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

Installation Manual

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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 Rev. X.07.0*x*, F.07.0*x*, October 1994

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.

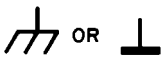
Safety Symbols

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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1

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.

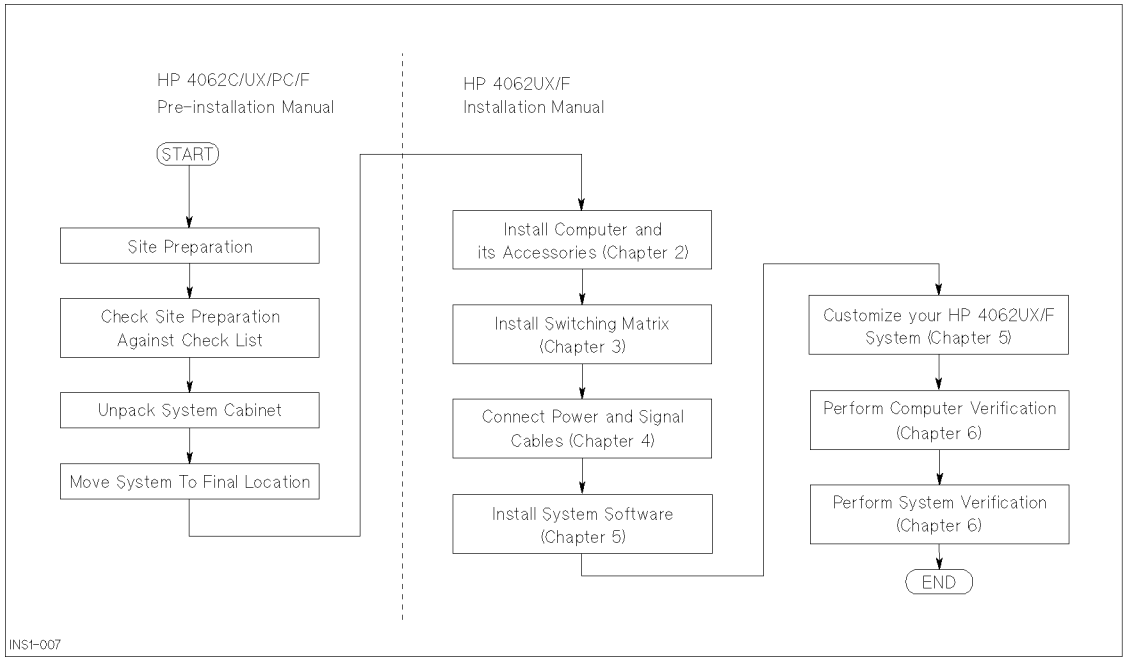


Figure 1-1. System Installation Flow Diagram

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, which need about 200 megabytes. It takes about two or three hours to load the HP-UX system files from the cartridge tape or digital audio tape (DAT). 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.

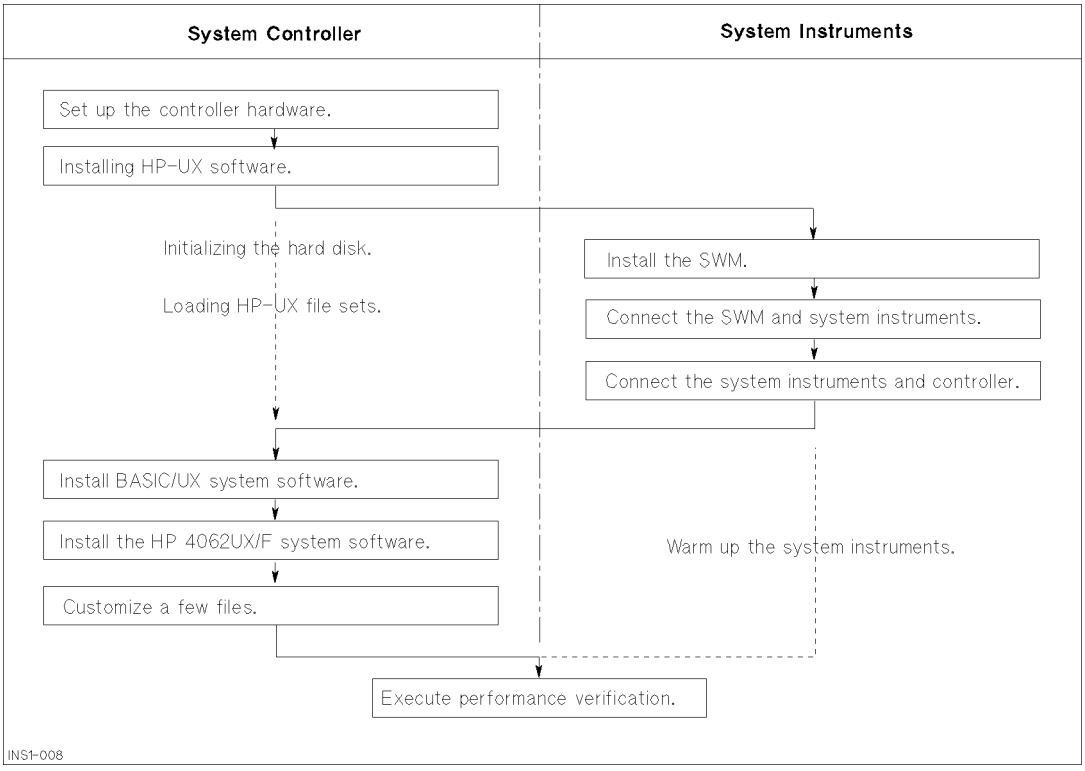


Figure 1-2. Arranged Installation Sequences for HP 4062UX/F

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

2

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 300 Model 360, 370, 375, 380, 382, or R/382; Model 340, or 345 for diskless cluster configuration.

HP 9000 Series 700 Model 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:

- Series 300 computers
  - HP 98568A, HP 98568A option 132, or HP 98570A Backplane Expander.[1]
  - HP A2246A DIO-I Bus Expander
  - HP 98267A/B/C, 98264A/B, 98258A/B/C, 98257A, or 98256A RAM Card(s).[1]
  - HP 98624A HP-IB Interface Card.[2]

[1] Specific combinations of these items may be included, depending on the HP 4062UX/F software configuration and memory requirements.

[2] Additional accessories cannot be installed into model 340 or 345 computers because these computer models do not contain enough mechanical or electrical provisions for additional device I/O (DIO) or DIO II interfaces.

- Series 700 computers
  - For instrument control
    - Series 745i/747i Internal HP-IB Interface Card
    - HP E2071B High Performance 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.

The HP 4062UX/F system requires an HP 46084A ID Module for system software security. Installing the HP 46084A is described in this chapter.

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 300 Hardware Installation

Note

If the system controller is an HP 9000 Series 300 Model 345, proceed to "ID Module" because you cannot add accessories to these computer models.

If the system controller is an HP 9000 Series 300 Model 340, 360, 370, 375, 380, 382, or R/382, the computer needs additional accessories, and may include several optional accessories, depending on the system software configuration and memory requirements. The following paragraphs briefly describe the accessories and installation. For any accessories that are not described in the following paragraphs, see the *Installation Note* 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.

Backplane Expander

To install an HP 98568A, HP 98568A Option 132, or HP 98570A Backplane Expander into the system controller, refer to the HP 98568A/98570A *Installation Note* (HP part number 98568-90603, and so on), or to the computer *Installing Peripherals* (HP part number B1862-90007), Volume 1, Chapter 4, for complete installation information.

To install an HP A2246A DIO-I Bus Expander on the model 362 or 382, refer to the *Installation Guide; Model 362/382 Controller and HP A2246/7 Bus Expanders* (HP part number A1473-90010).

Random Access Memory (RAM)

The system controller is shipped with random access memory (RAM) by ordered options. If the system controller needs additional RAM cards (HP 98256A, 98257A, 98258A/B/C, 98264A/B, 98267A/B/C, and so on), you must install RAM cards by yourself.

For complete RAM card installation information, refer to step 4, "Installing Memory and I/O Expander" in *Installing Peripherals*, and to the installation note furnished with the RAM cards.

Caution

Many RAM card components are static-sensitive. Handle RAM cards by using their antistatic envelopes. Do not touch the electrical traces on the card and never lay a card on a statically charged surface.

HP-IB Interface Cards

The HP 4062UX/F requires an HP 98624A Interface Card in addition to the Series 300 built-in HP-IB interface. Each HP-IB interface is reserved for a specific system function, as listed in Table 2-1.

Table 2-1. HP-IB Interface Settings

Interface	Select Code	Description
Computer's Built-in HP-IB	7	For communicating with computer peripherals or controlling other instruments
HP 98624A	27	For controlling the system instruments; HP 4084B, HP 4142B, HP 4280A, HP 4284A, and HP 8110As
HP 98624A	25	For controlling the HP-IB controlled wafer probers on the HP 4062UX/F system

HP 98624A HP-IB Interface Cards must be configured as shown Table 2-2.

Table 2-2. HP-IB Interface Card Switch Settings

Factory Settings	be changed . . .
Non-system Controller	System Controller
Interrupt Level: 3	Interrupt Level: 3
Select Code: 8	Select Code: 27 or 25
Primary Address: 0	Primary Address: 21

If you configure two HP-IB interface cards for the system instruments and the wafer prober, set the *select code* of one interface card to 27 and the other to 25. If you configure one HP-IB interface card for the system instruments, set the select code of the interface card to 27. Figure 2-1 shows the switch settings of the HP-IB interface card.

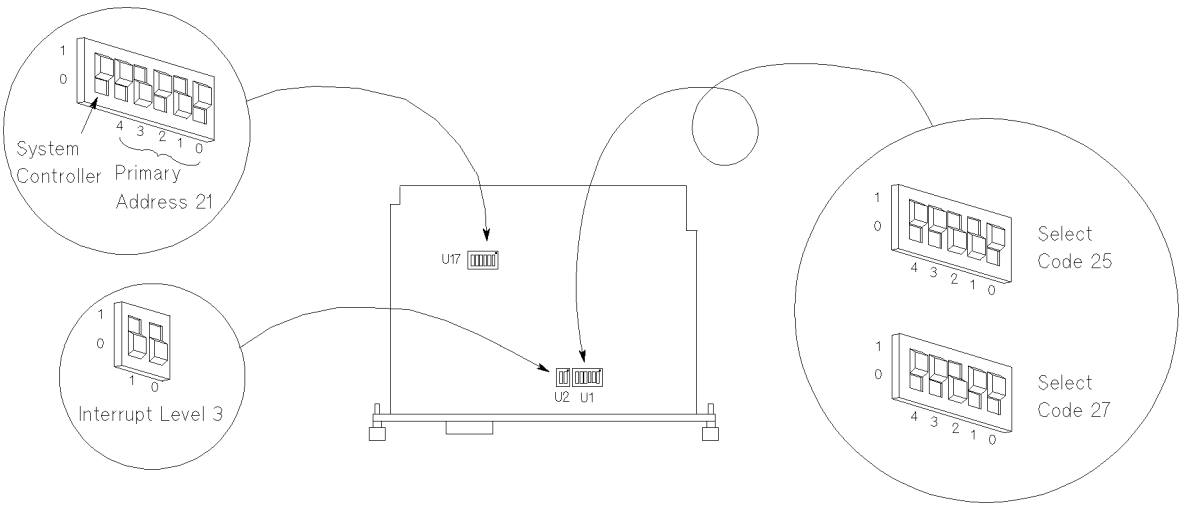


Figure 2-1. HP-IB Interface Card Switch Settings

Verify the remaining interface card settings as shown above.

Complete interface card installation instructions are given in Volume 1, Chapter 2 of the *Installing Peripherals*, and in the *Installation Note* of the interface card. When configured, install the interface card into an empty even-numbered slot in the computer.

ID Module

The HP 46084A ID Module contains a unique, machine-readable serial number, required by the software of the HP 4062UX/F, that uses the HP "Codeword Delivery" security scheme. The ID Module must be installed in the HP-HIL interface system as shown in Figure 2-2. Refer to "HP 46084A HP-HIL ID Module" in Chapter 6 of the *Installing Peripherals, Volume 2* for complete ID Module installation information.

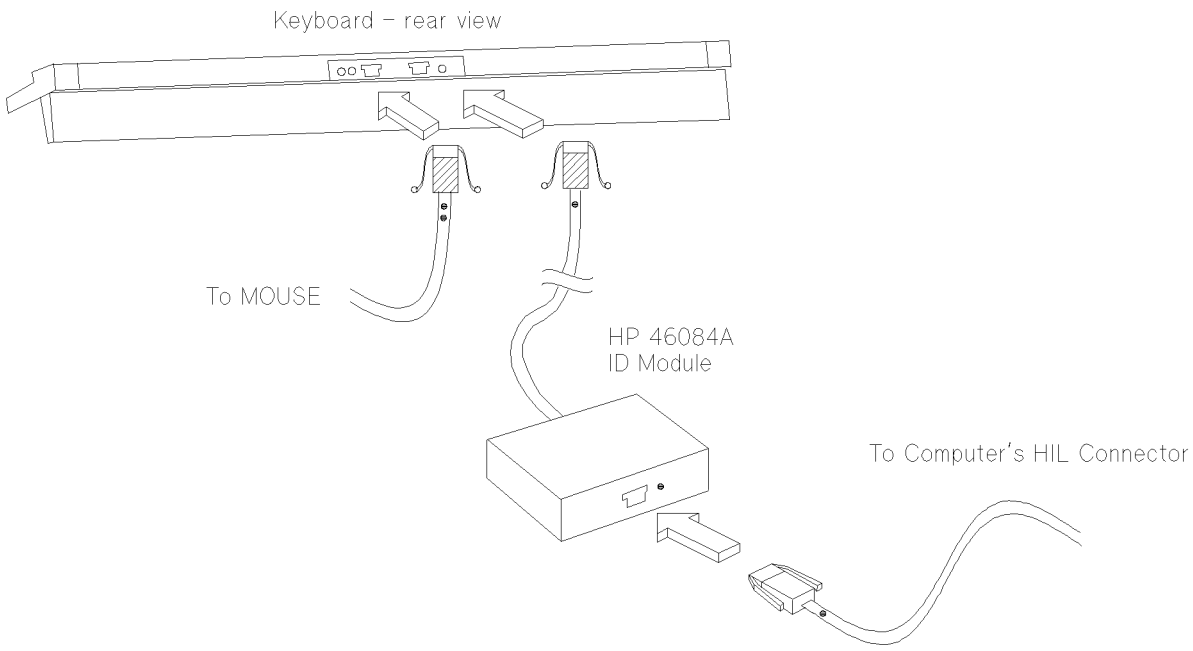


Figure 2-2. Connecting the ID Module in the HP-HIL Interface

Verifying Installed Accessories

To verify installed accessories (RAM cards, HP-IB interface card), perform the following procedure:

1. Connect the video display and keyboard to the computer, and prepare to boot up the computer system.
2. Turn the computer on and press the space bar a few times to suspend the booting process.
3. Observe the displayed list of components and check for the following:

   a. If the message `HP98624 at 27` is displayed, you have correctly installed the HP-IB interface card for system instruments. If the message `HP98624 at 25` is displayed, you have correctly installed the HP-IB interface card for the wafer prober.

   If this message is *not* displayed, repeat the interface card installation procedure and repeat step 1. If the message still does not appear, contact your HP Service Representative for assistance.

   b. The last message in the list means the amount of physical memory size. If the expected memory size is displayed (depending on how much memory you installed), for example `8388434 Bytes`, you have correctly installed the additional memory card(s).

   If an incorrect memory size message is displayed, repeat the RAM card installation procedure and repeat step 1. If the displayed memory size is still incorrect, contact your HP Service Representative for assistance.

4. After you've verified the installed accessories, turn the computer off and unplug it.

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 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 2-3.

Table 2-3. HP-IB Interface Supported for Series 700 Computers

Interface	Description
HP 25560A	For communicating with computer peripherals
745i/747i internal HP-IB, HP E2071B (for model 725)	For controlling the system instruments: HP 4084B, HP 4142B, HP 4280A, HP 4284A, and HP 8110As
HP E2071B	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.

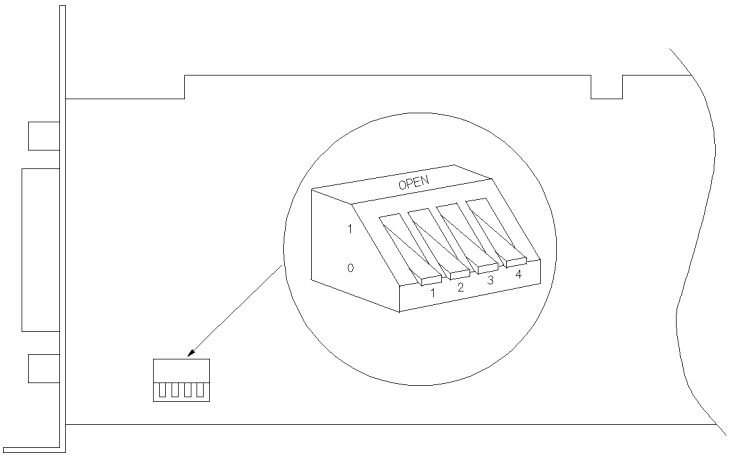


Figure 2-3. HP E2071B HP-IB Interface Card Switches

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 E2071B Installation Guide* and *User's Guide* of each computer.

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

ID Module

The HP 46084A ID Module contains a unique, machine-readable serial number, required by the software of the HP 4062UX/F, that uses the HP "Codeword Delivery" security scheme. The ID Module must be installed in the HP-HIL interface system as shown in Figure 2-4. Refer to "HP 46084A HP-HIL ID Module" in Chapter 6 of the *Installing Peripherals, Volume 2* for complete ID Module installation information.

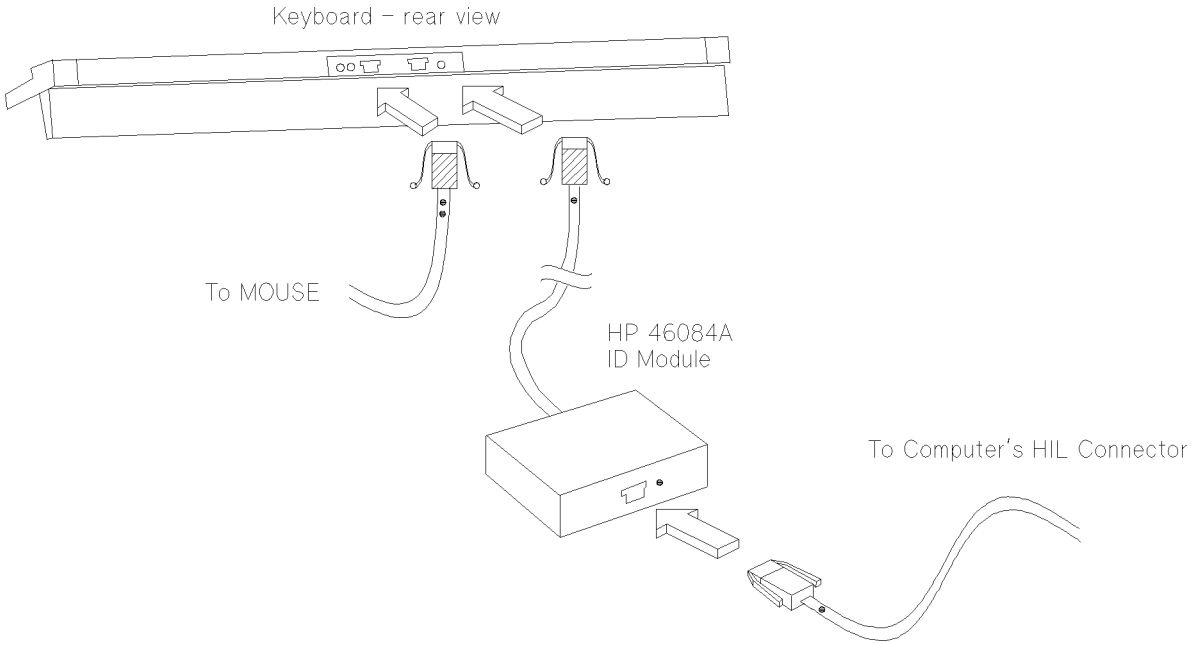


Figure 2-4. Connecting the ID Module in the HP-HIL Interface

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 701, 702, 703, 704, 705, or 706 (depending on the controller model and configuration) 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 and Backplane Expander (Option 701, 702, 703, or 704)

The rack mount kits are installed in the system cabinet at the factory. Before executing the rack mounting, remove the rack mount kits from the system cabinet.

Table 2-4 lists option 701, 702, 703, and 704 rack mount kit contents for rack mounting the system controller. Check the contents of the kit against Table 2-4 before you proceed.

Table 2-4. Option 701, 702, 703, and 704 Rack Mount Kit Contents

Item	Description	HP Part Number	Quantity			
			Option 701	Option 702	Option 703	Option 704
(1)	Support Shelf	04062-00199	1	1	—	—
(2)	Strap	9223-0678	1	1	—	—
(3)	Front Panel	04062-00297	1	1	—	—
(4)	Left-Hand Plate	04062-00249	—	1	—	—
(5)	Right-Hand Plate	04062-00250	—	1	—	—
(6)	Cup Washer	3050-0007	4	8	4	8
(7)	Insert Washer	3050-0248	4	8	4	8
(8)	Screw	2680-0119	4	8	4	8
(9)	Rack Flange	5062-3974	—	—	1 pair	2 pairs

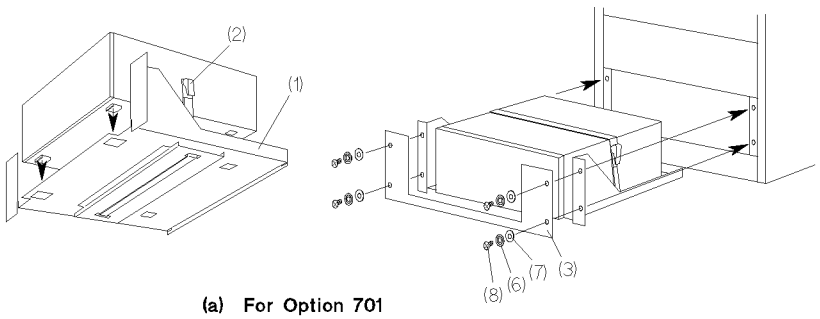
Assemble the rack mount kit and install the controller (and backplane expander if applicable) into the bottom blank space of the system cabinet as described in the following procedures. Refer to Figure 2-5. The parenthetical numbers in the following procedures are keyed to the Item column in Table 2-4 and to the parenthetical numbers in Figure 2-5.

Controller and Backplane Expander Installation Procedure (Option 701 or 702):

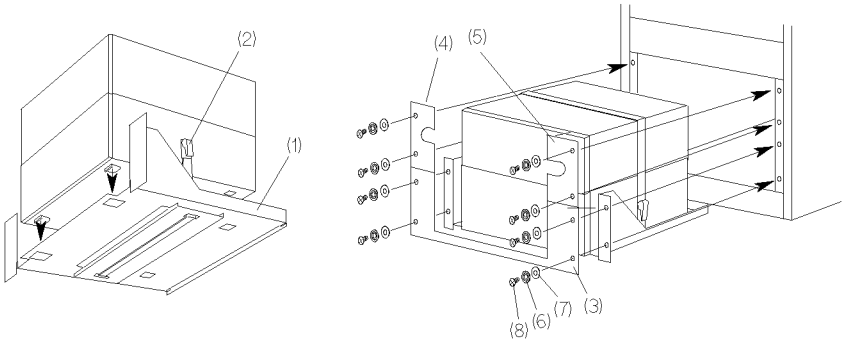
1. Remove the support shelf and front panel (left- and right-hand plates) from the system cabinet.
2. Lay the support shelf (1) on a flat surface.
3. Thread the strap (2) as follows:
   a. Position the buckle, with the protective pad facing down and the free end of the strap to the right, near the left-hand 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 both the support shelf and the cross beam, then out the left-hand strap hole of each.
   c. Lay each end of the strap over the sides of the support shelf.
4. Place the controller on the support shelf, making sure the four feet of the controller fit into their holes on the shelf.
5. 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 controller.
   c. Tighten the strap around the controller, but not too tightly. There should be enough slack to lift the buckle approximately 12.7 mm (0.5 in) away from the controller
   d. Close the buckle, securing the strap.
6. Place the controller and support shelf assembly on the side rails of the cabinet and push the assembly into the cabinet.
7. Place a cup washer (6), then an insert washer (7) on each flat-head screw (8).
8. Place the front panel (3) over the controller and secure the front panel to the support shelf of the controller, then to the system cabinet, using the furnished flat-head screws and washers.
9. If installing a backplane expander, position the left-hand plate (4) and right-hand plate (5) on both sides of the expander and secure the plates to the backplane expander using the furnished flat-head screws and washers.

Controller and Bus Expander Installation Procedure (Option 703 or 704):

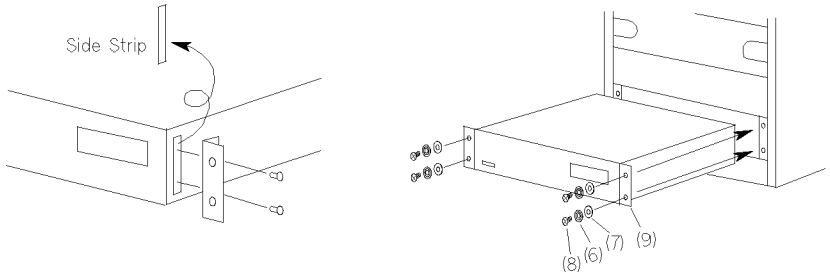
1. Remove the side strips from each side of the model 362/382 controller (and bus expander).
2. Attach the rack flange (9) to each side of the controller (and bus expander) using the screws furnished with the rack flange.
3. Slide the controller (to which you attached the bus expander) into the bottom blank space of the system cabinet.
4. Secure the rack flanges of the controller to the system cabinet using the furnished washers (6) and (7) and screws (8).



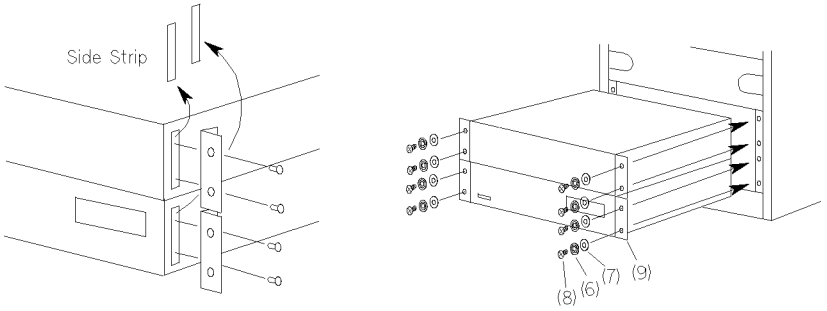
(a) For Option 701



(b) For Option 702



(c) For Option 703



(d) For Option 704

Figure 2-5. Rack Mounting the Controller and Backplane Expander

Installing Controller (Option 705 or 706)

Option 705 or 706 rack mount kit contains two rack flanges and eight screws.

Use the rack mount kit to install the controller into the lower empty space of the system cabinet as described in the following procedure.

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.

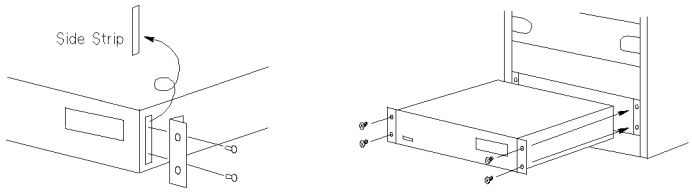


Figure 2-6. Rack Mounting the Controller (Option 705 and 706)

Mass Storage Unit

Table 2-5 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 2-5 before proceeding.

Table 2-5. 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 2-7. Note that the parenthetical numbers in the following procedure are keyed to the Item column in Table 2-5 and to the parenthetical numbers in Figure 2-7.

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.

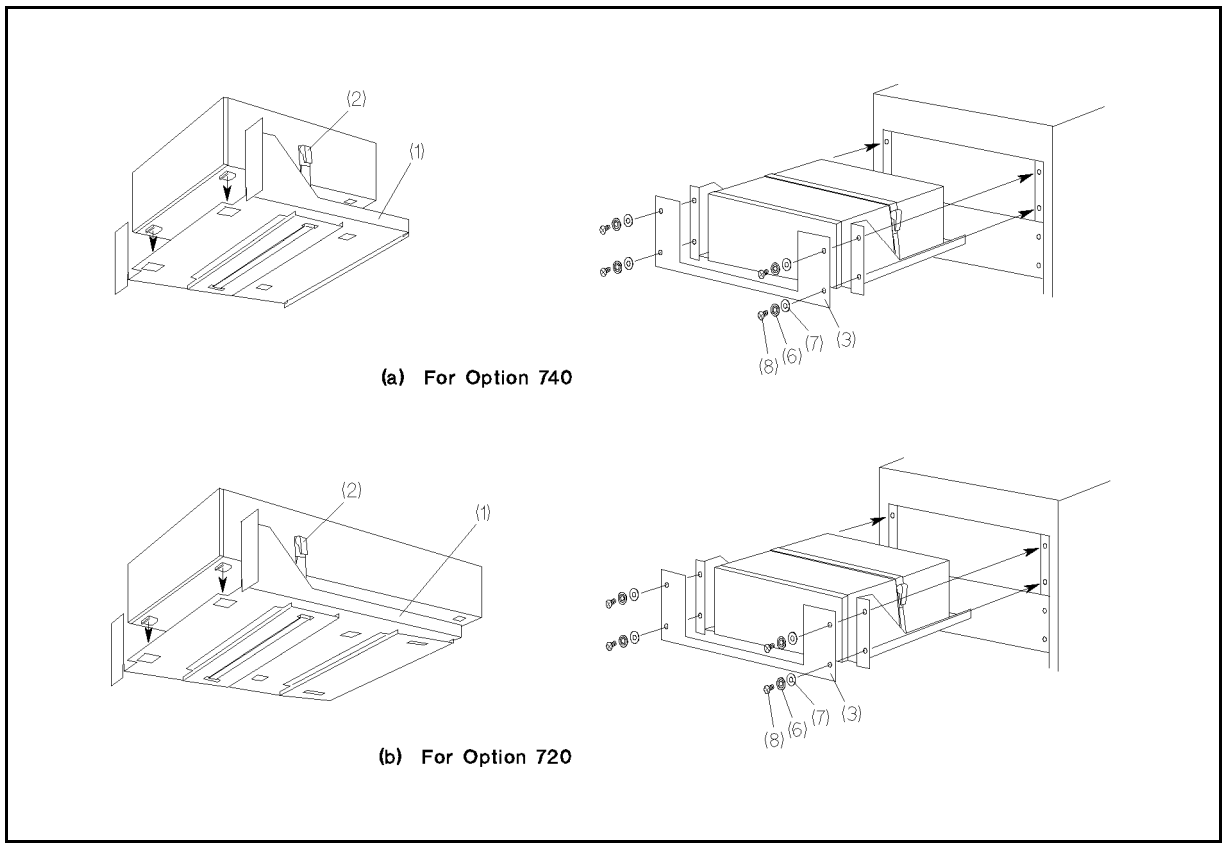


Figure 2-7. Rack Mounting the Mass Storage Unit

3

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.

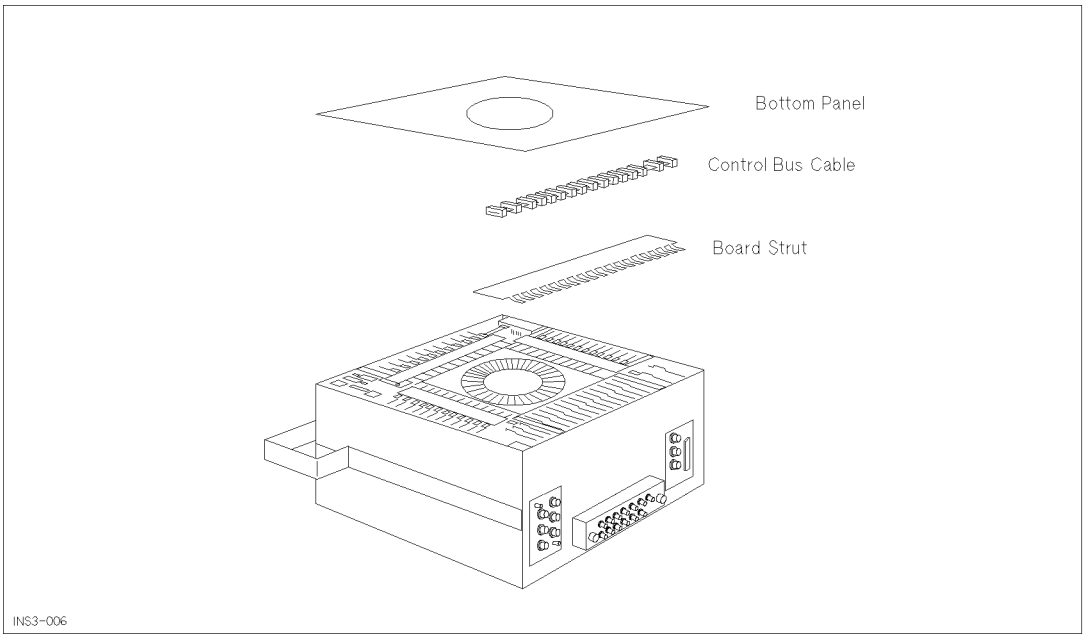


Figure 3-1. Accessing Pin Boards

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.

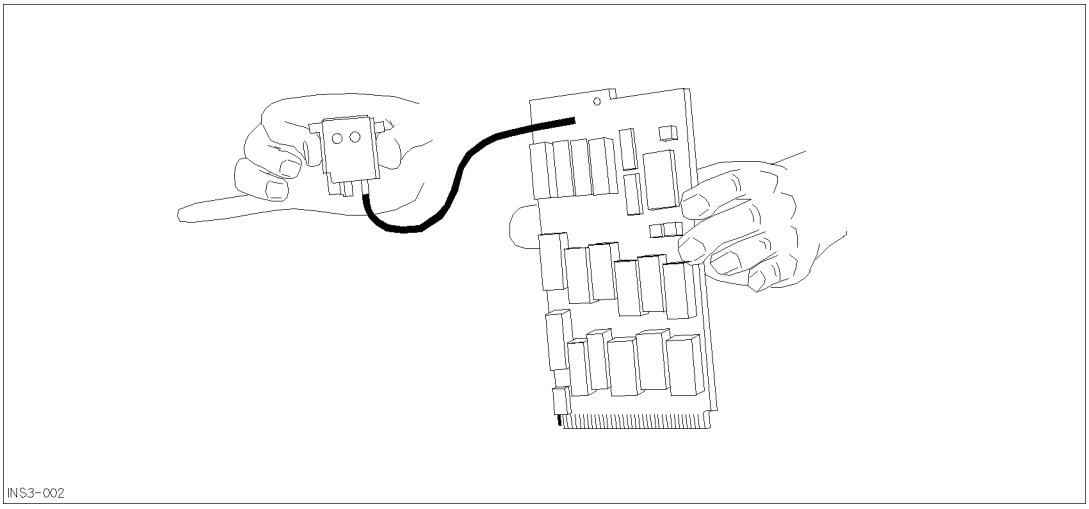


Figure 3-2. Handling Pin Boards

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*.

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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*.

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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.

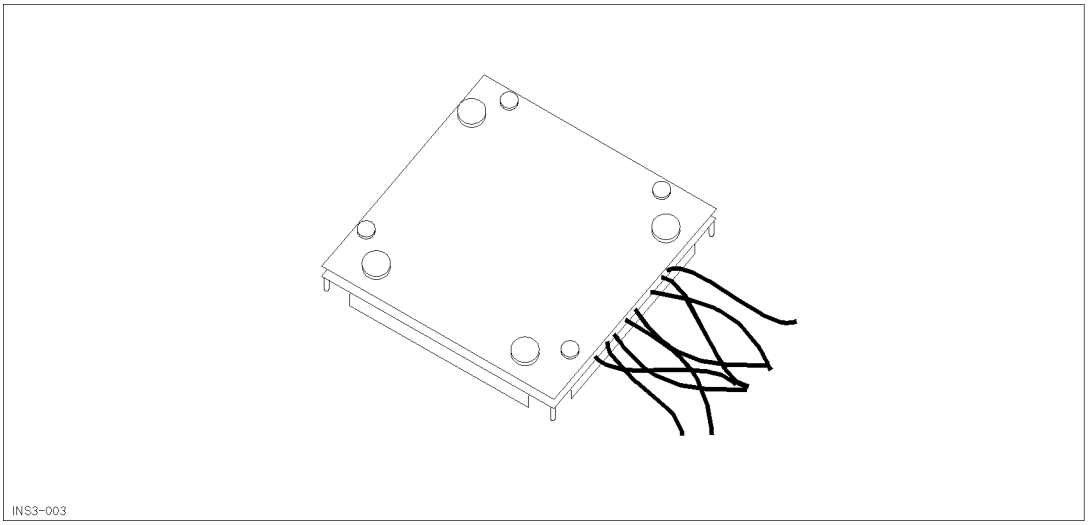


Figure 3-3. HP 16077A/F Extension Cable Fixture

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.

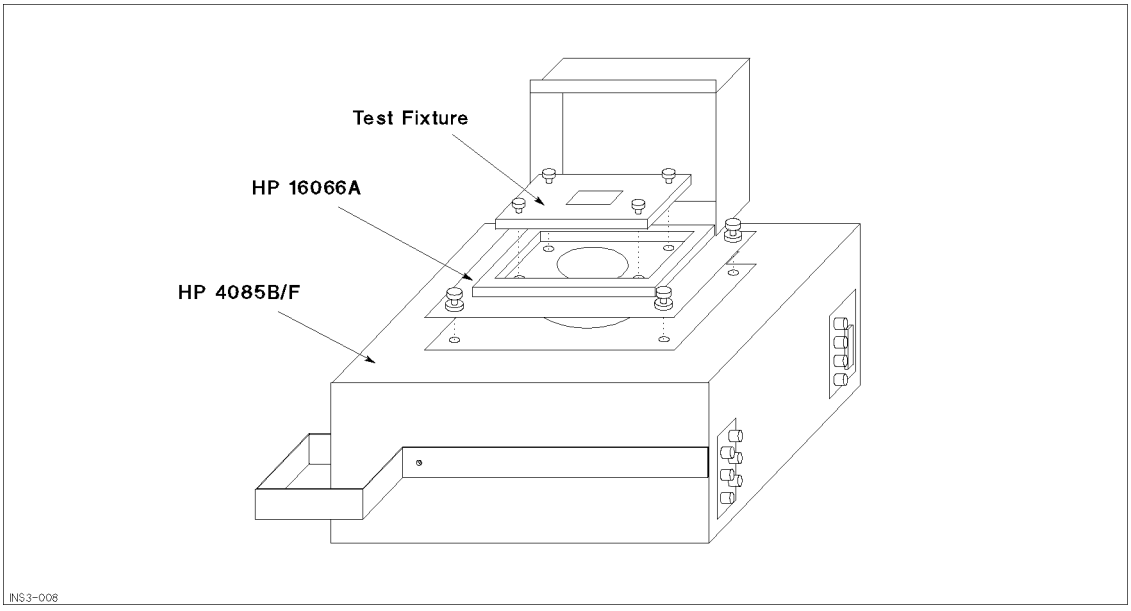


Figure 3-4. Mounting Test Fixtures

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

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.

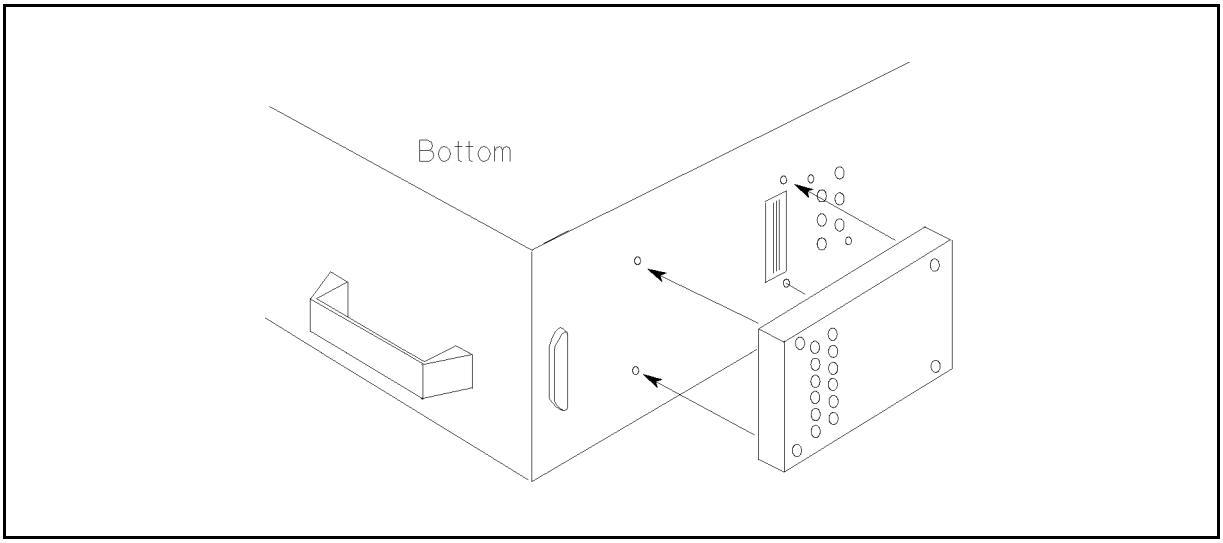


Figure 3-5. Installing a Port Expander

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.

4

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 Low, 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 Low. 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

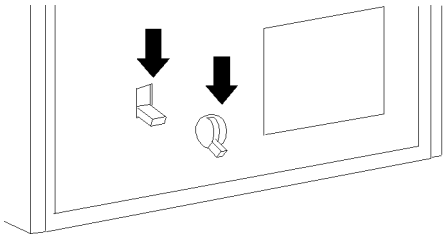
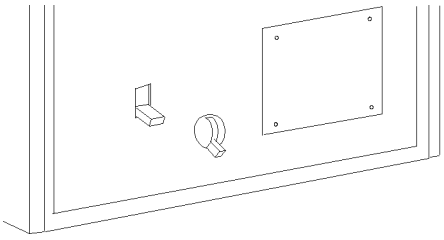
Warning

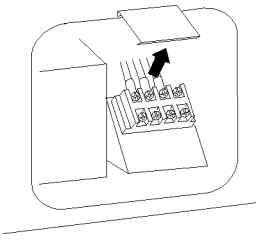
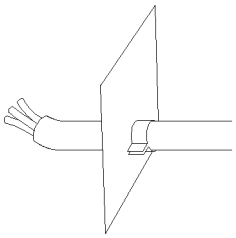
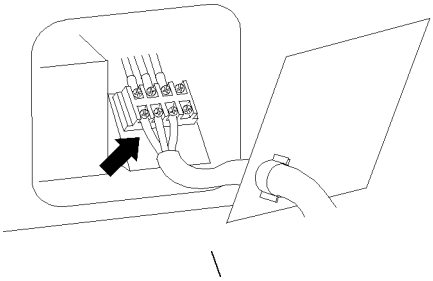
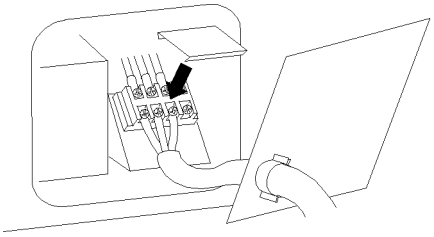
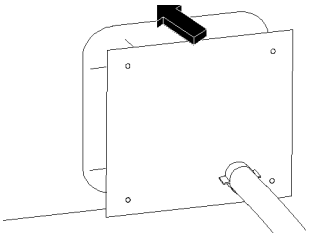
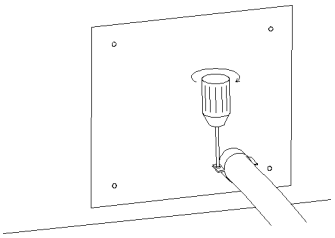
Main power cable installation must be performed by trained service personnel or electrician only. Incorrect installation will result in serious injury to operating personnel and damage to equipment.

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

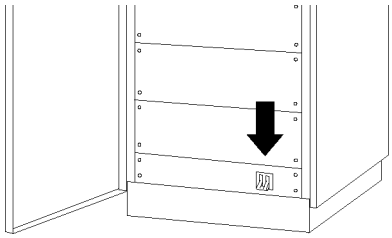
Warning

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.

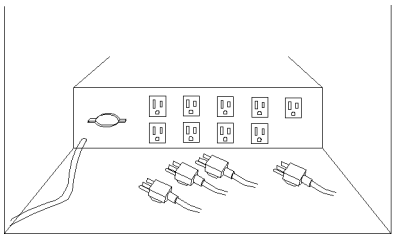
Caution

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".

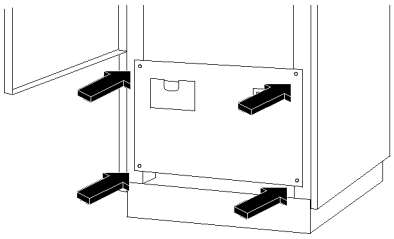
Use the following instructions for installing the main power cable:



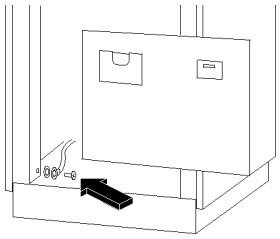
1. Set the main power switch of the PDU to OFF.



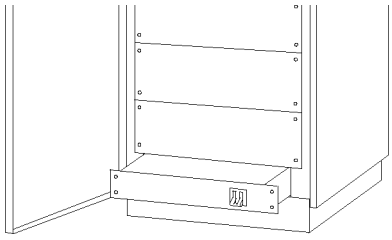
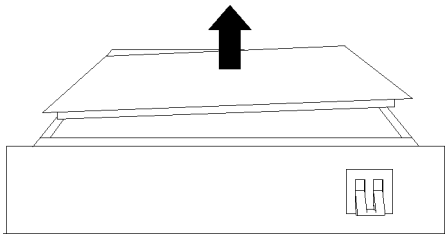
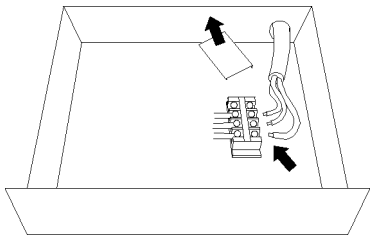
2. Open the rear door and disconnect all the power cables of the instruments and hour meter.



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.

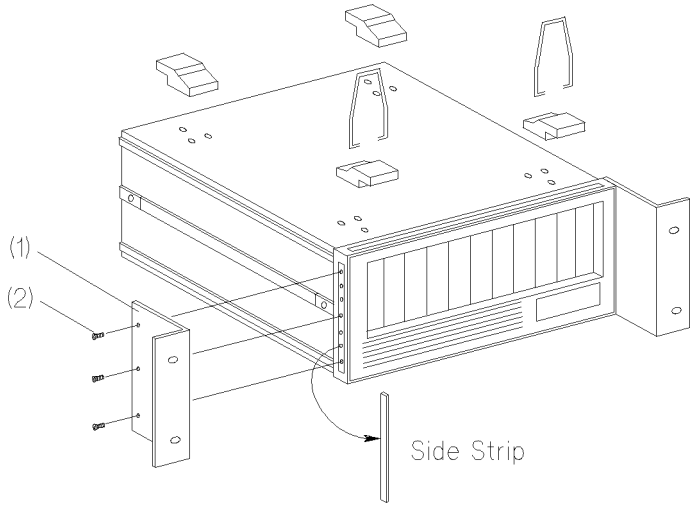


Figure 4-1. Attaching Rack Flanges to the HP 4142B

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.

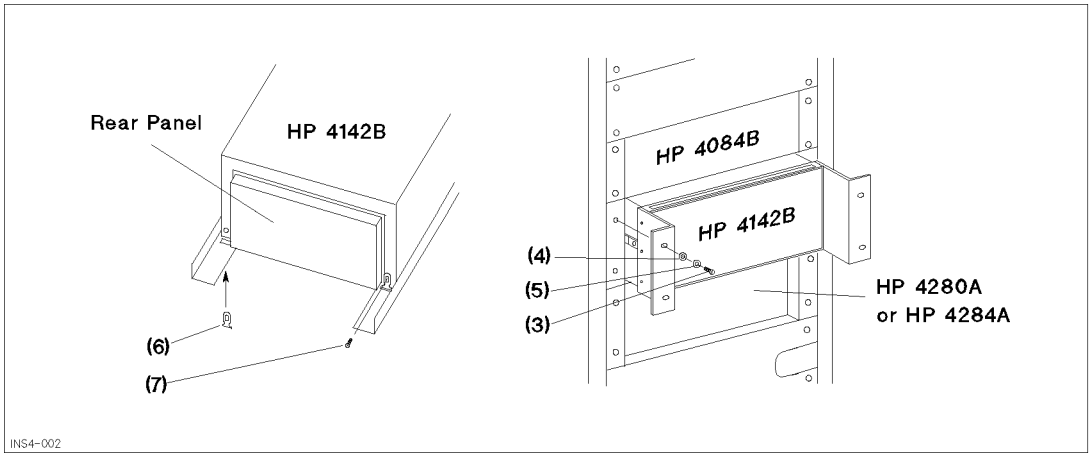


Figure 4-2. Installing the HP 4142B

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.

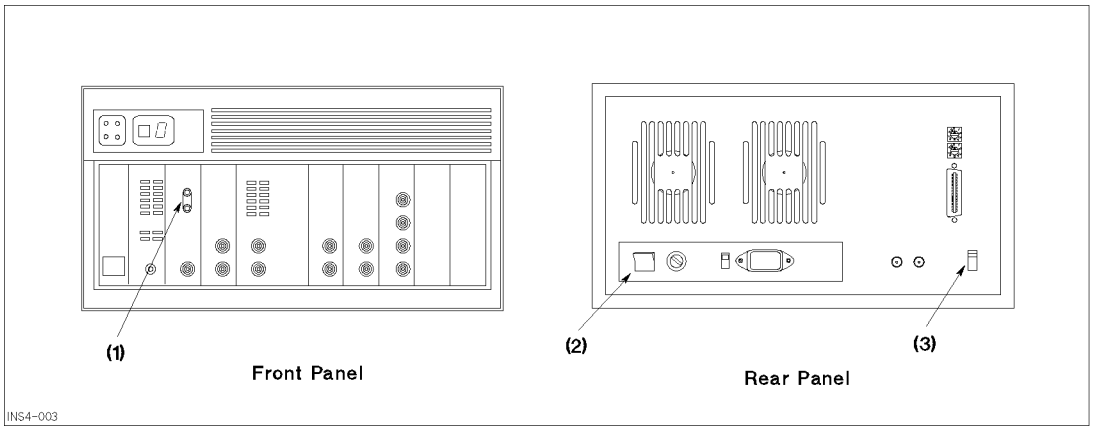


Figure 4-3. HP 4142B Settings

(1) CIRCUIT COMMON (▽) – CHASSIS GROUND (⊥) terminals:

For floating measurements, the HP 4142B is equipped with CIRCUIT COMMON (▽) – CHASSIS GROUND (⊥) 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 (⊥) 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 (⊥) 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	04062-611601	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.

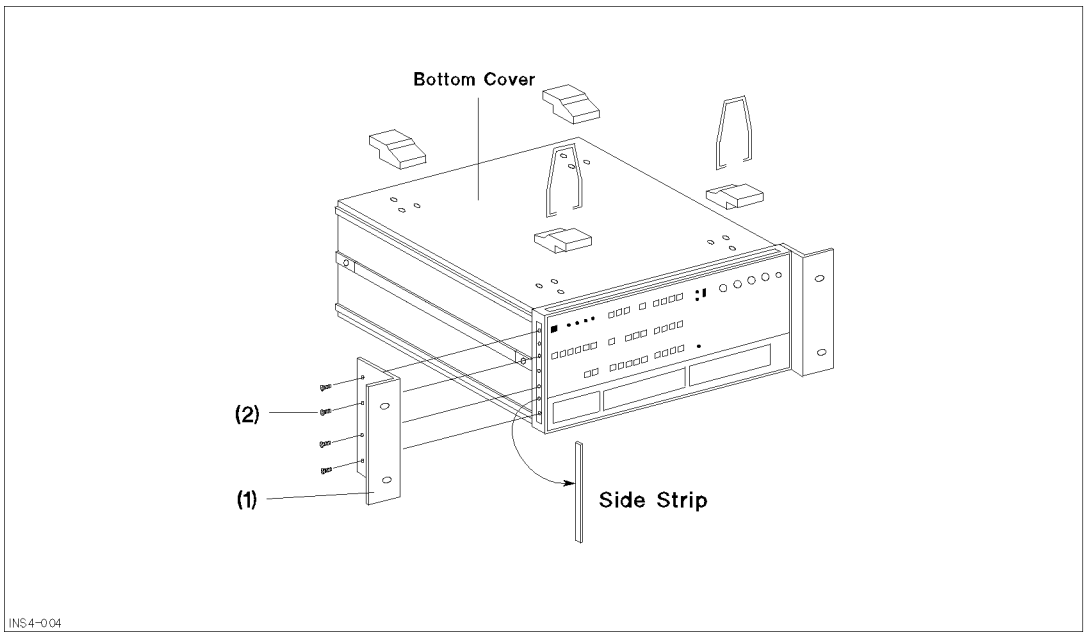


Figure 4-4. Attaching Rack Flanges to the HP 4280A

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.

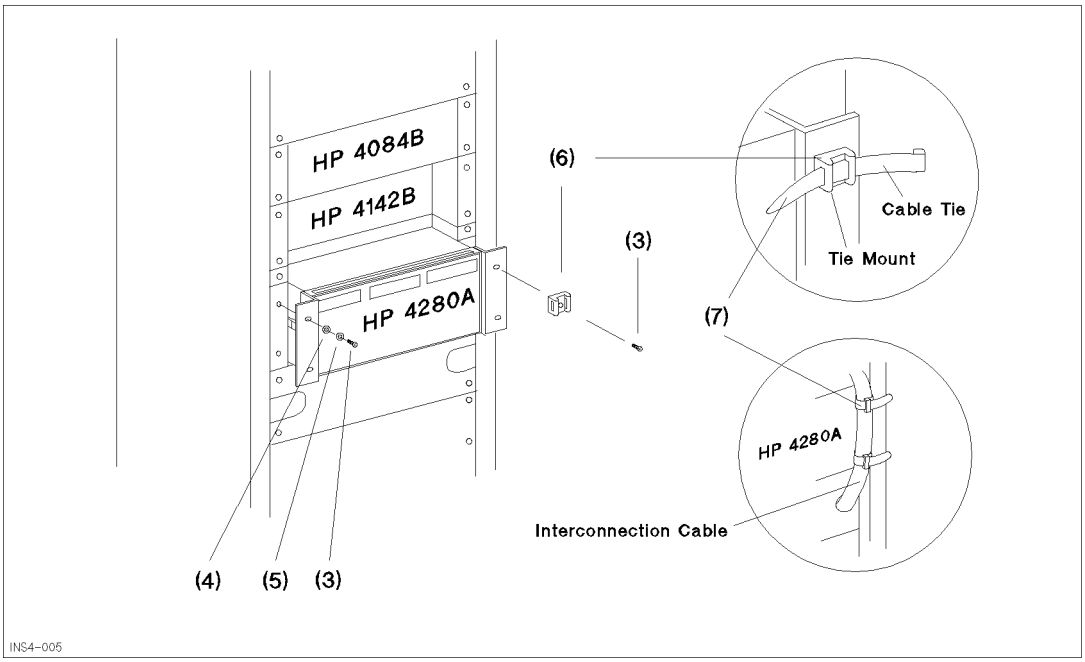


Figure 4-5. Installing the HP 4280A

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.

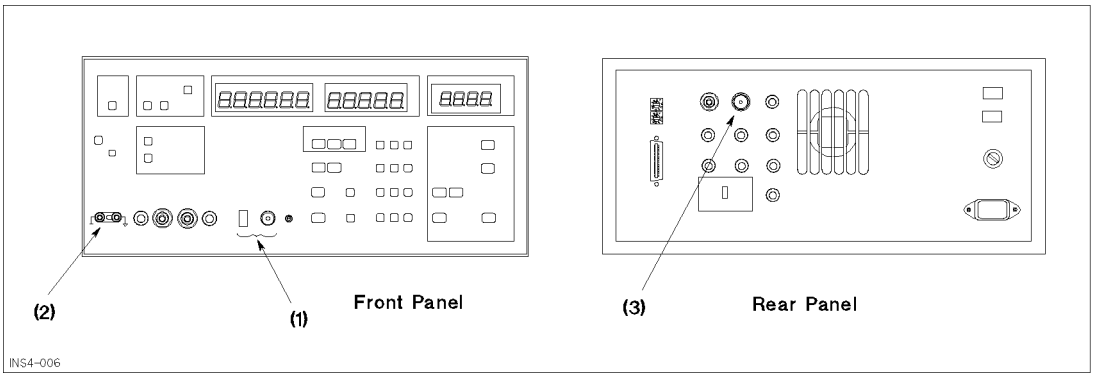


Figure 4-6. HP 4280A Settings on the Front and Rear Panels

(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(⊥) 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 (⊥) 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	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.

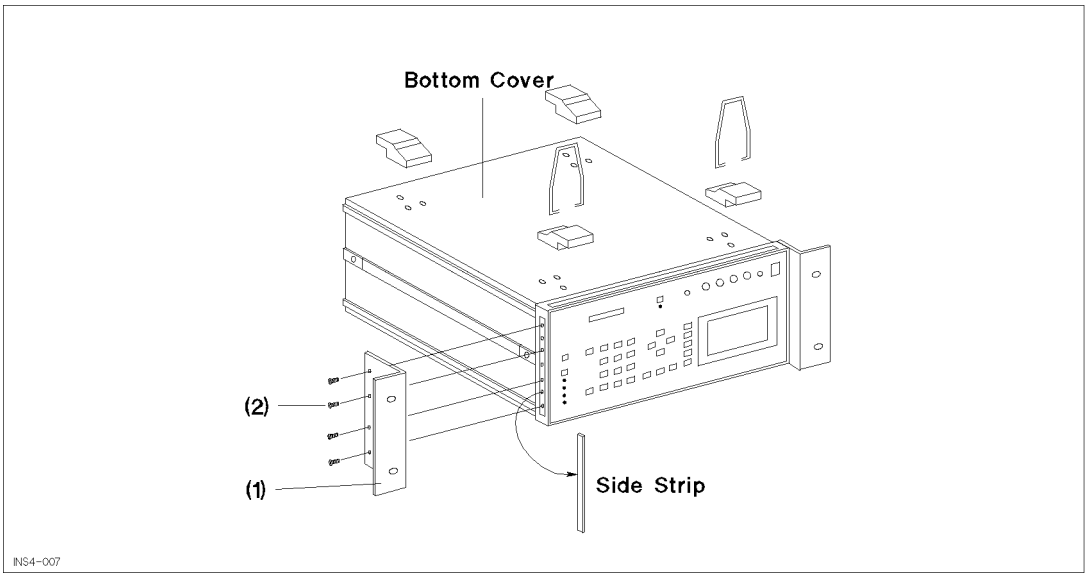


Figure 4-7. Attaching Rack Flanges for HP 4284A

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.

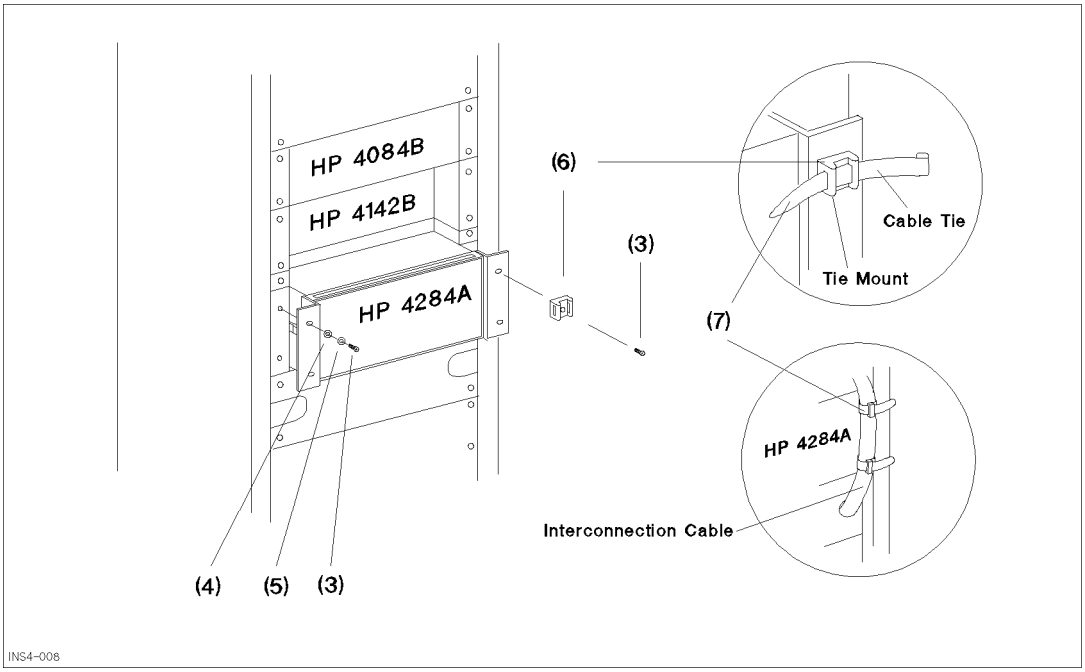


Figure 4-8. Installing the HP 4284A

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 *01.05.00*.	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.

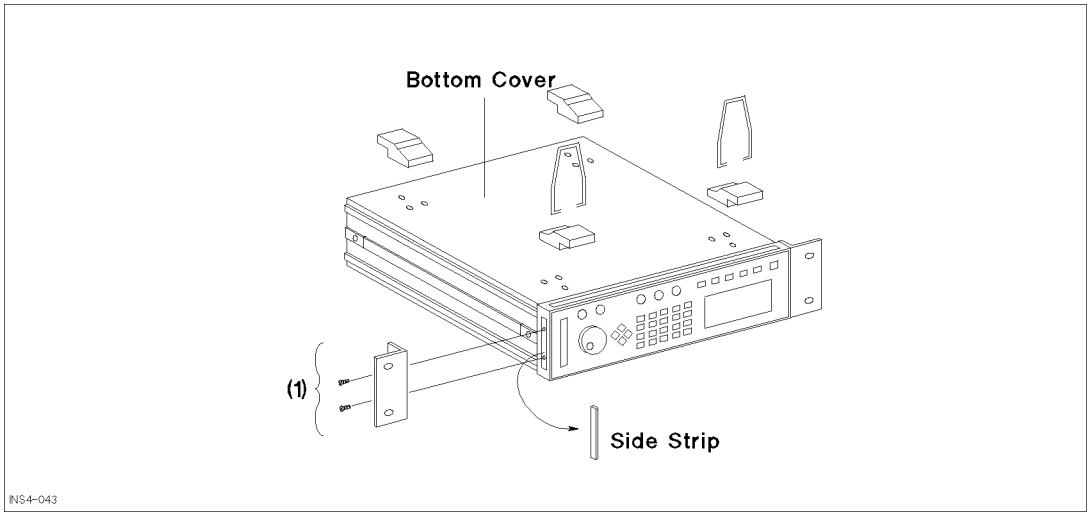


Figure 4-9. Attaching Rack Flanges to HP 8110A

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).

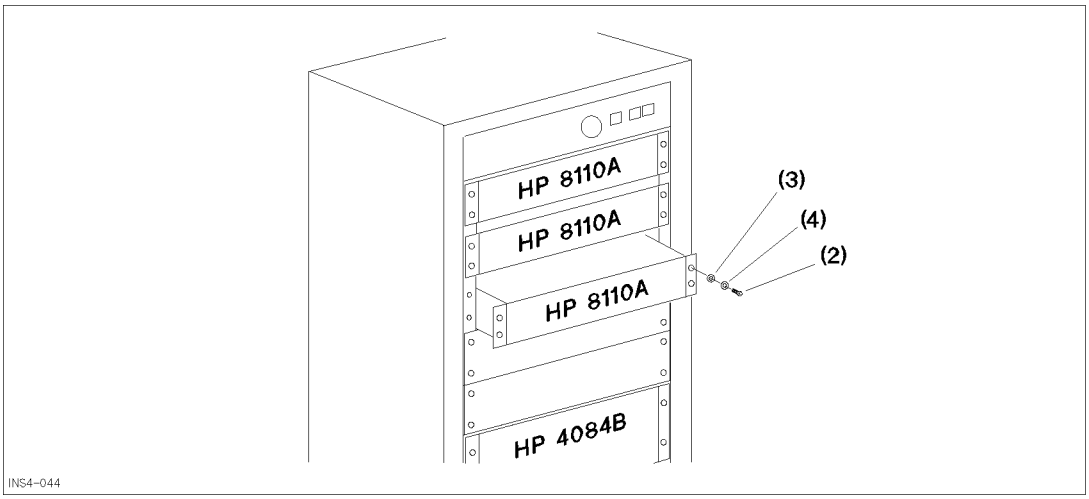


Figure 4-10. Installing the HP 8110A

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.

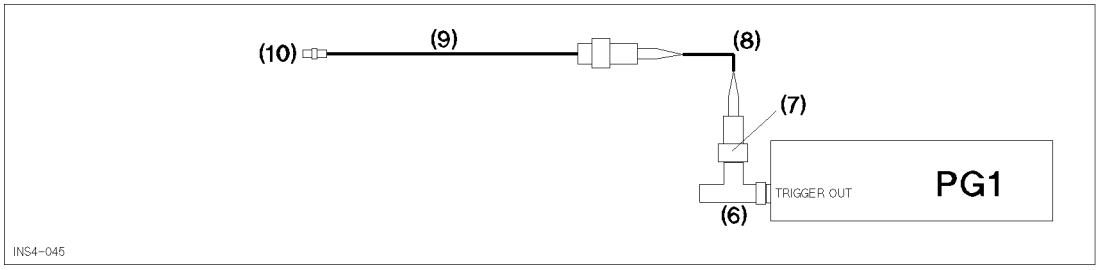
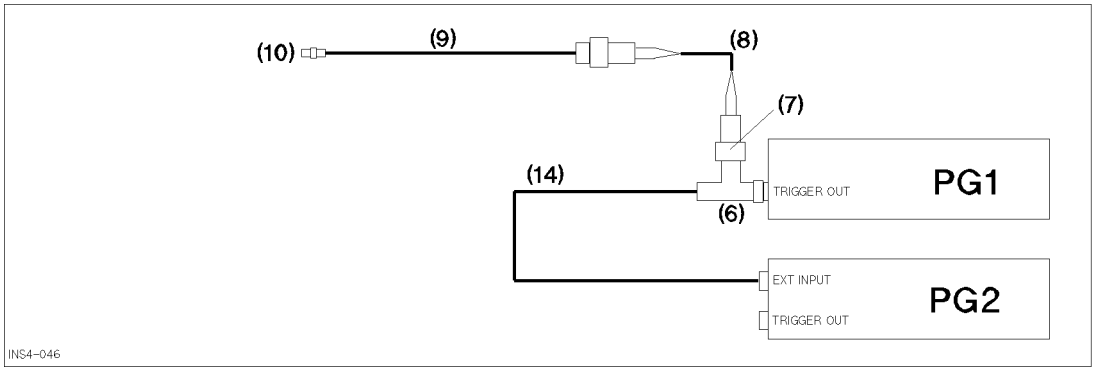
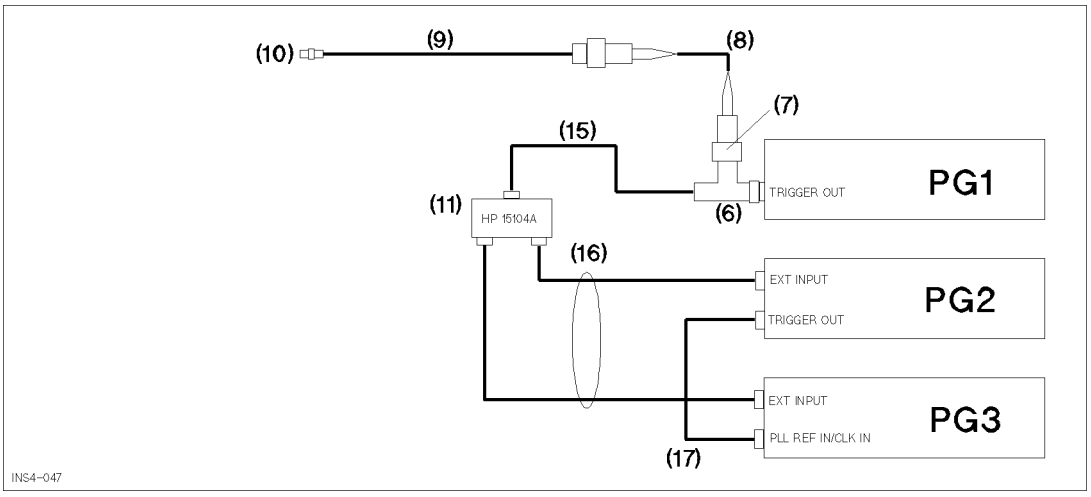


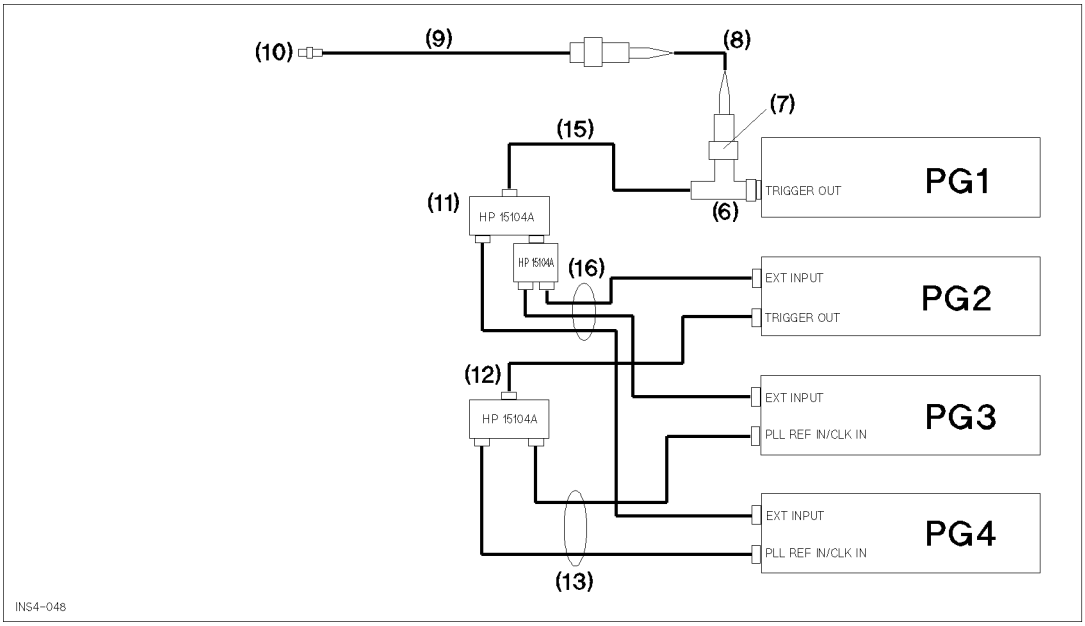
Figure 4-11. Trigger Cable Connections of One HP 8110A



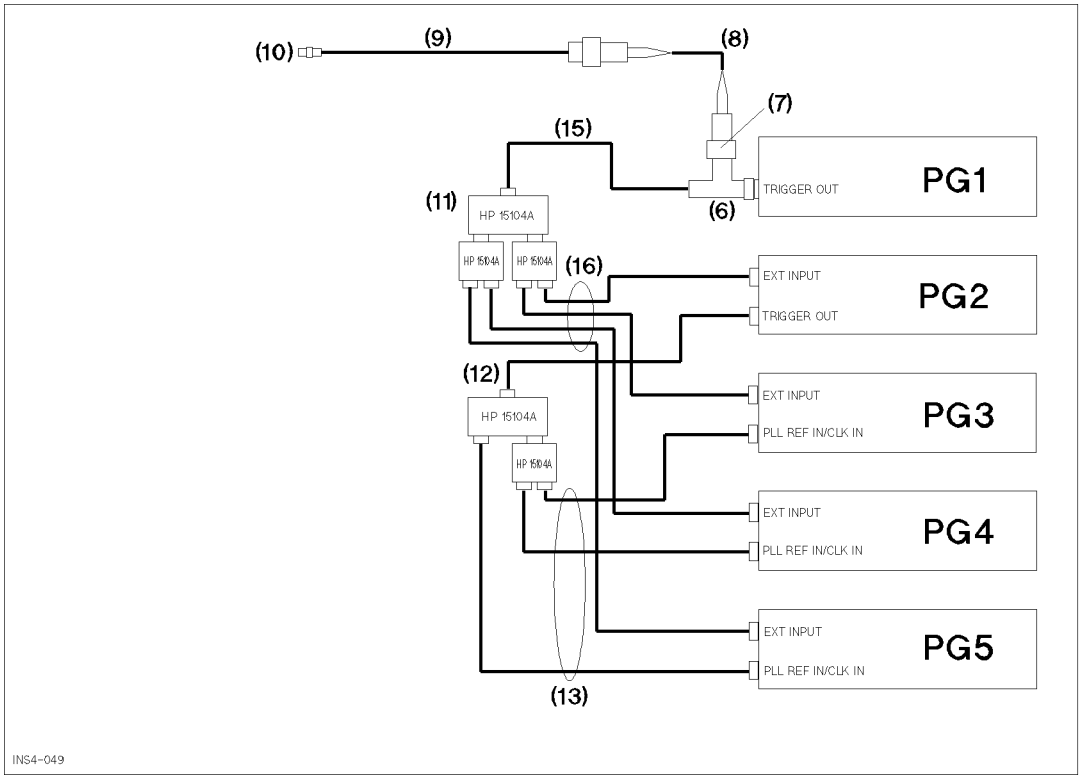
Trigger Cable Connections of Two HP 8110As (Continued)



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:

a. Attach a BNC T-adapter (6) to the TRIGGER OUT terminal on the rear panel of the top HP 8110A (PG1).

b. Attach a probe tip-to-BNC adapter (7) to the BNC T-adapter (6).

c. Connect a resistive probe (8) to the probe tip-to-BNC adapter.

d. Connect a BNC-to-SMA cable assembly (9) to the resistive probe.

e. Connect a 50 Ω SMA terminator (10) to the BNC-to-SMA cable assembly.

f. Fix the resistive probe to the support rail with a cable tie (see Figure 4-12).

g. Fix the BNC-to-SMA cable assembly to the cabinet frame with three cable ties (see Figure 4-12).

h. Pass the BNC-to-SMA cable assembly through the right opening of the front panel of cabinet.

i. Wind the cable assembly around the two knobs (see Figure 4-12).

j. Fix the wound cable with a cable tie at the center of two knobs.

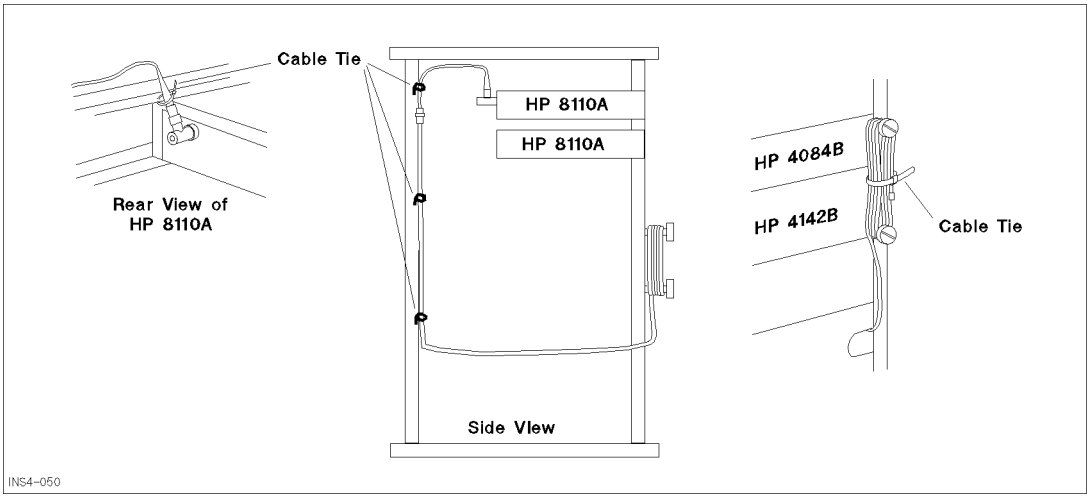


Figure 4-12. Installing the BNC-to-SMA cable assembly

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.

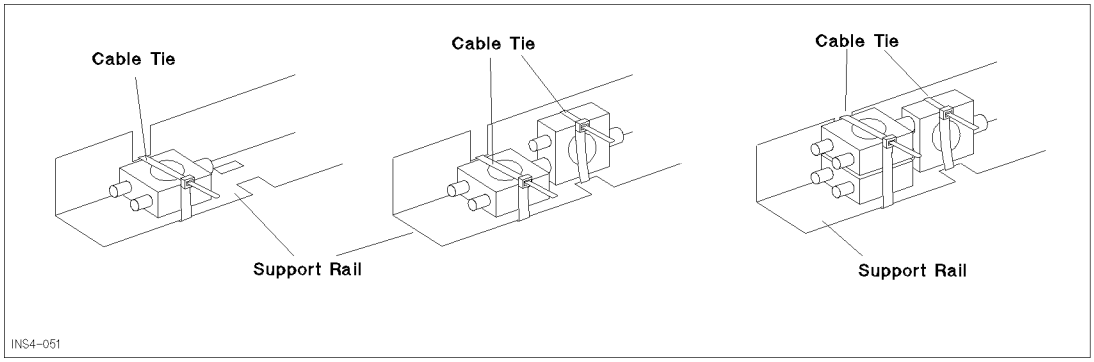


Figure 4-13. Pulse Adder/Splitters Fixed on the Support Rail

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 SWC1[1]	22	Mini-rotary switches on the rear panel
HP 4084B SWC2[1]	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 and Table 4-12 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 (For series 300 computers)

Select Code of HP-IB Interface	Connected System Instruments
27[1]	HP 4084B, HP 4142B, HP 4280A or HP 4284A, and HP 8110A(s) (system instruments)
7	System printer or plotter

1 If no devices are connected to the built-in HP-IB (select code 7), you can connect the system instruments to the built-in HP-IB interface instead of the HP-IB interface card (select code 27). You cannot connect the system instruments to an HP-IB interface to which the system printer/plotter or other instruments are connected. When the system instruments are connected to an HP-IB interface in which the select code is other than 27, the contents of the SYSCONFIG file must be modified. See "Installing and Customizing Your System" in Chapter 5.

Table 4-12.
Connections between the Controller and the System Instruments (For Series 700 Computers)

Interface	Description
HP 25560A	For communicating with computer peripherals
745i/747i internal HP-IB	For controlling the system instruments: HP 4084B, HP 4142B, HP 4280A, HP 4284A, and HP 8110As
HP E2071B	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.

- For series 300 computer

  HP 98624A HP-IB interface card (select code 27)

- For series 700 computer
  - Model 745i/747i computer

    745i/745i internal HP-IB interface card
  - Model 725 computer

    HP E2071B HP-IB interface card

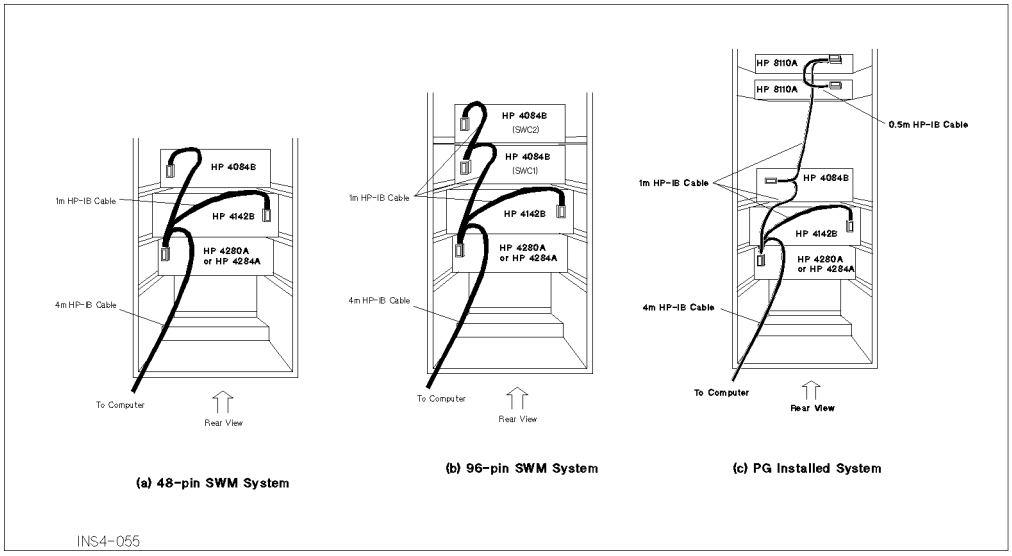


Figure 4-14. Connections of the HP-IB Cables

If the system controller is installed in the standard system cabinet (Option 701, 702, 703, 704, 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.

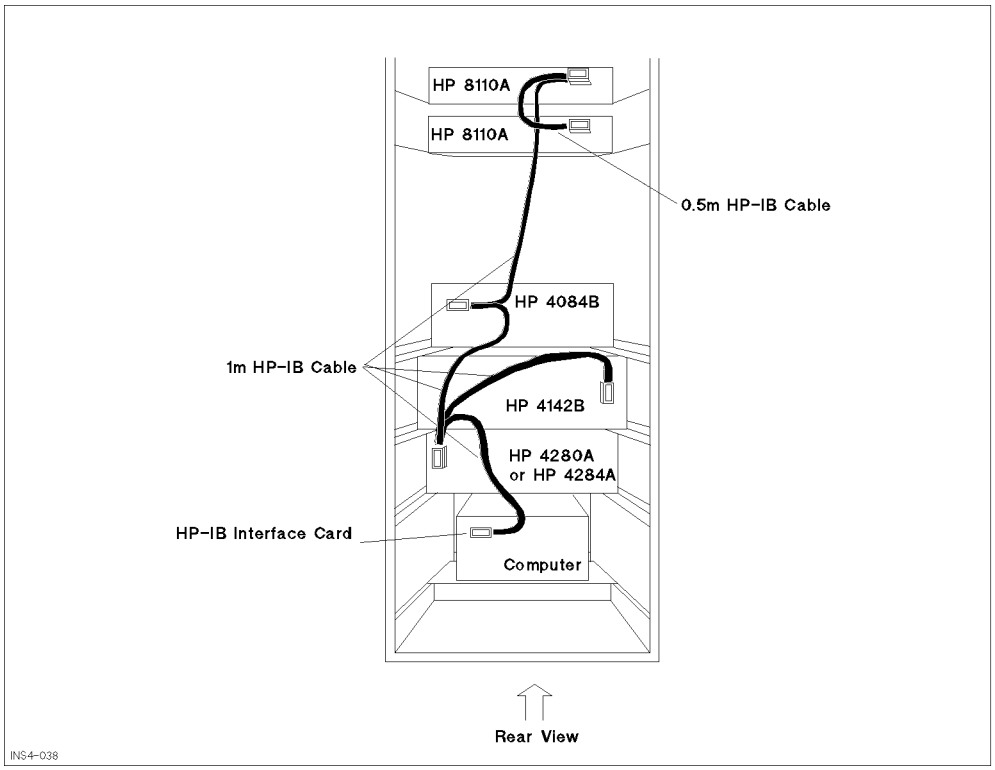


Figure 4-15. Connections of the HP-IB Cables with Controller

If the HP 9000 series 300 model 340 or 345 controller is used as a system controller in the diskless cluster, connect the HP-IB of the system instruments to the built-in HP-IB interface

(select code 7) of the controller using the furnished 4 m HP-IB cable. Note that no printer or plotter can be connected to the built-in HP-IB interface of the diskless cluster.

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 the 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.

If the controller, however, is model 340 or 345 used as a system controller in a diskless cluster, connect the wafer prober to the built-in HP-IB interface (select code 7) of the controller.

Use 25 for select code (series 300 computers) or for logical unit number (series 700 computers). Select code and logical unit number are set in the SYSCONFIG file. The default setting of the select code and the logical unit number in the SYSCONFIG file is 25. For details about wafer prober setting, see "Customizing the 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.

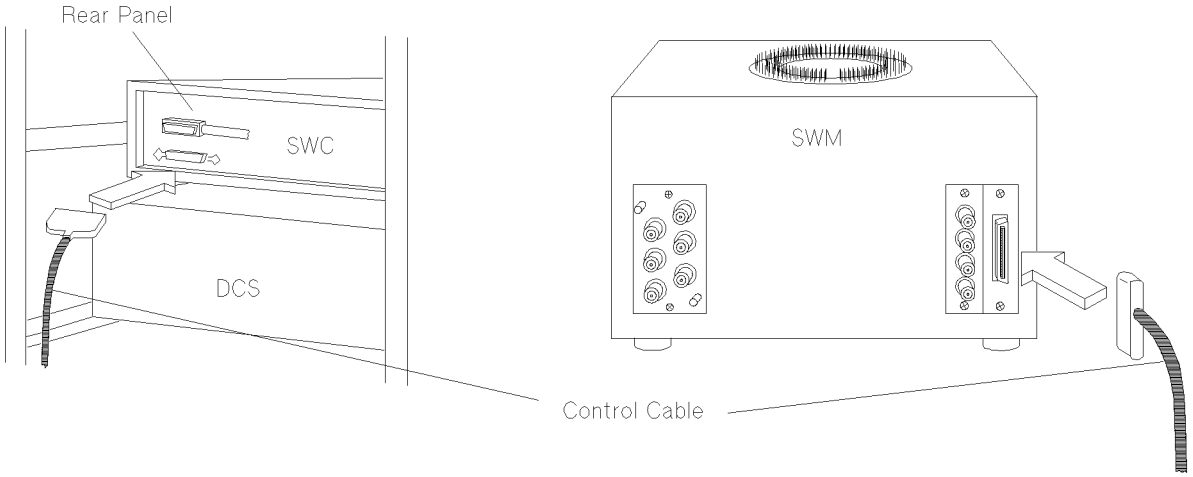


Figure 4-16. Connecting the SWC to the SWM

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.

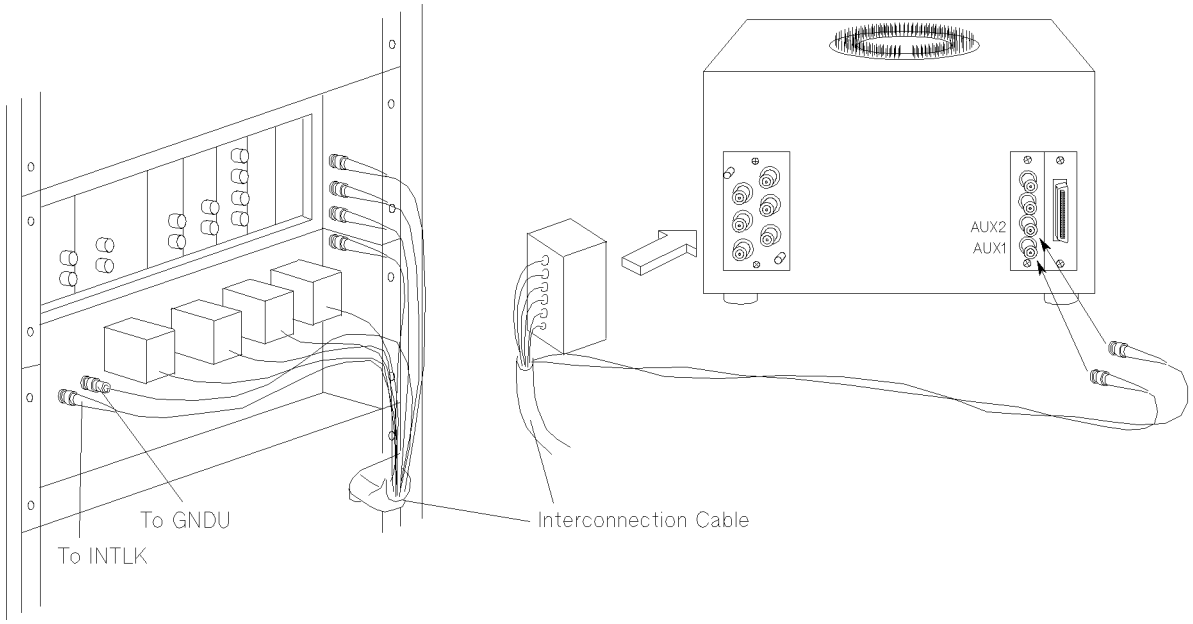


Figure 4-17. Connecting the DCS to the SWM

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.

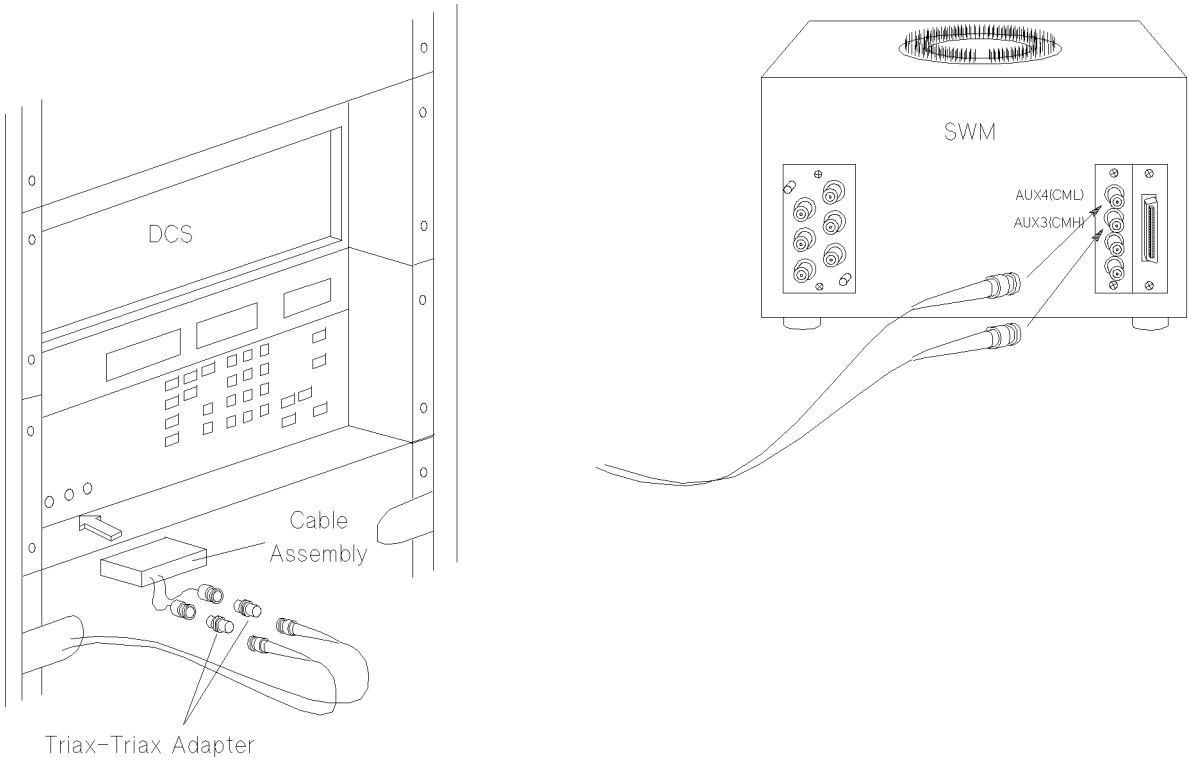


Figure 4-18. Connecting the CMU to the SWM

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 (⊥) 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.

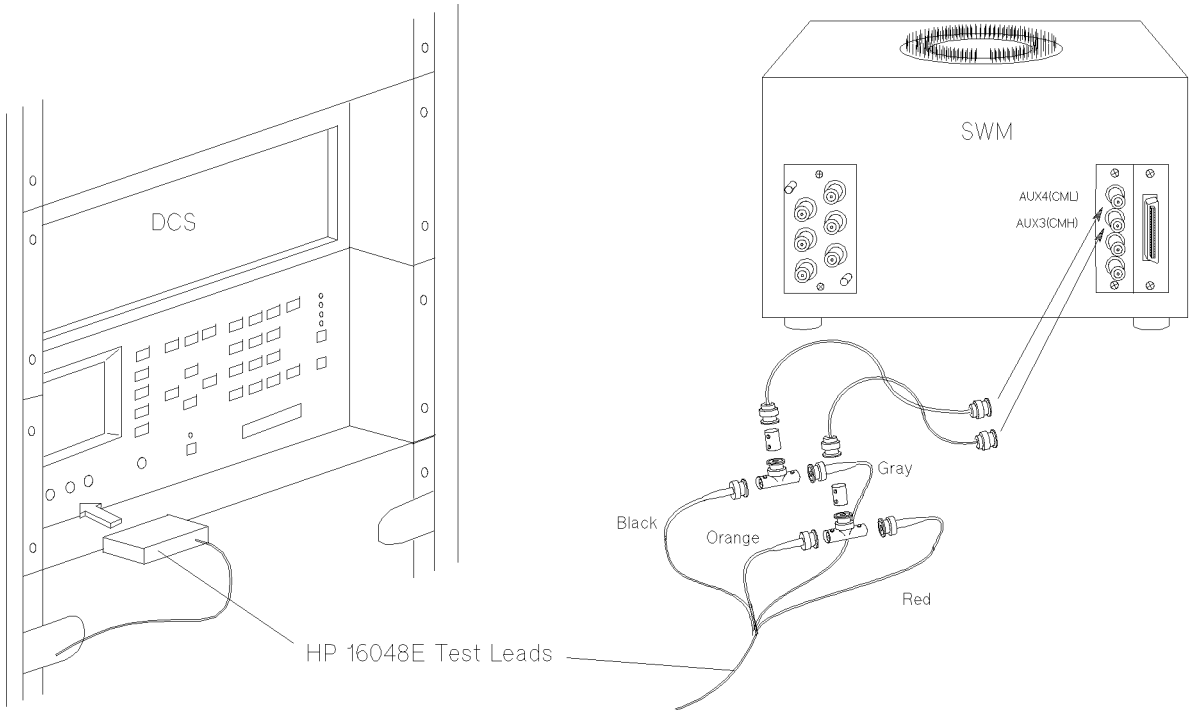


Figure 4-19. Connecting the CMU84 to the SWM

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.

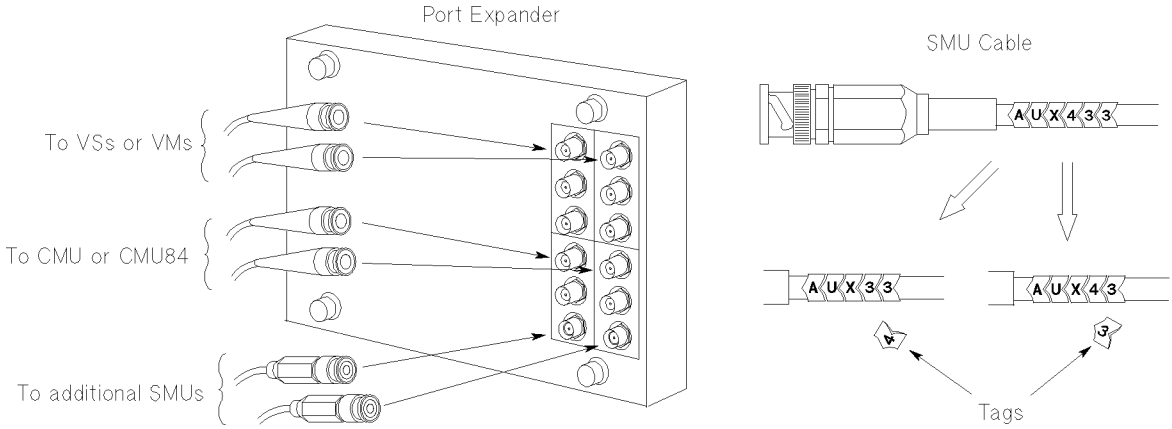


Figure 4-20. Connecting Signal Cables to the Port Expander

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.

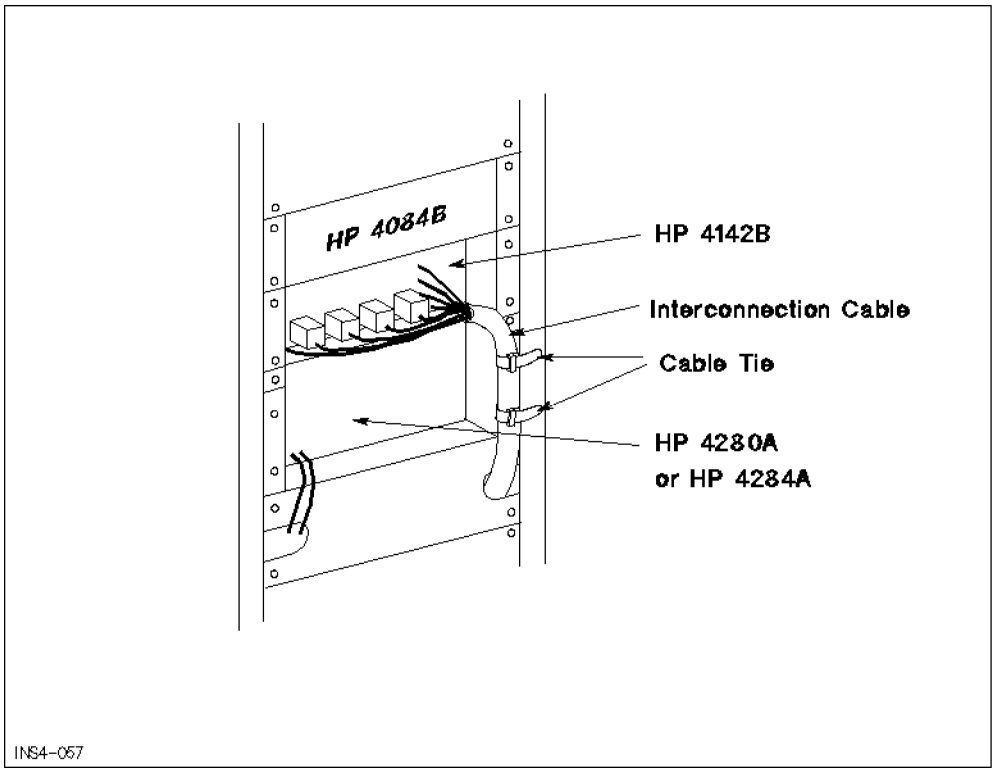


Figure 4-21. Fastening the Interconnection Cables with Cable Ties

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.

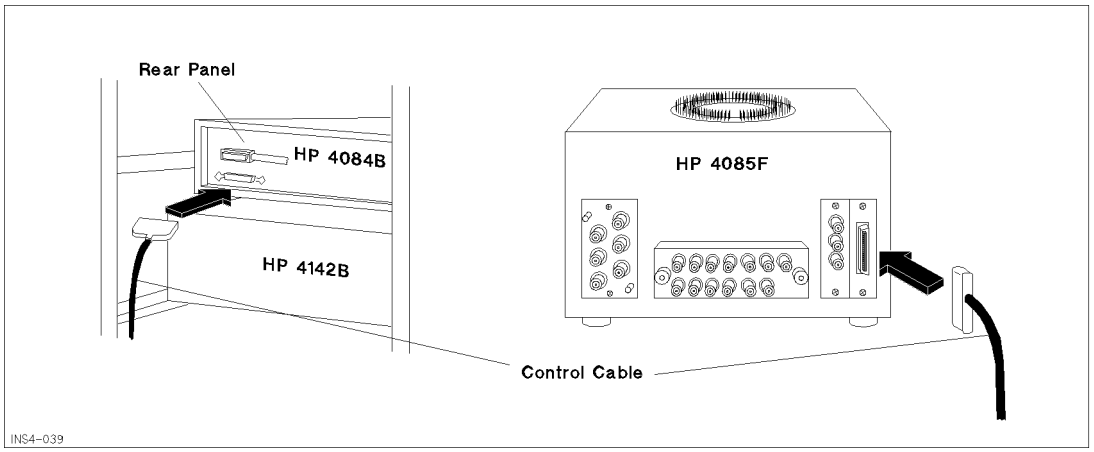


Figure 4-22. Connecting the HP 4084B SWC to the HP 4085F SWM

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.

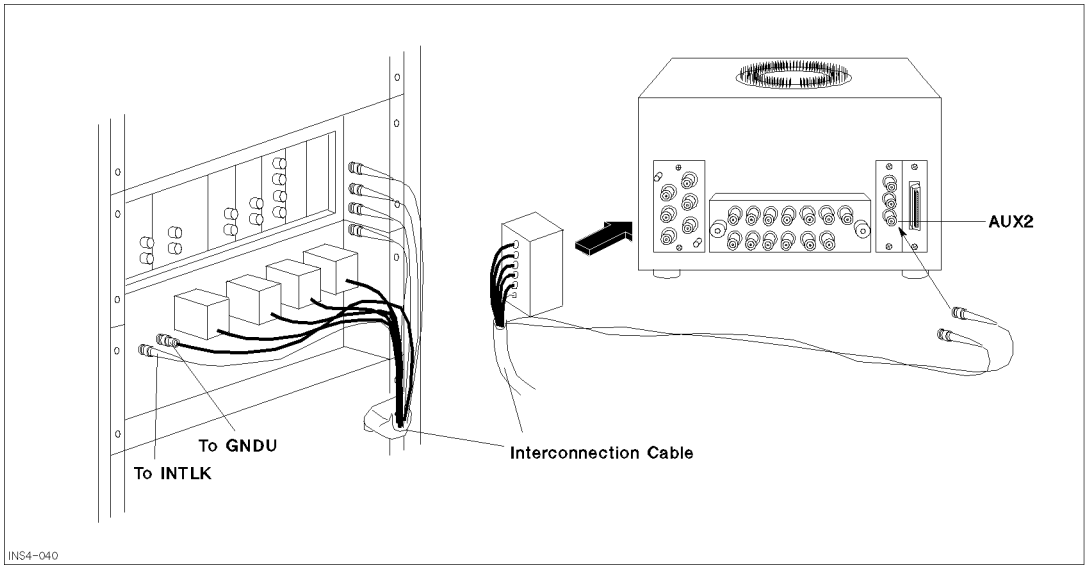


Figure 4-23. Connecting the HP 4142B DCS to the HP 4085F SWM

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.

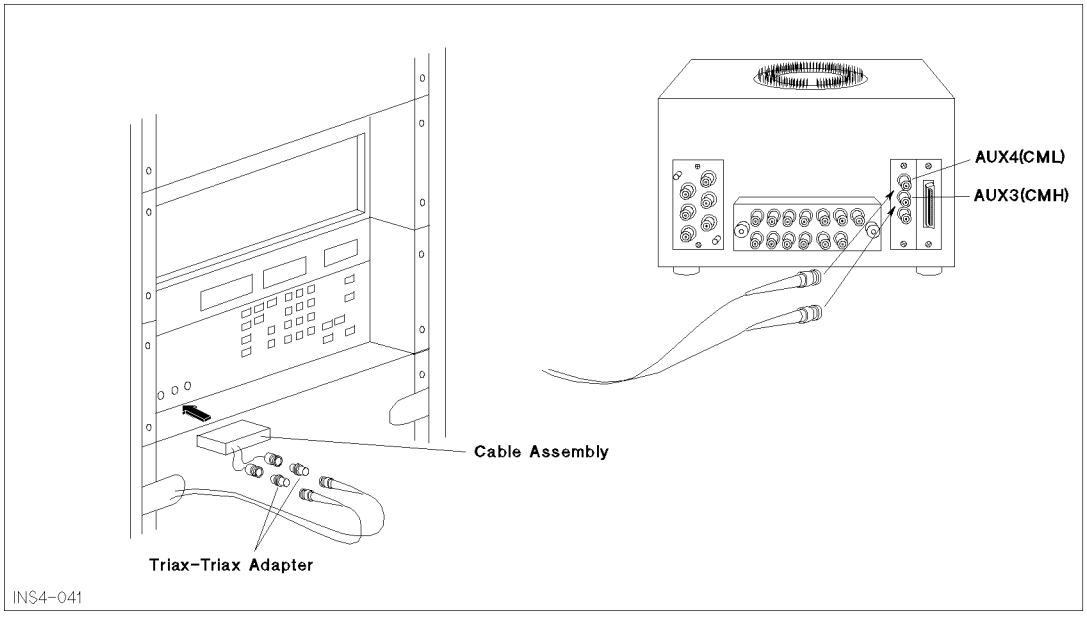


Figure 4-24. Connecting the HP 4280A CMU to the HP 4085F SWM

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 (⊥) 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.

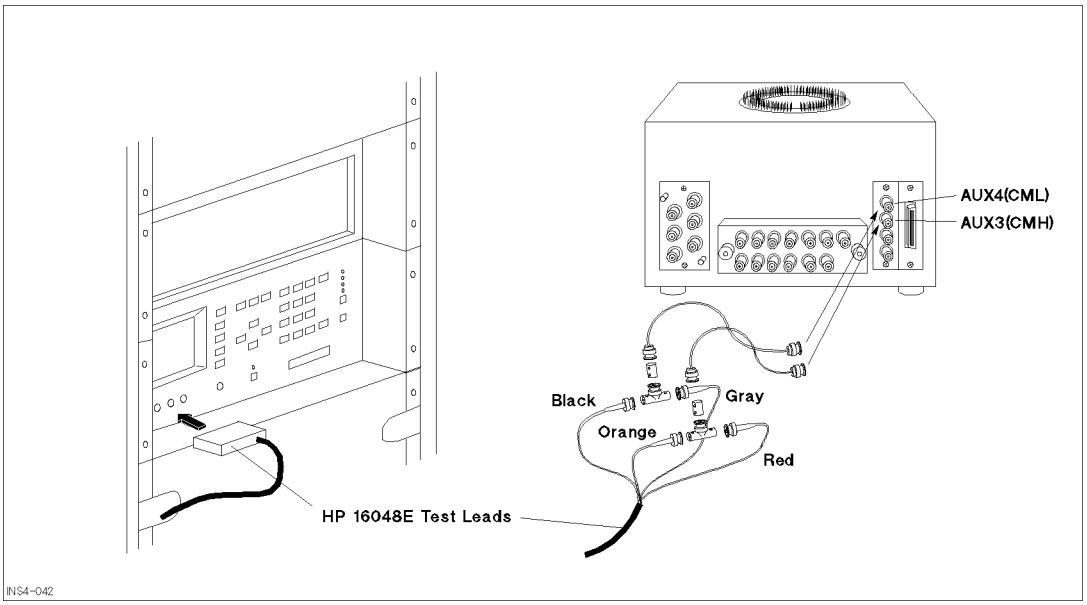


Figure 4-25. Connecting the HP 4284A CMU84 to the HP 4085F SWM

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.

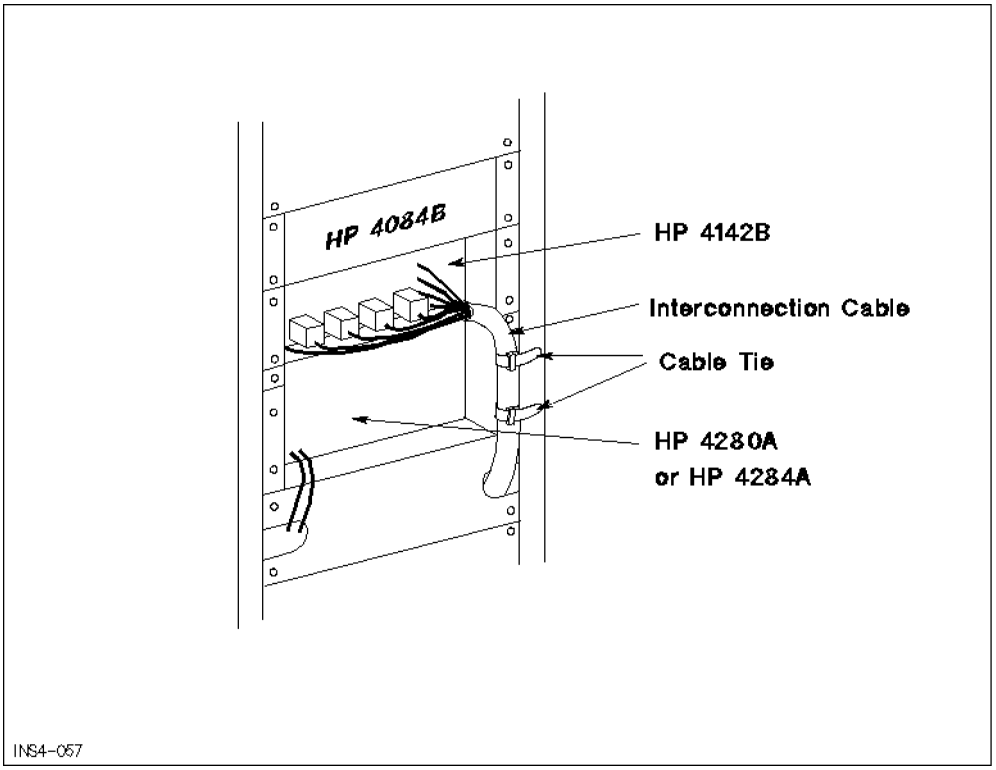


Figure 4-26. Fastening the Interconnection Cables with Cable Ties

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 4-13.

Table 4-13.
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

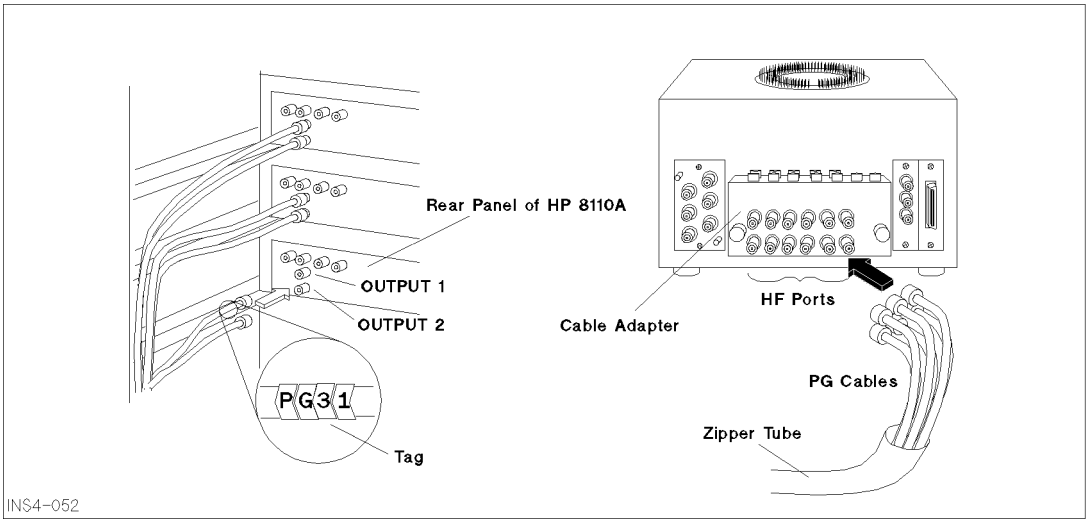


Figure 4-27. Connecting the HP 8110A PGs to the HP 4085F SWM

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.

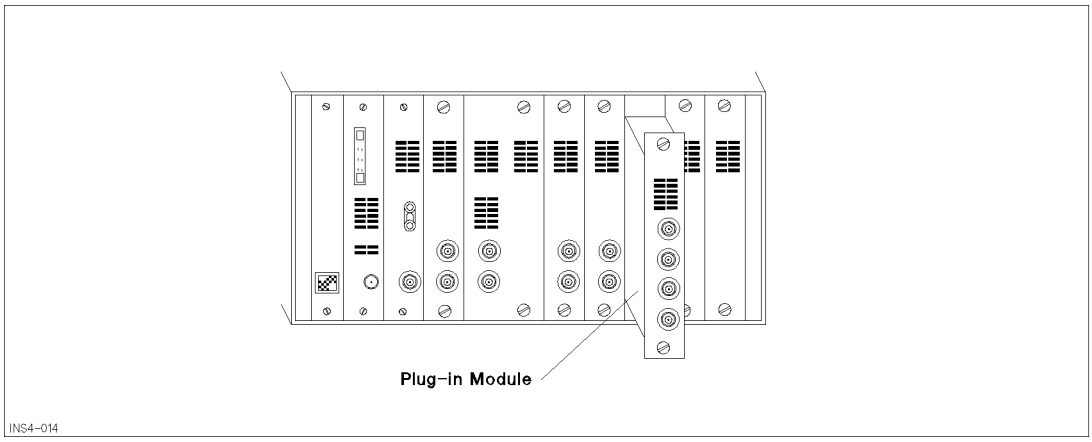


Figure 4-28. Removing HP 4142B's Plug-in Modules

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 (1) 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 indicater 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.

5

Software Installation

Introduction

This chapter provides 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. Refer to Appendix A when updating system software, which is the user's responsibility.

Following system software installation and customization, information to customize the wafer prober is provided.

If your system has the HP Interactive Measurement and Analysis (IMA) software, use this chapter to install your HP IMA software.

Caution

If you are installing the new software on a hard disk that has been used, Hewlett-Packard recommends that you backup the user's programs and data. See *Installing and Maintaining HP BASIC/UX* for backup information.

Installing the HP 4062UX/F System Software

This paragraph covers the installation procedure of the HP 4062UX/F system software. See *Read Me Before Installing the HP 4062UX/F Revision 7.xx System Software* to confirm the software compatibility before going to the following procedure.

The HP-UX Run-Time Environment, HP BASIC/UX, and HP 4062UX/F system software are required as a minimum environment for the HP 4062UX/F system. If you have any questions about the HP 4062UX/F environment, contact the nearest HP Sales Office in your area.

Note

If configuring the HP 4062UX/F in a diskless cluster, perform the installation procedures on the server.

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

- Installing HP-UX and other application software.
- Installing HP BASIC/UX.
- Installing HP 4062UX/F system software and HP 4062UX C library (optional).
- Installing HP IMA/UX system software (if needed).
- Customizing the HP 4062UX/F system.
- Customizing the HP IMA/UX (if needed).

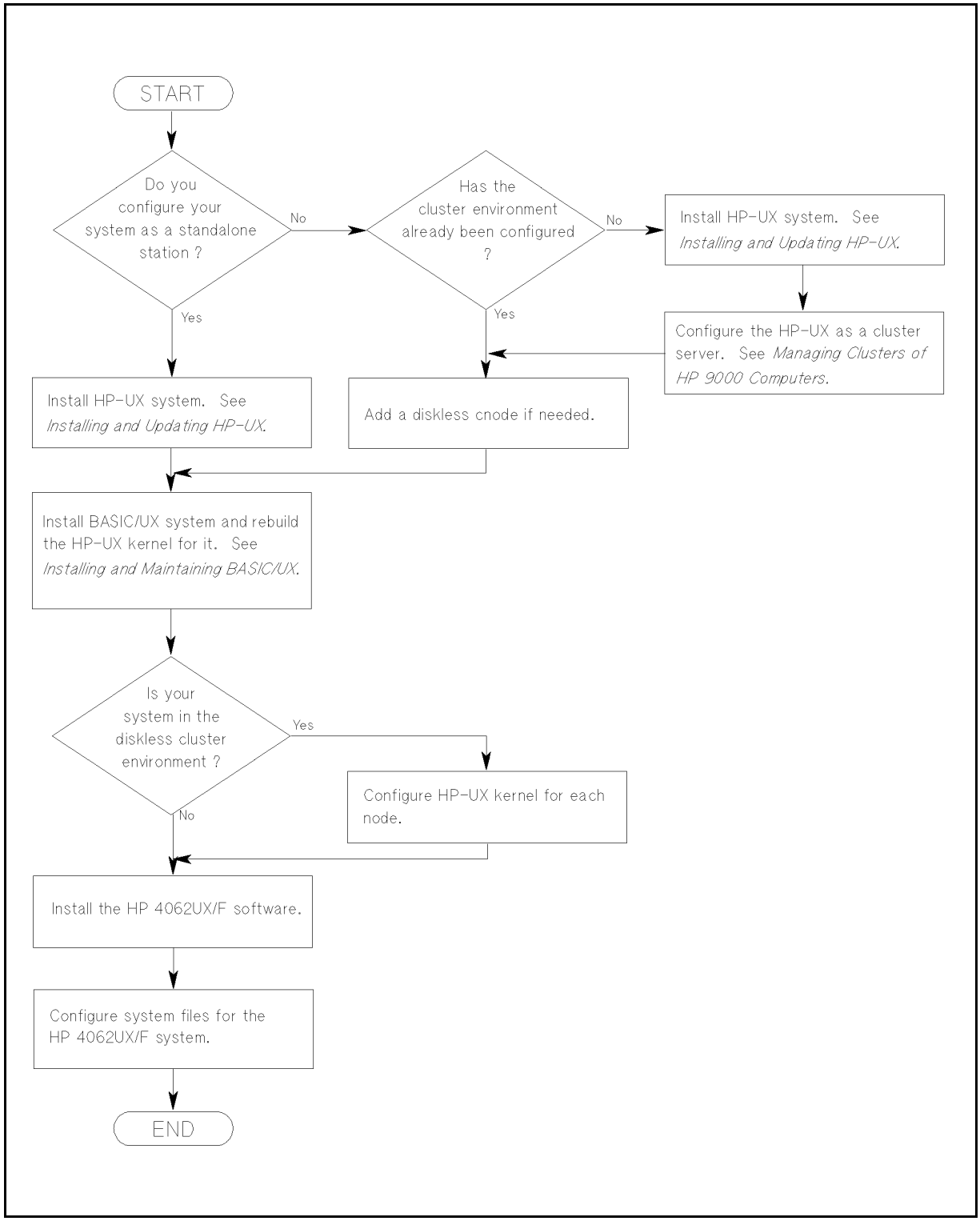


Figure 5-1. Installation Flowchart for HP 4062UX/F System Software

Installing HP-UX and Other Application Software

To install or update HP-UX, refer to the *Installing and Updating HP-UX*.

To configure your HP-UX system into a diskless cluster environment and to add a diskless cluster node, use the SAM(1M) command. Note that you must go into single user mode of your HP-UX system to change your kernel to the diskless cluster environment. For details, see *Managing Clusters of HP 9000 Computers* manual.

Note

If the swap space size is not large enough for the recommended environment (see Table 5-1 or Table 5-2), modify the kernel configuration of the HP-UX system as described in "Reconfiguring the HP-UX Kernel" of the *HP-UX System Administration Tasks* manual.

Table 5-1.
Required Swap Size and Memory for Series 300 Computers (Runtime Environment)

Recommended Environment	Minimum Disk Size	Swap Size[1] (1 block = 512 bytes)	Memory[2]
Standalone Environment	200 MB	20 MB (40960 Blocks)	8 megabytes
Diskless Cnode Environment	—	20 MB (40960 Blocks)/cnode	8 megabytes

1 Hewlett-Packard recommends to keep more than 30 MB (61440 blocks) of swap space for X11 Windows or HP Visual User Environment (VUE).

2 Hewlett-Packard recommends to install at least 16 megabytes of memory for the X11 Windows environment.

Table 5-2.
Required Swap Size and Memory for Series 700 Computers (Runtime Environment)

Recommended Environment	Minimum Disk Size	Swap Size (1 block = 512 bytes)	Memory
Standalone Environment	400 MB	60 MB (122880 Blocks)	32 megabytes
Diskless Cnode Environment	—	60 MB (122880 Blocks)/cnode	32 megabytes

After loading the HP-UX filesets from the master tape, Hewlett-Packard recommends to customize `/.profile` and `/etc/ttytype` properly for your console:

- `/.profile` file

  To suppress the display type query when you log in as a root user, modify the /.profile file as follows:

```
 .   .   .   .   .   .   .   .
TERM=hp
if [ -x /usr/bin/tset ]
then
      eval 'tset -s -Q -h'
      if [ "$TERM" = "" -o "$TERM...
      then
         TERM=hp
         ask="yes"
      else
         ask="no"     # change to...   ⇐ change from "yes" to "no"
         echo "TERM value from /e...   ⇐ remove the "#" in the first column
 .   .   .   .   .   .   .   .
```

In the default settings, the HP-UX asks you to set the display type when you log in as a root user. To suppress this question, change the parameter `yes` to `no` in the `/.profile` file and remove the sharp sign (`#`) in the first column as shown above.

- `/etc/ttytype` file

  To set your console display type, modify the /etc/ttytype file as follows:

```
98550a console    ⇐ for example
2397 tty00
2397 tty01
2397 tty02
```

  The default setting of your console is `300h`. If your display type is not `300h`, you must correct it. The display board inserted in the backplane of your computer shows the display type.

For HP Visual User Environment (VUE) configuration, you can start the HP VUE screen after booting the HP-UX system. To do so, the run level of the "init" procedure in the /etc/inittab file must be set to 4 as follows:

```
init:4:initdefault:                                          ⇐=
stty::sysinit:stty 9600 clocal icanon echo opost onlcr ien...
brc1::bootwait:/etc/bcheckrc </dev/console >/dev/console 2...
  .   .   .   .   .   .   .   .   .   .   .   .   .   .   .
```

Installing and Customizing Your System

This section gives step-by-step instructions for installing and customizing HP BASIC/UX, HP 4062UX/F software.

1. Install HP BASIC/UX.

To install HP BASIC/UX software, see *Installing and Maintaining HP BASIC/UX*. This section provides only brief instructions and explanations.

If your HP-UX system is configured into a diskless cluster, make sure to establish a diskless cluster node (cnode) before installing the HP BASIC/UX system software. Note that you must install the HP BASIC/UX system software in the cluster server.

Note

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

To start the UPDATE(1M) utility and load the HP BASIC/UX files from DAT or cartridge tape, use the following procedures:

1. Log in as a superuser by entering `root` after the `Login:` prompt as follows:

   ```
   Login: root
   ```

   After the `Password:` prompt appears, enter the root password of your system. The password that you type is not displayed on your console.

2. To start the UPDATE(1M) utility, enter:

   ```
   # update
   ```

   After starting the UPDATE utility, follow the displayed instructions.

2. Install HP SICL 3.01 (HP 4062UX C Library for Series 700 Only)

If you use HP 4062UX C library (option 034) in series 700 computers, Hewlett-Packard recommends to install *all* filesets of HP SICL 3.01 by using `update` command as a superuser. At least, install the following *three* filesets that are used in HP BASIC/UX 7.01:

- PIL_RUN
- PIL_PRG
- PIL_HPIB

For details of HP SICL installation, see *Installing and Maintaining HP BASIC/UX*.

3. Install HP 4062UX/F software.

The HP 4062UX/F requires HP BASIC/UX, which must be installed on the HP-UX system before the HP 4062UX/F software can be installed.

If the HP 4062UX/F is configured in a diskless cluster, make sure to establish a diskless cluster node (cnode) before installing the HP 4062UX/F system software.

The HP 4062UX/F system software is stored in cartridge tapes or digital audio tape (DAT) cassettes. Table 5-3 shows the file sets of the system software.

Table 5-3. File Sets for HP 4062UX/F System

Option	Description	Media	File Set
022[1]	HP 4062UX/F System Software	CT[2]	4062UX, 4062UX2, 4062RMB, 4062DIAG, and 4062F[3]
023[1]/024, 026[1]/027		DAT[4]	
032	C Language Library	CT	4062TISC
033, 034		DAT	

1 Option 022, 023, and 026 include the HP-UX system software and HP BASIC/UX system software.

2 CT stands for cartridge tape.

3 This file set is included in HP 4062F software only.

4 DAT stands for digital audio tape.

Note

If you install the system software to an HP 4062UX that is configured in a diskless cluster, the software must be installed on the root server (*not* on the diskless cnode).

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.

To load the file sets, perform the following procedure:

1. Log in as a superuser by entering `root` after the `Login:` prompt as follows:

   ```
   Login: root
   ```

   After the `Password:` prompt appears, enter the root password of your system. The password that you type is not displayed on your console.

2. To start the UPDATE(1M) utility, enter:

   ```
   # update
   ```

   Update starts and displays the main menu. The default source for the update is `/dev/update.src`. This procedure assumes that the `/dev/update.src` is set correctly. If the `/dev/update.src` setting is not correct, see the *HP-UX System Administration Tasks* manual.

3. Make sure the installation media is set to write-protected state.

4. Insert the installation media into the cartridge tape drive or DAT drive, and wait until the BUSY indicator turns off.

5. To load all the files from the installation media, Select `Select All Filesets on the Source Media ->` function by using the up and down arrow keys and the `Select Item` softkey.

   All the files are loaded from the installation media.

6. Remove the installation media, then put it in a safe place.

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

Note

When you install the HP 4062UX/F system software into a cluster environment, the HP-UX update procedure automatically checks to see if the system is clustered. If the update procedure finds the system is on an HP-UX cluster, update creates the necessary Context Dependent Files (CDFs) and directories for all cnodes.

4. Change the `msgtql` parameter value in the dfile by using SAM(1M) utility.

If your controller is a series 300 computer, skip this step.

If your system is configured in a diskless cluster environment, you must perform this step for each diskless cnode and server.

The only kernel parameter for which the default value is not sufficient is `msgtql`. The recommended value for `msgtql` is 256. For details of each kernel parameter value and parameter setup procedure, see *Installing and Maintaining HP BASIC/UX*.

To change the `msgtql` parameter value, use the following procedures:

1. Login as a superuser and execute the command: sam.
2. Open the `[Kernel Configuration ->]` menu.
3. Open the `[Configuration Parameters ->]` submenu. The kernel parameters are listed in alphabetical order.
4. Select and highlight `msgtql` parameter column.
5. Select `[Actions]`, then select `[Modify Configurable Parameter]`.
6. Change the default value(40) to recommended value(256) in the box provided. Your change is confirmed in the `Pending Value` column after you select `[OK]`.
7. Select `[Action]`, then select `[Create a New Kernel]`.
8. Select `[Yes]` to the confirmation question.
9. Wait for the kernel build to complete.

   If you need to change other parameters, change parameter values.
10. Select `[Exit Without Moving the Kernel Into Place]`.
11. Select `[OK]`.
12. Exit sam.
13. As soon as you exit from `sam`, execute as follows:

```
cp /etc/conf/dfile.SAM  /etc/conf/dfile
```

5. Edit the `/usr/pil/etc/hwconfig.cf` file appropriate for your HP-IB interface configuration.

If your controller is a series 300 computer, skip this step.

If your system is configured in a diskless cluster environment, you must perform this step for each diskless cnode and server.

If the /usr/pil/etc/hwconfig.cf file was not modified after HP-UX installation, copy the template file provided by the HP 4062UX/F software as follows:

```
# cp /usr/pcs/newconfig/s700/hwconfig.cf /usr/pil/etc/hwconfig.cf
```

If the /usr/pil/etc/hwconfig.cf was already modified for other applications, you need to add setups for the HP-IB interface card appropriate for your configuration. If your configuration is different from the default setup of /usr/pcs/newconfig/s700/hwconfig.cf file, edit the /usr/pil/etc/hwconfig.cf file or add card setups to the end of the file according to the following definitions.

HP-IB interface setup for HP 4062UX/F are provided at the end of the /usr/pcs/newconfig/s700/hwconfig.cf file. This default setup is for model 745i internal HP-IB interface card and E2071B HP-IB interface card installed in slot 1. Each line corresponds to an interface card.

The following shows the default setup in the /usr/pcs/newconfig/s700/hwconfig.cf file.

```
##########################################################################
### HP 4062UX/F for HP 9000 S700 configuration template
If you use 4062UX/F s700 system with the configuration except for the
example below, set I/F parameters appropriate for your configuration.
### Example: model 745i internal I/F and E2071B installed in slot 1
25      hpib25  e2071  1  21  0b0000  1  3                    <= for prober control
27      hpib27  s745  0xf0835000  21  1                      <= for HP 4062 control
```

If your controller is model 745i/747i, internal card is recommended to use for HP 4062UX/F control, and E2071B is recommended to use for prober control.

If your controller is model 725, use one E2071B for prober and one E2071B for HP 4062UX/F control.

The format of each line is briefly explained as follows. For details of each line format, see *Installing and Maintaining HP BASIC/UX* or *Installation Guide* for each card.

- HP E2071B HP-IB interface

  The syntax for the HP E2071B card:

  ```
  <lu><symname><cardname><slot><busaddr><dip><sysctl><irq>
  ```

  Where:

  <lu> Logical unit number of the card. Set to the following value.

  25: for prober control

  27: for HP 4062 control

  <symname> A symbolic name for your card. Set a desired name.

  <cardname> The name of the card that is installed.

  <slot> The EISA/ISA slot number of your computer in which you inserted the card as described in Chapter 2.

  <busaddr> HP-IB bus address of this card. You do not need to edit this number(21).

  <dip> Value of the DIP switch setting you set in Chapter 2.

  <sysctl> 1 = system controller; 0 = not system controller

<irq> The legal IRQ line choises for the E2071 are: 3, 5, 7, 9, 10, 11, 12, 15.

- series 700 internal HP-IB interface

  The syntax for the series 700 internal card:

  ```
  <lu><symname><cardname><location>[card specific values]
  ```

  You can change only <lu> and <symname> parameters:

  <lu> Logical unit number of the card. Set to the following value.

  25: for prober control

  27: for HP 4062 control

  <symname> A symbolic name for your card. Set a desired name.

6. Perform `postcustomize` command to customize some files automatically.

1. Perform the `postcustomize` command as follows:

   ```
   # /usr/pcs/etc/postcustomize
   ```

2. When "`Continue [Y/N] ⇒`" is displayed, enter "`Y`".

   If your system is in a diskless cluster, perform this step for server and each diskless cnode.

   This command automatically customizes the following files.

   /etc/profile
   /etc/csh.login
   /usr/vue/config/Xsession
   /usr/lib/rmb/rmbrc
   /usr/lib/X11/app-defaults/Rmb

   For series 300 computers, this command also rebuilds the HP-UX kernel for HP BASIC/UX.

7. If your controller is a series 300 computer, reboot your HP-UX system.

If your controller is a series 700 computer, skip this step.

Enter as follows:

```
# shutdown -r 0
```

8. Perform `pilconf` command to finish HP SICL configuration and build a new kernel.

If your controller is a series 300 computer, skip this step.

Type as follows:

```
# /usr/pil/bin/pilconf
```

Press Return key for the first to third displayed messages. Type "`y`" for the last message that asks if you want to reboot your system.

For details of the `pilconf` command, see *Installing and Maintaining HP BASIC/UX*.

9. Customize X Window environment.

1. Modify the /usr/pcs/etc/xinitcolor file according to your graphics and applications. For example, if your HP 4062UX system is furnished with a color display and has the HP IMA/UX software, edit the /usr/pcs/etc/xinitcolor file as follows:

```
  .   .   .   .   .   .   .   .
###  system.

### For 4062UX on Color display system
#/usr/bin/X11/xinitcolormap -c 16 . . .
  .   .   .   .   .   .   .   .

### For IMA/UX
/usr/bin/X11/xinitcolormap -f /u . . .    ⇐ Remove #.
```

   If your system is in a diskless cluster, perform this step for server and each diskless cnode.

2. Copy the X11 environment file "`.Xdefaults`" for HP BASIC/UX, then change the permission as follows:

```
# cp /etc/newconfig/rmb/d.Xdefaults /.Xdefaults
# chmod u+rw .Xdefaults
```

3. Copy an X11 startup file "`.x11start`" for the HP 4062UX, then change the permission as follows:

```
# cp /usr/pcs/newconfig/d.x11start /.x11start
# chmod u+rwx .x11start
```

10. Execute the following commands for X11 colormap database setup.

- For color display:

```
# cat /etc/newconfig/rmb/rgb.rmb >> /usr/lib/X11/rgb.txt
# /usr/bin/X11/rgb < /usr/lib/X11/rgb.txt
```

- For gray scale display:

```
# cat /etc/newconfig/rmb/gray.rmb >> /usr/lib/X11/rgb.txt
# /usr/bin/X11/rgb < /usr/lib/X11/rgb.txt
```

11. Start X Window.

Enter as follows:

```
# x11start
```

12. Setup codewords by performing `addcodeword`.

Enter as follows:

```
# /usr/pcs/etc/addcodeword
```

Then follow the displayed instructions.

If your system is configured in a diskless cluster environment, you must perform this step for each diskless cnode and server.

The HP 4062UX/F system uses the HP "Codeword Delivery" security scheme. A codeword consists of 16 characters. It is used in conjunction with the HP 46084A ID Module.

13. Set select code for series 300 computers or logical unit number for series 700 computers.

Use `setsysconfig` command as follows:

```
# /usr/pcs/etc/setsysconfig
```

If your system is configured in a diskless cluster environment, you must perform this step for each diskless cnode and server.

Set select code (logical unit number) as follows:

```
Interface bus for instrument ⇒ 27
Interface bus for prober ⇒ 25
```

14. Perform `hpib4062` command to confirm HP-IB cards.

Enter as follows:

```
# /usr/pcs/etc/hpib4062
```

If your system is configured in a diskless cluster environment, you must perform this step for each diskless cnode and server.

This command checks whether three cards exist: 7, 25, and 27 select code or logical unit number.

15. (HP 4062F only) Customize /usr/pcs/etc/FLCONFIG file.

The FLCONFIG file includes the information on the device selectors (select code × 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 to 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 PG4x and PG5x lines 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       ⇐
```

Installing and Customizing HP IMA

Installing HP IMA/UX

To install HP IMA/UX system software from the distribution tape, perform the following procedure:

1. Log in as a superuser by entering `root` after the `Login:` prompt as follows:

   ```
   Login: root
   ```

   After the `Password:` prompt appears, enter the root password of your system. The password that you type is not displayed on your console.

2. Change to single user mode (run level s) as follows:

   ```
   # shutdown 0
   ```

   After about 30 seconds, the HP-UX system changes to single user mode.

3. Execute the `update` utility as follows:

   ```
   # /etc/update
   ```

4. The Main menu is displayed. The default source for the update is /dev/update.src. This procedure assumes that /dev/update.src is set correctly. If the /dev/update.src setting is not correct, refer to the *HP-UX System Administration Tasks* manual.

5. Make sure the distribution tape is set to write-protected state.

6. Insert the distribution tape into the tape drive and wait until the BUSY indicator turns off.

7. To load all files of the tape, select the `Select All Filesets on the Source Media` function in the main menu.

   All the files are loaded from the distribution tape.

8. After finishing the `update` utility, review the update log for any error or warning messages with the following command:

   ```
   # view /tmp/update.log
   ```

9. Remove the distribution tape and put it in a safe place.

Note

When you install HP IMA/UX software into a diskless cluster environment, the HP-UX update procedure automatically checks to see if the system is clustered. If the update procedure finds the system is on an HP-UX cluster, `update` creates the necessary Context Dependent Files (CDFs) and directories for all cnodes.

Customizing for HP IMA/UX

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.

/usr/lib/rmbrc or $HOME/.rmbrc. Add the following lines to the configuration file:

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

/usr/pcs/etc/xinitcolor. Remove **#** from the following line to be effective:

```
### For IMA/UX or '4062UX & IMA/UX'
/usr/bin/X11/xinitcolormap -f /usr/pcs/etc/ima/imacolormap    ⇐ Remove #
```

Confirm that **#** is placed at beginning of following lines:

```
### For 4062UX on Color display system
#/usr/bin/X11/xinitcolormap -c 16 -f /etc/newconfig/rmb/xrmbcolormap                    ⇐
### For 4062UX on Grayscale display system
#/usr/bin/X11/xinitcolormap -c 16 -f /etc/newconfig/rmb/xrmbgraymap                     ⇐
### For 4062UX with BASIC-PLUS (more than 4 planes color display system)
#/usr/bin/X11/xinitcolormap -f /usr/lib/rmb/PLUS/bplus_colormap                        ⇐
### For 4062UX with BASIC-PLUS (4 planes color display system; See BASIC-PLUS manual)
#/usr/bin/X11/xinitcolormap -f /usr/lib/rmb/PLUS/bplus_cmap.4                          ⇐
### For IMA/UX or '4062UX & IMA/UX'
/usr/bin/X11/xinitcolormap -f /usr/pcs/etc/ima/imacolormap
```

/usr/pcs/etc/CODEWORD. Add your codeword for HP IMA/UX into the `/usr/pcs/etc/CODEWORD` file.

```
1000  ! Please add your CODEWORDs to this file.
1010  ! RE-SAVE "/usr/pcs/etc/CODEWORD:HFS"
1020  !   #1234567890123456              Example of CODEWORD
1030  !   #DD6C6BB9A757DCE7    ID 2944AXXXXX  FOR 4062UX
1040  !   #86A1542B408AA511    ID 2944AXXXXX  FOR IMA/UX      ⇐
```

/usr/pcs/etc/PERCONFIG.

Note

If your system is in a diskless cluster, perform the modifications at cluster server and each diskless cnode.

If your CRT is not 16/19 inch high-resolution (1280×1024), you must modify the /usr/pcs/etc/PERCONFIG file.

The CRT type, which specifies the CRT resolution of your 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: 16/19 inch middle-resolution (1024×768), 16/19 inch high-resolution (1280×1024), and VGA (Video Graphics Array). The default setting is 16/19 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 VI(1) editor to modify the CRT TYPE setting of this file according your CRT type.

Creating a New User Account

When creating a new user account on your HP 4062UX/F system, you must especially consider the following. The System Administration Manager (SAM) helps you create a new user account. The following briefly explains how to create a new user account.

1. Log in as a superuser by entering `root` after the `Login:` prompt as follows:

   ```
   Login: root
   ```

   After the `Password:` prompt appears, enter the root password of your system. The password that you type is not displayed on your console.

2. To start the SAM(1M) utility, enter:

   ```
   # sam
   ```

3. Move the field pointer to "Users and Groups", then select `Open` softkey.

4. Move the field pointer to "Users", then select `Open` softkey.

5. Select `Menubar on/off`, then press [A] (Action) and [A] (Add ...) keys.

6. Fill in the fields properly, then select `OK` softkey.

7. When you are prompted to enter the password, press [Return] only. In this stage, the new account does not need a password. Later the user will set his password. For setting your password, see *A Beginner's Guide to HP-UX*.

8. Exit SAM(1M), then log off the HP-UX system.

9. Log in as the new account. For example, if the new account name is "mike," enter `mike` [Return] after the `Login:` prompt.

   When you are prompted `TERM = (hp)`, enter your terminal type. For example, enter:

   ```
   TERM = (hp) 98550
   ```

10. Copy the X11 environment file "`.Xdefaults`" for HP BASIC/UX as follows:

    ```
    $ cp /etc/newconfig/rmb/d.Xdefaults ./.Xdefaults
    $ chmod u+rw .Xdefaults
    ```

11. If you use HP IMA/UX with the HP 4062UX/F system, perform the following steps:

    a. Set the proper fonts for HP BASIC/UX. To do so, edit the $HOME`/.Xdefaults` file by entering:

       ```
       $ vi .Xdefaults
       ```

       and modify as in the following example:

       ```
       Rmb*font:          hp8.10x20
       ```

       The font name depends on the resolution of your graphics display.

    b. If your controller is series 700 computer, modify $HOME`/.Xdefaults` file as follows to set background color for HP BASIC/UX.

       ```
       rmb*BackGroundColor:     rmb_black
       ```

12. Copy a X11 startup file "`.x11start`" for the HP 4062UX/F as follows:

```
$ cp /usr/pcs/newconfig/d.x11start ./.x11start
$ chmod u+rwx .x11start
```

If you use HP 700/X or 700/RX X stations with the HP 4062UX/F system, You must also perform the following customization for each account. For details, see *HP 700/X System Administrator's Guide*.

- If telnet is used to start the X clients on the X stations:

1. Execute the following commands to set the environment variable DISPLAY:

   - For Bourne shell (sh) or Korn shell (ksh):

     ```
     $ DISPLAY=hostname:0
     $ export DISPLAY
     ```

   - For C shell (csh):

     ```
     % setenv DISPLAY hostname:0
     ```

   Note that the *hostname* is the host name of your X stations.

2. Copy a template file for starting up the X Terminal as follows:

   ```
   $ cd
   $ mkdir bin
   $ cp /usr/lib/X11/700X/examples/x11start.700x bin/x11start.700x
   ```

3. Change the permission of x11start.700x file as follows:

   ```
   $ chmod u+rwx bin/x11start.700x
   ```

4. Modify the x11start.700x file for your environment. You can use VI(1) editor to modify this file.

   a. Add one of the following command lines for your X Terminal:

   - For color CRT:

     ```
     ### For Color CRT
     /usr/bin/X11/xinitcolormap -c 16 /etc/newconfig/rmb/xrmbcolormap
     ```

   - For gray scale CRT:

     ```
     ### For Gray Scale CRT
     /usr/bin/X11/xinitcolormap -c 16 /etc/newconfig/rmb/xrmbgraymap
     ```

   - For color CRT with BASIC Plus (greater than 4 planes)

     ```
     ### For Color CRT with BASIC Plus (greater than 4 planes)
     /usr/bin/X11/xinitcolormap -f /usr/lib/rmb/PLUS/bplus_colormap
     ```

   - For color CRT with BASIC Plus (4 planes)

     ```
     ### For Color CRT with BASIC Plus (4 planes)
     /usr/bin/X11/xinitcolormap -f /usr/lib/rmb/PLUS/bplus_cmap.4
     ```

     See BASIC Plus manual for creating bplus_cmap.4 file.

   Note that the shell scripts above must be placed after the error logging procedure as in the following example:

```
exec >$HOME/.x11startlog 2>$HOME/.x11startlog

### For Color CRT                                          ⇐=
/usr/bin/X11/xinitcolormap -c 16 /etc/newconfig/rmb/xrmbcolormap   ⇐=
```

b. Add the command lines that set the environment variables LANG and KBD_LANG if needed.

- If xdm is used to start the X clients on the X stations:

1. Copy a global startup file for the X Terminal to create your local startup file as follows:

```
$ cd
$ cp /etc/newconfig/xdm/sys.xsession ./.xsession
```

2. Change the permission of .xsession file as follows:

```
$ chmod u+rwx ./.xsession
```

3. Modify the .xsession file for your environment. You can use VI(1) editor to modify this file.

a. Add one of the following command lines for your X Terminal:

□ For color CRT:

```
### For Color CRT
/usr/bin/X11/xinitcolormap -c 16 /etc/newconfig/rmb/xrmbcolormap
```

□ For gray scale CRT:

```
### For Gray Scale CRT
/usr/bin/X11/xinitcolormap -c 16 /etc/newconfig/rmb/xrmbgraymap
```

□ For color CRT with BASIC Plus (greater than 4 planes)

```
### For Color CRT with BASIC Plus (greater than 4 planes)
/usr/bin/X11/xinitcolormap -f /usr/lib/rmb/PLUS/bplus_colormap
```

□ For color CRT with BASIC Plus (4 planes)

```
### For Color CRT with BASIC Plus (4 planes)
/usr/bin/X11/xinitcolormap -f /usr/lib/rmb/PLUS/bplus_cmap.4
```

See BASIC Plus manual for creating bplus_cmap.4 file.

Note that the shell scripts above must be placed after the error logging procedure as in the following example:

```
exec >$HOME/.x11startlog 2>$HOME/.x11startlog

### For Color CRT                                          ⇐=
/usr/bin/X11/xinitcolormap -c 16 /etc/newconfig/rmb/xrmbcolormap   ⇐=
```

b. Add the command lines that set the environment variables LANG and KBD_LANG if needed.

Customizing the Wafer Prober

Use this section to customize the wafer prober. If your 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

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

The HP-IB primary address of the wafer prober registered in the SYSCONFIG file must be the same as the HP-IB primary address of the wafer prober. Confirm the HP-IB primary address of your wafer prober. The default select code (for series 300 computers) or logical unit number (for series 700 computers) 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 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.

6

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 C.

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.

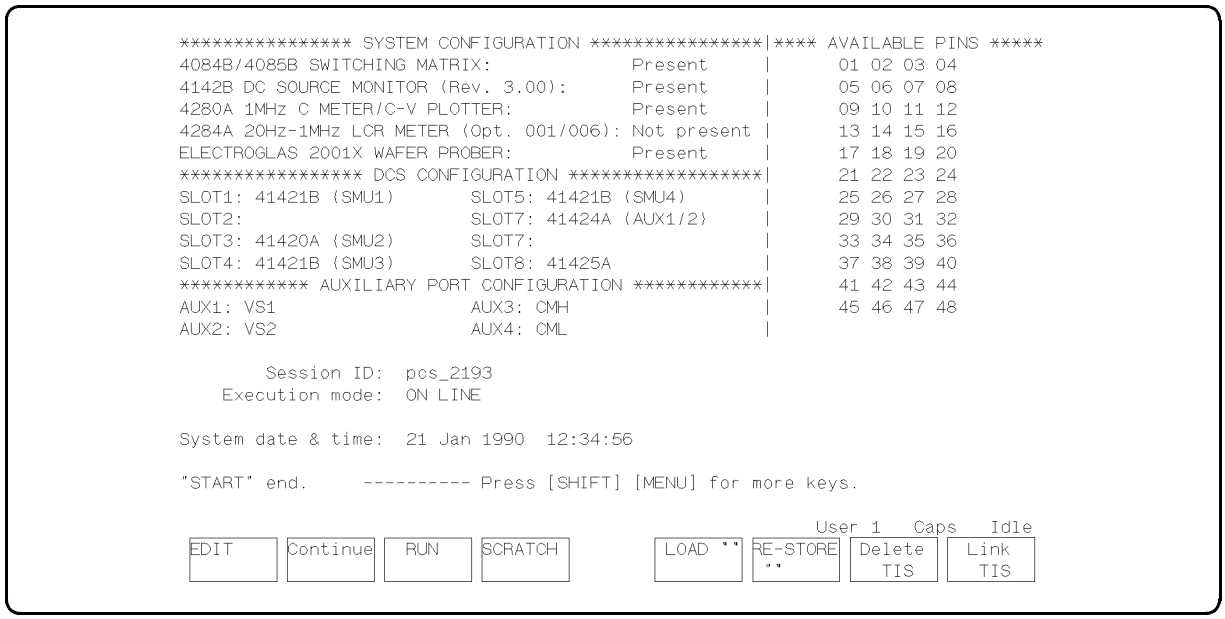


Figure 6-1. Example of Configuration Page (HP 4062UX)

Note

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

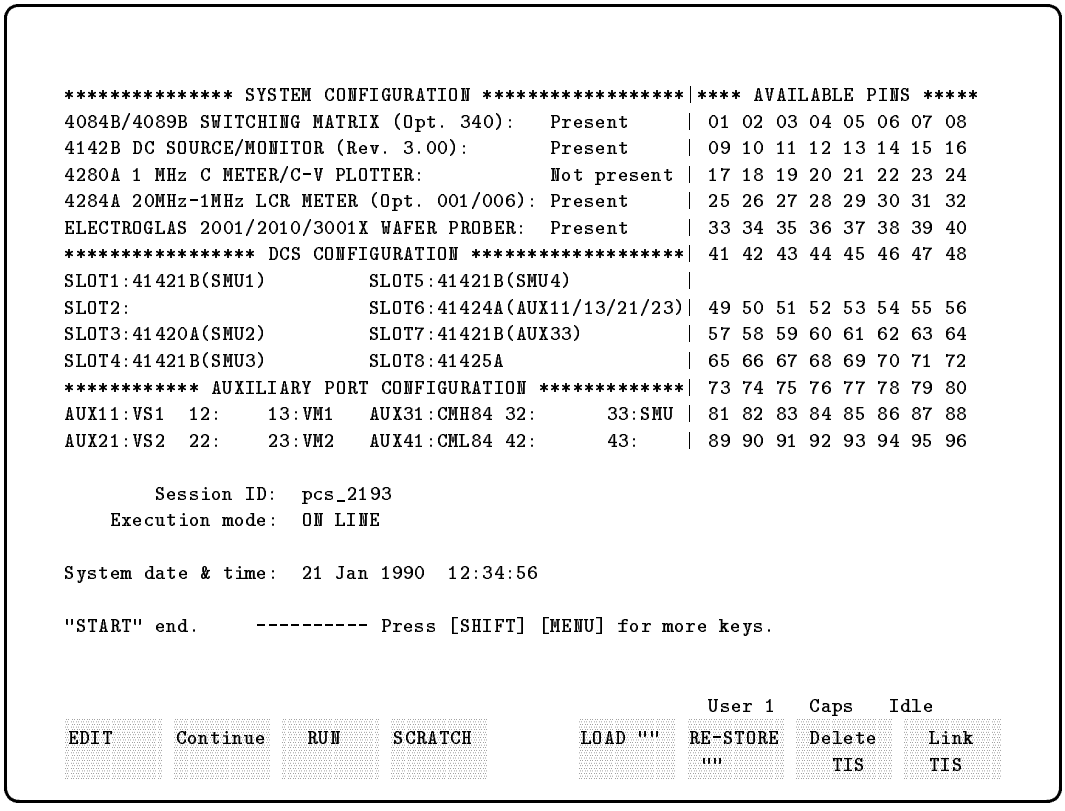


Figure 6-2. Example of Configuration Page for Port Expander

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 C.

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"  Return
   RUN  Return                                   or select the RUN 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(SMU1)          SLOT5:41421B(SMU4)            |    29 30 31 32
SLOT2:                      SLOT6:41424A(AUX2)            |    33 34 35 36
SLOT3:41420A(SMU2)          SLOT7:                        |    37 38 39 40
SLOT4:41421B(SMU3)          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"  Return
   RUN  Return                    or select the RUN softkey
   ```

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

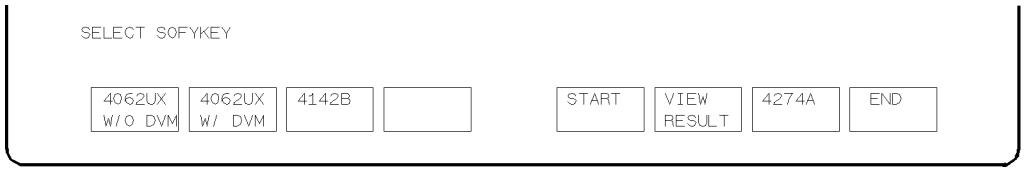


Figure 6-4. PV4062 Menu Page (HP 4062UX)

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 selectiong 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.

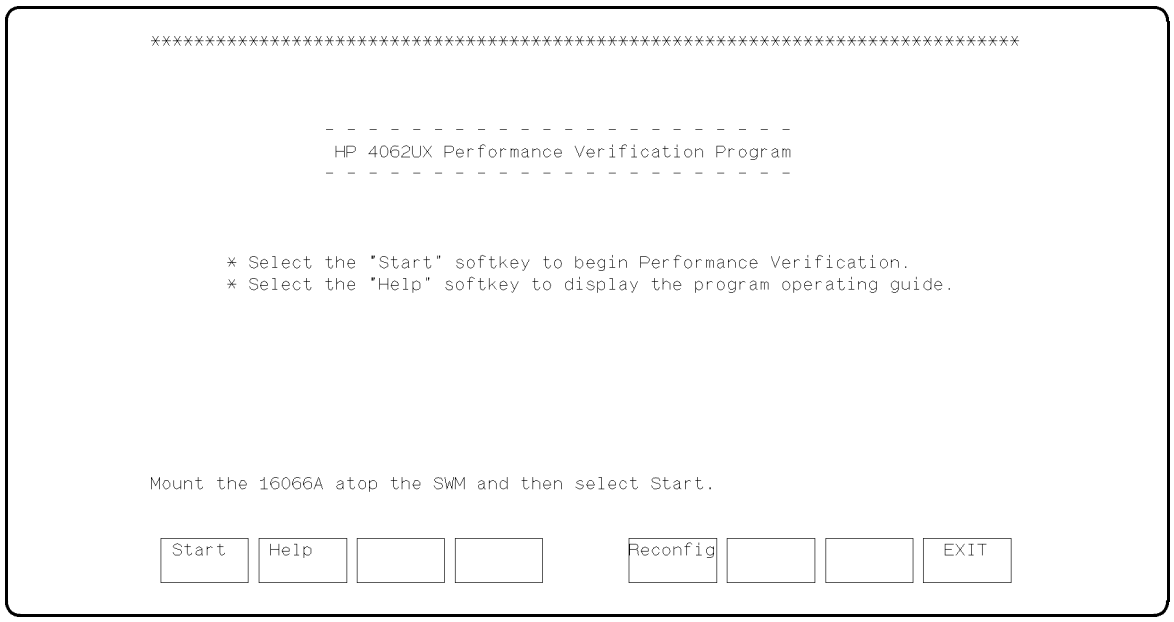


Figure 6-5. 4062UX W/O DVM Test Startup Page

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.

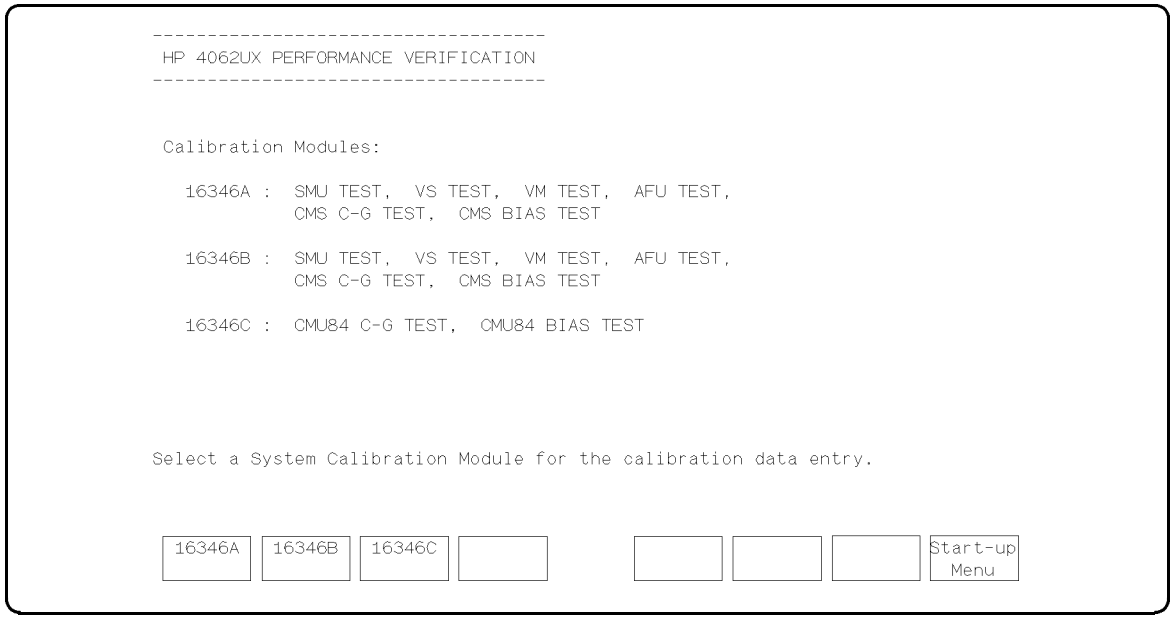


Figure 6-6. Calibration Module Menu Page for 48-pin SWM System

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.

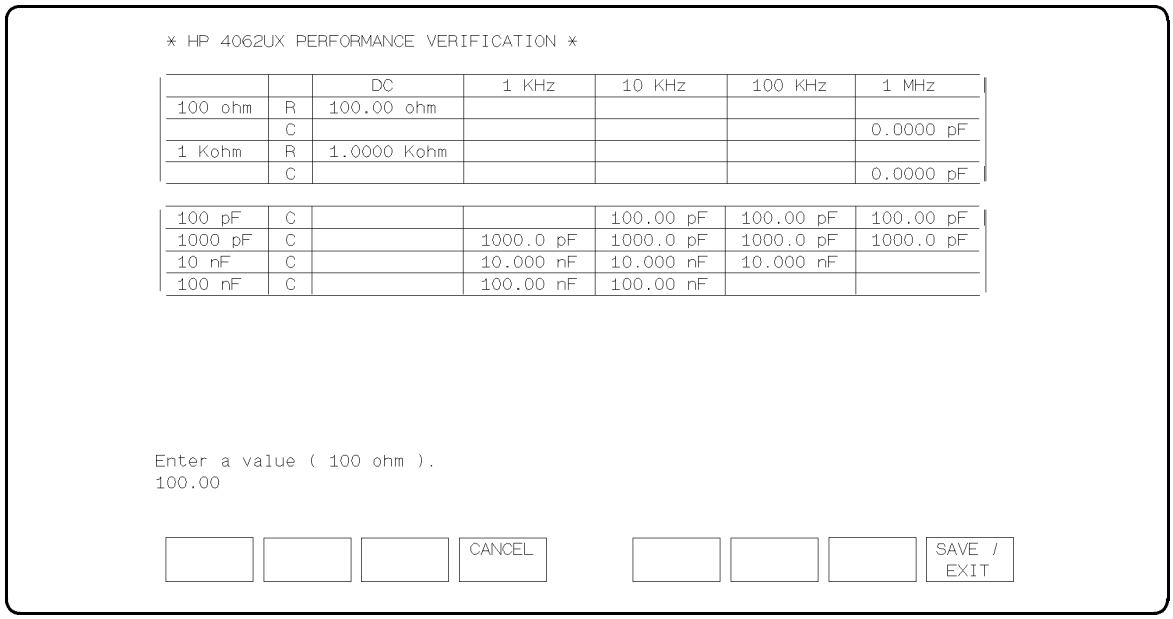


Figure 6-7. An Example of Calibration Data Entry Page: HP 16346C

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.

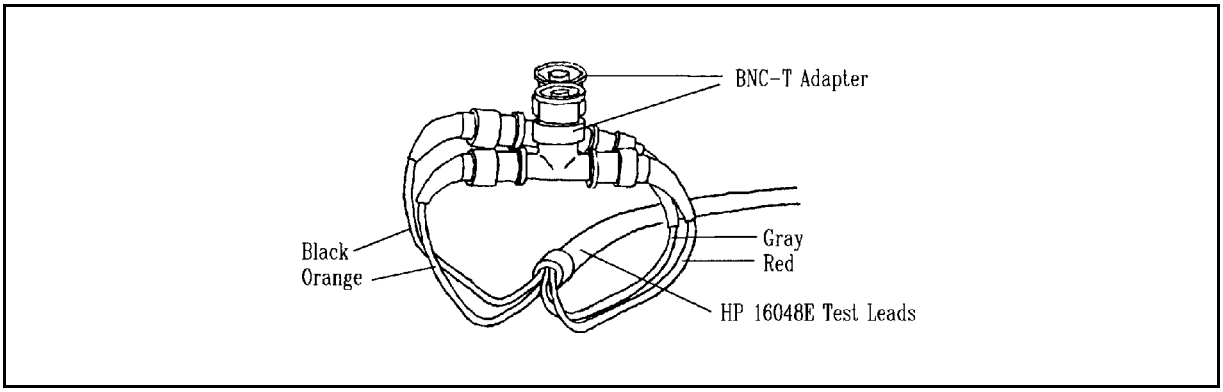


Figure 6-8. Test Lead Connections for OPEN Correction

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

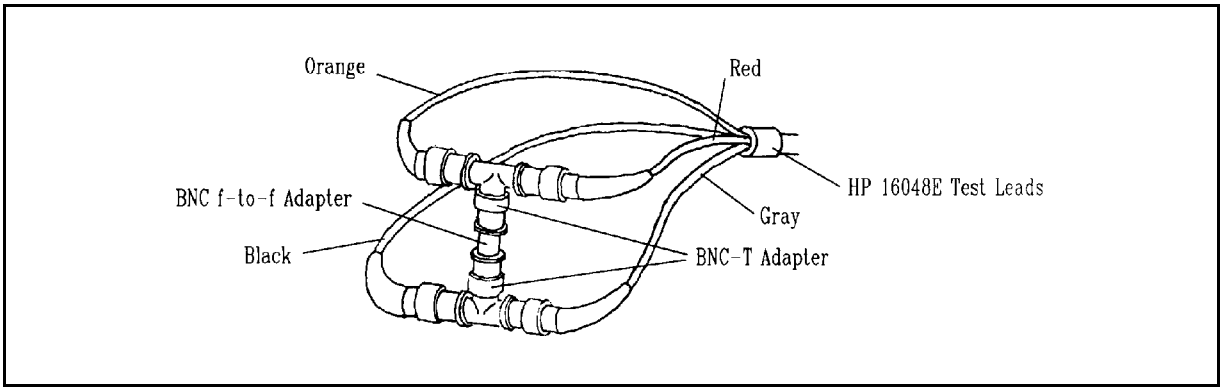


Figure 6-9. Test Lead Connections for SHORT Correction

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              *   Tests can be  executed  individually by     *
VS    Test              *   selecting  the  corresponding   softkey.    *
VM    Test              *   The Relay Test should be executed first.    *
AFU   Test              *   All tests can be  executed  sequentially    *
CMU84 C-G Test          *   by selecting the "SEQ" softkey.             *
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/PVWO0190` Return *or*
    `data/PVWO0190` Return

    or

    `PVWO0190:,700,1` Return

    The file name "PVWO0190" 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
Semiconductor Process Control System            Tested by _____________________
Serial Number _____________________             Date _____________21 Jan 1990
Temperature _____________________               Humidity _____________________
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.

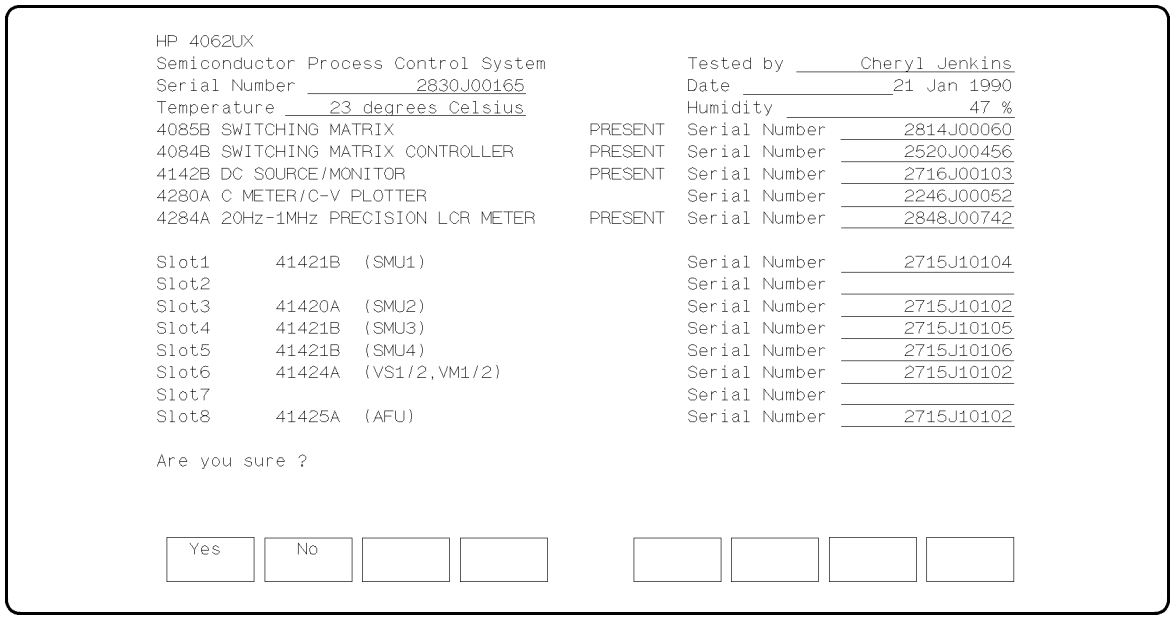


Figure 6-12. Example PV Test Results Data Entry Page

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                                |
    ```

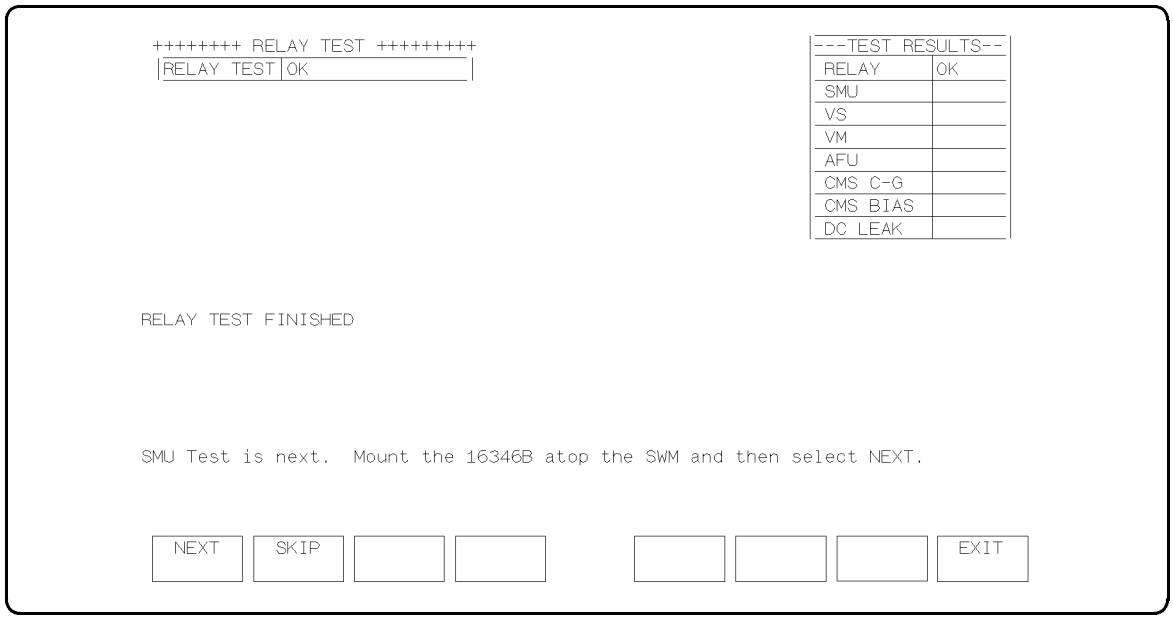


Figure 6-13. Relay Test Results Page for 48-pin SWM

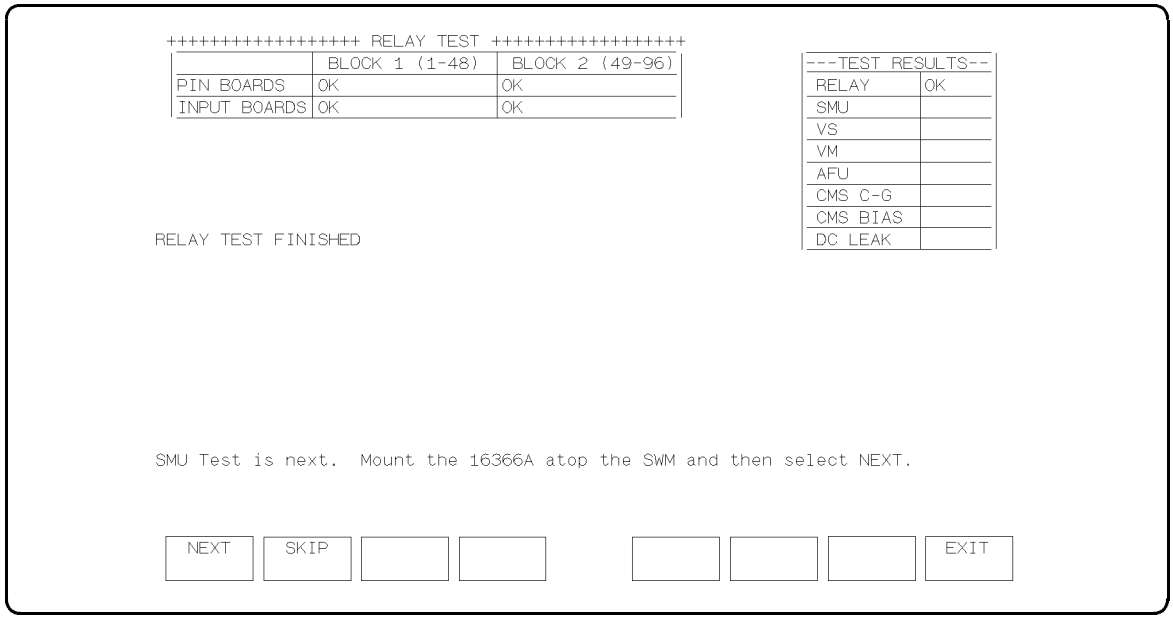


Figure 6-14. Relay Test Results Page for 96-pin SWM

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.

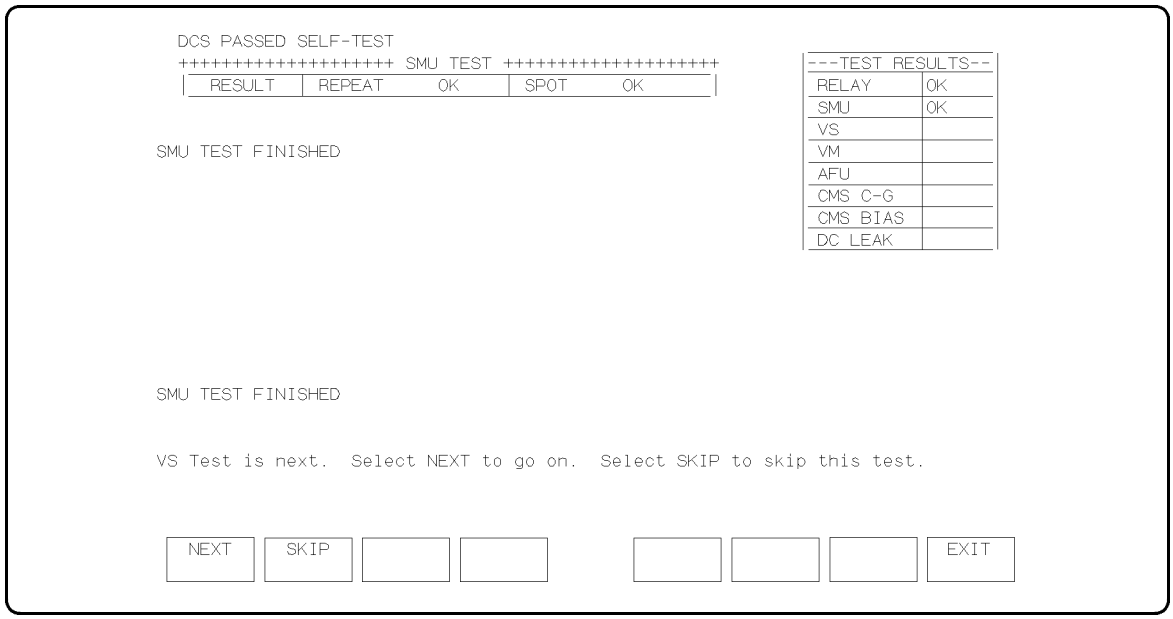


Figure 6-15. SMU Test Results Page

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.

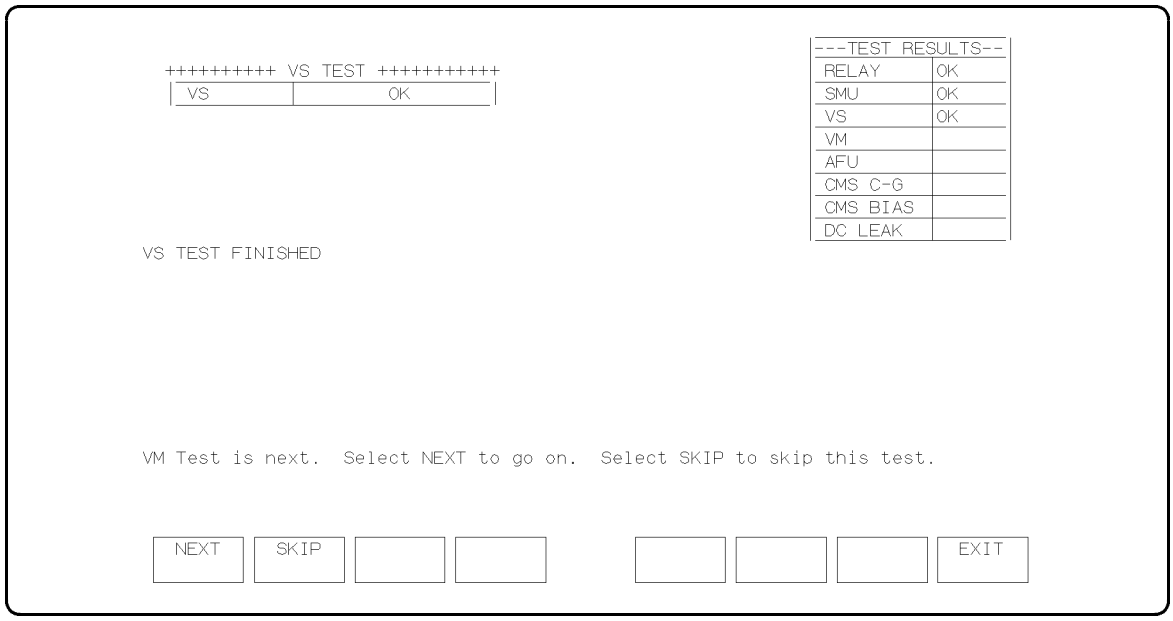


Figure 6-16. VS Test Results Page

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.

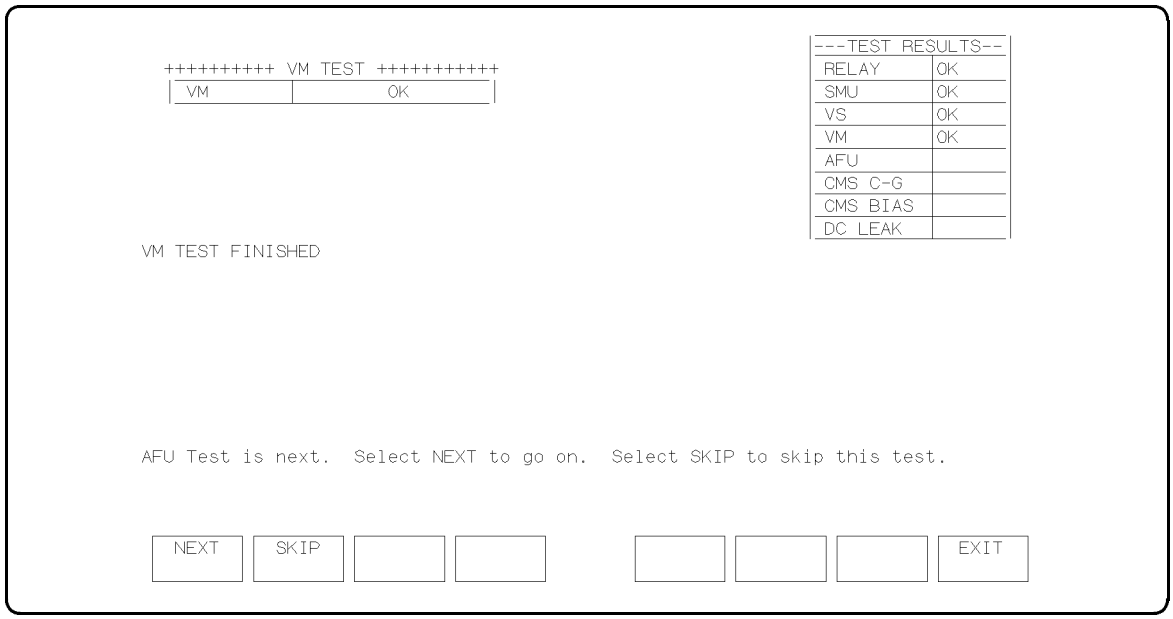


Figure 6-17. VM Test Results Page

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.

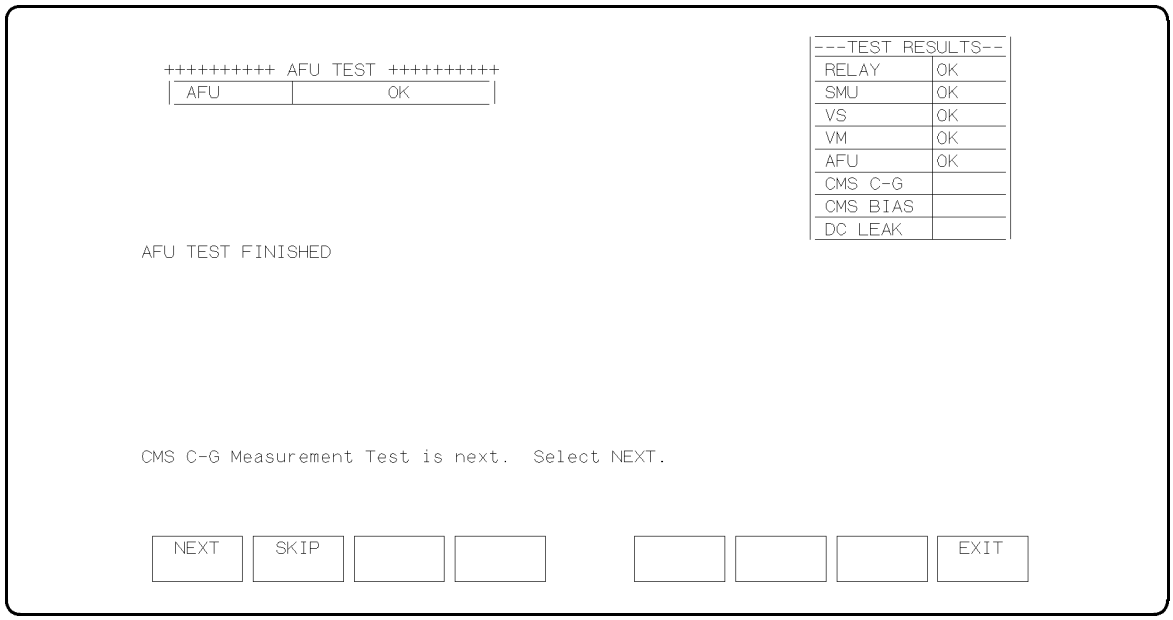


Figure 6-18. AFU Test Results Page

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.

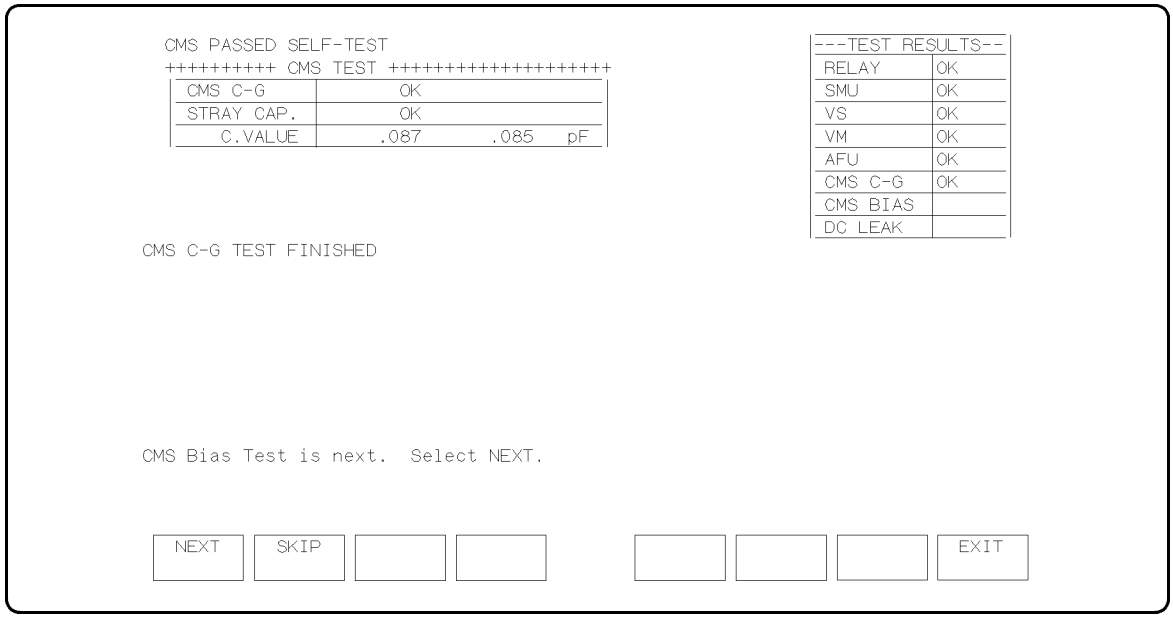


Figure 6-19. CMS C-G Test Results Page for 48-pin SWM

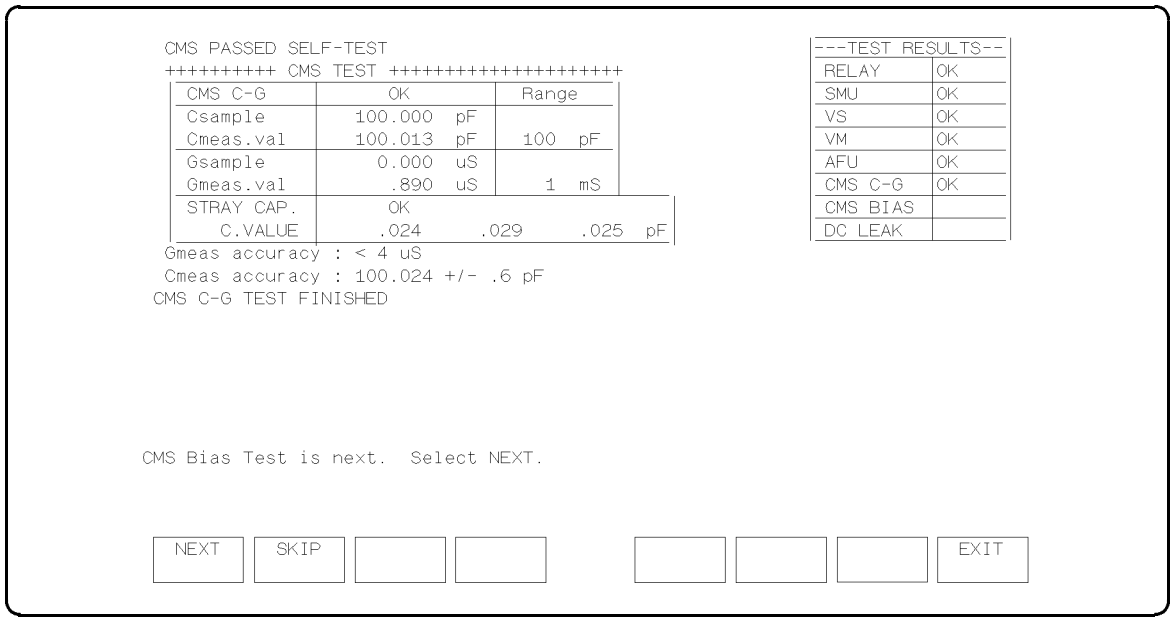


Figure 6-20. CMS C-G Test Results Page for 96-pin SWM

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.

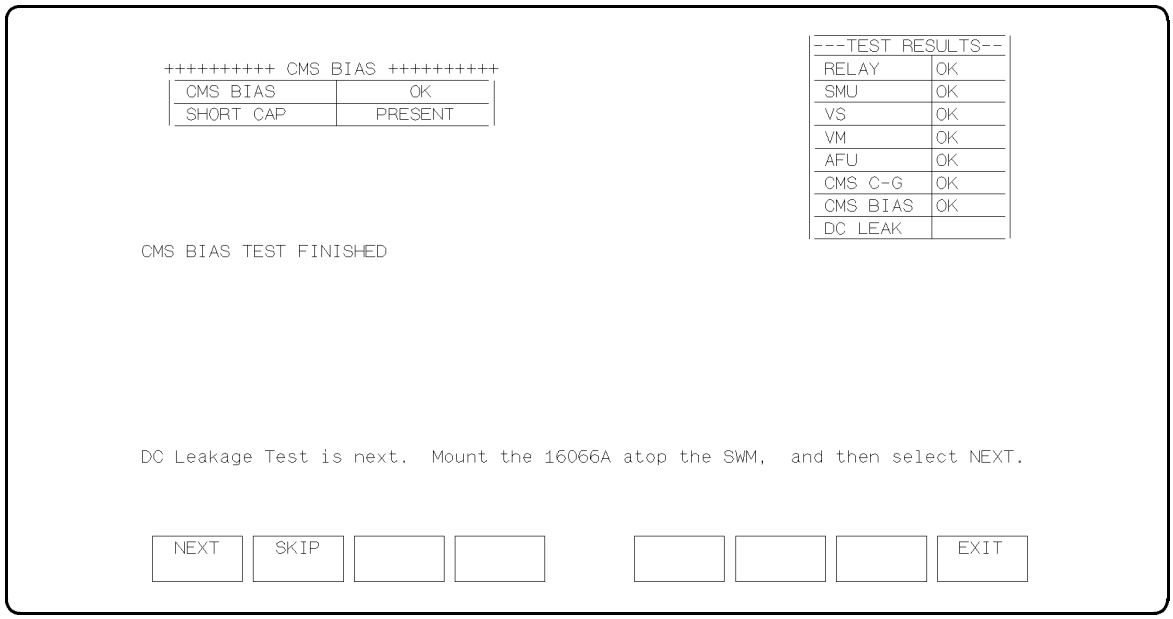


Figure 6-21. CMS Bias Test Results Page for HP 4280A

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.

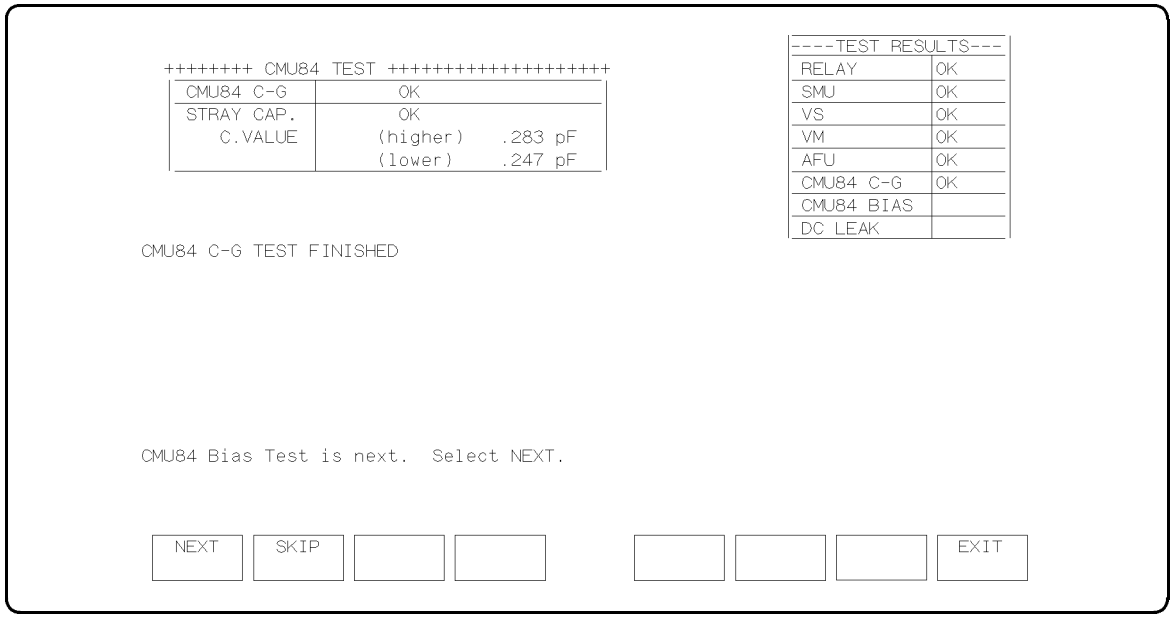


Figure 6-22. CMU84 C-G Test Results page for HP 4284A

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.

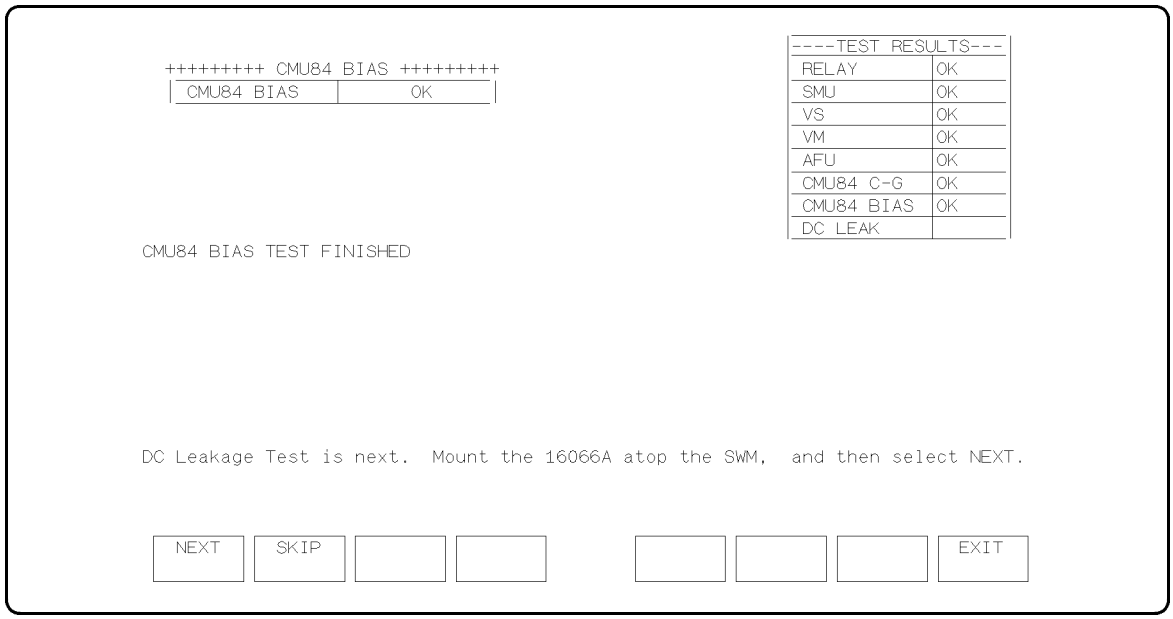


Figure 6-23. CMU84 Bias Test Results Page for HP 4284A

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.

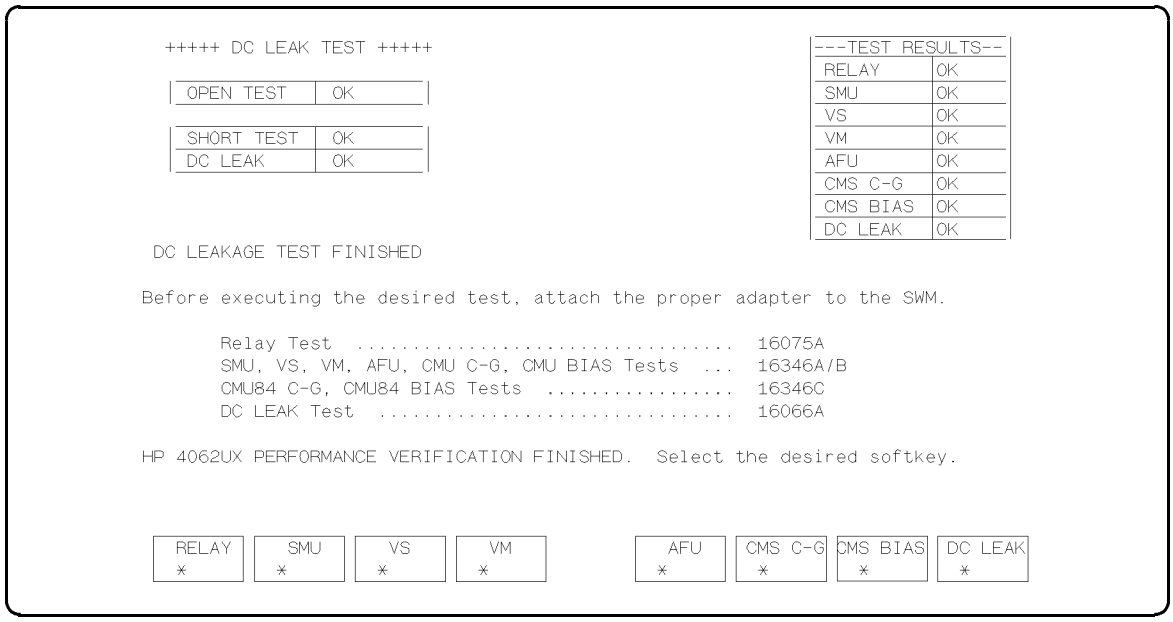


Figure 6-24. DC Leak Test Results Page

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.

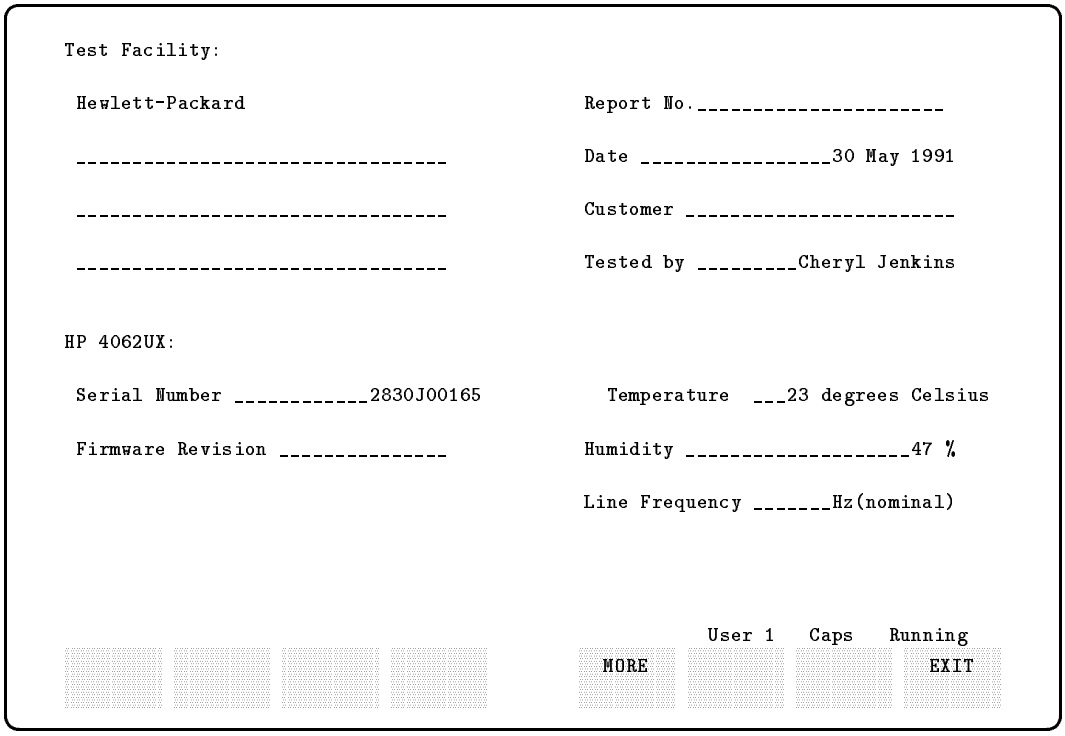


Figure 6-25. An Example Page of View Result (CRT)

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).

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

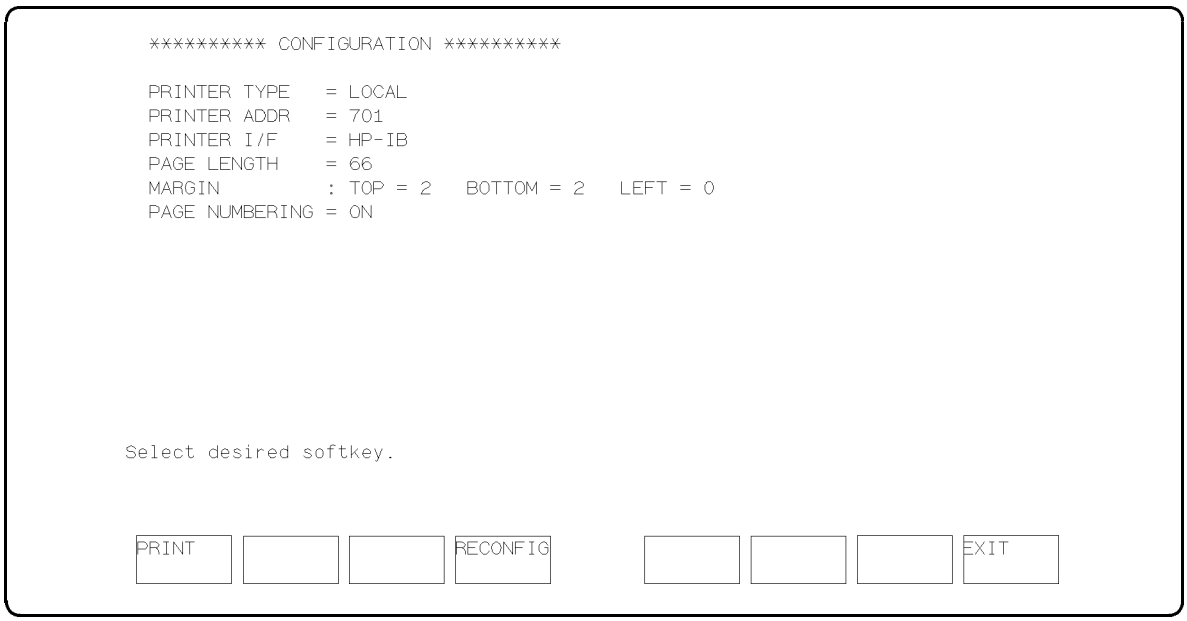
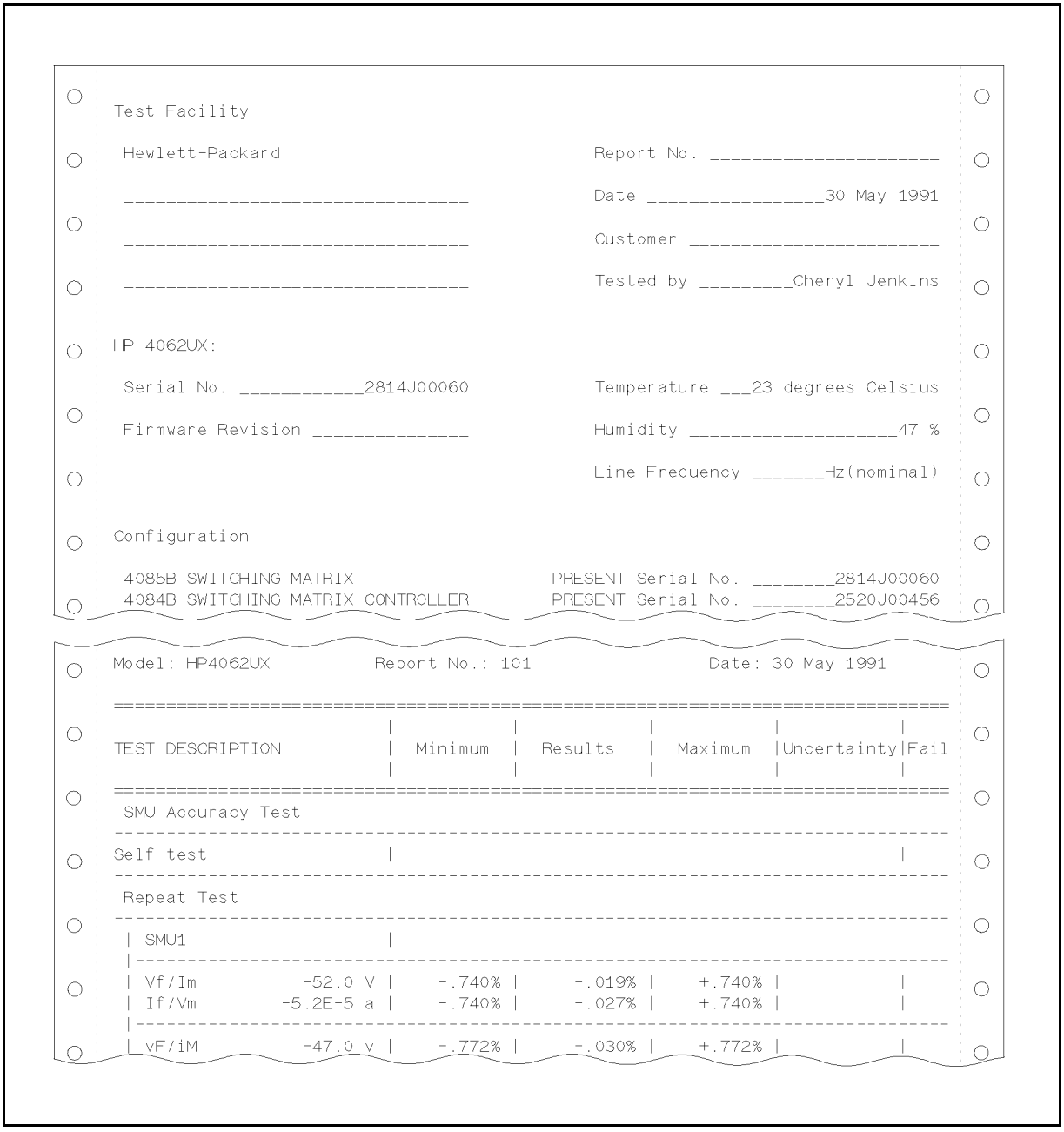


Figure 6-26. An Example of Printer Configuration Page

5. To change the printer configuration, select the RECONFIG softkey. Refer to Appendix B 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

Hewlett-Packard — Report No. _____

_____ — 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.

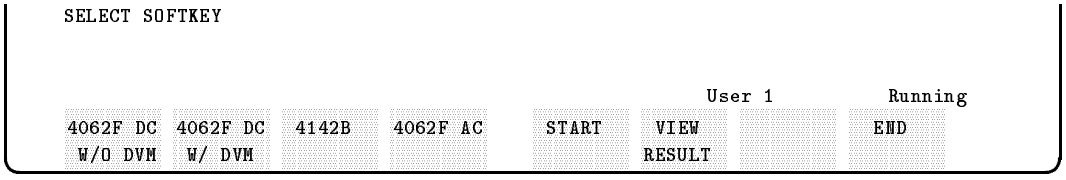


Figure 6-28. PV4062.F Menu Page (HP 4062F)

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 wherer 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.

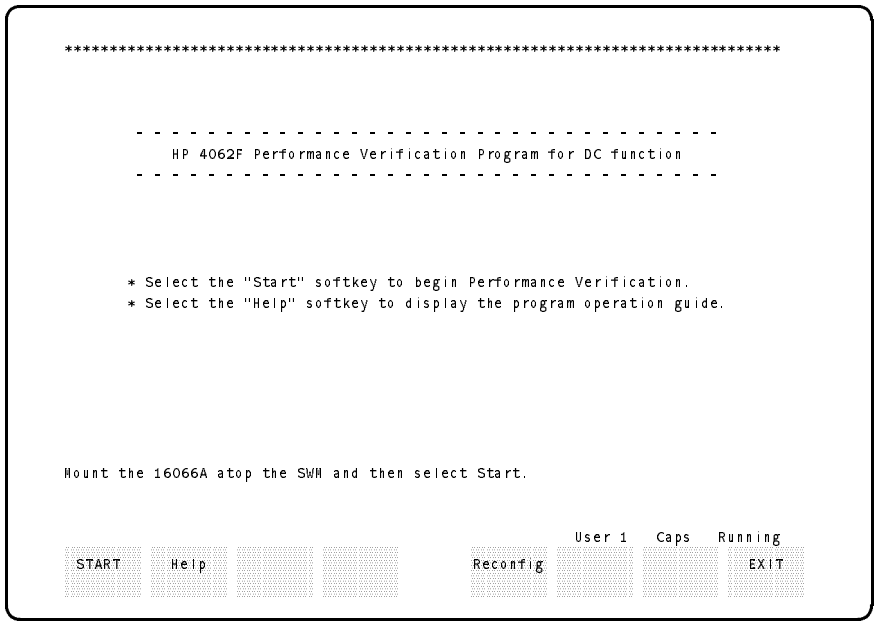


Figure 6-29. 4062F DC W/O DVM Test Startup Page

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.

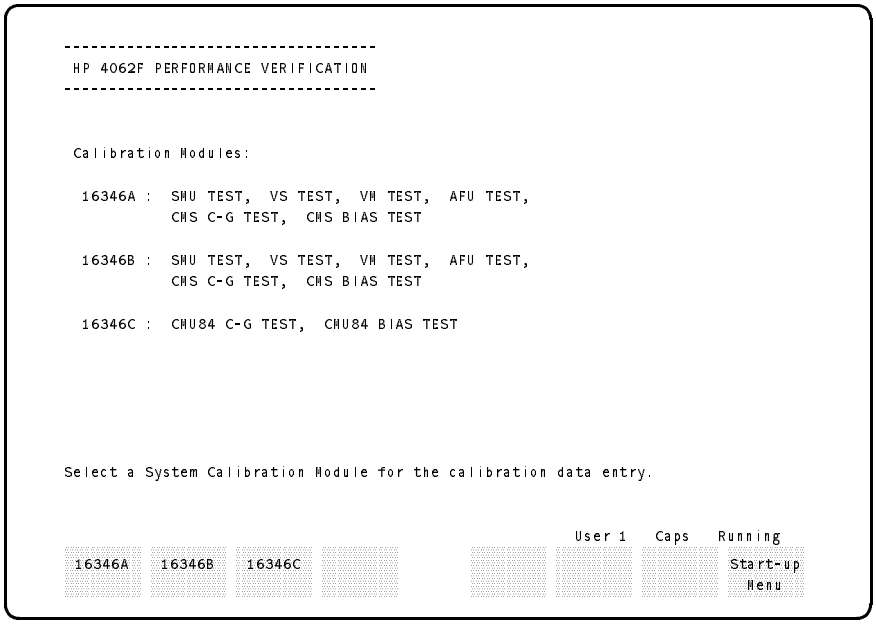


Figure 6-30. Calibration Module Menu Page

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.

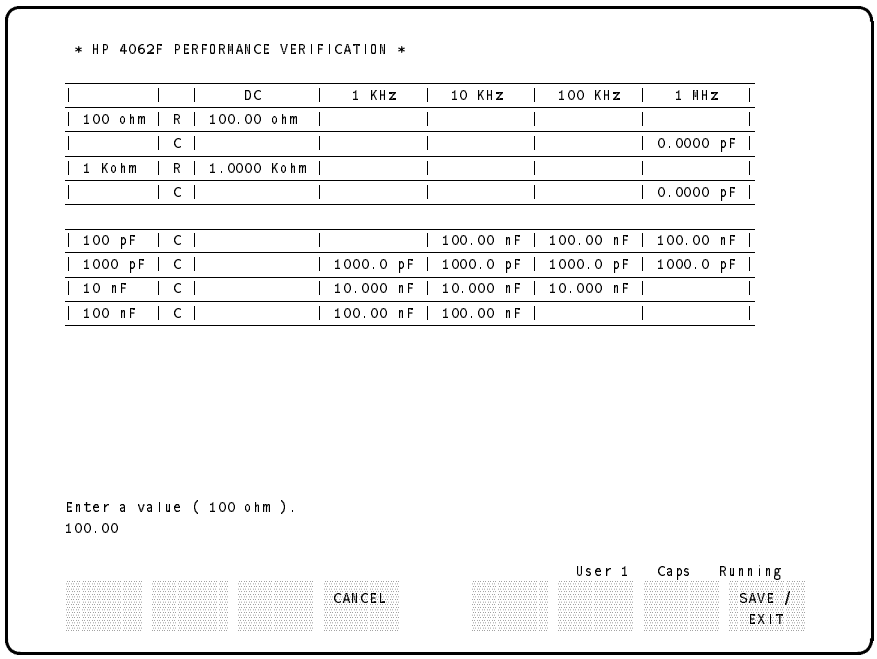


Figure 6-31. Example of Calibration Data Entry Page: HP 16346C

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.

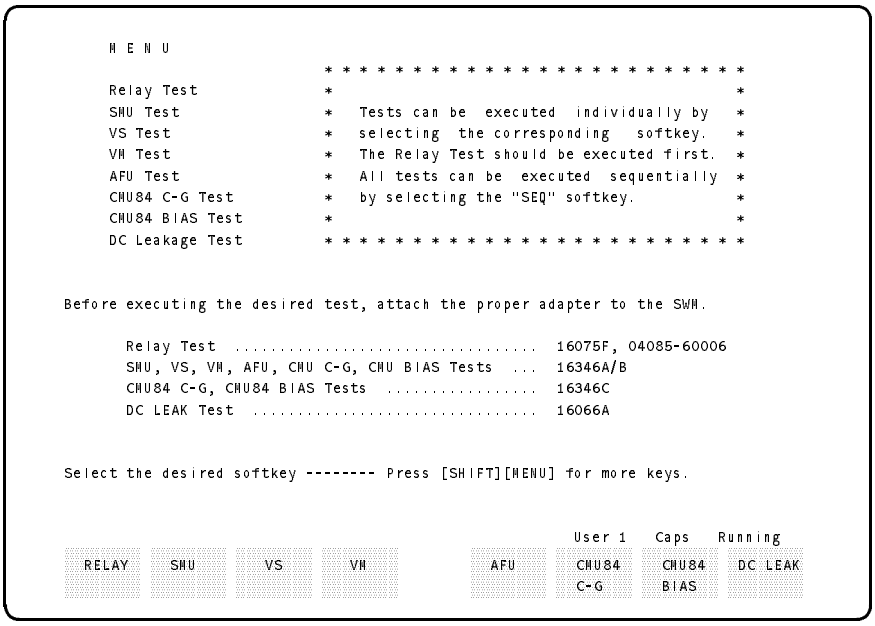


Figure 6-32. 4062F DC W/O DVM Menu Page

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`*MonthYear*.

   - 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.

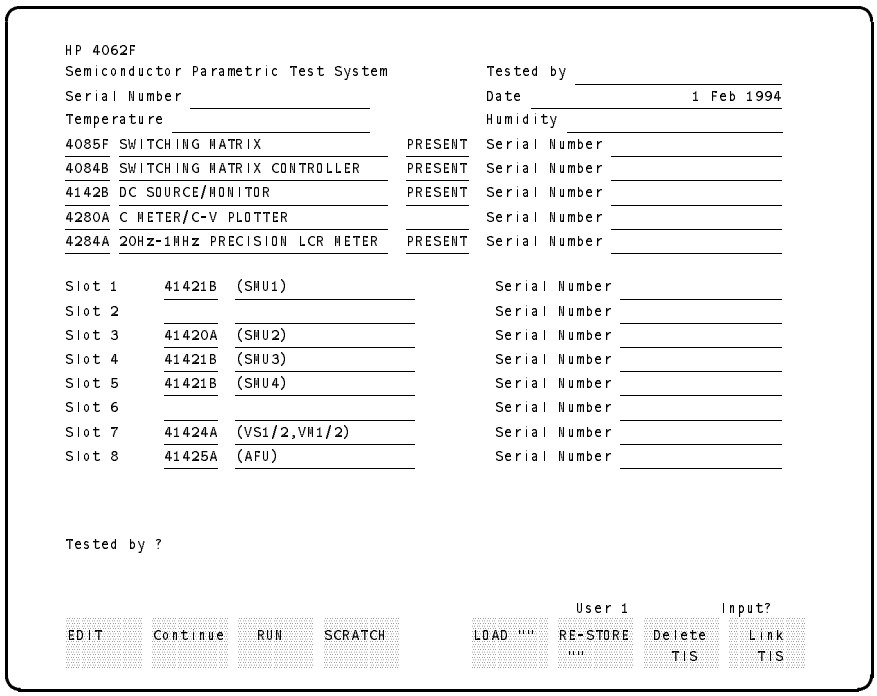


Figure 6-33. PV Test Results Data Entry Page

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.

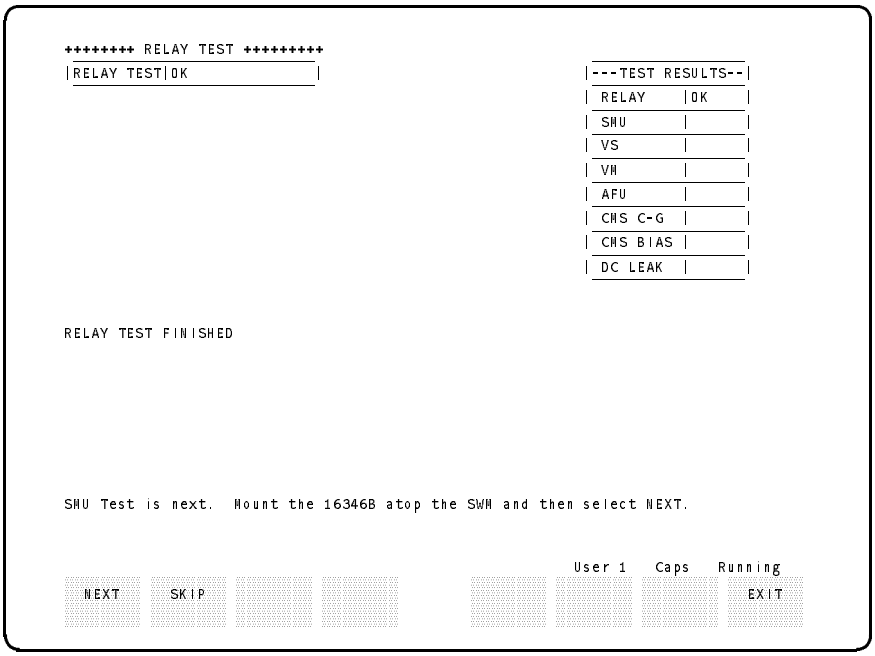


Figure 6-34. Relay Test Results Page

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.

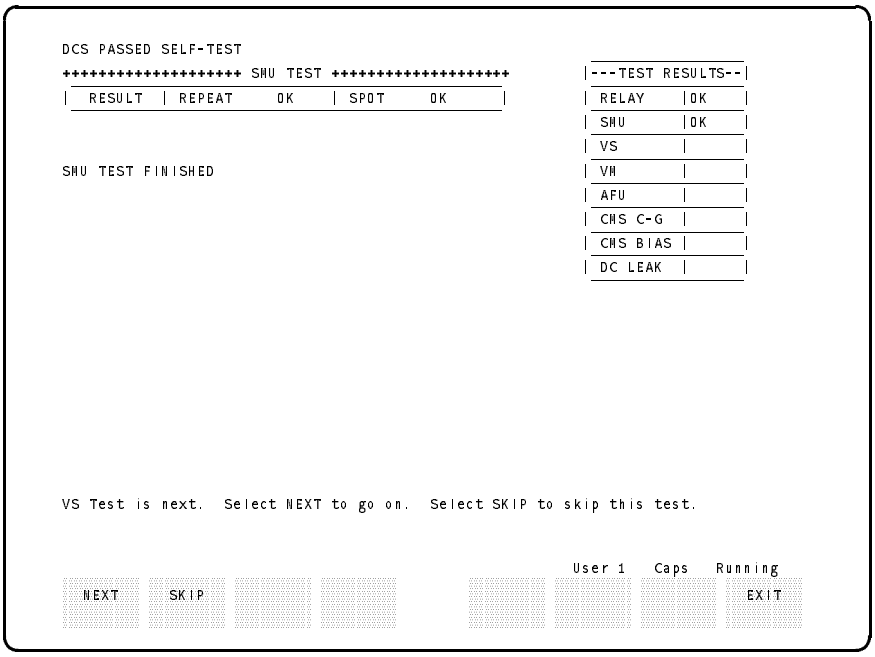


Figure 6-35. SMU Test Results Page

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

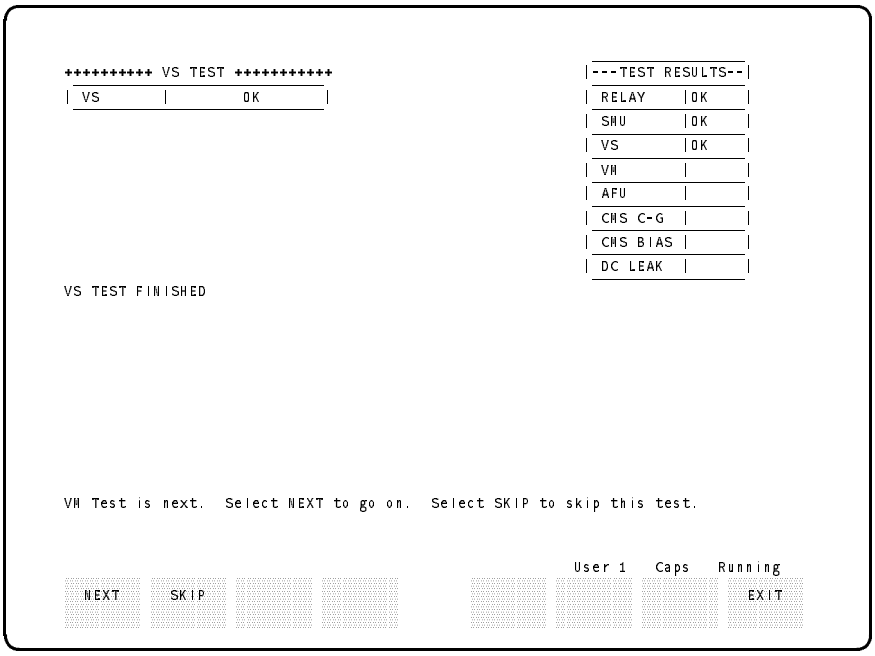


Figure 6-36. VS Test Results Page

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

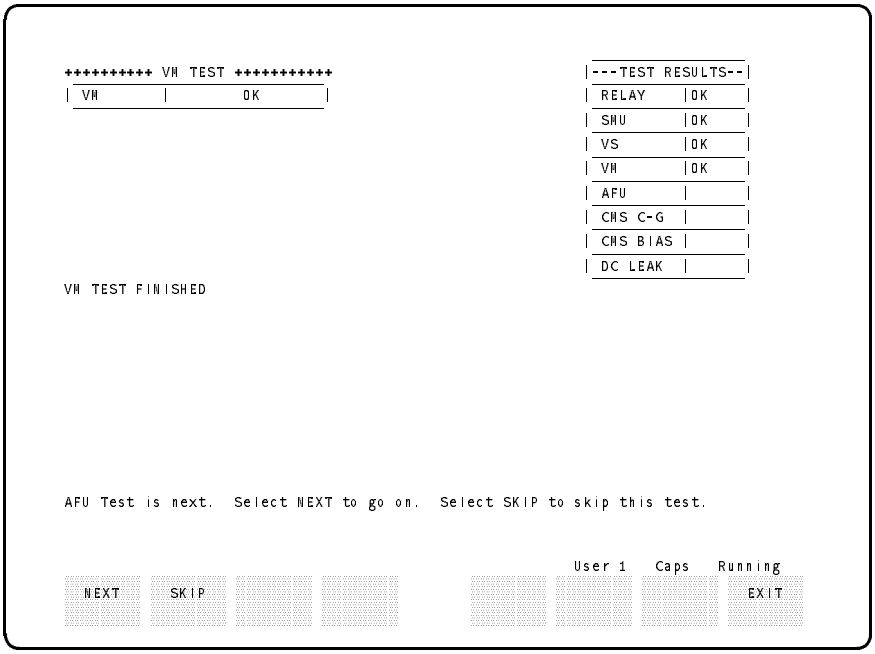


Figure 6-37. VM Test Results Page

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.

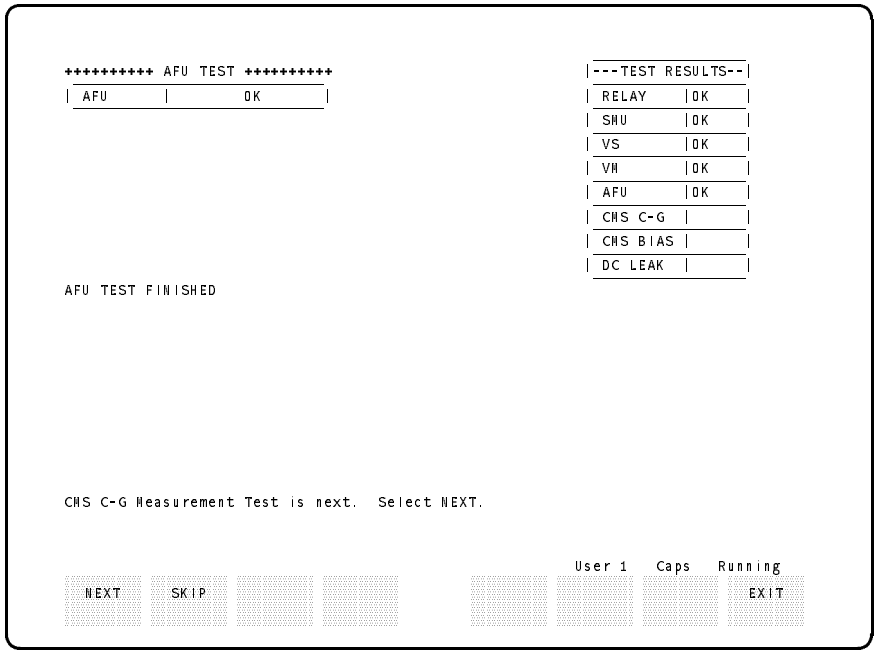


Figure 6-38. AFU Test Results Page

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:

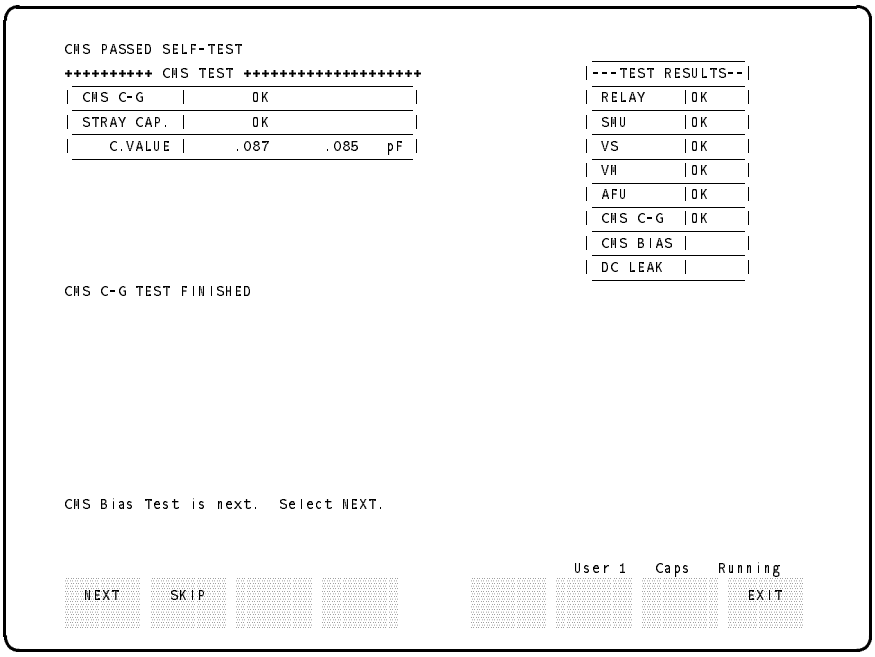


Figure 6-39. CMS C-G Test Results Page for HP 4280A

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.

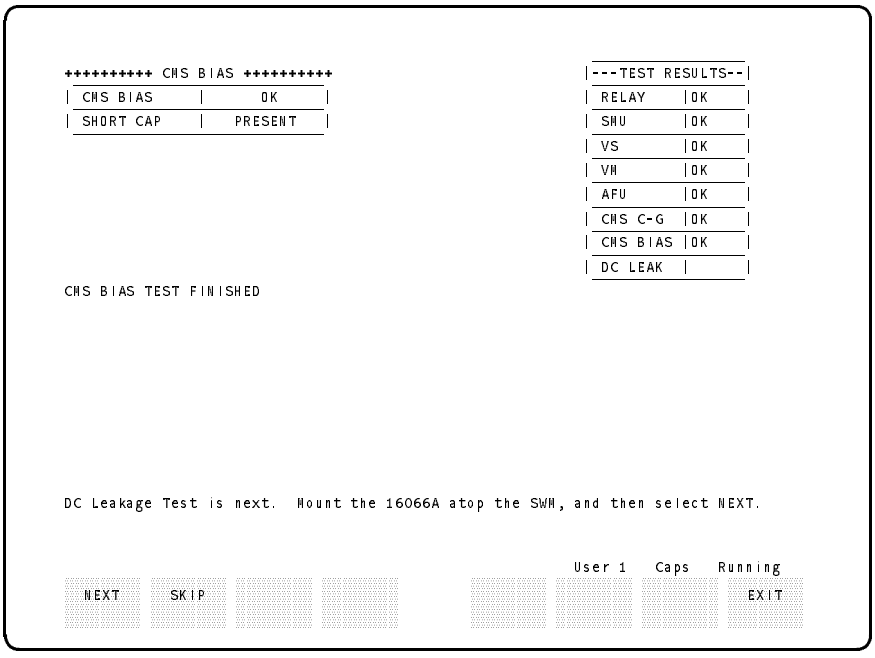


Figure 6-40. CMS Bias Test Results Page for HP 4280A

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:

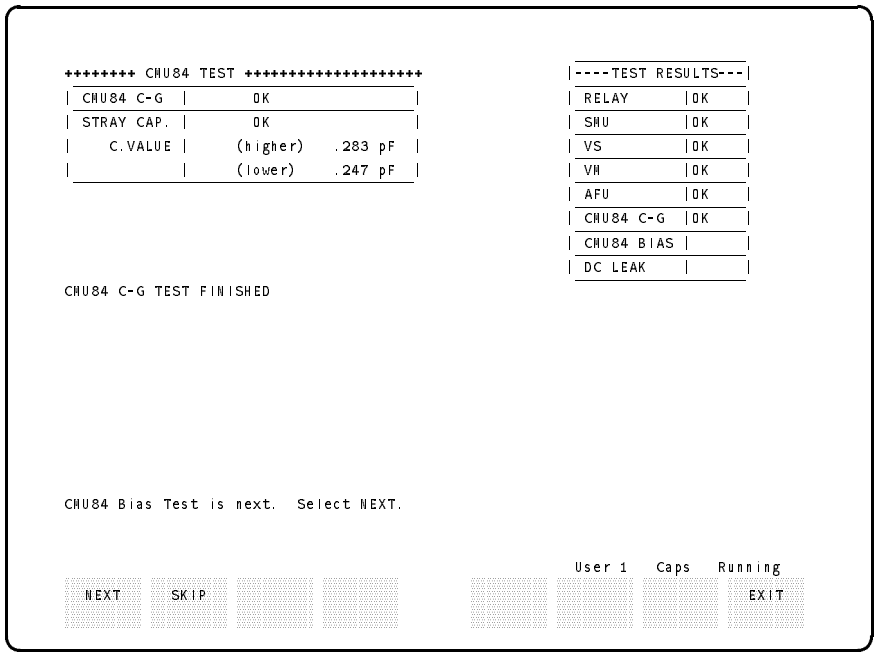


Figure 6-41. CMU84 C-G Test Results Page for HP 4284A

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

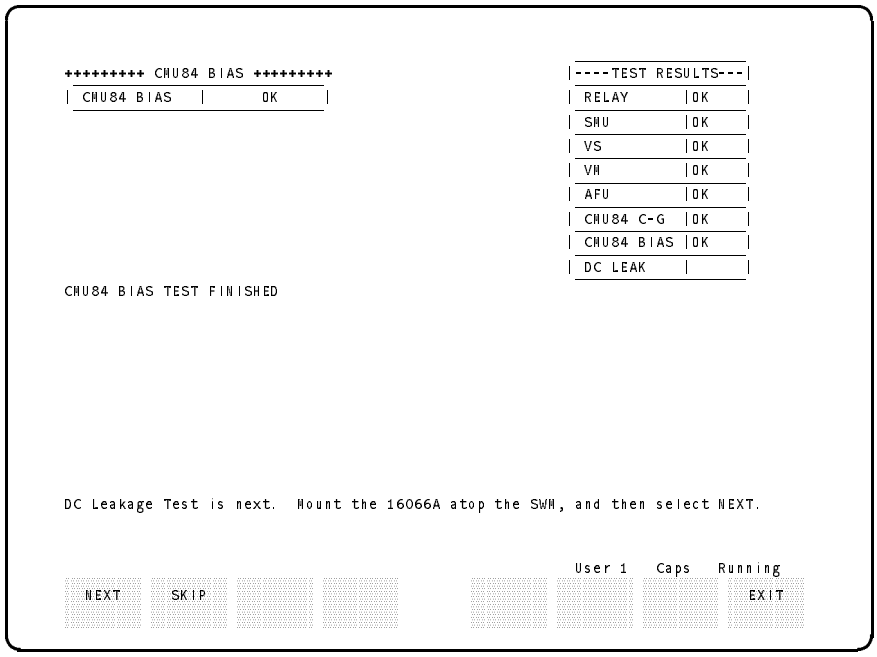


Figure 6-42. CMU84 Bias Test Results Page for HP 4284A

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.

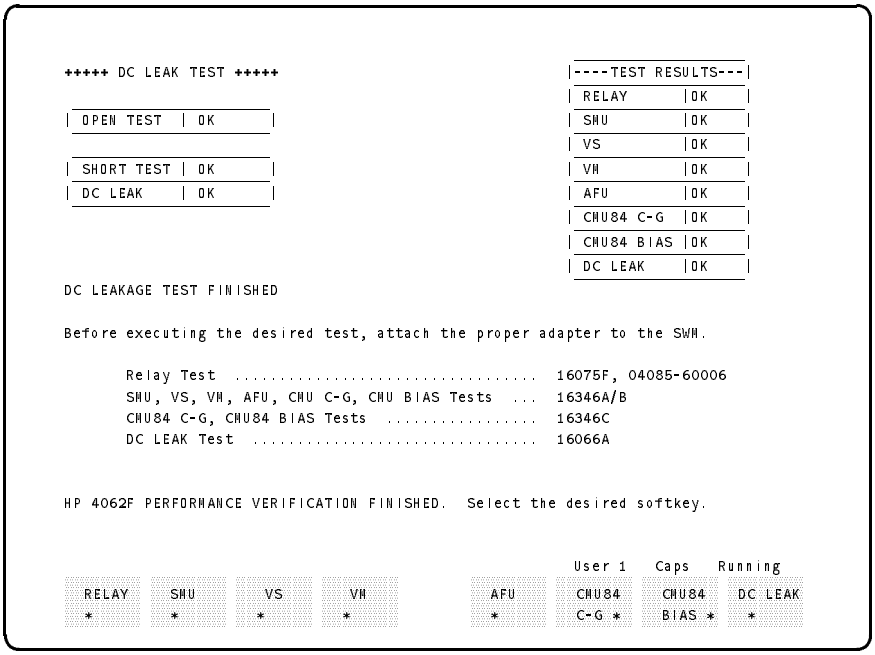


Figure 6-43. DC Leak Test Results Page

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.

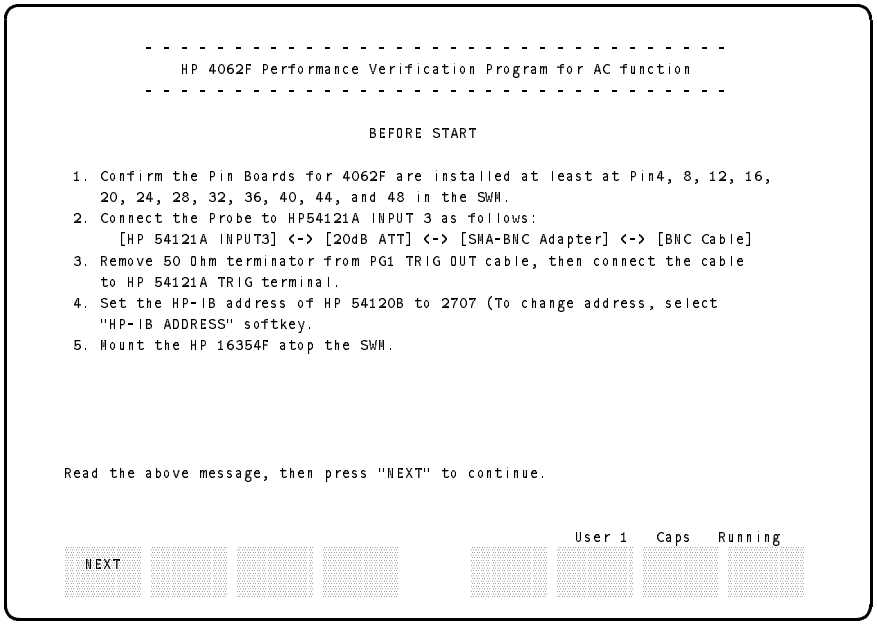


Figure 6-44. Preparation Page for 4062F AC

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.

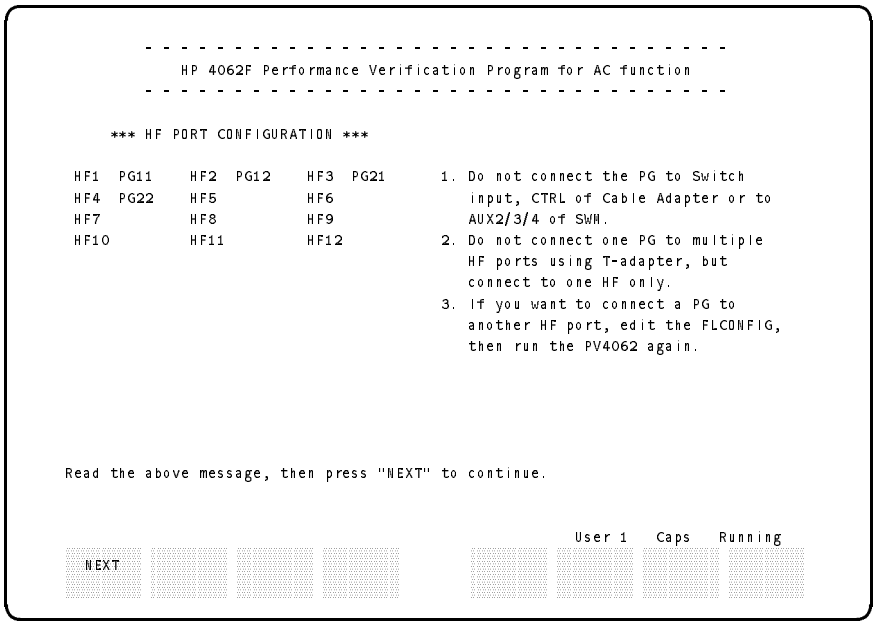


Figure 6-45. HF Port Configuration Page

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

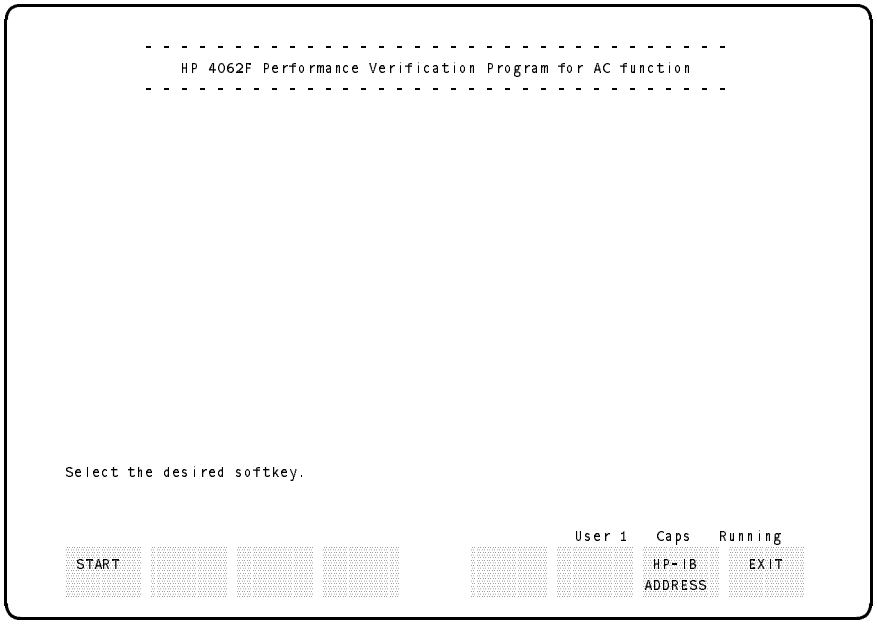


Figure 6-46. 4062F AC Test Startup Menu Page

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.

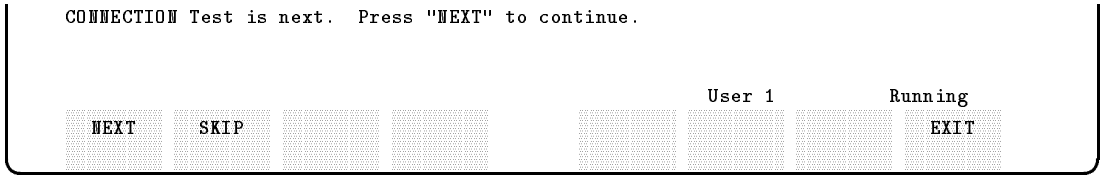
   If the HP-IB settings of HP 54120B are incorrect (for example, wrong select code), select the `HP-IB ADDRESS` softkey. The following prompt is displayed:

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

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

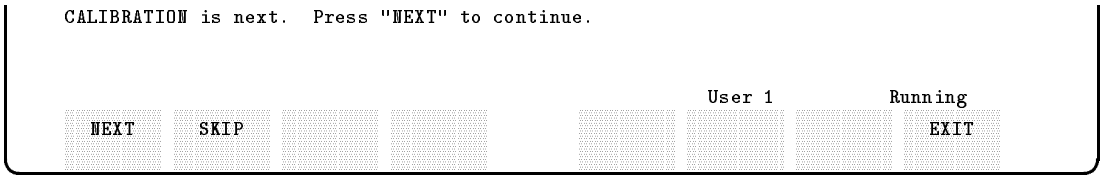
6. **Connection Test**

   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.

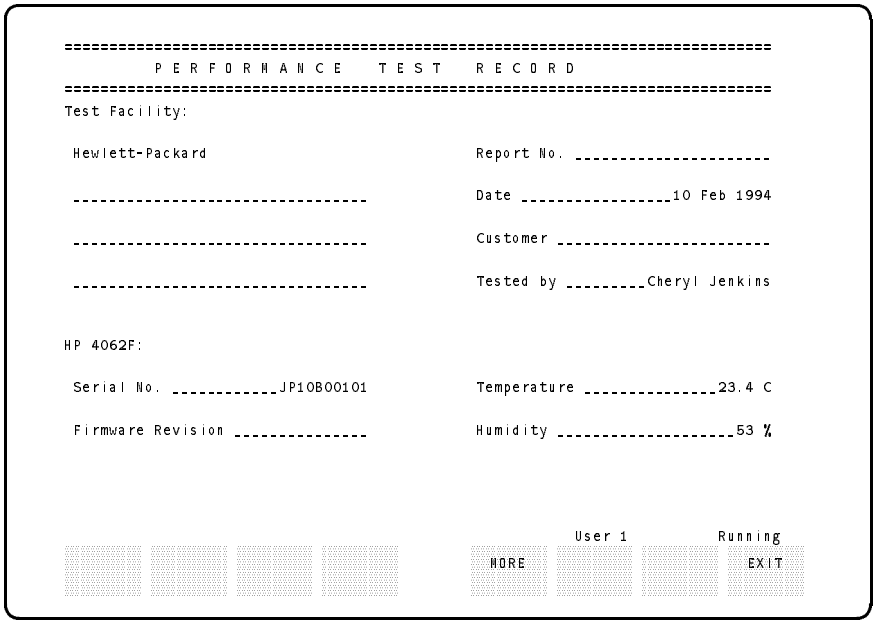


Figure 6-47. Example Page of View Result (CRT)

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.

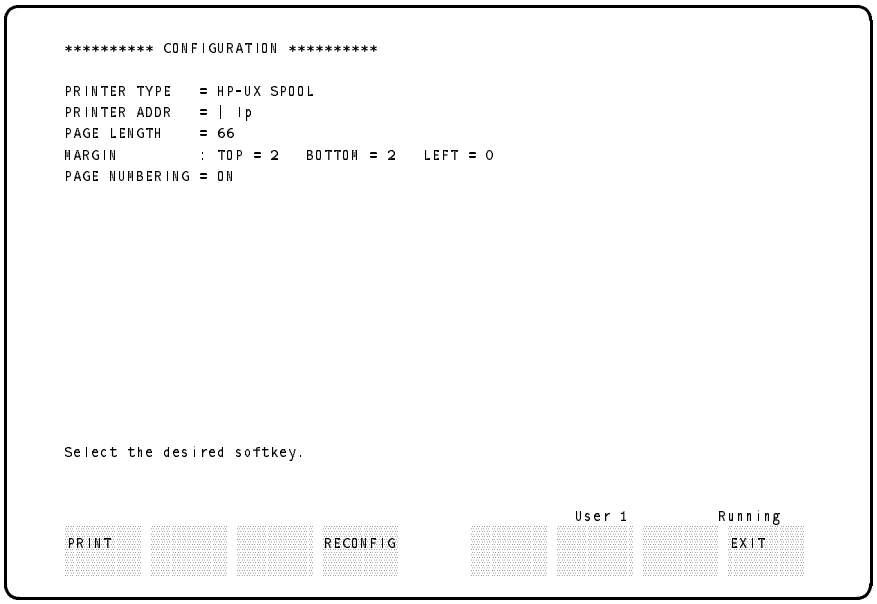
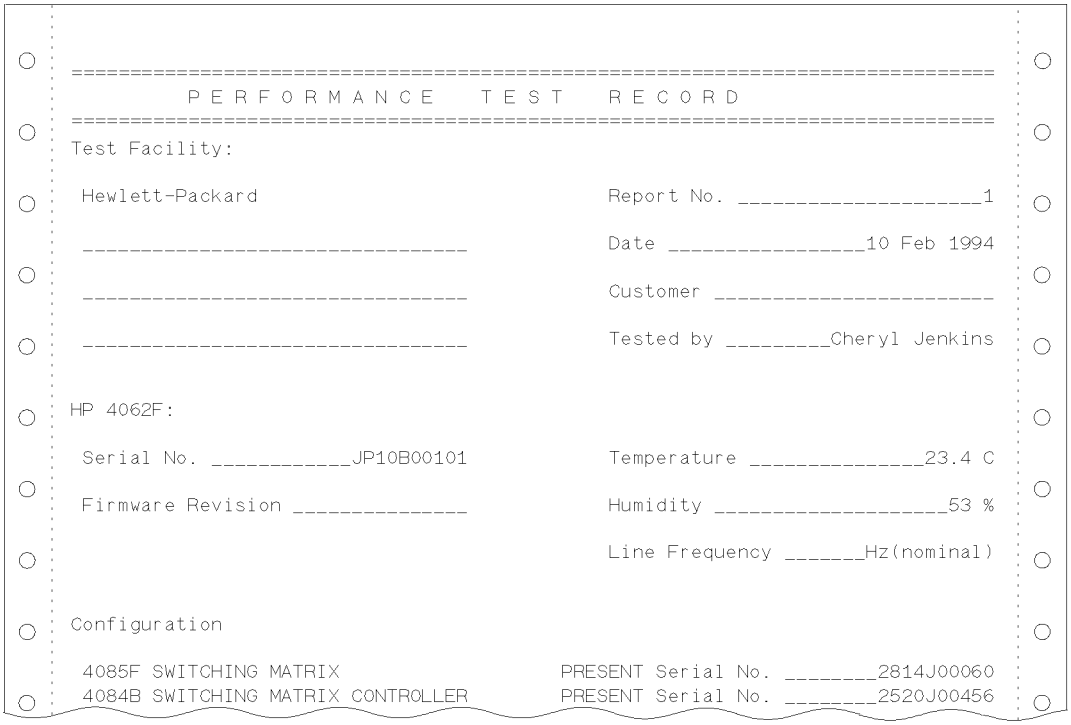


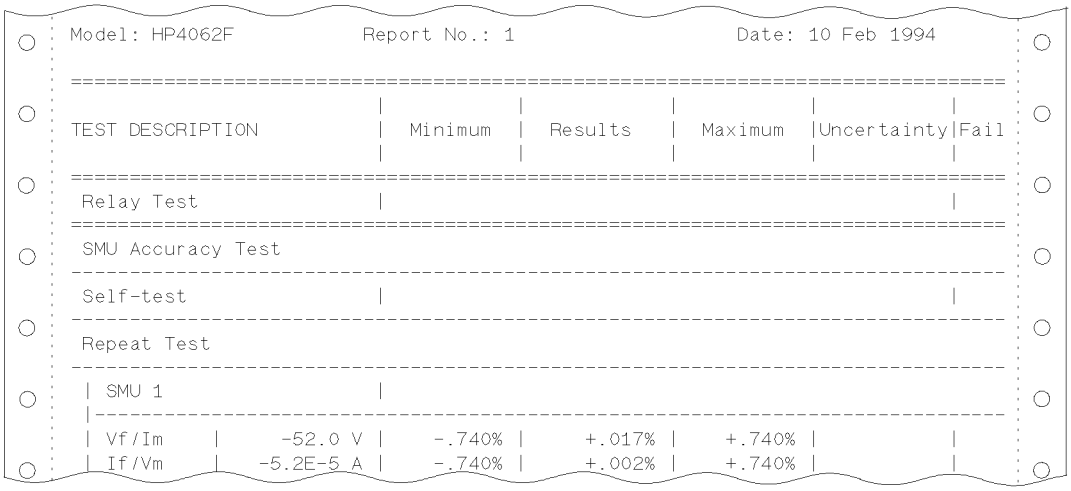
Figure 6-48. Example of Printer Configuration Page

6. To change the printer configuration, select the `RECONFIG` softkey. Refer to Appendix B 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% |           |
```

INS6-066

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

A

Updating the System Software

Introduction

The HP 4062UX/F system software will occasionally be revised. When the HP 4062UX/F system software is updated, new software and documentation are delivered to customers who have an HP Software Support Product. If manuals are revised with the system software, a new set of manuals is also delivered. If you have any questions, contact your local Hewlett-Packard Sales and Service Office.

This appendix provides you guidelines for updating your HP 4062UX/F system software. When you receive the update, check the materials against the kit contents list to make sure that every item was delivered. If there are missing items, contact your local Hewlett-Packard Sales and Service Office.

Note

HP Software Support Product delivers the operating system software and other application software (HP-UX, BASIC/UX, and so on) *before* the HP 4062UX/F system software. *Wait* until you receive the HP 4062UX/F system software, then update all the software together as described in the next procedure. The correspondence of the HP 4062UX/F system software and operating system software is described in *Read Me Before Installing the HP 4062UX/F Revision xx.xx System Software*.

Updating for HP 4062UX/F

Below are guidelines to update the HP 4062UX/F system software.

1. Before updating your system software, check the notations in *Read Me Before Installing the HP 4062UX/F Revision xx.xx System Software*.
2. Back up all programs and database you have created.
3. Update the HP-UX system and other application software (for example, NS-ARPA Services and X Windows). Refer to *System Administration Tasks* manual.
4. Customize the new HP-UX system.
5. Update the BASIC/UX system software. Refer to the *HP-UX System Administration Tasks* manual and *Installing and Maintaining HP BASIC/UX xx.xx*.
6. Customize the new BASIC/UX system.
7. Update the HP 4062UX/F system software. Refer to the *HP-UX System Administration Tasks* manual and "Installing the HP 4062UX/F System Software" in Chapter 5.
8. Customize the new HP 4062UX/F system.

B

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 three types of printers: local by HP BASIC/UX (series 300 only), spooled by HP-UX , and remote by SRM (series 300 only). 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 B-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 B-1. An Example of the Printer Configuration Page

Configuring the System Printer

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

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

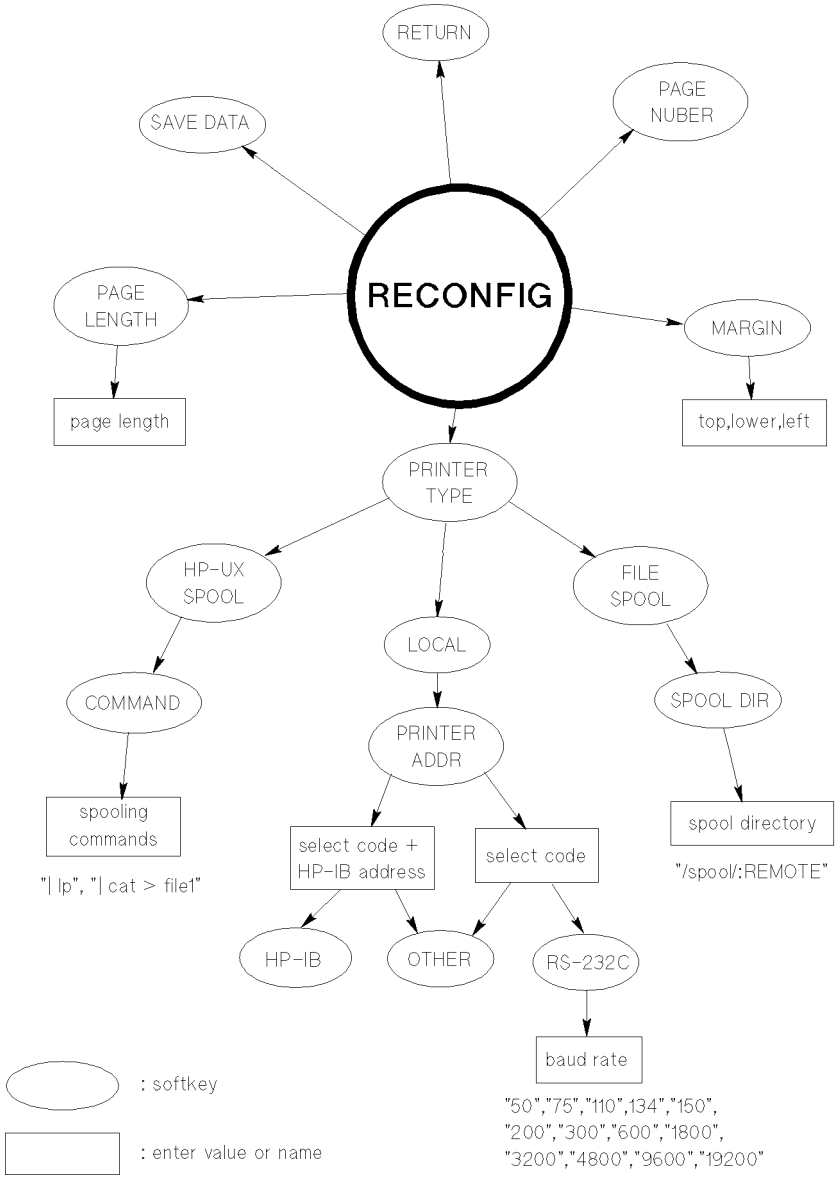


Figure B-2. Printer Configuration Softkey Map

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:

```
"| lp"
"| cat > file1"
"| remsh hpux lp -dlaser -oc -od"
```

`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.

C

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 0 : Not authorized to use the software.

Possible Cause	Solution
The HP 46084A ID Module is not connected or not connected properly.	Check and connect the ID module properly.
The codeword is incorrect in the CODEWORD file.	Check the contents of the CODEWORD file. If it is incorrect, call the nearest HP Sales Office.
The CODEWORD file does not exist.	Check that the CODEWORD file is located in correct directory (/usr/pcs/etc).

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 (/usr/pcs/etc).
When you are using a diskless cluster system, the SYSCONFIG file is not copied properly.	Check that the SYSCONFIG file for cnode is properly copied. Note that the SYSCONFIG file is CDF.

START ERROR 300 : PCS_SESSION_ID not defined.

Possible Cause	Solution

When you are using with B or K shell, customization of /etc/profile is incorrect.	Check the contents of /etc/profile. The /etc/profile must have following lines:
	`PCS_SESSION_ID=pcs_$$`
	`export  PCS_SESSION_ID`

When you are using a C shell, customization of /etc/csh.login is incorrect.	Check the contents of /etc/csh.login. The /etc/csh.login file must have following line: `setenv PCS_SESSION_ID  pcs_$$`

When you are using with HP VUE, customization of /usr/lib/X11/vue/Vuelogin/Xsession is incorrect.	Check the contents of Xsession file. The Xsession file must have following lines:
	`PCS_SESSION_ID=pcs_$$`
	`export  PCS_SESSION_ID`

START ERROR 310 : Group 'pcs' not registered.

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

START ERROR 330 : Device file /dev/pcs/hpib*xx* not found.

Possible Cause	Solution
The select code of HP-IB interface card is incorrect.	Check the select code setting of additional HP-IB interface card.
When you are using a diskless cluster system and the computer for a diskless cnode has no additional HP-IB interface card, SYSCONFIG.7 must be used as the template for SYSCONFIG file, not SYSCONFIG.27.	Check the contents of /usr/pcs/etc/SYSCONFIG file. Note that the SYSCONFIG file is CDF.

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_xxxx
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:
	`# chown root /usr/pcs/bin/pcsstart`
	`# chgrp root /usr/pcs/bin/pcsstart`
	`# chmod 6555 /usr/pcs/bin/pcsstart`

The following error message is displayed at a diskless cnode:

```
Location = Open_hpib()
Function = open()
Parameter = /dev/rmb/hpib27
No such device
```

or

```
Location = Open_hpib()
Function = open()
Parameter = /dev/rmb/hpib27
File table overflow
```

Possible Cause	Solution
The kernel for the diskless cnode is not sufficient. The device drivers `hpib` and `98624` are not in the kernel, or `ndilbuffer` is set to 1.	Check the kernel configuration using /usr/lib/rmb/rmbdfile command. See *Installing and Maintaining the BASIC/UX System* and Chapter 5.

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
/usr/pil/etc/hwconfig.cf or /usr/pcs/etc/SYSCONFIG files are set incorrectly.	Check the settings in the /usr/pil/etc/hwconfig.cf or /usr/pcs/etc/SYSCONFIG files. Then perform /usr/pil/bin/pilconf 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 Infomation 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.