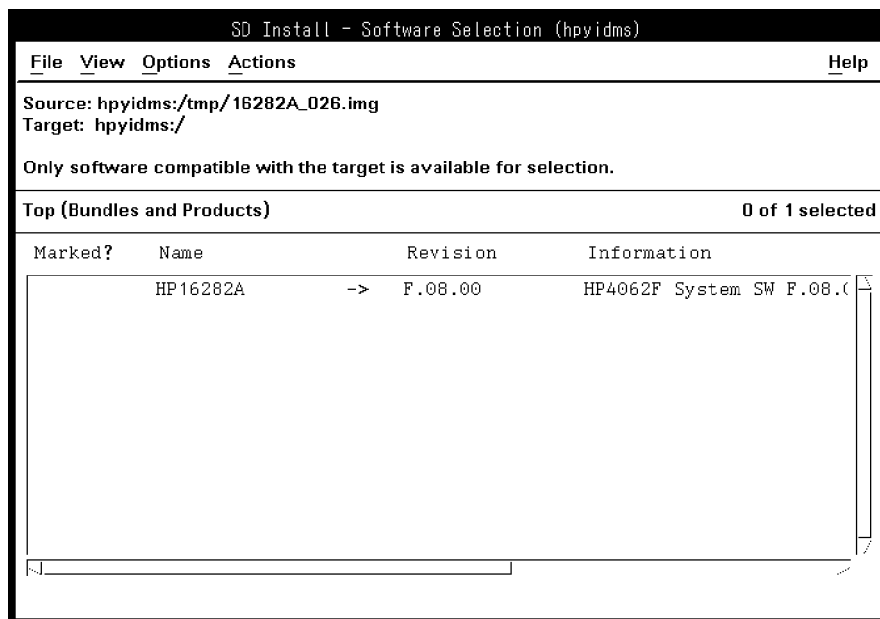


Figure 5-3. SD Install Window with HP 4062UX/F System Software

- e. Choose the HP16280A (HP 4062UX system software), HP16281A (HP 4062UX C library), or HP16282A (HP 4062F system software).
- f. Choose Action: Install (Analysis) ... as shown in Figure 5-4.

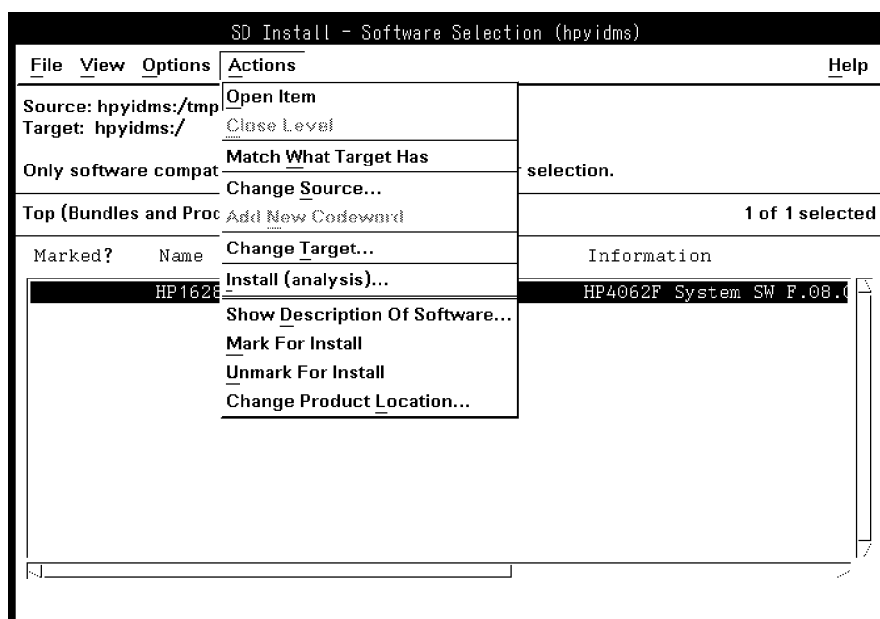


Figure 5-4. SD Install Window with Action Menu

The install analysis window appears as shown in Figure 5-5.

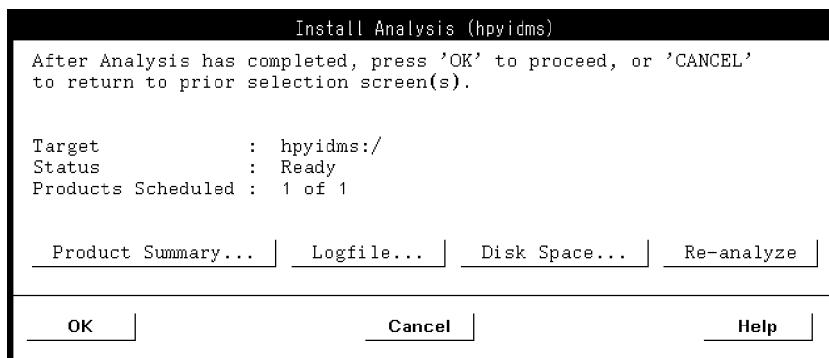


Figure 5-5. Install Analysis Window

g. Click **Logfile...**. The logfile window appears as shown in Figure 5-6.

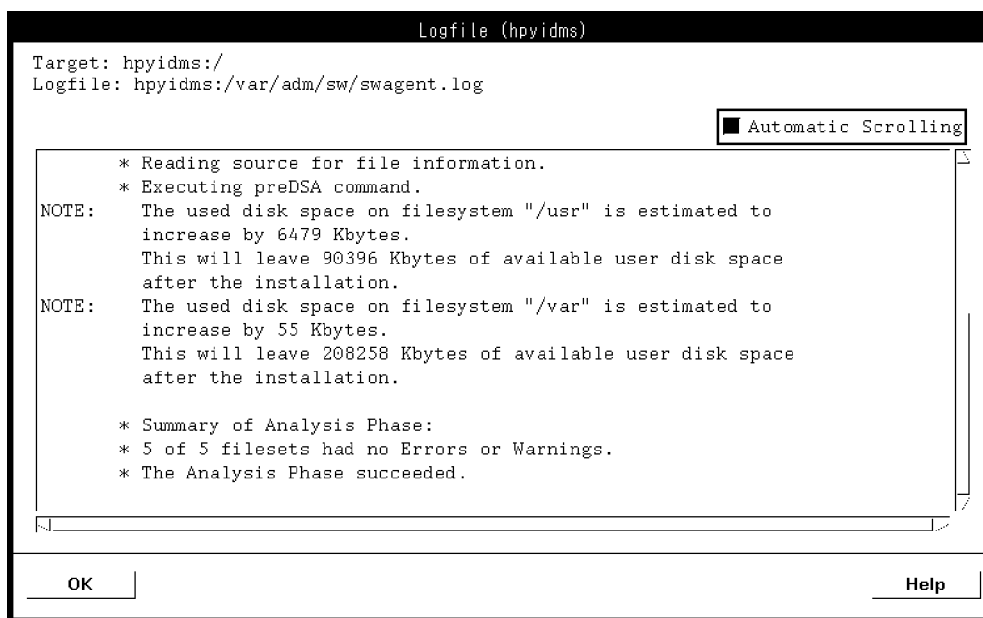


Figure 5-6. Logfile Window

- h. Check if there is no error in the logfile. If there is an error, stop the installation, and troubleshoot.
- i. Click **OK** on the logfile window. Then the logfile window disappears.

- j. Click **OK** on the install analysis window. The confirmation window appears as shown in Figure 5-7.

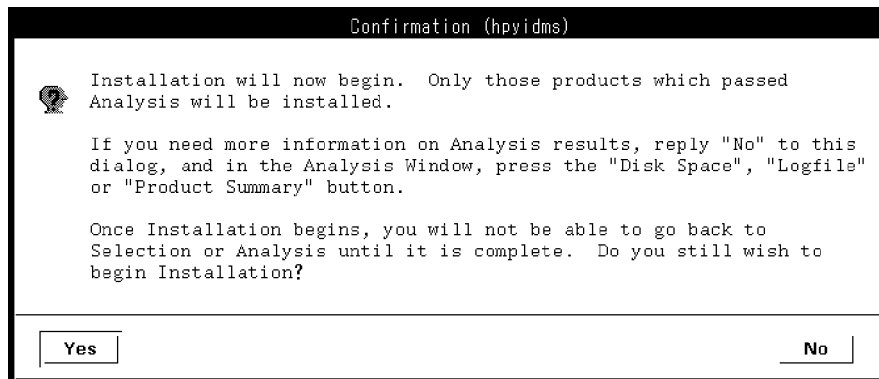


Figure 5-7. Confirmation Window

- k. Click **Yes** on the confirmation window. The confirmation window disappears, and the software installation begins. It takes about 2 minutes.

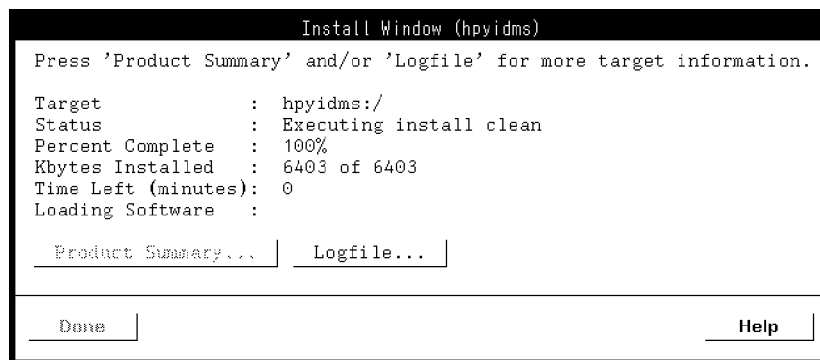


Figure 5-8. Install Window

- l. After the software installation finishes, check that there is no error in the `/var/adm/sw/swagent.log` file. To check it, click **Logfile...** on the install window.

The logfile window appears as shown in Figure 5-9.

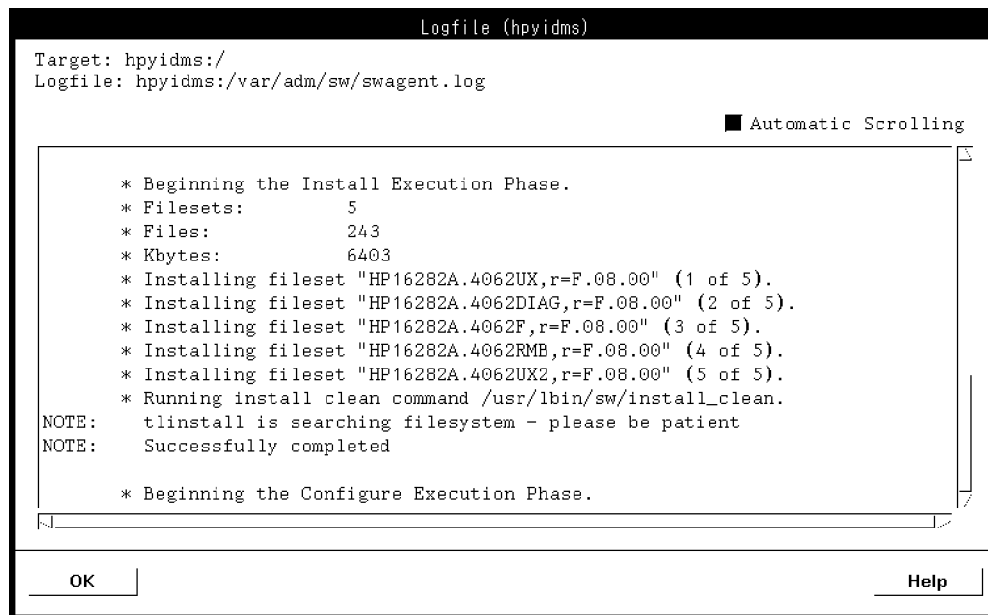


Figure 5-9. Logfile Window

- m. Click **OK** on the logfile window. The logfile window disappears.
 - n. Click **Done** on the install window. The install window disappears.
 - o. Choose **File: Exit** on the swinstall window, and log out from swinstall.
5. Unmount the CD-ROM drive, if necessary, using the `/sbin/umount` command.
 6. Remove the software media (CD-ROM) from the CD-ROM drive, and put it in a safe place.

Note



(Optional)

Use the same procedure to install from the installation media that contain the C Language Library (option 032, 033, or 034).

Installing HP IMA/UX

To install HP IMA/UX system software from the distribution CD-ROM, use the `/usr/sbin/swinstall` command as described in “Installing HP 4062UX/F System Software”.

Customizing for HP 4062UX/F

Customizing HP-UX

To customize HP-UX for HP 4062UX/F, execute the `/home/hpsrvc/config/config.hpux` command. This command executes the following:

- Drivers are added to kernel as follows.

```
sflop
stape
```

- Kernel parameters are modified as follows.

```
maxdsiz 0x08000000
maxuprc 200
msgtql 256
shmmax 0x08000000
```

- HP-UX kernel is rebuilt and placed in `/stand/system` after the previous kernel is backed up as `/stand/vmunix.prev`.
- HP-UX system configuration information is placed in `/stand/system` after the previous information is backed up as `/stand/vmunix.prev`.

Note Reboot is required to make the new kernel effective.



Customizing Common Desktop Environment (CDE)

Hewlett-Packard recommends that you customize the `/usr/dt/config/C/sys.resources` (for English) or `/usr/dt/config/ja_JP.SJIS/sys.resources` (for Japanese) as follows:

```
:
dtsession*lockTimeout: 0    ⇐ change "30" to "0"
:
```

Note If you do not customize this setting, the display is automatically locked by the CDE with the password.



Configuring HP SICL and Installing HP-IB Interface

To configure HP SICL and install the HP-IB interface for HP 4062UX/F, use the following procedure. If you configure an other interface, refer to the *HP I/O Libraries Installation and Configuration Guide for HP-UX*, *Installing and Using HP BASIC/UX 8.0*, or *Installation Guide* of each interface.

Note



If the system controller is Model 745/132L or 725, use one HP E2071 for HP 4062UX/F and one HP E2071 for wafer prober control.

If the system controller is Model 745i or 747i, use the built-in HP-IB interface for HP 4062UX/F control, and HP E2071 high speed HP-IB interface for wafer prober control.

1. Execute the `/opt/sicl/bin/iosetup` command. The I/O setup for HP-UX window appears as shown in Figure 5-10.

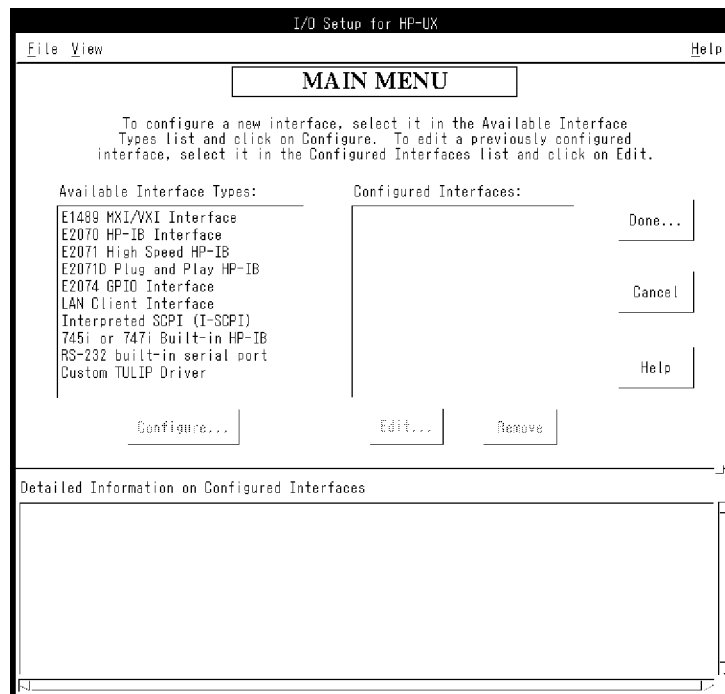


Figure 5-10. I/O Setup for HP-UX Window

2. If the system controller is 745/132L or 725, set up the HP-IB interface by using the following procedure.
 - a. Double-click **E2071 High Speed HP-IB**. The HP E2071 high speed HP-IB configuration window appears as shown in Figure 5-11.

HP E2071 High Speed HP-IB configuration

E2071 HP-IB

Default settings for this interface are shown. Make changes if desired, and click on OK to accept.

Identifiers

Logical Unit #: 25

Symbolic Name: hpib25

Hardware Settings
(Must match installed hardware)

EISA Slot: 2

DIP switches: (OPEN = 1) 1100

Base I/O Addr: 0x350

Other Settings

IRQ Line: 10

HP-IB Bus Addr: 21

System Controller: yes

OK
Cancel
Defaults
Help

Figure 5-11. HP E2071 High Speed HP-IB Configuration Window

- b. Set each parameter as shown in the following example.
Example (installing the HP E2071 into slot 2)

Logical unit number:	27
Symbolic name:	hpib27
EISA slot:	2
DIP switches:	0100
IRQ line:	10
HP-IB bus address:	21
System controller:	Yes

 - c. Click **OK**.
 - d. Repeat step a through c to set up the secondary HP-IB interface, and use suitable parameters as shown in the following example.
Example (installing the HP E2071 into slot 4)

Logical unit number:	25
Symbolic name:	hpib25
EISA slot:	4
DIP switches:	1100
IRQ line:	7
HP-IB bus address:	21
System controller:	Yes

3. If the system controller is Model 745i or 747i, set up the HP-IB interface by using the following procedure.
 - a. Double-click **745i or 747i Built-in HP-IB**. The model 745i built-in HP-IB configuration window appears as shown in Figure 5-12.

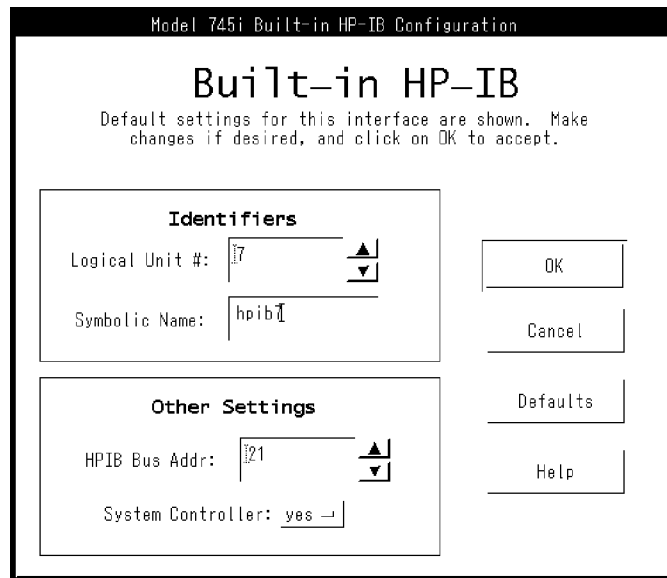


Figure 5-12. Model 745i Built-in HP-IB Configuration Window

- b. Set each parameter as follows:

Logical unit number:	27
Symbolic name:	hpib27
HP-IB bus address:	21
System controller:	Yes
 - c. Click **OK**.
 - d. Set up the HP 2071 high speed HP-IB interface by using the procedure described in step 2 and the example in step 2-d.

4. Choose **File: Build ...** to rebuild the kernel as shown in Figure 5-13.

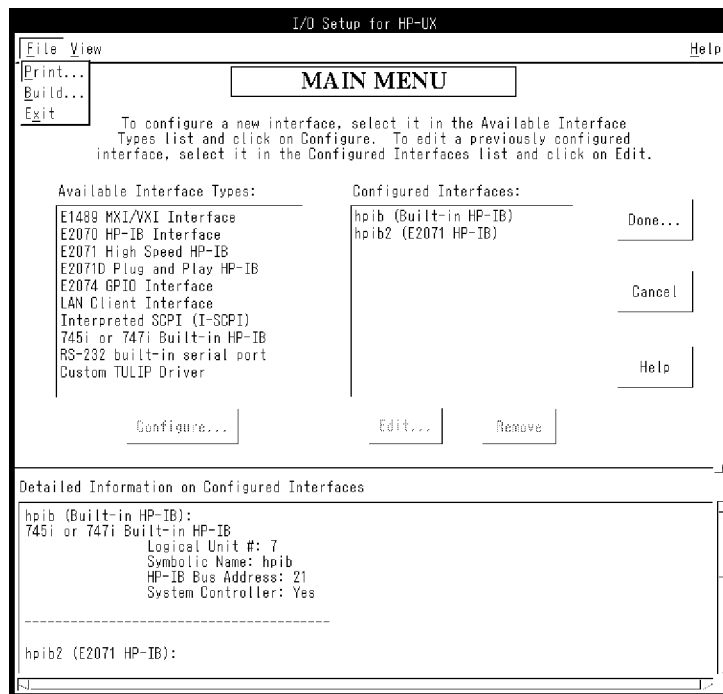


Figure 5-13. I/O Setup for HP-UX Window with File Menu

The accept configuration window appears as shown in Figure 5-14.



Figure 5-14. Accept Configuration Window

5. Click **OK** on the accept configuration window. The accept configuration window disappears, and the build kernel window appears as shown in Figure 5-15.

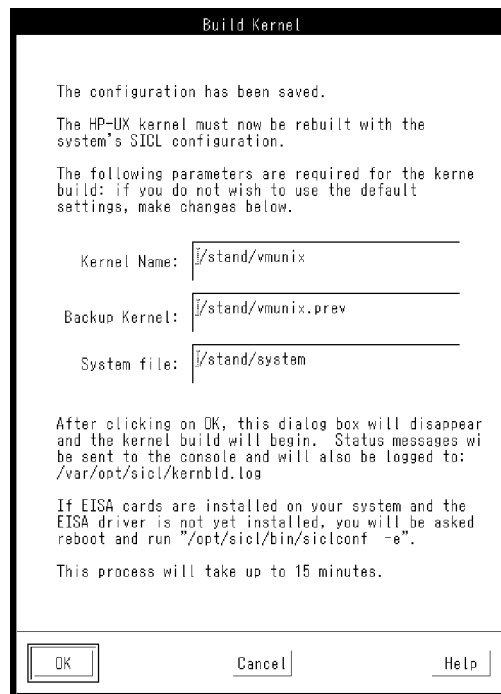


Figure 5-15. Build Kernel Window

6. Click **OK**. The new kernel is automatically rebuilt. It takes about 15 minutes.
7. After creating the new kernel, shut down HP-UX by using the `/sbin/shutdown` command.
8. Turn off the system controller after the shutdown process is completed.
9. Install the HP-IB interface card(s) into the system controller EISA slot.
10. Turn on the system controller and boot up the HP-UX operating system.

Note If you remove the HP-IB interface cards from the EISA slots, you need to execute the `/sbin/eisa_config` command to reconfigure the kernel. See the *HP Standard Instrument Control Library Installation and User's Guide for HP-UX*.

Customizing HP BASIC/UX

To customize HP BASIC/UX for HP 4062UX/F, execute the `/home/hpsrv/c/config/config.rmb` command. This command executes the following:

- The `/etc/dt/config/Xsession.d/0000.rmb` file is created for the CDE. The colormap and xmodmap information is described in this file.
- The `/etc/X11/rgb.txt` file is modified to include colors predefined by HP BASIC/UX. Also, the `/usr/bin/X11/rgb` command is executed by using the `/etc/X11/rgb.txt` file.
- The `/opt/rmb/rmb8_02/newconfig/Rmb` file is copied to `/usr/lib/X11/app-defaults/Rmb`.

5-16 Software Installation

Customizing HP 4062UX/F System Software

To customize HP 4062UX/F system software, execute the `/home/hpsrvc/config/config.4062` command. This command automatically customizes the following files.

```
/etc/profile
/etc/csh.login
/etc/dt/config/Xsession.d/4062.Xsession
/etc/vue/config/Xsession.d/4062.Xsession
/etc/opt/rmb/rmb8_02rc
/usr/lib/X11/app-defaults/Rmb
```

Also this command checks the kernel parameters, and reconfigures the kernel if they do not match for 4062UX/F.

(HP 4062F only) Customizing `/usr/pcs/etc/FLCONFIG` File

The `/usr/pcs/etc/FLCONFIG` file includes information on the device selectors (select code $\times 100 +$ HP-IB address) of the HP 8110As and on the connections between pulse generator units and HF ports.

You must specify the correct connections between pulse generator (PG) units and HF ports in this file. The default setting in this file assumes that five HP 8110As (containing two PG units each) are installed in the HP 4062F system, and the PG units are connected to HF ports 1 through 10 as follows:

```
1080 ! HF1  PG11
1090 ! HF2  PG12
1100 ! HF3  PG21
1110 ! HF4  PG22
1120 ! HF5  PG31
1130 ! HF6  PG32
1140 ! HF7  PG41
1150 ! HF8  PG42
1160 ! HF9  PG51
1170 ! HF10 PG52
```

For example, if three HP 8110As are installed and each HP 8110A has two PG units, *add* to the PG4*x* and PG5*x* lines as follows:

```
1080 ! HF1  PG11
1090 ! HF2  PG12
1100 ! HF3  PG21
1110 ! HF4  PG22
1120 ! HF5  PG31
1130 ! HF6  PG32
1140 !!HF7  PG41      <= add
1150 !!HF8  PG42      <= add
1160 !!HF9  PG51      <= add
1170 !!HF10 PG52      <= add
```

Customizing HP IMA

To use the HP IMA/UX system properly, certain system files must be modified. For more information about system files, refer to the HP-UX and HP BASIC/UX manuals. customize the HP IMA by using the following procedure.

■ /etc/opt/rmb/rmb8_02rc File

Add the following lines to the configuration file:

```
2670 !# HP4062 customization
2680 !  WORKSPACE=3M
2690 !  SHL_SEARCH /usr/pcs/lib
2700 !  SHL_LOAD librmb8_02.sl
2710 !  SHL_LOAD tis.sl
2720 !  SHL_LOAD ast.sl          ⇐ add
2730 !  SHL_LOAD sec_check.sl   ⇐ add
```

■ /usr/pcs/etc/PERCONFIG File

If the CRT is not 17/20 inch high-resolution (1280×1024), you must modify the /usr/pcs/etc/PERCONFIG file.

The CRT type, which specifies the CRT resolution of the controller, is defined in the PERCONFIG file. The PERCONFIG file is in the /usr/pcs/etc directory.

HP BASIC/UX can use three types of CRTs: 17/20 inch middle-resolution (1024×768), 17/20 inch high-resolution (1280×1024), and VGA (Video Graphics Array). The default setting is 17/20 inch high-resolution CRT.

The default setting of the CRT TYPE in the /usr/pcs/etc/PERCONFIG file is as follows:

```
1580 !# CRT TYPE      : Vga_ws
1590 !# CRT TYPE      : Vga_ux
1600 !# CRT TYPE      : 1024x768
1610 !  CRT TYPE      : 1280x1024
```

Note that the sharp sign (#) means comment data entry.

Use the editor to modify the CRT TYPE setting of this file according to the CRT type.

Customizing Wafer Prober

Use this section to customize the wafer prober. If the HP 4062UX/F system is not used with an automatic or semiautomatic wafer prober, skip this section and go to the next chapter.

The HP 4062 supports the following wafer probers:

- Electroglas 1034X, 2001X, 2010X, 3001X, 4060X, and 4080X
- TSK A-PM-3000A, -6000A, -7000A, -60A, -80A, and -90A
- Tokyo Electron 4000A, 4400A, 19S, 20S, 80S, 78S, and 80W
- Micronics Japan SP-900B, -1000B, and -1100B

Note



The wafer prober must be configured for the HP 4062 system. Contact the wafer prober manufacturer for details on the HP 4062 configuration.

The logical unit number of the wafer prober registered in the `SYSCONFIG` file must be the same as the logical unit number of the wafer prober. Confirm the logical unit number of the wafer prober. The default logical unit number set in the `/usr/pcs/etc/SYSCONFIG` file is 25.

To show and modify the `SYSCONFIG` file, use the following procedure:

1. Boot the HP-UX system.
2. Log in as a superuser.
3. Start HP BASIC/UX by entering `rmb`.
4. Load the `SYSCONFIG` file, which is stored in the `/usr/pcs/etc` directory, using the `GET` command as follows:

```
GET "/usr/pcs/etc/SYSCONFIG" Return
```

5. Start the BASIC EDITor by entering `EDIT`.
6. Modify the contents of the `SYSCONFIG` file, if needed.
7. If you modify the file, save the `SYSCONFIG` file as follows:

```
RE-SAVE "/usr/pcs/etc/SYSCONFIG" Return
```

Note



If the registered address of the wafer prober is the same as the address of another device, modify the address of the wafer prober.

Creating New User Account

The `hp4070`, `hpspecs`, and `hpsrvc` users are automatically created by loading the software installation/configuration tools. If you need to create additional user accounts, use the following procedure.

To create a new user account, use the system administration manager (SAM). The following explains how to create a new user account.

1. Log in as a superuser by typing `root`, and type the root password for the system controller.
2. To start the SAM (1M) utility, type:

```
# sam
```

The SAM window appears as shown in Figure 5-16.

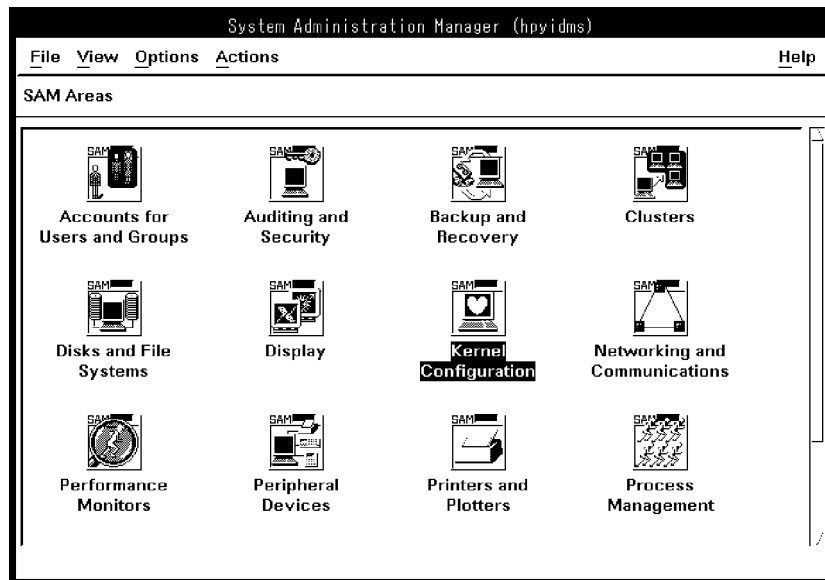


Figure 5-16. System Administration Manager (SAM) Window

3. Double-click the **Accounts for Users and Groups** icon.

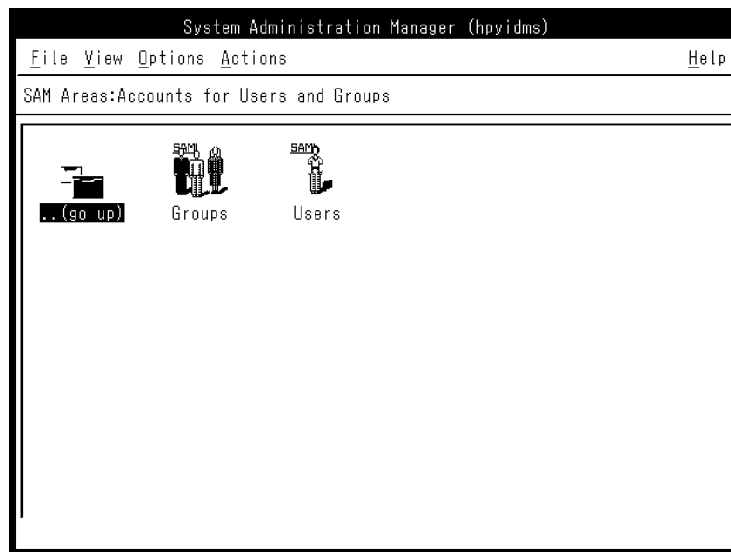


Figure 5-17. Accounts for Users and Group Screen of SAM Window

4. Double-click the **Users** icon. The accounts for users and groups window appear as shown in Figure 5-18.

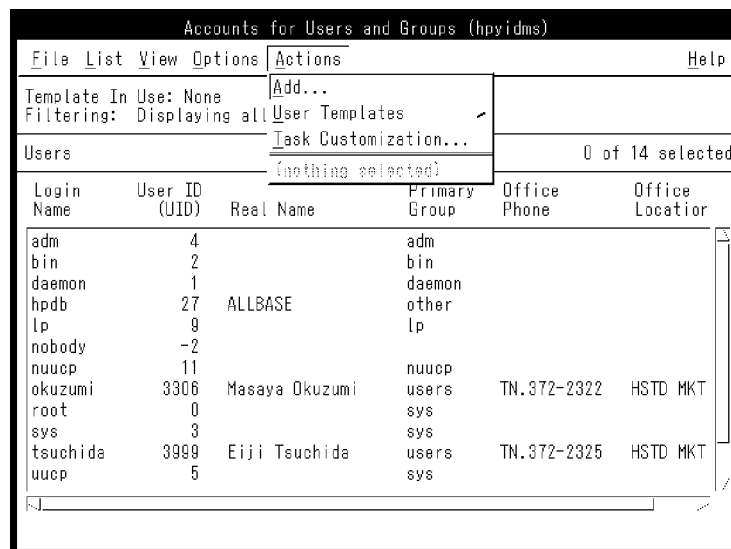
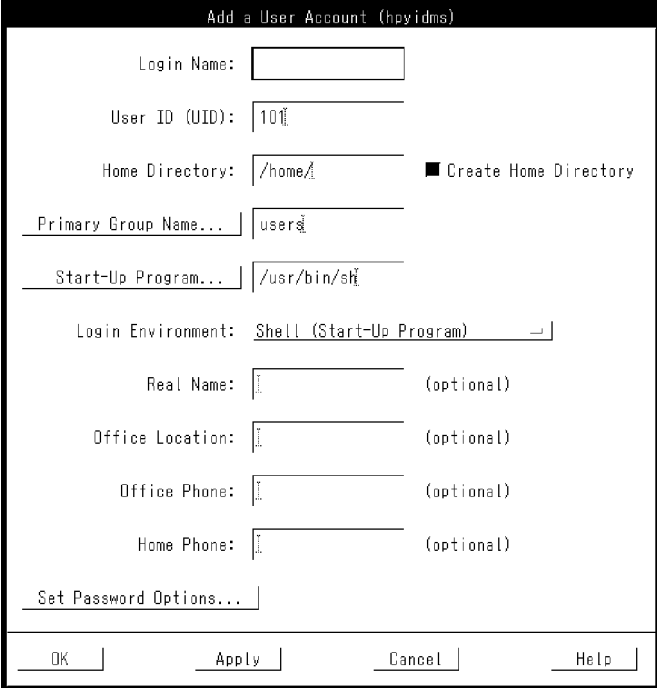


Figure 5-18. Accounts for Users and Group Window

5. Choose **Action: Add ...** on the accounts for users and group window. The add a user account window appears as shown in Figure 5-19.



The "Add a User Account (hpyidms)" window contains the following fields and options:

- Login Name:
- User ID (UID):
- Home Directory: ☒ Create Home Directory
- Primary Group Name...:
- Start-Up Program...:
- Login Environment:
- Real Name: (optional)
- Office Location: (optional)
- Office Phone: (optional)
- Home Phone: (optional)
- Set Password Options...:

Buttons at the bottom:

Figure 5-19. Add a User Account Window

6. Fill in the required information, then click **OK** on the add a user account window. The set user password window appears as shown in Figure 5-20.



The "Set User Password (hpyidms)" window contains the following information:

- Login Name: hp4070
- Enter a password. The password will not appear when it is typed.
- Password:

Buttons at the bottom:

Figure 5-20. Set User Password Window

7. Set the temporary password, and click **OK** on the set user password window.

Note

You must set the password for system security. Then, the password must be reported to the system administrator after installation.

After the new user has been created, the note window appears as shown in Figure 5-21.

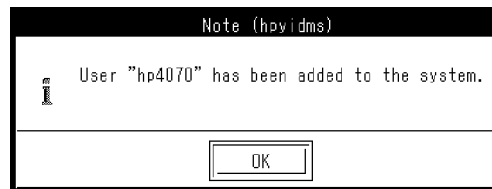


Figure 5-21. Note Window

8. Click **OK** on the note window. The note window disappears.
9. Choose **File: Exit** on the SAM window. The SAM window disappears.
10. Log off from the superuser environment.

System Verification

This chapter provides instructions and procedures to verify correct HP 4062UX/F operation. System verification should be performed immediately after system installation.

System Configuration Verification for HP 4062UX

The first step in verifying correct system operation is to check the configuration of the HP 4062UX system instruments. To do so, perform the START program included in the system software. Use the following procedures to run the START program.

Verifying the System Configuration with START Program

Confirm the system configuration with the configuration page of START. Use the following procedures to perform the START program. If problems occur, go to Appendix B.

1. Turn the system instruments on.
2. Turn the controller system on and start the HP-UX system.
3. Log in as a superuser.
4. Start BASIC/UX as follows:

```
# rmb
```

5. Load the START program as follows:

```
LOAD "/usr/pcs/bin/START"
```

6. Run the START program by selecting the **RUN** softkey or by typing: RUN **Return**.
7. The copyright message page is displayed. Select the **Continue** softkey.
8. The execution mode selection page is displayed. Choose the ON LINE mode by selecting the **NEXT CHOICE** and **PREVIOUS CHOICE** softkeys, and select the **Continue** softkey to continue.
9. START is performed and the configuration page is displayed. An example of the configuration page is shown in the Figure 6-1. Confirm that your system configuration is correct.

```
***** SYSTEM CONFIGURATION *****|**** AVAILABLE PINS ****
4084B/4085B SWITCHING MATRIX:      Present | 01 02 03 04
4142B DC SOURCE MONITOR (Rev. 3.00): Present | 05 06 07 08
4280A 1MHz C METER/C-V PLOTTER:    Present | 09 10 11 12
4284A 20Hz-1MHz LCR METER (Opt. 001/006): Not present | 13 14 15 16
ELECTROGLAS 2001X WAFER PROBER:    Present | 17 18 19 20
***** DCS CONFIGURATION *****| 21 22 23 24
SLOT1: 41421B (SMU1)              SLOT5: 41421B (SMU4) | 25 26 27 28
SLOT2:                            SLOT7: 41424A (AUX1/2) | 29 30 31 32
SLOT3: 41420A (SMU2)              SLOT7:              | 33 34 35 36
SLOT4: 41421B (SMU3)              SLOT8: 41425A         | 37 38 39 40
***** AUXILIARY PORT CONFIGURATION *****| 41 42 43 44
AUX1: VS1                        AUX3: CMH              | 45 46 47 48
AUX2: VS2                        AUX4: CML              |

      Session ID: pcs_2193
      Execution mode: ON LINE

System date & time: 21 Jan 1990 12:34:56

"START" end.      ----- Press [SHIFT] [MENU] for more keys.

User 1 Caps Idle
[EDIT] [Continue] [RUN] [SCRATCH] [LOAD **] [RE-STORE] [Delete] [Link]
               " "      TIS      TIS
```

Figure 6-1. Example of Configuration Page (HP 4062UX)

Note



If your SWM has a port expander (Option 340), the following description, for example, is displayed in the START configuration display page:

```
***** SYSTEM CONFIGURATION *****|**** AVAILABLE PINS ****
4084B/4089B SWITCHING MATRIX (Opt. 340): Present | 01 02 03 04 05 06 07 08
4142B DC SOURCE/MONITOR (Rev. 3.00): Present | 09 10 11 12 13 14 15 16
4280A 1 MHz C METER/C-V PLOTTER: Not present | 17 18 19 20 21 22 23 24
4284A 20MHz-1MHz LCR METER (Opt. 001/006): Present | 25 26 27 28 29 30 31 32
ELECTROGLAS 2001/2010/3001X WAFER PROBER: Present | 33 34 35 36 37 38 39 40
***** DCS CONFIGURATION *****| 41 42 43 44 45 46 47 48
SLOT1:41421B(SMU1)          SLOT5:41421B(SMU4) |
SLOT2:          SLOT6:41424A(AUX11/13/21/23)| 49 50 51 52 53 54 55 56
SLOT3:41420A(SMU2)          SLOT7:41421B(AUX33) | 57 58 59 60 61 62 63 64
SLOT4:41421B(SMU3)          SLOT8:41425A      | 65 66 67 68 69 70 71 72
***** AUXILIARY PORT CONFIGURATION *****| 73 74 75 76 77 78 79 80
AUX11:VS1 12: 13:VM1 AUX31:CHH84 32: 33:SMU | 81 82 83 84 85 86 87 88
AUX21:VS2 22: 23:VM2 AUX41:CHL84 42: 43:    | 89 90 91 92 93 94 95 96
```

```
Session ID: pcs_2193
Execution mode: ON LINE
```

```
System date & time: 21 Jan 1990 12:34:56
```

```
"START" end. ----- Press [SHIFT] [MENU] for more keys.
```

					User 1	Caps	Idle
EDIT	Continue	RUN	SCRATCH	LOAD ""	RE-STORE	Delete	Link
					""	TIS	TIS

Figure 6-2. Example of Configuration Page for Port Expander

System Configuration Verification for HP 4062F

The first step in verifying correct system operation is to check the configuration of the HP 4062F system instruments. To do so, perform the START.F program included in the system software. Use the following procedures to run the START.F program.

Verifying the System Configuration with START.F Program

Confirm the system configuration with the configuration page of START.F. Use the following procedures to perform the START.F program. If problems occur, go to Appendix B.

1. Turn the system instruments on.
2. Turn the controller system on and start the HP-UX system.
3. Log in as a superuser.
4. Start HP BASIC/UX as follows:

```
# rmb
```

5. Load and run the START.F program as follows:

```
LOAD "/usr/pcs/bin/START.F" 
```

```
RUN 
```

or select the softkey

The copyright message page is displayed.

6. START.F is performed, then the configuration page is displayed. An example of the configuration page is shown in the Figure 6-3. Confirm that your system configuration is correct.

```
***** SYSTEM CONFIGURATION *****|*** AVAILABLE PINS ***
4084B/4085F SWITCHING MATRIX:      Present | 01 02 03 04
4142B DC SOURCE/MONITOR (Rev. 4.10): Present | 05 06 07 08
4280A 1MHz C METER/C-V PLOTTER:   Not present| 09 10 11 12
4284A 20Hz-1MHz LCR METER (Opt. 001/006): Present | 13 14 15 16
8110A 150MHz PULSE GENERATOR (1,2,3): Present | 17 18 19 20
ELECTROGLAS 2001/2010/3001X WAFER PROBER: Present | 21 22 23 24
***** DCS CONFIGURATION *****| 25 26 27 28
SLOT1: 41421B(SHU1)              SLOT5: 41421B(SHU4) | 29 30 31 32
SLOT2:                          SLOT6: 41424A(AUX2) | 33 34 35 36
SLOT3: 41420A(SHU2)              SLOT7:              | 37 38 39 40
SLOT4: 41421B(SHU3)              SLOT8: 41425A        | 41 42 43 44
***** HIGH FREQUENCY PORT CONFIGURATION *****| 45 46 47 48
HF1: PG11  2: PG12  3: PG21  4: PG22  5: PG31  6: PG32 |
HF7:      8:      9:     10:    11:    12:    |
***** AUXILIARY PORT CONFIGURATION *****|
AUX2:VS1      AUX3:      AUX4:      |

System date & time: 25 Apr 1994 18:36:46

"START" end.  ----- Press [SHIFT] [MENU] for more keys.

User 1      Idle
EDIT  Continue  RUN  SCRATCH  LOAD ""  RE-STORE  Delete  Link
      ""      ""      ""      ""      ""      TIS    TIS
```

Figure 6-3. Example of Configuration Page

System Performance Verification for HP 4062UX

The Performance Verification (PV) program verifies the operation of the HP 4062UX. It is contained in the PV4062 file. The PV 4062 program exists on the /usr/pcs/diag directory.

The PV4062 program consists of the following five parts:

- 4062UX W/O DVM
- 4062UX W/ DVM
- 4142B
- START
- VIEW RESULT

After installation, you must perform only the 4062UX W/O DVM test. To print verification results, use the VIEW RESULT function.

Before running PV4062, make sure that no system instrument has failed self-test at power on. For failures, refer to the chapter/section 3 in the *Operation Manual* of the instrument that failed for instructions on handling self-test failures.

Note



The HP 4062UX needs at least 40 minutes to warm up. If you don't allow the HP 4062UX enough time to warm up, Hewlett-Packard does not guarantee any performance verification data.

Table 6-1 shows the equipment required to run performance verification.

Table 6-1. Required Equipment for Performance Verification

Required Equipment	For 48-pin SWM	For 96-pin SWM
Test Fixture Adapter	HP 16066A	HP 16370A
Relay Test Adapter	HP 16075A	HP 16355A
System Calibration Module	HP 16346B/C ¹	HP 16366A/B ²

¹ If the HP 4062UX is equipped with an HP 4284A 20 Hz – 1 MHz Precision LCR Meter, both the HP 16346B and the HP 16346C are required. Otherwise, only the HP 16346B is required.

² If the HP 4062UX is equipped with an HP 4284A 20 Hz – 1 MHz Precision LCR Meter, only the HP 16366B is required. Otherwise, either HP 16366A or HP 16366B is required.

The pin boards must be installed into the following number slots of the SWM:

48-pin SWM	4-, 8-, 12-, 16-, 20-, 24-, 28-, 32-, 36-, 40-, 44-, and 48-th slots
96-pin SWM with CMU (HP 4280A)	4-, 12-, 16-, 20-, 24-, 28-, 32-, 36-, 40-, 68-, 72-, 76-, 80-, 84-, 88-, and 96-th slots
96-pin SWM with CMU84 (HP 4284A)	4-, 12-, 16-, 20-, 24-, 28-, 32-, 36-, 40-, 44-, 48-, 52-, 56-, 60-, 64-, 68-, 72-, 76-, 80-, 84-, 88-, and 96-th slots

Note



If your SWM has a port expander and if unsupported instruments are connected to the AUX ports on the port expander box, remove the connectors from the AUX ports that are connected to unsupported instruments. In place of the unsupported instruments, attach BNC shorting caps to the AUX ports. Note that the AUX33 and AUX43 ports, which are triaxial connectors, can be connected *only* to SMUs.

Running the PV4062

To start PV4062, perform the following procedure:

1. Turn the system controller on and boot the HP-UX system.
2. Log in as a superuser.
3. Change the current directory to the /usr/pcs/diag directory as follows:

```
$ cd /usr/pcs/diag
```

4. Enter the HP BASIC/UX environment as follows:

```
$ rmb
```

5. Load and run the PV program as follows:

```
LOAD "PV4062" 
```

```
RUN  or select the RUN softkey
```

PV4062 main menu page is displayed as shown in Figure 6-4.



Figure 6-4. PV4062 Menu Page (HP 4062UX)

The 4062UX W/O DVM

The 4062UX W/O (without) DVM test provides ten subtests for verifying SWM, DCS, CMU, and CMU84 operation. Table 6-2 lists the subtests and provides a description of the tests and the equipment needed.

The PV4062 program is completely interactive and provides two test modes: sequential and single. In the sequential test mode, PV4062 performs each subtest in the sequence listed in Table 6-2. In the single test mode, tests can be performed individually in any desired sequence. For both test modes, PV4062 displays a running record of test results.

This section provides instructions for performing subtests of the 4062UX W/O DVM in the *sequential test mode* only. For more details on each test and for system troubleshooting procedures, refer to the *HP 4062 Service Manual*.

Table 6-2. Subtests of the 4062UX W/O DVM

Subtest	Description	48-pin SWM	96-pin SWM
Relay Test	Tests all relay operations on the SWM pin boards. ¹	HP 16075A	HP 16355A
SMU Test	Performs the DCS self-test and checks SMU accuracy (four SMUs).	HP 16346B	HP 16366A/B
VS Test	Checks the DCS VS1 and VS2 accuracy.	HP 16346B	HP 16366A/B
VM Test	Checks the DCS VM1 and VM2 accuracy.	HP 16346B	HP 16366A/B
AFU Test	Performs an analog feedback measurement using the DCS AFU, and checks measurement results against test limits.	HP 16346B	HP 16366A/B
CMS C-G Test ²	Performs the CMU ROM/RAM Test, checks C-G measurement accuracy, and measures measurement pins' residual capacitance.	HP 16346B	HP 16366A/B
CMS Bias Test ²	Checks the CMU internal dc bias source accuracy.	HP 16346B	HP 16366A/B
CMU84 C-G Test ³	Checks C-G measurement accuracy, and measures residual capacitance of the measurement pins.	HP 16346C	HP 16366B
CMU84 Bias Test ³	Checks the internal dc bias source accuracy of the CMU84.	HP 16346C	HP 16366B
DC Leak Test	Measures the SWM dc leakage current.	HP 16066A	HP 16370A

1 If your system is equipped with a 96-pin SWM, input relays are also tested. If your SWM has a port expander, the port expander relays are also tested.

2 If the HP 4280A CMU is present in your system and is connected to the SWM properly, this test is performed.

3 If the HP 4284A CMU84 is present in your system and is connected to the SWM properly, this test is performed.

Procedure:

1. Select the **4062UX W/O DVM** softkey.

After selecting the **4062UX W/O DVM** softkey, the START program runs for about one minute.

When START finishes, a configuration page of START similar to that shown in Figure 6-1 is displayed for less than a second, and the start-up menu page as shown in Figure 6-5 appears on the screen.

If your HP 4062UX system is equipped with a CMU84, the **HP4284A Corr.** softkey is also displayed. When you select this softkey, the CMU84 performs the OPEN and SHORT correction. Refer to the HP 4284A *Operation Manual* for details.

Caution



Do not touch the measurement pins of the SWM or the contact pads of the relay test adapter with bare hands. Oil, perspiration, and dirt prevent good electrical contact and degrade measurement accuracy.

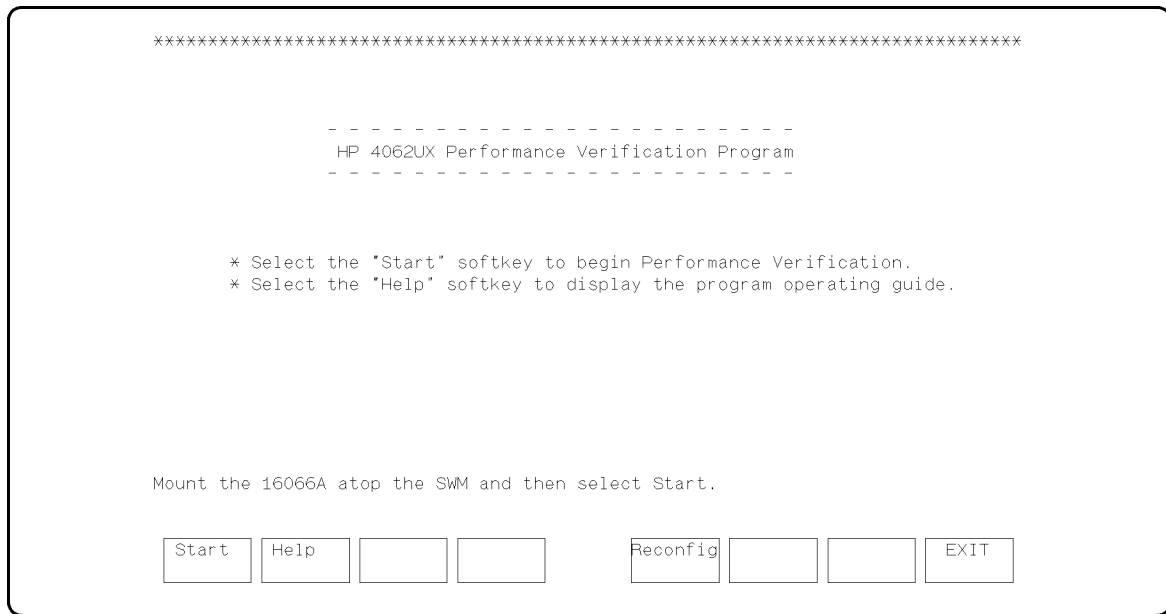


Figure 6-5. 4062UX W/O DVM Test Startup Page

2. To verify or change the calibrated values of the system calibration module, select the **Reconfig** softkey. The program displays the RECONFIG page, which shows the presently set system calibration module and its calibrated values. Refer to the data sheet furnished with the system calibration module for the correct calibrated values.

To display a brief operating guide, select the **Help** softkey. To return to the startup menu page, select the **Return** softkey.

If this step is not required, proceed to step 6.

3. The calibration module menu page shown in Figure 6-6 shows the product number of the calibration modules. For a 48-pin SWM system, “16346A,” “16346B,” and “16346C” is shown, and for 96-pin SWM system, “16366A” and “16366B” is shown. Hewlett-Packard recommends using the HP 16346B for performance verification of the HP 4085B SWM.

Select the desired softkey of the product number according to your system instrument. For example, if your system is equipped with an HP 4284A CMU84 and a 48-pin SWM, select the **16346B** and **16346C** softkeys and modify both calibration module data.

HP 4062UX PERFORMANCE VERIFICATION

Calibration Modules:

16346A : SMU TEST, VS TEST, VM TEST, AFU TEST,
CMS C-G TEST, CMS BIAS TEST

16346B : SMU TEST, VS TEST, VM TEST, AFU TEST,
CMS C-G TEST, CMS BIAS TEST

16346C : CMU84 C-G TEST, CMU84 BIAS TEST

Select a System Calibration Module for the calibration data entry.

16346A

16346B

16346C

Start-up
Menu

Figure 6-6. Calibration Module Menu Page for 48-pin SWM System

4. Figure 6-7 shows an example of an HP 16346C calibration data entry page. The field pointer shows the entry of data and, if it is re-entered, the current data is displayed in the display area. If you want to change the current data, move the field pointer using the arrow keys or the **Tab** key and type in new data and **Return**. After entering the calibration data, select the **SAVE/EXIT** softkey to return to the calibration module menu page.

Use the same method to enter calibration data for other calibration modules.

* HP 4062UX PERFORMANCE VERIFICATION *

		DC	1 KHz	10 KHz	100 KHz	1 MHz
100 ohm	R	100.00 ohm				
	C					0.0000 pF
1 Kohm	R	1.0000 Kohm				
	C					0.0000 pF

100 pF	C			100.00 pF	100.00 pF	100.00 pF
1000 pF	C		1000.0 pF	1000.0 pF	1000.0 pF	1000.0 pF
10 nF	C		10.000 nF	10.000 nF	10.000 nF	
100 nF	C		100.00 nF	100.00 nF		

Enter a value (100 ohm).
100.00

CANCEL

SAVE /
EXIT

Figure 6-7. An Example of Calibration Data Entry Page: HP 16346C

5. After entering the necessary calibration data, select the **Start-up Menu** softkey on the calibration module menu page to return to the startup page.

6. If your HP 4062UX system is equipped with a CMU84, perform the OPEN and SHORT corrections of the CMU84. To do so, select the **HP4284A Corr.** softkey and follow the displayed prompts. It takes about three minutes for the corrections.

For OPEN correction, disconnect the BNC-BNC cables from the SWM and remove the BNC-BNC cables and BNC f-to-f adapters as shown in Figure 6-8.

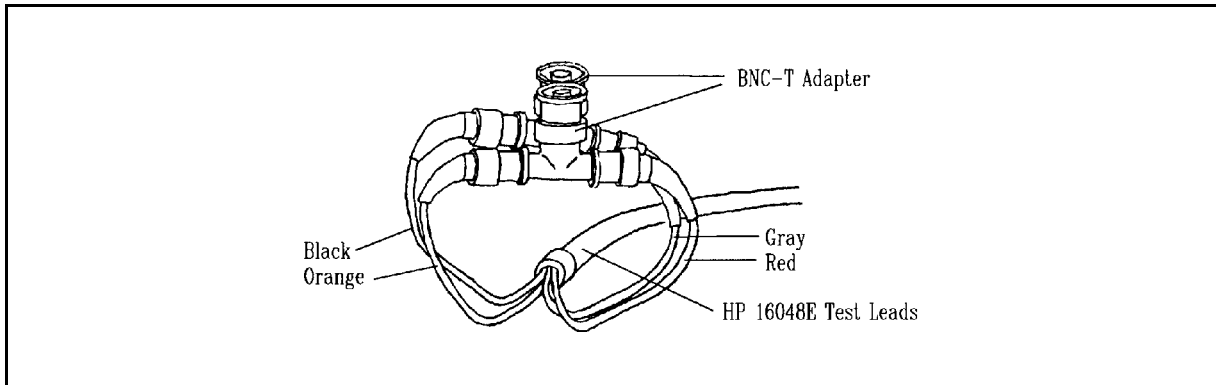


Figure 6-8. Test Lead Connections for OPEN Correction

For SHORT correction, interconnect the BNC-T adapters with a BNC f-to-f adapter as shown Figure 6-9.

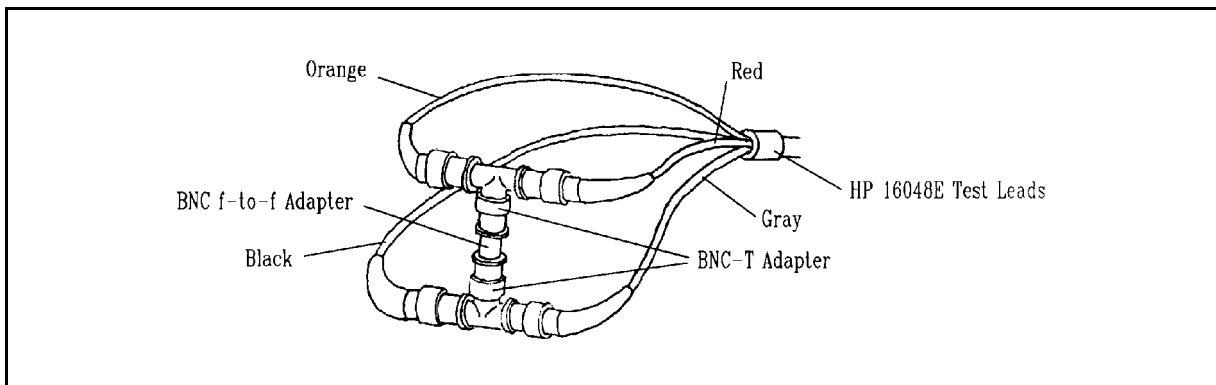


Figure 6-9. Test Lead Connections for SHORT Correction

After the OPEN and SHORT corrections, connect the test leads to the SWM using the BNC-BNC cables and the BNC f-to-f adapters.

7. Select the **Start** softkey. The 4062UX W/O DVM test menu page similar to Figure 6-10 is displayed.

```

M E N U
Relay Test          *
SWM Test           *
VS Test            *
VM Test            *
AFU Test           *
CMU84 C-G Test     *
CMU84 Bias Test    *
DC Leakage Test    *
*****

Before executing the desired test, attach the proper adapter to the SWM.

Relay Test ..... 16075A
SMU, VS, VM, AFU, CMU C-G, CMU BIAS Tests ... 16346A/B
CMU84 C-G, CMU84 BIAS Tests ..... 16346C
DC LEAK Test ..... 16066A

Select the desired softkey ----- Press [SHIFT][MENU] for more keys.

```

RELAY

SMU

VS

VM

AFU

CMU84
C-G

CMU84
BIAS

DC LEAK

Figure 6-10. 4062UX W/O DVM Menu Page

8. Press **Shift** **Menu** to display additional softkeys. Be sure the (empty) test fixture adapter is installed on the SWM, and select the **SEQ** softkey to perform all 4062UX W/O DVM subtests sequentially.

9. The following message is displayed:

Do you want to keep results in a file? (Type CAT to get file catalog)

To continue testing without keeping test results, select the **No** softkey and proceed to step 11. Note, however, that Hewlett-Packard recommends that you save all test results for future reference.

To view the file catalog, enter CAT **Return**.

To keep the test results, select the **Yes** softkey.

10. The following message is displayed:

Type filename. Press RETURN to cancel.

Enter the filename for the PV test results. Do not specify a file name on the current directory or on the current flexible disk. Hewlett-Packard recommends that you keep the test results in the /usr/pcs/diag/data or /PCS/DIAG/DATA directory or on a working copy flexible disk. For example, enter as follows:

DATA/PVW00190 **Return** or

data/PVW00190 **Return**

or

PVW00190: ,700,1 **Return**

The file name “PVW00190” stands for “Performance Verification W/O DVM, January 1990.” The DATA or data directory is used to store the PV data or DIAG data.

11. The PV test results data entry page is displayed, similar to that shown in Figure 6-11, for entering test information. Follow the instructions displayed.

HP 4062UX		Tested by _____	
Semiconductor Process Control System		Date _____ 21 Jan 1990	
Serial Number _____		Humidity _____	
Temperature _____		Serial Number _____	
4085B SWITCHING MATRIX	PRESENT	Serial Number	_____
4084B SWITCHING MATRIX CONTROLLER	PRESENT	Serial Number	_____
4142B DC SOURCE/MONITOR	PRESENT	Serial Number	_____
4280A C METER/C-V PLOTTER		Serial Number	_____
4284A 20Hz-1MHz PRECISION LCR METER	PRESENT	Serial Number	_____
Slot1	41421B (SMU1)	Serial Number	_____
Slot2		Serial Number	_____
Slot3	41420A (SMU2)	Serial Number	_____
Slot4	41421B (SMU3)	Serial Number	_____
Slot5	41421B (SMU4)	Serial Number	_____
Slot6	41424A (VS1/2, VM1/2)	Serial Number	_____
Slot7		Serial Number	_____
Slot8	41425A (AFU)	Serial Number	_____
Tested by ?			

Figure 6-11. PV Test Results Data Entry Page

Figure 6-12 shows an example PV data entry page with test result data. After you enter the test result data, reply to the displayed prompt: select the **Yes** softkey if all information is correct, or the **No** softkey to correct erroneous information.

HP 4062UX		Tested by <u>Cheryl Jenkins</u>	
Semiconductor Process Control System		Date <u>21 Jan 1990</u>	
Serial Number <u>2830J00165</u>		Humidity <u>47 %</u>	
Temperature <u>23 degrees Celsius</u>			
4085B SWITCHING MATRIX	PRESENT	Serial Number	<u>2814J00060</u>
4084B SWITCHING MATRIX CONTROLLER	PRESENT	Serial Number	<u>2520J00456</u>
4142B DC SOURCE/MONITOR	PRESENT	Serial Number	<u>2716J00103</u>
4280A C METER/C-V PLOTTER		Serial Number	<u>2246J00052</u>
4284A 20Hz-1MHz PRECISION LCR METER	PRESENT	Serial Number	<u>2848J00742</u>
Slot1	41421B (SMU1)	Serial Number	<u>2715J10104</u>
Slot2		Serial Number	<u> </u>
Slot3	41420A (SMU2)	Serial Number	<u>2715J10102</u>
Slot4	41421B (SMU3)	Serial Number	<u>2715J10105</u>
Slot5	41421B (SMU4)	Serial Number	<u>2715J10106</u>
Slot6	41424A (VS1/2,VM1/2)	Serial Number	<u>2715J10102</u>
Slot7		Serial Number	<u> </u>
Slot8	41425A (AFU)	Serial Number	<u>2715J10102</u>
Are you sure ?			
Yes	No		

Figure 6-12. Example PV Test Results Data Entry Page

12. Install the relay test adapter on the SWM and select the **NEXT** softkey. The Relay Test starts immediately.

If a faulty relay is detected, the Relay Test stops and an error message like the one below is displayed:

```
PV. ERROR !! A relay is open (contacts will not MAKE).
Relay#K21 on pin board#26.
Normally open contacts of a SENSE TRANSFER relay not functioning
properly.
```

While testing the HP 4085B 48-pin SWM, the Relay Test performs a Pin Board Test, which checks all relays on the pin boards on/off (make/break) operation. When the Relay Test finishes without errors, the test results are displayed as shown in Figure 6-13.

When testing the HP 4089B 96-pin SWM, the Relay Test performs a Pin Board Test and an Input Relay Test, which checks all input relays on the port boards on/off (make/break) operation. Note that you must remove the relay test adapter from the SWM when performing the Input Relay Test.

If the SWM has a port expander, the Relay Test also tests the port expander relays. Disconnect all unsupported instruments. Place BNC shorting caps on the connectors in place of the unsupported instruments and also on unused coaxial connectors.

When the Relay Test finishes without errors, test results are displayed as shown in Figure 6-14. If the port expander relays are also tested, the test results are displayed as follows:

```

+++++++ RELAY TEST ++++++
|          | BLOCK 1 (1-48) | BLOCK 2 (49-96) |
| PIN BOARDS | OK          | OK          |
| INPUT BOARDS | OK          | OK          |
| PORT EXPANDER | OK          |

```

```

+++++++ RELAY TEST ++++++
| RELAY TEST | OK          |

```

---TEST RESULTS---	
RELAY	OK
SMU	
VS	
VM	
AFU	
CMS C-G	
CMS BIAS	
DC LEAK	

RELAY TEST FINISHED

SMU Test is next. Mount the 16346B atop the SWM and then select NEXT.

Figure 6-13. Relay Test Results Page for 48-pin SWM

```

+++++++ RELAY TEST ++++++
|          | BLOCK 1 (1-48) | BLOCK 2 (49-96) |
| PIN BOARDS | OK          | OK          |
| INPUT BOARDS | OK          | OK          |

```

---TEST RESULTS---	
RELAY	OK
SMU	
VS	
VM	
AFU	
CMS C-G	
CMS BIAS	
DC LEAK	

RELAY TEST FINISHED

SMU Test is next. Mount the 16366A atop the SWM and then select NEXT.

Figure 6-14. Relay Test Results Page for 96-pin SWM

13. Install the system calibration module on the SWM and select the **NEXT** softkey to start the SMU Test. When the test finishes, test results are displayed as shown in Figure 6-15.

DCS PASSED SELF-TEST			
+++++ SMU TEST +++++			
RESULT	REPEAT	OK	SPOT OK

SMU TEST FINISHED

---TEST RESULTS---	
RELAY	OK
SMU	OK
VS	
VM	
AFU	
CMS C-G	
CMS BIAS	
DC LEAK	

SMU TEST FINISHED

VS Test is next. Select NEXT to go on. Select SKIP to skip this test.

Figure 6-15. SMU Test Results Page

14. Select the **NEXT** softkey to start the VS Test. Follow the VS to AUX port connection instructions on the display. When the VS Test finishes, test results are displayed as shown in Figure 6-16.

+++++ VS TEST +++++	
VS	OK

VS TEST FINISHED

---TEST RESULTS---	
RELAY	OK
SMU	OK
VS	OK
VM	
AFU	
CMS C-G	
CMS BIAS	
DC LEAK	

VM Test is next. Select NEXT to go on. Select SKIP to skip this test.

Figure 6-16. VS Test Results Page

15. Select the **NEXT** softkey to start the VM Test. Follow the VM to AUX port connection instructions on the display. When the VM Test finishes, test results are displayed as shown in Figure 6-17.

+++++++ VM TEST +++++++		---TEST RESULTS---	
VM	OK	RELAY	OK
		SMU	OK
		VS	OK
		VM	OK
		AFU	
		CMS C-G	
		CMS BIAS	
		DC LEAK	
VM TEST FINISHED			
AFU Test is next. Select NEXT to go on. Select SKIP to skip this test.			
NEXT	SKIP		
			EXIT

Figure 6-17. VM Test Results Page

16. Select the **NEXT** softkey to start the AFU Test. When the AFU Test finishes, test results are displayed as shown in Figure 6-18.

+++++++ AFU TEST +++++++		---TEST RESULTS---	
AFU	OK	RELAY	OK
		SMU	OK
		VS	OK
		VM	OK
		AFU	OK
		CMS C-G	
		CMS BIAS	
		DC LEAK	
AFU TEST FINISHED			
CMS C-G Measurement Test is next. Select NEXT.			
NEXT	SKIP		
			EXIT

Figure 6-18. AFU Test Results Page

17. If the system is equipped with an HP 4280A CMU, it proceeds to the CMS C-G Test when you select the **NEXT** softkey. Go to next step.

If the system is equipped with an HP 4284A CMU84, it proceeds to the CMU84 C-G Test when you select the **NEXT** softkey. Go to step 19.

18. The CMS C-G Test is performed. When the test finishes, test results are displayed as shown in Figure 6-19 for 48-pin SWM, and as shown in Figure 6-20 for 96-pin SWM.

CMS PASSED SELF-TEST
+++++++ CMS TEST ++++++

CMS C-G	OK
STRAY CAP.	OK
C.VALUE	.087 .085 pF

CMS C-G TEST FINISHED

CMS Bias Test is next. Select NEXT.

---TEST RESULTS---

RELAY	OK
SMU	OK
VS	OK
VM	OK
AFU	OK
CMS C-G	OK
CMS BIAS	
DC LEAK	

NEXT
SKIP

EXIT

Figure 6-19. CMS C-G Test Results Page for 48-pin SWM

CMS PASSED SELF-TEST
+++++++ CMS TEST ++++++

CMS C-G	OK	Range
Csample	100.000 pF	
Cmeas.val	100.013 pF	100 pF
Gsample	0.000 uS	
Gmeas.val	.890 uS	1 mS
STRAY CAP.	OK	
C.VALUE	.024 .029 .025 pF	

Gmeas accuracy : < 4 uS
Cmeas accuracy : 100.024 +/- .6 pF
CMS C-G TEST FINISHED

CMS Bias Test is next. Select NEXT.

---TEST RESULTS---

RELAY	OK
SMU	OK
VS	OK
VM	OK
AFU	OK
CMS C-G	OK
CMS BIAS	
DC LEAK	

NEXT
SKIP

EXIT

Figure 6-20. CMS C-G Test Results Page for 96-pin SWM

19. Select the **NEXT** softkey to start the CMS Bias Test. When the test finishes, test results are displayed as shown in Figure 6-21.

Go to step 21.

+++++++ CMS BIAS +++++++		---TEST RESULTS---	
CMS BIAS	OK	RELAY	OK
SHORT CAP	PRESENT	SMU	OK
		VS	OK
		VM	OK
		AFU	OK
		CMS C-G	OK
		CMS BIAS	OK
		DC LEAK	

CMS BIAS TEST FINISHED

DC Leakage Test is next. Mount the 16066A atop the SWM, and then select NEXT.

NEXT
SKIP

EXIT

Figure 6-21. CMS Bias Test Results Page for HP 4280A

20. The CMU84 C-G Test is performed. For the 48-pin SWM, make sure that the HP 16346C Calibration Module is installed on the SWM. For the 96-pin SWM, make sure that the HP 16366B Calibration Module is installed on the SWM.

When the test finishes, test results are displayed as shown in Figure 6-22.

+++++++ CMU84 TEST ++++++				----TEST RESULTS----	
CMU84 C-G	OK	RELAY	OK	SMU	OK
STRAY CAP.	OK	VS	OK	VM	OK
C. VALUE	(higher) .283 pF	AFU	OK	CMU84 C-G	OK
	(lower) .247 pF	CMU84 BIAS		DC LEAK	

CMU84 C-G TEST FINISHED

CMU84 Bias Test is next. Select NEXT.

NEXT
SKIP

EXIT

Figure 6-22. CMU84 C-G Test Results page for HP 4284A

21. Select the **NEXT** softkey to start the CMU84 Bias Test. When the test finishes, test results are displayed as shown in Figure 6-23.

+++++++ CMU84 BIAS +++++++

CMU84 BIAS	OK
------------	----

CMU84 BIAS TEST FINISHED

DC Leakage Test is next. Mount the 16066A atop the SWM, and then select NEXT.

NEXT	SKIP						EXIT
------	------	--	--	--	--	--	------

----TEST RESULTS----	
RELAY	OK
SMU	OK
VS	OK
VM	OK
AFU	OK
CMU84 C-G	OK
CMU84 BIAS	OK
DC LEAK	

Figure 6-23. CMU84 Bias Test Results Page for HP 4284A

22. For the DC Leakage Test, make sure only the test fixture adapter is installed on the SWM.
- Select the **NEXT** softkey to start the DC Leakage Test.
- When the DC Leakage Test finishes, test results are displayed as shown in Figure 6-24.

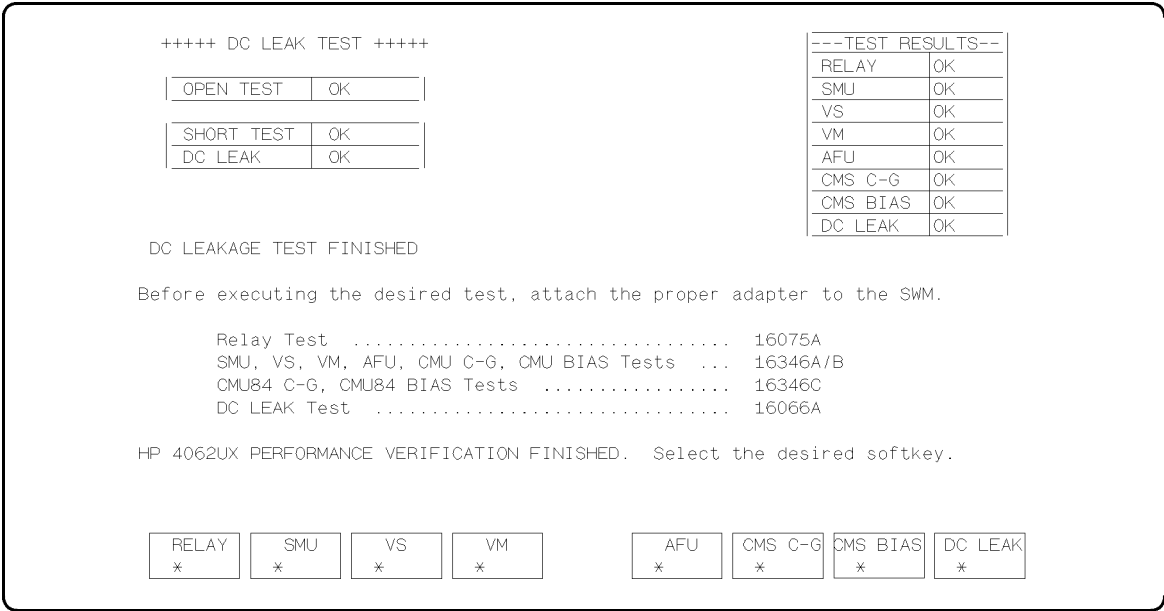


Figure 6-24. DC Leak Test Results Page

23. When all 4062UX W/O DVM tests are finished, press **Shift** **Menu** and select the **EXIT** softkey to return the PV4062 main menu page.

Displaying and Printing Test Results

If the PV test results were saved during the 4062UX W/O DVM test (in step 8), use the View Result function of the PV4062 to see the test results. You can see the test results on the controller display or on a printed copy from the system printer. The procedures for displaying and printing test results follow:

Displaying PV test results:

1. From the PV4062 main menu page (Figure 6-4), select the **VIEW RESULT** softkey, and the View Result Start page is displayed.
2. Select the **READ FILE** softkey to obtain PV test results.
3. Enter the name of the file that contains the PV test results. For example, using the file name in step 8 of the 4062UX W/O DVM test, enter PVW00190 **Return**.
4. Select the **CRT** softkey to display test results. A View Results Display page similar to Figure 6-25 is displayed. Select the **MORE** softkey to display the next page of test results.

Test Facility:	
Hewlett-Packard	Report No. _____
_____	Date _____30 May 1991
_____	Customer _____
_____	Tested by _____Cheryl Jenkins
HP 4062UX:	
Serial Number _____2830J00165	Temperature ___23 degrees Celsius
Firmware Revision _____	Humidity _____47 %
	Line Frequency _____Hz(nominal)
User 1 Caps Running	
MORE EXIT	

Figure 6-25. An Example Page of View Result (CRT)

Printing PV test results:

1. From the PV4062 main menu page (Figure 6-4), select the **VIEW RESULT** softkey, and the View Result Start page is displayed.
2. Select the **READ FILE** softkey to obtain PV test results.
3. Enter the name of the file that contains the PV test results. For example, using the file name in step 8 of the 4062UX W/O DVM test, enter PVW00190 **Return**.

6-22 System Verification

4. Select the **PRINTER** softkey. The printer configuration page is displayed as shown in Figure 6-26.

***** CONFIGURATION *****

PRINTER TYPE = LOCAL
PRINTER ADDR = 701
PRINTER I/F = HP-IB
PAGE LENGTH = 66
MARGIN : TOP = 2 BOTTOM = 2 LEFT = 0
PAGE NUMBERING = ON

Select desired softkey.

PRINT

RECONFIG

EXIT

Figure 6-26. An Example of Printer Configuration Page

5. To change the printer configuration, select the **RECONFIG** softkey. Refer to Appendix A for information to configure the system printer.

If the printer configuration is correct and if the printer is ready, select the **PRINT** softkey. A print out similar to Figure 6-27 is printed.

○	Test Facility		Report No. _____	○
○	Hewlett-Packard		Date _____ 30 May 1991	○
○	_____		Customer _____	○
○	_____		Tested by _____ Cheryl Jenkins	○
○	HP 4062UX:			○
○	Serial No. _____ 2814J00060		Temperature ____ 23 degrees Celsius	○
○	Firmware Revision _____		Humidity _____ 47 %	○
○			Line Frequency _____ Hz(nominal)	○
○	Configuration			○
○	4085B SWITCHING MATRIX		PRESENT Serial No. _____ 2814J00060	○
○	4084B SWITCHING MATRIX CONTROLLER		PRESENT Serial No. _____ 2520J00456	○

○	Model: HP4062UX	Report No.: 101	Date: 30 May 1991	○		
○	=====					
○	TEST DESCRIPTION	Minimum	Results	Maximum	Uncertainty	Fail
○	=====					
○	SMU Accuracy Test					
○	-----					
○	Self-test					
○	-----					
○	Repeat Test					
○	-----					
○	SMU1					
○	-----					
○	Vf/Im	-52.0 V	-.740%	-.019%	+.740%	
○	If/Vm	-5.2E-5 a	-.740%	-.027%	+.740%	
○	-----					
○	vF/iM	-47.0 v	-.772%	-.030%	+.772%	

Figure 6-27. An Example Page of View Result (Printer)

System Performance Verification for HP 4062F

The Performance Verification (PV) program verifies the system performance of the HP 4062F. It is contained in the PV4062.F file. The PV4062.F file is in the `/usr/pcs/diag` directory.

The PV4062.F program is completely interactive and consists of the following six parts:

- 4062F DC W/O DVM
- 4062F DC W/ DVM
- 4142B
- 4062F AC
- START
- VIEW RESULT

After installation, you must perform the 4062F DC W/O DVM, then connection and calibration of 4062F AC tests. To display or print verification results, use the VIEW RESULT function. The 4142B and START tests are used for troubleshooting purposes.

Before running PV4062.F, make sure that no system instrument has failed self-test at power on. For failures, refer to manual of the instrument that failed for instructions on handling self-test failures.

Note



The HP 4062F needs at least 40 minutes to warm up. If you don't allow the HP 4062F enough time to warm up, Hewlett-Packard does not guarantee any performance verification data.

Table 6-3 shows the equipment required to run performance verification.

Table 6-3. Required Equipment for Performance Verification

Required Equipment	Test Name	
	4062F DC W/O DVM	4062F AC (Connection Test and Calibration)
HP 16066A Test Fixture Adapter ¹	✓	
HP 16075F Relay Test Adapter ¹	✓	
04085-60006 Relay Test Shorting Adapter ¹	✓	
HP 16346A/B System Calibration Module ²	✓	
HP 16346C System Calibration Module ³	✓	
HP 10503A or 8120-1840 BNC-BNC Cable (2 cables)		✓
HP 10833B/C HP-IB Cable		✓
HP 16354F Pulse Test Module ¹		✓
HP 54121T Digitizing Oscilloscope		✓
HP 33340C Option 020 20 dB Attenuator		✓
1250-1200 SMA(m)-to-BNC(f) Adapter		✓

1 Furnished with the HP 4062F system.

2 If HP 41420A 200 V/1 A SMU is installed in the HP 4142B, the HP 16346B must be used for the W/O DVM tests.

3 If the HP 4062F is equipped with an HP 4284A Precision LCR Meter, both the HP 16346B and the HP 16346C are required for the 4062F DC W/O DVM tests. Otherwise, only the HP 16346B is required.

Note

Make sure HP 16346A/B/C, HP 3456A/HP 3458A, and HP 54121T are calibrated. Refer to the operation or service manual of each product for the calibration cycle.

Note

For performance verification, pin boards must be installed in the SWM at following pin board slots at least:

slots: 4, 8, 12, 16, 20, 24, 28, 32, 36, 40, 44, and 48

Running PV4062.F

To start PV4062.F, perform the following procedure:

- 1. Turn the system controller on and boot the HP-UX system.
- 2. Log in as a superuser.
- 3. Change the current directory to the /usr/pcs/diag directory as follows:

```
# cd /usr/pcs/diag
```

- 4. Enter the HP BASIC/UX environment as follows:

```
# rmb
```

- 5. Load and run the PV4062.F program as follows:

```
LOAD "PV4062.F" Return  
RUN Return or select the RUN softkey
```

PV4062.F main menu page is displayed as shown in Figure 6-28.

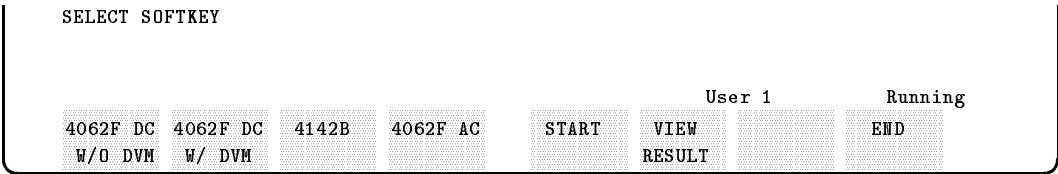


Figure 6-28. PV4062.F Menu Page (HP 4062F)

- 6. Install the HP 16066A test fixture adapter on the SWM.

Note



The test fixture adapter (with no test fixture installed) is used to hold the WAFER PROBER SENSE switch closed during this test (to enable the SWM). If the test fixture adapter is not available, press and hold the WAFER PROBER SENSE switch during this test.

Warning



The WAFER PROBER SENSE switch detects whether or not the switching matrix is positioned (lowered) atop the prober and enables output voltage or current from the measurement pins. If the WAFER PROBER SENSE switch is pressed, dangerous dc voltage exceeding ±42 V may be present at the measurement pins. Severe electrical shock will results if pins are touched.

“4062F DC W/O DVM” Test

The 4062F DC W/O (without) DVM test provides the following ten subtests for verifying SWM, DCS, and CMU or CMU84 operation.

- Relay Test
- SMU Test
- VS Test
- VM Test
- AFU Test
- CMS C-G Test or CMU84 C-G Test
- CMS Bias Test or CMU84 Bias Test
- DC leak Test

The 4062F DC W/O DVM test provides two test modes: sequential and individual. In the sequential test mode, this test performs all subtests in the sequence listed above. In the individual test mode, tests can be performed individually in any desired sequence. For both test modes, the program displays a running record of test results.

To verify HP 4062F after installation, you must execute *all* these subtests sequentially, and save the test results in a file for future reference.

So, this section provides instructions for performing all subtests of 4062F DC W/O DVM in the *sequential test mode* only. For details about each test and for system troubleshooting procedures, refer to the HP 4062C/UX *Service Manual*.

Required Equipment

- ☐ Relay test adapter
- ☐ Relay test shorting adapter
- ☐ System calibration module
- ☐ Test fixture adapter

Test Procedure

1. Select the **4062F DC W/O DVM** softkey.

After selecting the **4062F DC W/O DVM** softkey, the START.F program runs for about one minute.

When START finishes, a configuration page of START similar to that shown in Figure 6-3 is displayed for less than a second, then the start-up menu page as shown in Figure 6-29 appears on the screen.

If your HP 4062F system is equipped with an HP 4284A CMU84, the **HP4284A Corr.** softkey is also displayed. If you select this softkey, the CMU84 performs the OPEN and SHORT correction. However, you do not need to execute this correction to verify HP 4062F system installation. Refer to the HP 4284A *Operation Manual* for details.

Caution



Do not touch the measurement pins of the SWM or the contact pads of the relay test adapter with bare hands. Oil, perspiration, and dirt prevent good electrical contact and degrade measurement accuracy.



Figure 6-29. 4062F DC W/O DVM Test Startup Page

2. To verify or change the calibration values of the system calibration module, select the **Reconfig** softkey. Refer to the *CALIBRATION REPORT* sheet furnished with the system calibration module for the correct calibration values.

To display a brief operating guide, select the **Help** softkey. To return to the startup menu page, select the **Return** softkey.

If this step is not required, go to step 3.

- a. The calibration module menu page shown in Figure 6-30 shows the product number of the calibration modules: “16346A,” “16346B,” and “16346C”. Hewlett-Packard recommends using the HP 16346B for performance verification of the HP 4085F SWM. If your system is equipped with an HP 4284A CMU84, an HP 16346C is also required.

Select the desired softkey of the product number according to your system instrument. For example, if your system is equipped with an HP 4284A CMU84, select the **16346B** softkey and modify the calibration data, then select **16346C** softkey and modify the calibration data.

HP 4062F PERFORMANCE VERIFICATION

Calibration Modules:

16346A : SHU TEST, VS TEST, VH TEST, AFU TEST,
CHS C-G TEST, CHS BIAS TEST

16346B : SHU TEST, VS TEST, VH TEST, AFU TEST,
CHS C-G TEST, CHS BIAS TEST

16346C : CHU84 C-G TEST, CHU84 BIAS TEST

Select a System Calibration Module for the calibration data entry.

16346A16346B16346C

User 1CapsRunning

Start-upMenu

Figure 6-30. Calibration Module Menu Page

- b. Figure 6-7 shows an example of an HP 16346C calibration data entry page. You can move the field pointer by using the arrow keys or the **Tab** key. The data at the field pointer is displayed in the display area. If you want to change the displayed data, type in new data, then press **Return**. After entering the calibration data, select the **SAVE/EXIT** softkey to return to the calibration module menu page.

Use the same method if you need to enter calibration data for other calibration modules.

* HP 4062F PERFORMANCE VERIFICATION *

		DC	1 KHz	10 KHz	100 KHz	1 MHz
100 ohm	R	100.00 ohm				
	C					0.0000 pF
1 Kohm	R	1.0000 Kohm				
	C					0.0000 pF

100 pF	C		100.00 nF	100.00 nF	100.00 nF
1000 pF	C	1000.0 pF	1000.0 pF	1000.0 pF	1000.0 pF
10 nF	C	10.000 nF	10.000 nF	10.000 nF	
100 nF	C	100.00 nF	100.00 nF		

Enter a value (100 ohm).

100.00

User 1
Caps
Running

CANCEL
SAVE / EXIT

Figure 6-31. Example of Calibration Data Entry Page: HP 16346C

Note



Calibration data is stored in the `/usr/pcs/diag/CAL_PV` file and is used each time the PV software is run.

- c. After entering the necessary calibration data, select the **Start-up Menu** softkey on the calibration module menu page.
- d. Select softkey of your system calibration module.

3. Select the **Start** softkey. The 4062F DC W/O DVM test menu page similar to Figure 6-32 is displayed.

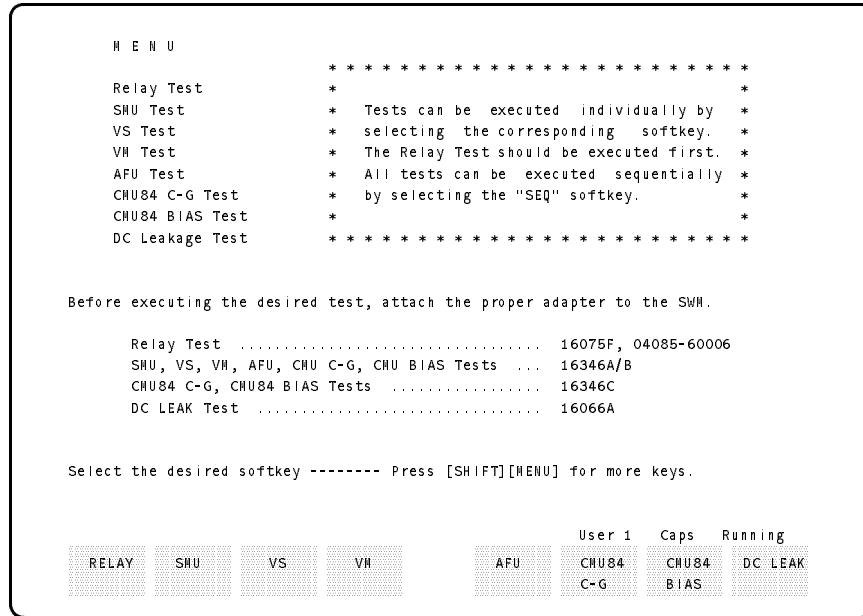


Figure 6-32. 4062F DC W/O DVM Menu Page

4. Press **Shift** **Menu** to display additional softkeys. Be sure the test fixture adapter (with no test fixture) is installed on the SWM, then select the **SEQ** softkey to perform all 4062F DC W/O DVM subtests sequentially.

5. The following message is displayed:

Do you want to keep results in a file? (Type CAT to get file catalog)

For performance verification after system installation, you should save all test results to a file. So, select **Yes** softkey. Default file name is displayed: */usr/pcs/diag/data/PVW0 Month Year*.

- To not save results to a file, select **No** softkey. Then, go to step 6.
- To list existing file names, type: CAT **(Return)**.
- To save results to a file, select the **Yes** softkey. The following message is displayed:

Type filename. Clear line and press RETURN to cancel.

- a. Edit filename using arrow keys if desired.

Do not use same file name as for 4062F DC W DVM or 4062F AC tests. Also, do not save to present directory (*/usr/pcs/diag* directory). Hewlett-Packard recommends to save PV and DIAG results in */usr/pcs/diag/data* directory. For example, enter as follows:

data/PVW00294 **(Return)**

(PVW00294: Performance Verification W/O DVM, February (02) 1994.)

- b. If you entered an existing file name, go to step 6.

If you entered a new file name, a page is displayed (similar to that shown in Figure 6-33) for entering test information. Follow displayed instructions.

HP 4062F				Tested by _____	
Semiconductor Parametric Test System				Date _____ 1 Feb 1994	
Serial Number _____				Humidity _____	
Temperature _____				Serial Number _____	
4085F	SWITCHING MATRIX	PRESENT	Serial Number _____		
4084B	SWITCHING MATRIX CONTROLLER	PRESENT	Serial Number _____		
4142B	DC SOURCE/MONITOR	PRESENT	Serial Number _____		
4280A	C METER/C-V PLOTTER		Serial Number _____		
4284A	20Hz-1MHz PRECISION LCR METER	PRESENT	Serial Number _____		
Slot 1	41421B	(SHU1)	Serial Number _____		
Slot 2			Serial Number _____		
Slot 3	41420A	(SHU2)	Serial Number _____		
Slot 4	41421B	(SHU3)	Serial Number _____		
Slot 5	41421B	(SHU4)	Serial Number _____		
Slot 6			Serial Number _____		
Slot 7	41424A	(VS1/2,VM1/2)	Serial Number _____		
Slot 8	41425A	(AFU)	Serial Number _____		
Tested by ?					
EDIT Continue RUN SCRATCH LOAD "" RE-STORE "" Delete TIS Input? Link TIS					

Figure 6-33. PV Test Results Data Entry Page

After you enter the test information, reply to displayed prompt "Are you sure?": select **Yes** softkey if all information is correct, or **No** softkey if you need to re-enter information.

6. Relay Test

Install the HP 16075F Relay Test Adapter and relay test shorting adapter (HP part number 04085-60006) on the SWM, then select the **NEXT** softkey. The Relay Test starts immediately.

If a faulty relay is detected, the Relay Test stops and an error message like the one below is displayed:

```
PV. ERROR !!  A relay is open (contacts will not MAKE).  
Relay#K21 on pin board#26.  
Normally open contacts of a SENSE TRANSFER relay not functioning  
properly.
```

While testing the HP 4085F SWM, the Relay Test performs a Pin Board Test, which checks on/off (make/break) operation of all relays on the pin boards. If the Relay Test finishes without errors, the test results are displayed as shown in Figure 6-13.

The screenshot displays the 'RELAY TEST' results page. At the top, it shows '***** RELAY TEST *****' and a status bar with 'RELAY TEST OK'. A table titled '---TEST RESULTS---' lists various components and their status, all marked as 'OK'. Below the table, it states 'RELAY TEST FINISHED'. A message indicates the next step: 'SHU Test is next. Mount the 16346B atop the SWM and then select NEXT.' At the bottom, there are several softkey options: 'NEXT', 'SKIP', and 'EXIT'.

---TEST RESULTS---	
RELAY	OK
SHU	OK
VS	OK
VH	OK
AFU	OK
CHS C-G	OK
CHS BIAS	OK
DC LEAK	OK

RELAY TEST FINISHED

SHU Test is next. Mount the 16346B atop the SWM and then select NEXT.

User 1 Caps Running

NEXT SKIP EXIT

Figure 6-34. Relay Test Results Page

7. Remove the relay test shorting adapter from the SWM, then install the cable adapter.

8. SMU Test

Remove the relay test adapter from the SWM, install the HP 16346A/B System Calibration Module, then select the **NEXT** softkey to start the SMU Test. When the test finishes, test results are displayed as shown in Figure 6-15.

DCS PASSED SELF-TEST					---TEST RESULTS---	
***** SHU TEST *****					RELAY	OK
RESULT	REPEAT	OK	SPOT	OK	SHU	OK
					VS	
SHU TEST FINISHED					VH	
					AFU	
					CHS C-G	
					CHS BIAS	
					DC LEAK	
VS Test is next. Select NEXT to go on. Select SKIP to skip this test.						
User 1 Caps Running						
NEXT	SKIP					EXIT

Figure 6-35. SMU Test Results Page

9. VS Test

Select **NEXT** softkey to start VS Test. Follow VS to AUX port connection instructions.

***** VS TEST *****		---TEST RESULTS--	
VS	OK	RELAY	OK
		SHU	OK
		VS	OK
		VH	
		AFU	
		CHS C-G	
		CHS BIAS	
		DC LEAK	
VS TEST FINISHED			
VH Test is next. Select NEXT to go on. Select SKIP to skip this test.			
User 1 Caps Running			
NEXT	SKIP		EXIT

Figure 6-36. VS Test Results Page

10. VM Test

Select **NEXT** softkey to start VM Test. Follow VM to AUX port connection instructions.

***** VM TEST *****		---TEST RESULTS--	
VM	OK	RELAY	OK
		SHU	OK
		VS	OK
		VH	OK
		AFU	
		CHS C-G	
		CHS BIAS	
		DC LEAK	
VM TEST FINISHED			
AFU Test is next. Select NEXT to go on. Select SKIP to skip this test.			
User 1 Caps Running			
NEXT	SKIP		EXIT

Figure 6-37. VM Test Results Page

11. **AFU Test** Select the **NEXT** softkey to start the AFU Test. When the AFU Test finishes, test results are displayed as shown in Figure 6-18.

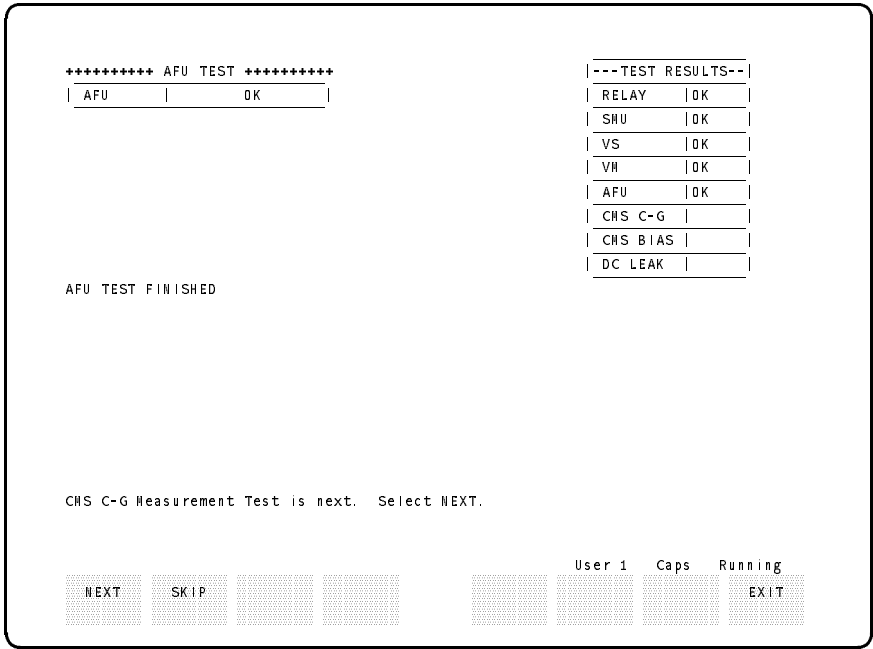


Figure 6-38. AFU Test Results Page

Note



- If the system is equipped with an HP 4280A CMU, the CMS C-G Test is next. Go to next step.
- If the system is equipped with an HP 4284A CMU84, the CMU84 C-G Test is next. Go to step 14.

12. CMS C-G Test

Select **NEXT** softkey to start CMS C-G Test. When test finishes, results are displayed:

CHS PASSED SELF-TEST		---TEST RESULTS---	
***** CHS TEST *****			
CHS C-G	OK	RELAY	OK
STRAY CAP.	OK	SHU	OK
C.VALUE	.087 .085 pF	VS	OK
		VH	OK
		AFU	OK
		CHS C-G	OK
		CHS BIAS	
		DC LEAK	
CHS C-G TEST FINISHED			
CHS Bias Test is next. Select NEXT.			
NEXT	SKIP	User 1	Caps Running
			EXIT

Figure 6-39. CMS C-G Test Results Page for HP 4280A

13. CMS Bias Test

Select **NEXT** softkey to start CMS Bias Test. When test finishes, results are displayed as shown in Figure 6-21. Go to step 16.

***** CHS BIAS *****		---TEST RESULTS---	
CHS BIAS	OK	RELAY	OK
SHORT CAP	PRESENT	SHU	OK
		VS	OK
		VH	OK
		AFU	OK
		CHS C-G	OK
		CHS BIAS	OK
		DC LEAK	
CHS BIAS TEST FINISHED			
DC Leakage Test is next. Mount the 16066A atop the SWH, and then select NEXT.			
NEXT	SKIP	User 1	Caps Running
			EXIT

Figure 6-40. CMS Bias Test Results Page for HP 4280A

14. CMU84 C-G Test

Select **NEXT** softkey to start CMU84 C-G Test. Make sure that HP 16346C calibration module is installed on SWM. When test finishes, results are displayed:

***** CHU84 TEST *****		----TEST RESULTS----	
CHU84 C-G	OK	RELAY	OK
STRAY CAP.	OK	SHU	OK
C.VALUE	(higher) .283 pF	VS	OK
	(lower) .247 pF	VH	OK
		AFU	OK
		CHU84 C-G	OK
		CHU84 BIAS	
		DC LEAK	

CHU84 C-G TEST FINISHED

CHU84 Bias Test is next. Select NEXT.

User 1 Caps Running			
NEXT	SKIP		EXIT

Figure 6-41. CMU84 C-G Test Results Page for HP 4284A

15. CMU84 Bias Test

Select **NEXT** softkey to start CMU84 Bias Test. When test finishes, results are displayed:

***** CHU84 BIAS *****		----TEST RESULTS----	
CHU84 BIAS	OK	RELAY	OK
		SHU	OK
		VS	OK
		VH	OK
		AFU	OK
		CHU84 C-G	OK
		CHU84 BIAS	OK
		DC LEAK	

CHU84 BIAS TEST FINISHED

DC Leakage Test is next. Mount the 16066A atop the SWM, and then select NEXT.

User 1 Caps Running			
NEXT	SKIP		EXIT

Figure 6-42. CMU84 Bias Test Results Page for HP 4284A

16. DC Leakage Test

For the DC Leakage Test, make sure only the test fixture adapter is installed on the SWM.

Select the **NEXT** softkey to start the DC Leakage Test.

When the DC Leakage Test finishes, test results are displayed as shown in Figure 6-24.

***** DC LEAK TEST *****		----TEST RESULTS----	
OPEN TEST	OK	RELAY	OK
SHORT TEST	OK	SHU	OK
DC LEAK	OK	VS	OK
		VH	OK
		AFU	OK
		CHU84 C-G	OK
		CHU84 BIAS	OK
		DC LEAK	OK

DC LEAKAGE TEST FINISHED

Before executing the desired test, attach the proper adapter to the SWM.

Relay Test		16075F, 04085-60006
SHU, VS, VH, AFU, CHU C-G, CHU BIAS Tests	...	16346A/B
CHU84 C-G, CHU84 BIAS Tests		16346C
DC LEAK Test		16066A

HP 4062F PERFORMANCE VERIFICATION FINISHED. Select the desired softkey.

				User 1 Caps Running		
RELAY	SHU	VS	VH	AFU	CHU84	CHU84
*	*	*	*	*	C-G *	BIAS *
						DC LEAK *

Figure 6-43. DC Leak Test Results Page

17. When all 4062F DC W/O DVM tests are finished, press **Shift** **Menu**, then select the **EXIT** softkey to return the PV4062.F main menu page.

“4062F AC” Test

The 4062F AC test provides the following five subtests for verifying the SWM and PG operation.

- Connection Test
- Calibration
- HP 8110A Self-test
- Switch Test
- Pulse Test

To verify HP 4062F after installation, you must execute connection test and calibration. So, this section provides instructions for performing the connection test and calibration of 4062F AC.

Note



To perform the 4062F AC Test, pin boards must be installed in the SWM at the following slots at least:

slots: 4, 8, 12, 16, 20, 24, 28, 32, 36, 40, 44, 48.

Required Equipment

- ☐ Pulse test module (HP 16354F)
- ☐ Digitizing oscilloscope (HP 54121T)
- ☐ HP-IB cable
- ☐ 20 dB attenuator
- ☐ SMA(m)-to-BNC(f) adapter
- ☐ BNC(m)-to-BNC(m) cable (less than 1.5 m)

Note



The HP 54121T oscilloscope must be warmed up for at least one hour.



Warning



When you execute the PV4062F.AC Test, be sure that the HP 16354F is removed from the HP 4085F SWM. Then mount the HP 16354F on the SWM according to messages displayed by the system software.

If you mount the HP 16354F on the SWM when a voltage or current source is forcing voltage or current, dangerous voltages may be present on the connectors of HP 16354F, and may shock you.

Preparation

The HP 54121T Digitizing Oscilloscope consists of the HP 54121A Four Channel Test Set and HP 54120B Digitizing Oscilloscope Mainframe. See the HP 54121T manual for setting up the HP 54121T.

1. Connect an HP-IB cable to the HP-IB connector on the rear panel of the oscilloscope.
2. Connect the other end of the HP-IB cable to the built-in HP-IB connector or the HP-IB card of the system controller.
3. Connect the probe cable as follows:
 - a. Remove the shorting cap from the INPUT 3 terminal of the HP 54121A.
 - b. Attach a 20 dB attenuator to the INPUT 3 terminal.
 - c. Attach a SMA(m)-to-BNC(f) adapter to the 20 dB attenuator.
 - d. Attach a BNC(m)-to-BNC(m) cable (less than 1.5 m) to the SMA-to-BNC adapter.
4. Remove 50 Ω terminator from the PG1 TRIG OUT cable, remove shorting cap from the TRIG terminal of the HP 54121A, then connect the cable to the TRIG terminal.
5. Confirm the HP-IB address settings of the HP 54120B. To do so, select **Utility**, then **HP-IB Menu** softkeys. The following settings are recommended:
 - HP-IB Address: 7 (default)
 - Talk/Listen
 - EOI: On

Test Procedure

1. Select **4062F AC** softkey from PV4062.F main menu. Preparation page is displayed as shown in Figure 6-44. Confirm that you have prepared everything as described on this page.

If COM blocks need to be redeclared, START program runs automatically to redeclare them. If so, configuration page is displayed temporarily, then preparation page is displayed.

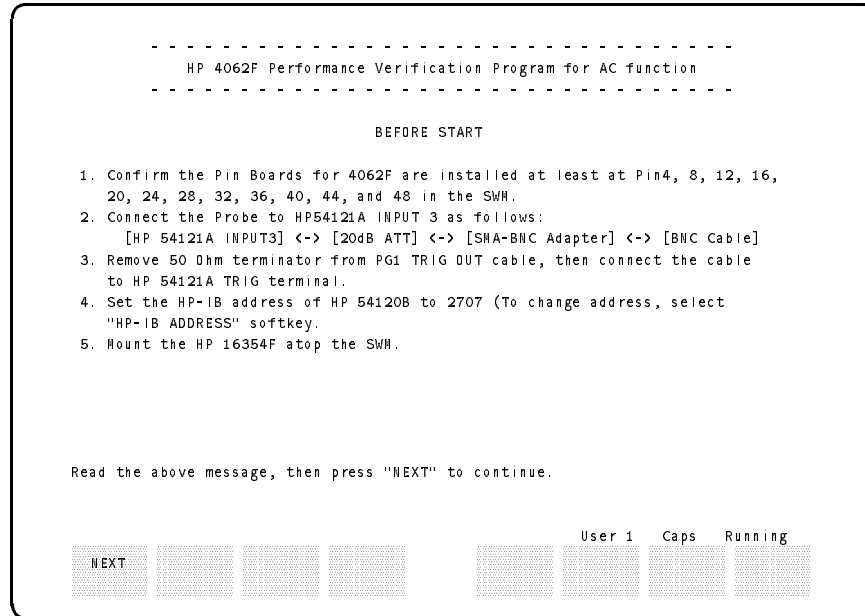


Figure 6-44. Preparation Page for 4062F AC

2. Install the pulse test module (HP 16354F) on the SWM.

3. Select the **NEXT** softkey. The HF port configuration page similar to Figure 6-45 appears. Confirm that this information is correct.

```
-----
HP 4062F Performance Verification Program for AC function
-----

*** HF PORT CONFIGURATION ***

HF1 PG11  HF2 PG12  HF3 PG21  1. Do not connect the PG to Switch
HF4 PG22  HF5      HF6      input, CTRL of Cable Adapter or to
HF7      HF8      HF9      AUX2/3/4 of SWH.
HF10     HF11     HF12     2. Do not connect one PG to multiple
                           HF ports using T-adapter, but
                           connect to one HF only.
                           3. If you want to connect a PG to
                           another HF port, edit the FLCDFNFIG,
                           then run the PV4062 again.

Read the above message, then press "NEXT" to continue.

User 1  Caps  Running
NEXT
```

Figure 6-45. HF Port Configuration Page

4. Select the **NEXT** softkey. The start-up page of the 4062F AC test appears.

```
-----
HP 4062F Performance Verification Program for AC function
-----

Select the desired softkey.

User 1  Caps  Running
START  HP-IB  EXIT
        ADDRESS
```

Figure 6-46. 4062F AC Test Startup Menu Page

5. If HP-IB settings are correct, select **START** softkey. Self-test of HP 8110As is executed. This is a dummy self-test and results are not stored.

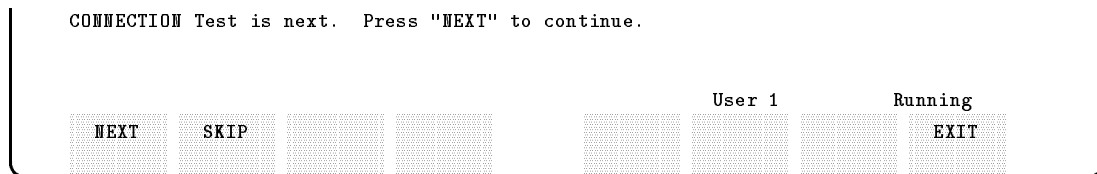
If the HP-IB settings of HP 54120B are incorrect (for example, wrong select code), select the **HP-IB ADDRESS** softkey. The following prompt is displayed:

Enter address of HP 54120B (e.g. 2707)

You enter a new device selector. For example, type: 707 **Return**.

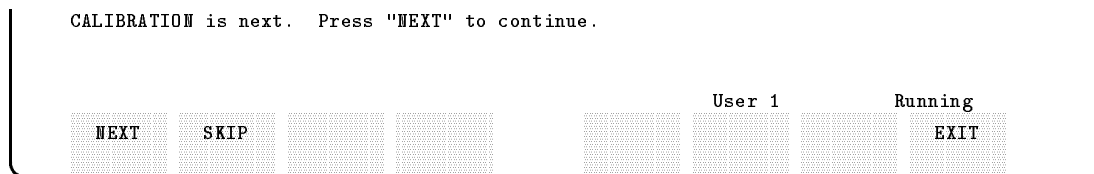
6. Connection Test

Select **NEXT** softkey to execute the CONNECTION test.



7. Calibration

- a. Select **NEXT** softkey to execute the CALIBRATION test.



You can select a softkey to execute calibration for each HP 8110A individually or for all HP 8110As.

- b. Select the **ALL** softkey. The calibration is executed for all the pulse generator units of the HP 8110A.
- c. Press **Shift** **Menu** key, then select **EXIT** softkey twice to exit the test procedure.

Displaying and Printing Test Results

If the PV test results were saved during the tests, you can use the View Result function of the PV4062.F to see the test results. You can display the test results on the controller monitor or print them on the system printer. The following describes procedures for displaying and printing test results:

Displaying PV Test Results:

1. From the PV4062.F main menu page (Figure 6-4), select the **VIEW RESULT** softkey. The View Result Start page is displayed.
2. Select the **READ FILE** softkey to obtain PV test results.
3. Enter the name of the file that contains the PV test results. For example, using the file name in step 5 of the 4062F DC W/O DVM test, type: **data/PVW00294** **Return**.
4. Select the **CRT** softkey to display test results. A page similar to Figure 6-25 is displayed. Select the **MORE** softkey to display the next page of test results.

```
=====
      P E R F O R M A N C E   T E S T   R E C O R D
=====
Test Facility:

Hewlett-Packard                      Report No. _____
_____                             Date _____10 Feb 1994
_____                             Customer  _____
_____                             Tested by  _____Cheryl Jenkins

HP 4062F:

Serial No. _____JP10B00101      Temperature _____23.4 C
Firmware Revision _____        Humidity _____53 %

=====
User 1      Running
MORE        EXIT
```

Figure 6-47. Example Page of View Result (CRT)

Printing PV Test Results:

1. From the PV4062.F main menu page (Figure 6-4), select the **VIEW RESULT** softkey. The View Result Start page is displayed.
2. Select the **READ FILE** softkey to obtain PV test results.
3. Enter the name of the file that contains the PV test results. For example, using the file name in step 5 of the 4062F DC W/O DVM test, enter **data/PVW00294** **Return**.
4. Select the **PRINTER** softkey.
5. Enter report number that you want to appear on the printout. For example, type: **1** **Return**.

The printer configuration page is displayed as shown in Figure 6-26.

```
***** CONFIGURATION *****  
  
PRINTER TYPE   = HP-UX SPOOL  
PRINTER ADDR   = | lp  
PAGE LENGTH    = 66  
MARGIN         : TOP = 2   BOTTOM = 2   LEFT = 0  
PAGE NUMBERING = ON  
  
Select the desired softkey.  
  
User 1      Running  
PRINT      RECONFIG      EXIT
```

Figure 6-48. Example of Printer Configuration Page

6. To change the printer configuration, select the **RECONFIG** softkey. Refer to Appendix A for information to configure the system printer.

If the printer configuration is correct and if the printer is ready, select the **PRINT** softkey. A printout similar to Figure 6-27 is printed.

P E R F O R M A N C E T E S T R E C O R D						
Test Facility:						
Hewlett-Packard			Report No. _____1			
_____			Date _____10 Feb 1994			
_____			Customer _____			
_____			Tested by _____Cheryl Jenkins			
HP 4062F:						
Serial No. _____JP10B00101			Temperature _____23.4 C			
Firmware Revision _____			Humidity _____53 %			
			Line Frequency _____Hz(nominal)			
Configuration						
4085F SWITCHING MATRIX			PRESENT Serial No. _____2814J00060			
4084B SWITCHING MATRIX CONTROLLER			PRESENT Serial No. _____2520J00456			
Model: HP4062F Report No.: 1 Date: 10 Feb 1994						
TEST DESCRIPTION	Minimum	Results	Maximum	Uncertainty	Fail	
Relay Test						
SMU Accuracy Test						
Self-test						
Repeat Test						
SMU 1						
Vf/Im	-52.0 V	-.740%	+.017%	+.740%		
If/Vm	-5.2E-5 A	-.740%	+.002%	+.740%		

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Figure 6-49. An Example Page of View Result (Printer)

A

Configuring the System Printer for PV4062/PV4062.F

This appendix describes how to change the configuration of the system printer to print the test results by using the VIEW RESULT function.

The HP 4062UX/F environment allows the HP-UX spool printer. Before using your desired printer, you must set the proper configuration information as described in this appendix. To establish print environments, refer to the HP BASIC documentation.

You may also modify page formatting items (page length, margins, and page numbering ON/OFF) by using the VIEW RESULT function.

Figure A-1 shows the PV4062/PV4062.F printer configuration page. To display this page, load and run the PV4062/PV4062.F program, select the **VIEW RESULT** softkey, select the **READ FILE** softkey, enter the name of the file that contains the test results, then select the **PRINTER** softkey.

```
***** CONFIGURATION *****

PRINTER TYPE   = HP-UX SPOOL
SPOOL COMMAND  = | lp
PAGE LENGTH    = 66
MARGIN         : TOP = 2   BOTTOM = 2   LEFT = 0
PAGE NUMBERING = ON

Select desired softkey

PRINT  RECONFIG  EXIT
```

Figure A-1. An Example of the Printer Configuration Page

Configuring the System Printer

The default settings of the printer configuration are listed in Table A-1. To change these settings, select the **RECONFIG** softkey from the printer configuration page shown in Figure A-1.

Table A-1. Default Printer Configuration Settings

Item	Default
PRINTER TYPE	HP-UX SPOOL
PRINTER ADDRESS	701
PRINTER I/F	HP-IB
SPOOL DIRECTORY	/spool:REMOTE
SPOOL COMMAND	lp
BAUD RATE (RS-232C)	9600 baud
PAGE LENGTH	66 line/page
MARGIN	Top: 2 lines, Bottom: 2 lines, Left: 0 spaces
PAGE NUMBERING	ON

Figure A-2 shows a softkey map for configuring printer settings. Select the desired softkeys and enter the required values and names to change printer settings.

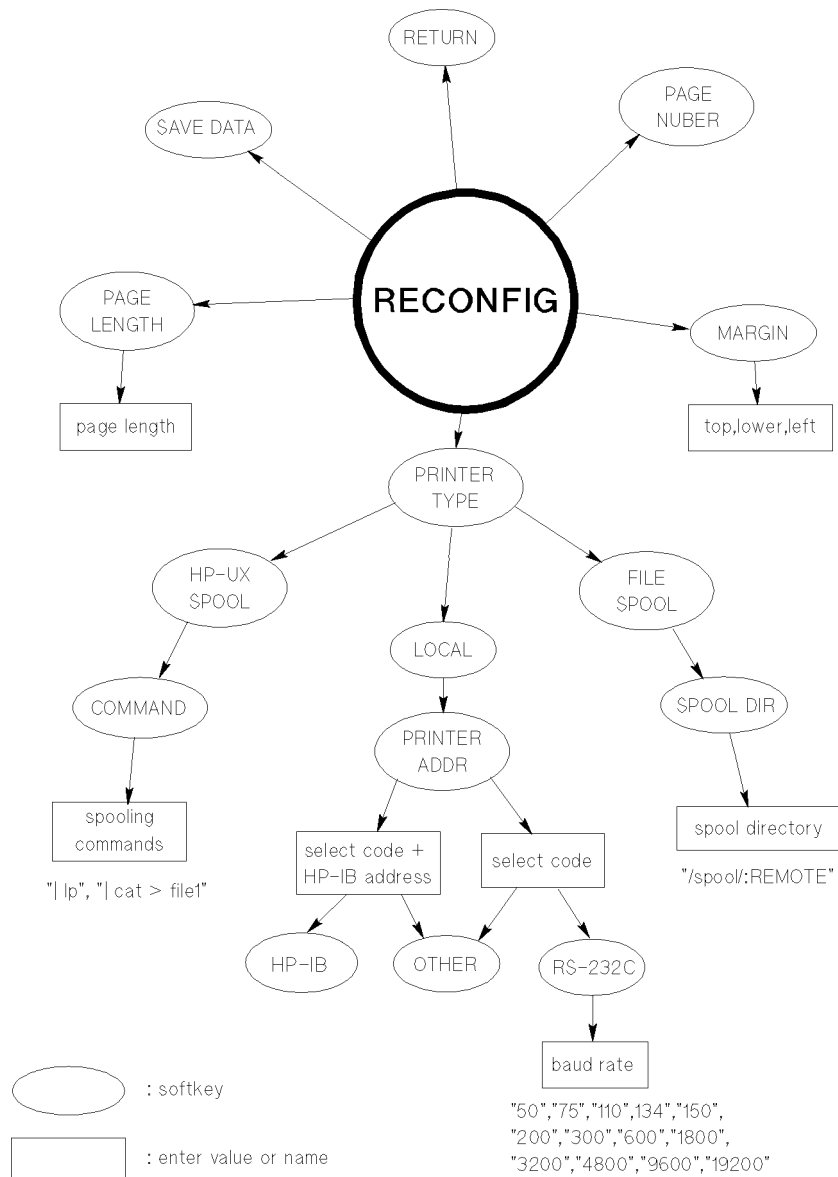


Figure A-2. Printer Configuration Softkey Map

The following describes each softkey:

PRINTER TYPE	Displays the LOCAL, FILE SPOOL, and HP-UX SPOOL softkeys for selecting or changing the presently set printer.
PRINTER ADDR	Displayed only when PRINTER TYPE is set to LOCAL. This softkey is for changing the address of the printer (select code and HP-IB address). After selecting this softkey, the message “Type new address” is displayed. Enter the new printer address, then press Return. ■ If you press Return only, the present address of the printer is retained. ■ If you enter a new select code and HP-IB address, the message “Select printer I/F” is displayed and two softkeys—HP-IB and OTHER—appear. Select the required softkey. ■ If you enter a new select code only, the message “Select printer I/F” is displayed and two softkeys—RS-232C and OTHER—appear. If you select the RS-232C softkey, the message “Enter baud rate of RS-232C I/F” is displayed. The following baud rates are available: 50, 75, 110, 134, 150, 200, 300, 600, 1800, 2400, 3200, 4800, 9600, 19200
COMMAND	Displayed only when PRINTER TYPE is set to HP-UX SPOOL. This softkey is for changing the HP-UX spooling command. After selecting this softkey, the present spooling command is displayed at the keyboard input line and the following message appears. Enter new spooling command with leading ' ' in double quotations. Enter the new spooling command. Note that the pipe must be specified first. For example: <pre>" lp" " cat > file1" " remsh hpux lp -dlaser -oc -od"</pre>
SPOOL DIR.	Displayed only when PRINTER TYPE is set to FILE SPOOL. This softkey is for changing the spool directory of the SRM system. After selecting this softkey, the following message appears, and the present spooling command is displayed at the keyboard input line. Enter new spooling directory in double quotations. Enter the new spooling directory. For example, "/spool:REMOTE".
PAGE LENGTH	For changing the page length of the printer (lines/page). The allowable range is 10 through 32767.

MARGIN

For changing the top, bottom, and left margins.

After selecting this softkey, the message “Type new margin (top,bottom,left)” is displayed. Enter three values separated by commas. For example, enter: 4, 4, 2.

The top margin, bottom margin, and page length settings must satisfy the following conditions:

- top margin ≥ 0
- bottom margin ≥ 0
- if page numbering is ON, then:
top margin + bottom margin $<$ page length – 6
- if page numbering is OFF, then:
top margin + bottom margin $<$ page length – 8

PAGE NUMBER

Turns page numbering ON/OFF (toggles between ON and OFF).

SAVE DATA

Saves configuration data into the file VIEW_DATA.

RETURN

Exits RECONFIG function.

Installation Problems You May Encounter

The following section covers the typical errors caused by installation mistakes.

When an instrument is powered up, it begins a self-test that includes a memory check, interface check, and so on. If the instrument reports a self-test error, see the instrument's manual.

Errors during the START/START.F Program

After software installation, perform the START/START.F program to verify that the system is installed correctly. The START/START.F program has a system initialization function and a system check function. Most installation problems are detected during the START/START.F program.

For HP 4062UX/F System

START ERROR 90 : SYSCONFIG file not found.

Possible Cause	Solution
The SYSCONFIG file does not exist.	Check that the SYSCONFIG file is located in the correct directory (<code>/usr/pcs/etc</code>).
The owner, group, or permission of <code>/usr/pcs/etc/SYSCONFIG</code> is incorrect.	Its owner is "root", and group is "pcs". The permission of SYSCONFIG must be <code>-rw-rw-r--</code> .

START ERROR 135 : DUMCONFIG Corresponding unit not installed

Possible Cause	Solution
The <code>/usr/pcs/etc/DUMCONFIG</code> file is incorrect.	Copy the master file from <code>/usr/pcs/newconfig/DUMCONFIG</code> to <code>/usr/pcs/etc/DUMCONFIG</code> .
The owner, group, or permission of <code>/usr/pcs/etc/DUMCONFIG</code> is incorrect.	Its owner is "root", and group is "pcs". The permission of SYSCONFIG must be <code>-rw-rw-r--</code> .

START ERROR 300 : PCS_SESSION_ID not defined.

Possible Cause	Solution
When you are using with CDE, customization of <code>/usr/dt/config/Xsession.d/4062Xsession</code> is incorrect.	Check the contents of Xsession file. The Xsession file must have following lines: <code>PCS_SESSION_ID=pcs_\$\$</code> <code>export PCS_SESSION_ID</code>
When you are using with VUE, customization of <code>/usr/vue/config/Xsession.d/4062Xsession</code> is incorrect.	Check the contents of Xsession file. The Xsession file must have following lines: <code>PCS_SESSION_ID=pcs_\$\$</code> <code>export PCS_SESSION_ID</code>
When you are using with B or K shell, customization of <code>/etc/profile</code> is incorrect.	Check the contents of <code>/etc/profile</code> . The <code>/etc/profile</code> must have following lines: <code>PCS_SESSION_ID=pcs_\$\$</code> <code>export PCS_SESSION_ID</code>
When you are using a C shell, customization of <code>/etc/csh.login</code> is incorrect.	Check the contents of <code>/etc/csh.login</code> . The <code>/etc/csh.login</code> file must have following line: <code>setenv PCS_SESSION_ID pcs_\$\$</code>

START ERROR 310 : Group 'pcs' not registered.

Possible Cause	Solution
The customization of <code>/etc/group</code> file is incorrect.	Check the contents of <code>/etc/group</code> file. The file must include the following line: <code>pcs::13:</code>

START ERROR 450 : Fatal error in pcsstart command.

The following error message is displayed:

```
Location = Obtain_session_key_file()
Function = create()
Parameter = /usr/pcs/session/pcs_xxx
Permission denied
```

Possible Cause	Solution
The owner, group, or permission of /usr/pcs/bin/pcsstart is incorrect.	Its owner and group are “root”. The permission of pcsstart must be -r-sr-sr-x . Use the following commands to change them: <pre># chown root /usr/pcs/bin/pcsstart # chgrp root /usr/pcs/bin/pcsstart # chmod 6555 /usr/pcs/bin/pcsstart</pre>

pcsstart: Error in SYSCONFIG: Invalid select code 29

The following error message is displayed:

```
pcsstart error 326
pcsstart: fatal error
    Location = Open_hpib()
    Function = iopen()
    Parameter = 27
```

Possible Cause	Solution
/etc/opt/sicl/hwconfig.cf or /usr/pcs/etc/SYSCONFIG files are set incorrectly.	Check the settings in the /etc/opt/sicl/hwconfig.cf or /usr/pcs/etc/SYSCONFIG files. Then perform /opt/scil/bin/iosetup command again. For details about settings of these files, see Chapter 5.

System Configuration Error

The results of START/START.F are different from the real configuration. For example, *Not present* is displayed for a system instrument when it is actually installed.

Possible Cause	Solution
The HP-IB cables are not connected properly.	Shut down the computer system, then turn the system off. Confirm the HP-IB cable connections.

Errors during the PV4062/PV4062.F Program

Error occurs while Test Information of File is being Stored

As described in Chapter 6, you specify a file name in which you want to save the PV results. For a new file, you enter test information, which will be the header information for the file. If an error occurs while this information is being stored, the program aborts and cannot be continued.

Possible errors and their probable causes are listed as follows: where *xxxxx* is the file name that you specified and *yyyyy* is a temporary file name.

If an error occurs (program aborts), list the files that are on the data disk, then delete temporary files (TEMP001, TEMP002, and so on).

■ Can't create *xxxxx*.

Incorrect mass storage, or a write protected device is specified. Or this error may occur when reading a previously stored file, or if mass storage is full.

■ Can't output data to *yyyyy*.

Error when writing data to a temporary file. Disk rejected.

■ Can't copy *yyyyy* to *xxxxx*.

Error when copying a temporary file to a user specified file.

■ Can't purge *yyyyy*.

Error when purging temporary files.

■ Can't assign *xxxxx* (*yyyyy*).

The ASSIGN statement failed.

■ Error in copying data from *yyyyy* to *xxxxx*.

Error when reading from or writing to a file.