

HP E5250A/E5252A/E5255A Low Leakage Switch
Service Manual

SERIAL NUMBERS

This manual applies to instruments with serial numbers JP10C-.



HP Part No. E5250-90600
Printed in Japan January 1999

Edition 2
E0199

© Copyright Hewlett-Packard Company 1997,1999.

All Rights Reserved.
Reproduction, adaptation, or translation without prior written permission is prohibited, except as allowed under the copyright laws.

HP Part Number
E5250-90600

Printing History

Edition 1, March 1997
Edition 2, January 1999

Printed in Japan

Product Warranty

Hewlett-Packard warrants Hewlett-Packard hardware, accessories and supplies against defects in materials and workmanship for the period of one year from the warranty start date specified below. If Hewlett-Packard receives notice of such defects during the warranty period, Hewlett-Packard will, at its option, either repair or replace products which prove to be defective. Replacement products may be either new or like-new.

For warranty service or repair, this product must be returned to a service facility designated by Hewlett-Packard. Buyer shall prepay shipping charges to Hewlett-Packard and Hewlett-Packard shall pay shipping charges to return the product to Buyer. However, Buyer shall pay all shipping charges, duties, and taxes for products returned to Hewlett-Packard from another country.

Hewlett-Packard warrants that Hewlett-Packard software will not fail to execute its programming instructions, for the period of one year from the warranty start date specified below, due to defects in material and workmanship when properly installed and used. If Hewlett-Packard receives notice of such defects during the warranty period, Hewlett-Packard will replace software media which does not execute its programming instructions due to such defects.

Hewlett-Packard does not warrant that the operation of Hewlett-Packard products will be uninterrupted or error free. If Hewlett-Packard is unable, within a reasonable time, to repair or replace any product to a condition as warranted, customer will be entitled to a refund of the purchase price upon prompt return of the product.

The Hewlett-Packard products may contain remanufactured parts equivalent to new in performance or may have been subject to incidental use.

The warranty period begins on the date of delivery or on the date of installation if installed by Hewlett-Packard. If customer schedules or delays Hewlett-Packard installation more than 30 days after delivery, warranty begins on the 31st day from delivery.

Warranty does not apply to defects resulting from (a) improper or inadequate maintenance or calibration, (b) software, interfacing, parts or supplies not supplied by Hewlett-Packard, (c) unauthorized modification or misuse, (d) operation outside of the published environmental specifications for the product, or (e) improper site preparation or maintenance.

To the extent allowed by local law, the above warranties are exclusive and no other warranty or condition, whether written or oral, is expressed or implied and Hewlett-Packard specifically disclaims any implied warranties or conditions of merchantability, satisfactory quality, and fitness for a particular purpose.

Hewlett-Packard will be liable for damage to tangible property per incident up to the greater of \$300,000 or the actual amount paid for the product that is the subject of the claim, and for damages for bodily injury or death, to the extent that all such damages are determined by a court of competent jurisdiction to have been directly caused by a defective Hewlett-Packard product.

To the extent allowed by local law, the remedies in this warranty statement are customer's sole and exclusive remedies. Except as indicated above, in no event will Hewlett-Packard or its suppliers be liable for loss of data or for direct, special, incidental, consequential (including lost profit or data), or other damage, whether based in contract, tort, or otherwise.

For consumer transactions in Australia and New Zealand: the warranty terms contained in this statement, except to the extent lawfully permitted, do not exclude, restrict or modify and are in addition to the mandatory statutory rights applicable to the sale of this product to you.

Assistance

Product maintenance agreements and other customer assistance agreements are available for Hewlett-Packard products.

For any assistance, contact your nearest Hewlett-Packard Sales Office.

Certification

Hewlett-Packard Company certifies that this product met its published specifications at the time of shipment [from the factory]. Hewlett-Packard further certifies that its calibration measurements are traceable to the **National Institute of Standards and Technology** (NIST), to the extent allowed by the Institute's calibration facility, and to the calibration facilities of other International Standards Organization members.

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 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.

■ 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).



Indicates earth (ground) terminal.



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



Alternating current (power line).



Direct current (power line).

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.

Preface

Contents

Warning



The information in this manual is provided for use by service trained personnel only. To avoid electrical shock, do not perform any procedures in this manual, unless you are qualified to do so.

This manual contains information relating to performance verification and repair of the HP E5250A Low Leakage Switch Mainframe, HP E5252A 10×12 Matrix Switch, and HP E5255A 24 (8×3) Channel Multiplexer. The manual consists of the following chapters:

1. Service Introduction Contains information needed before the performance verification and repair.
2. Service Operation and Test Functions Contains information and instructions for initial inspection, diagnostics, and performance verification.
3. Troubleshooting Procedure Contains troubleshooting instructions.
4. Hardware Information Contains hardware information to aid in troubleshooting.
5. Replaceable Parts Contains information on replaceable parts and assembly location.

Other Manuals

See the following user's manual for information on user operation and programming.

User's Guide (HP part number E5250-90000)

Contents

1. Service Introduction	
Product Description	1-1
HP E5250A Low Leakage Switch Mainframe	1-1
HP E5252A 10×12 Matrix Switch	1-2
HP E5255A 24 (8×3) Channel Multiplexer	1-2
Operational Verification and Performance Verification Methods	1-2
Operational Verification	1-2
Performance Verification	1-3
Repair Policy	1-3
Required Equipment	1-4
Service Kit	1-5
Product Support Package	1-5
Retrofit Products	1-5
Options and Accessories	1-5
2. Service Operation and Test Functions	
Function Tests	2-1
Power-On Test	2-1
Result Display of Power-On Test	2-1
Power-On Test Sequence	2-2
Relay Test (via Front Panel)	2-2
Required Equipment	2-2
Relay Test Operation	2-2
Relay Test Theory	2-4
Function Tests via IBASIC Controller (Overview Only)	2-4
Performance Verification Overview	2-5
Required Equipment	2-5
Performance Test Record	2-5
Performance Verification Cycle	2-5
Performance Verification Environment	2-6
Performance Verification Test Procedures	2-6
Preparation	2-6
Starting the MT5250 Program	2-6
Setting Up Test Equipment Configurations	2-7
Executing Performance Verification Tests	2-8
Relay Test	2-13
Test Equipment	2-13
Test Method	2-13
Isolation Resistance Test	2-14
Specifications	2-14
HP E5252A	2-14
HP E5255A	2-14

Test Equipment	2-14
Test Connections	2-15
HP E5252A Test Connection	2-15
HP E5255A Test Connection	2-18
Closed Channel Resistance Test	2-20
Specifications	2-20
HP E5252A	2-20
HP E5255A	2-20
Test Equipment	2-20
Test Connections	2-21
HP E5252A Test Connection	2-21
HP E5255A Test Connection	2-22
RECONFIG MENU Operation	2-24
HP-IB Address Entry	2-24
Printer Control Setting Entry	2-24
Reporting Test Results	2-25
Printer Setting for REPORT RESULT	2-27
Running Trouble Isolation	2-29
Executing the Controller Test	2-29
Executing the Front Panel Interface Test	2-30
Executing the Relay Test	2-30
Executing Trouble Isolation	2-30
Performance Verification Operating Theory	2-31
General Information	2-31
Tools and Instruments Required	2-32
Traceability and Measurement Uncertainty	2-33
PV Execution Time (Including Time for Manual Operation)	2-35
HP E5252A Isolation Resistance	2-36
Overview	2-36
Overall Measurement Sequence	2-36
Connection Details (Input Channels)	2-37
Connection Details (Output Channels)	2-37
Connection Details (Input/Output)	2-38
HP E5252A Closed Channel Resistance	2-39
Overview	2-39
Overall Measurement Sequence	2-39
Connection Details	2-39
HP E5255A Isolation Resistance	2-40
Overview	2-40
Overall Measurement Sequence	2-40
Connection Details	2-41
HP E5255A Closed Channel Resistance	2-42
Overview	2-42
Overall Measurement Sequence	2-42
Connection Details	2-42

3. Troubleshooting Procedure	
Overview	3-1
Failure Modes	3-1
Field Replaceable Units (FRUs)	3-2
Troubleshooting Flow	3-3
1. Power-On Fail	3-3
1-1: "Line" LED does not light	3-3
1-2: "System Fail" LED is lit	3-3
1-3: "Fail" LED is lit	3-3
1-4: Other LEDs are lit (unexpectedly)	3-4
2. Unable to Control	3-4
2-1: Self-Test cannot be executed from Front Panel	3-4
2-2: Unable to control unit via HP-IB	3-4
3. Self-Test Fail	3-4
3-1: Self-Test (Relay Test) Fail	3-4
4. PV Test Fail (HP E5252A Matrix)	3-5
4-1: ON R Test Fail (Closed Channel Resistance)	3-5
4-2: Off R Test Fail (Isolation Resistance/ Leakage)	3-6
5. PV Test Fail (HP E5255A Multiplexer)	3-7
5-1: ON R Test Fail (Closed Channel Resistance)	3-7
5-2: Off R Test Fail (Isolation Resistance/ Leakage)	3-8
4. Hardware Information	
HP E5252A 10×12 Matrix Switch	4-1
HP E5255A 24 (8×3) Channel Multiplexer	4-2
HP E5255A DIP Switch Settings	4-4
HP E5250A DIP Switch/HP-IB Address Settings	4-5
Power-On Self-Test	4-6
Control and Power Supply Diagram	4-9
Circuit Diagrams	4-10
5. Replaceable Parts	
Replaceable Parts Lists	5-2
HP E5250A Mainframe Assemblies	5-2
HP E5252A/E5255A Parts	5-3
Tools and Consumables	5-12
HP E5250A Mainframe Chassis	5-13
HP E5250A Power Switch	5-15
HP E5250A Front Panel	5-16
HP E5250A CPU and Power Supply	5-20
HP E5250A Mother Board	5-22
HP E5250A Rear Frame	5-25
HP 16495A/F Connector Plate	5-28
HP 16495B/G Connector Plate	5-30
HP 16495C Connector Plate	5-32
HP 16495D Connector Plate	5-34

Index

Figures

2-1. Isolation Resistance Test Tools	2-32
2-2. Closed Channel Resistance Test Tools	2-33
4-1. HP E5252A Block Diagram	4-2
4-2. HP E5255A (One Block) Block Diagram	4-3
4-3. HP E5255A DIP Switch Settings	4-4
4-4. Rear Panel DIP Switch Settings	4-5
4-5. CPU and Control Diagram	4-9
4-6. Mother Board (Backplane) Configuration	4-10
4-7. HP E5252A Circuit Diagram (1/4)	4-11
4-8. HP E5252A Circuit Diagram (2/4)	4-12
4-9. HP E5252A Circuit Diagram (3/4)	4-13
4-10. HP E5252A Circuit Diagram (4/4)	4-14
4-11. HP E5255A Circuit Diagram (1/3)	4-15
4-12. HP E5255A Circuit Diagram (2/3)	4-16
4-13. HP E5255A Circuit Diagram (3/3)	4-17
5-1. HP E5250A Assembly Location	5-2
5-2. Mainframe (1 of 2)	5-13
5-3. Mainframe (2 of 2)	5-14
5-4. Power Switch	5-15
5-5. Front Panel (1 of 4)	5-16
5-6. Front Panel (2 of 4)	5-17
5-7. Front Panel (3 of 4)	5-18
5-8. Front Panel (4 of 4)	5-19
5-9. CPU and Power Supply (1 of 2)	5-20
5-10. CPU and Power Supply (2 of 2)	5-21
5-11. Mother Board (1 of 3)	5-22
5-12. Mother Board (2 of 3)	5-23
5-13. Mother Board (3 of 3)	5-24
5-14. Rear Frame (1 of 3)	5-25
5-15. Rear Frame (2 of 3)	5-26
5-16. Rear Frame (3 of 3)	5-27
5-17. HP 16495A/F (1 of 2)	5-28
5-18. HP 16495A/F (2 of 2)	5-29
5-19. HP 16495B/G (1 of 2)	5-30
5-20. HP 16495B/G (2 of 2)	5-31
5-21. HP 16495C (1 of 2)	5-32
5-22. HP 16495C (2 of 2)	5-33
5-23. HP 16495D (1 of 2)	5-34
5-24. HP 16495D (2 of 2)	5-35

Tables

1-1. Required Equipment	1-4
1-2. Contents of Product Support Package (E5250-65801)	1-5
2-1. Required Equipment	2-5
4-1. Rear Panel DIP Switch Settings	4-5
5-1. HP E5250A Major Assemblies	5-3
5-2. HP E5252A/E5255A Major Replaceable Parts	5-3
5-3. HP E5252A Parts	5-4
5-4. HP E5255A Parts	5-8
5-5. Tools and Consumables	5-12
5-6. Mainframe (1 of 2)	5-13
5-7. Mainframe (2 of 2)	5-14
5-8. Power Switch	5-15
5-9. Front Panel (1 of 4)	5-16
5-10. Front Panel (2 of 4)	5-17
5-11. Front Panel (3 of 4)	5-18
5-12. Front Panel (4 of 4)	5-19
5-13. CPU and Power Supply (1 of 2)	5-20
5-14. CPU and Power Supply (2 of 2)	5-21
5-15. Mother Board (1 of 3)	5-22
5-16. Mother Board (2 of 3)	5-23
5-17. Mother Board (3 of 3)	5-24
5-18. Rear Frame (1 of 3)	5-25
5-19. Rear Frame (2 of 3)	5-26
5-20. Rear Frame (3 of 3)	5-27
5-21. HP 16495A/F (1 of 2)	5-28
5-22. HP 16495A/F (2 of 2)	5-29
5-23. HP 16495B/G (1 of 2)	5-30
5-24. HP 16495B/G (2 of 2)	5-31
5-25. HP 16495C (1 of 2)	5-32
5-26. HP 16495C (2 of 2)	5-33
5-27. HP 16495D (1 of 2)	5-34
5-28. HP 16495D (2 of 2)	5-35

Service Introduction

This manual provides information and instructions for verifying and repairing the HP E5250A Low Leakage Switch Mainframe, HP E5252A 10×12 Matrix Switch, and HP E5255A 24 (8×3) Channel Multiplexer.

Warning



The information in this manual is provided for use by service trained personnel only. To avoid electrical shock, do not perform any procedures in this manual, unless you are qualified to do so.

This chapter covers product general information, and performance verification and repair strategies.

For the HP E5250A/E5252A/E5255A specifications, see Appendix A, "Specifications" of the *HP E5250A User's Guide* (HP P/N E5250-90000).

For detailed hardware information, see Chapter 4.

Product Description

HP E5250A Low Leakage Switch Mainframe

The HP E5250A Low Leakage Switch Mainframe is a computer-controlled (via HP-IB) mainframe for the HP E5252A 10×12 Matrix Switch and the HP E5255A 24 (8×3) Channel Multiplexer. The HP E5250A, HP E5252A, and HP E5255A are designed for semiconductor dc characteristics measurements, which require low leakage current specifications.

The HP E5250A can be controlled only by an external computer (HP BASIC controller, instrument with built-in HP IBASIC, or personal computer) and is usually used with an instrument that has SMUs (Source and Monitor Units). It can also be used with a C-Meter. A typical configuration for using the HP E5250A is as follows:

Controller	HP 4155A or HP 4156A (as an HP IBASIC controller); or personal computer with Microsoft® Windows® and HP Interactive Characterization Software (ICS)
SMU	HP 4155A or HP 4156A
C-Meter	HP 4284A

The HP E5250A has four slots for installing HP E5252As and HP E5255As. The HP E5250A can be configured with:

- HP E5252As
- HP E5255As
- Mix of HP E5252As and HP E5255As

The front panel of the HP E5250A has four status indicators (LEDs) and a **Local/Self-Test** key. All the input/output connections are made at the rear part.

HP E5252A 10×12 Matrix Switch

The HP E5252A is equal to the HP E5250A option 001.

For using the HP E5252A 10×12 Matrix Switch, six SMU (triaxial) ports (two low leakage and four general), two HF (BNC) ports, and two CV (BNC) ports are available on the rear panel of the HP E5250A. Each HP E5252A has 12 output (triaxial) connectors, which allow six Kelvin connections.

HP E5255A 24 (8×3) Channel Multiplexer

The HP E5255A is equal to the HP E5250A option 501.

For using the HP E5255A 24 (8×3) channel Multiplexer, six SMU (triaxial) ports are available on the rear panel for the HP E5250A. Each HP E5255A has three 8-channel (coaxial) multiplexers. The user can define the connections between the SMU ports and the 8-channel multiplexers by making internal cable connections. For example, the HP E5250A with four HP E5255As can have various input-output connections—six 16-channel multiplexers, three 32-channel multiplexers, one 96-channel multiplexer, and so on.

Three bias input (BNC) ports are also available on *each* HP E5255A.

Operational Verification and Performance Verification Methods

Operational Verification

The Power-On Test, Relay Test, and Leak Test verify that the HP E5250A/E5252A/E5255A are functioning properly with 90% confidence.

These tests, easily performed by customers, also cover incoming inspection and verification after installing the HP E5252A or HP E5255A, which are customer installable.

Note



If full performance verification is required after installing the HP E5252A or HP E5255A, use the Performance Verification program.

Power-On Test Performs the CPU Self-Test. This is automatically performed when the HP E5250A is turned on. The CPU Self-Test can also be performed from the Self-Test utility software (furnished with the HP E5250A), which runs on the HP 4155A/4156A.

- Relay Test** Checks relays. A Relay Test Adapter (HP E5250A option 301, which is equal to HP P/N E5250-60002) and BNC shorting caps (HP P/N 1250-0929; furnished with the HP E5250A/E5255A) are required. The Relay Test can be performed from the front panel **Local/Self-Test** key, and also from the Self-Test utility software (furnished with the HP E5250A), which runs on the HP 4155A/4156A.
- Leak Test** Performs leakage current tests. The Leak Test can be performed only from the Self-Test utility software (furnished with the HP E5250A), which runs on the HP 4155A/4156A.

For more information on the Power-On Test and Relay Test, see Chapter 2. For information on the Leak Test, see Chapter 3 of the *User's Guide* (HP P/N E5250-90000).

Performance Verification

Performance Verification Tests are used to verify the HP E5250A/E5252A/E5255A specifications. All tests can be easily performed by using the Performance Verification software (MT5250, which is on a 3.5-inch flexible disk and must be ordered separately), which runs on the HP BASIC 5.0 or later. This software conforms to MIL-STD-45662A.

Perform the tests for periodic verification of performance and for inspection after troubleshooting. The recommended Performance Verification cycle is one year.

When you perform Performance Verification, the ambient temperature and humidity must be:

Temperature: $23^{\circ}\text{C} \pm 5^{\circ}\text{C}$

Humidity: $< 60\% \text{ RH}$

For more information on the Performance Verification software, see Chapter 2.

Repair Policy

The HP E5250A/E5252A/E5255A will be repaired and calibrated in a local HP Service Center.

Most HP E5250A repairs are handled on an assembly-level replacement basis. Mechanical parts and fuses are handled on a parts-level replacement basis.

The HP E5252A/E5255A repairs are handled on a parts-level replacement basis. The Performance Verification software is also used for isolating defective relays on the HP E5252A/E5255A.

Note



Relays have life specifications. If near the end of their expected life, and many relays are wearing out, we recommend that the assemblies be replaced with new assemblies.

Required Equipment

The following table lists the equipment required for performance tests and troubleshooting.

Note



Equipment should be calibrated by an instrument traceable to the National Institute of Standards and Technology (NIST) or an equivalent standard; or calibrated directly by an authorized calibration organization such as NIST. The calibration cycle should be in accordance with the stability specifications of each component.

Table 1-1. Required Equipment

Equipment	Use ¹
Computer/HP BASIC 5.0 or later	P,T
HP-IB Cables	P,T
HP 4339A/B High Resistance Meter ²	P
HP 3458A Multimeter ²	P
HP E5250A Low Leakage Switch Mainframe ³	T
Relay Test Adapter (E5250-60002 ⁴)	P,T
BNC Shoring Cap (1250-0929), 3 ea	P,T
Isolation Test Adapter (E5250-65002)	P
Banana-Triax Adapter (E5250-65003)	P
Banana-BNC Adapter (E5250-65004)	P
Banana-Dsub Adapter (E5250-65005)	P
Triax-BNC Adapter (E5250-65006)	P
PV/Diag (MT5250) Disk (E5250-65201)	P,T
Triaxial Cable (1 m, 04142-61641; or 1.5m, 16058-61603 ⁵), 3 ea	P
BNC Cable (61 cm, 8120-1839; 122 cm, HP 10503A; or 1.5m, 04142-61636 ⁶)	P
Banana-Banana Cable (HP 11058A), 2 ea	P
Torx TX15 Driver (for Top and Bottom Covers)	T
Torx TX25 Driver (for Side Cover)	T
Torx Wrench for Plug-In Modules (8710-2151 ⁷)	T
Module Extractor (04155-60007 ⁸)	T
Flat-Blade Screwdrivers	T
Philips (Pozidriv No. 1, No. 2) Screwdrivers	T

1 P = Performance Verification, T = Troubleshooting

2 Must have been calibrated within the recommended interval.

3 Allows returning defective E5252A/E5255A only (without E5250A).

4 Available as Mainframe option (HP E5250A #301).

5 Equals HP 16493C #001.

6 Equals HP 16493B #001.

7 Furnished with HP E5250A/E5252A/E5255A.

8 Furnished with HP E5250A/4155A/4156A and Product Support Package for HP 4155A/4156A (04155-65801).

Service Kit

Product Support Package

The Product Support Package for the HP E5250A/E5252A/E5255A (HP part number E5250-65801) contains items required for performance testing and troubleshooting the HP E5250A/E5252A/E5255A. The contents are shown below.

Table 1-2. Contents of Product Support Package (E5250-65801)

Part Number	Quantity	Description
E5250-65002	1	Isolation Test Adapter
E5250-65003	1	Banana - Triax Adapter
E5250-65004	1	Banana - BNC Adapter
E5250-65005	1	Banana - Dsub Adapter
E5250-65006	1	Triax - BNC Adapter
E5250-65201	1	MT5250 Program (3.5-Inch Disk)

Retrofit Products

When the HP E5250A option 001 and option 501 are specified, HP E5252A and E5255A are installed in the HP E5250A and their performance is verified at the factory. The HP E5252A and HP E5255A are usually ordered when additional channels are necessary (as retrofit products).

The HP E5252A/E5255A can be installed by customers. The Relay Test and Leak Test should be performed after the installation.

Options and Accessories

See "Options and Accessories" in Chapter 1 of the *HP E5250A User's Guide*.

Service Operation and Test Functions

This chapter explains the service operation for the HP E5250A/E5252A/E5255A, the built-in test functions, and the Performance Verification operating theory.

Service operations are of three types:

Function Tests	Firmware and software used to verify that the HP E5250A/E5252A/E5255A are operational. The function tests are mainly for users. See Chapter 3 of the <i>User's Guide</i> (HP P/N E5250-90000) for details.
Performance Verification Tests	Software to verify that the HP E5250A/E5252A/E5255A meet the published specifications.
Trouble Isolation	Software to isolate defective FRUs (field replaceable units).

Note The HP BASIC program MT5250 is used for both Trouble Isolation and Performance Verification purposes.



Function Tests

Power-On Test

Result Display of Power-On Test

When you power on the HP E5250A, the Power-On Test is automatically executed. The result of the Power-On Test is indicated by the front panel LEDs. The Power-On Test *does not* perform the Relay Test. To perform the Relay Test, see "Relay Test (via Front Panel)" or "Running Trouble Isolation".

Note The HP E5250A has eight DIP switches on the rear panel. Bits 1, 2, and 3 (the leftmost three bits) must be at the **0** position for normal Power-On Test operation. Bits 4 through 8 are for setting the HP-IB address.



When the HP E5250A is functioning properly, the following four front panel LEDs will light, and then they extinguish within five seconds after power-on. (The Power-On Test result is "PASS".)

Remote
Sys Fail
Fail
Local/Self Test

In all the other cases (shown below), the Power-On Test result is "FAIL". See chapter 3.

- One or more LEDs (except **Line**) remain lit for more than five seconds after power-on. (In most cases, **Sys Fail** or **Fail**.)
- The four LEDs do not light at all.

Power-On Test Sequence

The Power-On Test is executed in the following order.

1. (Turn on Mainframe.)
2. Turn on all LEDs.
3. Start up CPU.
4. Perform CPU board ROM check-sum test.
5. Perform CPU board RAM read/write test.
6. Turn off **Remote** and **Sys Fail** LEDs.
7. Perform CPU board timer test.
8. Perform slot communication test.
9. Turn off **Fail** LED.

Relay Test (via Front Panel)

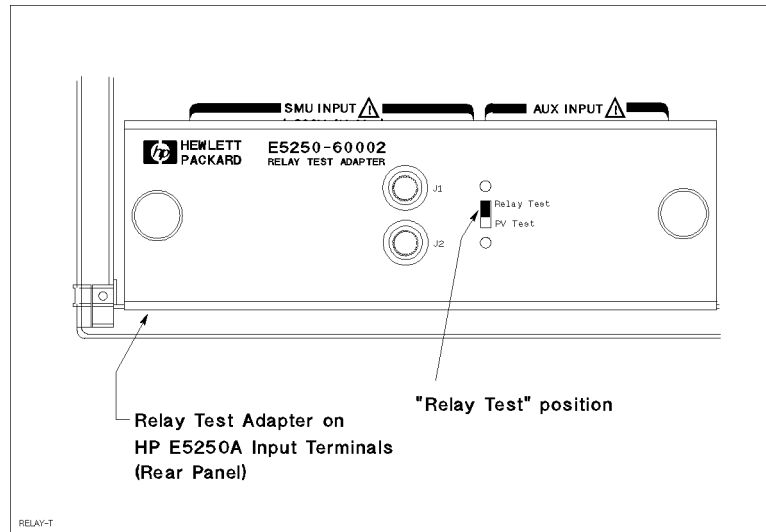
The Relay Test via the front panel tests all the modules together and indicates the "PASS" or "FAIL" result of the unit. This test does not indicate which module(s) are defective. An external controller is not required to perform this test.

Required Equipment

- Relay Test Adapter (E5250-60002)
- (HP E5255A only) BNC Shorting Caps (1250-0929, 3 ea per HP E5255A)

Relay Test Operation

1. Make sure all the output terminals of the HP E5250A are open.
2. Mount the Relay Test Adapter (HP P/N E5250-60002) on the input terminals (rear panel) of the HP E5250A, then tighten the two thumb screws.
3. Make sure the slide switch of the Relay Test Adapter is at the **Relay Test** position.



Relay Test Adapter

4. (Only if the HP E5255A module(s) are installed.) Attach three BNC shorting caps onto the three **BIAS INPUT** terminals of each HP E5255A module.
5. (If the **Remote LED** is lit.) Press the Local/Self-Test button on the front panel to set the HP E5250A to "local".
6. Press the Local/Self-Test button on the front panel.
7. Check the **Fail LED**. If the LED is lit, one or more of the relays are considered to be defective. Use the MT5250 program to isolate the defective relays. (See "Running Trouble Isolation".)

Relay Test Theory

This section explains the relay test theory briefly. For the troubleshooting procedure (isolating defective relays), see "Running Trouble Isolation".

The CPU board of the HP E5250A has a relay test circuitry. The circuitry consists of two current sources (20 mA and 100 μ A), two voltage comparators (150 mV and 5 V), and four relays (used to test the relay test circuitry itself and to connect the circuitry to CV1 and CV2 ports).

The Relay Test performs Close Tests and Open Tests. It tests the relay test circuitry and its four relays first, then tests the relays on all the installed modules.

To perform a relay test, a test path (loop) must be set up. The Relay Test Adapter interconnects the input ports so that the input port relays are included with the test loop. The BNC shorting caps for the HP 5255A are for the same purpose. All the output ports must be open. (Output cables may be left connected if the other sides are *open*.)

■ Close Test

1. Close (make) relays to be tested (all the relays in a test path).
2. Force 20 mA.
3. Check the voltage by using the 150 mV comparator. The Close Test is PASS when the voltage is less than 150 mV. (The path resistance is less than 7.5 Ω .)

■ Open Test

1. Open (break) the relay to be tested (one of the relays in a test path).
2. Force 100 μ A.
3. Check the voltage by using the 5 V comparator. The Open Test is PASS when the voltage is greater than 5 V.

Function Tests via IBASIC Controller (Overview Only)

Function Tests (Controller, Front Panel, and Relay Test) are performed via an HP IBASIC controller (typically, HP 4155A/4156A) by users to verify the operation of the HP E5250A/E5252A/E5255A. Note that all the Function Test items are also covered by the MT5250 program. (See "Running Trouble Isolation".) For more information about the Function Tests via IBASIC, see Chapter 3 of the *User's Guide* (HP P/N E5250-90000).

Performance Verification Overview

Required Equipment

The following is equipment required for the HP E5250A/E5252A/E5255A performance verification tests.

Table 2-1. Required Equipment

Description	Quantity	Model / Part Number
Computer / HP BASIC 5.0 or later	1	
HP-IB Cables		
High Resistance Meter	1	HP 4339A/B
Multimeter	1	HP 3458A
Relay Test Adapter	1	E5250-60002
BNC Shoring Cap	3	1250-0929
Isolation Test Adapter ¹	1	E5250-65002
Banana-Triax Adapter ¹	1	E5250-65003
Banana-BNC Adapter ¹	1	E5250-65004
Banana-Dsub Adapter ¹	1	E5250-65005
Triax-BNC Adapter ¹	1	E5250-65006
PV/Diag Disk ¹	1	E5250-65201
Triaxial Cable	3	04142-61641 (1 m) or 16058-61603 (=HP 16493C #001) (1.5 m)
BNC Cable	1	8120-1839 (61 cm), HP 10503A (122 cm), or 04142-61636 (=HP 16493B #001) (1.5 m)
Banana-Banana Cable	2	HP 11058A

¹ Included in Product Support Package (E5250-65801).

Performance Test Record

Performance Test Results can be printed out to a printer by using the MT5250 Program. Examples of performance test records are at the end of this chapter.

Performance Verification Cycle

The frequency of performance verification depends on the operating and environmental conditions under which the instrument is used. We recommend that the HP E5250A/E5252A/E5255A's performance be verified at least once a year.

Performance Verification Environment

Important Perform all performance verification tests in the following conditions:



Temperature: 23 °C ± 5 °C

Humidity: < 60% RH

Allow the HP 4339A/B and HP 3458A to warm up and stabilize for their warmup time.

Note The HP 4339A/B and HP 3458A must be warmed up at least:



HP 4339A/B: 30 minutes

HP 3458A: four hours

Perform ACAL for the HP 3458A after the warmup time.

Performance Verification Test Procedures

The following procedures explain how to execute the HP E5250A/E5252A/E5255A performance verification tests using the MT5250 program.

Preparation

Before the tests, perform the following steps:

1. (HP E5255A only) Make sure the internal DIP switch setting is correct. See "HP E5255A DIP Switch Settings" in Chapter 4.
2. Connect the HP-IB cables.
Interconnect the controller, HP E5250A, HP 3458A, HP 4339A/B, disk drive, and printer with interface cables. A printer is required only if you want to print the Test Records after the tests are complete.
3. Make sure the **Terminals** push-switch on the HP 3458A front panel is at the **Front** position.
4. Make sure the **Guard** push-switch on the HP 3458A front panel is at the **Open** position.
5. Check the HP-IB addresses of the HP 3458A and HP 4339A/B, and remember them.

Starting the MT5250 Program

Use the following procedure to start the MT5250 program.

1. Turn the controller on and boot the HP BASIC/WS system.
Insert BASIC 5.0 (or later) disk into the disk drive and turn your computer on. The language system loads automatically and **BASIC Ready** is displayed when BASIC is loaded. Remove the disk.
2. Load BASIC BIN files.
Load the following binary (BIN) files from the BASIC Driver Disk and the BASIC Language Extensions Disk:

Driver BIN: HPIB
Language Extension BIN: CLOCK, ERR, IO, MAT

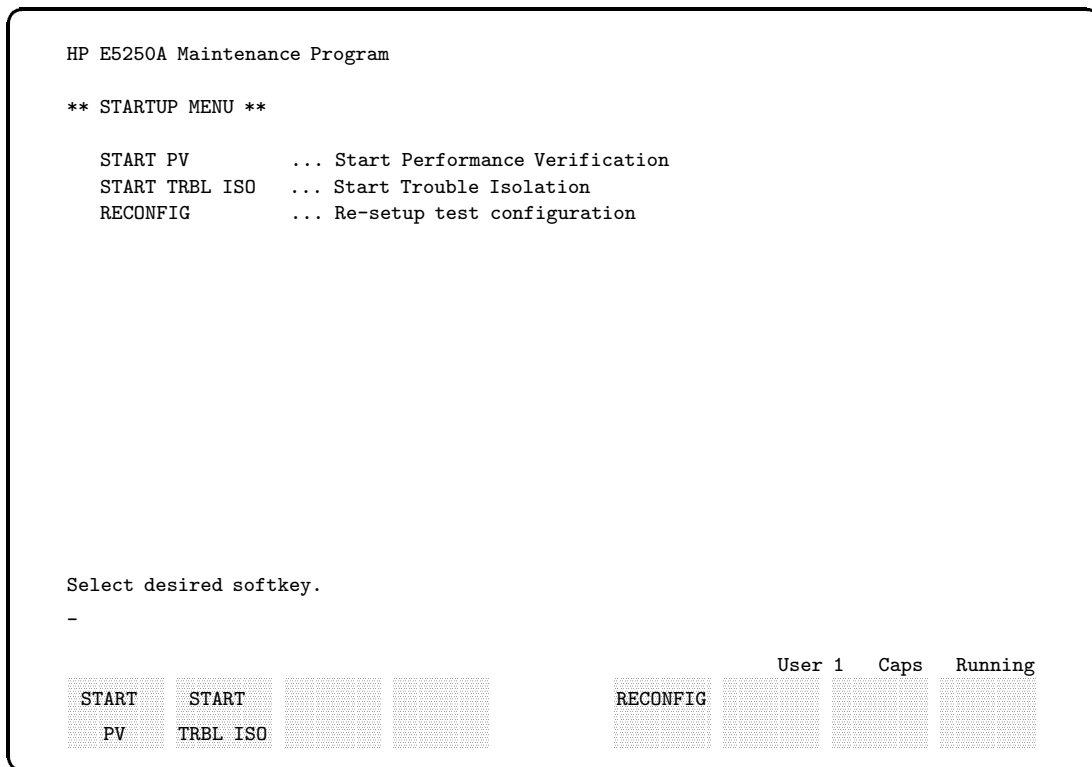
If you are using an external disk drive or other storage medium, you also need to load other BIN files (for example CS80 and DISC). Remove the disk.

3. Load and run the MT5250 program as follows:

```
LOAD "MT5250"   
RUN 
```

Change the working directory to the directory where MT5250 and related files are stored, or set MASS STORAGE IS (MSI) to the disk drive where MT5250 disk is inserted.

After the copyright message is displayed and the program initialization is completed, the STARTUP MENU is displayed.



Setting Up Test Equipment Configurations

Before you begin the performance verification tests, you need to confirm/change the following items that are necessary information for the tests. Select the **RECONFIG** softkey in the STARTUP MENU. The RECONFIG MENU is displayed.

```

HP E5250A Maintenance Program

** RECONFIG MENU **

E5250A ADDR      ... change E5250A HP-IB address
3458A ADDR       ... change 3458A HP-IB address
4339A ADDR       ... change 4339A HP-IB address
PRINTER TYPE     ... change printer type
PRINTER ADDR     ... change printer's address, I/F
STARTUP MENU     ... return to STARTUP MENU

CURRENT SETTINGS
HP E5250A ADDR   = 722
HP 3458A ADDR    = 711
HP 4339A ADDR    = 718
PRINTER TYPE     = LOCAL
PRINTER ADDR     = 701           I/F = HP-IB

Select desired softkey.
-

E5250A  3458A  4339A  PRINTER  PRINTER  User 1  Caps  Running
ADDR    ADDR    ADDR    TYPE    ADDR

```

You can confirm/change the following items in this menu.

- HP E5250A HP-IB address
- HP 3458A HP-IB address
- HP 4339A/B HP-IB address
- Printer information (type, HP-IB address, and spooling directory)

Select an appropriate softkey to confirm/change the item values. See "RECONFIG MENU Operation" for the details.

After you have set up the configurations, select the **STARTUP MENU** softkey to return to the STARTUP MENU.

Executing Performance Verification Tests

To execute the performance verification tests, perform the following steps:

1. Display the PV MAIN MENU.
 To display the PV MAIN MENU, select the **START PV** softkey in the STARTUP MENU. Selecting the **START PV** softkey initializes the HP E5250A, HP 3458A, and HP 4339A/B. If the HP-IB addresses are not set correctly, an error message is displayed and the MT5250 program terminates.


```
HP E5250A Maintenance Program

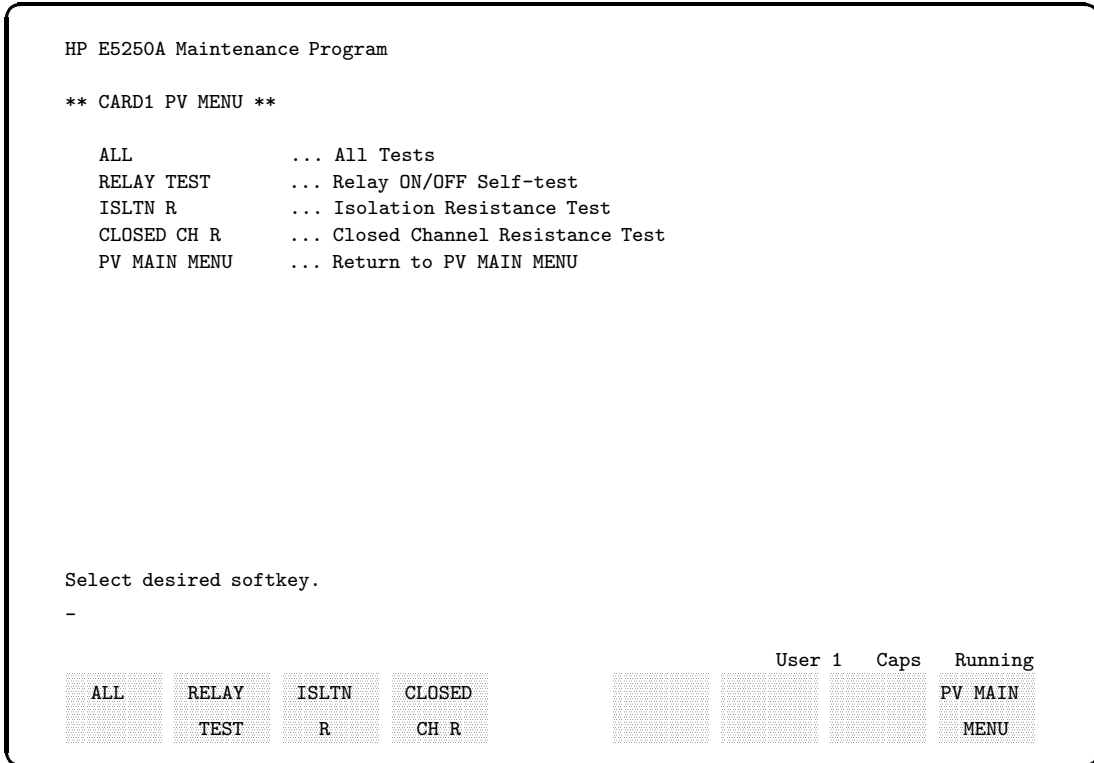
** PV MAIN MENU **

CARD 1      ... Slot1 E5255A Performance Verification
CARD 2      ... Slot2 E5255A Performance Verification
CARD 3      ... Not installed
CARD 4      ... Slot4 E5252A Performance Verification
RESULT REPORT ... Read the Test Result Report
QUIT       ... Quit This Program

Select desired softkey.
-

                                User 1  Caps  Running
CARD1  CARD2  [ ]  CARD4  RESULT  [ ]  [ ]  QUIT
REPORT  [ ]  [ ]  [ ]  [ ]  [ ]  [ ]  [ ]
```

2. Select the Slot (Card) number.
Execute the Performance Verification for *each* module (card). Select the module to be tested by selecting from the card number softkeys.



3. Select the execution mode.

The MT5250 program has two test modes for the performance verification tests. One is the Sequential Test mode, which verifies all the test items for the selected module. The other is the Selective Test mode, which executes one test item specified by a softkey. Test results can be saved to a disk and printed out as the test record only in the Sequential Test mode. Select the **ALL** softkey in the PV MENU to start the Sequential Test.

4. Execute the tests.

To perform all tests sequentially, use the following steps:

- a. Select the **ALL** softkey. The message and softkeys are displayed:

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

- b. Select the desired softkey (**YES** or **NO**). To be able to print out the test results as the test record, you must save the test results in a file (select the **YES** softkey).
- c. Insert a disk for saving the test results. Do not remove the disk until the PV MENU is displayed again after all tests are complete, because the MT5250 program creates temporary files on the disk during the tests and merges them into one file after all tests are complete.

Note

You can execute any BASIC statement directly whenever the MT5250 program is waiting for softkey input. For example, you can execute the CAT statement to display the catalog, or you can execute the PURGE statement to purge a file.

- d. Type the name of the file in which you want to save the test results, then press **(Return)**. A default filename is, for example, PVS10396 (PVS10396: Performance Verification Slot 1, March (3) 1996). If you press **(Shift)-(Return)** without typing a filename and then **(Return)**, the MT5250 program returns you to step b again.
-

Note

Do not use TEMP001 through TEMP999 as your test results filename because the MT5250 program creates temporary files with these names during the tests. After the tests are complete, these temporary files are automatically purged.

If you specify a file that has already been used to save the test results of a previous Performance Verification execution, you can selectively resave the results of desired test items. In this case, go to step g since you can not change the contents of step e. You can perform the desired test items by using the **CONTINUE** softkey and the **SKIP** softkey to skip over undesired test items.

- e. Type the serial numbers of the HP E5250A/E5252A/E5255A and press **(Return)**. Then enter Temperature, Humidity, Date, and operator's name as prompted. Press **(Return)** after each entry.
- f. After you have finished all the entries, MT5250 asks you if the entered data are correct or not:

Are you sure ?

If you have correctly entered all the data in step e, select the **YES** softkey. If you select the **NO** softkey, MT5250 returns you to step e again. Once you select the **YES** softkey, you can never change the data entered in step e.

- g. Perform test items in accordance with the messages that are displayed during test execution. See each test description for the details of the test method including cable connections.
-

Warning

During the Isolation Resistance Test, dangerous voltages may be present at the terminals of the HP E5250A, E5250-65002 test adapter, and cables.

Remove all the unused cables from the HP E5250A and E5250-65002, and do not touch other open terminals.

The following shows the softkeys that are displayed during test item execution. First connect the cables in accordance with the displayed messages, then select the **CONTINUE** softkey to execute the test item. After the test result (PASS or FAIL) is displayed, select the **CONTINUE** softkey to perform the next test item. Basically, you can perform all test items by changing the cable connections, then selecting the **CONTINUE** softkey. After all tests are complete, MT5250 displays the PV MAIN MENU.

Softkey	Function
CONTINUE	Goes to the next step in the test item.
SKIP	Goes to the next test item.
EXIT	Returns to the PV MAIN MENU. Or if this softkey is selected after selecting the CRT softkey, exits from displaying the detailed test results.
RETRY	Performs the test item again. If the test fails, make sure the cable connections are correct, then select this softkey if you want to perform the test item again. If the test results are being saved to a disk, the new test results overwrite the old test results.
DUMP	Displays or prints the detailed test results. If the PRINTER TYPE is set to FILE SPOOL , the created file name is MT5250_Dn (<i>n</i> is incremented from 1 to 99 repeatedly, such as 1, 2, ... , 99, 1) and the file type is ASCII (LIF ASCII) .
CRT	Displays the detailed test results.
PRINTER	Prints the detailed test results.
MORE	Displays one more screen of the detailed test results.
CANCEL	Cancels printing.

Relay Test

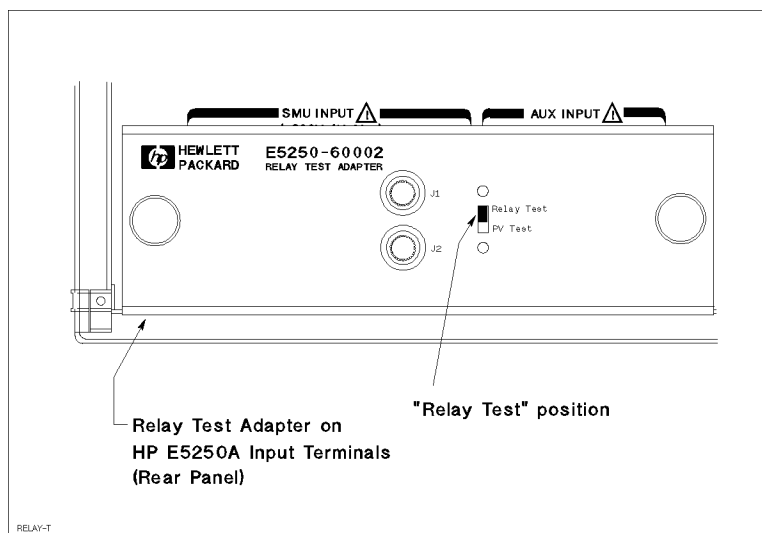
This test performs the built-in relay test of the HP E5250A. This test is executed when the **RELAY TEST** softkey is selected in **CARD_n PV MENU**.

Test Equipment

- Relay Test Adapter (E5250-60002)
- (HP E5255A Only) BNC Shorting Caps (1250-0929; 3 ea)

Test Method

1. Attach the Relay Test Adapter to the HP E5250A input terminals.
2. Set the switch of the Relay Test Adapter to the **Relay Test** position.
3. (HP E5255A only) Attach three BNC shorting caps on the three **BIAS INPUT** terminals of the HP E5255A.
4. Disconnect all the cables from the HP E5252A/E5255A.
5. MT5250 sends the relay test command to the HP E5250A and checks the result.



Relay Test Adapter

Isolation Resistance Test

This test verifies the isolation resistance between channels. This test is executed when the **ISLTN R** softkey is selected in **CARD n PV MENU**.

Specifications

HP E5252A.

Low Leak I-V Ports (SMU1 and SMU2)	$10^{13}\Omega$
General I-V Ports (SMU3 through SMU6)	$10^{12}\Omega$
CV, HF Paths	$10^9\Omega$

HP E5255A.

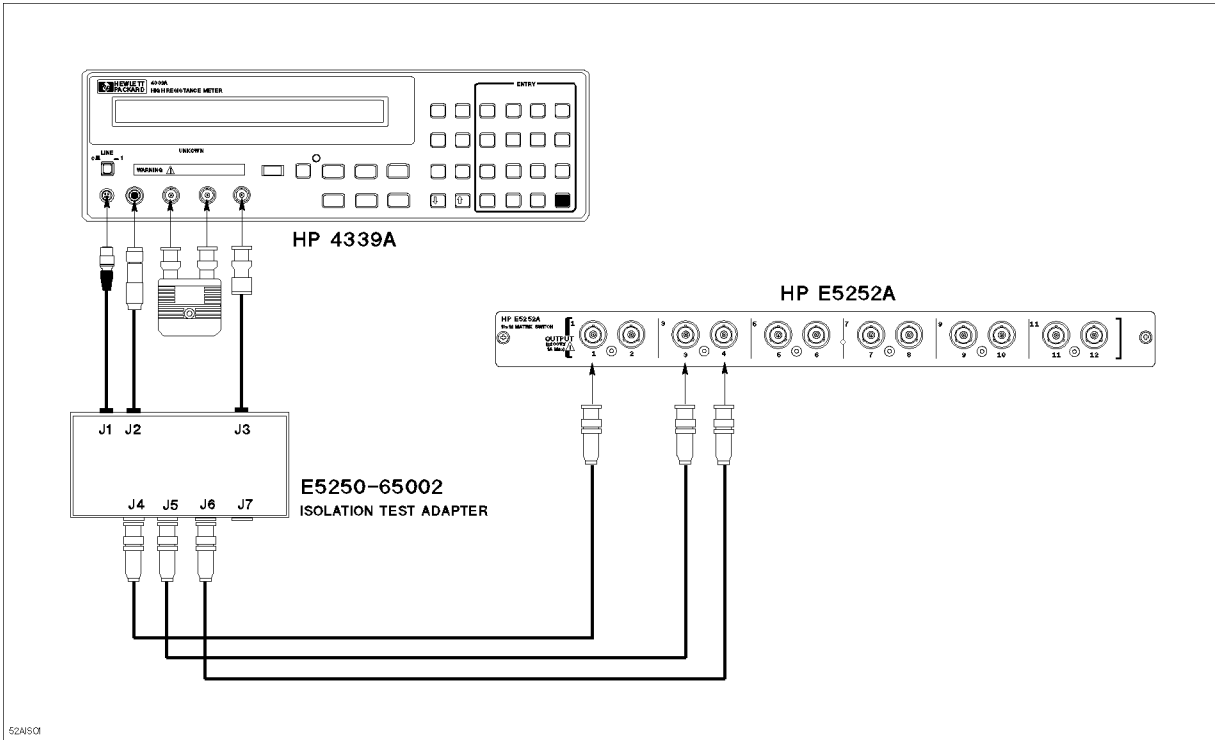
I-V Ports	$10^{13}\Omega$
Bias Ports	$10^9\Omega$

Test Equipment

- HP 4339A/B High Resistance Meter
- Isolation Test Adapter (E5250-65002)
- Triaxial Cable; 3 ea:
 - 04142-61641 (1 m),
 - or 16058-61603 (=HP 16493C #001) (1.5 m)
- (HP E5255A Only) BNC Cable:
 - 8120-1839 (61 cm),
 - or HP 10503A (122 cm),
 - or 04142-61636 (=HP 16493B #001) (1.5 m)
- (HP E5255A Only) Triax-BNC Adapter (E5250-65006)

Test Connections

HP E5252A Test Connection.



HP E5252A Input - Input Isolation Resistance Test

Important



Before beginning this test, remove the Relay Test Adapter from the HP E5250A input terminals. Otherwise, the test will FAIL.

** INPUT - INPUT ISOLATION RESISTANCE TEST **

Attach 04339-60003 on 4339A Ground/Guard. Press CONTINUE.

Connect E5250-65002 J1 to 4339A Interlock. Press CONTINUE.

Connect E5250-65002 J2 to 4339A Input. Press CONTINUE.

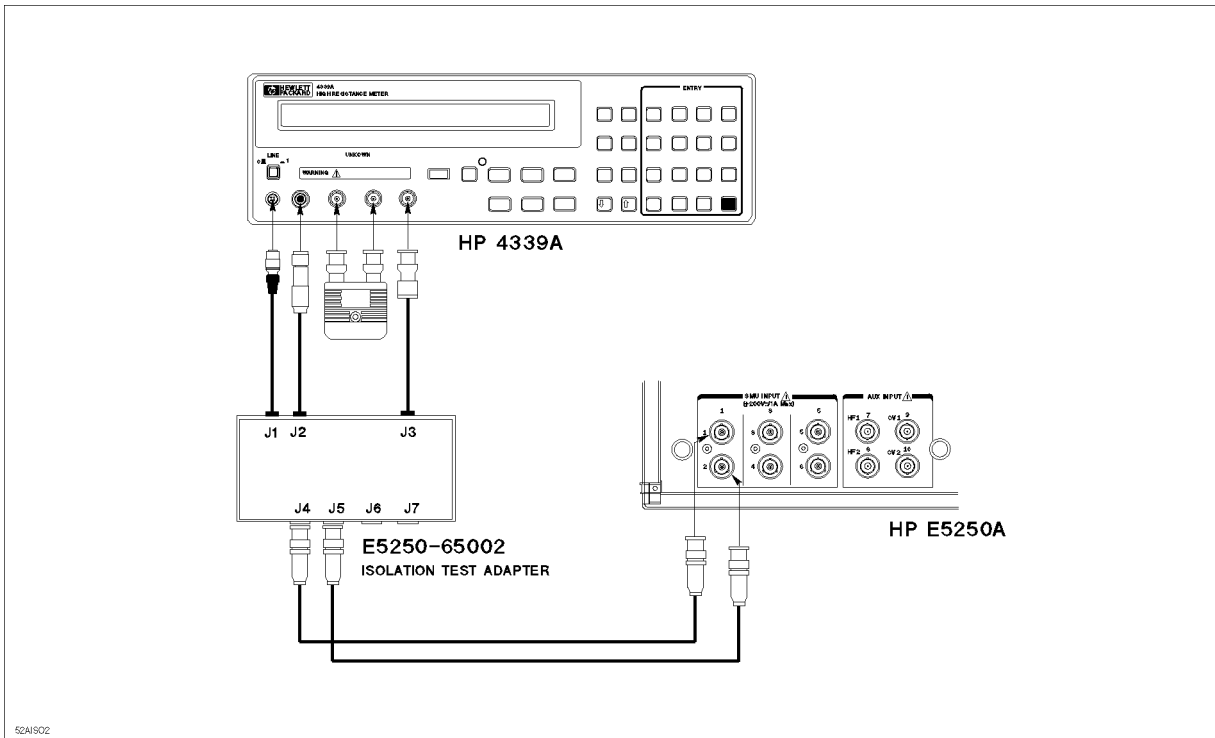
Connect E5250-65002 J3 to 4339A Output. Press CONTINUE.

Connect E5250-65002 J4 to E5252A(CARDn) OUTPUT 1. Press CONTINUE.

Connect E5250-65002 J5 to E5252A(CARDn) OUTPUT 3. Press CONTINUE.

Connect E5250-65002 J6 to E5252A(CARDn) OUTPUT 4. Press CONTINUE.

Disconnect cable from E5250-65002 J7. Press CONTINUE.



52A1502

HP E5252A Output- Output Isolation Resistance Test

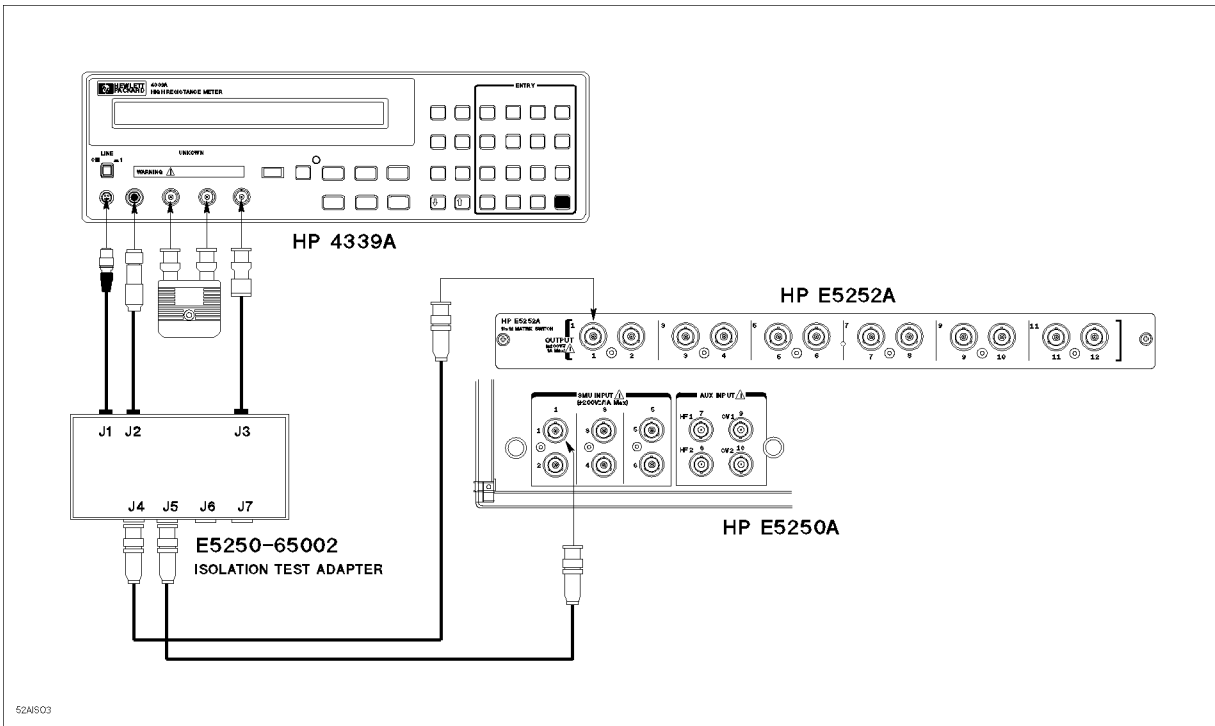
**** OUTPUT - OUTPUT ISOLATION RESISTANCE TEST ****

Connect E5250-65002 J4 to E5250A SMU INPUT 1. Press CONTINUE.

Connect E5250-65002 J5 to E5250A SMU INPUT 2. Press CONTINUE.

Disconnect cable from E5250-65002 J6. Press CONTINUE.

Disconnect all cables from E5252A(CARDn). Press CONTINUE.



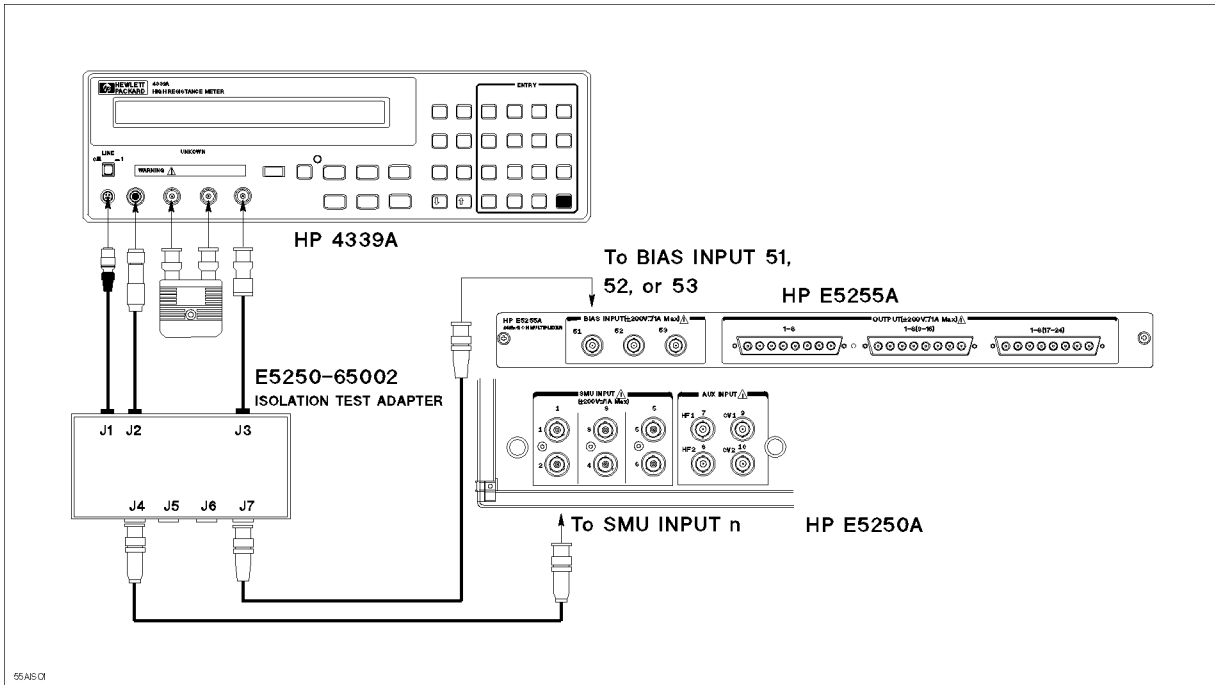
HP E5252A Input - Output Isolation Resistance Test

**** INPUT - OUTPUT ISOLATION RESISTANCE TEST ****

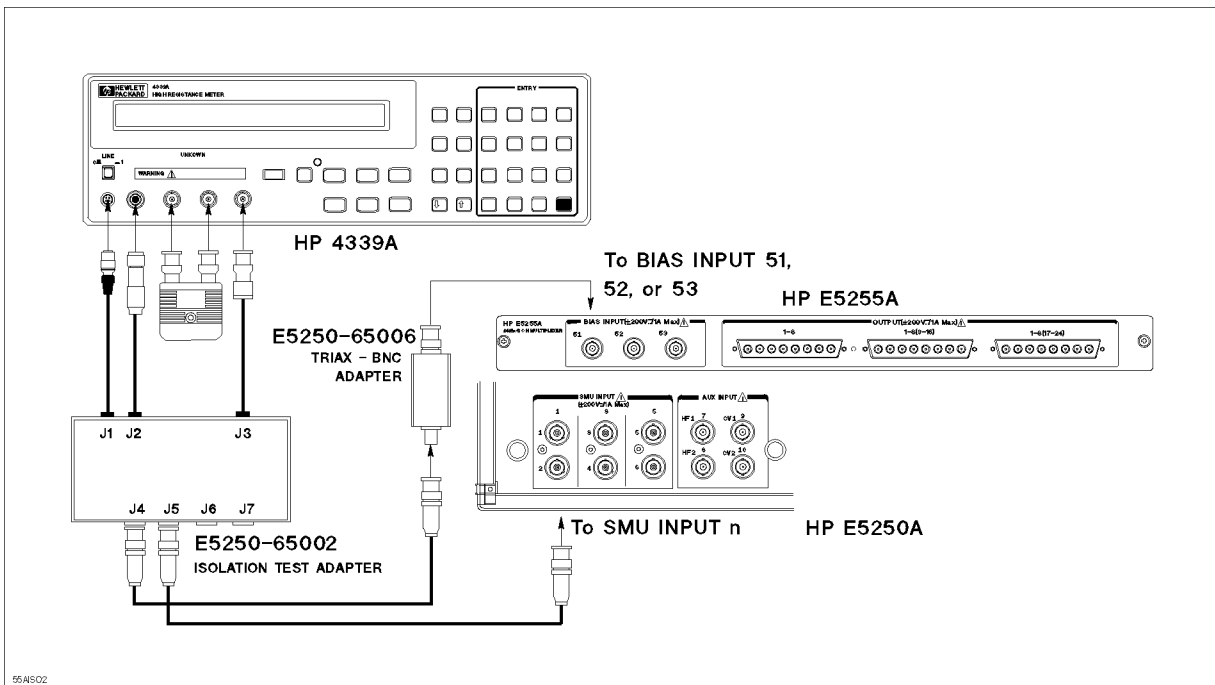
Connect E5250-65002 J4 to E5252A(CARDn) OUTPUT 1. Press CONTINUE.

Connect E5250-65002 J5 to E5250A SMU INPUT 1. Press CONTINUE.

HP E5255A Test Connection.



HP E5255A IV Port Isolation Resistance Test



HP E5255A BIAS Port Isolation Resistance Test

**** E5255A ISOLATION RESISTANCE TEST ****
**** BLOCK1 : IV PORT n ISOLATION RESISTANCE TEST ****
Attach 04339-60003 on 4339A Ground/Guard. Press CONTINUE.
Connect E5250-65002 J1 to 4339A Interlock. Press CONTINUE.
Connect E5250-65002 J2 to 4339A Input. Press CONTINUE.
Connect E5250-65002 J3 to 4339A Output. Press CONTINUE.
Disconnect cable from E5250-65002 J6. Press CONTINUE.
Disconnect cable from E5250-65002 J5. Press CONTINUE.
Connect E5250-65002 J4 to E5250A SMU INPUT n. Press CONTINUE.
Connect E5250-65002 J7 to E5255A(CARDn) BIAS INPUT 51. Press CONTINUE.
**** BLOCK1 : BIAS PORT 51 ISOLATION RESISTANCE TEST ****
Disconnect cable from E5250-65002 J7. Press CONTINUE.
Attach E5250-65006 on E5255A(CARDn) BIAS INPUT 51. Press CONTINUE.
Connect E5250-65002 J4 to E5250-65006. Press CONTINUE.
Connect E5250-65002 J5 to E5250A SMU INPUT n. Press CONTINUE.

**** BLOCK2 : IV PORT n ISOLATION RESISTANCE TEST ****
Disconnect cable from E5250-65002 J5. Press CONTINUE.
Connect E5250-65002 J4 to E5250A SMU INPUT n. Press CONTINUE.
Connect E5250-65002 J7 to E5255A(CARDn) BIAS INPUT 52. Press CONTINUE.
**** BLOCK2 : BIAS PORT 52 ISOLATION RESISTANCE TEST ****
Disconnect cable from E5250-65002 J7. Press CONTINUE.
Attach E5250-65006 on E5255A(CARDn) BIAS INPUT 52. Press CONTINUE.
Connect E5250-65002 J4 to E5250-65006. Press CONTINUE.
Connect E5250-65002 J5 to E5250A SMU INPUT n. Press CONTINUE.

**** BLOCK3 : IV PORT n ISOLATION RESISTANCE TEST ****
Disconnect cable from E5250-65002 J5. Press CONTINUE.
Connect E5250-65002 J4 to E5250A SMU INPUT n. Press CONTINUE.
Connect E5250-65002 J7 to E5255A(CARDn) BIAS INPUT 53. Press CONTINUE.
**** BLOCK3 : BIAS PORT 53 ISOLATION RESISTANCE TEST ****
Disconnect cable from E5250-65002 J7. Press CONTINUE.
Attach E5250-65006 on E5255A(CARDn) BIAS INPUT 53. Press CONTINUE.
Connect E5250-65002 J4 to E5250-65006. Press CONTINUE.
Connect E5250-65002 J5 to E5250A SMU INPUT n. Press CONTINUE.

Closed Channel Resistance Test

This test verifies the closed channel resistance. This test is executed when the **CLOSED CH R** softkey is selected in **CARD n PV MENU**.

Specifications

HP E5252A.

Low Leak I-V Ports (SMU1 and SMU2)	0.6 Ω
General I-V Ports (SMU3 through SMU6)	1.0 Ω
CV, HF Paths	1.0 Ω

HP E5255A.

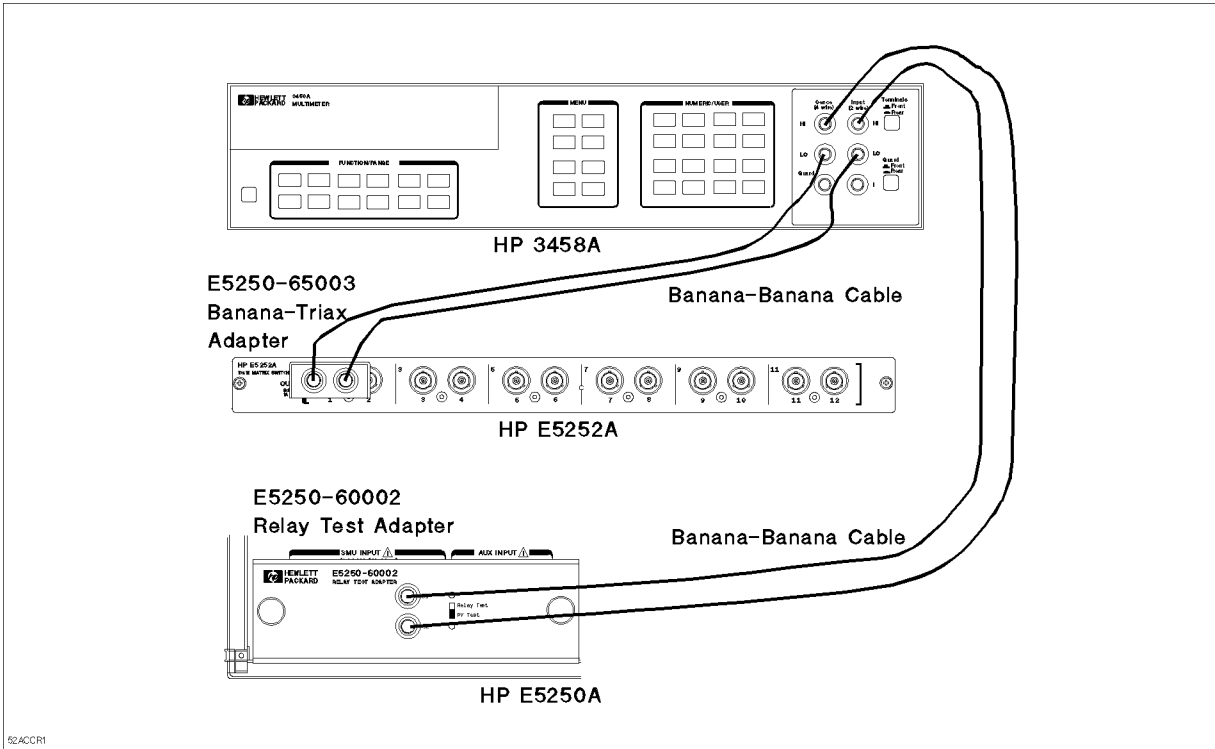
I-V Ports	0.6 Ω
Bias Ports	1.0 Ω

Test Equipment

- HP 3458A Mutimeter
- Relay Test Adapter (E5250-60002)
- (HP E5252A Only) Banana-Triax Adapter (E5250-65003)
- (HP E5255A Only) Banana-BNC Adapter (E5250-65004)
- (HP E5255A Only) Banana-Dsub Adapter (E5250-65005)
- Banana-Banana Cable (HP 11058A), 2 ea.

Test Connections

HP E5252A Test Connection.



HP E5252A Closed Channel Resistance Test

** E5252A CLOSED CHANNEL RESISTANCE TEST **

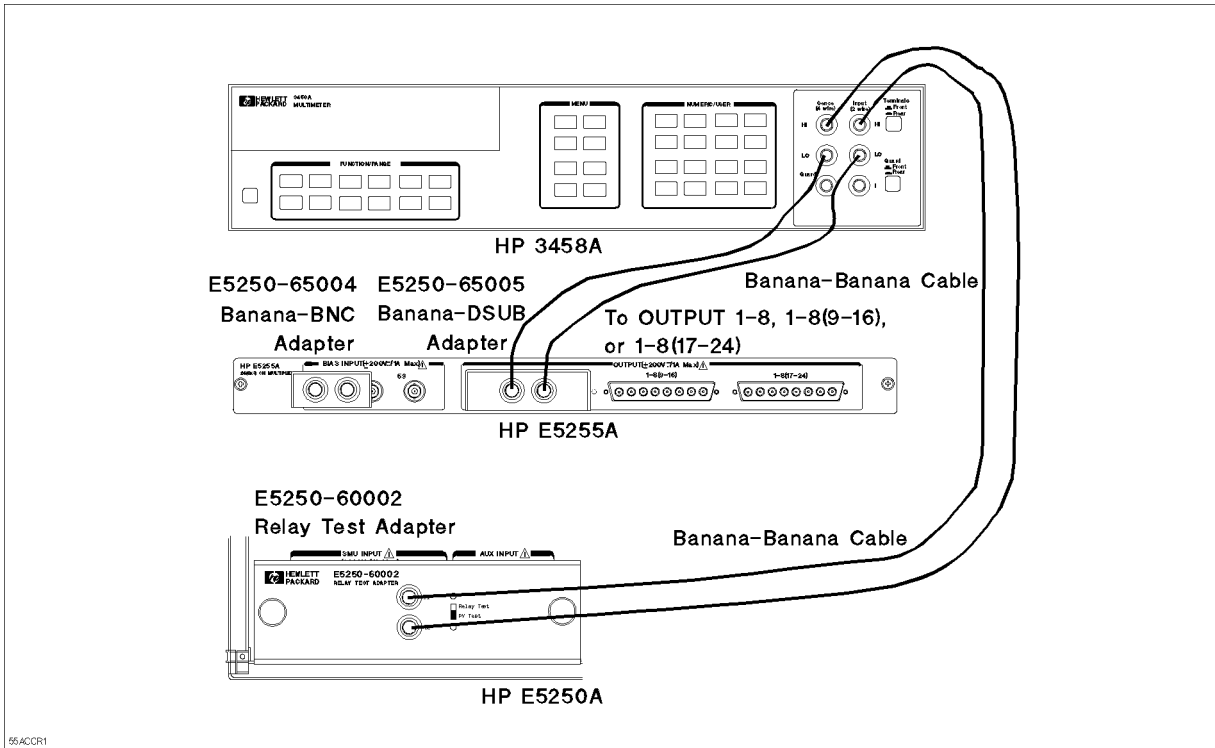
Attach E5250-60002 on E5250A input terminal. Press CONTINUE.
Set E5250-60002 switch at PV Test position. Press CONTINUE.
Connect 3458A Input/Sense HI to E5250-60002. Press CONTINUE.
Attach E5250-65003 on E5252A(CARDn) OUTPUT 1. Press CONTINUE.
Connect 3458A Input/Sense LO to E5250-65003. Press CONTINUE.

Attach E5250-65003 on E5252A(CARDn) OUTPUT 2. Press CONTINUE.
Connect 3458A Input/Sense LO to E5250-65003. Press CONTINUE.

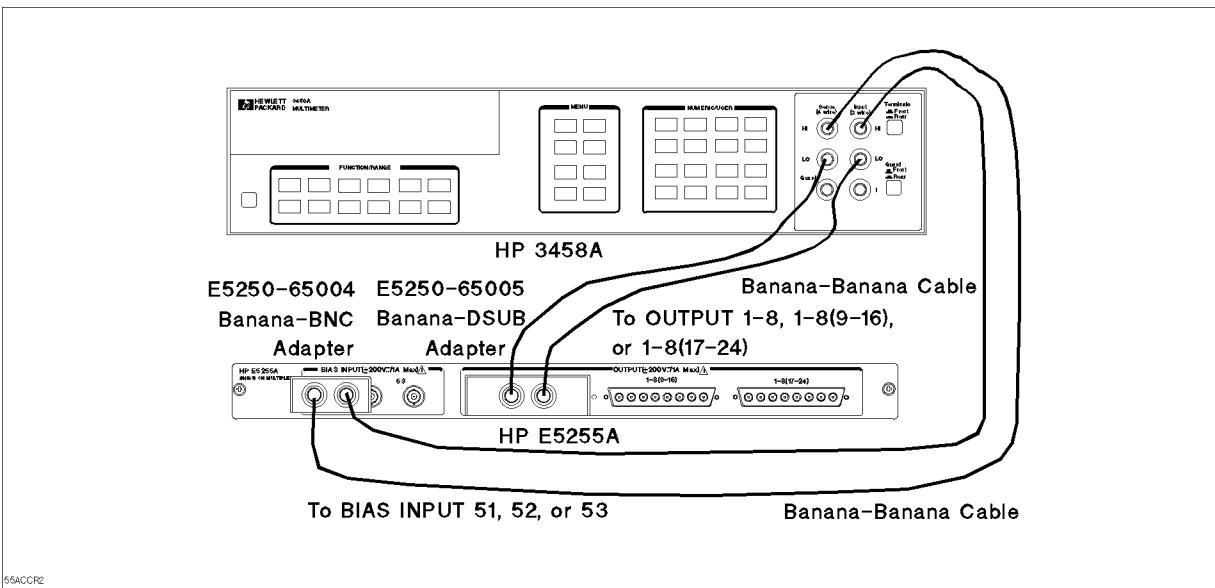
:

Attach E5250-65003 on E5252A(CARDn) OUTPUT 12. Press CONTINUE.
Connect 3458A Input/Sense LO to E5250-65003. Press CONTINUE.

HP E5255A Test Connection.



HP E5255A IV Port Closed Channel Resistance Test



HP E5255A Bias Port Closed Channel Resistance Test

**** E5255A CLOSED CHANNEL RESISTANCE TEST ****
**** BLOCK1 IV PORT CLOSED CHANNEL RESISTANCE TEST ****
Attach E5250-60002 on E5250A input terminal. Press CONTINUE.
Set E5250-60002 switch at PV Test position. Press CONTINUE.
Connect 3458A Input/Sense HI to E5250-60002. Press CONTINUE.
Attach E5250-65004 on E5255A(CARDn) BIAS INPUT 51. Press CONTINUE.
Attach E5250-65005 on E5255A(CARDn) OUTPUT 1-8. Press CONTINUE.
Connect 3458A Input/Sense LO to E5250-65005. Press CONTINUE.
**** BLOCK1 BIAS PORT CLOSED CHANNEL RESISTANCE TEST ****
Connect 3458A Input/Sense HI to E5250-65004. Press CONTINUE.

**** BLOCK2 IV PORT CLOSED CHANNEL RESISTANCE TEST ****
Connect 3458A Input/Sense HI to E5250-60002. Press CONTINUE.
Attach E5250-65004 on E5255A(CARDn) BIAS INPUT 52. Press CONTINUE.
Attach E5250-65005 on E5255A(CARDn) OUTPUT 1-8(9-16). Press CONTINUE.
Connect 3458A Input/Sense LO to E5250-65005. Press CONTINUE.
**** BLOCK2 BIAS PORT CLOSED CHANNEL RESISTANCE TEST ****
Connect 3458A Input/Sense HI to E5250-65004. Press CONTINUE.

**** BLOCK3 IV PORT CLOSED CHANNEL RESISTANCE TEST ****
Connect 3458A Input/Sense HI to E5250-60002. Press CONTINUE.
Attach E5250-65004 on E5255A(CARDn) BIAS INPUT 53. Press CONTINUE.
Attach E5250-65005 on E5255A(CARDn) OUTPUT 1-8(17-24). Press CONTINUE.
Connect 3458A Input/Sense LO to E5250-65005. Press CONTINUE.
**** BLOCK3 BIAS PORT CLOSED CHANNEL RESISTANCE TEST ****
Connect 3458A Input/Sense HI to E5250-65004. Press CONTINUE.

RECONFIG MENU Operation

This section describes how to set up test equipment configurations in RECONFIG MENU before you begin the performance verification tests.

HP-IB Address Entry

Select the **E5250A ADDR**, **3458A ADDR**, or **4339A ADDR** softkey in RECONFIG MENU and type the new HP-IB address for the HP E5250A, HP 3458A, or HP 4339A/B. Press **Return**. The range allowed is 700 to 3130. The lower two digits must be 30 or less. The new HP-IB address is displayed.

If you press **Return** without entering numeric data, the present value is retained.

After pressing **Return**, RECONFIG MENU is displayed again.

Type new HP-IB address.

						User 1	Caps	Running			

Printer Control Setting Entry

To change your printer control settings, use the following procedure.

1. Select the **PRINTER TYPE** softkey in RECONFIG MENU, then select the **LOCAL** softkey. If you use the SRM, select the **FILE SPOOL** softkey instead of **LOCAL**.

2. If you select the **LOCAL** softkey:

Select the **PRINTER ADDR** softkey. The message **Type new address.** is displayed. If you use an HP-IB interface printer, enter the new printer address in the range of 700 to 3130. Then select the **HP-IB** softkey.

If you use an RS-232C interface printer, enter the new printer address in the range of 8 to 31, then select the **RS-232C** softkey, then enter the baud rate of the RS-232C interface.

The following values are allowed:

50, 75, 110, 134, 150, 200, 300, 600, 1800, 2400, 3200,
4800, 9600, 19200

3. If you select the **FILE SPOOL** softkey:

Select the **SPOOL DIR.** softkey. The message **Enter new spooling directory in double quotations.** is displayed. Enter the new spooling directory. For example, type:

"/spool:REMOTE" Return

If you do not enter a volume specifier, the volume specifier of the current mass storage unit is used.

After you have entered all the items, RECONFIG MENU is displayed again.

2-24 Service Operation and Test Functions

Reporting Test Results

The test results can be printed out by the printer or displayed on the CRT. The instruments are not required to report the test results. To report the test results, use the following procedure:

1. Display the MAIN MENU.
2. Select the **REPORT RESULT** softkey. The REPORT program must exist on the working directory or the current mass storage unit. If REPORT does not exist on there, the following message is displayed:

Insert 'REPORT' into the current mass storage device. Then press CONTINUE.

3. The REPORT RESULT MENU shown in the following figure is displayed:

```
HP E5250A Maintenance Program

** REPORT RESULT MENU **

  READ FILE    ... Enter file name to be reported
  MAIN MENU    ... Return to MAIN MENU

Select desired softkey. Type CAT [RETURN] to get file catalog.
-

User 1  Caps  Running
READ    FILE    MAIN
FILE    MENU
```

Softkey	Function
READ FILE	Enables test results to be reported.
MAIN MENU	Displays the MAIN MENU.

4. Remove the MT5250 disk, then insert the disk that contains the test results. Execute the CAT statement to see the catalog of the disk so that you can confirm the filename of the test result data.
5. Select the **READ FILE** softkey. The following message is displayed:

Type file name. Press RETURN to cancel.

6. Type the name of the file that you want to report. Then press **Return**. If you press **Return** without typing the file name, the REPORT RESULT MENU is displayed again.

If you want to report the file from the mass storage unit that is not specified as the current mass storage unit, type the mass storage unit specifier after the file name; such as, PVS10396: ,700,1.

Note

When you perform step 7, the MT5250/REPORT executes the following BASIC statement to use memory volume ":MEMORY,0,15".

```
INITIALIZE ":MEMORY,0.15"
```

If you already use that memory volume, move your data to another memory volume or it will be lost when you perform step 7.

7. Select the desired softkey (**CRT** or **PRINTER**).

- **CRT** softkey is selected

The first screen of test results is displayed on the CRT. Select the **MORE** softkey to report the next screen. If all the test results have been displayed, the REPORT RESULT MENU is displayed again.

- **PRINTER** softkey is selected

- a. Type **report number**. is displayed. If you want to print a report number on the test record, type the report number with maximum 14 characters, then press **Return**. If not, press **Return** without typing any characters.
- b. Select the **RECONFIG** softkey. Change the printer control settings to your desired settings. After you finish changing the settings, select the **RETURN** softkey. See "Printer Setting for REPORT RESULT" for the details.
- c. Select the **PRINT** softkey. The test results are printed as the Test Record. During printing, the **CANCEL** softkey is displayed. If you select this key, printing is canceled. When printing is complete, the REPORT RESULT MENU is displayed again.

Note

If a test fails, the following characters are printed or displayed on the **Fail** column of the test record.

- If the test result is over the maximum value: >>>
 - If the test result is under the minimum value: <<<
-

Printer Setting for REPORT RESULT

This section describes how to change the configuration of the printer to print test results using the REPORT RESULT function.

The following is the REPORT RESULT printer configuration page.

```

***** CONFIGURATION *****

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

PRINTER TYPE ... change printer type
PRINTER ADDR ... change Printer's address. I/F
PAGE LENGTH  ... change number of printing lines per page
MARGIN       ... change top. bottom. and left margin
PAGE NUMBER  ... change page numbering ON/OFF
SAVE DATA   ... store configuration data into "VIEW_DATA"

Select desired softkey.
-

User 1  Caps  Running
PRINTER PAGE  MARGIN PAGE  PRINTER  SAVE  RETURN
ADDR  LENGTH  NUMBER  TYPE  DATA

```

Softkey

Function

PRINTER ADDR

(Displayed when PRINTER TYPE is set to LOCAL.) This softkey is for changing the address of the printer (select code and HP-IB address).

SPOOL DIR.

(Displayed 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 current 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 (lines/page) of the printer. The allowable range is 17 for disabled **PAGE NUMBER** (19 for enabled **PAGE NUMBER**) 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 the 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 \geq 0, bottom margin \geq 0

if **PAGE NUMBER** is enabled, then:

top margin + bottom margin < page length – 6

if **PAGE NUMBER** is disabled, then:

top margin + bottom margin < page length – 8

PAGE NUMBER

For enabling and disabling page number and test result file name to be printed on the bottom of each page.

PRINTER TYPE

For changing the printer type. If you select this softkey, the **LOCAL** and **FILE SPOOL** softkeys are displayed for selecting or changing the presently set printer.

SAVE DATA

For saving or resaving the setting data of **REPORT RESULT RECONFIG MENU** into the file **VIEW_DATA**.

When you select the **REPORT RESULT** softkey in the **MAIN MENU**, if the **VIEW_DATA** file is stored in the current mass storage unit, all settings of **REPORT RESULT RECONFIG MENU** are read from this file. If the **VIEW_DATA** file does not exist, the settings are as follows:

PAGE LENGTH: 66 lines/page

MARGIN: Top: 2 line, Bottom: 2 line, Left: 0 space

PAGE NUMBERING: ON

Other settings: the settings of **RECONFIG MENU** directly under the **START UP MENU**.

RETURN

For returning to the previous menu.

Running Trouble Isolation

The MT5250 program also has the function of running relay tests, controller test, front panel test, and isolating defective field replaceable units (FRUs). The test functions available from the TROUBLE ISOLATION MAIN MENU are almost the same as the functions of the SELF TEST MENU, which is displayed by running the SELFTTEST program in the HP E5250A's program disk for user. However, the SELF TEST MENU is for function tests only and doesn't have the trouble isolation function.

To start the trouble isolation, use the following procedure:

1. Display the START UP MENU.
2. Select the **START TRBL ISO** softkey. The TROUBLE ISOLATION MAIN MENU is displayed.

```
HP E5250A Maintenance Program

** TROUBLE ISOLATION MAIN MENU **

CARD 1 RELAY    ... Start Slot1 E5255A Relay Test    [F]
CARD 2 RELAY    ... Start Slot2 E5255A Relay Test    [P]
CARD 3 RELAY    ... Not installed
CARD 4 RELAY    ... Start Slot4 E5252A Relay Test    [N]
CONTROL         ... Start E5250A Controller Test     [P]
FRONT PANEL     ... Start E5250A Front Panel UIF Test [N]
START TRBL ISO  ... Start Trouble Isolation Program

[P] indicates test was passed.
[F] indicates test was failed.
[N] indicates test is not executed.

Prepare the relay test adapters before you select "CARDn RELAY" key.
Execute all test before you select "TROUBLE ISO." key.

Select desired softkey.
-
```

		User 1	Caps	Running		
CARD1	CARD2	CARD4	CONTRO-	FRONT	START	QUIT
RELAY	RELAY	RELAY	LLER	PANEL	TRBL ISO	

Executing the Controller Test

To execute the controller test, press the **CONTROLLER** softkey.

Executing the Front Panel Interface Test

To execute the front panel interface test, do the following:

1. Press the **FRONT PANEL** softkey.
2. Confirm that the following four LEDs on the HP E5250A front panel are blinking. Then, press the **Local/Self Test** key on the HP E5250A front panel within 10 seconds.

Remote

System Fail

Fail

Local/Self Test

Executing the Relay Test

To execute the Relay Test, press the **CARD n RELAY** softkey ($n= 1$ to 4). Use the same procedure as for the Relay Test from the Performance Verification.

Executing Trouble Isolation

To execute Trouble Isolation, press the **Start TRBL ISO** softkey.

Performance Verification Operating Theory

General Information

- For performance verification, the Performance Verification (PV) program must be executed *after* the HP E5250A has passed the Relay Function Test.
- For trouble isolation, the "Closed Channel Resistance" test of the PV program may be used when the Relay Function Test fails.
- There are two PV test items, corresponding to the HP E5250A specifications.
 - Isolation Resistance
 - Closed Channel Resistance
- The HP 4339A/B is used for Isolation Resistance measurements.
- The HP 3458A is used for Closed Channel Resistance measurements.
- The PV program is executed for each plug-in module (HP E5252A or HP E5255A). (PV data is taken for each module.)

Tools and Instruments Required

■ Isolation Resistance Measurement

- HP 4339A/B (Voltage Force/ Current Measurement)
- Isolation Test Adapter (E5250-65002) (= Adapter 2)
- Triaxial-BNC Adapter (E5250-65006) (= T/B Adapter)
- Triaxial Cable 1.5m (3 ea) (16058-61603 or equivalent)
- BNC Cable 1.5m (04142-61636 or equivalent)

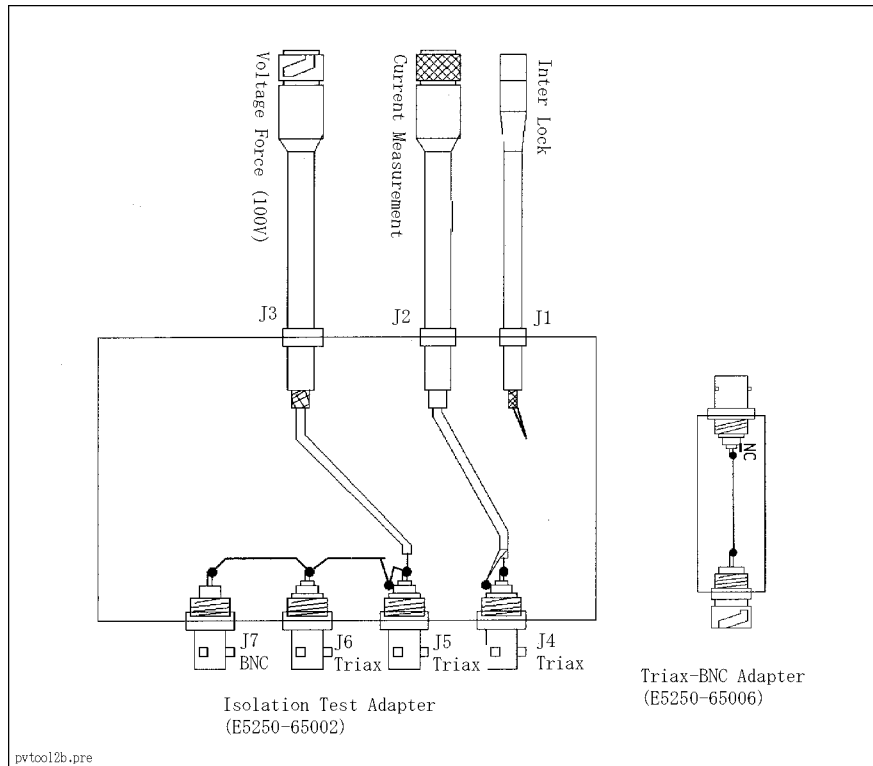


Figure 2-1. Isolation Resistance Test Tools

- Closed Channel Resistance

- HP 3458A (for 4-wire resistance measurement)
- Relay Function Test Adapter (E5250-60002) (= Adapter 1)
- Banana-Triax Adapter (E5250-65003) (= Adapter 3)
- Banana-BNC Adapter (E5250-65004) (= Adapter 4)
- Banana-Dsub 8W8 Adapter (E5250-65005) (= Adapter 5)
- Banana Cable (2 set) (HP 11058A)

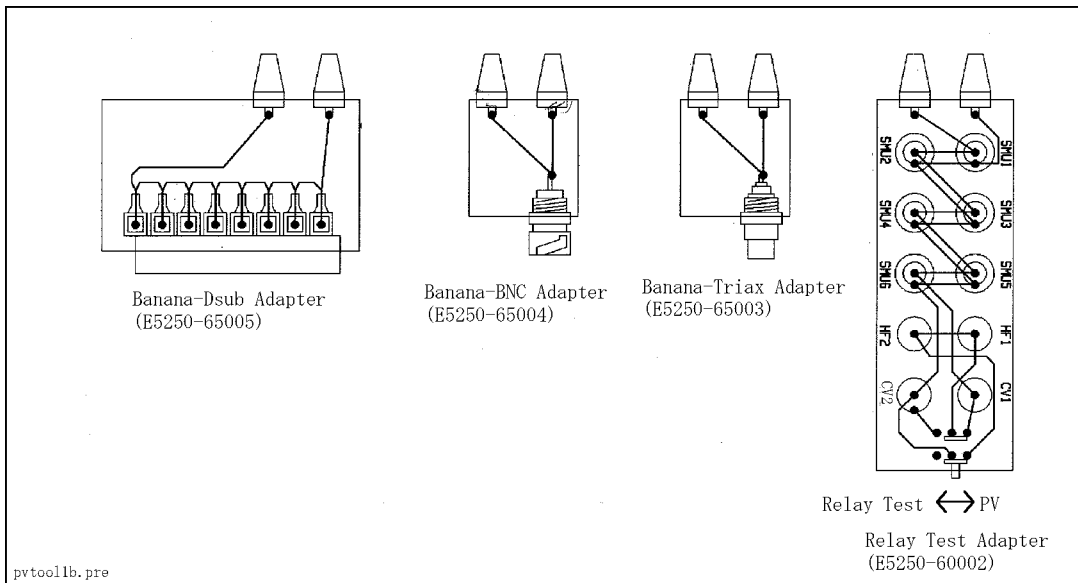


Figure 2-2. Closed Channel Resistance Test Tools

- Traceability and Measurement Uncertainty

- Traceability

Both Isolation R and Closed Ch R are traced via HP 4339A/B and HP 3458A.

The maximum uncertainty is 3.43% of the specification.

- Isolation R Uncertainty

HP 4339A/B Conditions:

- Calibrated within one year
- $23 \pm 5 \text{ } ^\circ\text{C}$
- Meas Time: Long
- Contact Check Off
- Offset Error ON
- After Auto Cal
- Open Correction

HP 4339A/B VF Uncertainty:

0.16% + 100 mV
(0.26% @100 V)

HP 4339A/B IM Uncertainty:

100 pA Range: 2.57% of reading + 0.060 pA (HP E5252A: IV 1–2; HP E5255A: IV path)
→ 3.17% (@ 10 pA =100 V/10¹³Ω)

1 nA Range: 0.91% of reading+0.003 nA (HP E5252A: IV path3–6)
→ 1.21% (@ 1 nA =100 V/10¹¹Ω)

100 nA Range: 0.5% of reading +0.025 nA (HP E5252A: CV/HF path) (HP E5255A: Bias path)
→ 0.525% (@ 100 nA =100 V/10⁹Ω)

Total Isolation R Uncertainty:

Note



The uncertainties of the HP E5252A IV path 3–6/CV/HF, and HP E5255A Bias path include offset measurement errors.

Specifications

Uncertainty

HP E5252A IV1–2: > 10 ¹³ Ω	3.43%/0.343 TΩ
HP E5252A IV3–6: > 10 ¹¹ Ω	2.68%/2.68 GΩ
HP E5252A CV/HF: > 10 ⁹ Ω	1.31%/0.0131 GΩ
HP E5255A IV: > 10 ¹³ Ω	3.43%/0.343 TΩ
HP E5255A Bias: > 10 ⁹ Ω	1.31%/0.0131 GΩ

■ Closed Ch R Uncertainty

HP 3458A Conditions:

Calibrated within one year
23 ± 5 °C,
± 1 °C of ACAL
± 5 °C of Tcal
NPLC =1
Offset COMP = ON

HP 3458A 4-Wire Resistance Measurement Uncertainty:

10 ohm: 15 ppm of Reading
+ 3ppm of reading (HP factory traceability)
+ 1ppm of reading (Gain error @NPLC=1)
+ 5ppm of range
+ 5ppm of range (Noise error @NPLC=1)
→ 0.0019% +100 μΩ

Contact Resistances:

Triax: 3 mΩ
BNC: 8 mΩ
D-SUB Coax: 7.33 mΩ

Total Closed Ch R Uncertainty:

Specifications

Uncertainty

HP E5252A IV1-2: $\leq 0.6 \Omega$	0.0019% + 6.1 m Ω (1.01%/6.1 m Ω)
HP E5252A IV3-6: $\leq 1.0 \Omega$	0.0019% + 6.1 m Ω (0.61%/6.1 m Ω)
HP E5252A CV/HF: $\leq 1.0 \Omega$	0.0019% + 11.1 m Ω (1.11%/11.1 m Ω)
HP E5255A IV: $\leq 0.6 \Omega$	0.0019% + 10.43 m Ω (1.73%/10.4 m Ω)
HP E5255A Bias: $\leq 1.0 \Omega$	0.0019% + 15.43 m Ω (1.54%/15.4 m Ω)

PV Execution Time (Including Time for Manual Operation)

HP E5252A: 30 min/slot

(Isolation R = 22 min/slot)

(Closed Ch R = 3 min/slot)

(Preparation, etc. = 5 min/slot)

(Prep, etc. should be added once per PV)

HP E5255A: 26 min/slot

(Isolation R = 18 min/slot)

(Closed Ch R = 3 min/slot)

(Preparation, etc. = 5 min/slot)

(Prep, etc. should be added once per PV)

HP E5252A Isolation Resistance

Overview

The following isolation resistances are measured in this test.

- Isolation between Input Channels
- Isolation between Output Channels
- Input/Output Matrix Isolation

The output channel isolation measurement between slots is not performed. This is substituted (or covered) by testing the isolation between output channels.

The isolation between two terminals is measured by connecting one terminal to the VF (voltage force) port of the HP 4339A/B and one terminal to the IM (current measure) port.

In the following measurement sequence, the input ports of the HP E5250A are named Input 1 through Input 10. (HF1 = Input 7, HF2 = Input 8, ...)

Overall Measurement Sequence

1. HP 4339A/B Setup

VF, IM (100 V/1 mA output)

Make connections between Adapter 2 and the HP 4339A/B. (Display instructions).

2. HP E5250A/E5252A Connection

Connect J4 through J6 of Adapter 2. (Display instructions).

3. Connection Check

Check that connections J4 through J6 are correct by using the HP 4339A/B.

4. Offset Current Measurement

Measure offset current for each new "IM" path except SMU1 and SMU2 of the HP E5252A.

5. Measurement

Set the IM range of the HP 4339A/B. (Use fixed range; in case of overflow, use auto-ranging.)

Set up the measurement path in the HP E5252A.

Force 100 V. (In case of overload, record the status.)

Wait for five seconds.

Measure current. (In case of overflow, use auto-ranging.)

Force 0 V.

Go to next measurement.

6. Result Report

Calculate resistance from VF, IM, and offset values. ($I_m \leq 0$ is acceptable considering offset currents.)

Calculate measurement uncertainty.

Connection Details (Input Channels)

1. Connect Adapter 2

IM (Adapter 2 J4) ← Triaxial Cable → Output 1
VF (Adapter 2 J5) ← Triaxial Cable → Output 3
VF (Adapter 2 J6) ← Triaxial Cable → Output 4
VF (Adapter 2 J7) NC

2. Measurement 1

Set up the HP E5252A to check all the following connections. (Check offset current every time N changes.)

Input N ↔ Output 1 (IM) [N = 1, ... ,5]
Input M ↔ Output 3 (VF) [M = N+1, ... ,6 @N=1,3, ... ,5]
 [M = 1, N+1, ... ,6 @N=2]

3. Measurement 2

Set up the HP E5252A to check all the following connections. (Check offset current every time N changes.)

Input N ↔ Output 1 (IM) [N = 1, ... ,9]
Input M ↔ Output 4 (VF) [M = K, ... ,10] (K: 7 or N+1 (greater))

The following connections are not measured:

N = 5 / M = 7, 9
N = 6 / M = 8, 10
N = 7 / M = 9
N = 8 / M = 10

- Input 7 through 10 are coaxial terminals and guard voltages cannot be applied.
- Each of input 5–6, 7–8, and 9–10 uses a single (common) bus in the module.

4. The above measures resistances between input channels and resistances between input channels and output 1.

Connection Details (Output Channels)

1. Connect Adapter 2.

IM (Adapter 2 J4) ← Triaxial Cable → Input 1
VF (Adapter 2 J5) ← Triaxial Cable → Input 2
VF (Adapter 2 J6) NC
VF (Adapter 2 J7) NC

2. Measurement

Set up the HP E5252A to check all the following connections.

Input 1 ↔ Output N (IM) [N = 1, ... ,11]
Input 2 ↔ Output M (VF) [M = N+1, ... ,12]

3. The above measures resistances between output channels and resistances between input 1 and output 2 through 10. ("Input 1 ↔ Output 1" has been measured already, in the step "Connection Details (Input Channels)".)

Connection Details (Input/Output)

At "Connection Details (Input Channels)" and "Connection Details (Output Channels)", "Input 1 ↔ each output" and "each input ↔ Output 1" have been measured already. The remaining connections are checked.

1. Connect Adapter 2.

IM (Adapter 2 J4) ← Triaxial Cable → Output 1

VF (Adapter 2 J5) ← Triaxial Cable → Input 1

VF (Adapter 2 J6) NC

VF (Adapter 2 J7) NC

2. Measurement

Set up the HP E5252A to check all the following connections. (Check offset current every time N changes.)

Input N ↔ Output 1 (IM) [N = 2, ... ,10]

Input 1 ↔ Output M (VF) [M = 2, ... ,12]

HP E5252A Closed Channel Resistance

Overview

This test performs 4-wire measurements by using the HP 3458A. Adapter 1 and 3 are used for making Kelvin connections. Adapter 1 is also used for making Kelvin connections to the input ports. (The DIP switch must be at the "PV" position.) The closed channel resistance of each input/output connection is measured.

Overall Measurement Sequence

1. HP 3458A and HP E5250A Setup

- 4-Wire Ohm Measurement

- 10 Ω Range

- Attach Adapter 1 to the HP E5250A and set the DIP switch to the "PV" position.

- (Display instructions.)

- Connect the HP 3458A terminals to Adapter 1 and Adapter 3 by using banana cables.

- (Display instructions.)

- (Input Hi, ohm sense Hi to Adapter 1)

- (Input Lo, ohm sense Lo to Adapter 2)

2. Connection

- Connect Adapter 3 to the HP E5252A OUTPUT channel. (Display instructions.)

3. Measurement

- Measure resistance. (Use fixed range; in case of overflow, use auto-ranging.)

- Measurement conditions

- 10 Ω Range

- NPLC: 1

- Range: 10 Ω

- Offset Compensation: ON

- AUTO Ranging

- NPLC: 1

- Range: AUTO

- Offset Compensation: OFF

4. Result Report

- Calculate resistance.

- Calculate measurement uncertainty.

Connection Details

1. Connect Adapter 3 to Output N (N = 1, ... ,12) .

2. Set up the HP E5252A to check each of the following connections.

- Input M \leftrightarrow Output N (M = 1, ... ,10)

3. Measure resistance.

HP E5255A Isolation Resistance

Overview

This performs measurement for each block.

The isolation resistances between slots are not measured since they are guarded by the case.

The isolation between two terminals is measured by connecting one terminal to the VF (voltage force) port of the HP 4339A/B and one terminal to the IM (current measure) port.

Overall Measurement Sequence

1. HP 4339A/B Setup

VF, IM (100 V / 1 mA output)

Make connections between Adapter 2 and the HP 4339A/B. (Display instructions.)

2. HP E5250A/E5255A Connection

■ I-V Port

Connect the Adapter 2 terminals to the HP E5250A/E5255A.

IM(J4): I-V Input Channel used (connected, and indicated by DIP switch).
(Use Triaxial Cable.)

VF(J5): NC

VF(J6): NC

VF(J7): Bias Input Channel used (connected, and indicated by DIP switch).
(Use BNC Cable.)

(Display instructions.)

■ Bias Port

Connect Adapter 2 terminals to HP E5250A/E5255A.

IM(J4): Bias Input Channel used (connected, and indicated by DIP switch).
(Use Triaxial Cable, T/B Adapter, and BNC Cable.)

VF(J5): I-V Input Channel used (connected, and indicated by DIP switch).
(Use Triaxial Cable.)

VF(J6): NC

VF(J7): NC

(Display instructions.)

3. Connection Check

Check that connections J4 through J7 are correct by using the HP 4339A/B.

4. Offset Current Measurement

Measure offset current for each new "IM" path except the following connection type (offset current values are negligible):

IM path is connected to IV Input Channel.

5. Measurement

Set the IM range of the HP 4339A/B. (Use fixed range; in case of overflow, use auto-ranging.)

Set up the measurement path in the HP E5252A.

Force 100 V. (In case of overload, record the status.)

2-40 Service Operation and Test Functions

Wait for five seconds.
 Measure current. (In case of overflow, use auto-ranging.)
 Force 0 V.
 Go to next measurement.

6. Result Report
7. Calculate resistance from VF, IM, and offset values. ($I_m \leq 0$ is acceptable considering offset currents.)
8. Calculate measurement uncertainty.

Connection Details

■ I-V Port

Set up the HP E5255A to check all the following connections. (Check offset current every time N changes.)

I-V Input ↔ Output N (IM)	[N = 1, ... ,8]
Bias Input ↔ Output M (VF)	[M = N+1, ... ,8 @N = 1, ... ,7] [M = 1 @N = 8]

■ Bias Port

Set up the HP E5255A to check all the following connections. (Check offset current every time N changes.)

Bias Input ↔ Output N (IM)	[N = 1, ... ,8]
I-V Input ↔ Output M (VF)	[M = N+1, ... ,8 @N = 1, ... ,7] [M = 1 @N = 8]

HP E5255A Closed Channel Resistance

Overview

This test performs 4-wire measurements by using the HP 3458A. Adapters 1, 3, 4, and 5 are used for making Kelvin connections. (The DIP switch of Adapter 1 must be at the "PV" position.) Adapter 5 makes Kelvin connections of all the output terminals. The closed channel resistance of each input/output connection is measured.

Overall Measurement Sequence

1. HP 3458A and HP E5250A Setup

4-Wire Ohm Measurement

10 Ω Range

Attach Adapter 1 to the HP E5250A and set the DIP switch to the "PV" position.
(Display instructions.)

2. Connection

- a. Connect Adapter 4 to the HP E5255A Bias Input of the measured block.
- b. Connect Adapter 5 to the HP E5255A Output of the measured block.
- c. (I-V) Connect the HP 3458A terminals to Adapters 1 and 5 with banana cables.
(Bias) Connect the HP 3458A terminals to Adapters 4 and 5 with banana cables.
(Display instructions.)

3. Measurement

Measure resistance. (Use fixed range; in case of overflow, use auto-ranging.)

Measurement conditions

- a. 10 Ω Range
NPLC: 1
Range: 10 Ω
Offset Compensation: ON
- b. AUTO Ranging
NPLC: 1
Range: AUTO
Offset Compensation: OFF

4. Result Report

Calculate resistance.

Calculate measurement uncertainty.

PASS/FAIL judgment exception:

If resistors (other than 0 ohm) are on bias paths of a block, test results are always PASS.

Connection Details

■ I-V Port

1. Connect the HP 3458A terminals to Adapters 1 and 5 by using banana cables. (Display instructions.)
2. (Input Hi, ohm sense Hi to Adapter 1)

3. (Input Lo, ohm sense Lo to Adapter 5)
4. Set up the HP E5255A to check each of the following connections.

I-V Input \leftrightarrow Output N (N = 1, . . . ,8)

5. Measure resistance.

■ Bias Port

1. Connect the HP 3458A terminals to Adapters 4 and 5 by using banana cables. (Display instructions.)
2. (Input Hi, ohm sense Hi to Adapter 4)
3. (Input Lo, ohm sense Lo to Adapter 5)
4. Set up the HP E5255A to check each of the following connections.

Bias Input \leftrightarrow Output N (N = 1, . . . ,8)

5. Measure resistance.

=====

P E R F O R M A N C E T E S T R E P O R T

=====

Test Facility:

Hewlett-Packard

Report No. _____E5252A-001

_____ Date _____23 Jan 1996

_____ Customer _____

_____ Tested by _____M0

Temperature _____25 degree C

Humidity _____50 %

Line Frequency _____Hz(nominal)

CARD 1 HP E5252A 10x12 Matrix Switch

Serial Number: _____

HP E5250A Low Leakage Switch Mainframe

Serial Number: ____JP10C00106

Special Notes:

E5252A_N1

--- 1/ ---

HP E5252A Test Record Example (1/15)

Model: HP E5252

Report No.: E5252A-001

Date: 23 Jan 1996

Test Equipment Used:

	Description	Model No.	Trace No.	Cal Due Date
1.	-----	-----	-----	-----
2.	-----	-----	-----	-----
3.	-----	-----	-----	-----
4.	-----	-----	-----	-----
5.	-----	-----	-----	-----
6.	-----	-----	-----	-----
7.	-----	-----	-----	-----
8.	-----	-----	-----	-----
9.	-----	-----	-----	-----
10.	-----	-----	-----	-----
11.	-----	-----	-----	-----
12.	-----	-----	-----	-----
13.	-----	-----	-----	-----
14.	-----	-----	-----	-----

E5252A_N1

--- 2/ ---

HP E5252A Test Record Example (2/15)

Model: HP E5252A

Report No.: E5252A-001

Date: 23 Jan 1996

```

=====
TEST DESCRIPTION | Minimum | Results | Maximum | Uncertainty | Fail
=====

```

Relay Open/Close Self-test

CARD 1

PASS

Isolation Resistance Test

Input Channel Isolation Resistance Test

```

| Input Terminal |
-----
| 1 | 2 | +10.00Tohm | +707.41Tohm | 3.43 % |
-----
| | 3 | +10.00Tohm | +622.42Tohm | 3.43 % |
-----
| | 4 | +10.00Tohm | +780.24Tohm | 3.43 % |
-----
| | 5 | +10.00Tohm | +989.74Tohm | 3.43 % |
-----
| | 6 | +10.00Tohm | +1.15Pohm | 3.43 % |
-----
| | 7 | +10.00Tohm | +792.76Tohm | 3.43 % |
-----
| | 8 | +10.00Tohm | +855.84Tohm | 3.43 % |
-----
| | 9 | +10.00Tohm | +1.05Pohm | 3.43 % |
-----
| | 10 | +10.00Tohm | +1.11Pohm | 3.43 % |
-----
| 2 | 1 | +10.00Tohm | +280.98Tohm | 3.43 % |
-----
| | 3 | +10.00Tohm | +386.53Tohm | 3.43 % |
-----
| | 4 | +10.00Tohm | +461.94Tohm | 3.43 % |
-----
| | 5 | +10.00Tohm | +602.09Tohm | 3.43 % |
-----
| | 6 | +10.00Tohm | +769.58Tohm | 3.43 % |
-----
| | 7 | +10.00Tohm | +684.28Tohm | 3.43 % |
-----
| | 8 | +10.00Tohm | +879.39Tohm | 3.43 % |
-----
| | 9 | +10.00Tohm | +981.62Tohm | 3.43 % |
-----
| | 10 | +10.00Tohm | +1.10Pohm | 3.43 % |
-----
| 3 | 4 | +1.00Tohm | +15.69Tohm | 1.47 % |
-----
| | 5 | +1.00Tohm | +22.80Tohm | 1.47 % |
-----
| | 6 | +1.00Tohm | +29.50Tohm | 1.47 % |
-----

```

E5252A_N1

--- 3/ ---

HP E5252A Test Record Example (3/15)

Model: HP E5252A

Report No.: E5252A-001

Date: 23 Jan 1996

```

=====
TEST DESCRIPTION | Minimum | Results | Maximum | Uncertainty | Fail
=====
| 7 | +1.00Tohm | +15.88Tohm | | 1.47 % |
-----
| 8 | +1.00Tohm | +35.80Tohm | | 1.47 % |
-----
| 9 | +1.00Tohm | +33.54Tohm | | 1.47 % |
-----
| 10 | +1.00Tohm | +55.44Tohm | | 1.47 % |
-----
4 | 5 | +1.00Tohm | +14.20Tohm | | 1.47 % |
-----
| 6 | +1.00Tohm | +31.91Tohm | | 1.47 % |
-----
| 7 | +1.00Tohm | +16.73Tohm | | 1.47 % |
-----
| 8 | +1.00Tohm | +46.37Tohm | | 1.47 % |
-----
| 9 | +1.00Tohm | +29.12Tohm | | 1.47 % |
-----
| 10 | +1.00Tohm | +78.03Tohm | | 1.47 % |
-----
5 | 6 | +1.00Tohm | +19.41Tohm | | 1.47 % |
-----
| 8 | +1.00Tohm | +17.92Tohm | | 1.47 % |
-----
| 10 | +1.00Tohm | +18.73Tohm | | 1.47 % |
-----
6 | 7 | +1.00Tohm | +10.00*ohm | | 1.47 % |
-----
| 9 | +1.00Tohm | +9.85Tohm | | 1.47 % |
-----
7 | 8 | +1.00Gohm | +10.00*ohm | | 0.785% |
-----
| 10 | +1.00Gohm | +9.85Tohm | | 0.785% |
-----
8 | 9 | +1.00Gohm | +10.00*ohm | | 0.785% |
-----
9 | 10 | +1.00Gohm | +10.00*ohm | | 0.785% |
=====

```

Output Channel Isolation Resistance Test

```

-----
| Output Terminal |
-----
| 1 | 2 | +10.00Tohm | +1.15Pohm | | 3.43 % |
-----
| 3 | +10.00Tohm | +921.48Tohm | | 3.43 % |
-----
| 4 | +10.00Tohm | +908.98Tohm | | 3.43 % |
-----
| 5 | +10.00Tohm | +916.76Tohm | | 3.43 % |
-----
| 6 | +10.00Tohm | +907.06Tohm | | 3.43 % |
-----

```

E5252A_N1

--- 4/ ---

HP E5252A Test Record Example (4/15)

Model: HP E5252A

Report No.: E5252A-001

Date: 23 Jan 1996

```

=====
TEST DESCRIPTION | Minimum | Results | Maximum | Uncertainty | Fail
=====
| 7 | +10.00Tohm | +967.45Tohm | | 3.43 % |
-----
| 8 | +10.00Tohm | +1.00Pohm | | 3.43 % |
-----
| 9 | +10.00Tohm | +1.01Pohm | | 3.43 % |
-----
| 10 | +10.00Tohm | +1.01Pohm | | 3.43 % |
-----
| 11 | +10.00Tohm | +1.01Pohm | | 3.43 % |
-----
| 12 | +10.00Tohm | +1.06Pohm | | 3.43 % |
-----
2 | 3 | +10.00Tohm | +868.00Tohm | | 3.43 % |
-----
| 4 | +10.00Tohm | +938.05Tohm | | 3.43 % |
-----
| 5 | +10.00Tohm | +931.85Tohm | | 3.43 % |
-----
| 6 | +10.00Tohm | +978.98Tohm | | 3.43 % |
-----
| 7 | +10.00Tohm | +987.92Tohm | | 3.43 % |
-----
| 8 | +10.00Tohm | +1.08Pohm | | 3.43 % |
-----
| 9 | +10.00Tohm | +1.07Pohm | | 3.43 % |
-----
| 10 | +10.00Tohm | +1.05Pohm | | 3.43 % |
-----
| 11 | +10.00Tohm | +1.06Pohm | | 3.43 % |
-----
| 12 | +10.00Tohm | +1.14Pohm | | 3.43 % |
-----
3 | 4 | +10.00Tohm | +859.41Tohm | | 3.43 % |
-----
| 5 | +10.00Tohm | +843.66Tohm | | 3.43 % |
-----
| 6 | +10.00Tohm | +877.99Tohm | | 3.43 % |
-----
| 7 | +10.00Tohm | +908.83Tohm | | 3.43 % |
-----
| 8 | +10.00Tohm | +975.91Tohm | | 3.43 % |
-----
| 9 | +10.00Tohm | +977.60Tohm | | 3.43 % |
-----
| 10 | +10.00Tohm | +985.69Tohm | | 3.43 % |
-----
| 11 | +10.00Tohm | +1.04Pohm | | 3.43 % |
-----
| 12 | +10.00Tohm | +1.07Pohm | | 3.43 % |
-----
4 | 5 | +10.00Tohm | +782.52Tohm | | 3.43 % |
-----

```

E5252A_N1

--- 5/ ---

HP E5252A Test Record Example (5/15)

Model: HP E5252A

Report No.: E5252A-001

Date: 23 Jan 1996

```

=====
TEST DESCRIPTION | Minimum | Results | Maximum | Uncertainty | Fail
=====
| 6 | +10.00Tohm | +748.50Tohm | | 3.43 % |
-----
| 7 | +10.00Tohm | +828.15Tohm | | 3.43 % |
-----
| 8 | +10.00Tohm | +857.21Tohm | | 3.43 % |
-----
| 9 | +10.00Tohm | +864.61Tohm | | 3.43 % |
-----
| 10 | +10.00Tohm | +872.06Tohm | | 3.43 % |
-----
| 11 | +10.00Tohm | +889.05Tohm | | 3.43 % |
-----
| 12 | +10.00Tohm | +956.71Tohm | | 3.43 % |
-----
5 | 6 | +10.00Tohm | +1.20Pohm | | 3.43 % |
-----
| 7 | +10.00Tohm | +1.36Pohm | | 3.43 % |
-----
| 8 | +10.00Tohm | +1.52Pohm | | 3.43 % |
-----
| 9 | +10.00Tohm | +1.58Pohm | | 3.43 % |
-----
| 10 | +10.00Tohm | +1.61Pohm | | 3.43 % |
-----
| 11 | +10.00Tohm | +1.70Pohm | | 3.43 % |
-----
| 12 | +10.00Tohm | +1.99Pohm | | 3.43 % |
-----
6 | 7 | +10.00Tohm | +947.83Tohm | | 3.43 % |
-----
| 8 | +10.00Tohm | +1.05Pohm | | 3.43 % |
-----
| 9 | +10.00Tohm | +970.05Tohm | | 3.43 % |
-----
| 10 | +10.00Tohm | +966.63Tohm | | 3.43 % |
-----
| 11 | +10.00Tohm | +1.02Pohm | | 3.43 % |
-----
| 12 | +10.00Tohm | +1.07Pohm | | 3.43 % |
-----
7 | 8 | +10.00Tohm | +1.03Pohm | | 3.43 % |
-----
| 9 | +10.00Tohm | +1.11Pohm | | 3.43 % |
-----
| 10 | +10.00Tohm | +1.06Pohm | | 3.43 % |
-----
| 11 | +10.00Tohm | +1.24Pohm | | 3.43 % |
-----
| 12 | +10.00Tohm | +1.19Pohm | | 3.43 % |
-----
8 | 9 | +10.00Tohm | +984.47Tohm | | 3.43 % |
-----

```

E5252A_N1

--- 6/ ---

HP E5252A Test Record Example (6/15)

Model: HP E5252A

Report No.: E5252A-001

Date: 23 Jan 1996

```

=====
TEST DESCRIPTION | Minimum | Results | Maximum | Uncertainty | Fail
=====
| 10 | +10.00Tohm | +961.17Tohm | | 3.43 % |
-----
| 11 | +10.00Tohm | +971.45Tohm | | 3.43 % |
-----
| 12 | +10.00Tohm | +1.05Pohm | | 3.43 % |
-----
9 | 10 | +10.00Tohm | +1.13Pohm | | 3.43 % |
-----
| 11 | +10.00Tohm | +1.04Pohm | | 3.43 % |
-----
| 12 | +10.00Tohm | +1.02Pohm | | 3.43 % |
-----
10 | 11 | +10.00Tohm | +1.52Pohm | | 3.43 % |
-----
| 12 | +10.00Tohm | +1.70Pohm | | 3.43 % |
-----
11 | 12 | +10.00Tohm | +1.38Pohm | | 3.43 % |
=====

```

Input/Output Channel Isolation Resistance Test

```

-----
Input | Output |
-----
2 | 2 | +10.00Tohm | +949.93Tohm | | 3.43 % |
-----
| 3 | +10.00Tohm | +1.07Pohm | | 3.43 % |
-----
| 4 | +10.00Tohm | +1.20Pohm | | 3.43 % |
-----
| 5 | +10.00Tohm | +1.08Pohm | | 3.43 % |
-----
| 6 | +10.00Tohm | +1.17Pohm | | 3.43 % |
-----
| 7 | +10.00Tohm | +1.27Pohm | | 3.43 % |
-----
| 8 | +10.00Tohm | +1.28Pohm | | 3.43 % |
-----
| 9 | +10.00Tohm | +1.28Pohm | | 3.43 % |
-----
| 10 | +10.00Tohm | +1.32Pohm | | 3.43 % |
-----
| 11 | +10.00Tohm | +1.30Pohm | | 3.43 % |
-----
| 12 | +10.00Tohm | +1.37Pohm | | 3.43 % |
-----
3 | 2 | +1.00Tohm | +68.08Tohm | | 1.47 % |
-----
| 3 | +1.00Tohm | +326.59Tohm | | 1.47 % |
-----
| 4 | +1.00Tohm | +15.38Pohm | | 1.47 % |
-----
| 5 | +1.00Tohm | +10.00*ohm | | 1.47 % |
=====

```

E5252A_N1

--- 7/ ---

HP E5252A Test Record Example (7/15)

Model: HP E5252A

Report No.: E5252A-001

Date: 23 Jan 1996

```

=====
TEST DESCRIPTION | Minimum | Results | Maximum | Uncertainty | Fail
=====
| 6 | +1.00Tohm | +16.09Pohm | | 1.47 % |
-----
| 7 | +1.00Tohm | +10.00*ohm | | 1.47 % |
-----
| 8 | +1.00Tohm | +10.00*ohm | | 1.47 % |
-----
| 9 | +1.00Tohm | +10.00*ohm | | 1.47 % |
-----
| 10 | +1.00Tohm | +10.00*ohm | | 1.47 % |
-----
| 11 | +1.00Tohm | +10.00*ohm | | 1.47 % |
-----
| 12 | +1.00Tohm | +10.00*ohm | | 1.47 % |
-----
4 | 2 | +1.00Tohm | +147.47Tohm | | 1.47 % |
-----
| 3 | +1.00Tohm | +10.00*ohm | | 1.47 % |
-----
| 4 | +1.00Tohm | +10.00*ohm | | 1.47 % |
-----
| 5 | +1.00Tohm | +10.00*ohm | | 1.47 % |
-----
| 6 | +1.00Tohm | +10.00*ohm | | 1.47 % |
-----
| 7 | +1.00Tohm | +10.00*ohm | | 1.47 % |
-----
| 8 | +1.00Tohm | +10.00*ohm | | 1.47 % |
-----
| 9 | +1.00Tohm | +10.00*ohm | | 1.47 % |
-----
| 10 | +1.00Tohm | +10.00*ohm | | 1.47 % |
-----
| 11 | +1.00Tohm | +10.00*ohm | | 1.47 % |
-----
| 12 | +1.00Tohm | +10.00*ohm | | 1.47 % |
-----
5 | 2 | +1.00Tohm | +168.38Tohm | | 1.47 % |
-----
| 3 | +1.00Tohm | +10.00*ohm | | 1.47 % |
-----
| 4 | +1.00Tohm | +10.00*ohm | | 1.47 % |
-----
| 5 | +1.00Tohm | +10.00*ohm | | 1.47 % |
-----
| 6 | +1.00Tohm | +10.00*ohm | | 1.47 % |
-----
| 7 | +1.00Tohm | +10.00*ohm | | 1.47 % |
-----
| 8 | +1.00Tohm | +10.00*ohm | | 1.47 % |
-----
| 9 | +1.00Tohm | +10.00*ohm | | 1.47 % |
-----

```

E5252A_N1

--- 8/ ---

HP E5252A Test Record Example (8/15)

Model: HP E5252A

Report No.: E5252A-001

Date: 23 Jan 1996

```

=====
TEST DESCRIPTION | Minimum | Results | Maximum | Uncertainty | Fail
=====
| 10 | +1.00Tohm | +10.00*ohm | | 1.47 % |
-----
| 11 | +1.00Tohm | +10.00*ohm | | 1.47 % |
-----
| 12 | +1.00Tohm | +10.00*ohm | | 1.47 % |
-----
6 | 2 | +1.00Tohm | +10.00*ohm | | 1.47 % |
-----
| 3 | +1.00Tohm | +10.00*ohm | | 1.47 % |
-----
| 4 | +1.00Tohm | +10.00*ohm | | 1.47 % |
-----
| 5 | +1.00Tohm | +10.00*ohm | | 1.47 % |
-----
| 6 | +1.00Tohm | +10.00*ohm | | 1.47 % |
-----
| 7 | +1.00Tohm | +10.00*ohm | | 1.47 % |
-----
| 8 | +1.00Tohm | +10.00*ohm | | 1.47 % |
-----
| 9 | +1.00Tohm | +10.00*ohm | | 1.47 % |
-----
| 10 | +1.00Tohm | +10.00*ohm | | 1.47 % |
-----
| 11 | +1.00Tohm | +10.00*ohm | | 1.47 % |
-----
| 12 | +1.00Tohm | +10.00*ohm | | 1.47 % |
-----
7 | 2 | +1.00Gohm | +61.39Tohm | | 0.785% |
-----
| 3 | +1.00Gohm | +227.34Tohm | | 0.785% |
-----
| 4 | +1.00Gohm | +137.43Tohm | | 0.785% |
-----
| 5 | +1.00Gohm | +154.38Tohm | | 0.785% |
-----
| 6 | +1.00Gohm | +1.74Pohm | | 0.785% |
-----
| 7 | +1.00Gohm | +594.76Tohm | | 0.785% |
-----
| 8 | +1.00Gohm | +288.47Tohm | | 0.785% |
-----
| 9 | +1.00Gohm | +248.01Tohm | | 0.785% |
-----
| 10 | +1.00Gohm | +317.11Tohm | | 0.785% |
-----
| 11 | +1.00Gohm | +1.07Pohm | | 0.785% |
-----
| 12 | +1.00Gohm | +281.73Tohm | | 0.785% |
-----
8 | 2 | +1.00Gohm | +68.38Tohm | | 0.785% |
=====

```

E5252A_N1

--- 9/ ---

HP E5252A Test Record Example (9/15)

Model: HP E5252A

Report No.: E5252A-001

Date: 23 Jan 1996

```

=====
TEST DESCRIPTION | Minimum | Results | Maximum | Uncertainty | Fail
=====
| 3 | +1.00Gohm | +150.52Tohm | | 0.785% |
-----
| 4 | +1.00Gohm | +123.67Tohm | | 0.785% |
-----
| 5 | +1.00Gohm | +345.98Tohm | | 0.785% |
-----
| 6 | +1.00Gohm | +79.41Tohm | | 0.785% |
-----
| 7 | +1.00Gohm | +221.01Tohm | | 0.785% |
-----
| 8 | +1.00Gohm | +252.45Tohm | | 0.785% |
-----
| 9 | +1.00Gohm | +308.55Tohm | | 0.785% |
-----
| 10 | +1.00Gohm | +210.00Tohm | | 0.785% |
-----
| 11 | +1.00Gohm | +217.21Tohm | | 0.785% |
-----
| 12 | +1.00Gohm | +330.85Tohm | | 0.785% |
-----
9 | 2 | +1.00Gohm | +58.68Tohm | | 0.785% |
-----
| 3 | +1.00Gohm | +182.87Tohm | | 0.785% |
-----
| 4 | +1.00Gohm | +119.50Tohm | | 0.785% |
-----
| 5 | +1.00Gohm | +135.17Tohm | | 0.785% |
-----
| 6 | +1.00Gohm | +534.67Tohm | | 0.785% |
-----
| 7 | +1.00Gohm | +371.09Tohm | | 0.785% |
-----
| 8 | +1.00Gohm | +216.66Tohm | | 0.785% |
-----
| 9 | +1.00Gohm | +188.44Tohm | | 0.785% |
-----
| 10 | +1.00Gohm | +226.35Tohm | | 0.785% |
-----
| 11 | +1.00Gohm | +566.44Tohm | | 0.785% |
-----
| 12 | +1.00Gohm | +215.35Tohm | | 0.785% |
-----
10 | 2 | +1.00Gohm | +68.93Tohm | | 0.785% |
-----
| 3 | +1.00Gohm | +211.62Tohm | | 0.785% |
-----
| 4 | +1.00Gohm | +181.27Tohm | | 0.785% |
-----
| 5 | +1.00Gohm | +3.85Pohm | | 0.785% |
-----
| 6 | +1.00Gohm | +115.64Tohm | | 0.785% |
-----
=====

```

E5252A_N1

--- 10/ ---

HP E5252A Test Record Example (10/15)

Model: HP E5252A

Report No.: E5252A-001

Date: 23 Jan 1996

```

=====
TEST DESCRIPTION | Minimum | Results | Maximum | Uncertainty | Fail
=====
| 7 | +1.00Gohm | +773.21Tohm | | 0.785% |
-----
| 8 | +1.00Gohm | +1.69Pohm | | 0.785% |
-----
| 9 | +1.00Gohm | +10.00*ohm | | 0.785% |
-----
| 10 | +1.00Gohm | +753.99Tohm | | 0.785% |
-----
| 11 | +1.00Gohm | +1.23Pohm | | 0.785% |
-----
| 12 | +1.00Gohm | +10.00*ohm | | 0.785% |
=====

```

Closed Channel Resistance Test

```

-----
Output | Input |
-----
| 1 | 1 | | +207.73mohm | +600.00mohm | 0.76 % |
-----
| 2 | 2 | | +213.92mohm | +600.00mohm | 0.76 % |
-----
| 3 | 3 | | +247.29mohm | +1.00 ohm | 0.76 % |
-----
| 4 | 4 | | +263.08mohm | +1.00 ohm | 0.76 % |
-----
| 5 | 5 | | +256.32mohm | +1.00 ohm | 0.76 % |
-----
| 6 | 6 | | +274.95mohm | +1.00 ohm | 0.76 % |
-----
| 7 | 7 | | +371.19mohm | +1.00 ohm | 0.76 % |
-----
| 8 | 8 | | +365.50mohm | +1.00 ohm | 0.76 % |
-----
| 9 | 9 | | +371.03mohm | +1.00 ohm | 0.76 % |
-----
| 10 | 10 | | +361.11mohm | +1.00 ohm | 0.76 % |
-----
| 2 | 1 | | +200.59mohm | +600.00mohm | 0.76 % |
-----
| 2 | 2 | | +207.67mohm | +600.00mohm | 0.76 % |
-----
| 3 | 3 | | +260.72mohm | +1.00 ohm | 0.76 % |
-----
| 4 | 4 | | +266.38mohm | +1.00 ohm | 0.76 % |
-----
| 5 | 5 | | +268.02mohm | +1.00 ohm | 0.76 % |
-----
| 6 | 6 | | +273.20mohm | +1.00 ohm | 0.76 % |
-----
| 7 | 7 | | +383.21mohm | +1.00 ohm | 0.76 % |
-----
| 8 | 8 | | +364.40mohm | +1.00 ohm | 0.76 % |
-----

```

E5252A_N1

--- 11/ ---

HP E5252A Test Record Example (11/15)

Model: HP E5252A

Report No.: E5252A-001

Date: 23 Jan 1996

```

=====
TEST DESCRIPTION | Minimum | Results | Maximum | Uncertainty | Fail
=====
| 9 | | +383.37mohm | +1.00 ohm | 0.76 % |
-----
| 10 | | +359.49mohm | +1.00 ohm | 0.76 % |
-----
3 | 1 | | +210.09mohm | +600.00mohm | 0.76 % |
-----
| 2 | | +214.47mohm | +600.00mohm | 0.76 % |
-----
| 3 | | +251.81mohm | +1.00 ohm | 0.76 % |
-----
| 4 | | +272.45mohm | +1.00 ohm | 0.76 % |
-----
| 5 | | +264.98mohm | +1.00 ohm | 0.76 % |
-----
| 6 | | +261.85mohm | +1.00 ohm | 0.76 % |
-----
| 7 | | +380.34mohm | +1.00 ohm | 0.76 % |
-----
| 8 | | +352.52mohm | +1.00 ohm | 0.76 % |
-----
| 9 | | +380.49mohm | +1.00 ohm | 0.76 % |
-----
| 10 | | +348.16mohm | +1.00 ohm | 0.76 % |
-----
4 | 1 | | +217.66mohm | +600.00mohm | 0.76 % |
-----
| 2 | | +209.44mohm | +600.00mohm | 0.76 % |
-----
| 3 | | +253.02mohm | +1.00 ohm | 0.76 % |
-----
| 4 | | +274.63mohm | +1.00 ohm | 0.76 % |
-----
| 5 | | +273.12mohm | +1.00 ohm | 0.76 % |
-----
| 6 | | +253.81mohm | +1.00 ohm | 0.76 % |
-----
| 7 | | +388.56mohm | +1.00 ohm | 0.76 % |
-----
| 8 | | +344.42mohm | +1.00 ohm | 0.76 % |
-----
| 9 | | +388.75mohm | +1.00 ohm | 0.76 % |
-----
| 10 | | +339.98mohm | +1.00 ohm | 0.76 % |
-----
5 | 1 | | +217.31mohm | +600.00mohm | 0.76 % |
-----
| 2 | | +218.40mohm | +600.00mohm | 0.76 % |
-----
| 3 | | +265.76mohm | +1.00 ohm | 0.76 % |
-----
| 4 | | +279.33mohm | +1.00 ohm | 0.76 % |
=====

```

E5252A_N1

--- 12/ ---

HP E5252A Test Record Example (12/15)

Model: HP E5252A

Report No.: E5252A-001

Date: 23 Jan 1996

```

=====
TEST DESCRIPTION | Minimum | Results | Maximum | Uncertainty | Fail
=====
| 5 | | +275.95mohm | +1.00 ohm | 0.76 % |
-----
| 6 | | +268.88mohm | +1.00 ohm | 0.76 % |
-----
| 7 | | +391.54mohm | +1.00 ohm | 0.76 % |
-----
| 8 | | +359.64mohm | +1.00 ohm | 0.76 % |
-----
| 9 | | +391.63mohm | +1.00 ohm | 0.76 % |
-----
| 10 | | +355.01mohm | +1.00 ohm | 0.76 % |
-----
6 | 1 | | +211.49mohm | +600.00mohm | 0.76 % |
-----
| 2 | | +212.27mohm | +600.00mohm | 0.76 % |
-----
| 3 | | +281.63mohm | +1.00 ohm | 0.76 % |
-----
| 4 | | +288.81mohm | +1.00 ohm | 0.76 % |
-----
| 5 | | +286.23mohm | +1.00 ohm | 0.76 % |
-----
| 6 | | +272.02mohm | +1.00 ohm | 0.76 % |
-----
| 7 | | +401.75mohm | +1.00 ohm | 0.76 % |
-----
| 8 | | +353.38mohm | +1.00 ohm | 0.76 % |
-----
| 9 | | +402.09mohm | +1.00 ohm | 0.76 % |
-----
| 10 | | +348.77mohm | +1.00 ohm | 0.76 % |
-----
7 | 1 | | +218.15mohm | +600.00mohm | 0.76 % |
-----
| 2 | | +220.35mohm | +600.00mohm | 0.76 % |
-----
| 3 | | +273.03mohm | +1.00 ohm | 0.76 % |
-----
| 4 | | +294.78mohm | +1.00 ohm | 0.76 % |
-----
| 5 | | +295.07mohm | +1.00 ohm | 0.76 % |
-----
| 6 | | +269.07mohm | +1.00 ohm | 0.76 % |
-----
| 7 | | +410.79mohm | +1.00 ohm | 0.76 % |
-----
| 8 | | +340.16mohm | +1.00 ohm | 0.76 % |
-----
| 9 | | +411.15mohm | +1.00 ohm | 0.76 % |
-----
| 10 | | +335.92mohm | +1.00 ohm | 0.76 % |
=====

```

E5252A_N1

--- 13/ ---

HP E5252A Test Record Example (13/15)

Model: HP E5252A

Report No.: E5252A-001

Date: 23 Jan 1996

```

=====
TEST DESCRIPTION | Minimum | Results | Maximum | Uncertainty | Fail
=====
| 8 | 1 | | +218.97mohm|+600.00mohm| 0.76 % |
|-----|
| | 2 | | +222.94mohm|+600.00mohm| 0.76 % |
|-----|
| | 3 | | +283.96mohm| +1.00 ohm| 0.76 % |
|-----|
| | 4 | | +292.95mohm| +1.00 ohm| 0.76 % |
|-----|
| | 5 | | +294.50mohm| +1.00 ohm| 0.76 % |
|-----|
| | 6 | | +268.90mohm| +1.00 ohm| 0.76 % |
|-----|
| | 7 | | +410.17mohm| +1.00 ohm| 0.76 % |
|-----|
| | 8 | | +339.03mohm| +1.00 ohm| 0.76 % |
|-----|
| | 9 | | +410.56mohm| +1.00 ohm| 0.76 % |
|-----|
| | 10 | | +334.74mohm| +1.00 ohm| 0.76 % |
|-----|
| 9 | 1 | | +227.19mohm|+600.00mohm| 0.76 % |
|-----|
| | 2 | | +226.97mohm|+600.00mohm| 0.76 % |
|-----|
| | 3 | | +287.91mohm| +1.00 ohm| 0.76 % |
|-----|
| | 4 | | +361.36mohm| +1.00 ohm| 0.76 % |
|-----|
| | 5 | | +300.89mohm| +1.00 ohm| 0.76 % |
|-----|
| | 6 | | +275.00mohm| +1.00 ohm| 0.76 % |
|-----|
| | 7 | | +416.86mohm| +1.00 ohm| 0.76 % |
|-----|
| | 8 | | +345.05mohm| +1.00 ohm| 0.76 % |
|-----|
| | 9 | | +417.06mohm| +1.00 ohm| 0.76 % |
|-----|
| | 10 | | +340.64mohm| +1.00 ohm| 0.76 % |
|-----|
| 10 | 1 | | +222.41mohm|+600.00mohm| 0.76 % |
|-----|
| | 2 | | +230.12mohm|+600.00mohm| 0.76 % |
|-----|
| | 3 | | +290.90mohm| +1.00 ohm| 0.76 % |
|-----|
| | 4 | | +313.82mohm| +1.00 ohm| 0.76 % |
|-----|
| | 5 | | +308.75mohm| +1.00 ohm| 0.76 % |
|-----|
| | 6 | | +282.80mohm| +1.00 ohm| 0.76 % |
|-----|

```

E5252A_N1

--- 14/ ---

HP E5252A Test Record Example (14/15)

Model: HP E5252A

Report No.: E5252A-001

Date: 23 Jan 1996

```

=====
TEST DESCRIPTION | Minimum | Results | Maximum | Uncertainty | Fail
=====
| 7 | | +424.44mohm | +1.00 ohm | 0.76 % |
-----
| 8 | | +352.94mohm | +1.00 ohm | 0.76 % |
-----
| 9 | | +424.79mohm | +1.00 ohm | 0.76 % |
-----
| 10 | | +348.56mohm | +1.00 ohm | 0.76 % |
-----
11 | 1 | | +226.99mohm | +600.00mohm | 0.76 % |
-----
| 2 | | +225.90mohm | +600.00mohm | 0.76 % |
-----
| 3 | | +306.23mohm | +1.00 ohm | 0.76 % |
-----
| 4 | | +305.28mohm | +1.00 ohm | 0.76 % |
-----
| 5 | | +304.61mohm | +1.00 ohm | 0.76 % |
-----
| 6 | | +286.84mohm | +1.00 ohm | 0.76 % |
-----
| 7 | | +420.44mohm | +1.00 ohm | 0.76 % |
-----
| 8 | | +357.53mohm | +1.00 ohm | 0.76 % |
-----
| 9 | | +420.78mohm | +1.00 ohm | 0.76 % |
-----
| 10 | | +353.17mohm | +1.00 ohm | 0.76 % |
-----
12 | 1 | | +240.07mohm | +600.00mohm | 0.76 % |
-----
| 2 | | +231.60mohm | +600.00mohm | 0.76 % |
-----
| 3 | | +310.11mohm | +1.00 ohm | 0.76 % |
-----
| 4 | | +325.82mohm | +1.00 ohm | 0.76 % |
-----
| 5 | | +322.28mohm | +1.00 ohm | 0.76 % |
-----
| 6 | | +292.45mohm | +1.00 ohm | 0.76 % |
-----
| 7 | | +438.04mohm | +1.00 ohm | 0.76 % |
-----
| 8 | | +362.81mohm | +1.00 ohm | 0.76 % |
-----
| 9 | | +438.52mohm | +1.00 ohm | 0.76 % |
-----
| 10 | | +358.21mohm | +1.00 ohm | 0.76 % |
=====

```

[END OF REPORT]

E5252A_N1

--- 15/ ---

HP E5252A Test Record Example (15/15)

=====
P E R F O R M A N C E T E S T R E P O R T
=====

Test Facility:

Hewlett-Packard

Report No. _____E5255A-003

Date _____23 Jan 1996

Customer _____

Tested by _____M0

Temperature _____25 degree C

Humidity _____50 %

Line Frequency _____Hz(nominal)

CARD 3 HP E5255A 24 (8x3) Channel Multiplexer

Serial Number: _____JP10C00106

HP E5250A Low Leakage Switch Mainframe

Serial Number: _____

Special Notes:

E5255A_N3

--- 1/ ---

HP E5255A Test Record Example (1/11)

Model: HP E5255

Report No.: E5255A-003

Date: 23 Jan 1996

Test Equipment Used:

	Description	Model No.	Trace No.	Cal Due Date
1.	-----	-----	-----	-----
2.	-----	-----	-----	-----
3.	-----	-----	-----	-----
4.	-----	-----	-----	-----
5.	-----	-----	-----	-----
6.	-----	-----	-----	-----
7.	-----	-----	-----	-----
8.	-----	-----	-----	-----
9.	-----	-----	-----	-----
10.	-----	-----	-----	-----
11.	-----	-----	-----	-----
12.	-----	-----	-----	-----
13.	-----	-----	-----	-----
14.	-----	-----	-----	-----

E5255A_N3

--- 2/ ---

HP E5255A Test Record Example (2/11)

Model: HP E5255A

Report No.: E5255A-003

Date: 23 Jan 1996

```

=====
TEST DESCRIPTION | Minimum | Results | Maximum | Uncertainty | Fail
=====
Relay Open/Close Self-test
-----
CARD 3 | PASS |
=====
Isolation Resistance Test
-----
Input/Bias Channel Isolation Resistance Test
-----
|Block|Output |Output |
-----
| 1 | 1 | 2 | +10.00Tohm| +10.00*ohm| | 3.43 % |
-----
| | | 3 | +10.00Tohm| +984.53Tohm| | 3.43 % |
-----
| | | 4 | +10.00Tohm| +815.93Tohm| | 3.43 % |
-----
| | | 5 | +10.00Tohm| +795.35Tohm| | 3.43 % |
-----
| | | 6 | +10.00Tohm| +771.31Tohm| | 3.43 % |
-----
| | | 7 | +10.00Tohm| +818.42Tohm| | 3.43 % |
-----
| | | 8 | +10.00Tohm| +902.52Tohm| | 3.43 % |
-----
| | 2 | 3 | +10.00Tohm| +673.46Tohm| | 3.43 % |
-----
| | | 4 | +10.00Tohm| +691.26Tohm| | 3.43 % |
-----
| | | 5 | +10.00Tohm| +786.05Tohm| | 3.43 % |
-----
| | | 6 | +10.00Tohm| +673.46Tohm| | 3.43 % |
-----
| | | 7 | +10.00Tohm| +757.71Tohm| | 3.43 % |
-----
| | | 8 | +10.00Tohm| +827.81Tohm| | 3.43 % |
-----
| | 3 | 4 | +10.00Tohm| +753.87Tohm| | 3.43 % |
-----
| | | 5 | +10.00Tohm| +704.34Tohm| | 3.43 % |
-----
| | | 6 | +10.00Tohm| +624.71Tohm| | 3.43 % |
-----
| | | 7 | +10.00Tohm| +641.54Tohm| | 3.43 % |
-----
| | | 8 | +10.00Tohm| +707.13Tohm| | 3.43 % |
-----
| | 4 | 5 | +10.00Tohm| +651.34Tohm| | 3.43 % |
-----
| | | 6 | +10.00Tohm| +584.88Tohm| | 3.43 % |
-----
| | | 7 | +10.00Tohm| +649.76Tohm| | 3.43 % |
-----

```

E5255A_N3

--- 3/ ---

HP E5255A Test Record Example (3/11)

Model: HP E5255A

Report No.: E5255A-003

Date: 23 Jan 1996

```

=====
TEST DESCRIPTION      | Minimum | Results | Maximum | Uncertainty | Fail
=====
|   |   | 8 | +10.00Tohm | +705.34Tohm |   | 3.43 % |
-----
|   | 5 | 6 | +10.00Tohm | +827.27Tohm |   | 3.43 % |
-----
|   |   | 7 | +10.00Tohm | +808.54Tohm |   | 3.43 % |
-----
|   |   | 8 | +10.00Tohm | +921.17Tohm |   | 3.43 % |
-----
|   | 6 | 7 | +10.00Tohm | +922.76Tohm |   | 3.43 % |
-----
|   |   | 8 | +10.00Tohm | +1.01Pohm |   | 3.43 % |
-----
|   | 7 | 8 | +10.00Tohm | +1.51Pohm |   | 3.43 % |
-----
|   | 8 | 1 | +10.00Tohm | +1.17Pohm |   | 3.43 % |
-----
| 2 | 1 | 2 | +10.00Tohm | +10.00*ohm |   | 3.43 % |
-----
|   |   | 3 | +10.00Tohm | +10.00*ohm |   | 3.43 % |
-----
|   |   | 4 | +10.00Tohm | +1.16Pohm |   | 3.43 % |
-----
|   |   | 5 | +10.00Tohm | +1.20Pohm |   | 3.43 % |
-----
|   |   | 6 | +10.00Tohm | +985.31Tohm |   | 3.43 % |
-----
|   |   | 7 | +10.00Tohm | +1.04Pohm |   | 3.43 % |
-----
|   |   | 8 | +10.00Tohm | +909.06Tohm |   | 3.43 % |
-----
|   | 2 | 3 | +10.00Tohm | +902.93Tohm |   | 3.43 % |
-----
|   |   | 4 | +10.00Tohm | +788.67Tohm |   | 3.43 % |
-----
|   |   | 5 | +10.00Tohm | +815.06Tohm |   | 3.43 % |
-----
|   |   | 6 | +10.00Tohm | +679.24Tohm |   | 3.43 % |
-----
|   |   | 7 | +10.00Tohm | +814.44Tohm |   | 3.43 % |
-----
|   |   | 8 | +10.00Tohm | +750.76Tohm |   | 3.43 % |
-----
|   | 3 | 4 | +10.00Tohm | +752.34Tohm |   | 3.43 % |
-----
|   |   | 5 | +10.00Tohm | +706.71Tohm |   | 3.43 % |
-----
|   |   | 6 | +10.00Tohm | +660.14Tohm |   | 3.43 % |
-----
|   |   | 7 | +10.00Tohm | +732.79Tohm |   | 3.43 % |
-----
|   |   | 8 | +10.00Tohm | +668.37Tohm |   | 3.43 % |
=====

```

E5255A_N3

--- 4/ ---

HP E5255A Test Record Example (4/11)

Model: HP E5255A

Report No.: E5255A-003

Date: 23 Jan 1996

```

=====
TEST DESCRIPTION | Minimum | Results | Maximum | Uncertainty | Fail
=====
| 4 | 5 | +10.00Tohm | +706.50Tohm | 3.43 % |
-----
| 6 | 6 | +10.00Tohm | +628.24Tohm | 3.43 % |
-----
| 7 | 7 | +10.00Tohm | +672.38Tohm | 3.43 % |
-----
| 8 | 8 | +10.00Tohm | +628.98Tohm | 3.43 % |
-----
| 5 | 6 | +10.00Tohm | +764.44Tohm | 3.43 % |
-----
| 7 | 7 | +10.00Tohm | +772.70Tohm | 3.43 % |
-----
| 8 | 8 | +10.00Tohm | +739.72Tohm | 3.43 % |
-----
| 6 | 7 | +10.00Tohm | +885.08Tohm | 3.43 % |
-----
| 8 | 8 | +10.00Tohm | +739.21Tohm | 3.43 % |
-----
| 7 | 8 | +10.00Tohm | +1.11Pohm | 3.43 % |
-----
| 8 | 1 | +10.00Tohm | +981.52Tohm | 3.43 % |
-----
3 | 1 | 2 | +10.00Tohm | +10.00*ohm | 3.43 % |
-----
| 3 | 3 | +10.00Tohm | +906.95Tohm | 3.43 % |
-----
| 4 | 4 | +10.00Tohm | +725.80Tohm | 3.43 % |
-----
| 5 | 5 | +10.00Tohm | +764.63Tohm | 3.43 % |
-----
| 6 | 6 | +10.00Tohm | +685.86Tohm | 3.43 % |
-----
| 7 | 7 | +10.00Tohm | +668.75Tohm | 3.43 % |
-----
| 8 | 8 | +10.00Tohm | +619.10Tohm | 3.43 % |
-----
| 2 | 3 | +10.00Tohm | +635.62Tohm | 3.43 % |
-----
| 4 | 4 | +10.00Tohm | +606.49Tohm | 3.43 % |
-----
| 5 | 5 | +10.00Tohm | +644.41Tohm | 3.43 % |
-----
| 6 | 6 | +10.00Tohm | +613.43Tohm | 3.43 % |
-----
| 7 | 7 | +10.00Tohm | +632.25Tohm | 3.43 % |
-----
| 8 | 8 | +10.00Tohm | +609.25Tohm | 3.43 % |
-----
| 3 | 4 | +10.00Tohm | +569.14Tohm | 3.43 % |
-----
| 5 | 5 | +10.00Tohm | +574.94Tohm | 3.43 % |
=====

```

E5255A_N3

--- 5/ ---

HP E5255A Test Record Example (5/11)

Model: HP E5255A

Report No.: E5255A-003

Date: 23 Jan 1996

```

=====
TEST DESCRIPTION      | Minimum | Results | Maximum | Uncertainty | Fail
=====
|   |   | 6 | +10.00Tohm | +588.51Tohm |   | 3.43 % |
|-----|
|   |   | 7 | +10.00Tohm | +584.34Tohm |   | 3.43 % |
|-----|
|   |   | 8 | +10.00Tohm | +509.37Tohm |   | 3.43 % |
|-----|
| 4 |   | 5 | +10.00Tohm | +686.70Tohm |   | 3.43 % |
|-----|
|   |   | 6 | +10.00Tohm | +713.20Tohm |   | 3.43 % |
|-----|
|   |   | 7 | +10.00Tohm | +664.56Tohm |   | 3.43 % |
|-----|
|   |   | 8 | +10.00Tohm | +593.87Tohm |   | 3.43 % |
|-----|
|   | 5 | 6 | +10.00Tohm | +589.95Tohm |   | 3.43 % |
|-----|
|   |   | 7 | +10.00Tohm | +623.22Tohm |   | 3.43 % |
|-----|
|   |   | 8 | +10.00Tohm | +557.20Tohm |   | 3.43 % |
|-----|
|   | 6 | 7 | +10.00Tohm | +751.29Tohm |   | 3.43 % |
|-----|
|   |   | 8 | +10.00Tohm | +653.70Tohm |   | 3.43 % |
|-----|
|   | 7 | 8 | +10.00Tohm | +1.06Pohm  |   | 3.43 % |
|-----|
|   | 8 | 1 | +10.00Tohm | +783.12Tohm |   | 3.43 % |
|-----|

```

Bias/Input Channel Isolation Resistance Test

```

|Block|Output |Output | | | | |
|---|---|---|---|---|---|---|
| 1 | 1 | 2 | +1.00Gohm | +7.89Tohm |   | 0.785% |
|-----|
|   |   | 3 | +1.00Gohm | +15.42Tohm |   | 0.785% |
|-----|
|   |   | 4 | +1.00Gohm | +17.11Tohm |   | 0.785% |
|-----|
|   |   | 5 | +1.00Gohm | +21.62Tohm |   | 0.785% |
|-----|
|   |   | 6 | +1.00Gohm | +26.54Tohm |   | 0.785% |
|-----|
|   |   | 7 | +1.00Gohm | +23.34Tohm |   | 0.785% |
|-----|
|   |   | 8 | +1.00Gohm | +22.04Tohm |   | 0.785% |
|-----|
|   | 2 | 3 | +1.00Gohm | +7.02Tohm |   | 0.785% |
|-----|
|   |   | 4 | +1.00Gohm | +8.67Tohm |   | 0.785% |
|-----|
|   |   | 5 | +1.00Gohm | +13.39Tohm |   | 0.785% |
|-----|

```

E5255A_N3

--- 6/ ---

HP E5255A Test Record Example (6/11)

Model: HP E5255A

Report No.: E5255A-003

Date: 23 Jan 1996

```

=====
TEST DESCRIPTION | Minimum | Results | Maximum | Uncertainty | Fail
=====
| | | 6 | +1.00Gohm | +18.77Tohm | | 0.785% |
-----
| | | 7 | +1.00Gohm | +22.46Tohm | | 0.785% |
-----
| | | 8 | +1.00Gohm | +37.31Tohm | | 0.785% |
-----
| | 3 | 4 | +1.00Gohm | +5.97Tohm | | 0.785% |
-----
| | | 5 | +1.00Gohm | +12.23Tohm | | 0.785% |
-----
| | | 6 | +1.00Gohm | +19.70Tohm | | 0.785% |
-----
| | | 7 | +1.00Gohm | +18.55Tohm | | 0.785% |
-----
| | | 8 | +1.00Gohm | +51.22Tohm | | 0.785% |
-----
| | 4 | 5 | +1.00Gohm | +6.52Tohm | | 0.785% |
-----
| | | 6 | +1.00Gohm | +10.54Tohm | | 0.785% |
-----
| | | 7 | +1.00Gohm | +14.16Tohm | | 0.785% |
-----
| | | 8 | +1.00Gohm | +24.06Tohm | | 0.785% |
-----
| | 5 | 6 | +1.00Gohm | +8.36Tohm | | 0.785% |
-----
| | | 7 | +1.00Gohm | +39.57Tohm | | 0.785% |
-----
| | | 8 | +1.00Gohm | +10.00*ohm | | 0.785% |
-----
| | 6 | 7 | +1.00Gohm | +6.77Tohm | | 0.785% |
-----
| | | 8 | +1.00Gohm | +33.50Tohm | | 0.785% |
-----
| | 7 | 8 | +1.00Gohm | +7.93Tohm | | 0.785% |
-----
| | 8 | 1 | +1.00Gohm | +10.00*ohm | | 0.785% |
-----
| 2 | 1 | 2 | +1.00Gohm | +9.77Tohm | | 0.785% |
-----
| | | 3 | +1.00Gohm | +545.85Tohm | | 0.785% |
-----
| | | 4 | +1.00Gohm | +34.10Tohm | | 0.785% |
-----
| | | 5 | +1.00Gohm | +10.00*ohm | | 0.785% |
-----
| | | 6 | +1.00Gohm | +10.00*ohm | | 0.785% |
-----
| | | 7 | +1.00Gohm | +10.00*ohm | | 0.785% |
-----
| | | 8 | +1.00Gohm | +10.00*ohm | | 0.785% |
=====

```

E5255A_N3

--- 7/ ---

HP E5255A Test Record Example (7/11)

Model: HP E5255A

Report No.: E5255A-003

Date: 23 Jan 1996

```

=====
TEST DESCRIPTION | Minimum | Results | Maximum | Uncertainty | Fail
=====
| 2 | 3 | +1.00Gohm | +17.43Tohm | 0.785% |
-----
| 4 | 4 | +1.00Gohm | +18.53Tohm | 0.785% |
-----
| 5 | 5 | +1.00Gohm | +56.97Tohm | 0.785% |
-----
| 6 | 6 | +1.00Gohm | +31.74Tohm | 0.785% |
-----
| 7 | 7 | +1.00Gohm | +55.17Tohm | 0.785% |
-----
| 8 | 8 | +1.00Gohm | +391.70Tohm | 0.785% |
-----
| 3 | 4 | +1.00Gohm | +11.54Tohm | 0.785% |
-----
| 5 | 5 | +1.00Gohm | +125.44Tohm | 0.785% |
-----
| 6 | 6 | +1.00Gohm | +115.89Tohm | 0.785% |
-----
| 7 | 7 | +1.00Gohm | +10.00*ohm | 0.785% |
-----
| 8 | 8 | +1.00Gohm | +10.00*ohm | 0.785% |
-----
| 4 | 5 | +1.00Gohm | +14.47Tohm | 0.785% |
-----
| 6 | 6 | +1.00Gohm | +26.77Tohm | 0.785% |
-----
| 7 | 7 | +1.00Gohm | +30.26Tohm | 0.785% |
-----
| 8 | 8 | +1.00Gohm | +87.10Tohm | 0.785% |
-----
| 5 | 6 | +1.00Gohm | +8.01Tohm | 0.785% |
-----
| 7 | 7 | +1.00Gohm | +19.28Tohm | 0.785% |
-----
| 8 | 8 | +1.00Gohm | +38.04Tohm | 0.785% |
-----
| 6 | 7 | +1.00Gohm | +49.64Tohm | 0.785% |
-----
| 8 | 8 | +1.00Gohm | +10.00*ohm | 0.785% |
-----
| 7 | 8 | +1.00Gohm | +13.16Tohm | 0.785% |
-----
| 8 | 1 | +1.00Gohm | +10.00*ohm | 0.785% |
-----
| 3 | 1 | 2 | +1.00Gohm | +5.51Tohm | 0.785% |
-----
| 3 | 3 | +1.00Gohm | +7.83Tohm | 0.785% |
-----
| 4 | 4 | +1.00Gohm | +9.08Tohm | 0.785% |
-----
| 5 | 5 | +1.00Gohm | +15.57Tohm | 0.785% |
=====

```

E5255A_N3

--- 8/ ---

HP E5255A Test Record Example (8/11)

Model: HP E5255A

Report No.: E5255A-003

Date: 23 Jan 1996

```

=====
TEST DESCRIPTION      | Minimum | Results | Maximum | Uncertainty | Fail
=====
|   |   | 6 | +1.00Gohm| +14.78Tohm|   | 0.785% |
|-----|
|   |   | 7 | +1.00Gohm| +16.79Tohm|   | 0.785% |
|-----|
|   |   | 8 | +1.00Gohm| +17.70Tohm|   | 0.785% |
|-----|
| 2 |   | 3 | +1.00Gohm| +4.58Tohm|   | 0.785% |
|-----|
|   |   | 4 | +1.00Gohm| +5.72Tohm|   | 0.785% |
|-----|
|   |   | 5 | +1.00Gohm| +8.91Tohm|   | 0.785% |
|-----|
|   |   | 6 | +1.00Gohm| +9.58Tohm|   | 0.785% |
|-----|
|   |   | 7 | +1.00Gohm| +12.43Tohm|  | 0.785% |
|-----|
|   |   | 8 | +1.00Gohm| +14.37Tohm|  | 0.785% |
|-----|
| 3 |   | 4 | +1.00Gohm| +5.26Tohm|   | 0.785% |
|-----|
|   |   | 5 | +1.00Gohm| +10.51Tohm|  | 0.785% |
|-----|
|   |   | 6 | +1.00Gohm| +16.89Tohm|  | 0.785% |
|-----|
|   |   | 7 | +1.00Gohm| +42.56Tohm|  | 0.785% |
|-----|
|   |   | 8 | +1.00Gohm| +34.57Tohm|  | 0.785% |
|-----|
| 4 |   | 5 | +1.00Gohm| +6.04Tohm|   | 0.785% |
|-----|
|   |   | 6 | +1.00Gohm| +11.79Tohm|  | 0.785% |
|-----|
|   |   | 7 | +1.00Gohm| +24.43Tohm|  | 0.785% |
|-----|
|   |   | 8 | +1.00Gohm| +42.05Tohm|  | 0.785% |
|-----|
| 5 |   | 6 | +1.00Gohm| +5.13Tohm|   | 0.785% |
|-----|
|   |   | 7 | +1.00Gohm| +9.67Tohm|   | 0.785% |
|-----|
|   |   | 8 | +1.00Gohm| +13.42Tohm|  | 0.785% |
|-----|
| 6 |   | 7 | +1.00Gohm| +6.14Tohm|   | 0.785% |
|-----|
|   |   | 8 | +1.00Gohm| +12.77Tohm|  | 0.785% |
|-----|
| 7 |   | 8 | +1.00Gohm| +6.59Tohm|   | 0.785% |
|-----|
| 8 | 1 | 1 | +1.00Gohm| +10.00*ohm|  | 0.785% |
=====
Closed Input/Output Channel Resistance Test
=====

```

E5255A_N3

--- 9/ ---

HP E5255A Test Record Example (9/11)

Model: HP E5255A

Report No.: E5255A-003

Date: 23 Jan 1996

```

=====
TEST DESCRIPTION | Minimum | Results | Maximum | Uncertainty | Fail
=====
| Block | Output |
-----
| 1 | 1 | | +215.79mohm | +600.00mohm | 1.30 % |
-----
| | 2 | | +211.00mohm | +600.00mohm | 1.30 % |
-----
| | 3 | | +217.18mohm | +600.00mohm | 1.30 % |
-----
| | 4 | | +220.23mohm | +600.00mohm | 1.30 % |
-----
| | 5 | | +222.34mohm | +600.00mohm | 1.30 % |
-----
| | 6 | | +216.51mohm | +600.00mohm | 1.30 % |
-----
| | 7 | | +214.54mohm | +600.00mohm | 1.30 % |
-----
| | 8 | | +216.28mohm | +600.00mohm | 1.30 % |
-----
| 2 | 1 | | +237.07mohm | +600.00mohm | 1.30 % |
-----
| | 2 | | +223.54mohm | +600.00mohm | 1.30 % |
-----
| | 3 | | +229.58mohm | +600.00mohm | 1.30 % |
-----
| | 4 | | +231.31mohm | +600.00mohm | 1.30 % |
-----
| | 5 | | +233.03mohm | +600.00mohm | 1.30 % |
-----
| | 6 | | +231.28mohm | +600.00mohm | 1.30 % |
-----
| | 7 | | +236.77mohm | +600.00mohm | 1.30 % |
-----
| | 8 | | +232.56mohm | +600.00mohm | 1.30 % |
-----
| 3 | 1 | | +246.76mohm | +600.00mohm | 1.30 % |
-----
| | 2 | | +243.31mohm | +600.00mohm | 1.30 % |
-----
| | 3 | | +242.66mohm | +600.00mohm | 1.30 % |
-----
| | 4 | | +242.56mohm | +600.00mohm | 1.30 % |
-----
| | 5 | | +249.99mohm | +600.00mohm | 1.30 % |
-----
| | 6 | | +240.69mohm | +600.00mohm | 1.30 % |
-----
| | 7 | | +251.42mohm | +600.00mohm | 1.30 % |
-----
| | 8 | | +256.94mohm | +600.00mohm | 1.30 % |
-----
Closed Bias/Output Channel Resistance Test
=====

```

E5255A_N3

--- 10/ ---

HP E5255A Test Record Example (10/11)

Model: HP E5255A

Report No.: E5255A-003

Date: 23 Jan 1996

```

=====
TEST DESCRIPTION | Minimum | Results | Maximum | Uncertainty | Fail
=====
| Block | Output |
-----
| 1 | 1 | | +183.16mohm | +1.00 ohm | 1.30 % |
-----
| | 2 | | +188.19mohm | +1.00 ohm | 1.30 % |
-----
| | 3 | | +186.37mohm | +1.00 ohm | 1.30 % |
-----
| | 4 | | +195.73mohm | +1.00 ohm | 1.30 % |
-----
| | 5 | | +205.48mohm | +1.00 ohm | 1.30 % |
-----
| | 6 | | +207.91mohm | +1.00 ohm | 1.30 % |
-----
| | 7 | | +222.49mohm | +1.00 ohm | 1.30 % |
-----
| | 8 | | +232.87mohm | +1.00 ohm | 1.30 % |
-----
| 2 | 1 | | +191.97mohm | +1.00 ohm | 1.30 % |
-----
| | 2 | | +209.63mohm | +1.00 ohm | 1.30 % |
-----
| | 3 | | +220.38mohm | +1.00 ohm | 1.30 % |
-----
| | 4 | | +221.33mohm | +1.00 ohm | 1.30 % |
-----
| | 5 | | +232.00mohm | +1.00 ohm | 1.30 % |
-----
| | 6 | | +242.84mohm | +1.00 ohm | 1.30 % |
-----
| | 7 | | +268.89mohm | +1.00 ohm | 1.30 % |
-----
| | 8 | | +268.33mohm | +1.00 ohm | 1.30 % |
-----
| 3 | 1 | | +217.41mohm | +1.00 ohm | 1.30 % |
-----
| | 2 | | +222.68mohm | +1.00 ohm | 1.30 % |
-----
| | 3 | | +232.80mohm | +1.00 ohm | 1.30 % |
-----
| | 4 | | +236.60mohm | +1.00 ohm | 1.30 % |
-----
| | 5 | | +259.49mohm | +1.00 ohm | 1.30 % |
-----
| | 6 | | +267.19mohm | +1.00 ohm | 1.30 % |
-----
| | 7 | | +272.60mohm | +1.00 ohm | 1.30 % |
-----
| | 8 | | +277.62mohm | +1.00 ohm | 1.30 % |
=====

```

[END OF REPORT]

E5255A_N3

--- 11/ ---

HP E5255A Test Record Example (11/11)

Troubleshooting Procedure

This troubleshooting procedure is for service personnel and assumes that the unit has passed the manufacturing test before.

Caution



Do not wash or clean the printed circuit boards unless you suspect the contamination on the boards is the cause of the PV failure (isolation resistance/leakage).

For cleaning with an air gun, use a filter. Unfiltered air may contain oil.

Important



Before starting the procedure:

1. Check that the DIP switch settings on the Mainframe rear panel are correct. See "HP E5250A DIP Switch/HP-IB Address Settings" in Chapter 4.
2. (HP E5255A only) Check that the DIP switch setting on the HP E5255A Multiplexer modules are correct. See "HP E5255A DIP Switch Settings" in Chapter 4.

Overview

Failure Modes

In this procedure, the failure modes are categorized as below. (Perform in the order 1. → 2. → 3. → 4.)

1. Power-On Fail
 - 1-1. **Line** LED does not light.
 - 1-2. **System Fail** LED is lit.
 - 1-3. **Fail** LED is lit.
 - 1-4. Other LEDs are lit (unexpectedly).
2. Unable to control
 - 2-1. Self-Test cannot be executed from Front Panel.
 - 2-2. Unable to control unit via HP-IB.
3. Self-Test Fail
 - 3-1. Self-Test (Relay Test) Fail
4. PV Test Fail (HP E5252A Matrix)

- 4-1. ON R Test Fail (Closed Channel Resistance)
- 4-2. Off R Test Fail (Isolation Resistance/ Leakage)
- 5. PV Test Fail (HP E5255A Multiplexer)
 - 5-1. ON R Test Fail (Closed Channel Resistance)
 - 5-2. Off R Test Fail (Isolation Resistance/ Leakage)

Field Replaceable Units (FRUs)

The troubleshooting procedure assumes that the following parts and assemblies are FRUs.

■ PC-Board Assemblies

- E5250-66501: CPU Bd (CPU Board)
- E5250-66502: M-Bd (Mother Board)
- E5250-66503: F-Bd (Front LED Board)
- E5250-66504: HP-IB Bd (HP-IB Board)
- E5250-61001: PS (Power Supply)
- E5252-66501: Matrix Bd (HP E5252A Matrix Module)
- E5255-66501: Multiplexer Bd (HP E5255A Multiplexer Module)

■ Others

- E5250-61631: AUX Path Coaxial Cable (The *IV* Path cables are soldered with the mother board.)
- E5250-61626: 14-Pin Cable Assy
- 0490-2326: Low I Path Relay (Matrix and Multiplexer)
(2A):
- 0490-1790: IV Path Pre-selector (Matrix: I-V 1-4 ch Path)
(1A1B): IV Path Pre-selector (Multiplexer: I-V Path)
- 0490-1793: General Path Relay (Matrix)
(2A): IV 5/6 Path Pre-selector (Matrix)
Bias Path Relay (Multiplexer)

Note

Pre-selectors are the relays that are located at the matrix/multiplexer input points.



Troubleshooting Flow

1. Power-On Fail

Note



Normal LED On/Off pattern at Power-On is as follows:

1. Power switch ON.
(0.5 sec)
 2. All LEDs are lit.
(0.5 sec)
 3. **Remote** and **System Fail** LEDs turn off.
(1 sec)
 4. **Fail** and **Local/Self-Test** LEDs turn off.
-

Perform in the order 1-1 → 1-2 → 1-3 → 1-4.

1-1: "Line" LED does not light

```
The LED never lights or goes off immediately?  
|  
+-Y-> Remove all modules, then retry. Fixed?  
|   |  
|   +-Y-> Install one module at a time, then check the result  
|   |   -> [Replace failed module]  
|   |  
|   +-N-> [Replace PS] (If not fixed replace CPU Bd)  
|  
+-N-> [Replace Front LED Bd] (If not fixed replace in the order of  
      CPU Bd -> M-Bd)
```

1-2: "System Fail" LED is lit

```
[Replace CPU Bd] (If not fixed replace PS)  
(Ignore the statuses of other LEDs)
```

1-3: "Fail" LED is lit

```
Remove all modules, then retry. Fixed?  
|  
+-Y-> Install one module at a time, then check the result  
|   |  
|   +-> [Replace failed module] (If not fixed replace M-Bd)  
|  
+-N-> [Replace CPU bd] (If not fixed replace M-Bd)
```

1-4: Other LEDs are lit (unexpectedly)

```
"Remote" or "Local/Self-Test" LED is lit?  
|  
+-Y-> [Replace CPU Bd] (If not fixed replace F-Bd)  
|  
+-N-> At least one LED lights?  
|  
+-Y-> [Replace CPU Bd]  
|  
+-N-> [Replace F-Bd] (If not fixed replace M-Bd)
```

2. Unable to Control

2-1: Self-Test cannot be executed from Front Panel

```
Unable to control unit via HP-IB?  
|  
+-Y-> [Replace CPU Bd]  
|  
+-N-> [Replace F-Bd] (If not fixed replace M-Bd)
```

2-2: Unable to control unit via HP-IB

```
[Replace CPU Bd] (If not fixed replace HP-IB Bd)
```

3. Self-Test Fail

3-1: Self-Test (Relay Test) Fail

```
Use Trouble Isolation Program--see the explanation below  
(If this does not work replace M-Bd or AUX Path Coax Cable)
```

The Trouble Isolation Program may report multiple relays as failed relays. The following example shows that the relays K705(F), K116(G), K205(F), K216(F), K316(F), K416(F), K516(F), K514(F) failed the OPEN TEST. (One of the relays is considered stuck.)

```
F705,G116,F205,F216,F316,F416,F516,F514 OPEN FAIL
```

If multiple relays are reported, use the following procedures to isolate the defective relay.

Open Test One of the reported relays is considered stuck. (The relays are normally
Fail: open.) Measure the resistances between the terminals of the reported relays
 (one by one).

Close Test One of the reported relays is considered open (will not make). Run the
Fail: Closed Channel Resistance Test of the Performance Verification. If an
 input-output path of the test includes the Open relay, the PV should fail at
 this measurement. Confirm the relays used in the failed measurement (on the
 block diagrams) and check for the relay(s) that are in the relay list displayed
 by the Trouble Isolation Program.

3-4 Troubleshooting Procedure

4. PV Test Fail (HP E5252A Matrix)

4-1: ON R Test Fail (Closed Channel Resistance)

Note: Marginal = [Spec R] > [On R] > [Spec R × 0.7]

|

One Output ch Fail?

|

+-Y-> [Exchange Failed Path Relay]

|

+-N-> Multiple Output Ch Fail (or Marginal) at single Input ch?

|

+-Y-> Multiple Modules Fail?

|

| +-Y-> [Replace Mother Bd or AUX Path Coax Cable]

|

| +-N-> [Replace Path Pre-selector Relay of failed Input ch]
(If not fixed replace Mother Bd or AUX Path Coax Cable,
then Failed Path Relay)

|

+-N-> [Replace Failed Path Relay] (If not fixed replace
Path Pre-selector Relay)

4-2: Off R Test Fail (Isolation Resistance/ Leakage)

Note: If multiple modules fail, perform PV & troubleshooting one by one.

|

Note: If one-by-one test passes and multiple test fails, then
replace [Pre Selector Relay -> Mother Bd or AUX Path Coax Cable]

|

One Output ch Fail?

|

+-Y-> [Replace Failed Path Relay] (If not fixed, contamination suspected)
| -> Replace module or clean module

|

+-N-> Multiple Output Ch Fail at single Input ch?

|

+-Y-> Only One Output Ch Pass?

|

| +-Y-> [Replace Passed Path Relay]
| | (If not fixed replace Failed Path Pre-Selector Relay)

|

| +-N-> All Output Ch Fail?

|

| +-Y-> [Replace Failed Input Ch Pre-Selector Relay]
| | (If not fixed replace Mother Bd or AUX Path Coax
| | Cable -> Failed Path Relay)

|

| +-N-> [Replace Path Relay passed with best measurement data]
| (If not fixed replace Failed Output Ch Path Relay
| -> Failed Input Ch Pre-Selector relay)

|

+-N-> [Replace Failed Output Ch Path Relay]
(If not fixed replace Path Pre-Selector Relay)

5. PV Test Fail (HP E5255A Multiplexer)

5-1: ON R Test Fail (Closed Channel Resistance)

Note: Marginal = [Spec R] > [On R] > [Spec R × 0.7]

|

Note: If resistors are used in Bias path, take resistor values into account. In this case PV program does not perform Pass/Fail judgment (performs measurements only).

If measured values seem unusual, check individual resistances; or short terminals temporarily, then perform PV.

|

One Output ch Fail?

|

+-Y-> [Replace Failed Path Relay]

|

+-N-> Multiple Output Ch Fail (or Marginal) at single Input ch?

|

+-Y-> Is Fail on Bias Path?

|

| +-Y-> [Replace Module]

|

| +-N-> Multiple Module or Blocks Fail?

|

| +-Y-> [Replace M-Bd]

|

| +-N-> [Replace Failed Input Ch Path Pre-Selector Relay]
(If not fixed replace M-Bd or AUX Path Coax Cable
-> Failed Path Relay)

|

+-N-> [Replace Failed Path Relay]

(If not fixed replace Path Pre-Selector Relay)

5-2: Off R Test Fail (Isolation Resistance/ Leakage)

Note: If multiple modules fail, perform PV & troubleshooting one by one.

|

Note: If multiple blocks are connected to single Input ch and PV fails, connect each block to single input, then perform PV & troubleshooting. If single input -- single block connections are OK and single input -- multiple block connections fail, then replace [Pre Selector Relay -> Mother Bd]

|

One Output ch Fail?

|

+-Y-> [Replace Failed Path Relay] (If not fixed, contamination suspected)
|
-> Replace module or clean module

|

+-N-> Multiple Output Ch Fail at single Input ch?

|

+-Y-> Only One Output Ch Pass?

|

| +-Y-> [Replace Passed Path Relay]
| (If not fixed replace Failed Path Pre-Selector Relay)

|

| +-N-> All Output Ch Fail?

|

| +-Y-> [Replace Failed Input Ch Pre-Selector Relay]
| (If not fixed replace Mother Bd or AUX Path Coax
| Cable -> Failed Path Relay)

|

| +-N-> [Replace Path Relay passed with best measurement data]
| (If not fixed replace Failed Output Ch Path Relay
| -> Failed Input Ch Pre-Selector relay)

|

+-N-> [Replace Failed Output Ch Path Relay]
(If not fixed replace Path Pre-Selector Relay)

Hardware Information

HP E5252A 10×12 Matrix Switch

The HP E5252A 10×12 Matrix Switch is a 10-input to 12-output switching matrix card for the HP E5250A.

A maximum of four HP E5252As can be installed in the HP E5250A. All the input terminals of the HP E5252As are connected together inside the HP E5250A (on the mother board backplane bus). The following are possible matrix configurations:

One HP E5252A: 10×12 matrix
Two HP E5252As: 10×24 matrix
Three HP E5252As: 10×36 matrix
Four HP E5252As: 10×48 matrix

The HP E5252A has 10 input ports connected to the HP E5250A rear panel.

Note the following points:

- SMU1 and SMU2 are for low current measurement and have better isolation resistance specification than other channels.
- SMU5, HF1, and CV1 ports share the same input path. (One port can be used at time.)
- SMU6, HF2, and CV2 ports share the same input path. (One port can be used at a time.)
- No DIP switch settings or inside cable connections are required.
- Each input port of the HP E5252A has a relay called **pre-selector relay**.

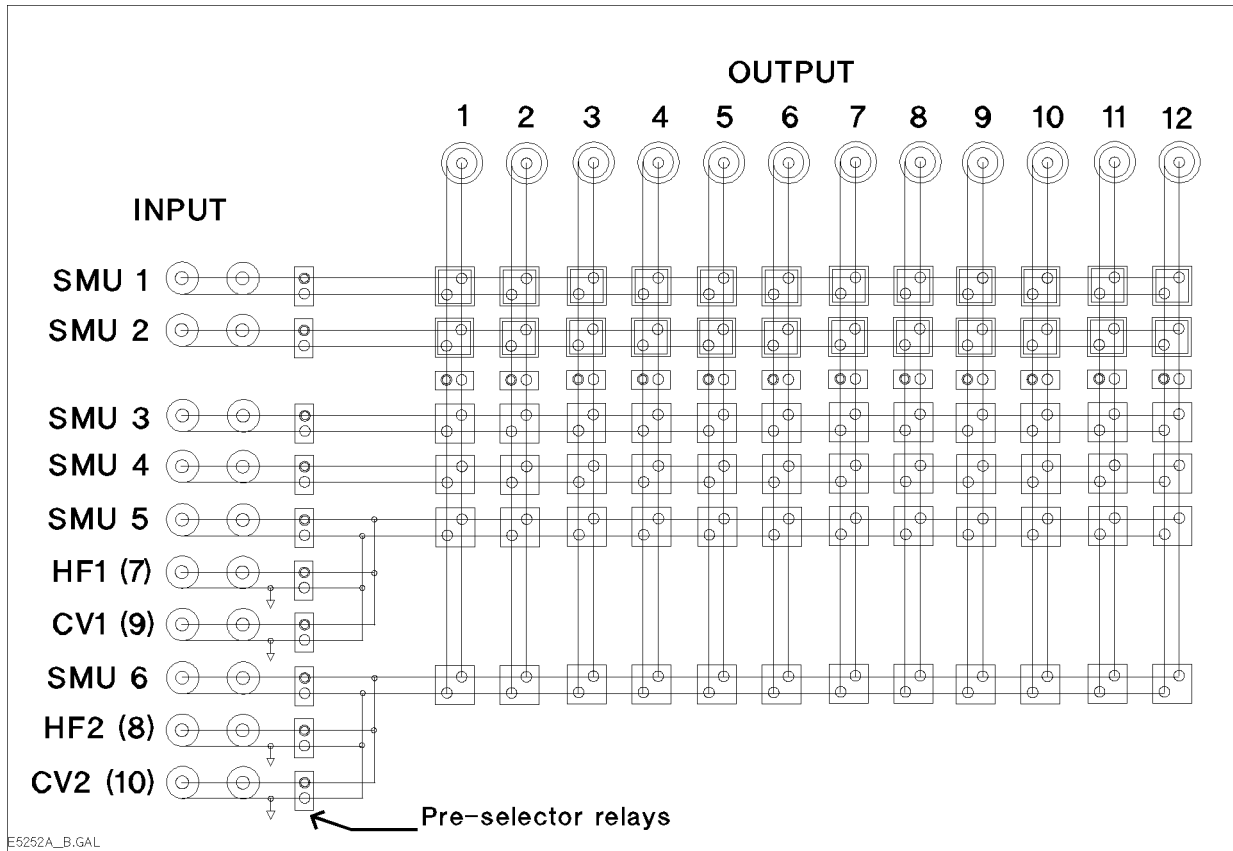


Figure 4-1. HP E5252A Block Diagram

HP E5255A 24 (8×3) Channel Multiplexer

The HP E5255A 24 (8×3) Channel Multiplexer is a 2-input (IV and BIAS) to 24-output multiplexer card for the HP E5250A. The HP E5255A consists of three blocks (three 2×8 multiplexers). One HP E5255A can be configured as a 2×8 multiplexer, 2×16 multiplexer, or 2×24 multiplexer.

A maximum of four HP E5255As can be installed in the HP E5250A, which can use the multiplexers in many configurations. The following are examples:

Twelve 8-output multiplexers: Three 8-output multiplexers → Four HP E5255As

Four 24-output multiplexers: 24-output multiplexer → Four HP E5255As (Four SMU inputs are used.)

One 96-output multiplexer: 24-output multiplexer → Four HP E5255As (One SMU input is used.)

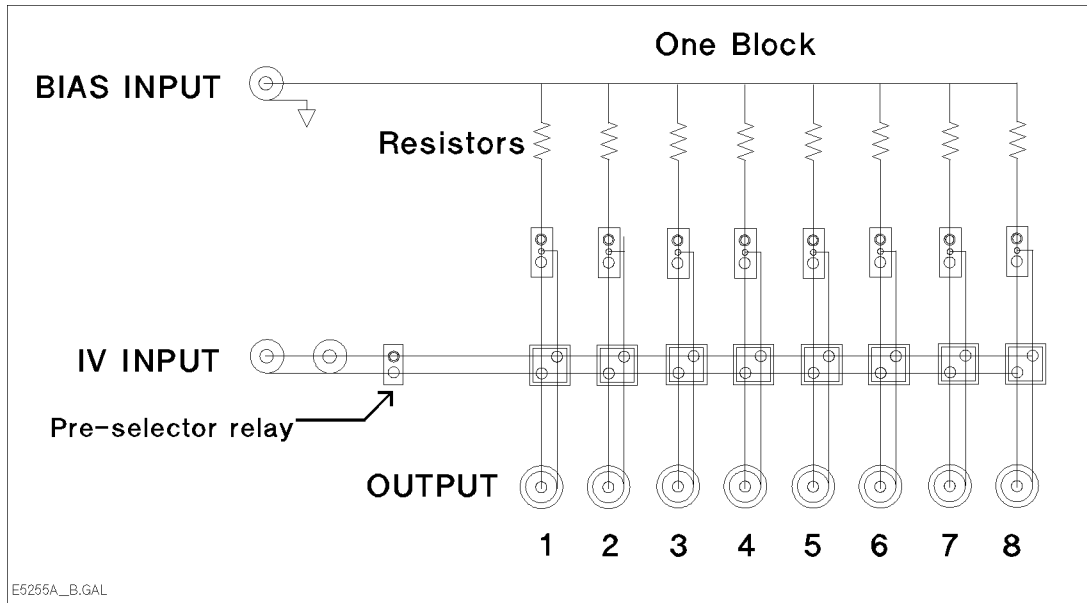


Figure 4-2. HP E5255A (One Block) Block Diagram

The HP E5255A has three (one for each block) BIAS input ports on the HP E5255A rear panel and SMU1–SMU6 terminals, which are connected to the SMU INPUT ports on the HP E5250A rear panel.

Note the following points:

- The BIAS input ports are used to apply ac or dc bias to DUT. BIAS ports are BNC connectors. Each BIAS input port is assigned to a 2×8 multiplexer block. The user can make internal connections to connect a BIAS input port to multiple blocks.
- IV input is used for measuring/forcing dc current/voltage. The IV input can be connected internally to the desired HP E5250A SMU INPUT connector (SMU1–SMU6). HP E5250A AUX INPUT connectors are not used with the HP E5255A.
- Each 8-channel output connector is assigned to a 2×8 multiplexer.
- Resistors connected between BIAS path and IV path are for protecting DUT from electrical damage. When shipped from the factory, 0Ω resistance is used in the HP E5255A. The user can easily replace this with desired resistors. Three resistor sets (0Ω, 1.2kΩ, and 22kΩ) are furnished with the HP E5255A.
- Each IV input port of the HP E5255A has a relay called **pre-selector relay**.

Important



Internal DIP switch setting is required. If the setting is correct, the Performance Verification program will fail.

- Specify the SMU INPUT connector used for the IV input. (Select from SMU1–SMU6.)
- Specify if resistors other than 0Ω are used (0Ω or other).

HP E5255A DIP Switch Settings

Each HP E5255A block has a DIP switch. The DIP switches must be set properly according to the internal connection. Each DIP switch has four bit switches. For detailed information about the HP E5255A setting, see "To Set up the Internal Connections of HP E5255A" in Chapter 2 of the *HP E5250A User's Guide* (HP P/N E5250-90000).

Bits 1 to 3 are used to specify which SMU input connector is connected to the IV input port of the block.

Bit 4 is related to the resistors in the resistor holders. If 0Ω resistors are installed in the resistor holder for a block, set bit 4 to 0. If other resistors are installed, set bit 4 to 1.

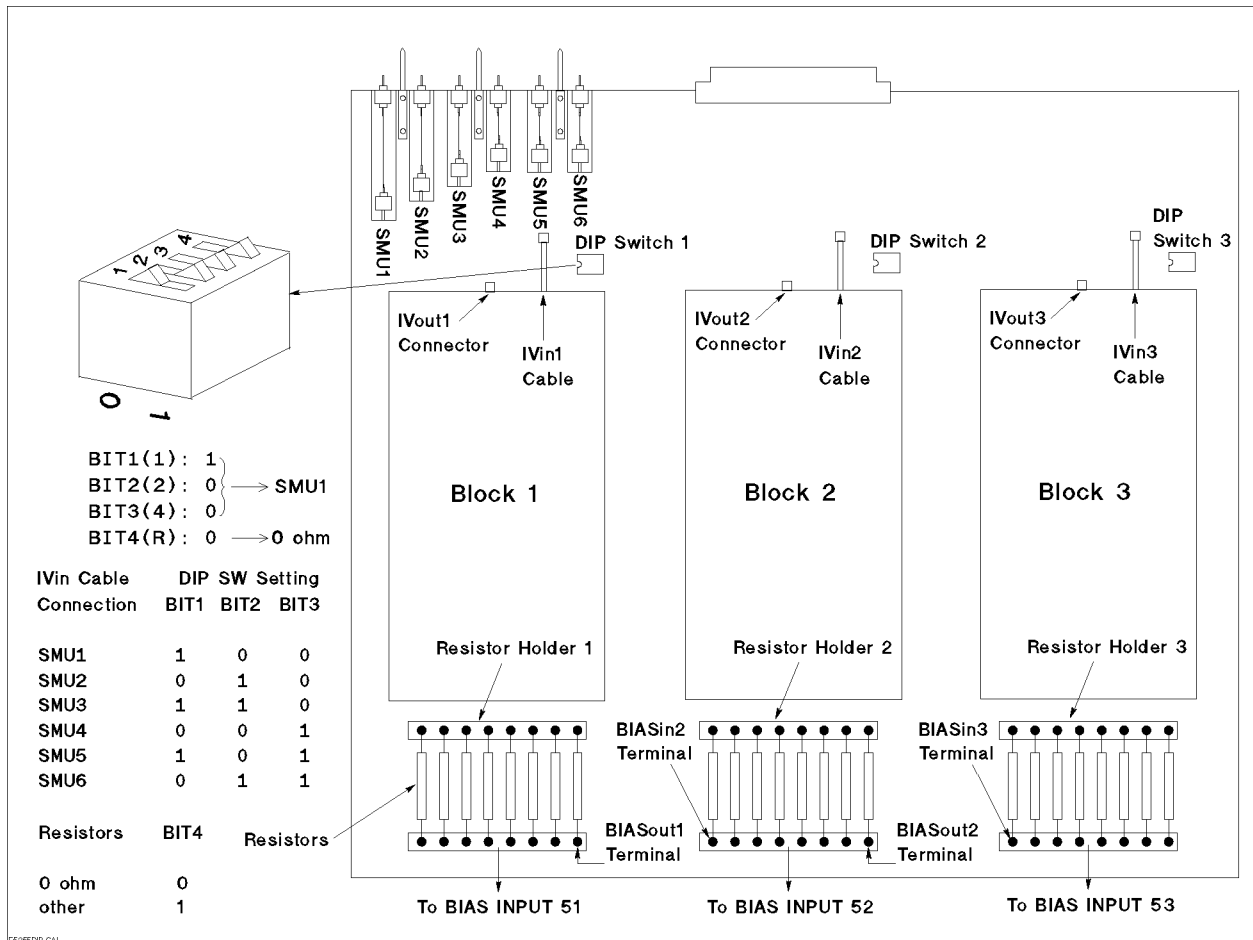


Figure 4-3. HP E5255A DIP Switch Settings

The following is an example for making 2-input × 24-output multiplexer using one HP E5255A:

1. Connect the "IVin1" cable of "Block1" to the desired SMU input connector. This will be the IV input for the 24 channel multiplexer.
2. Connect the "IVin2" cable of "Block2" to the "IVout1" connector of "Block1".
3. Connect the "IVin3" cable of "Block3" to the "IVout2" connector of "Block2".

4-4 Hardware Information

4. Connect the "BIASout1" terminal to the "BIASin2" terminal by using the wire included in the BIAS Input Modification Kit furnished with the HP E5255A.
5. Connect the "BIAS out2" terminal to the "BIASin3" terminal by using the wire.
6. Set "DIP SW1", "DIP SW2", and "DIP SW3". See Figure 4-3. Settings for bits 1 to 3 of these three DIP switches must be the same.
7. Connect BNC open caps included in the BIAS Input Modification Kit furnished with the HP E5255A to the BIAS INPUT 52 and 53 connectors. Hence, in this case, the BIAS INPUT 51 connector will be the bias input port of the 24 channel multiplexer.

HP E5250A DIP Switch/HP-IB Address Settings

The HP E5250A has a DIP switch on the rear panel, which is mainly used for setting the HP-IB address.

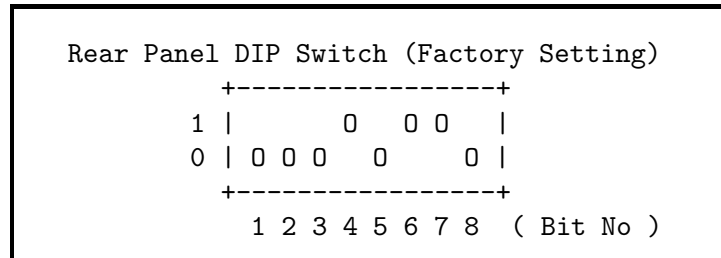


Figure 4-4. Rear Panel DIP Switch Settings

Table 4-1. Rear Panel DIP Switch Settings

Bit No	Name	Meaning
1	Prod Test Mode	0: Normal Mode ¹ 1: Production Test Mode
2	ROM CheckSum Skip	0: Execute ROM CheckSum ¹ 1: Skip ROM CheckSum
3	SYS_FAIL Disp Mode	0: Only SYS_FAIL LED on SYS_FAIL ¹ 1: ERROR Code (4-bit) on SYS_FAIL
4-8	HP-IB Address	0 - 31: HP-IB Address (Bit 8 is LSB) Factory Setting = 22

¹ Factory setting—do not change

The above factory (normal) setting means:

- Execute ROM CheckSum
- Only SYS_FAIL LED on SYS_FAIL
- HP-IB Address = 22

Bits 1 through 3 are for factory use only—they must be 0 for normal use at the customer site.

Power-On Self-Test

The following indicate the required HP E5250A rear panel DIP switch (bit) setting for each Power-On Test item (for bits 1 through 3):

1. LED Display Test: Bit1 = 1
2. ROM CheckSum Test: Bit2 = 0
3. RAM Read/Write Test: (Always executed)
4. DIP Switch Test: Bit1 = 1 (Infinite loop)
5. Timer Test: Bit1 = 0
6. Module IO Test: Bit1 = 0

The following are brief explanations of Power-On Test items:

1. LED Display Test

Front Panel LED ON/OFF Test

1. Turn on all LEDs (1 second).
2. Turn off all LEDs (0.5 second).
3. Turn on one LED at 0.3 second interval.
(Order: REMOTE → SYS_FAIL → FAIL → TEST)
4. Turn off all LEDs.

2. ROM CheckSum Test

3. RAM Read/Write Test

Perform read/write test of all RAMs.

1. 00H Write & Read Test
2. FFH Write & Read Test
3. A5H Write & Read Test (if Bit1 = 1)
4. 5AH Write & Read Test (if Bit1 = 1)
5. Addressability test (if Bit1 = 1)

4. DIP Switch Test

Indicate present DIP switch setting by using LEDs.

- (Repeat 1 through 3 infinitely.)
1. Turn on all LEDs (1 second).
 2. Bits 5 through 8 (1 second).
 3. Bits 1 through 4 (1 second).

5. Timer Test

1. TIMER2 Test (1 msec)
2. TIMER5 Test (1 sec)

6. Module IO Test

1. Card1 ID Check
2. Card1 ID Check
3. Card1 ID Check
4. Card1 ID Check

LED Patterns (Error Codes) on SYS_FAIL (SYS_FAIL Disp Mode—Bit3 = 1)

LED Patterns (Error Codes)

Error Code	TEST	FAIL	SYS_FAIL	REMOTE
1	off	off	off	ON
2	off	off	ON	off
3	off	off	ON	ON
4	off	ON	off	off
5	off	ON	off	ON
6	off	ON	ON	off
7	off	ON	ON	ON
8	ON	off	off	off
9	ON	off	off	ON
10	ON	off	ON	off
11	ON	off	ON	ON
12	ON	ON	off	off
13	ON	ON	off	ON
14	ON	ON	ON	off
15	ON	ON	ON	ON

■ SysFail on Boot Test

- ROM CheckSum Test Fail Error Code 1 (0.2 sec interval)
- RAM Read/Write Test Fail Error Code 2 (0.2 sec interval)

■ SysFail on Boot Initialize

PON_TEST Fail	Error Code 1 (0.5 sec interval)
IS_OPEN Fail	Error Code 2 (0.5 sec interval)
IS_REGISTER Fail	Error Code 3 (0.5 sec interval)
RLOCK_OPEN Fail	Error Code 4 (0.5 sec interval)
MCAT_OPEN Fail	Error Code 5 (0.5 sec interval)
SCPL_SPAWN Fail	Error Code 6 (0.5 sec interval)
SCPL_ACTIVATE Fail	Error Code 6 (0.5 sec interval)
KEYP_SPAWN Fail	Error Code 7 (0.5 sec interval)
KEYP_ACTIVATE Fail	Error Code 7 (0.5 sec interval)
SE_OPEN Fail	Error Code 8 (0.5 sec interval)
SCUM_OPEN Fail	Error Code 9 (0.5 sec interval)
HRSCPL_OPEN Fail	Error Code10 (0.5 sec interval)
SCPL_OPEN Fail	Error Code11 (0.5 sec interval)
SCPILANG_OPEN Fail	Error Code12 (0.5 sec interval)
SCPISTREAM_OPEN Fail	Error Code13 (0.5 sec interval)
OTHER Fail	Error Code15 (0.5 sec interval)

■ SysFail after Boot (Exception Error)

BUS Error	Error Code 1 (1.2 sec interval)
ADDRESS Error	Error Code 2 (1.2 sec interval)
ILLEGALOP Error	Error Code 3 (1.2 sec interval)
DIVZERO Error	Error Code 4 (1.2 sec interval)
PRIVVIOL Error	Error Code 5 (1.2 sec interval)
FMT Error	Error Code 6 (1.2 sec interval)
UNINIT Error	Error Code 7 (1.2 sec interval)
SPURIOUS Error	Error Code 8 (1.2 sec interval)
OTHER Error	Error Code15 (1.2 sec interval)

Control and Power Supply Diagram

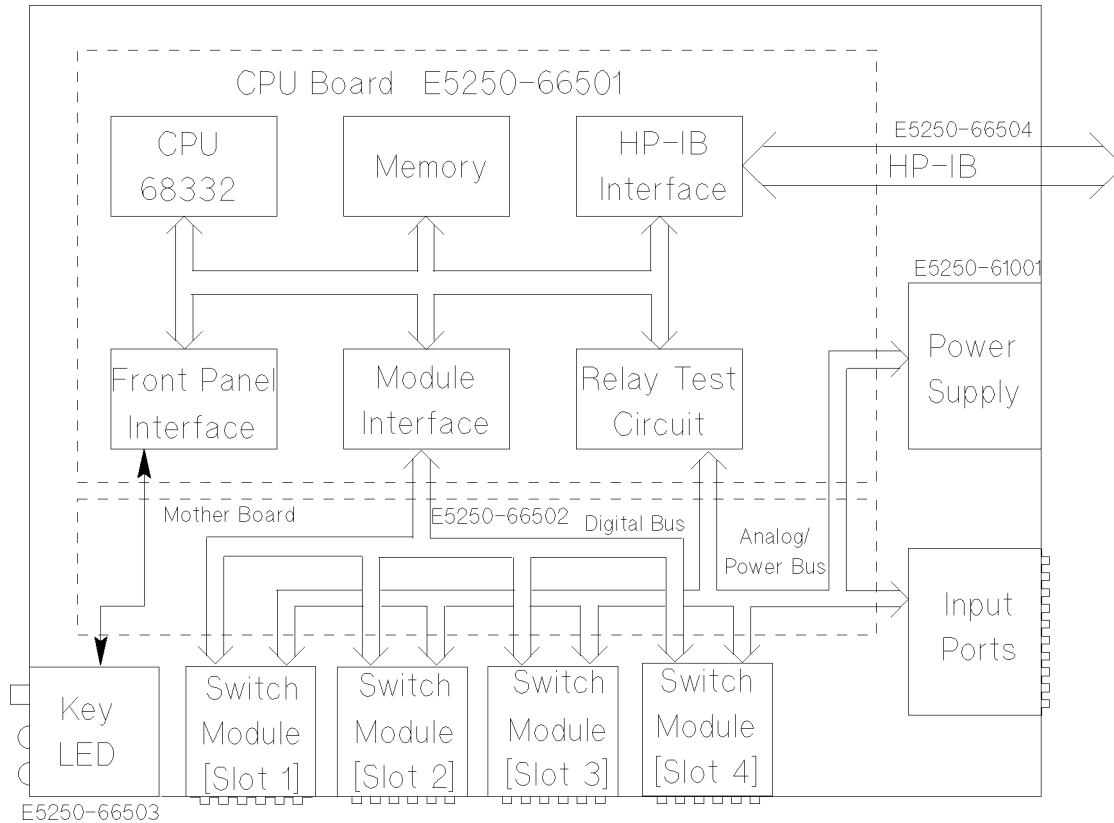


Figure 4-5. CPU and Control Diagram

CPU Board

68332 16 MHz
512 KB UVROM
128 KB SRAM
Self-Test Circuitry

Module Interface Bus

Data: 8-bit
Address: 5-bit
Control: 4 lines (Reset, Board Select, Read, Write)

Power Supply

Input:
100 – 240 VAC $\pm 10\%$ (Auto selection)
47 Hz – 63 Hz
100 VA Maximum
Output:
+12 V 3 A $\pm 7\%$ (For relays)
+5 V 2 A $\pm 3\%$ (For digital)

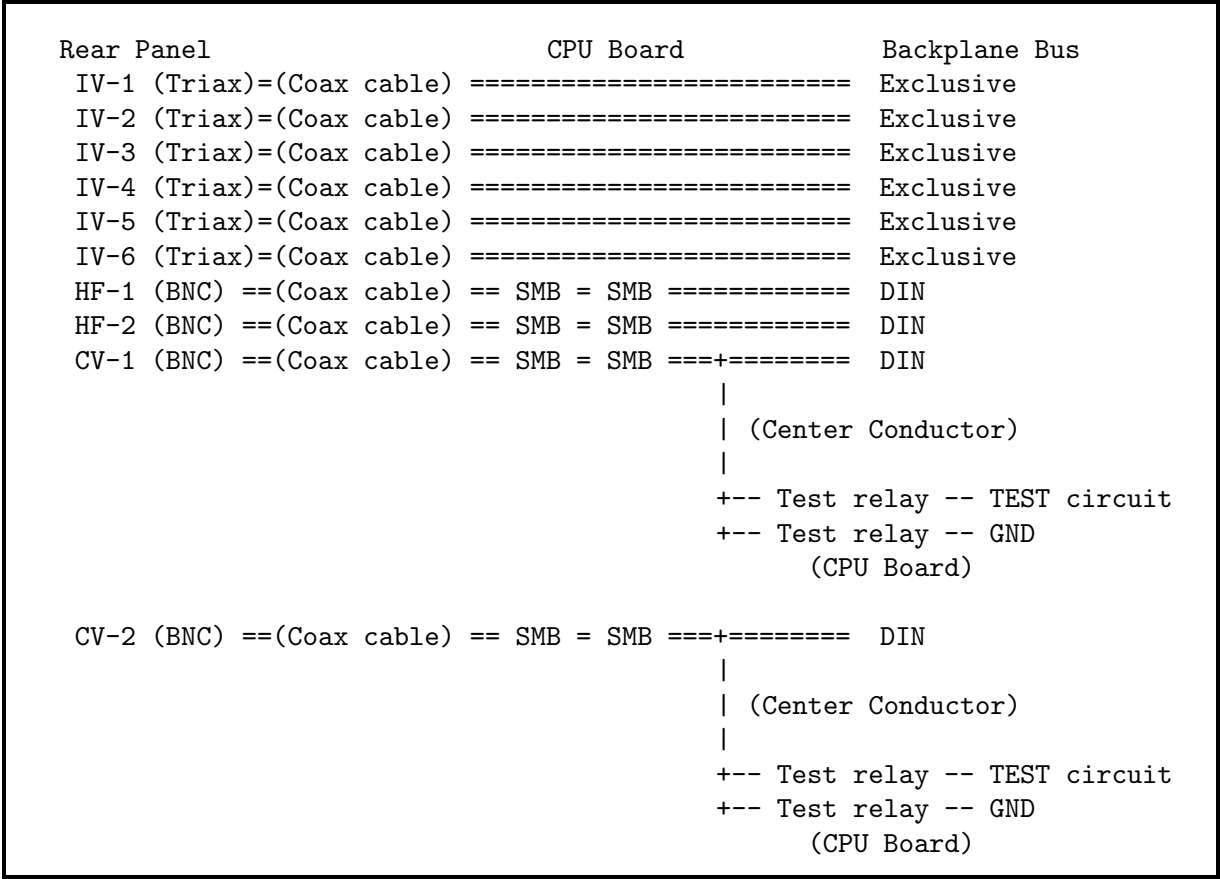


Figure 4-6. Mother Board (Backplane) Configuration

Circuit Diagrams

Insert artwork here.

Figure 4-7. HP E5252A Circuit Diagram (1/4)

Insert artwork here.

Figure 4-8. HP E5252A Circuit Diagram (2/4)

Insert artwork here.

Figure 4-9. HP E5252A Circuit Diagram (3/4)

Insert artwork here.

Figure 4-10. HP E5252A Circuit Diagram (4/4)

Insert artwork here.

Figure 4-11. HP E5255A Circuit Diagram (1/3)

Insert artwork here.

Figure 4-12. HP E5255A Circuit Diagram (2/3)

Insert artwork here.

Figure 4-13. HP E5255A Circuit Diagram (3/3)

Replaceable Parts

This chapter provides replaceable parts information.

Warning

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

**Warning**

When replacing the power supply module, do NOT touch the components on the module|they become very hot.

**Caution**

When handling the printed circuit boards and components on the HP E5252A and HP E5255A, use clean gloves. Stains, lint, oil, etc. cause leakage currents.



Replaceable Parts Lists

HP E5250A Mainframe Assemblies

The electrical part of the HP E5250A Mainframe consists of the assemblies shown in the following figure:

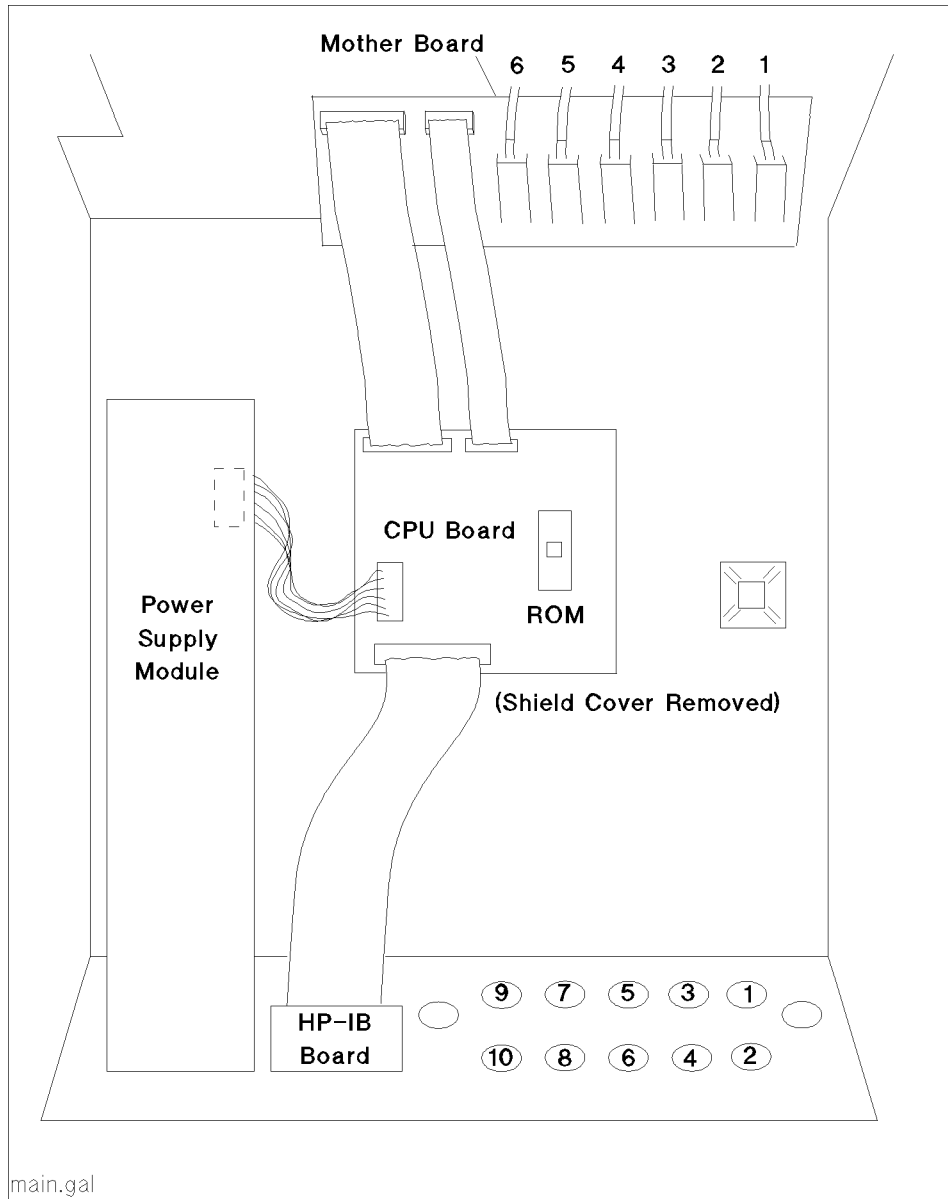


Figure 5-1. HP E5250A Assembly Location

Table 5-1. HP E5250A Major Assemblies

Assembly Name	New Assembly Part Number
Power Supply Unit	E5250-61001
CPU	E5250-66501
Mother Board	E5250-66502
Front LED Board	E5250-66503
HP-IB Board	E5250-66504

For the Front LED Board location, see Figure 5-6.

HP E5252A/E5255A Parts

The HP E5252A Matrix and HP E5255A Multiplexer are component-level repair products. Assembly replacement is acceptable when the assembly is worn out or component-level repair is not possible.

Note



Relays have life specifications. If near the end of their expected life, and many relays are wearing out, we recommend that the assemblies be replaced with new assemblies.

Table 5-2. HP E5252A/E5255A Major Replaceable Parts

Assembly/Part Name	New Assembly Part Number
10×12 Matrix (HP E5252A)	E5252-66501
24-Ch Multiplexer (HP E5255A)	E5255-66501
Relay, Reed 1C 12V	0490-1790
Relay, Reed 2A 12V	0490-1793
Relay, Reed 2M 12V	0490-2326
Spring Contact Pin	0960-0931
FUSE-SMT 5A 125V	2110-0935

Table 5-3. HP E5252A Parts

Reference Designation	Part Number	Description	Quantity
C1	0180-3597	CAP 47 μ F 35 V	1
C2	0180-3597	CAP 47 μ F 35 V	1
C3	0160-7563	CAP 0.1 μ F 25 V	1
C4	0160-7563	CAP 0.1 μ F 25 V	1
C5	0160-7563	CAP 0.1 μ F 25 V	1
C6	0160-7563	CAP 0.1 μ F 25 V	1
C7	0160-7563	CAP 0.1 μ F 25 V	1
C8	0160-7563	CAP 0.1 μ F 25 V	1
C9	0160-7563	CAP 0.1 μ F 25 V	1
C10	0160-7563	CAP 0.1 μ F 25 V	1
C11	0160-7563	CAP 0.1 μ F 25 V	1
C12	0160-7563	CAP 0.1 μ F 25 V	1
C13	0160-7563	CAP 0.1 μ F 25 V	1
C14	0160-7563	CAP 0.1 μ F 25 V	1
C15	0160-7563	CAP 0.1 μ F 25 V	1
C16	0160-7563	CAP 0.1 μ F 25 V	1
C17	0160-7563	CAP 0.1 μ F 25 V	1
C18	0160-7563	CAP 0.1 μ F 25 V	1
C19	0160-7563	CAP 0.1 μ F 25 V	1
C20	0160-7563	CAP 0.1 μ F 25 V	1
C21	0160-7563	CAP 0.1 μ F 25 V	1
C22	0160-7563	CAP 0.1 μ F 25 V	1
C23	0160-7563	CAP 0.1 μ F 25 V	1
F1	2110-0935	FUSE-SMT 5A 125V	1
F2	2110-0935	FUSE-SMT 5A 125V	1
I1	0360-1641	TERM-FKD-TUR	1
I3	0360-1641	TERM-FKD-TUR	1
I4	0360-1641	TERM-FKD-TUR	1
I5	0360-1641	TERM-FKD-TUR	1
I6	0360-1641	TERM-FKD-TUR	1
I7	0360-1641	TERM-FKD-TUR	1
I8	0360-1641	TERM-FKD-TUR	1
I10	0360-1641	TERM-FKD-TUR	1
I11	0360-1641	TERM-FKD-TUR	1
I12	0360-1641	TERM-FKD-TUR	1
I13	0360-1641	TERM-FKD-TUR	1
I15	0360-1641	TERM-FKD-TUR	1
I16	0360-1641	TERM-FKD-TUR	1
I17	0360-1641	TERM-FKD-TUR	1
I18	0360-1641	TERM-FKD-TUR	1
I20	0360-1641	TERM-FKD-TUR	1
I21	0360-1641	TERM-FKD-TUR	1
I23	0360-1641	TERM-FKD-TUR	1
I24	0360-1641	TERM-FKD-TUR	1
I25	0360-1641	TERM-FKD-TUR	1
I26	0360-1641	TERM-FKD-TUR	1
I28	0360-1641	TERM-FKD-TUR	1
I29	0360-1641	TERM-FKD-TUR	1
I30	0360-1641	TERM-FKD-TUR	1
I31	0360-1641	TERM-FKD-TUR	1
I33	0360-1641	TERM-FKD-TUR	1
I34	0360-1641	TERM-FKD-TUR	1
I35	0360-1641	TERM-FKD-TUR	1
I36	0360-1641	TERM-FKD-TUR	1
I38	0360-1641	TERM-FKD-TUR	1
I39	0360-1641	TERM-FKD-TUR	1
I40	0360-1641	TERM-FKD-TUR	1
I41	0360-1641	TERM-FKD-TUR	1
I42	0360-1641	TERM-FKD-TUR	1
I43	0360-1641	TERM-FKD-TUR	1
I45	0360-1641	TERM-FKD-TUR	1
I46	0360-1641	TERM-FKD-TUR	1

Table 5-3. HP E5252A Parts (continued)

Reference Designation	Part Number	Description	Quantity
I47	0360-1641	TERM-FKD-TUR	1
I48	0360-1641	TERM-FKD-TUR	1
I50	0360-1641	TERM-FKD-TUR	1
I51	0360-1641	TERM-FKD-TUR	1
I52	0360-1641	TERM-FKD-TUR	1
I53	0360-1641	TERM-FKD-TUR	1
I55	0360-1641	TERM-FKD-TUR	1
I56	0360-1641	TERM-FKD-TUR	1
I57	0360-1641	TERM-FKD-TUR	1
I58	0360-1641	TERM-FKD-TUR	1
I60	0360-1641	TERM-FKD-TUR	1
I61	0360-1641	TERM-FKD-TUR	1
I62	0360-1641	TERM-FKD-TUR	1
J1	0960-1238	PROBE COAX	1
J2	0960-1238	PROBE COAX	1
J3	0960-1238	PROBE COAX	1
J4	0960-1238	PROBE COAX	1
J5	0960-1238	PROBE COAX	1
J6	0960-1238	PROBE COAX	1
J7	1251-7799	CONN-POST-TP-PST	1
K101	0490-2326	RLY-REED 2M 1A	1
K102	0490-2326	RLY-REED 2M 1A	1
K103	0490-2326	RLY-REED 2M 1A	1
K104	0490-2326	RLY-REED 2M 1A	1
K105	0490-2326	RLY-REED 2M 1A	1
K106	0490-2326	RLY-REED 2M 1A	1
K107	0490-2326	RLY-REED 2M 1A	1
K108	0490-2326	RLY-REED 2M 1A	1
K109	0490-2326	RLY-REED 2M 1A	1
K110	0490-2326	RLY-REED 2M 1A	1
K111	0490-2326	RLY-REED 2M 1A	1
K112	0490-2326	RLY-REED 2M 1A	1
K116	0490-1790	RLY-REED 1T 2.5A	1
K201	0490-2326	RLY-REED 2M 1A	1
K202	0490-2326	RLY-REED 2M 1A	1
K203	0490-2326	RLY-REED 2M 1A	1
K204	0490-2326	RLY-REED 2M 1A	1
K205	0490-2326	RLY-REED 2M 1	1
K206	0490-2326	RLY-REED 2M 1A	1
K207	0490-2326	RLY-REED 2M 1A	1
K208	0490-2326	RLY-REED 2M 1A	1
K209	0490-2326	RLY-REED 2M 1A	1
K210	0490-2326	RLY-REED 2M 1A	1
K211	0490-2326	RLY-REED 2M 1A	1
K212	0490-2326	RLY-REED 2M 1A	1
K216	0490-1790	RLY-REED 1T 2.5A	1
K301	0490-1793	RLY-REED 2M 2.5A	1
K302	0490-1793	RLY-REED 2M 2.5A	1
K303	0490-1793	RLY-REED 2M 2.5A	1
K304	0490-1793	RLY-REED 2M 2.5A	1
K305	0490-1793	RLY-REED 2M 2.5A	1
K306	0490-1793	RLY-REED 2M 2.5A	1
K307	0490-1793	RLY-REED 2M 2.5A	1
K308	0490-1793	RLY-REED 2M 2.5A	1
K309	0490-1793	RLY-REED 2M 2.5A	1
K310	0490-1793	RLY-REED 2M 2.5A	1
K311	0490-1793	RLY-REED 2M 2.5A	1
K312	0490-1793	RLY-REED 2M 2.5A	1
K316	0490-1790	RLY-REED 1T 2.5A	1
K401	0490-1793	RLY-REED 2M 2.5A	1
K402	0490-1793	RLY-REED 2M 2.5A	1
K403	0490-1793	RLY-REED 2M 2.5A	1
K404	0490-1793	RLY-REED 2M 2.5A	1
K405	0490-1793	RLY-REED 2M 2.5A	1
K406	0490-1793	RLY-REED 2M 2.5A	1
K407	0490-1793	RLY-REED 2M 2.5A	1
K408	0490-1793	RLY-REED 2M 2.5A	1
K409	0490-1793	RLY-REED 2M 2.5A	1
K410	0490-1793	RLY-REED 2M 2.5A	1
K411	0490-1793	RLY-REED 2M 2.5A	1
K412	0490-1793	RLY-REED 2M 2.5A	1
K416	0490-1790	RLY-REED 1T 2.5A	1
K501	0490-1793	RLY-REED 2M 2.5A	1
K502	0490-1793	RLY-REED 2M 2.5A	1
K503	0490-1793	RLY-REED 2M 2.5A	1

Table 5-3. HP E5252A Parts (continued)

Reference Designation	Part Number	Description	Quantity
K504	0490-1793	RLY-REED 2M 2.5A	1
K505	0490-1793	RLY-REED 2M 2.5A	1
K506	0490-1793	RLY-REED 2M 2.5A	1
K507	0490-1793	RLY-REED 2M 2.5A	1
K508	0490-1793	RLY-REED 2M 2.5A	1
K509	0490-1793	RLY-REED 2M 2.5A	1
K510	0490-1793	RLY-REED 2M 2.5A	1
K511	0490-1793	RLY-REED 2M 2.5A	1
K512	0490-1793	RLY-REED 2M 2.5A	1
K514	0490-1793	RLY-REED 2M 2.5A	1
K515	0490-1793	RLY-REED 2M 2.5A	1
K516	0490-1793	RLY-REED 2M 2.5A	1
K601	0490-1793	RLY-REED 2M 2.5A	1
K602	0490-1793	RLY-REED 2M 2.5A	1
K603	0490-1793	RLY-REED 2M 2.5A	1
K604	0490-1793	RLY-REED 2M 2.5A	1
K605	0490-1793	RLY-REED 2M 2.5A	1
K606	0490-1793	RLY-REED 2M 2.5A	1
K607	0490-1793	RLY-REED 2M 2.5A	1
K608	0490-1793	RLY-REED 2M 2.5A	1
K609	0490-1793	RLY-REED 2M 2.5A	1
K610	0490-1793	RLY-REED 2M 2.5A	1
K611	0490-1793	RLY-REED 2M 2.5A	1
K612	0490-1793	RLY-REED 2M 2.5A	1
K614	0490-1793	RLY-REED 2M 2.5A	1
K615	0490-1793	RLY-REED 2M 2.5A	1
K616	0490-1793	RLY-REED 2M 2.5A	1
K701	0490-1790	RLY-REED 1T 2.5A	1
K702	0490-1790	RLY-REED 1T 2.5A	1
K703	0490-1790	RLY-REED 1T 2.5A	1
K704	0490-1790	RLY-REED 1T 2.5A	1
K705	0490-1790	RLY-REED 1T 2.5A	1
K706	0490-1790	RLY-REED 1T 2.5A	1
K707	0490-1790	RLY-REED 1T 2.5A	1
K708	0490-1790	RLY-REED 1T 2.5A	1
K709	0490-1790	RLY-REED 1T 2.5A	1
K710	0490-1790	RLY-REED 1T 2.5A	1
K711	0490-1790	RLY-REED 1T 2.5A	1
K712	0490-1790	RLY-REED 1T 2.5A	1
L1	9140-1976	L 10 μ H +10%–10%	1
L2	9140-1976	L 10 μ H +10%–10%	1
TP1	1252-3721	CONN-SGL CONT	1
TP2	1252-3721	CONN-SGL CONT	1
U1	1820-8486	IC-MC74ACT273DW	1
U2	1820-8486	IC-MC74ACT273DW	1
U3	1820-8486	IC-MC74ACT273DW	1
U4	1820-8486	IC-MC74ACT273DW	1
U5	1820-8486	IC-MC74ACT273DW	1
U6	1820-8486	IC-MC74ACT273DW	1
U7	1820-8486	IC-MC74ACT273DW	1
U8	1820-8486	IC-MC74ACT273DW	1
U9	1820-8486	IC-MC74ACT273DW	1
U10	1820-8486	IC-MC74ACT273DW	1
U11	1820-8486	IC-MC74ACT273DW	1
U12	1820-8486	IC-MC74ACT273DW	1
U13	1820-8486	IC-MC74ACT273DW	1
U14	1820-8486	IC-MC74ACT273DW	1
U15	1820-6412	XSTR ARY 16P-SMD	1
U16	1820-6412	XSTR ARY 16P-SMD	1
U17	1820-6412	XSTR ARY 16P-SMD	1
U18	1820-6412	XSTR ARY 16P-SMD	1
U19	1820-6412	XSTR ARY 16P-SMD	1
U20	1820-6412	XSTR ARY 16P-SMD	1
U21	1820-6412	XSTR ARY 16P-SMD	1
U22	1820-6412	XSTR ARY 16P-SMD	1
U23	1820-6412	XSTR ARY 16P-SMD	1
U24	1820-6412	XSTR ARY 16P-SMD	1
U25	1820-6412	XSTR ARY 16P-SMD	1
U26	1820-6412	XSTR ARY 16P-SMD	1
U27	1820-6412	XSTR ARY 16P-SMD	1
U28	1820-6412	XSTR ARY 16P-SMD	1
U31	1820-6156	IC-74ACT244SC	1
U32	1820-4257	IC-SN74ALS138D	1
U33	1820-4257	IC-SN74ALS138D	1
U34	1820-4245	IC-SN74ALS02AD	1

Table 5-3. HP E5252A Parts (continued)

Reference Designation	Part Number	Description	Quantity
U35	1820-4249	IC-SN74ALS04BD	1
U36	1820-4252	IC-SN74ALS10AD	1
U37	1820-4933	IC-SN74ALS541DW	1
	0361-1053	RVT-BLINDPL-THRU	2
	0515-0664	SCR-MACHINE (TORX)	2
	0515-0914	SCR-MACH M3X0.5 ¹	7
	0515-1550	SCR-MACHINE (FOR PC BRD)	16
	0515-1551	SCR-MACHINE (FOR GUIDE)	6
	0590-1095	THD INSR-NUT	7
	0590-1793	THD INSR-STDF	13
	0960-0931	SPRING CONTACT PIN	6
	1250-1906	TRIAxIAL CONNECTOR	12
	1400-0249	CABLE TIE	2
	3050-1284	WASHER CAPTIVE (FOR TORX)	2
	5080-3211	LABEL	1
	8150-3491	WIRE	3
	E5252-00101	CHASSIS	1
	E5252-00201	REAR PANEL	1
	E5252-00601	TOP COVER	1
	E5252-01201	L-ANGLE (LONG)	1
	E5252-01202	L-ANGLE (SHORT)	1
	E5252-24003	STANDOFF	4
	E5252-24004	GUIDE (FOR CONTACT PIN)	3
	E5252-26501	PC-BD BLANK	1
	E5252-61620	IV CONN CABLE(SMU1/2)	2
	E5252-61621	IV ROW CABLE (WHT/RED)	12

1 (FOR TOP COVER (3)/ PC BOARD (4))

**Table 5-4.
HP E5255A Parts**

Reference Designation	Part Number	Description	Quantity
C1	0180-3597	CAP 47 μ F 35 V	1
C2	0180-3597	CAP 47 μ F 35 V	1
C3	0160-7563	CAP 0.1 μ F 25 V	1
C4	0160-7563	CAP 0.1 μ F 25 V	1
C5	0160-7563	CAP 0.1 μ F 25 V	1
C6	0160-7563	CAP 0.1 μ F 25 V	1
C7	0160-7563	CAP 0.1 μ F 25 V	1
C8	0160-7563	CAP 0.1 μ F 25 V	1
C9	0160-7563	CAP 0.1 μ F 25 V	1
C10	0160-7563	CAP 0.1 μ F 25 V	1
C11	0160-7563	CAP 0.1 μ F 25 V	1
C12	0160-7563	CAP 0.1 μ F 25 V	1
C13	0160-7563	CAP 0.1 μ F 25 V	1
C14	0160-7563	CAP 0.1 μ F 25 V	1
C15	0160-7563	CAP 0.1 μ F 25 V	1
C16	0160-7563	CAP 0.1 μ F 25 V	1
C17	0160-7563	CAP 0.1 μ F 25 V	1
F1	2110-0935	FUSE-SMT 5A 125V	1
F2	2110-0935	FUSE-SMT 5A 125V	1
I1	0360-1641	TERM-FKD-TUR	1
I2	0360-1641	TERM-FKD-TUR	1
I3	0360-1641	TERM-FKD-TUR	1
I4	0360-1641	TERM-FKD-TUR	1
I5	0360-1641	TERM-FKD-TUR	1
I6	0360-1641	TERM-FKD-TUR	1
I7	0360-1641	TERM-FKD-TUR	1
I8	0360-1641	TERM-FKD-TUR	1
I9	0360-1641	TERM-FKD-TUR	1
I10	0360-1641	TERM-FKD-TUR	1
I11	0360-1641	TERM-FKD-TUR	1
I12	0360-1641	TERM-FKD-TUR	1
I13	0360-1641	TERM-FKD-TUR	1
I14	0360-1641	TERM-FKD-TUR	1
I15	0360-1641	TERM-FKD-TUR	1
I16	0360-1641	TERM-FKD-TUR	1
I17	0360-1641	TERM-FKD-TUR	1
I18	0360-1641	TERM-FKD-TUR	1
I19	0360-1641	TERM-FKD-TUR	1
I20	0360-1641	TERM-FKD-TUR	1
I21	0360-1641	TERM-FKD-TUR	1
I22	0360-1641	TERM-FKD-TUR	1
I23	0360-1641	TERM-FKD-TUR	1
I24	0360-1641	TERM-FKD-TUR	1
I25	0360-1641	TERM-FKD-TUR	1
I26	0360-1641	TERM-FKD-TUR	1
I27	0360-1641	TERM-FKD-TUR	1
I28	0360-1641	TERM-FKD-TUR	1
I29	0360-1641	TERM-FKD-TUR	1
I30	0360-1641	TERM-FKD-TUR	1
I31	0360-1641	TERM-FKD-TUR	1
I32	0360-1641	TERM-FKD-TUR	1
I33	0360-1641	TERM-FKD-TUR	1
I34	0360-1641	TERM-FKD-TUR	1
I35	0360-1641	TERM-FKD-TUR	1
I36	0360-1641	TERM-FKD-TUR	1
I37	0360-1641	TERM-FKD-TUR	1
I38	0360-1641	TERM-FKD-TUR	1
I39	0360-1641	TERM-FKD-TUR	1
I40	0360-1641	TERM-FKD-TUR	1
I41	0360-1641	TERM-FKD-TUR	1
I42	0360-1641	TERM-FKD-TUR	1
I43	0360-1641	TERM-FKD-TUR	1
I44	0360-1641	TERM-FKD-TUR	1
I45	0360-1641	TERM-FKD-TUR	1
I46	0360-1641	TERM-FKD-TUR	1
I47	0360-1641	TERM-FKD-TUR	1
I48	0360-1641	TERM-FKD-TUR	1
I49	0360-1641	TERM-FKD-TUR	1
I50	0360-1641	TERM-FKD-TUR	1
I51	0360-1641	TERM-FKD-TUR	1
I52	0360-1641	TERM-FKD-TUR	1
I53	0360-1641	TERM-FKD-TUR	1
I54	0360-1641	TERM-FKD-TUR	1

**Table 5-4.
HP E5255A Parts
(continued)**

Reference Designation	Part Number	Description	Quantity
J1	1251-7845	CONN-POST-TP-PST	1
J2	0960-1238	PROBE COAX	1
J3	0960-1238	PROBE COAX	1
J4	1251-7799	CONN-POST-TP-PST	1
J5	0360-2601	BARRIER BLOCK	1
J6	0360-2601	BARRIER BLOCK	1
J7	0360-2601	BARRIER BLOCK	1
J8	0960-1238	PROBE COAX	1
J9	1250-2558	TERMN-COAX-CA	1
J10	1250-2558	TERMN-COAX-CA	1
J11	1250-2558	TERMN-COAX-CA	1
J12	0360-2601	BARRIER BLOCK	1
J13	0360-2601	BARRIER BLOCK	1
J14	0360-2601	BARRIER BLOCK	1
J15	0960-1238	PROBE COAX	1
J16	0960-1238	PROBE COAX	1
J17	1250-2558	TERMN-COAX-CA	1
J18	0960-1238	PROBE COAX	1
J19	1250-2558	TERMN-COAX-CA	1
J21	1250-2558	TERMN-COAX-CA	1
J23	1250-2558	TERMN-COAX-CA	1
J25	1250-2558	TERMN-COAX-CA	1
K101	0490-2326	RLY-REED 2M 1A	1
K102	0490-2326	RLY-REED 2M 1A	1
K103	0490-2326	RLY-REED 2M 1A	1
K104	0490-2326	RLY-REED 2M 1A	1
K105	0490-2326	RLY-REED 2M 1A	1
K106	0490-2326	RLY-REED 2M 1A	1
K107	0490-2326	RLY-REED 2M 1A	1
K108	0490-2326	RLY-REED 2M 1A	1
K109	0490-1793	RLY-REED 2M 2.5A	1
K110	0490-1793	RLY-REED 2M 2.5A	1
K111	0490-1793	RLY-REED 2M 2.5A	1
K112	0490-1793	RLY-REED 2M 2.5A	1
K113	0490-1793	RLY-REED 2M 2.5A	1
K114	0490-1793	RLY-REED 2M 2.5A	1
K115	0490-1793	RLY-REED 2M 2.5A	1
K116	0490-1793	RLY-REED 2M 2.5A	1
K201	0490-2326	RLY-REED 2M 1A	1
K202	0490-2326	RLY-REED 2M 1A	1
K203	0490-2326	RLY-REED 2M 1A	1
K204	0490-2326	RLY-REED 2M 1A	1
K205	0490-2326	RLY-REED 2M 1A	1
K206	0490-2326	RLY-REED 2M 1A	1
K207	0490-2326	RLY-REED 2M 1A	1
K208	0490-2326	RLY-REED 2M 1A	1
K209	0490-1793	RLY-REED 2M 2.5A	1
K210	0490-1793	RLY-REED 2M 2.5A	1
K211	0490-1793	RLY-REED 2M 2.5A	1
K212	0490-1793	RLY-REED 2M 2.5A	1
K213	0490-1793	RLY-REED 2M 2.5A	1
K214	0490-1793	RLY-REED 2M 2.5A	1
K215	0490-1793	RLY-REED 2M 2.5A	1
K216	0490-1793	RLY-REED 2M 2.5A	1
K301	0490-2326	RLY-REED 2M 1A	1
K302	0490-2326	RLY-REED 2M 1A	1
K303	0490-2326	RLY-REED 2M 1A	1
K304	0490-2326	RLY-REED 2M 1A	1
K305	0490-2326	RLY-REED 2M 1A	1
K306	0490-2326	RLY-REED 2M 1A	1
K307	0490-2326	RLY-REED 2M 1A	1
K308	0490-2326	RLY-REED 2M 1A	1
K309	0490-1793	RLY-REED 2M 2.5A	1
K310	0490-1793	RLY-REED 2M 2.5A	1
K311	0490-1793	RLY-REED 2M 2.5A	1
K312	0490-1793	RLY-REED 2M 2.5A	1
K313	0490-1793	RLY-REED 2M 2.5A	1
K314	0490-1793	RLY-REED 2M 2.5A	1
K315	0490-1793	RLY-REED 2M 2.5A	1
K316	0490-1793	RLY-REED 2M 2.5A	1

**Table 5-4.
HP E5255A Parts
(continued)**

Reference Designation	Part Number	Description	Quantity
K401	0490-1790	RLY-REED 1T 2.5A	1
K402	0490-1790	RLY-REED 1T 2.5A	1
K403	0490-1790	RLY-REED 1T 2.5A	1
L1	9140-1976	L 10 μ H +10%–10%	1
L2	9140-1976	L 10 μ H +10%–10%	1
R1	1810-1128	NETWORK-RES SMD	1
SW1	3101-2063	SW-DIP 4-1A RKR	1
SW2	3101-2063	SW-DIP 4-1A RKR	1
SW3	3101-2063	SW-DIP 4-1A RKR	1
TP1	1252-3721	CONN-SGL CONT	1
U1	1820-6412	XSTR ARY 16P-SMD	1
U2	1820-6412	XSTR ARY 16P-SMD	1
U3	1820-6412	XSTR ARY 16P-SMD	1
U4	1820-6412	XSTR ARY 16P-SMD	1
U5	1820-6412	XSTR ARY 16P-SMD	1
U6	1820-4257	IC-SN74ALS138D	1
U7	1820-4245	IC-SN74ALS02AD	1
U8	1820-4933	IC-SN74ALS541DW	1
U9	1820-6156	IC-74ACT244SC	1
U10	1820-4257	IC-SN74ALS138D	1
U11	1820-6156	IC-74ACT244SC	1
U12	1820-6156	IC-74ACT244SC	1
U19	1820-8486	IC-MC74ACT273DW	1
U28	1820-8486	IC-MC74ACT273DW	1
U29	1820-8486	IC-MC74ACT273DW	1
U30	1820-8486	IC-MC74ACT273DW	1
U31	1820-8486	IC-MC74ACT273DW	1
U32	1820-8486	IC-MC74ACT273DW	1
U33	1820-8486	IC-MC74ACT273DW	1
U34	1820-6412	XSTR ARY 16P-SMD	1
U35	1820-6412	XSTR ARY 16P-SMD	1
U36	1820-6412	XSTR ARY 16P-SMD	1
W1	8159-0005	RES 0 CWM	1
W2	8159-0005	RES 0 CWM	1
W3	8159-0005	RES 0 CWM	1
W4	8159-0005	RES 0 CWM	1
W5	8159-0005	RES 0 CWM	1
W6	8159-0005	RES 0 CWM	1
W7	8159-0005	RES 0 CWM	1
W8	8159-0005	RES 0 CWM	1
W9	8159-0005	RES 0 CWM	1
W10	8159-0005	RES 0 CWM	1
W11	8159-0005	RES 0 CWM	1
W12	8159-0005	RES 0 CWM	1
W13	8159-0005	RES 0 CWM	1
W14	8159-0005	RES 0 CWM	1
W15	8159-0005	RES 0 CWM	1
W16	8159-0005	RES 0 CWM	1
W17	8159-0005	RES 0 CWM	1
W18	8159-0005	RES 0 CWM	1
W19	8159-0005	RES 0 CWM	1
W20	8159-0005	RES 0 CWM	1
W21	8159-0005	RES 0 CWM	1
W22	8159-0005	RES 0 CWM	1
W23	8159-0005	RES 0 CWM	1
W24	8159-0005	RES 0 CWM	1

**Table 5-4.
HP E5255A Parts
(continued)**

Reference Designation	Part Number	Description	Quantity
	0361-1053	RVT-BLINDPL-THRU	2
	0380-1782	STDF	12
	0380-3070	STDF-HEX .25-IN	6
	0515-0664	SCR-MACHINE (TORX)	2
	0515-0914	SCR-MACH M3X0.5 (FOR COVER(3))	12
	0515-1550	SCR-MACHINE (FOR PC BRD)	9
	0515-1551	SCR-MACHINE (FOR GUIDE)	6
	0590-1095	THD INSR-NUT	3
	0590-1793	THD INSR-STDF	11
	0960-0931	SPRING CONTACT PIN	6
	1250-0083	BNC CONNECTOR	3
	1400-0249	CABLE TIE	13
	2190-0016	WSHR-LK INTL T(FOR BNC)	3
	2190-0913	WSHR-LK HLCL (FOR DSUB)	6
	2260-0002	NUT-HEX-DBL-CHAM (FOR DSUB)	6
	2950-0001	NUT-HEX-DBL-CHAM (FOR BNC)	3
	3050-1284	WASHER CAPTIVE (FOR TORX)	2
	5080-3211	LABEL	1
	8150-3491	WIRE	2
	E5252-24004	GUIDE (FOR CONTACT PIN)	3
	E5255-00101	CHASSIS	1
	E5255-04001	COVER	3
	E5255-26501	PC-BD BLANK	1
	E5255-61620	D-SUB CABLE ASSY	3
	E5255-61621	SMB CABLE 1 (SHORT)	1
	E5255-61622	SMB CABLE 2 (MEDIUM)	1
	E5255-61623	SMB CABLE 3 (LONG)	1
	E5255-61624	BNC CONN WIRE (3-WIRE)	1

Tools and Consumables

The following are tools and consumables for the HP E5250A/E5252A/E5255A.

Table 5-5. Tools and Consumables

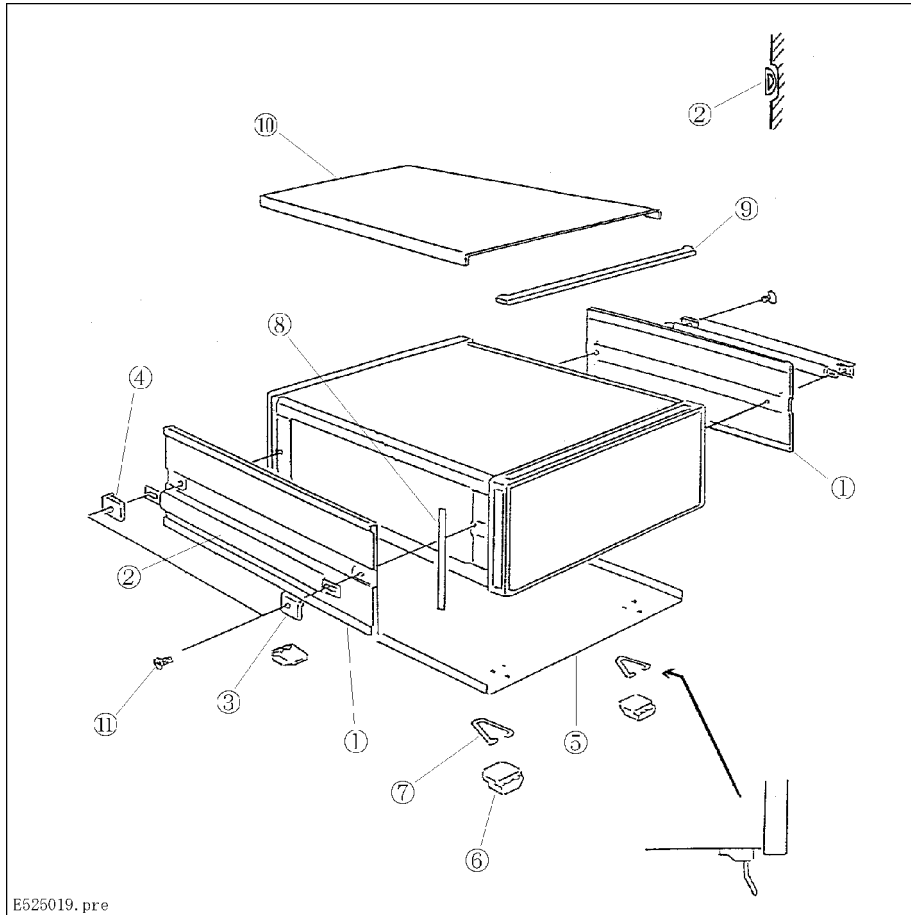
Assembly/Part Name	New Assembly/Part Number
Relay Test Adapter	E5250-60002
PV Tools:	
PV Tool Set ¹	E5250-65801
Isolation Test Adapter	E5250-65002
Banana-Triax Adapter	E5250-65003
Banana-BNC Adapter	E5250-65004
Banana-Dsub Adapter	E5250-65005
Triax-BNC Adapter	E5250-65006
MT5250 PV/Diag 3.5-In	E5250-65201
Consumables:	
Jumper Cable Set	E5255-65000
RESISTOR SET 0Ω	E5255-65001
RESISTOR SET 1.2k	E5255-65002
RESISTOR SET 22k	E5255-65003
CBL with Contact Pin	E5255-61626
Triax-DualTriax Adapter	E5250-60004
SMPL/UTIL Disk	E5250-87001
Module Extractor	04155-60007
Torx Wrench ²	8710-2151
Module Protector ³	E5250-89001

1 Includes five PV adapters and PV/Diag diskette; does not include Relay Test Adapter.

2 Used for removing/installing the HP E5252A/E5255A.

3 Used for protecting the HP E5252A/E5255A, such as during transit.

HP E5250A Mainframe Chassis



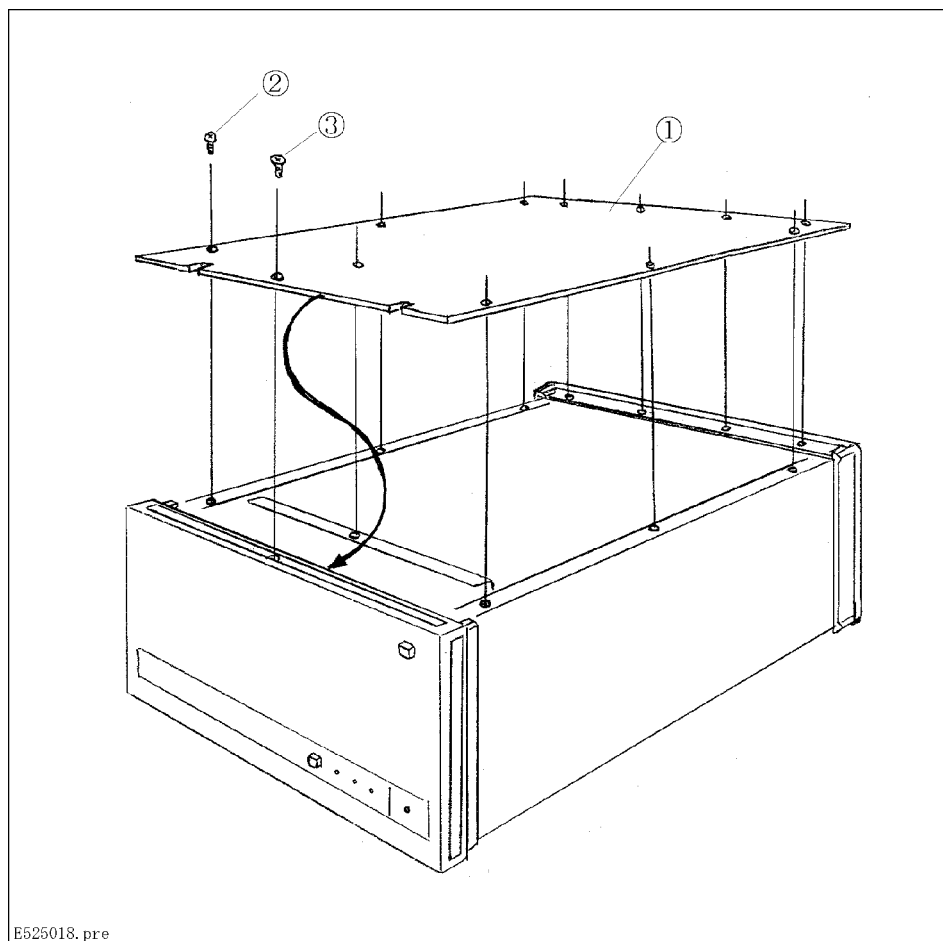
E525019.pre

Figure 5-2. Mainframe (1 of 2)

Table 5-6. Mainframe (1 of 2)

Reference Designation	Part Number (Original Color)	Part Number (New Color) ¹	Quantity	Description
1	5062-3848	5062-3999	2	Side Cover
2	5062-3705	5063-9211	2	Strap Handle
3	5041-8819	5041-9186	2	Front Cap
4	5041-8820	5041-9187	2	Rear Cap
5	5062-3748	5002-1089	1	Bottom Cover
6	5041-8801	5041-9167	4	Foot
7	1460-1345	⇐	2	Tilt Stand
8	5001-0541	5041-9173	2	Trim Side
9	5041-8802	5041-9176	1	Trip Top
10	5062-3736	5002-1048	1	Top Cover
11	0515-1384	⇐	4	Screw M5

¹ For JP10C00351 and above.



E525018.pre

Figure 5-3. Mainframe (2 of 2)

Table 5-7. Mainframe (2 of 2)

Reference Designation	Part Number	Quantity	Description
1	E5250-04003	1	Cover
2	0515-1719	11	Screw M4
3	0515-1012	1	Screw M4

HP E5250A Power Switch

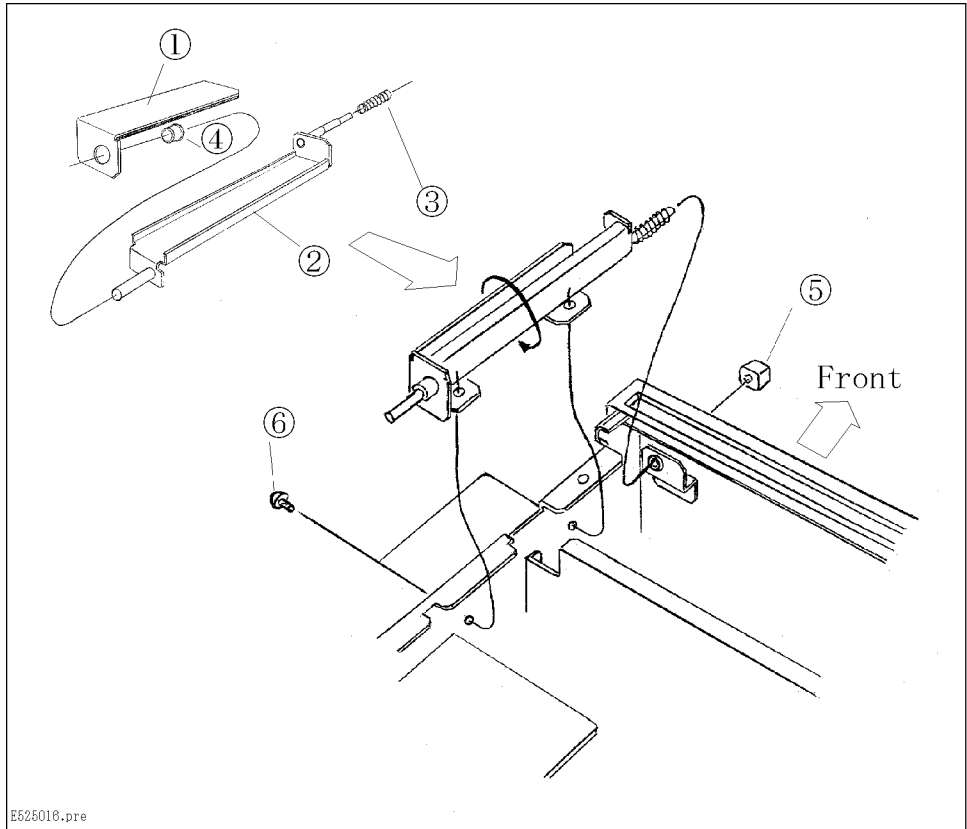


Figure 5-4. Power Switch

Table 5-8. Power Switch

Reference Designation	Part Number	Quantity	Description
1	E5250-01206	1	Angle
2	E5250-01204	1	Angle
3	1460-2360	1	Spring
4	0400-0064	1	Bush
5	5041-0564	1	Key Cap
6	0515-2079	2	Screw M4

HP E5250A Front Panel

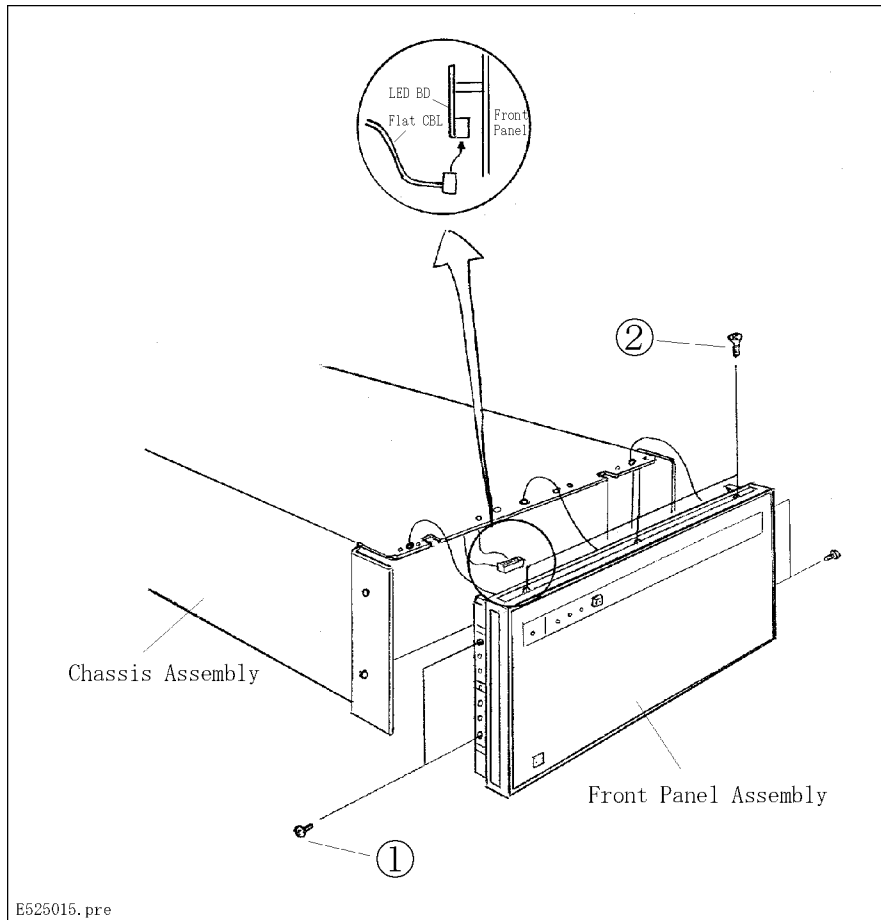


Figure 5-5. Front Panel (1 of 4)

Table 5-9. Front Panel (1 of 4)

Reference Designation	Part Number	Quantity	Description
1	0515-2079	4	Screw M4
2	0515-1012	3	Screw M4

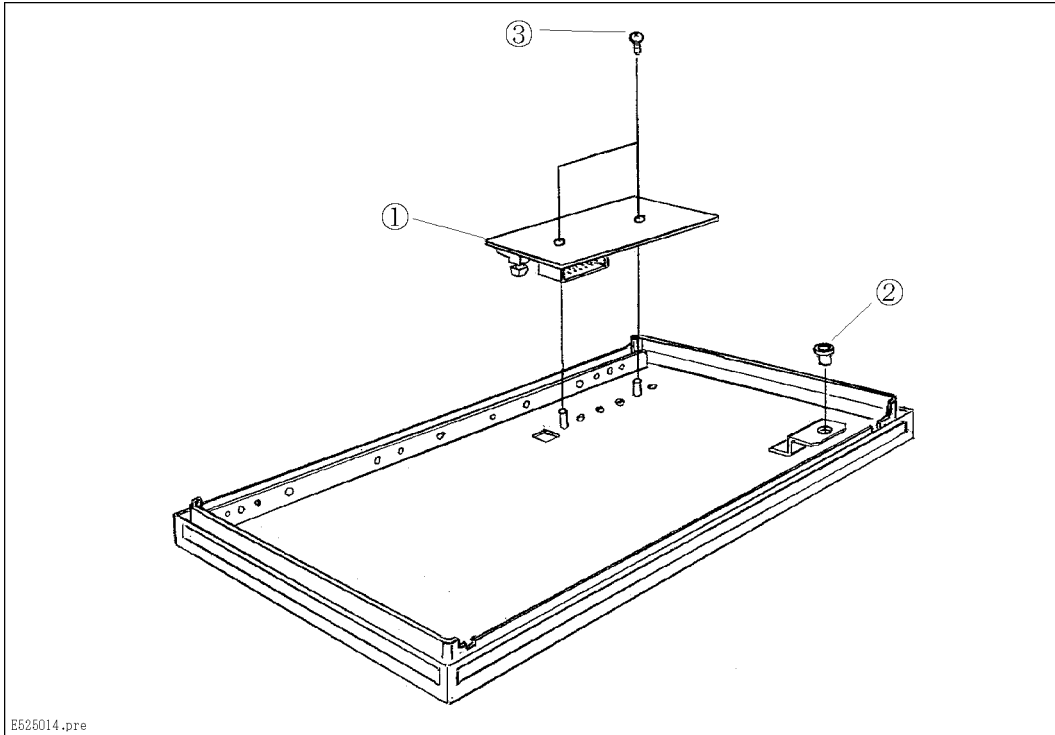


Figure 5-6. Front Panel (2 of 4)

Table 5-10. Front Panel (2 of 4)

Reference Designation	Part Number	Quantity	Description
1	E5250-66503	1	LED Board
2	0400-0157	1	Bush
3	0515-1550	2	Screw M3

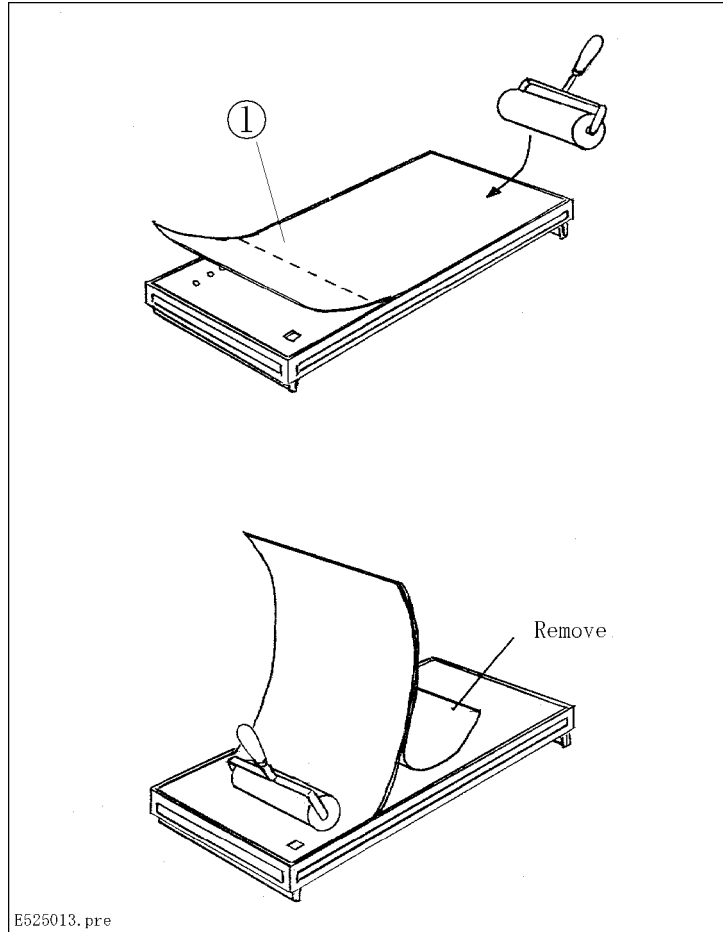


Figure 5-7. Front Panel (3 of 4)

Table 5-11. Front Panel (3 of 4)

Reference Designation	Part Number (Original Color)	Part Number (New Color) ¹	Quantity	Description
1	E5250-87101	E5250-87141	1	Label

¹ For JP10C00351 and above.

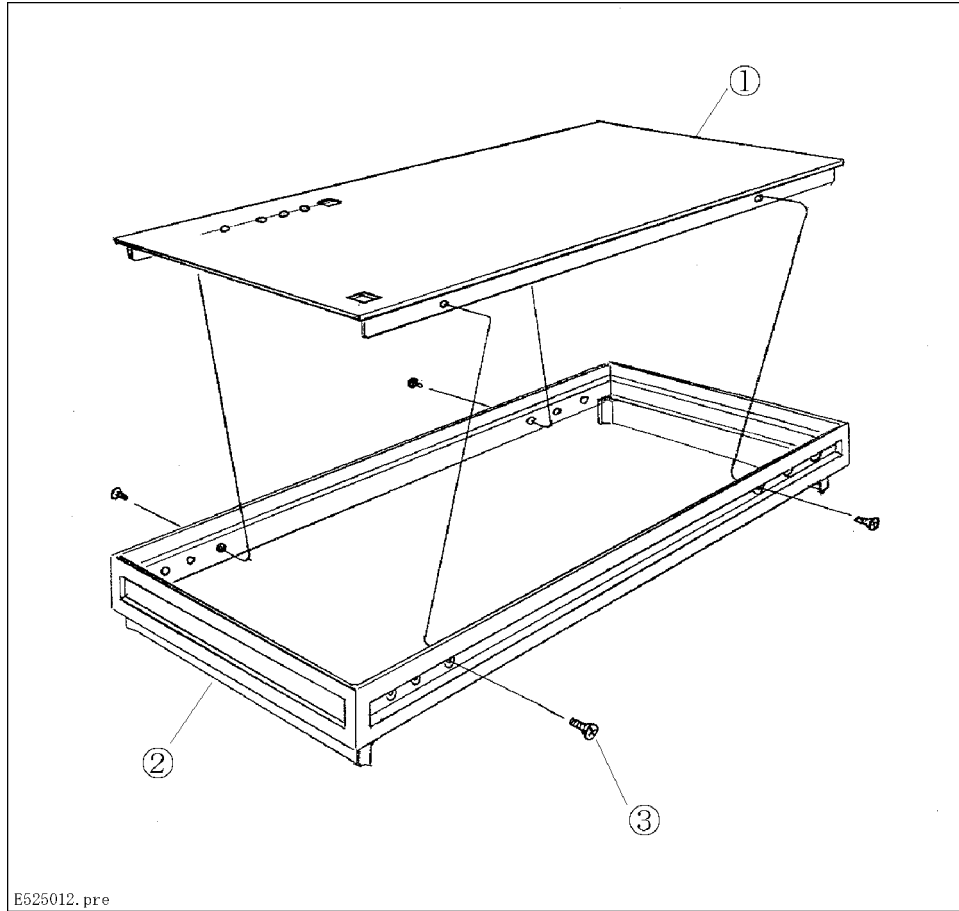


Figure 5-8. Front Panel (4 of 4)

Table 5-12. Front Panel (4 of 4)

Reference Designation	Part Number (Original Color)	Part Number (New Color) ¹	Quantity	Description
1	E5250-00201	⇐	1	Front Sub Panel
2	5021-8407	5022-1190	1	Front Frame
3	0515-1012	⇐	4	Screw M4

¹ For JP10C00351 and above.

HP E5250A CPU and Power Supply

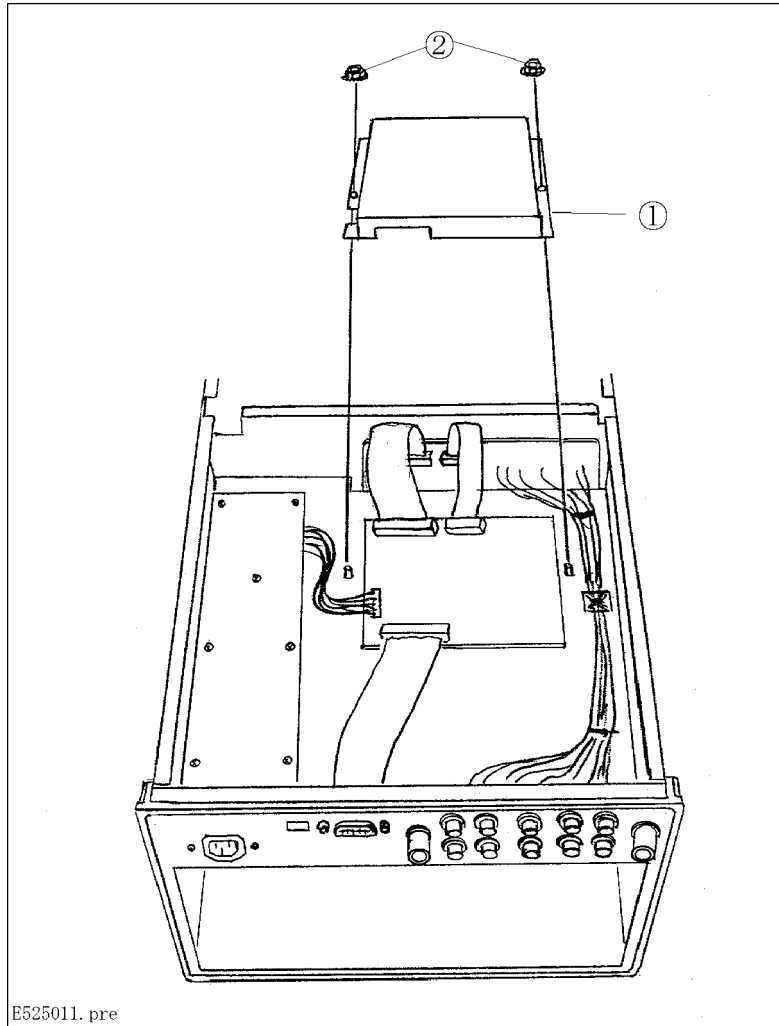


Figure 5-9. CPU and Power Supply (1 of 2)

Table 5-13. CPU and Power Supply (1 of 2)

Reference Designation	Part Number	Quantity	Description
1	E5250-04006	1	Shield Cover
2	05335-0043	2	Nut M4

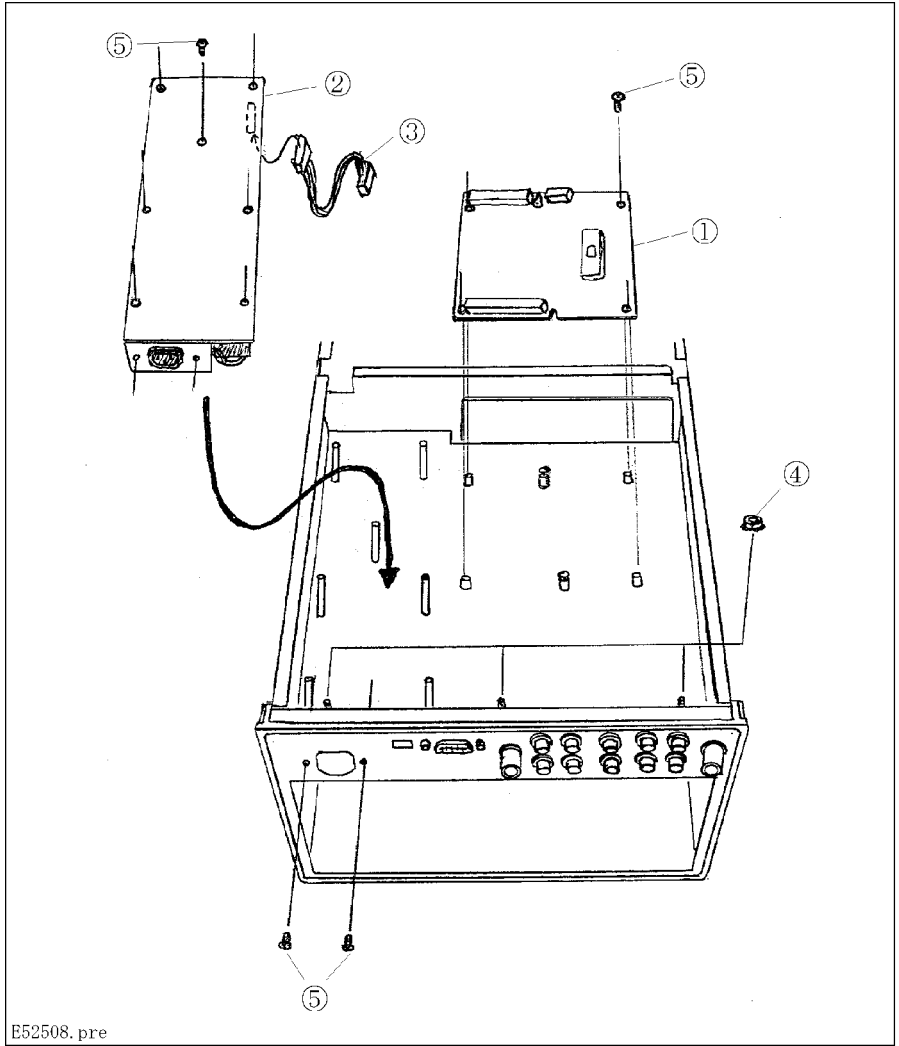
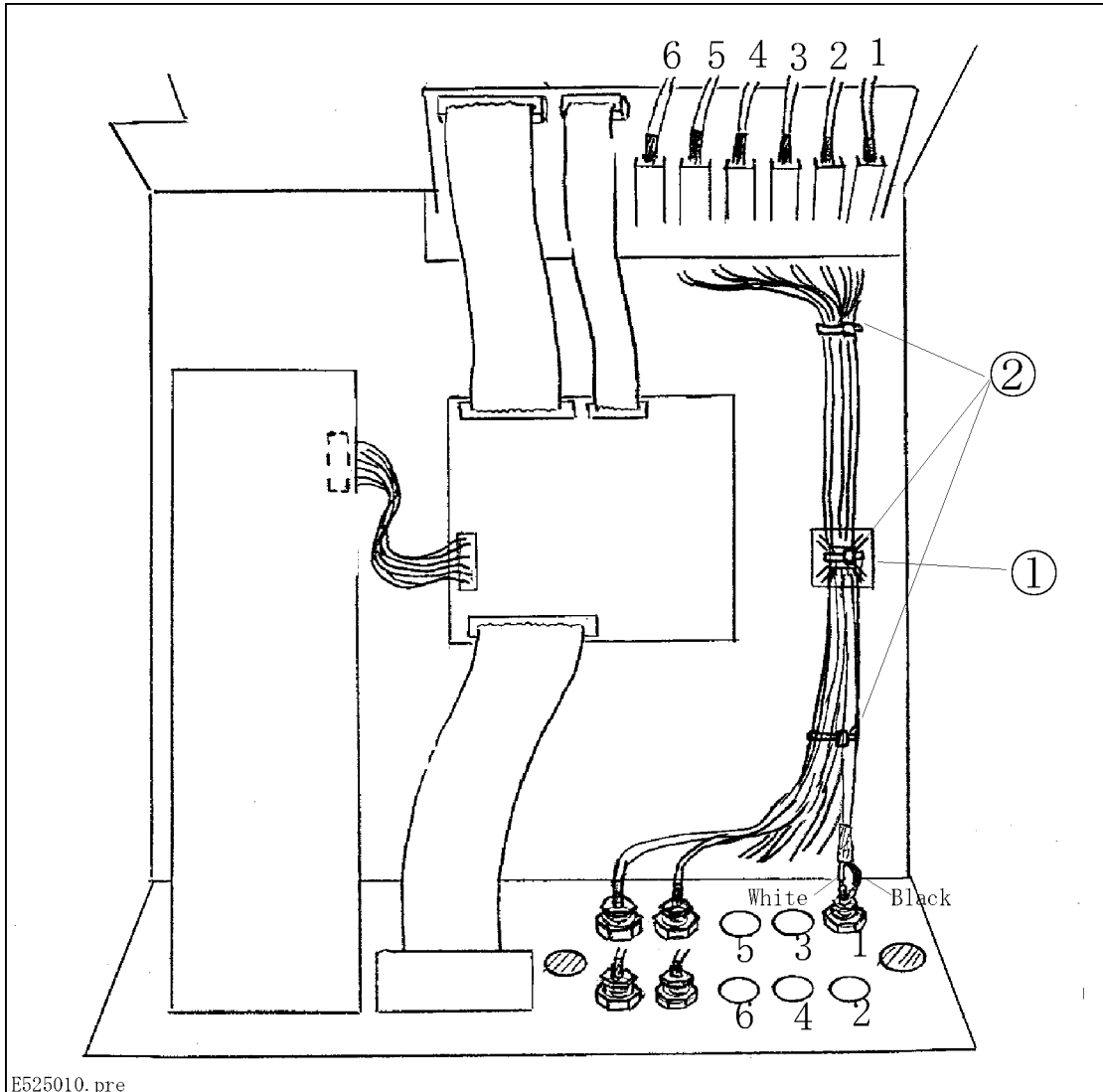


Figure 5-10. CPU and Power Supply (2 of 2)

Table 5-14. CPU and Power Supply (2 of 2)

Reference Designation	Part Number	Quantity	Description
1	E5250-66501	1	CPU Board
2	E5250-61001	1	Power Supply
3	E5250-61626	1	Cable Assembly
4	0535-0043	3	Nut M4
5	0515-1550	13	Screw M3

HP E5250A Mother Board



E525010.pre

Figure 5-11. Mother Board (1 of 3)

Table 5-15. Mother Board (1 of 3)

Reference Designation	Part Number	Quantity	Description
1	1400-1438	1	Cable Mount
2	1400-0493	3	Tie-wrap

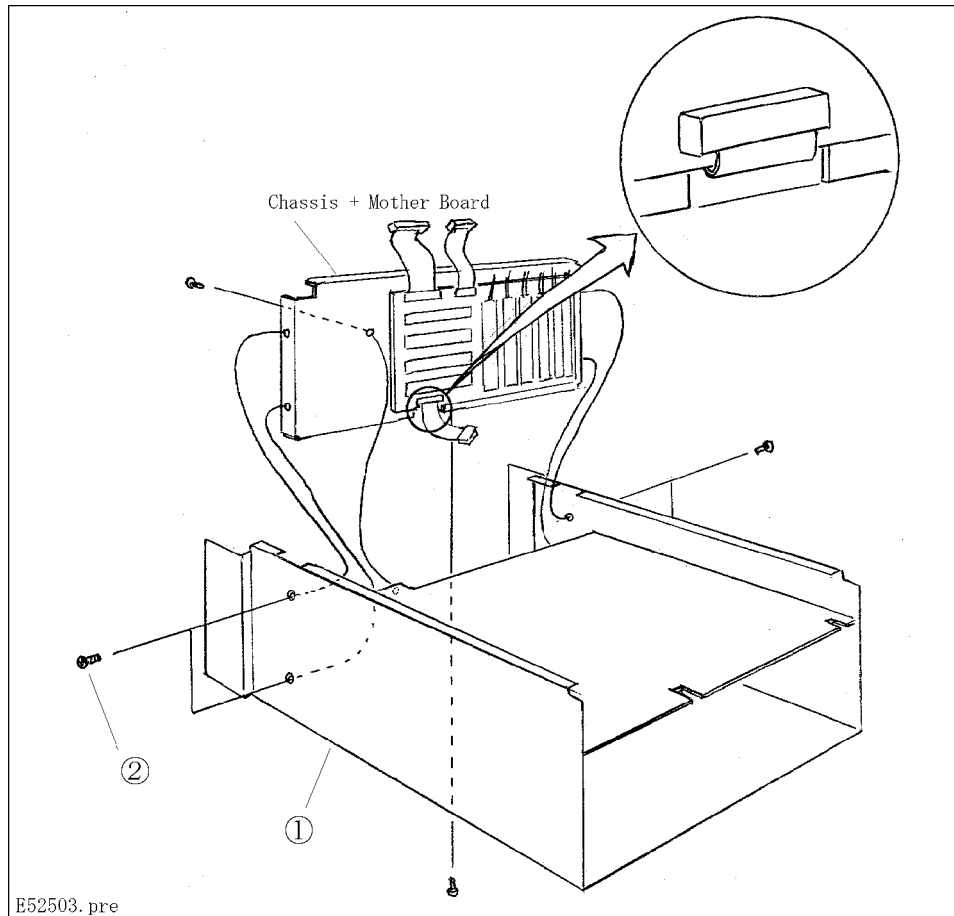


Figure 5-12. Mother Board (2 of 3)

Table 5-16. Mother Board (2 of 3)

Reference Designation	Part Number	Quantity	Description
1	E5250-00101	1	Chassis
2	0515-2079	6	Screw M4

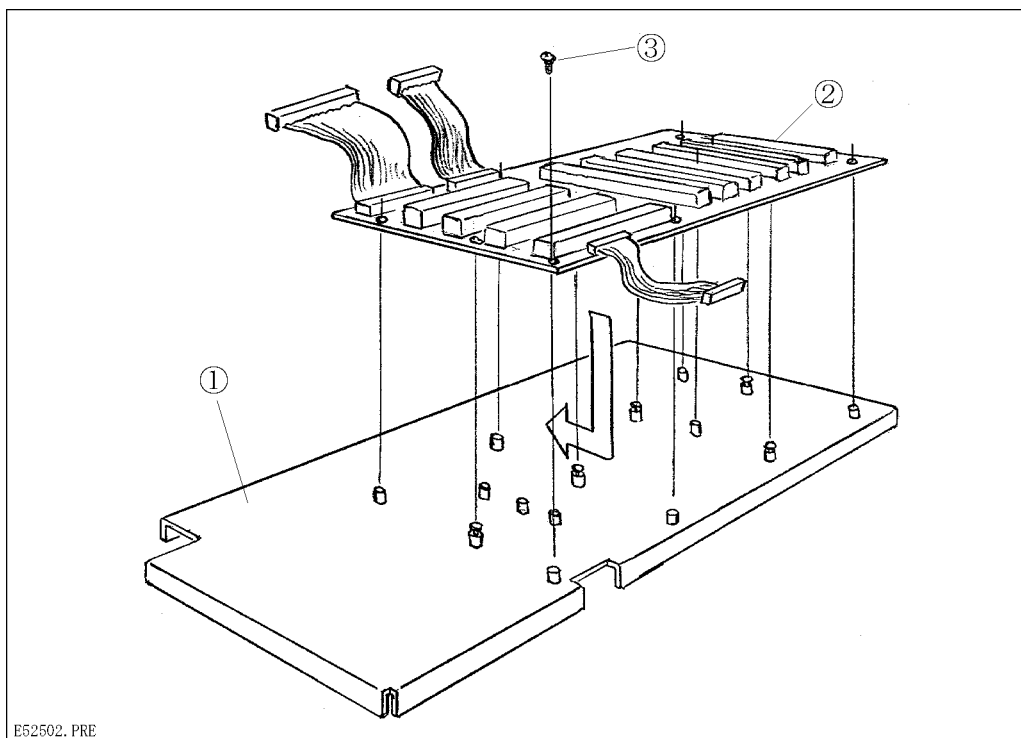


Figure 5-13. Mother Board (3 of 3)

Table 5-17. Mother Board (3 of 3)

Reference Designation	Part Number	Quantity	Description
1	E5250-00103	1	Mother Chassis
2	E5250-66502	1	Mother Board
3	0515-1550	7	Screw M3

HP E5250A Rear Frame

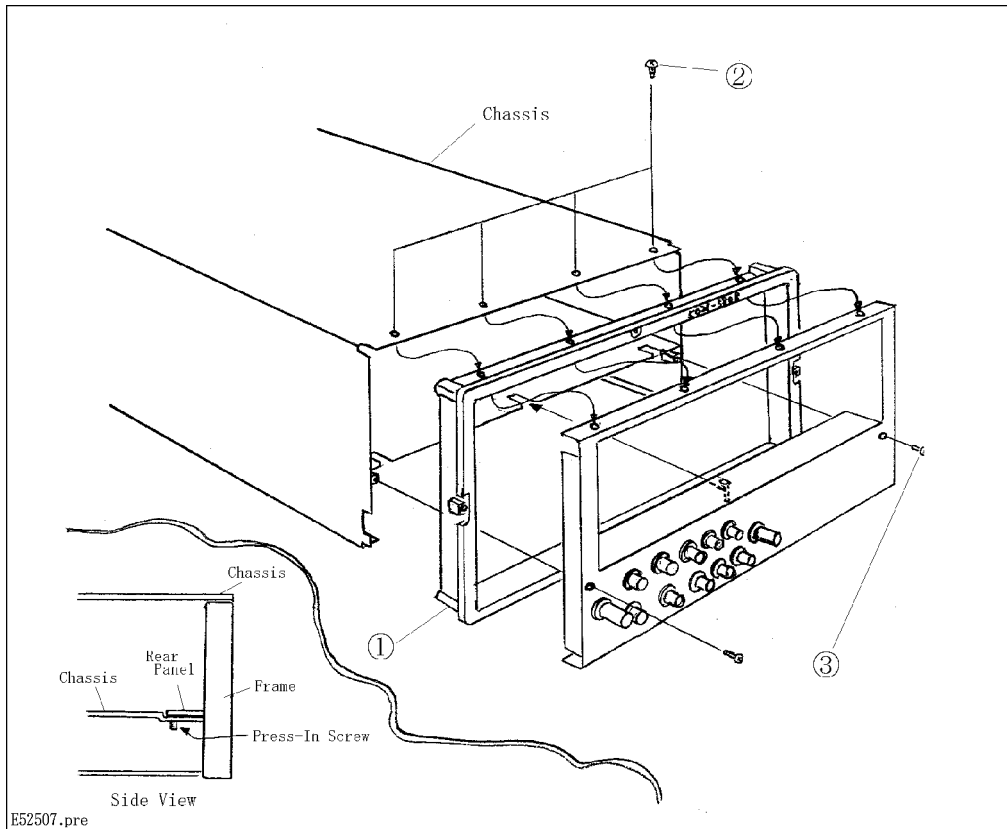


Figure 5-14. Rear Frame (1 of 3)

Table 5-18. Rear Frame (1 of 3)

Reference Designation	Part Number	Quantity	Description
1	5021-5808	1	Rear Frame
2	0515-1719	4	Screw M4
3	0515-1550	2	Screw M3

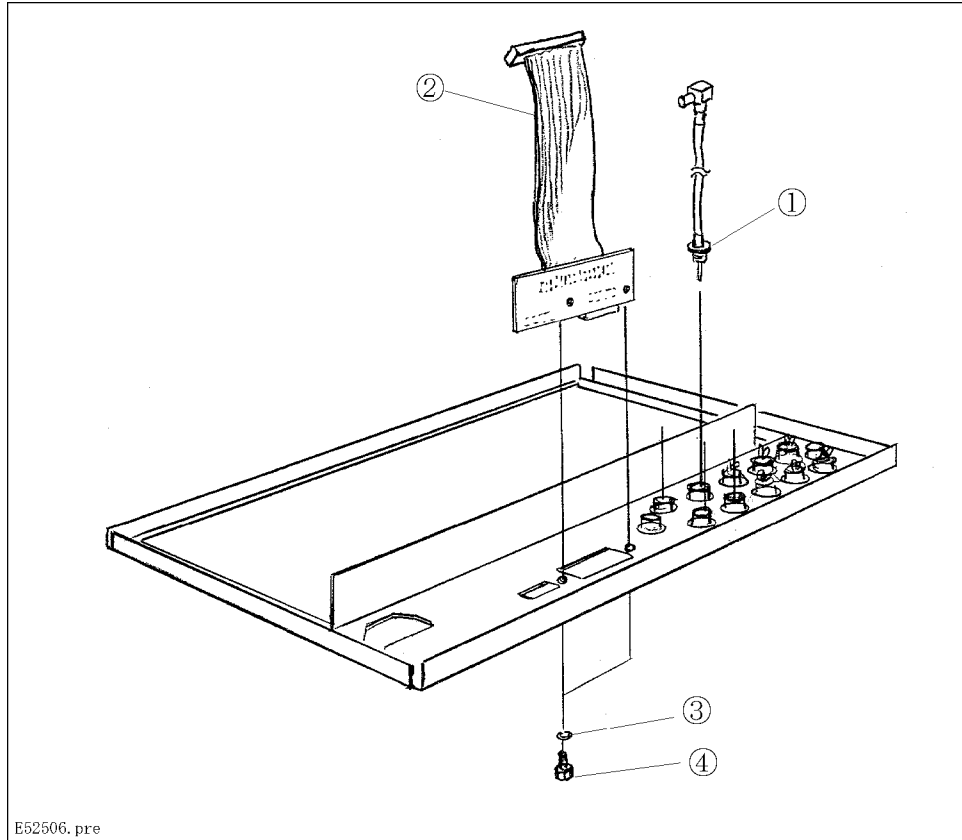


Figure 5-15. Rear Frame (2 of 3)

Table 5-19. Rear Frame (2 of 3)

Reference Designation	Part Number	Quantity	Description
1	E5250-61631	4	Coaxial Cable Assembly
2	E5250-66504	1	HP-IB Board
3	2190-0577	2	Spring Washer
4	0380-0643	2	Screw Hex

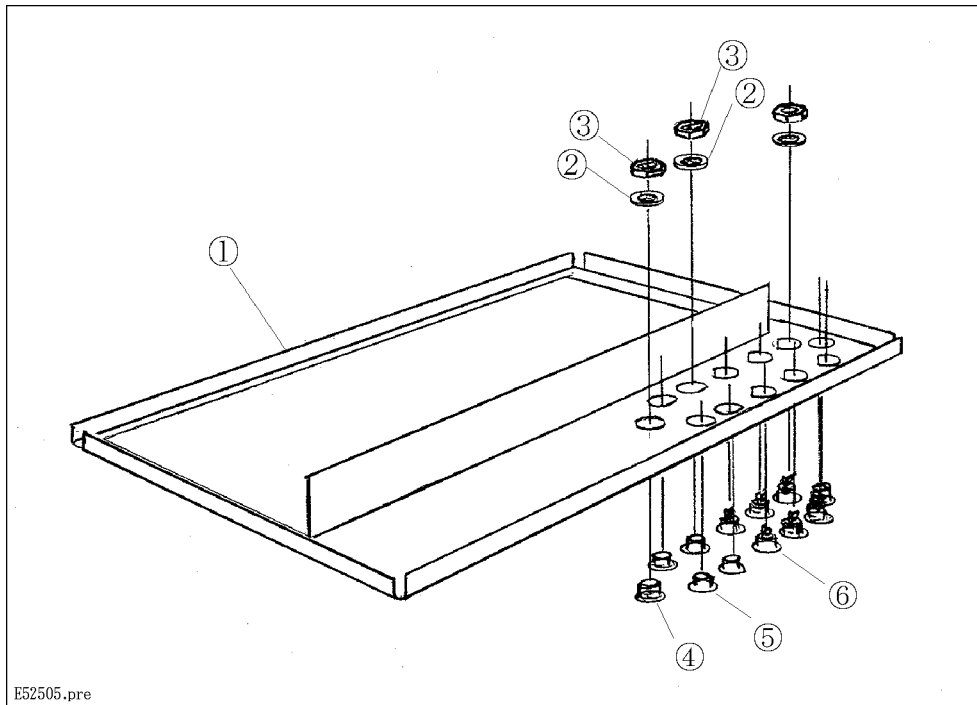


Figure 5-16. Rear Frame (3 of 3)

Table 5-20. Rear Frame (3 of 3)

Reference Designation	Part Number	Quantity	Description
1	E5250-04002	1	Rear Panel
2	2190-0054	6	Washer
3	2950-0054	6	Nut
4	E5250-24003	2	Guide
5	1250-0102	4	BNC Connector
6	1250-1906	6	Triaxial Connector

HP 16495A/F Connector Plate

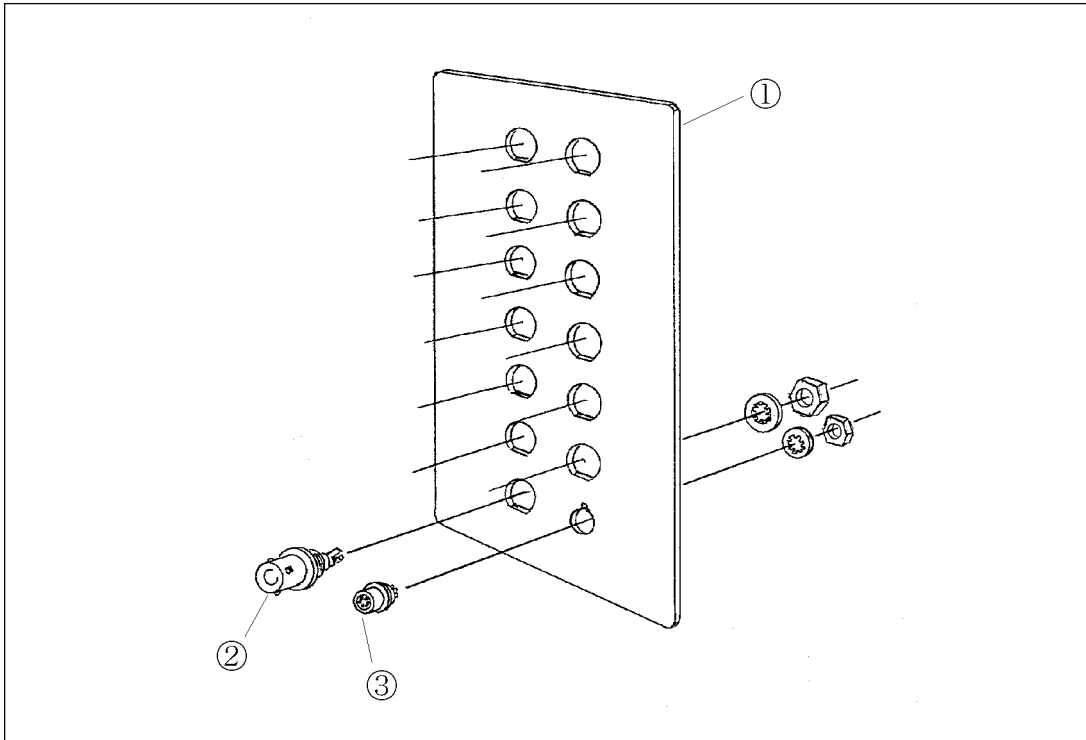


Figure 5-17. HP 16495A/F (1 of 2)

Table 5-21. HP 16495A/F (1 of 2)

Reference Designation	Part Number	Quantity	Description
1	16495-00201	1	(HP 16495A) Panel
	16495-00211	1	(HP 16495F #001) Panel
	16495-00206	1	(HP 16495F #002) Panel
2	1250-2618	13	(HP 16495F #001) Triaxial Connector
	1250-1906	13	(HP 16495A/16495F #002) Triaxial Connector
3	1252-1419	1	Connector 6-Pin

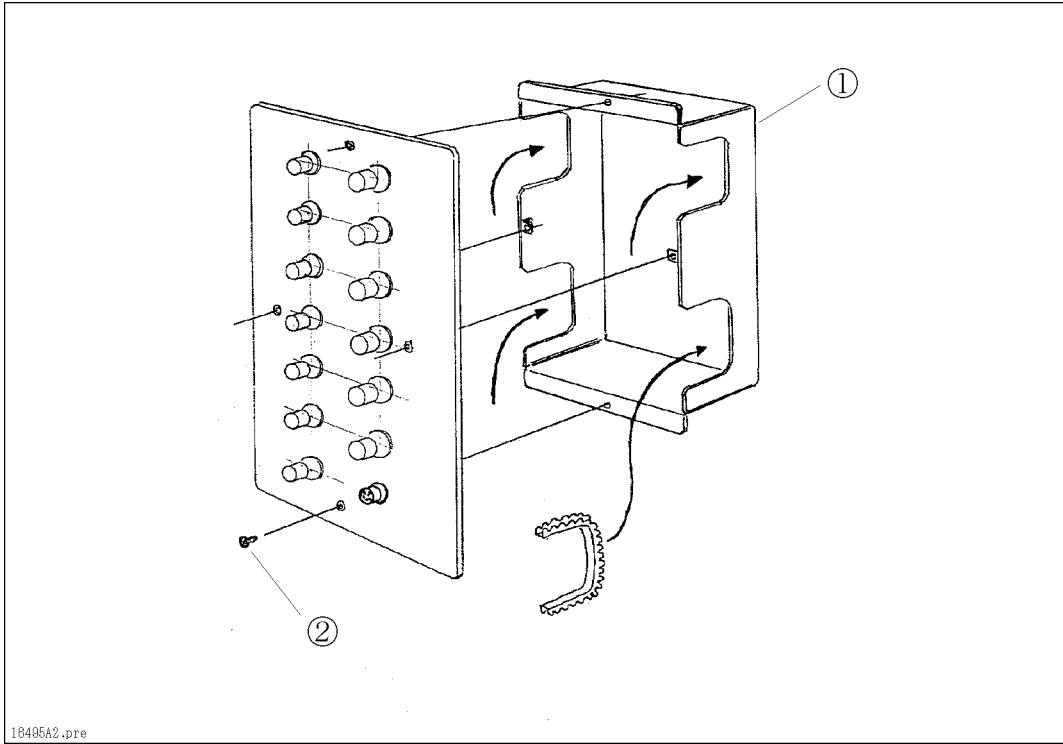


Figure 5-18. HP 16495A/F (2 of 2)

Table 5-22. HP 16495A/F (2 of 2)

Reference Designation	Part Number	Quantity	Description
1	16495-04001	1	Cover
2	0515-0914	4	Screw M3

HP 16495B/G Connector Plate

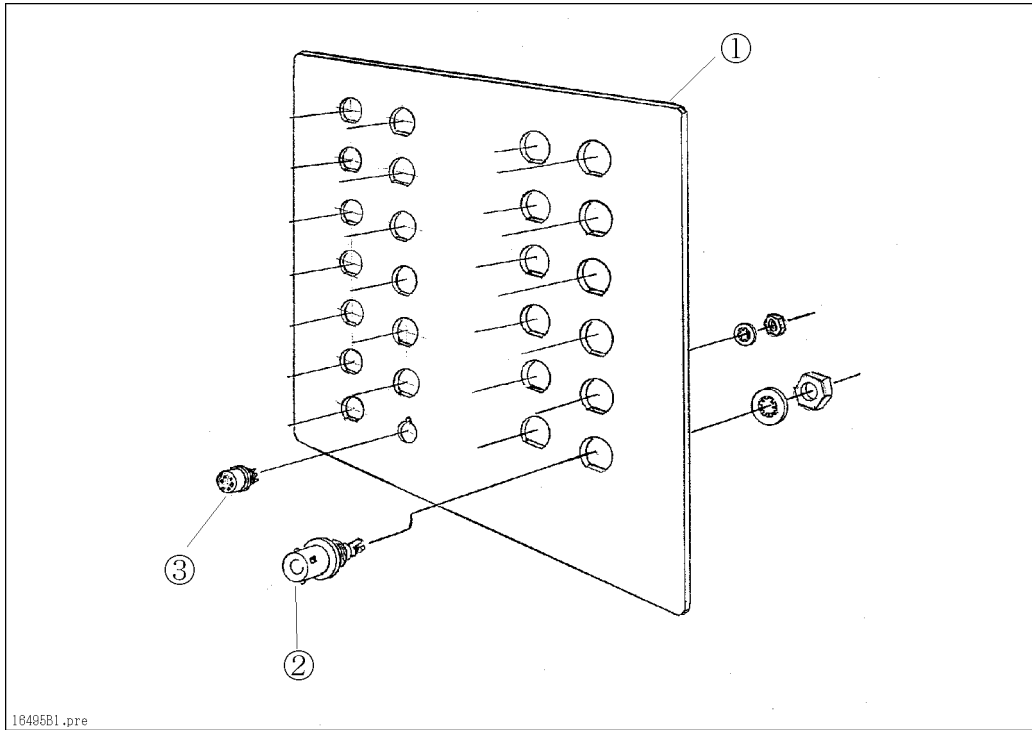


Figure 5-19. HP 16495B/G (1 of 2)

Table 5-23. HP 16495B/G (1 of 2)

Reference Designation	Part Number	Quantity	Description
1	16495-00202	1	(HP 16495B) Panel
	16495-00212	1	(HP 16495G #001) Panel
	16495-00207	1	(HP 16495G #002) Panel
2	1250-2618	25	(HP 16495G #001) Triaxial Connector
	1250-1906	25	(HP 16495B/HP 16495G #002) Triaxial Connector
3	1252-1419	1	Connector 6-Pin

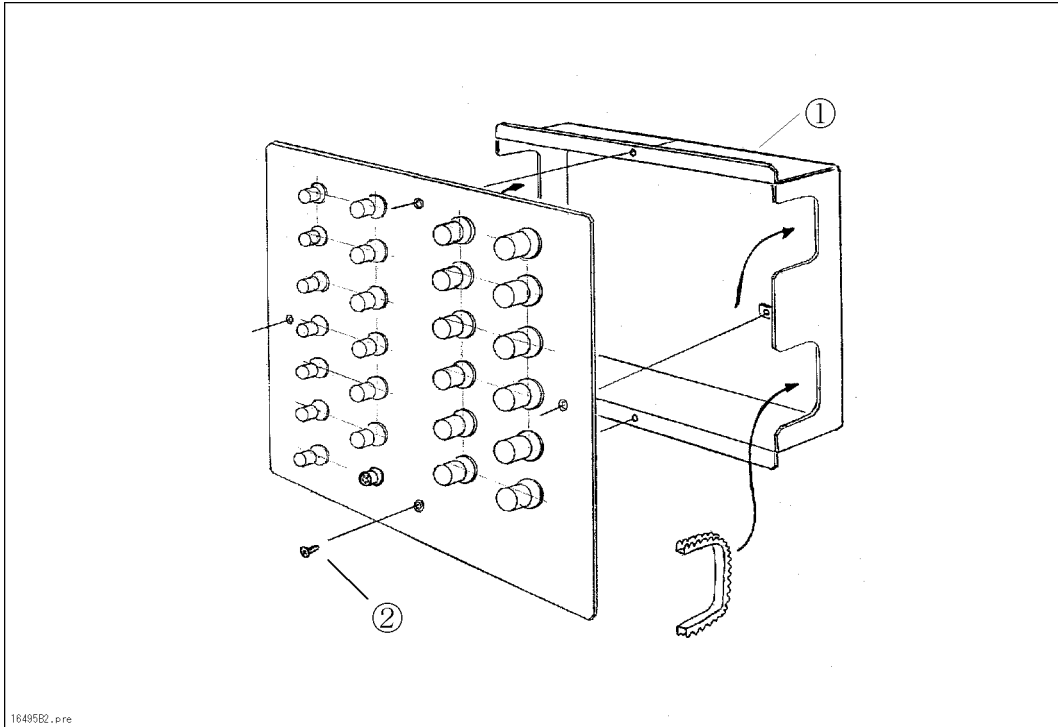


Figure 5-20. HP 16495B/G (2 of 2)

Table 5-24. HP 16495B/G (2 of 2)

Reference Designation	Part Number	Quantity	Description
1	16495-04002	1	Cover
2	0515-0914	4	Screw M3

HP 16495C Connector Plate

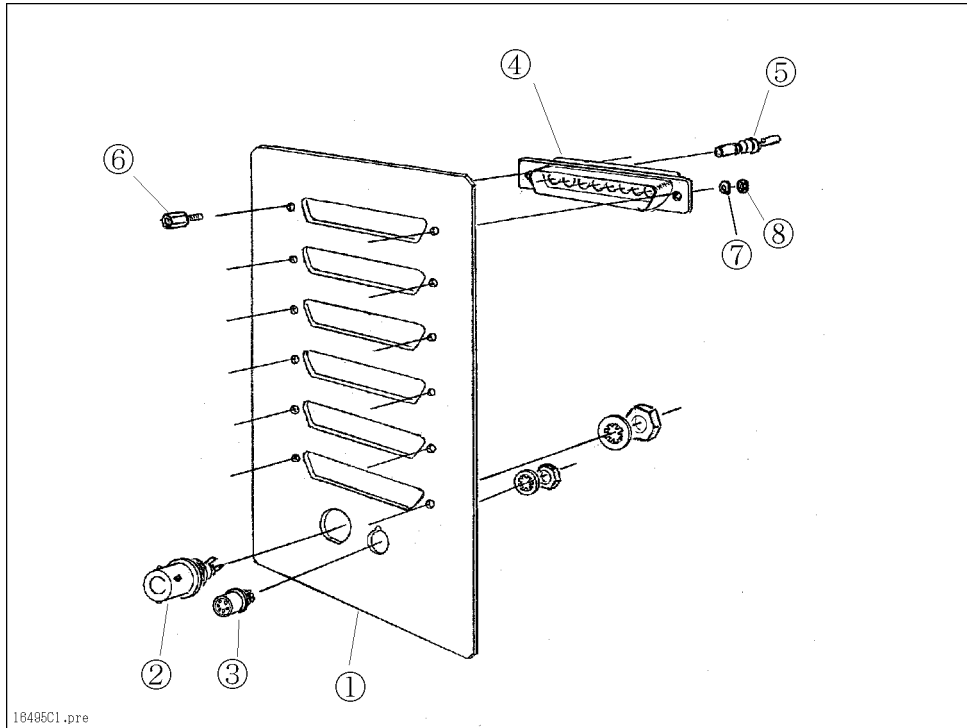


Figure 5-21. HP 16495C (1 of 2)

Table 5-25. HP 16495C (1 of 2)

Reference Designation	Part Number	Quantity	Description
1	16495-00203	1	Panel
2	1250-1906	1	Triaxial Connector
3	1252-1419	1	Connector 6-Pin
4	1251-2367	6	Connector 8-Pin
5	1251-0179	48	Contact Pin
6	0380-3070	12	Screw
7	2190-0913	12	Spring Washer
8	2260-0002	12	Nut

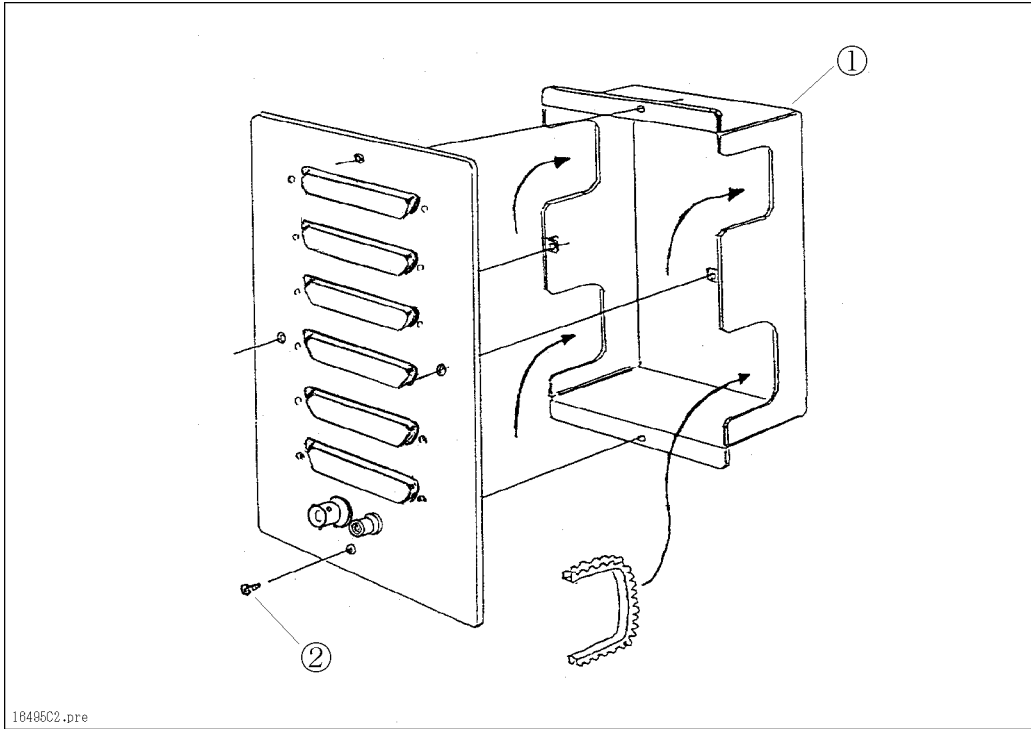


Figure 5-22. HP 16495C (2 of 2)

Table 5-26. HP 16495C (2 of 2)

Reference Designation	Part Number	Quantity	Description
1	16495-04001	1	Cover
2	0515-0914	4	Screw M3

HP 16495D Connector Plate

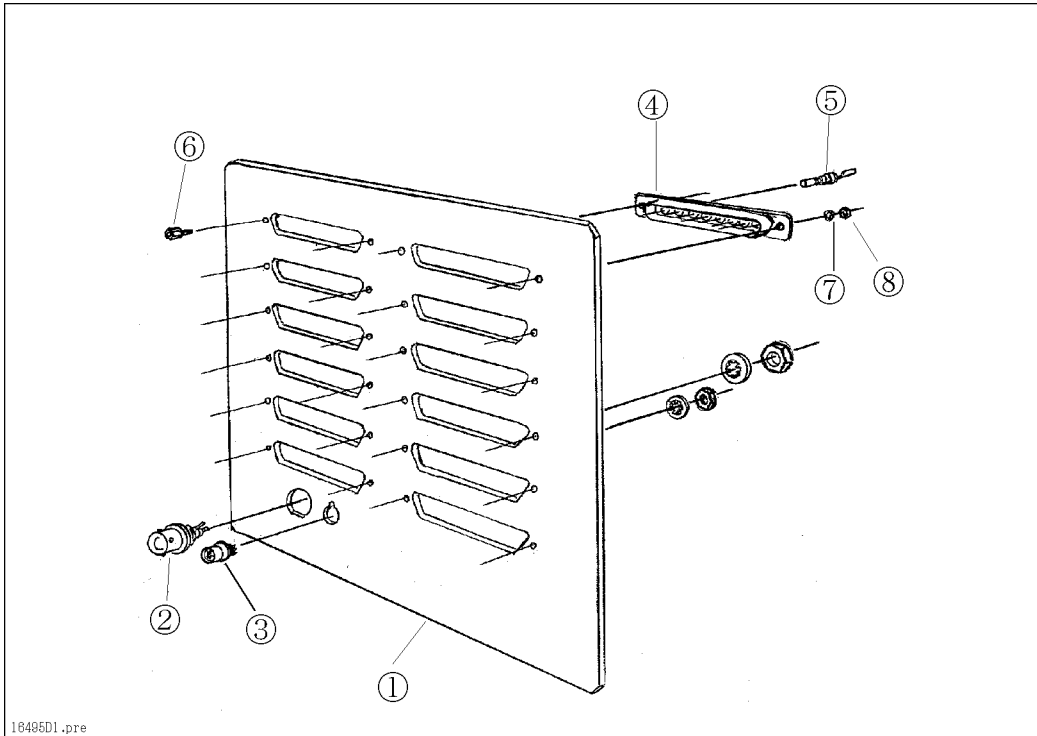


Figure 5-23. HP 16495D (1 of 2)

Table 5-27. HP 16495D (1 of 2)

Reference Designation	Part Number	Quantity	Description
1	16495-00204	1	Panel
2	1250-1906	1	Triaxial Connector
3	1252-1419	1	Connector 6-Pin
4	1251-2367	12	Connector 8-Pin
5	1251-0179	96	Contact Pin
6	0380-3070	24	Screw
7	2190-0913	24	Spring Washer
8	2260-0002	24	Nut

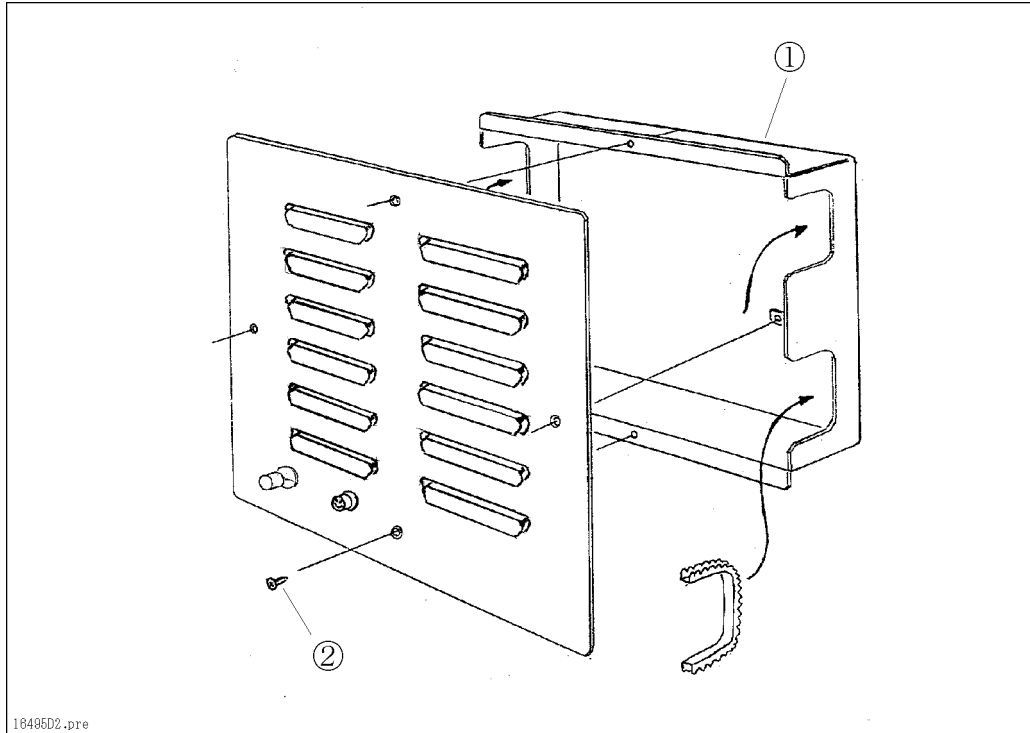


Figure 5-24. HP 16495D (2 of 2)

Table 5-28. HP 16495D (2 of 2)

Reference Designation	Part Number	Quantity	Description
1	16495-04002	1	Cover
2	0515-0914	4	Screw M3

Index

1

10×12 matrix switch, 4-1

2

24 (8×3) channel multiplexer, 4-2

A

assembly-level replacement, 1-3

AUX input, 4-3

B

backplane, 4-10

backplane bus, 4-1

banana-BNC adapter, 1-4, 1-5, 2-33

banana-Dsub adapter, 1-4, 1-5, 2-33

banana-triax adapter, 1-4, 1-5, 2-33

BASIC BIN files, 2-6

bias input ports, 1-2, 4-3

block

 multiplexer, 4-2, 4-3

BNC cable, 1-4

BNC shorting cap, 1-3, 1-4, 2-3

C

cable connections

 internal, 1-2

calibration cycle, 1-4

CARD1 PV MENU, 2-10

closed channel resistance specifications, 2-20

closed channel resistance test, 2-20, 2-31

 connection details (HP E5252A), 2-39

 connection details (HP E5255A), 2-42

 HP E5252A, 2-39

 HP E5255A, 2-42

 measurement sequence (HP E5252A), 2-39

 measurement sequence (HP E5255A), 2-42

 test connections, 2-21

 test equipment, 2-20

 tools, 2-33

C-meter, 1-1

connector plate, 5-28, 5-30, 5-32, 5-34

consumables, 5-12

controller, 1-1

controller test, 2-29

CPU board, 4-9, 5-2

 parts, 5-20

CPU self-test, 1-2

CV ports, 1-2

D

diagram

 CPU and control, 4-9

DIP switch

 E5250A, 2-1

 factory setting, 4-5

 HP E5250A, 4-5

 HP E5255A, 4-3, 4-4

 setting, 3-1

F

Fail LED, 3-3

field replaceable units (FRUs), 3-2

flat-blade screwdriver, 1-4

front panel

 parts, 5-16

front panel interface test, 2-30

H

hardware information, 4-1

HF ports, 1-2

HP 16495A, 5-28

HP 16495B, 5-30

HP 16495C, 5-32

HP 16495D, 5-34

HP 16495F, 5-28

HP 16495G, 5-30

HP 3458A, 1-4, 2-6, 2-8, 2-31

HP 4155A, 1-1

HP 4156A, 1-1

HP 4339A/B, 1-4, 2-6, 2-8, 2-31

HP BASIC, 1-3

HP E5250A, 1-1, 1-4

 assemblies, 5-2

HP E5252A, 1-1, 1-2, 4-1

 block diagram, 4-2

 parts, 5-3

HP E5255A, 1-1, 1-2, 4-2

 block diagram, 4-3

 parts, 5-3

HP-IB address

 setting, 4-5

HP-IB board, 5-2
HP service center, 1-3

I

ICS, 1-1
incoming inspection, 1-2
isolation resistance specifications, 2-14
isolation resistance test, 2-14
 connection details (HP E5252A), 2-37
 connection details (HP E5255A), 2-41
 HP E5252A, 2-36
 HP E5255A, 2-40
 measurement sequence (HP E5252A), 2-36
 measurement sequence (HP E5255A), 2-40
 test connections, 2-15
 test equipment, 2-14
 tools, 2-32
isolation test adapter, 1-4, 1-5, 2-32
IV input, 4-3, 4-4

K

Kelvin connection, 1-2

L

leak test, 1-3
LED board, 5-17
LEDs
 front panel, 2-1, 2-2
Line LED, 3-3
low current measurement, 4-1
low leakage switch, 1-1

M

mainframe, 1-1
 parts, 5-13
matrix switch, 1-2
MIL-STD-45662A, 1-3
module extractor, 1-4
module interface bus, 4-9
mother board, 4-10, 5-2
 parts, 5-22
MT5250, 1-3
 3.5-inch disk, 1-5
 starting, 2-6
 STARTUP MENU, 2-7
multiplexer, 1-2
 example, 4-4

N

National Institute of Standards and Technology
(NIST), 1-4

O

operational verification, 1-2
options and accessories, 1-5

P

parts-level replacement, 1-3
performance verification, 1-2, 1-3, 2-1
 cycle, 1-3, 2-5
 environment, 2-6
 execution mode, 2-10
 execution time, 2-35
 fail, 2-26
 fail (HP E5252A), 3-5
 fail (HP E5255A), 3-7
 measurement uncertainty, 2-33
 operating theory, 2-31
 overview, 2-5
 performing all tests, 2-10
 preparation, 2-6
 printer setting for REPORT RESULT, 2-27
 reporting test results, 2-25
 required equipment, 2-5
 saving test results, 2-10
 softkeys, 2-11
 temperature and humidity, 1-3
 test equipment configurations, 2-7
 test procedure, 2-6
 test record, 2-5
 test record example (HP E5252A), 2-44
 test record example (HP E5255A), 2-59
 tools and instruments, 2-32
 traceability, 2-33
Philips screwdriver, 1-4
power-on test, 1-2, 2-1
 DIP switch setting, 4-6
 error codes, 4-7
 explanations, 4-6
 fail, 3-3
 LED patterns, 4-7
 result display, 2-1
 sequence, 2-2
power supply, 4-9, 5-2
 parts, 5-20
power switch
 parts, 5-15
pre-selector, 3-2, 4-1, 4-3
product support package, 1-5
PV/Diag (MT5250) disk, 1-4
PV MAIN MENU, 2-9

R

rear frame
 parts, 5-25
rear panel

- HP E5250A, 4-5
- RECONFIG MENU, 2-7
- RECONFIG MENU operation, 2-24
 - HP-IB address entry, 2-24
 - printer control setting entry, 2-24
- relays
 - wearing out, 1-3
- relay test, 1-3, 2-13, 2-30, 2-31
 - close test, 2-4
 - fail, 3-4
 - front panel, 2-2
 - IBASIC, 2-4
 - open test, 2-4
 - operation, 2-2
 - required equipment, 2-2
 - test equipment, 2-13
 - test method, 2-13
 - theory, 2-4
- relay test adapter, 1-3, 1-4, 2-3, 2-13, 2-33
- repair policy, 1-3
- replaceable parts, 5-1
- REPORT RESULT MENU, 2-25
- required equipment, 1-4
- resistors
 - bias path, 4-3
 - E5255A, 4-4
- retrofit products, 1-5

ROM, 5-2

S

- selective test mode, 2-10
- self-test
 - fail, 3-4
- self-test utility software, 1-2, 1-3
- sequential test mode, 2-10
- service kit, 1-5
- SMU, 1-1
- SMU ports, 1-2
- specifications, 1-1

T

- tools, 5-12
- torx TX15 driver, 1-4
- torx TX25 driver, 1-4
- torx wrench for plug-in modules, 1-4
- triax-BNC adapter, 1-4, 1-5, 2-32
- triaxial cable, 1-4
- trouble isolation, 2-29, 2-30, 3-4
- TROUBLE ISOLATION MENU, 2-29
- troubleshooting
 - failure modes, 3-1
 - unable to control, 3-4
- troubleshooting procedure, 3-1

