

Agilent 4285A Precision LCR Meter Performance Test Program

Operation Manual

Second Edition



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Manual Printing History

The manual's printing date and part number indicate its current edition. The printing date changes when a new edition is printed. (Minor corrections and updates that are incorporated at reprint do not cause the date to change.) The manual part number changes when extensive technical changes are incorporated.

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How to use this manual

Section 1 of this manual gives general information about the Agilent 4285A Performance Test Program. Section 2 describes the program's operation. A step by step test procedure is not given in Section 2, because the procedure is displayed on the computer's screen. Appendix A describes the program flow. Appendix B describes the program's main display functions.

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SECTION 1

GENERAL INFORMATION

1-1. INTRODUCTION

The HP 4285A Performance Test Program is designed to minimize the test time and to help eliminate human error while performance testing the HP 4285A. When executing the program, the computer controls the HP 4285A under test and the related test equipment, and displays the test instructions. Test setup figures are included in this manual, and are not displayed on the computer's display screen. The standard capacitor's calibration data is stored on the performance test disk, and is used during the test. A hard copy of the Performance Test Record can be printed out by a printer.

The Performance Test Program is supplied with the 5.25 inch floppy disk and 3.5 inch floppy disk. The following table shows the part number for each disk type.

Table 1-1. HP 4285A Performance Test Program

Program Part Number	Contents
04285-65001	Operation Manual (04285-90032) Program Disk (5.25 inch)
04285-65002	Operation Manual (04285-90032) Program Disk (3.5 inch)

1-2. SOFTWARE ENVIRONMENT

HP BASIC revision 5.0 or above and the following additional binary files are required to run this program.

CRTA, CRTX, CLOCK, ERR, HPIB, IO, KBD

1-3. PERFORMANCE TESTS INCLUDED IN THE PROGRAM

The performance test program includes all the necessary tests to verify that the HP 4285A meets its published specifications. Table 1-3 lists the performance tests included in the performance test program. The performance test program automatically identifies if an HP 4285A has Option 001 and 002 installed, and performs the performance test according to the options installed.

Table 1-3. Performance Test List

1. Test Signal Frequency Accuracy Test
2. Test Signal Level Monitor Accuracy Test
3. Test Signal Level Accuracy Test
4. Impedance Measurement Accuracy Test
5. Store and Load Function Test
6. DC Bias Level Accuracy test (option 001 only)
7. Voltage Ratio Monitor Accuracy Test (option 002 only)
8. Accessory Control IF Function Test (option 002 only)

1-4. MAKING A BACKUP COPY

The performance test program disk is not write protected, because the HP-IB address data, a standard's calibration data, and the test results are written on the disk. Making and Using a back up copy of the performance test program is recommended, but do not copy the program for any purpose other than making a backup copy. Table 1-2 lists the file names.

Table 1-2. Program File Names

File Name	Description
TEST_4285A	Performance test main program
HPIB_ADRS	HP-IB address data
CAL_DATA	Test equipment's calibration data
MEAS_DATA	Test result data

1-5. TEST CONDITIONS

All tests must be performed within a temperature range of $23\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$, and all test equipment must be allowed to warm up completely before starting the test.

1-6. RECOMMENDED TEST EQUIPMENT

Table 1-4 shows the recommended equipment for the performance test, with which the test can be performed automatically. If the recommended test equipment is not available, equipment whose specifications equal to or surpass those of the recommended equipment may be used. (Refer to CHAPTER 1 PERFORMANCE TESTS of the HP 4285A Maintenance Manual.) When an electronic counter, Power Meter or a multi-meter not listed on Table 1-3 is used, it must be set up manually and test results must be entered manually from the computer's keyboard.

Table 1-4. Recommended Test Equipment

Equipment	Recommended Model
Electronic Counter	HP 5334A/B
Multimeter	HP 3458A
Power Meter	HP 436A, HP 437B, or HP 438A
Power Sensor	HP 8482A
LCR Meter	HP 4284A (SN 2940J01456 or above)
Computer	HP 9000 series 200 or series 300 with more than 1 M byte RAM
Standard Capacitor Set	HP 16380A
OPEN Termination	HP 42090A
SHORT Termination	HP 42091A
100 Ω Resistor ¹	HP 42102A
20 cm Air Line ²	HP 11567A
0 Ω Termination ²	HP PN 04191-85300
0 S Termination ²	HP PN 04191-85302
Terminal Adapter	HP 16085B
Step Attenuator ³	HP 8495A (Option 001)
Fixed Attenuator (20 dB) ³	HP 8491A (Option 020)
1 m Test Leads	HP 16048A
2 m Test Leads	HP 16048D
Interface Box	HP PN 04284-65007
Power Splitter	HP PN 04192-61001
BNC(f)-BNC(f) Adapter	HP PN 1250-0080
BNC(f)-Dual Banana Adapter	HP PN 1251-2277
BNC(m)-N(f) Adapter ³	HP PN 1250-1477
BNC(m)-BNC(m) Cable 30 cm ³	HP PN 8120-1838
BNC(m)-BNC(m) Cable 61 cm	HP PN 8120-1839
Memory Card	HP PN 04278-89001
Bias IF Simulator ³	HP PN 42841-65001

¹: 100 Ω Resistor HP PN 04285-61001, HP 4285A furnished accessory can be used.

²: Included in the HP 16342A Calibration Equipment Kit

³: Option 002 only

SECTION 2

OPERATION

2-1. INITIAL OPERATING PROCEDURE

This paragraph gives the pre-performance test procedure to perform before each performance test.

1. Connect the HP 4285A and a computer using an HP-IB cable. If you are going to perform an automatic test, connect the multimeter, power meter, and the electronic counter, recommended in Table 1-3, to the computer using HP-IB cables. The computer's HP-IB interface select code must be set to 7. Figure 2-1 shows the setup.

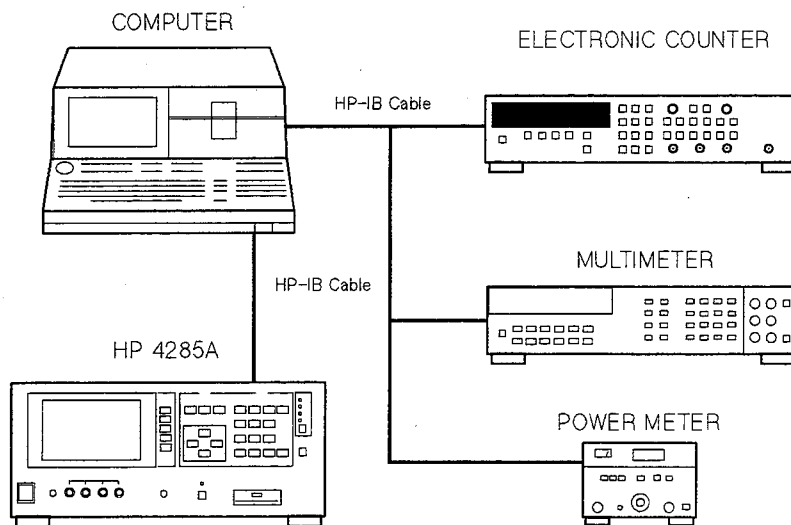


Figure 2-1. Performance Test Program Setup

2. Turn the instruments **ON**.
3. Boot up BASIC and load the necessary binary files into the computer. The necessary **BIN**aries for BASIC revision 5.0 are as follows.

CRTA, CRTX, CLOCK, ERR, HPIB, IO, KBD

4. Load the performance test program in the computer, the file name is "**TEST_4285A**".

NOTE

Do not remove the performance test program disk from the computer while the performance test program is running.

5. Press the computer's **RUN** key, the copyright and a list of the required test equipment will be displayed. Press the '**Next Step**' softkey to continue the program.
6. The display shown in Figure 2-2 appears. When you clear the performance test results of the last performance test performed and perform the test from the beginning, press the '**Clear**' softkey. When you want to maintain the last performance test results and modify them, press the '**Maintain**' softkey.

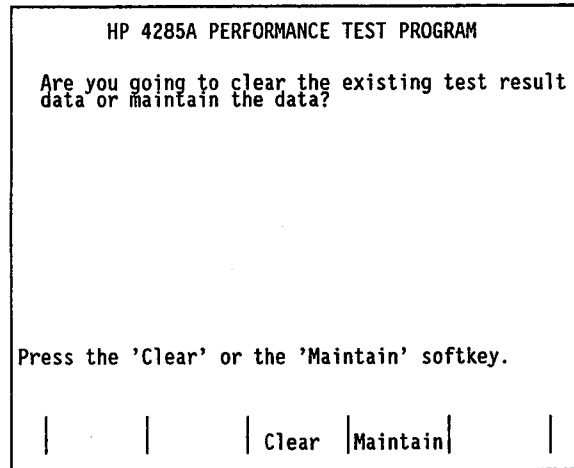


Figure 2-2. Test Result Handling Display

7. The instrument registration display will appear. Register the instrument and its HP-IB address, then press the '**Next Step**' softkey to continue the program. (Refer to APPENDIX B.)
8. HP-IB Interface Test will be performed automatically, then the **Main Menu** will be displayed. From the main menu, the Auto Sequence Test, Manual Sequence Test, and Performance Test Record Printout commands are available. Select a function using the softkeys, refer to APPENDIX A.

NOTE

If the HP 4285A fails the HP-IB Interface Test, press the '**Exit**' softkey to exit from the program, and confirm the HP-IB connection between the HP 4285A and the computer.

2-3. EACH TEST PROCEDURE

This paragraph describes how to perform each test.

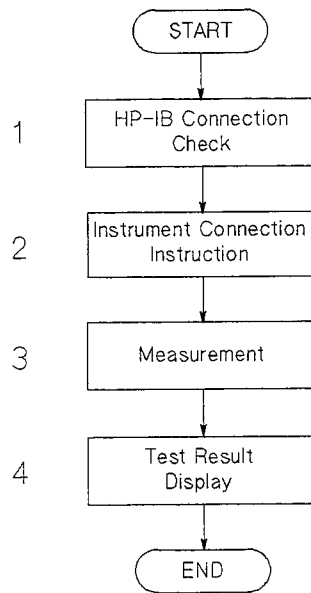


Figure 2-3. Performance Test Flow

The following paragraphs describe the performance test steps shown in Figure 2-3.

1. HP-IB Connection Check

In the first step of each test, the controller try to access the necessary instrument via HP-IB. If the controller cannot access the instrument, an error message and the instrument's registration display are displayed. Change the HP-IB address data and press the '**NextStep**' softkey to proceed with the test.

2. Instrument Connection Instructions

The instrument connection for the test is displayed step by step. Make the connections according to the display and press the '**NextStep**' softkey to proceed with the test.

3. Measurement

Automatic Test: Measurements are performed automatically for all of the test points.

Manual Test: The controller will set up the HP 4285A for the test. Perform the measurement manually and enter the measurement result through the computer keyboard.

4. Test result display

PASS/FAIL is displayed after all the test points are tested. In this display, the test result for all test points are displayed by pressing the '**Display**' softkey. In the 0 m High Frequency Impedance Measurement Accuracy Test, test results can be scrolled using the up and down arrow keys.

2-3. INSTRUMENT SETUP FOR EACH TEST

This paragraph shows the instrument setup for each performance test.

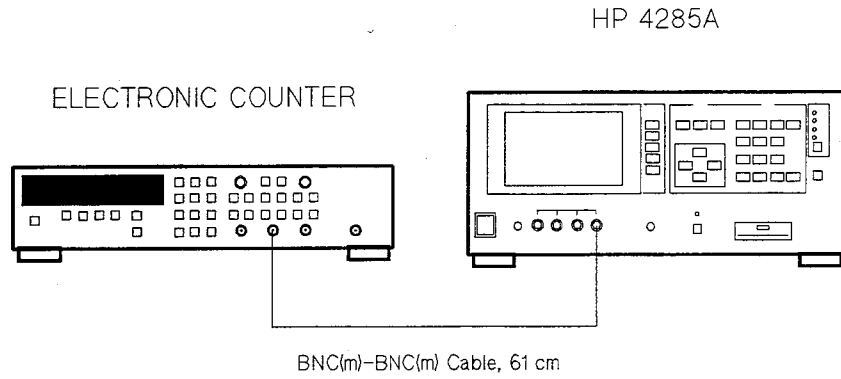


Figure 2-4. Test Frequency Accuracy Test Setup

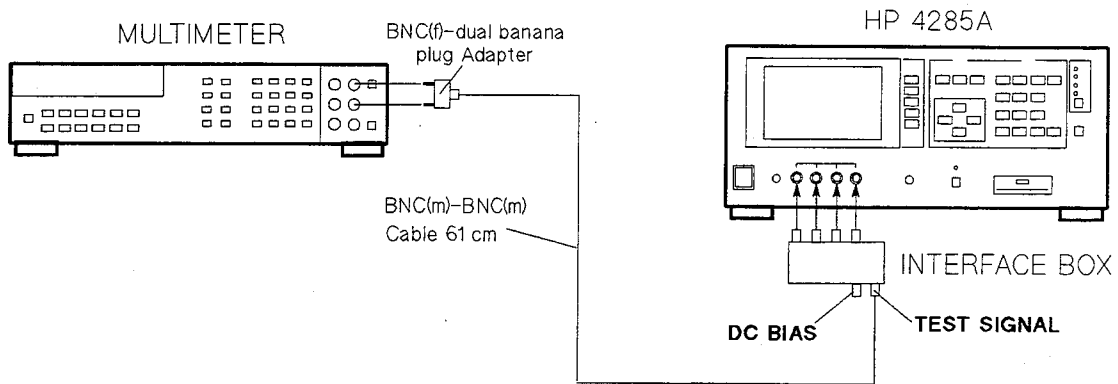


Figure 2-5. Test Signal Level Monitor Accuracy Test Setup
(Low Frequency Test)

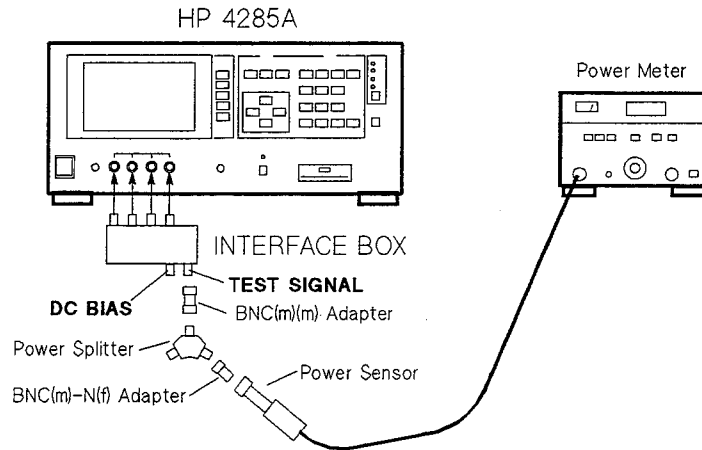


Figure 2-6. Test Signal Level Monitor Accuracy Test Setup (High Frequency Test)

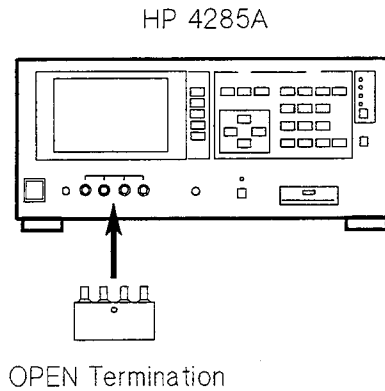
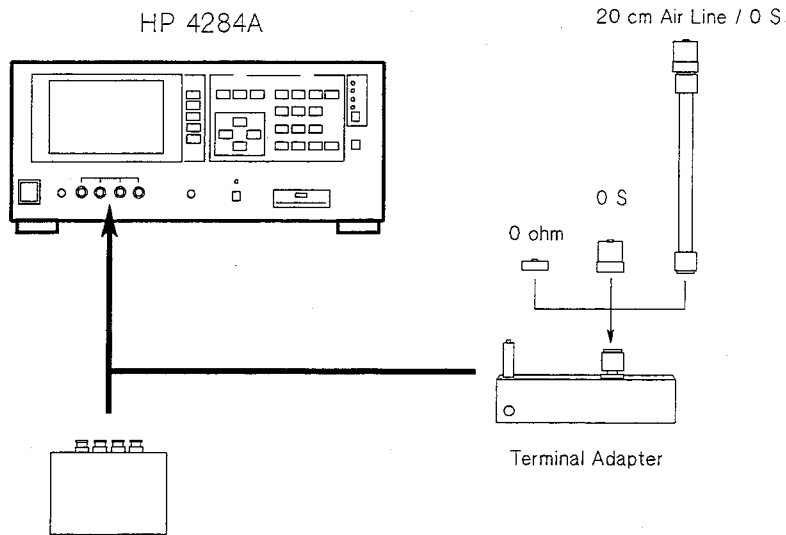
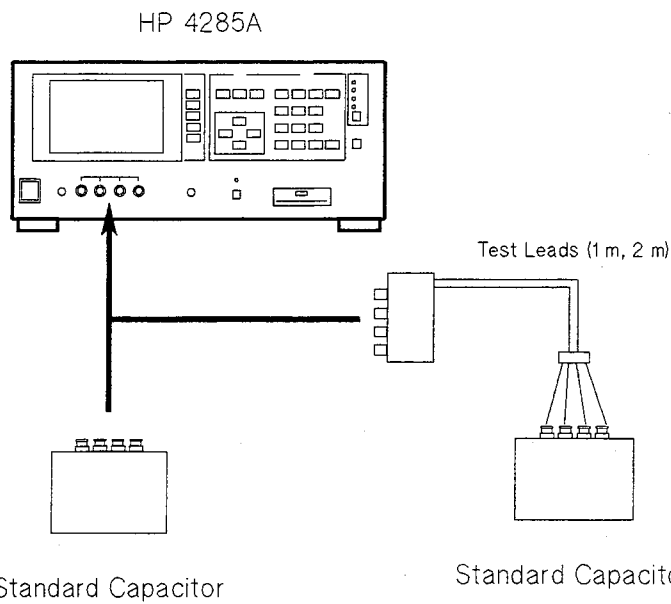


Figure 2-7. Test Signal Level Accuracy Test Setup



Standard Capacitor

Figure 2-8. Impedance Measurement Accuracy Test Setup (Air Line Calibration)



Standard Capacitor

Standard Capacitor

Figure 2-9. Impedance Measurement Accuracy Test Setup (Low Frequency Test)

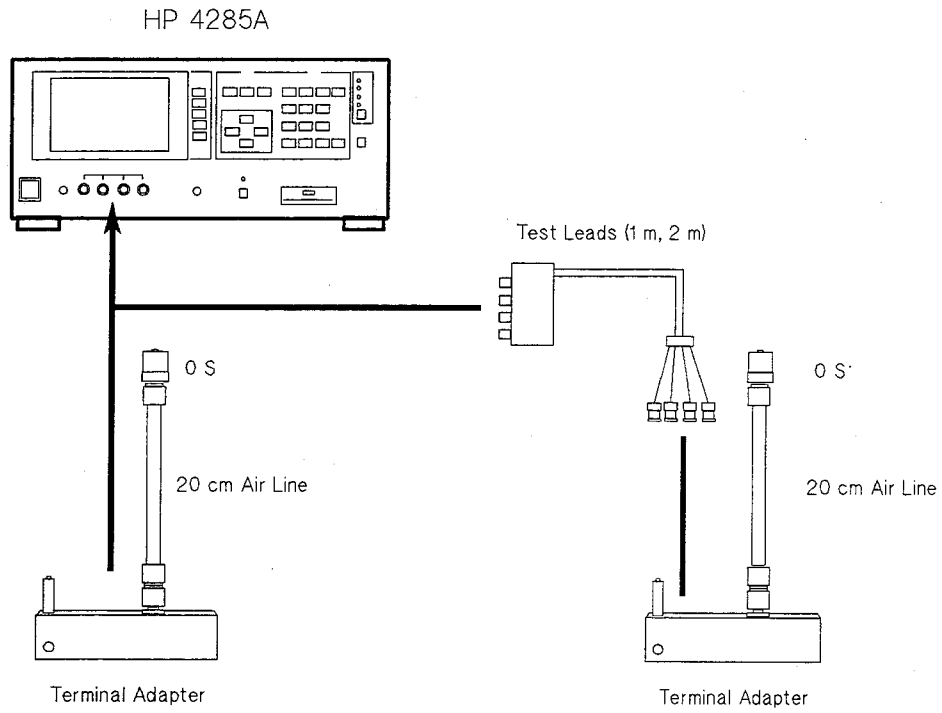


Figure 2-10. Impedance Measurement Accuracy Test Setup (High Frequency Test)

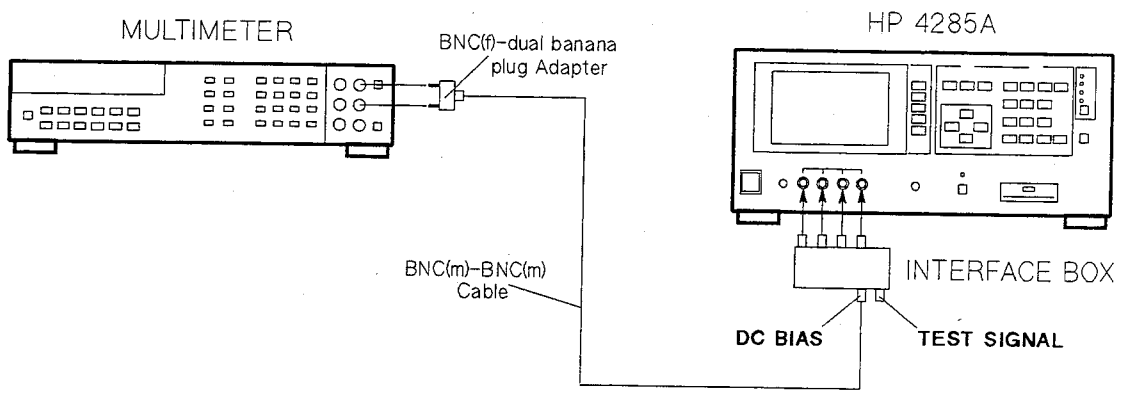


Figure 2-11. DC Bias Level Accuracy Test Setup

HP 4285A

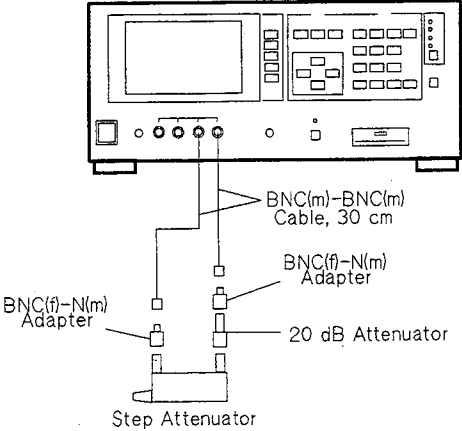


Figure 2-12. Voltage Ratio Monitor Accuracy Test Setup

APPENDIX A. PROGRAM FLOW

Figure A-1 shows the HP 4285A's performance test program flow.

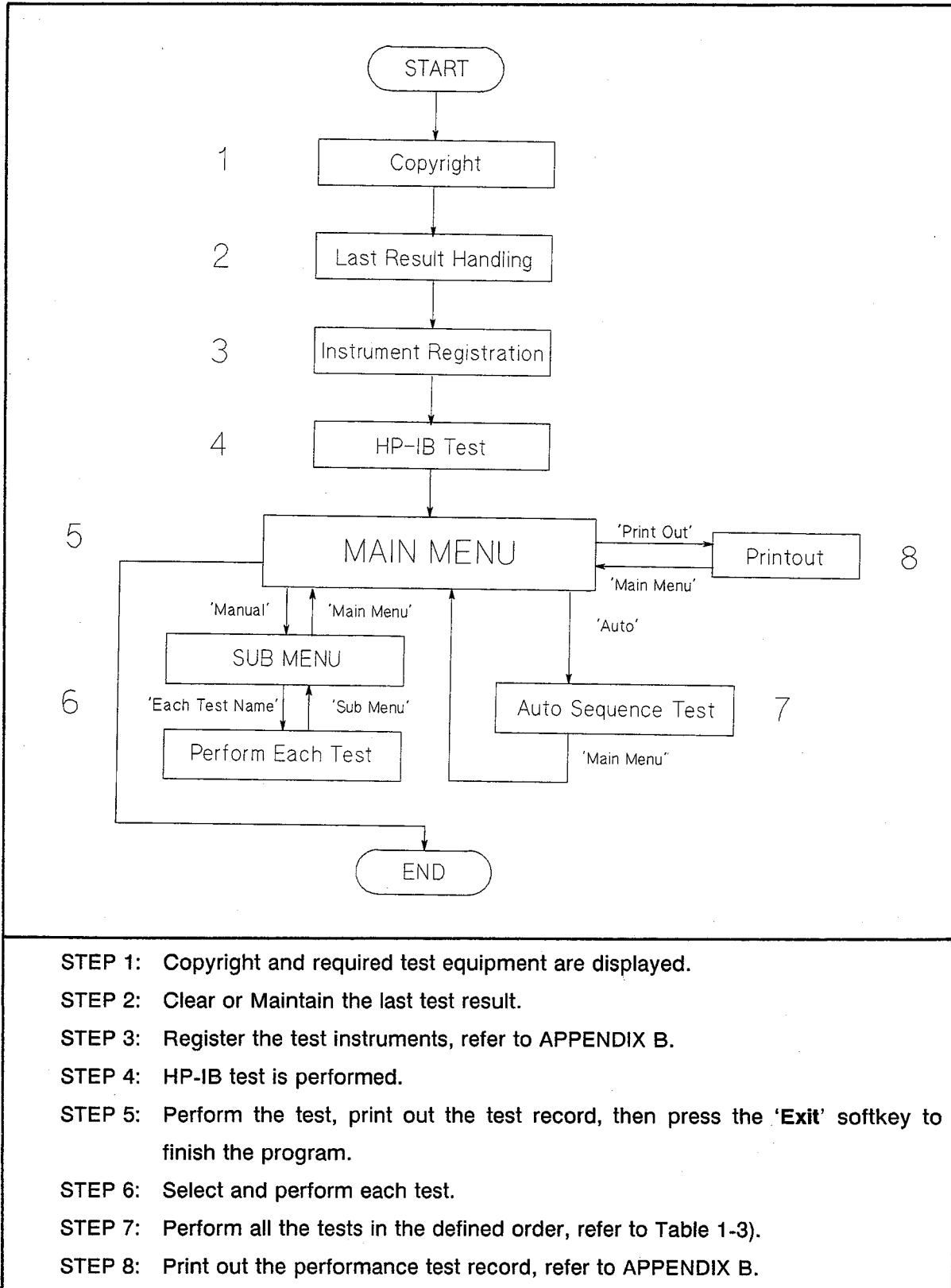


Figure A-1. Performance Test Program Flow

APPENDIX B. MAIN DISPLAYS FUNCTIONS

B-1. INSTRUMENT REGISTRATION DISPLAY

Figure B-1 shows the instrument registration displays. These displays appear during the program's initial operating procedure and when the computer cannot access the test instruments via HP-IB. These displays appear in turns by pressing the 'More X/2' softkey.

<p>HP 4285A PERFORMANCE TEST PROGRAM Instrument Registration</p> <p>Unit Under Test: HP 4285A Serial Number: XXXXJXXXXX (Serial) HP-IB Address: XX (4285Adrs)</p> <p>Electric Counter: HP 5334A/B (Counter) HP-IB Address: XX (5334Adrs)</p> <p>LCR Meter: HP 4284A HP-IB Address: XX (4284Adrs)</p> <p>Select and press the softkey to change the data.</p> <p> 5334Adrs Exit Serial 4285Adrs Counter 4284Adrs More 2/2 NextStep </p>	<p>HP 4285A PERFORMANCE TEST PROGRAM Instrument Registration</p> <p>Multimeter: HP 3458A (M Meter) HP-IB Address: XX (3458Adrs)</p> <p>Power Meter: HP 43XA (PW Meter) HP-IB Address: XX (PW Adrs)</p> <p>Printer HP-IB Address: XX (PrntAdrs)</p> <p>Select and press the softkey to change the data.</p> <p> PW Adrs Exit M Meter 3458Adrs PW Meter PrntAdrs More 1/2 NextStep </p>
----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Figure B-1. Instrument Registration Display

Test Instruments are registered in the program as follows.

HP 4285A's Serial Number Registration:

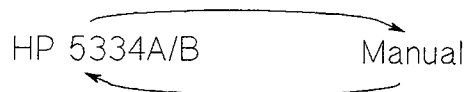
Press the 'Serial' softkey, then enter the serial number (XXXXJXXXXX) using the alphabetic, numeric, and enter keys.

HP-IB Address Registration:

Press the 'XXXXAdrs' softkey, then enter an HP-IB address using the numeric and enter keys. An HP-IB address must be between 0 through 30.

Electronic Counter Registration:

"Electronic counter" column is changed as follows, by pressing the 'Counter' softkey.



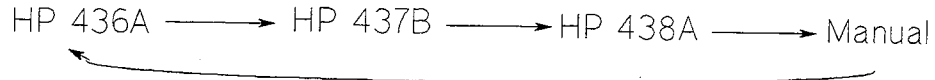
Multimeter Registration:

"Multimeter" column is changed as follows, by pressing the 'M Meter' softkey.



Power Meter Registration:

"Power Meter" column is changed as follows, by pressing the 'PW Meter' softkey.



B-2. PERFORMANCE TEST RECORD PRINT OUT DISPLAY

Figure B-2 shows the performance test record print out display.

```
HP 4285A PERFORMANCE TEST PROGRAM
Performance Test Record Print Out

Test Date: XXXX/XX/XX
Comment 1: -----
Comment 2: -----
Comment 3: -----

(Date):      Test Date Entry
(Comment1):  Comment in Record Header (1st Line)
(Comment2):  Comment in Record Header (2nd Line)
(Comment3):  Comment in Record Header (3rd Line)
(Ready):     Start Print

Press the 'Ready' softkey to start the Print.

|          | Date | Comment1 | Comment2 | Comment3 |
|          |     | MainMenu | Ready    |           |
```

Figure B-2. Performance Test Record Printout Display

The Performance Test record is printed out by pressing the 'Ready' softkey. The test date and the three line comments on the display are printed out in the header of the performance test record. The test date and comment are entered as follows.

Test Date:

Press the 'Test Date' softkey, then enter test date using the alphabetic, numeric, and enter keys.

Comment:

Press the 'CommentX' softkey, then enter a comment using the alphabetic, numeric, and enter keys. One line can be up to 70 characters long.

B-3. CALIBRATION DATA UPDATING DISPLAY

Figure B-3 shows the calibration data updating displays for the HP 8482A Power Sensor and the HP 16380A Standard Capacitor. In each calibration data updating display, "Cursor" can be moved using the cursor and tab keys, and the calibration data can be entered directly using the alphabetic, numeric, and enter keys. Press the 'NextStep' softkey to proceed to the next step, after the calibration data updating.

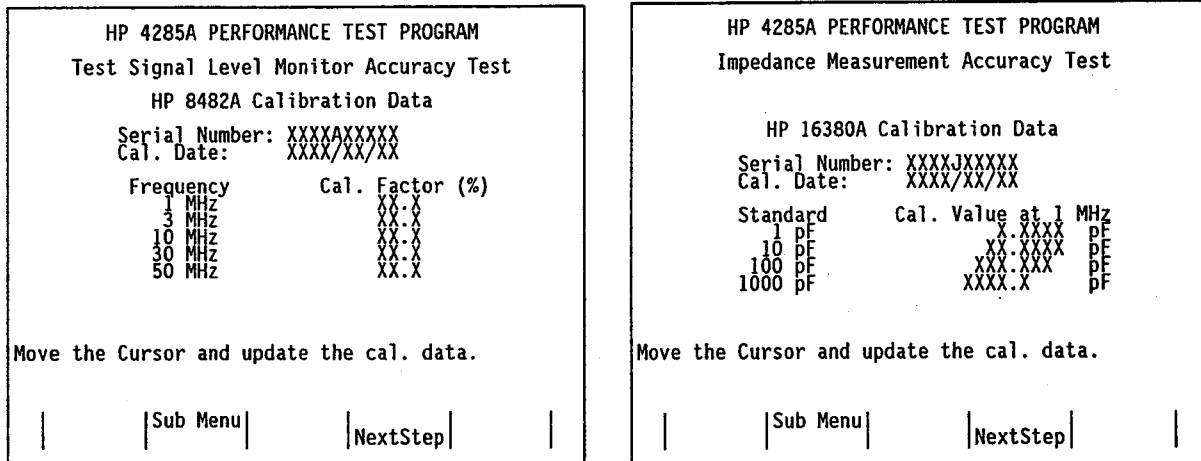


Figure B-3. Calibration Data Updating Displays

Figure B-4 shows the calibration data updating display for the HP 8495A Step Attenuator. Calibration data can be entered using the 'Serial', 'Date', and 'CalValue' softkeys, and the alphabetic, numeric, and enter keys. Press the 'NextStep' softkey to proceed to the next step, after the calibration data updating.

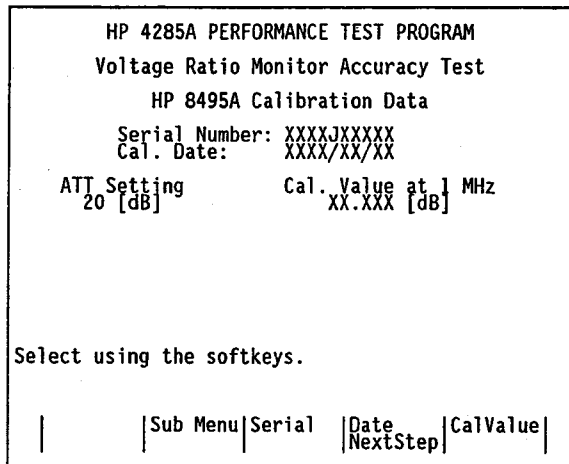


Figure B-4. Calibration Data Updating Display

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