Ericsson Cell Site Test Software
HP 11807B Option 042 Software

User's Guide

Software Version: B.02.00 and above

HP Part Number 11807-90152

Revision C

Printed in U.S.A.

October 1998

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1 Getting Started with FW Above Revision A.14.00

(for 882 and 882M Analog Transceivers Only)

Firmware Enhancements

NOTE: The firmware revision A.14.00 in the HP 8921A and HP 8921D, had several enhancements. This chapter applies to users with:

- HP 8921A test sets with firmware revision above A.14.00.

  The Test Set's firmware revision is displayed on the top right corner of the configuration screen.

- Press **Shift Config** to display the configuration screen and read the firmware revision

If you have an HP 8921A Test Set with firmware revision below A.14.00, refer to Chapter 2, "Getting Started with FW Below Revision A.14.00 (For 882 or 882M Analog Transceivers Only)," on page 29. Contact Hewlett-Packard at 1-800-922-8920 for details on upgrading your firmware if desired.

Test Set or System is Defined As:

- HP 8921A, Option 500, Dual-Mode Cellular Test System
- HP 8921D, Dual-Mode Cell Site Test System

What You'll Test and What You'll Need

Getting Started will quickly acquaint you with the operation of the Test Set and the HP 11807B Option 042 Software. You will do the following:

1. Run the local control file transfer test

   This will transfer the local control (FX) file from your laptop to the Test Set. Once this transfer has been done the Test Set will automatically download the local control file to the base station under test when other tests are run on a model 882 or Microcell transceiver. You will be initializing a memory card in the test set for storage of the local control file.

2. Run the transmitter power adjustment test on a model 882 transceiver.

   This will verify that the local control file was transferred to the Test Set and downloaded successfully to the base station.

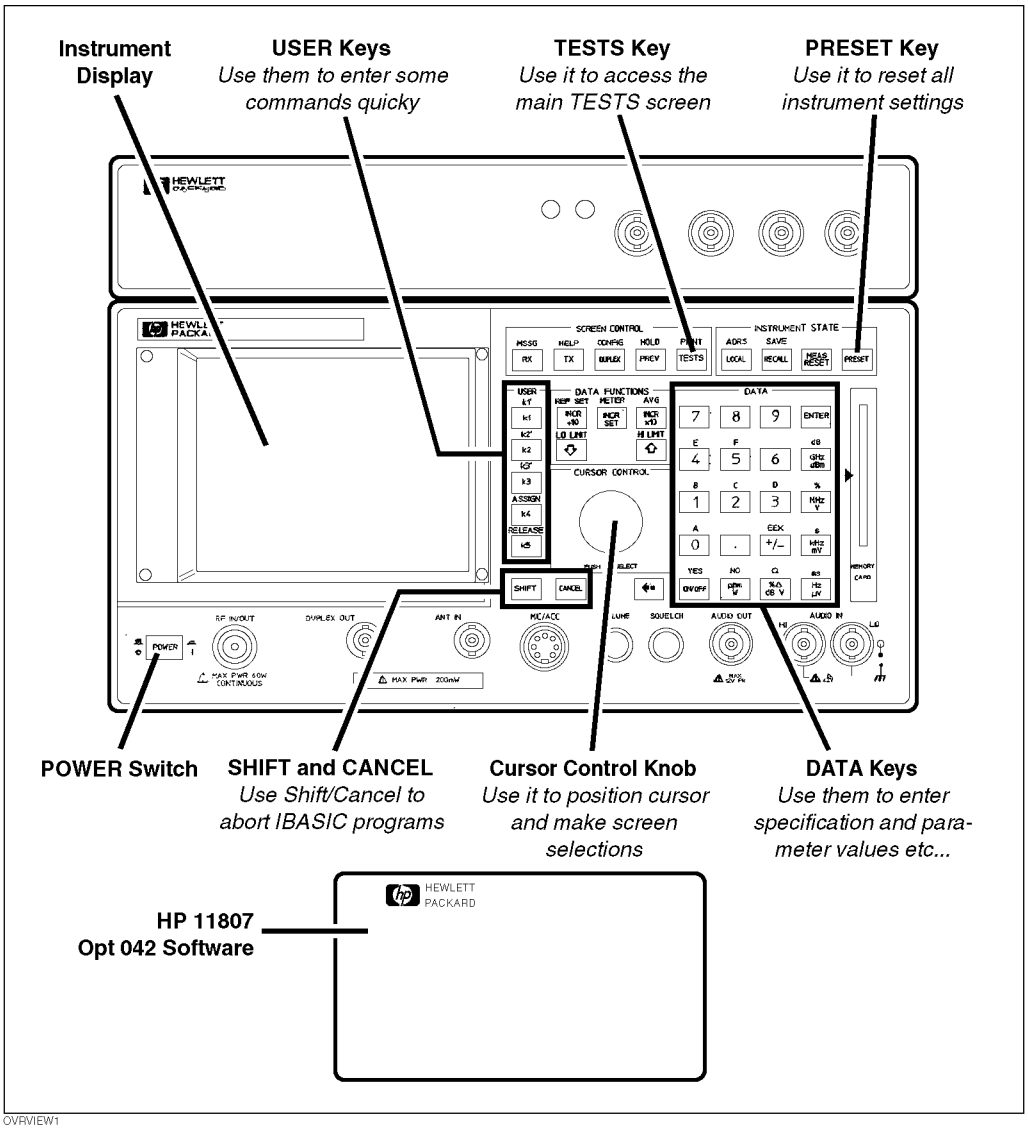
You will need the following in order to complete the testing in Getting Started:

- HP 11807B Option 042 Software
- One of the following:
  - HP 8921A, Option 500, Dual-Mode Cellular Test System
  - HP 8921D, Dual-Mode Cell Site Test System
- An Ericsson Model 882 Transceiver Module
- Type N (m) to Type N (m) 6 ft. RJ214 cable for transmitter output to Test Set RF IN/OUT connection
- RJ-11(m) to DB-9 (f) 4 wire cable for laptop to Test Set connection, supplied with HP 11807B Option 042 Software (part no. 08921-61038)
- Quarter Plug to RJ-11 (m) cable for local control connection, supplied with HP 11807B Option 042 Software (part no. 08921-61032)
- A laptop (PC compatible) with the local control program known as FX1 applicable to the Model 882

At the time of this writing, the HP 11807B Option 042 software is known to be compatible with Ericsson local control revision R14.

Test Set Overview

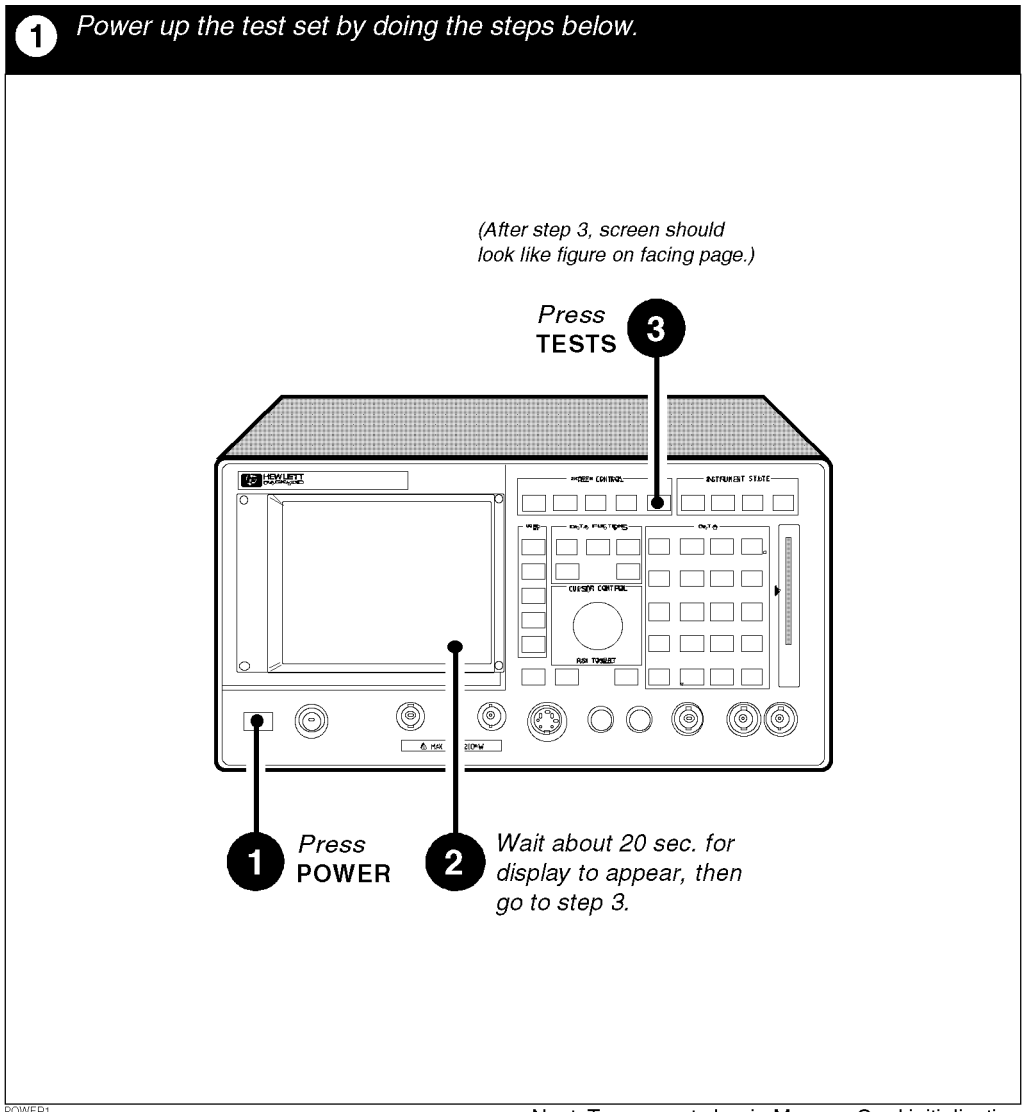
Figure 1-1



OVRVIEW1

Load the Software

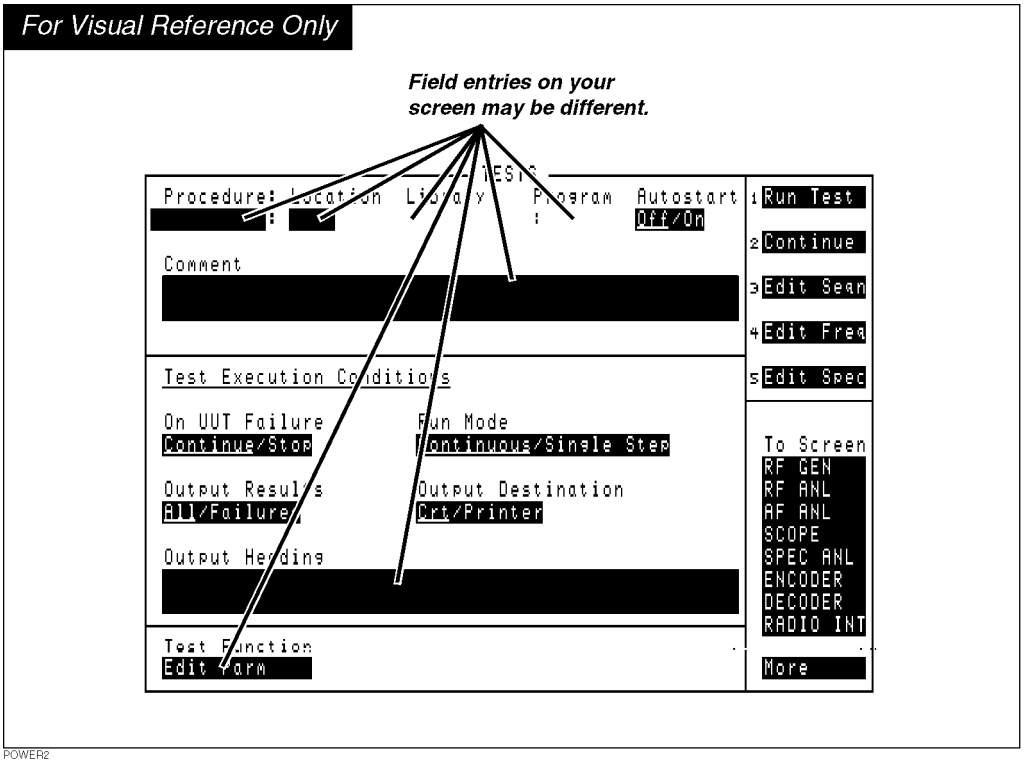
Figure 1-2



POWER1

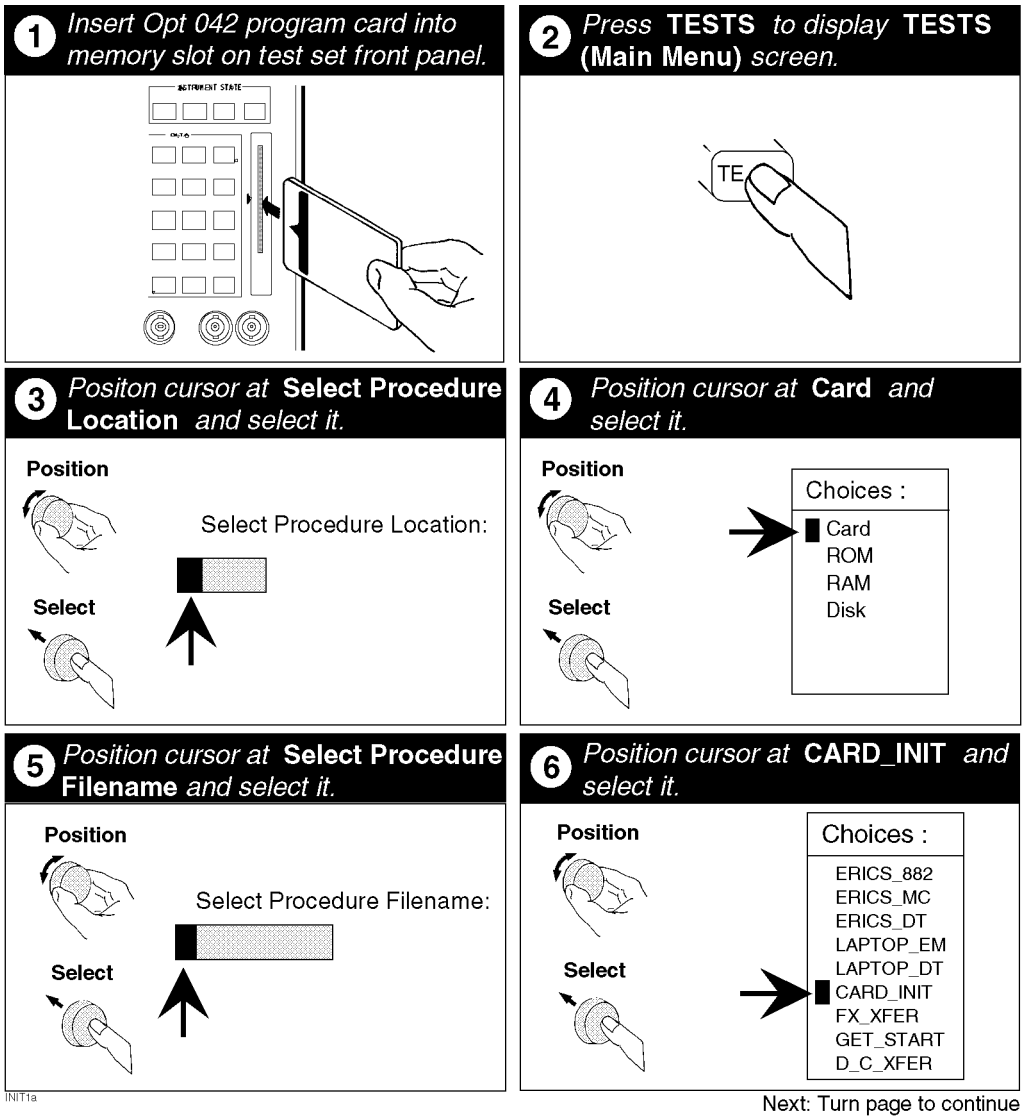
Next: Turn page to begin Memory Card initialization

Figure 1-3


For Visual Reference Only
Field entries on your screen may be different.
Procedure: Location Library Program Autostart
Off/On
Comment
Test Execution Conditions
On UUT Failure
Continue/Stop
Run Mode
Continuous/Single Step
Output Results
All/Failure
Output Destination
Crt/Printer
Output Heading
Test Function
Edit Parm
1 Run Test
2 Continue
3 Edit Sean
4 Edit Freq
5 Edit Spec
To Screen
RF GEN
RF ANL
AF ANL
SCOPE
SPEC ANL
ENCODER
DECODER
RADIO INT
More
POWER2

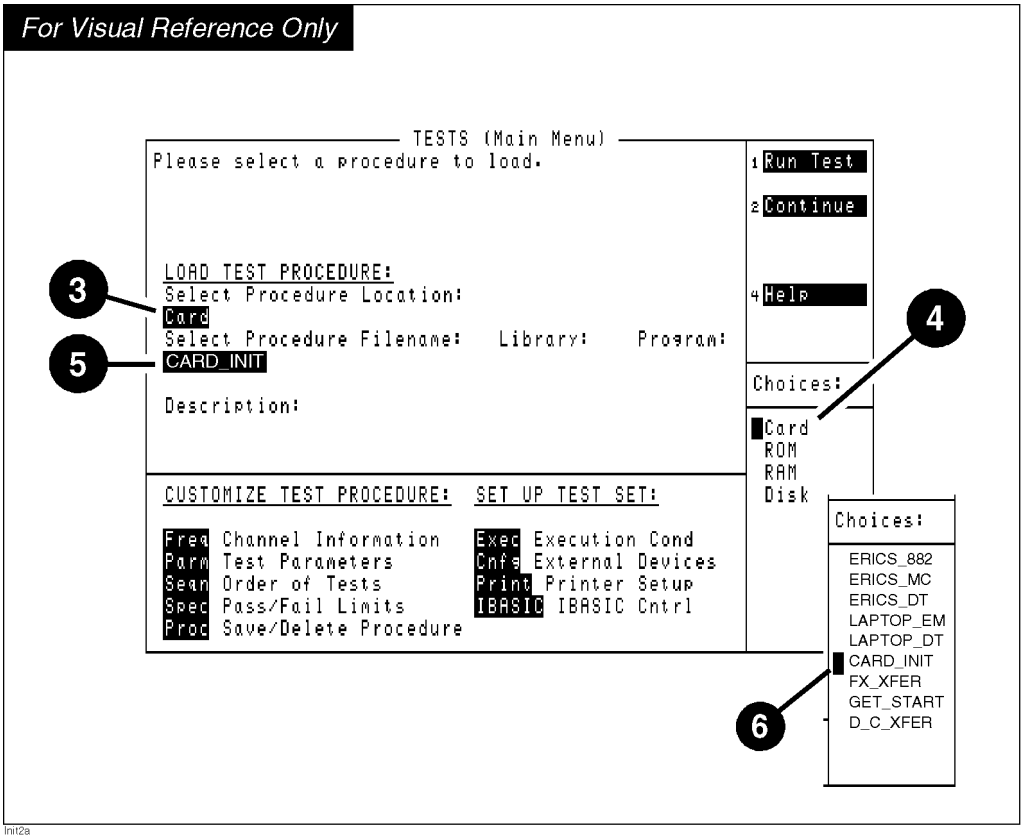
Initialize a Memory Card (for local control file storage)

Figure 1-4



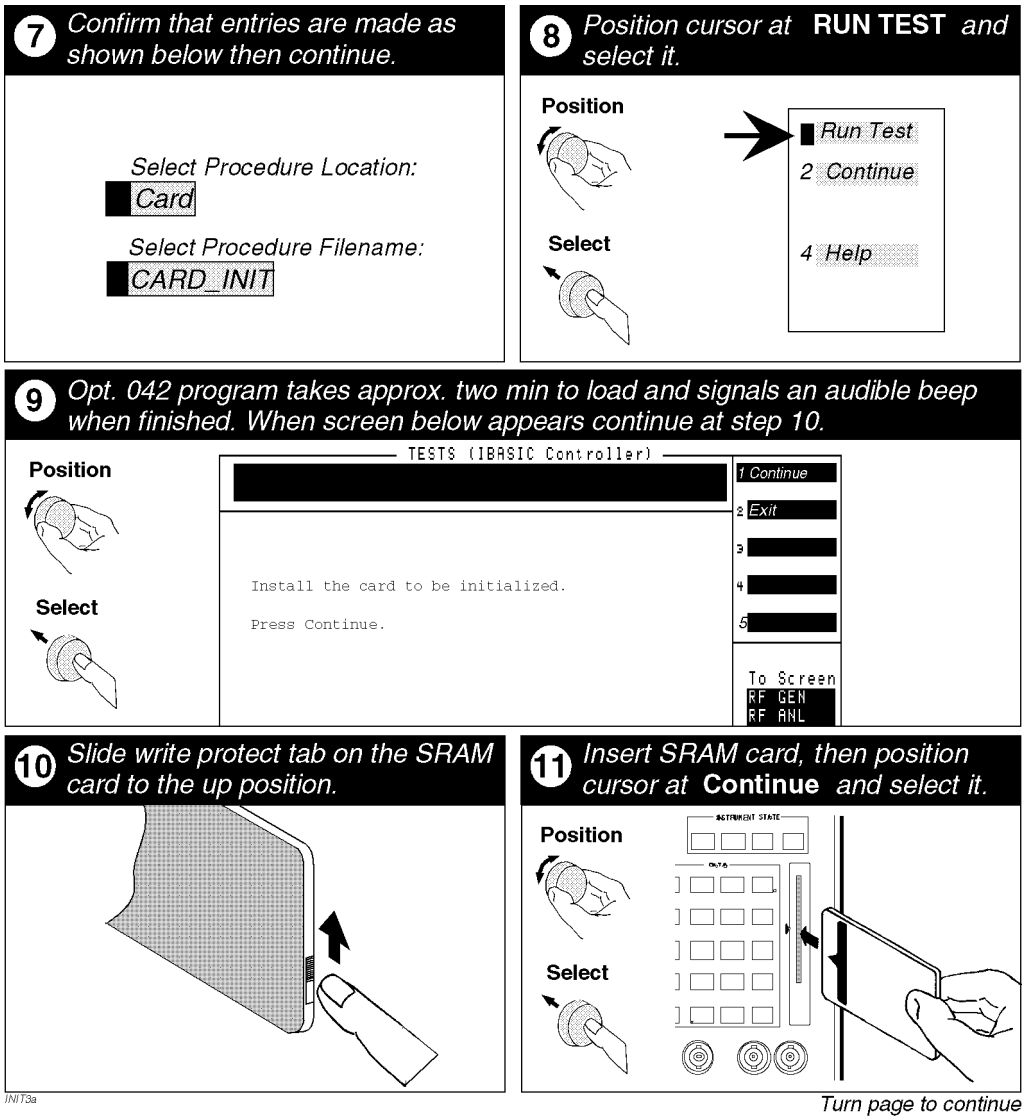
Next: Turn page to continue

Figure 1-5


For Visual Reference Only
TESTS (Main Menu)
Please select a procedure to load.
1 Run Test
2 Continue
4 Help
LOAD TEST PROCEDURE:
Select Procedure Location:
Card
Select Procedure Filename: Library: Program:
CARD_INIT
Description:
Choices:
Card
ROM
RAM
Disk
CUSTOMIZE TEST PROCEDURE:
Freq Channel Information
Parm Test Parameters
Sequ Order of Tests
Spec Pass/Fail Limits
Proc Save/Delete Procedure
SET UP TEST SET:
Exec Execution Cond
Cnfg External Devices
Print Printer Setup
IBASIC IBASIC Cntrl
Choices:
ERICS_882
ERICS_MC
ERICS_DT
LAPTOP_EM
LAPTOP_DT
CARD_INIT
FX_XFER
GET_START
D_C_XFER
3
4
5
6
init2a

Initialize a Memory Card (Continued)

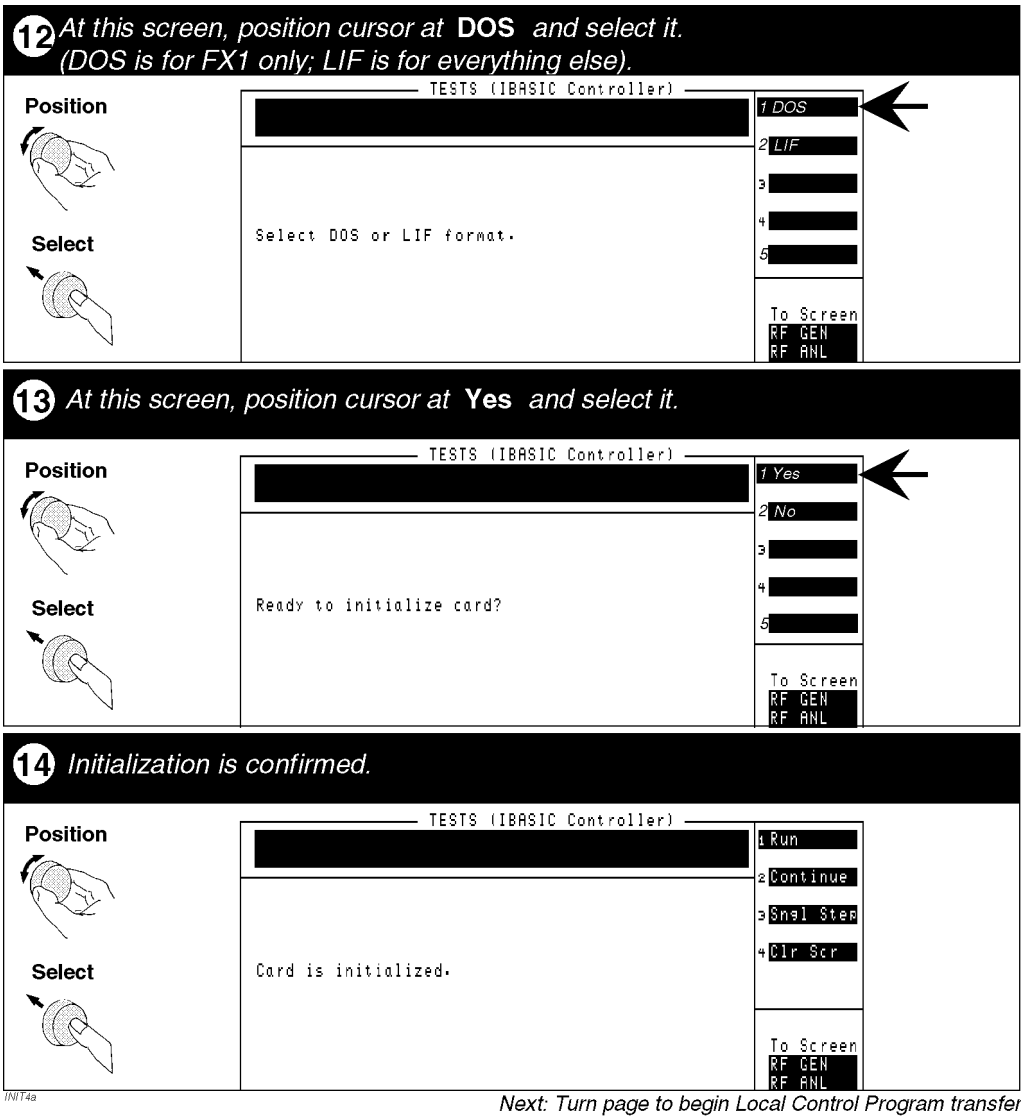
Figure 1-6



Turn page to continue

Initialize a Memory Card (Continued)

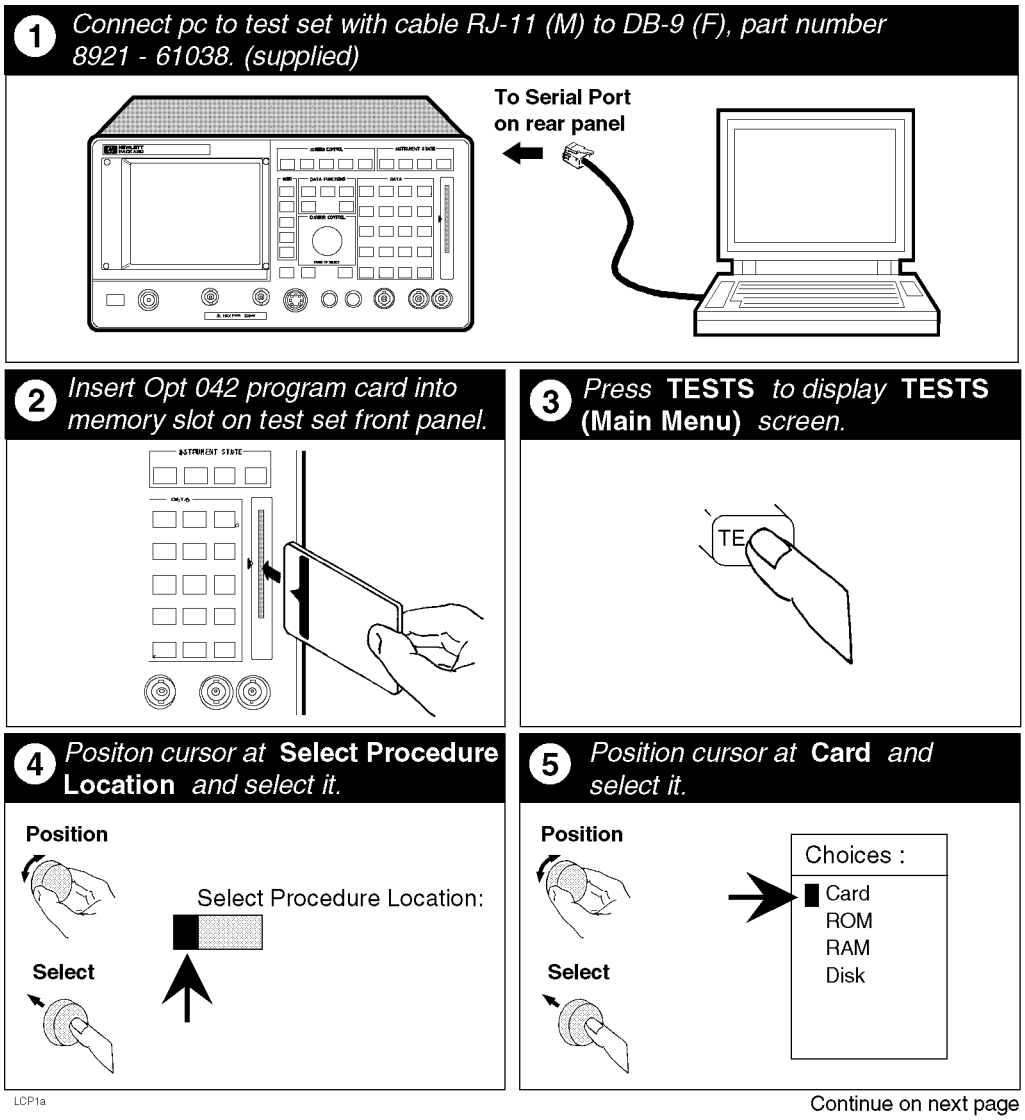
Figure 1-7



Next: Turn page to begin Local Control Program transfer

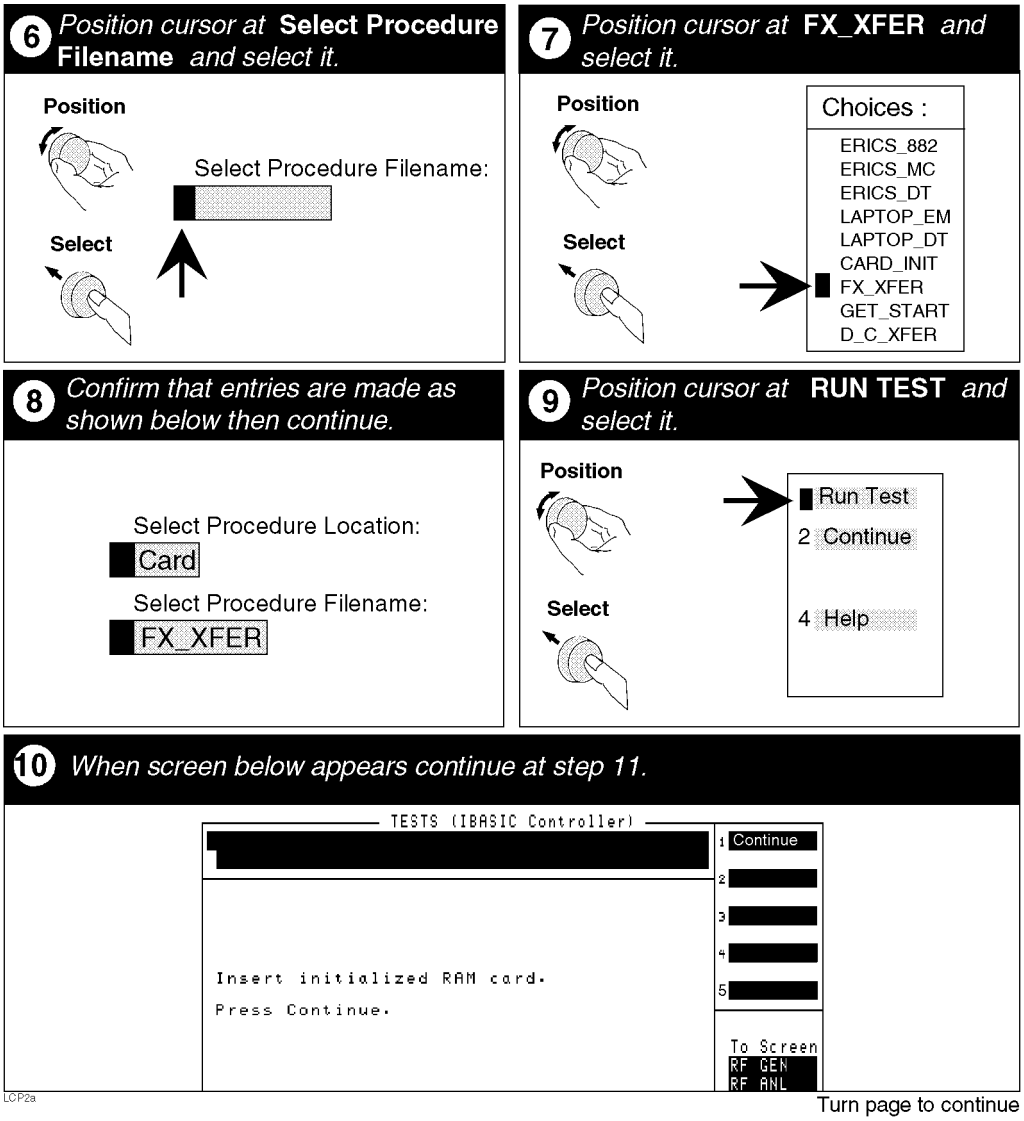
Transfer the Local Control Program

Figure 1-8



Continue on next page

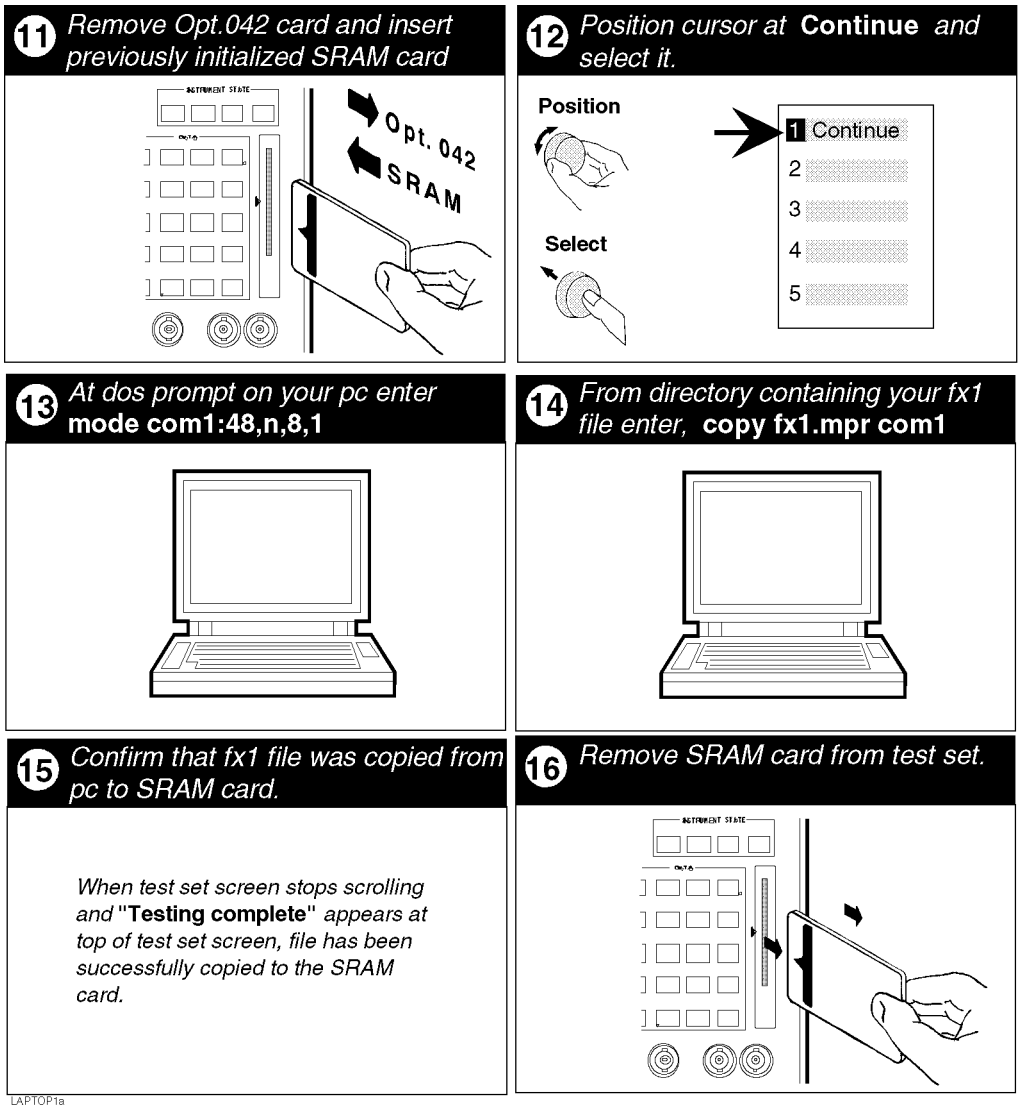
Figure 1-9



Turn page to continue

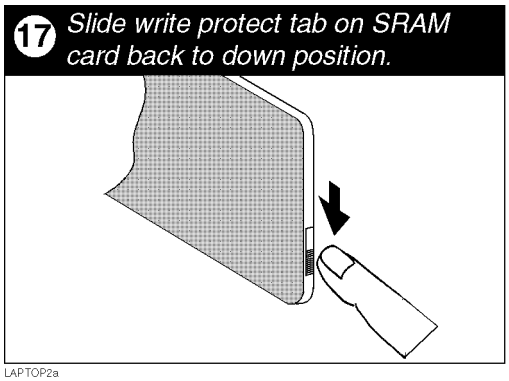
Transfer the Local Control Program (Continued)

Figure 1-10



Transfer the Local Control Program (Continued)

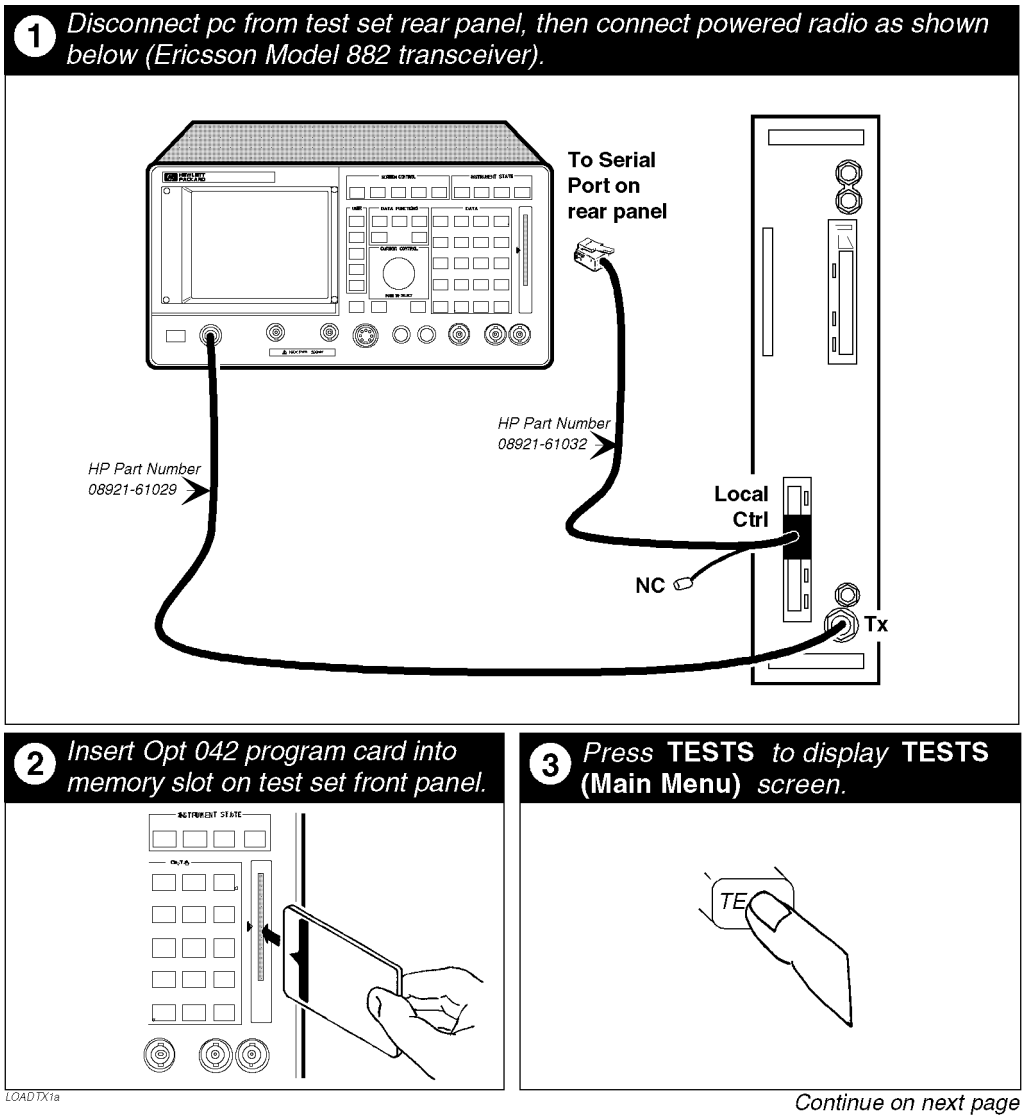
Figure 1-11



You have now completed local control file transfer. To verify that the local control program has been successfully transferred to the memory card, turn the page and follow the steps to load and run GET_START. GET_START contains a test (transmitter power) that will download the local control program from the memory card to the base station.

Verify Local Control Transfer (Transmitter Power Test)

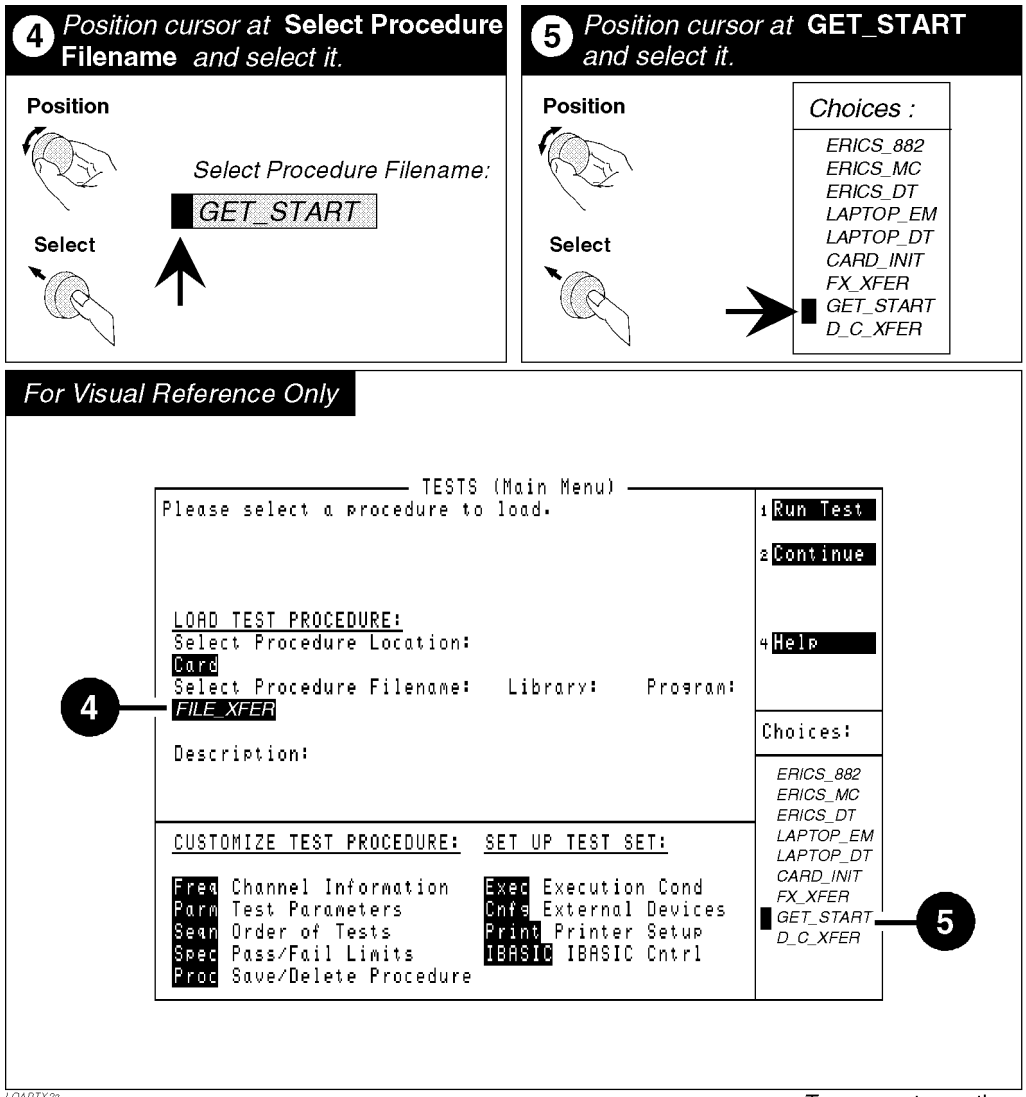
Figure 1-12



Continue on next page

Verify Local Control Transfer (Continued)

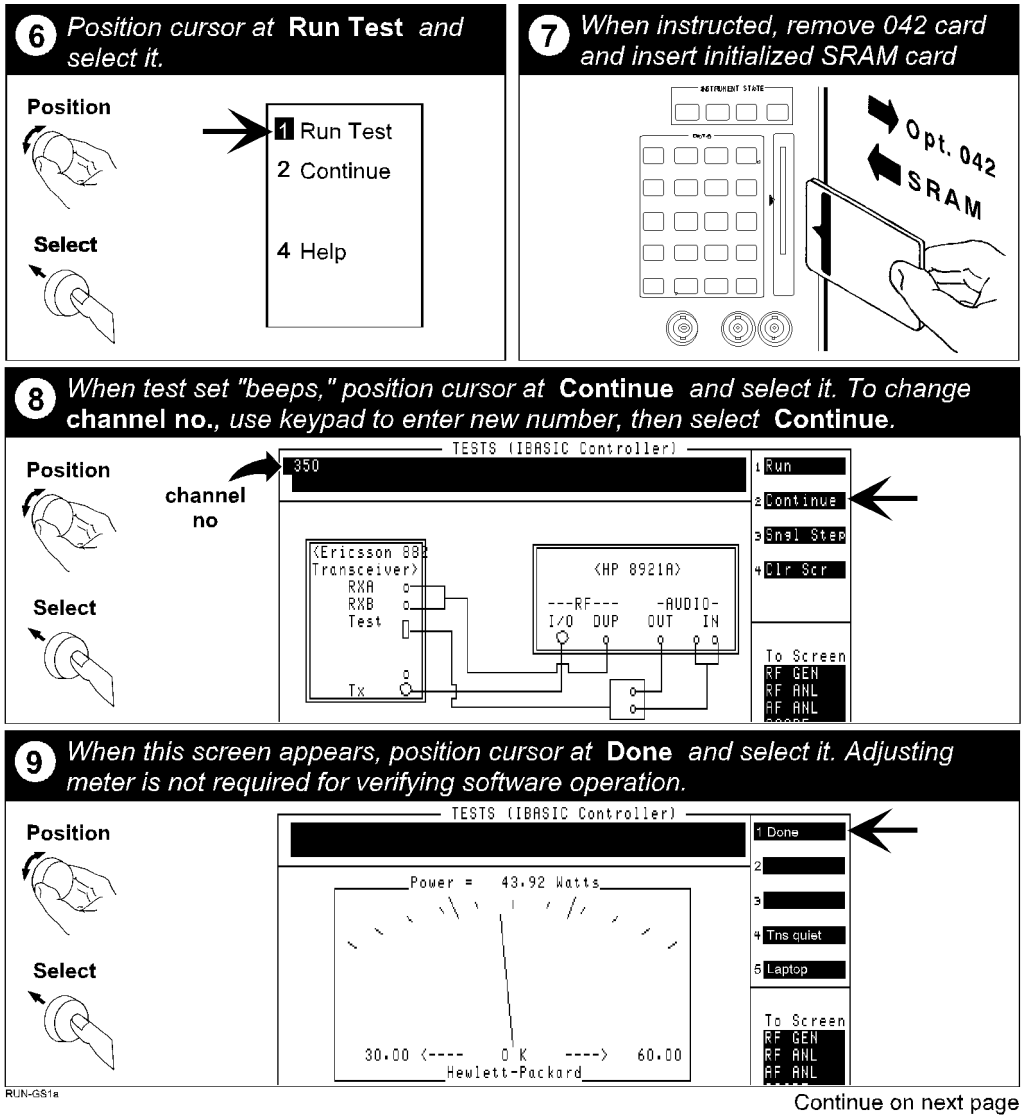
Figure 1-13



Turn page to continue

Verify Local Control Transfer (Continued)

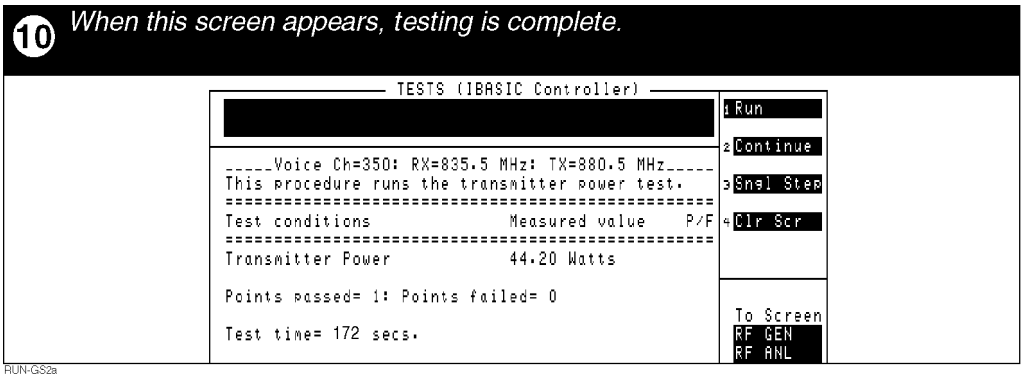
Figure 1-14



Continue on next page

Verify Local Control Transfer (Continued)

Figure 1-15



You have now completed the tasks associated with Getting Started. You have transferred the local control program from your laptop and have run the transmitter power test to confirm the functionality of the Test Set and local control program transfer. Proceed to Chapter 3, “Product Description,” on page 49 for an introduction to the HP 11807B Option 042 Software and a guide to the organization of this manual.

2 Getting Started with FW Below Revision A.14.00

(For 882 or 882M Analog Transceivers Only)

Firmware Enhancements

NOTE: The firmware revision A.14.00 in the HP 8921A and HP 8921D had several enhancements. This chapter applies to users with:

- HP 8921A test sets with firmware revision below A.14.00

  The test set's firmware revision is displayed on the top right corner of the configuration screen.

- Press **Shift Config** to display the configuration screen and read the firmware revision.

If you have an HP 8921A with firmware revision above A.14.00, refer to Chapter 1, "Getting Started with FW Above Revision A.14.00 (for 882 and 882M Analog Transceivers Only)," on page 9. Contact Hewlett-Packard at 1-800-922-8920 for details on upgrading your firmware if desired.

Test Set or System is Defined As:

- HP 8921A, Option 500, Dual-Mode Cellular Test System
- HP 8921D, Dual-Mode Cell Site Test System

What You'll Test and What You'll Need

Getting Started will quickly acquaint you with the operation of the Test Set and the HP 11807B Option 042 Software. You will do the following:

1. *Run the local control file transfer test.*

   This will transfer the local control (FX) file from your laptop to the test set. Once this transfer has been done the test set will automatically download the local control file to the base station under test when other tests are run on a model 882 or Microcell transceiver. You will be initializing a memory card in the test set for storage of the local control file.

2. *Run the transmitter power adjustment test on a model 882 transceiver.*

   This will verify that the local control file was transferred to the test set and downloaded successfully to the base station.

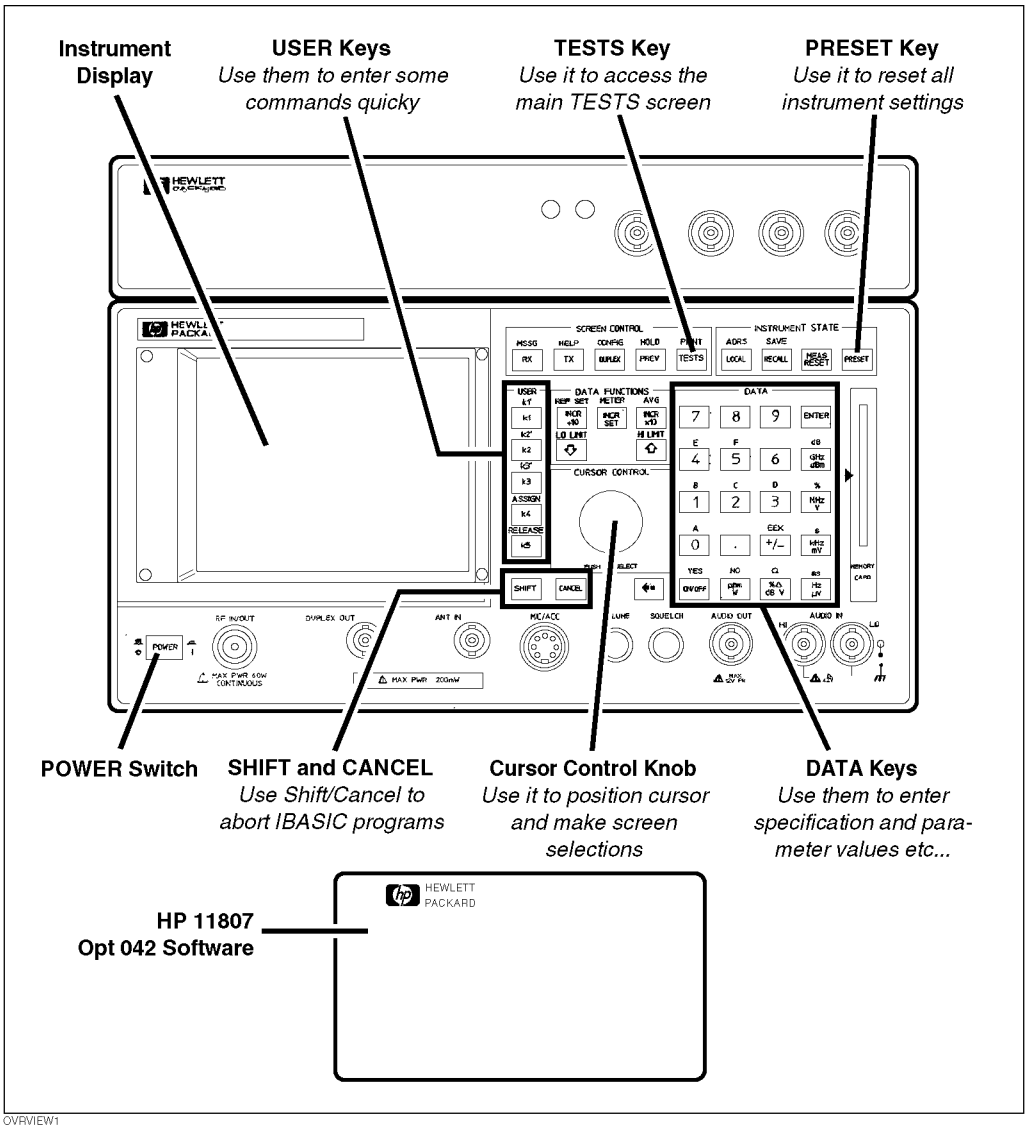
You will need the following in order to complete the testing in Getting Started:

- HP 11807B Option 042 Software
- One of the following:
  - HP 8921A, Option 500, Dual-Mode Cellular Test System
  - HP 8921D, Dual-Mode Cell Site Test System
- An Ericsson Model 882 Transceiver Module
- Type N (m) to Type N (m) 6 ft. RJ214 cable for transmitter output to test set RF IN/OUT connection
- RJ-11(m) to DB-9 (f) 4 wire cable for laptop to test set connection, supplied with HP 11807B Option 042 Software (part no. 08921-61038)
- Quarter Plug to RJ-11 (m) cable for local control connection, supplied with HP 11807B Option 042 Software (part no. 08921-61032)
- A laptop (PC compatible) with the local control program known as FX1 applicable to the Model 882

At the time of this writing, the HP 11807B Option 042 software is known to be compatible with Ericsson local control revision R14.

Test Set Overview

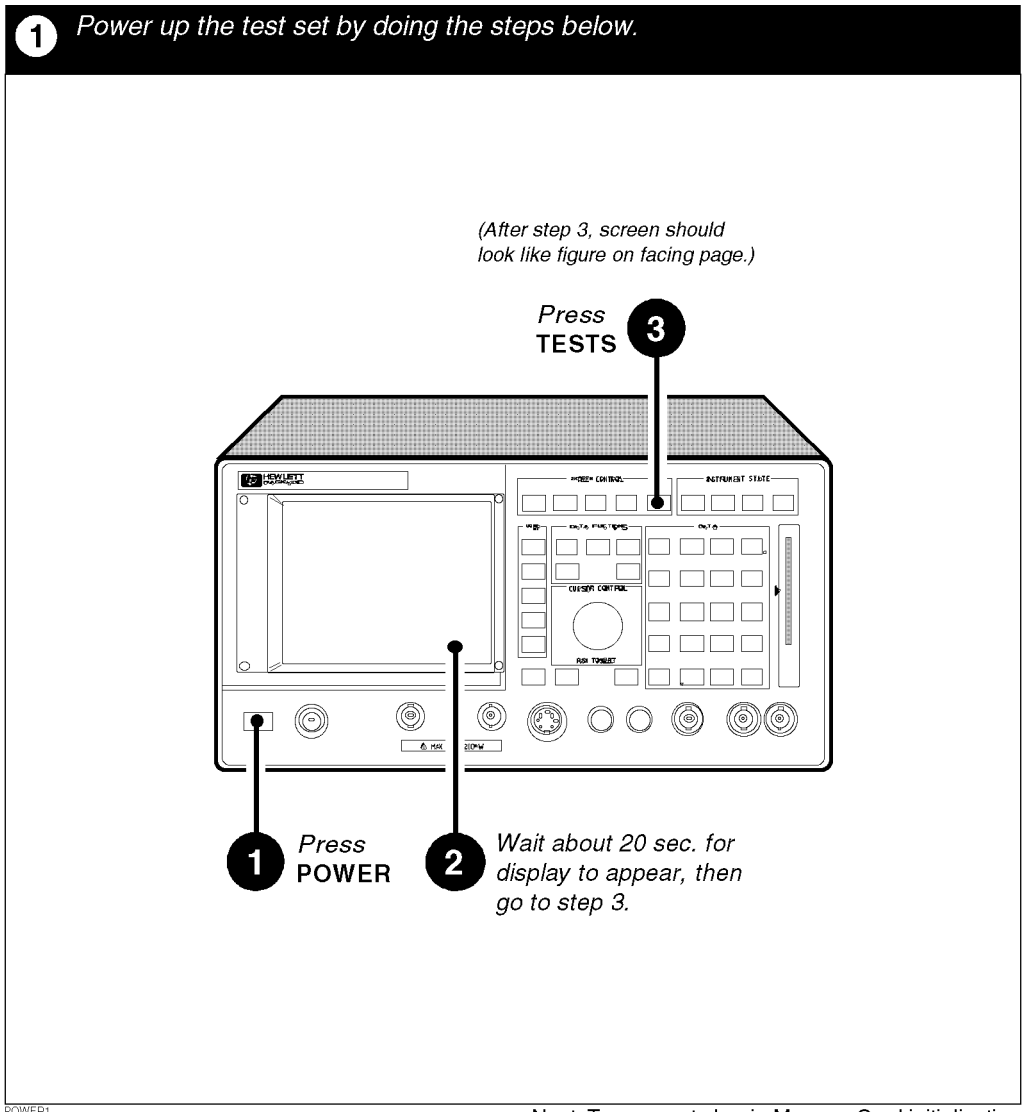
Figure 2-1



OVRVIEW1

Load the Software

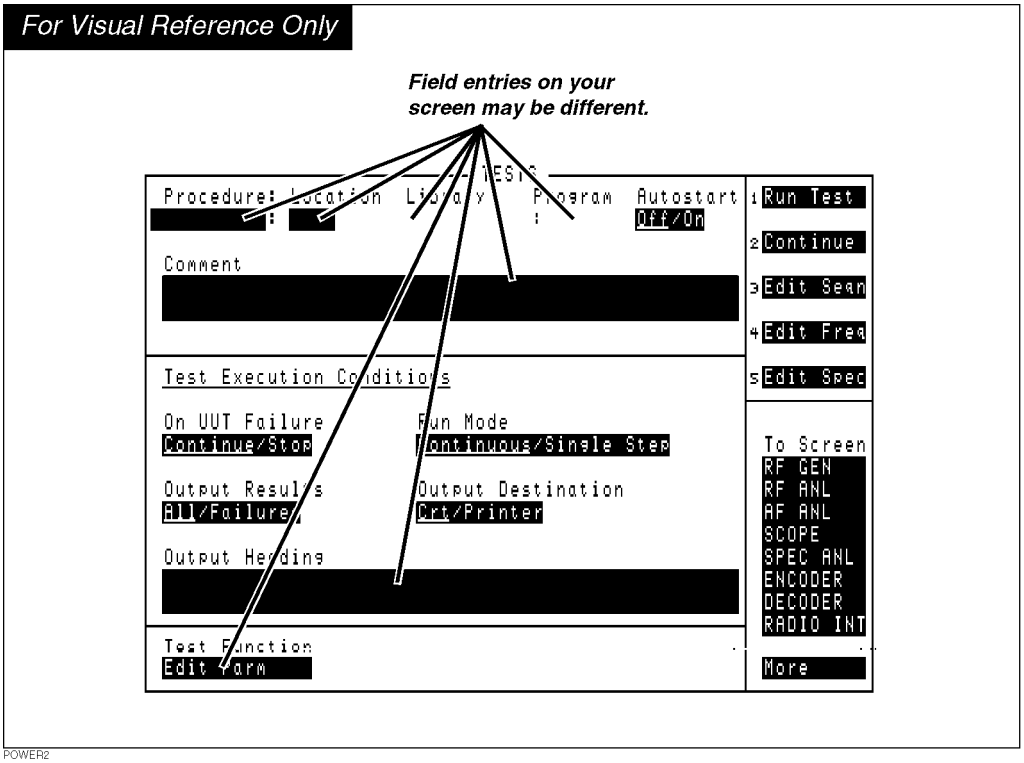
Figure 2-2



POWER1

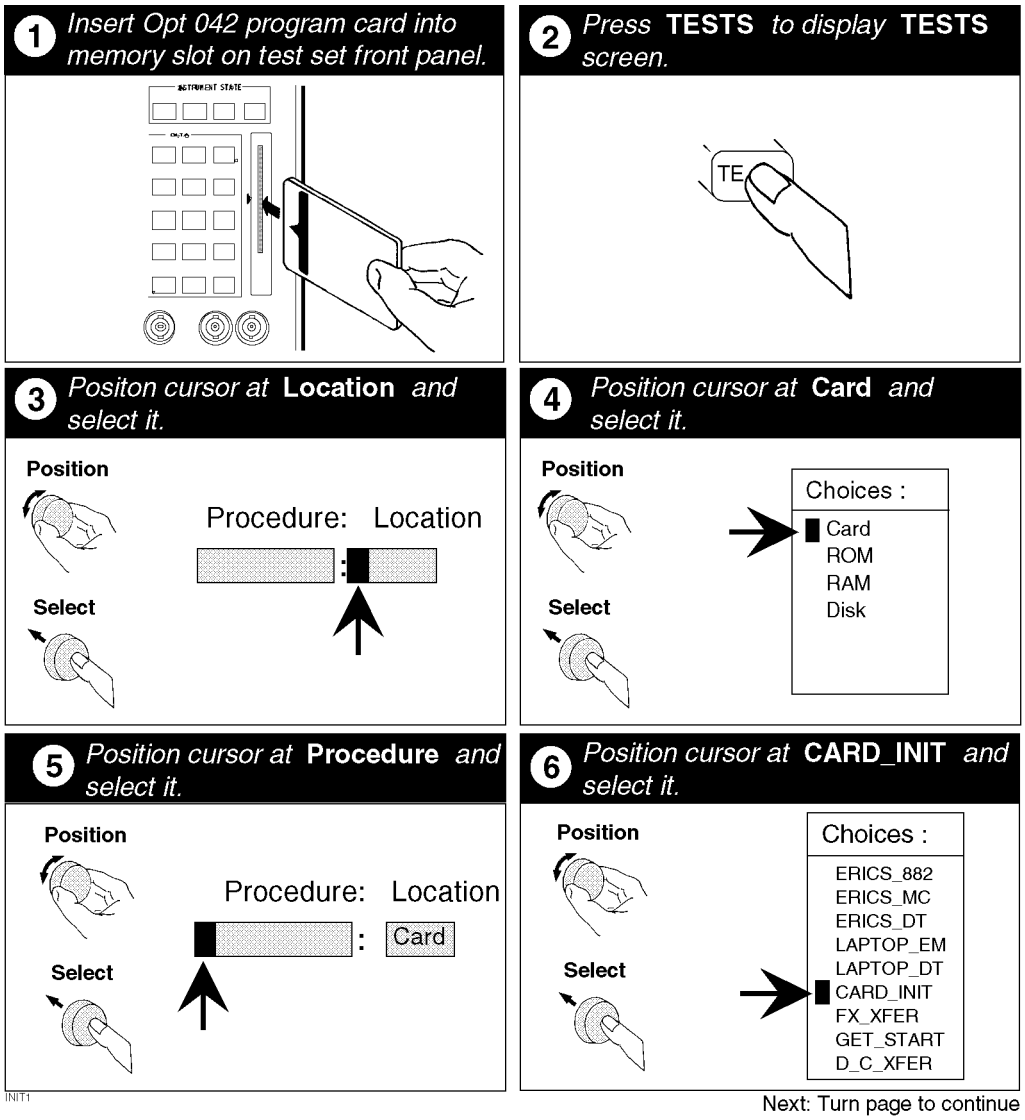
Next: Turn page to begin Memory Card initialization

Figure 2-3


For Visual Reference Only
Field entries on your screen may be different.
Procedure:
Location
Library
Program
Autostart
Off/On
Comment
Test Execution Conditions
On UUT Failure
Continue/Stop
Run Mode
Continuous/Single Step
Output Results
All/Failure
Output Destination
Crt/Printer
Output Heading
Test Function
Edit Yarn
1 Run Test
2 Continue
3 Edit Sean
4 Edit Freq
5 Edit Spec
To Screen
RF GEN
RF ANL
AF ANL
SCOPE
SPEC ANL
ENCODER
DECODER
RADIO INT
More
POWER2

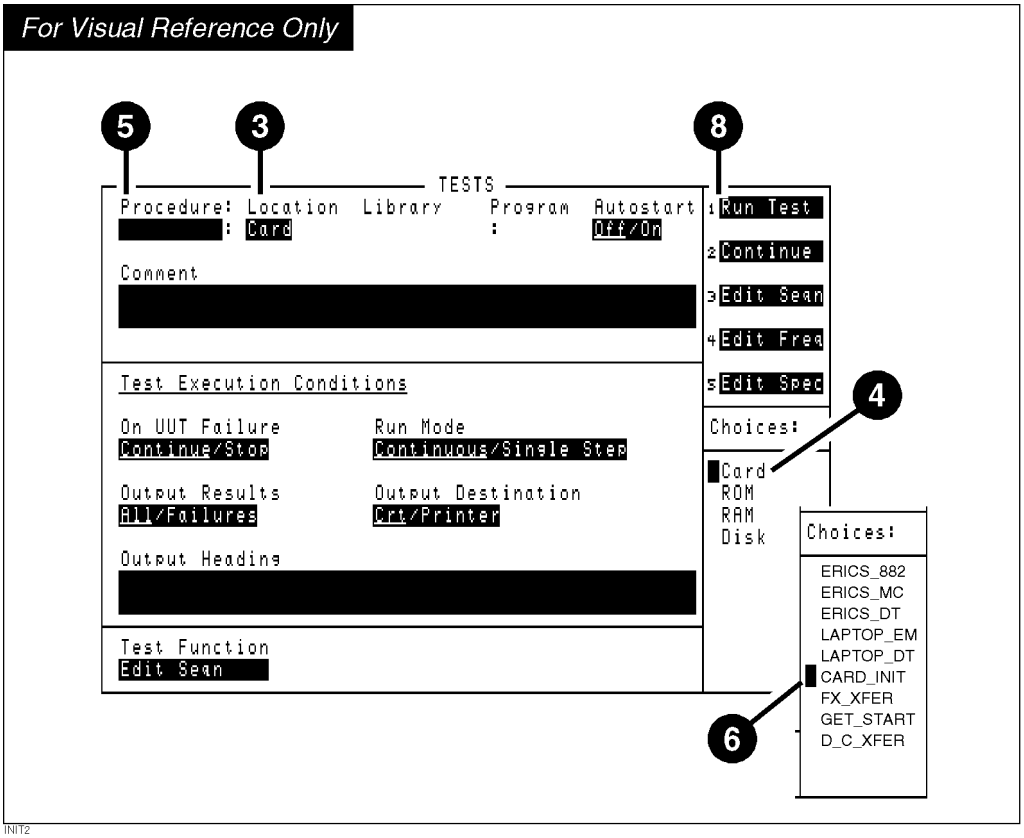
Initialize a Memory Card (for local control file storage)

Figure 2-4



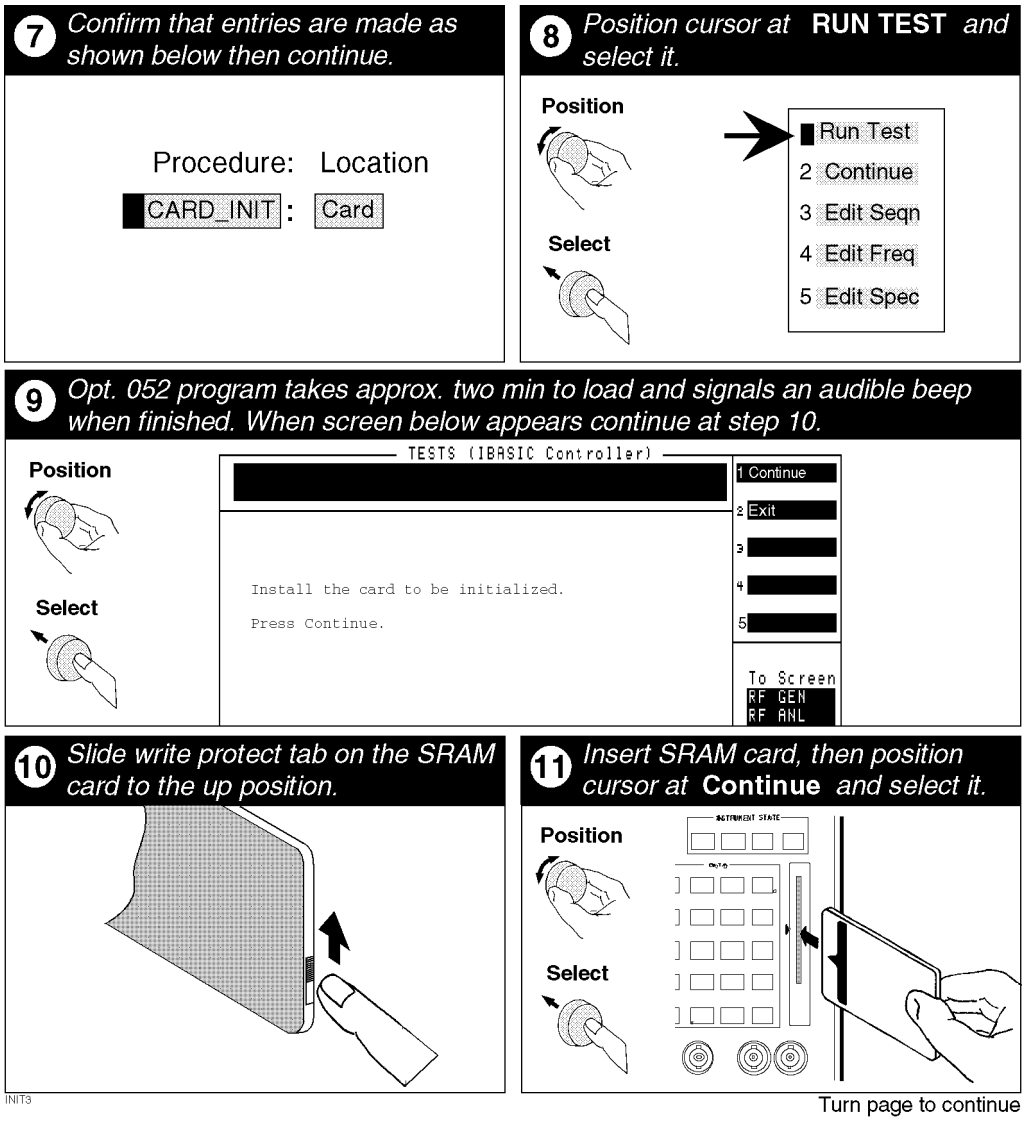
Next: Turn page to continue

Figure 2-5


For Visual Reference Only
5
3
8
TESTS
Procedure:
Location
Library
Program
Autostart
Card
Off/On
1 Run Test
2 Continue
3 Edit Sean
4 Edit Freq
5 Edit Spec
Comment
Test Execution Conditions
On UUT Failure
Continue/Stop
Run Mode
Continuous/Single Step
Output Results
All/Failures
Output Destination
Crt/Printer
Output Heading
Test Function
Edit Sean
Choices:
Card
ROM
RAM
Disk
4
Choices:
ERICS_882
ERICS_MC
ERICS_DT
LAPTOP_EM
LAPTOP_DT
CARD_INIT
FX_XFER
GET_START
D_C_XFER
6
INIT2

Initialize a Memory Card (Continued)

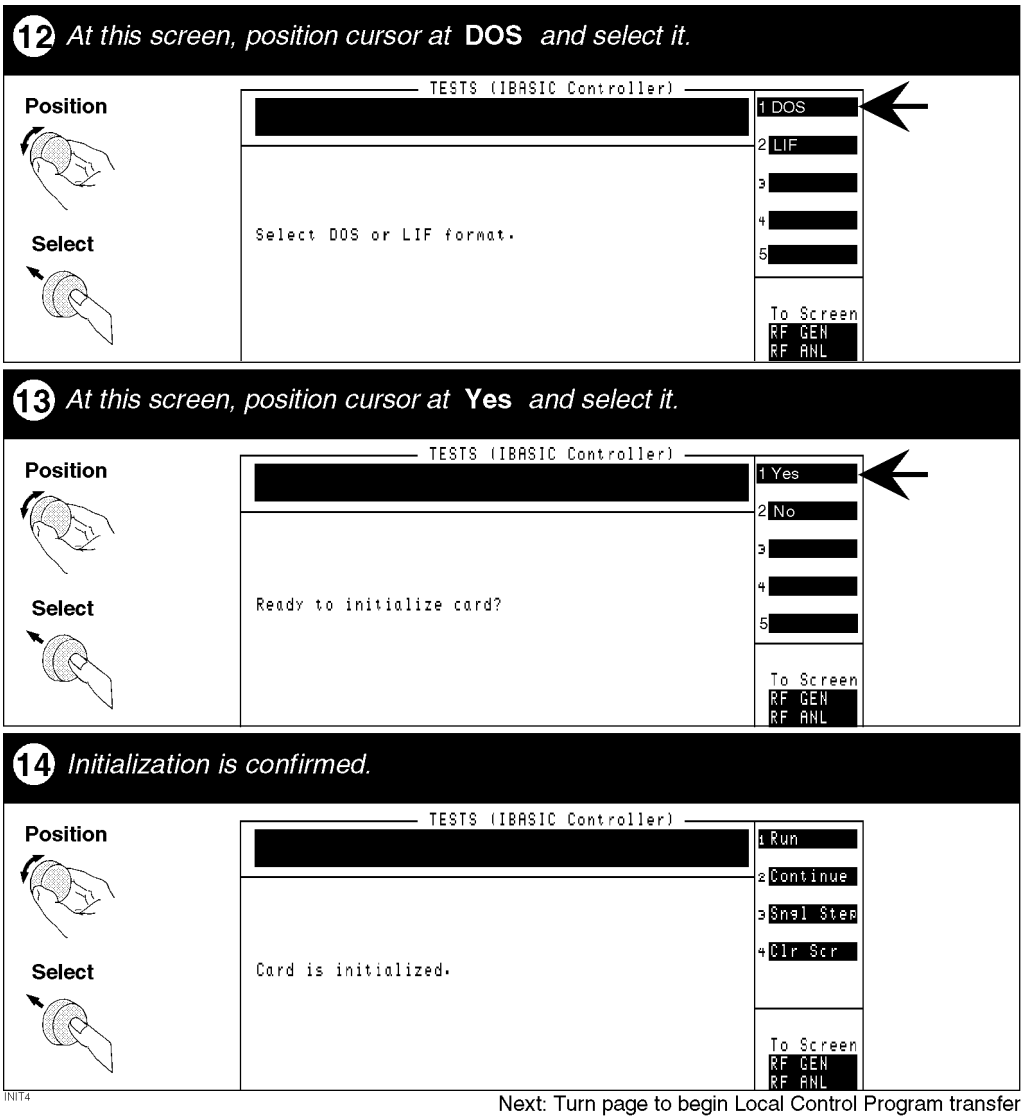
Figure 2-6



Turn page to continue

Initialize a Memory Card (Continued)

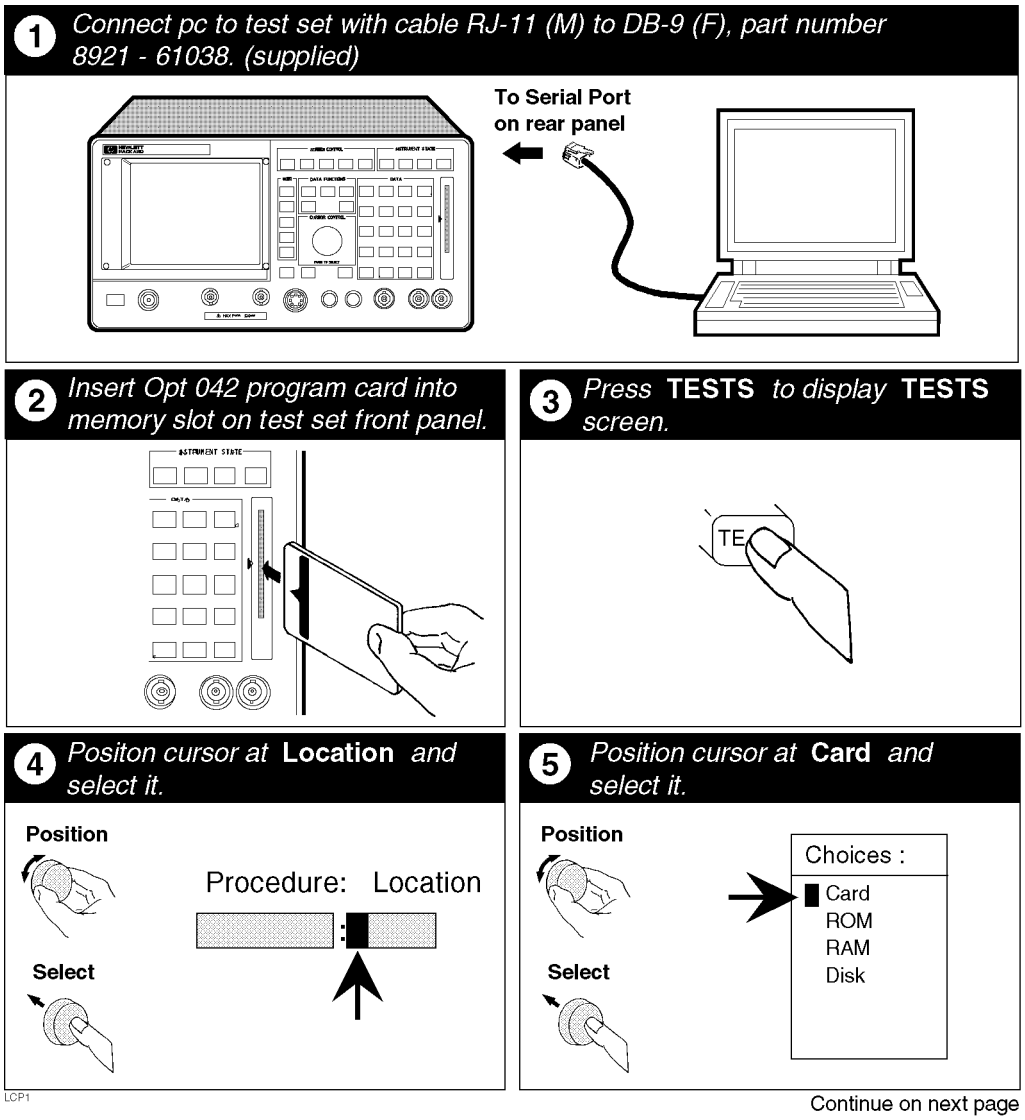
Figure 2-7



Next: Turn page to begin Local Control Program transfer

Transfer the Local Control Program

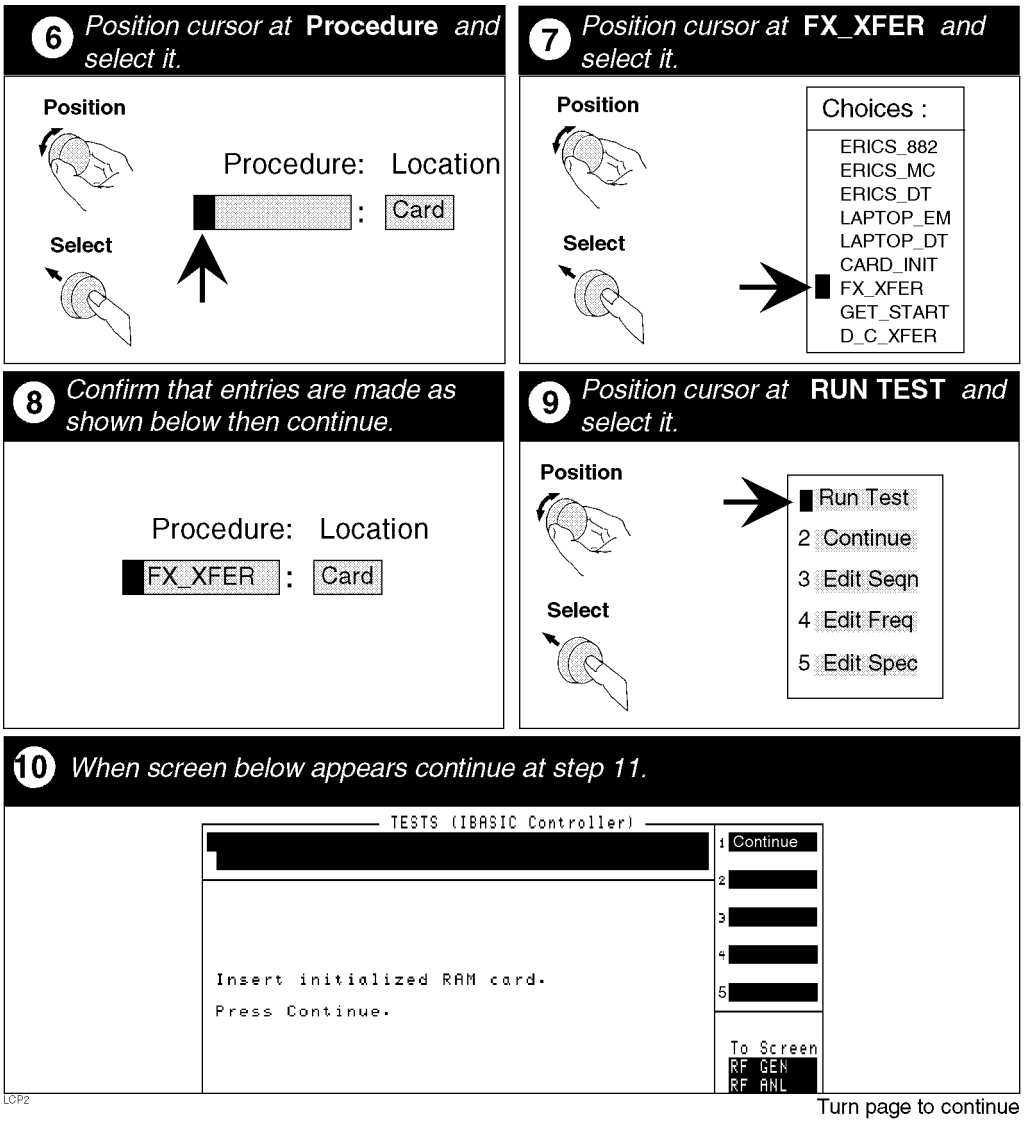
Figure 2-8



Continue on next page

Transfer the Local Control Program (Continued)

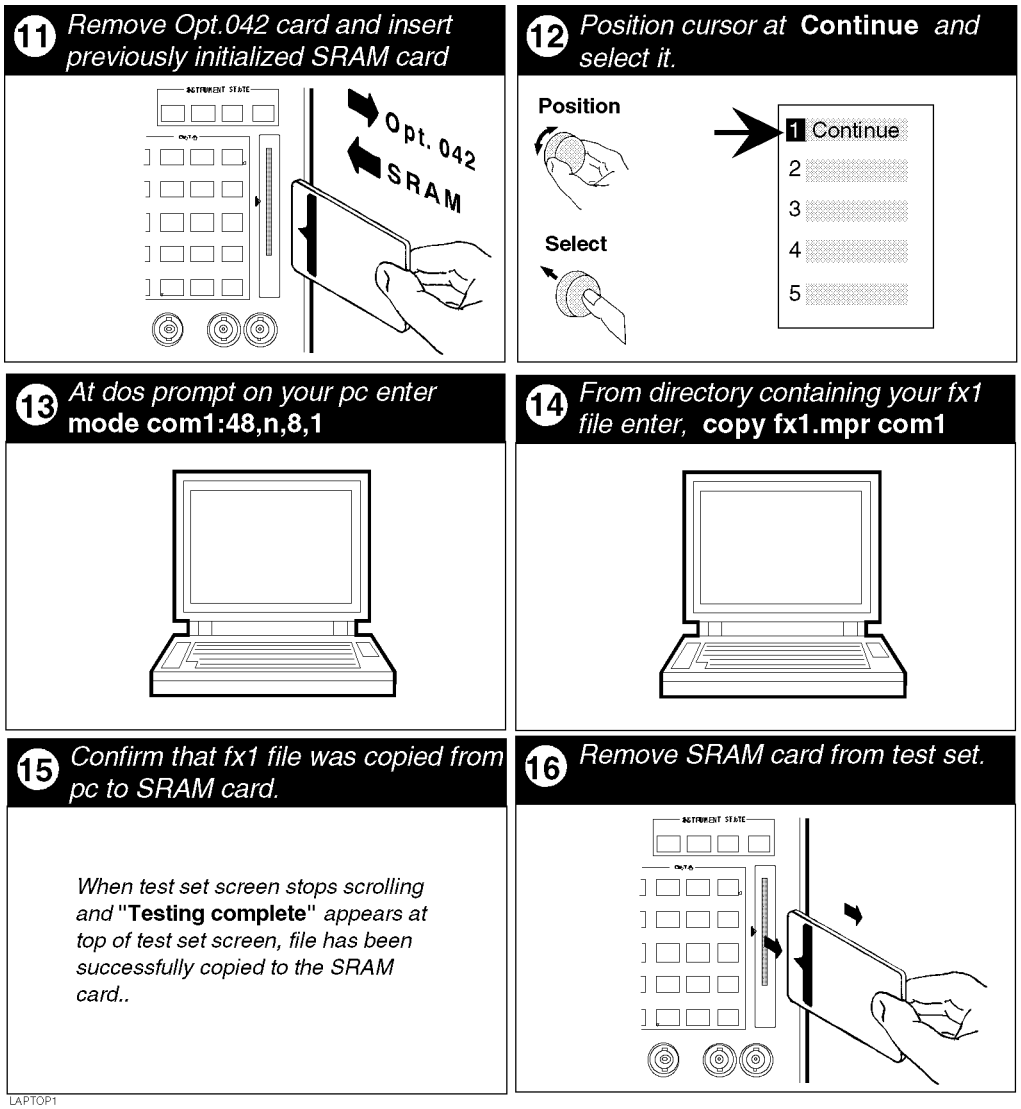
Figure 2-9



Turn page to continue

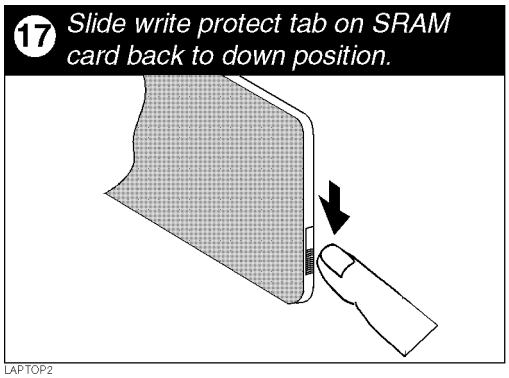
Transfer the Local Control Program (Continued)

Figure 2-10



Transfer the Local Control Program (Continued)

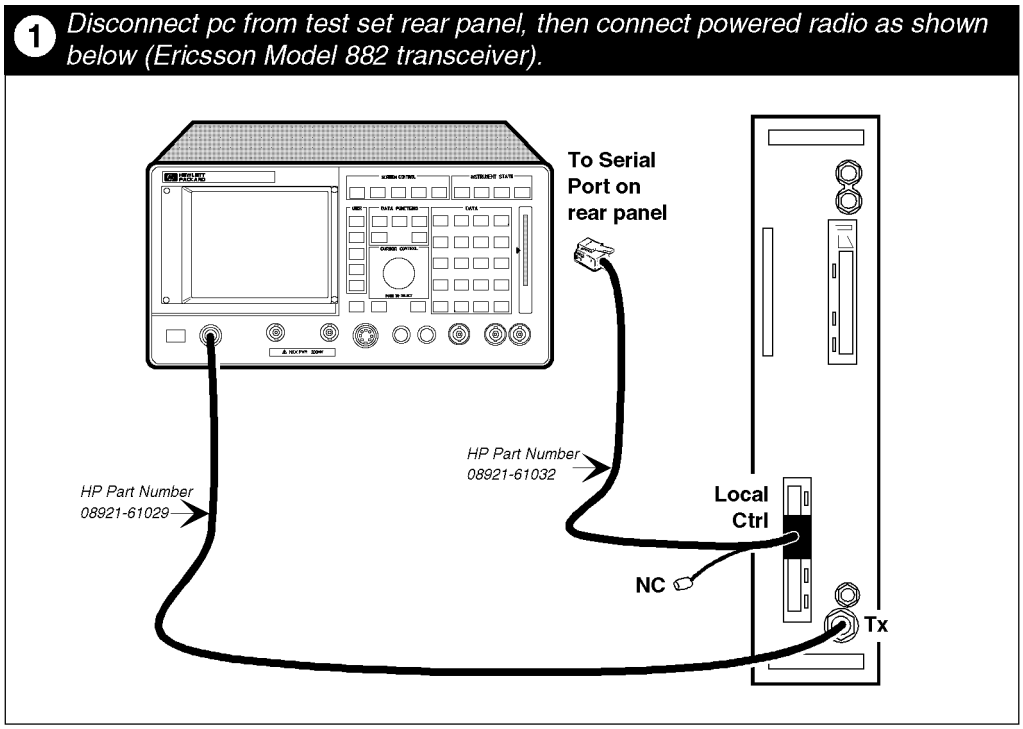
Figure 2-11



You have now completed local control file transfer. To verify that the local control program has been successfully transferred to the memory card, turn the page and follow the steps to load and run GET_START. GET_START contains a test (transmitter power) that will download the local control program from the memory card to the base station.

Verify Local Control Transfer (Transmitter Power Test)

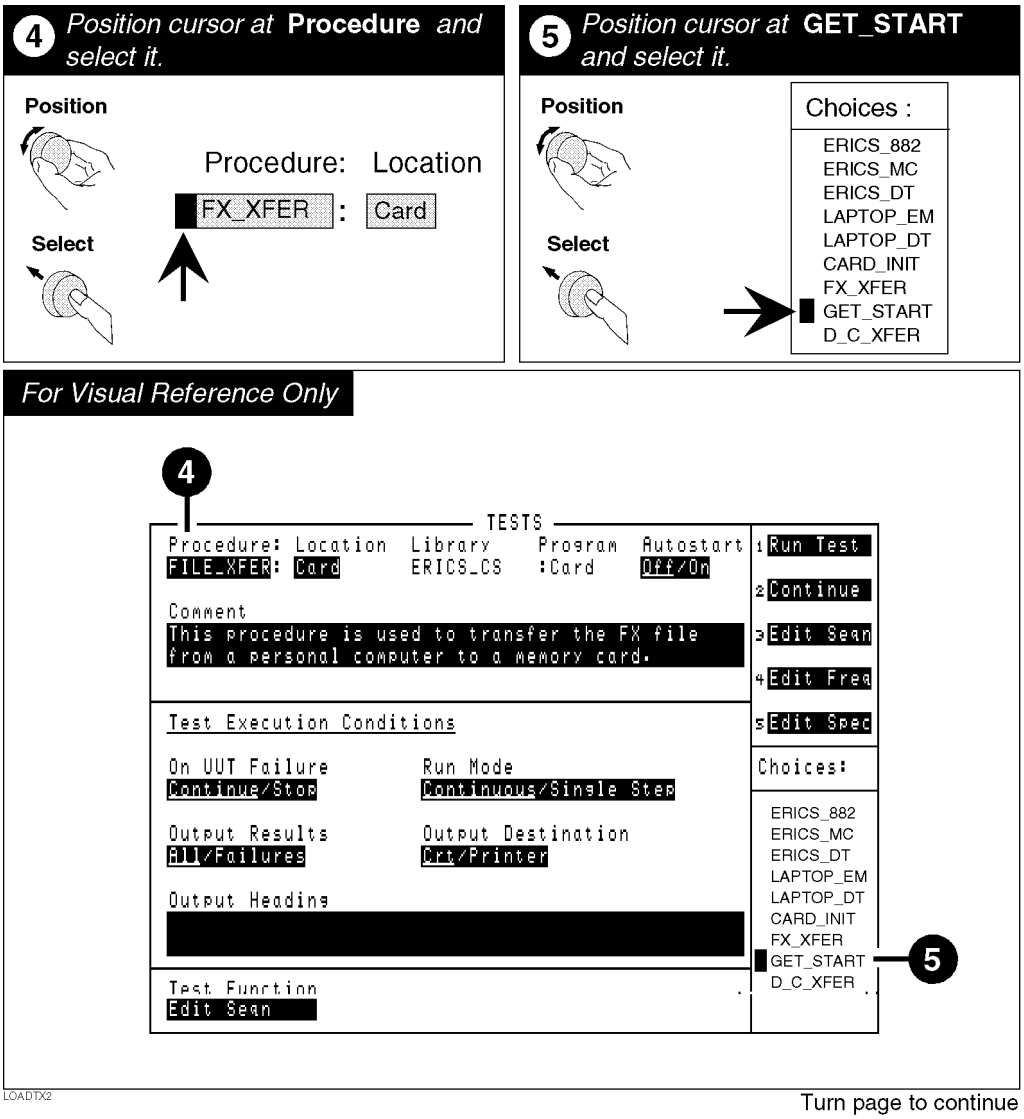
Figure 2-12



Continue on next page

Verify Local Control Transfer (Continued)

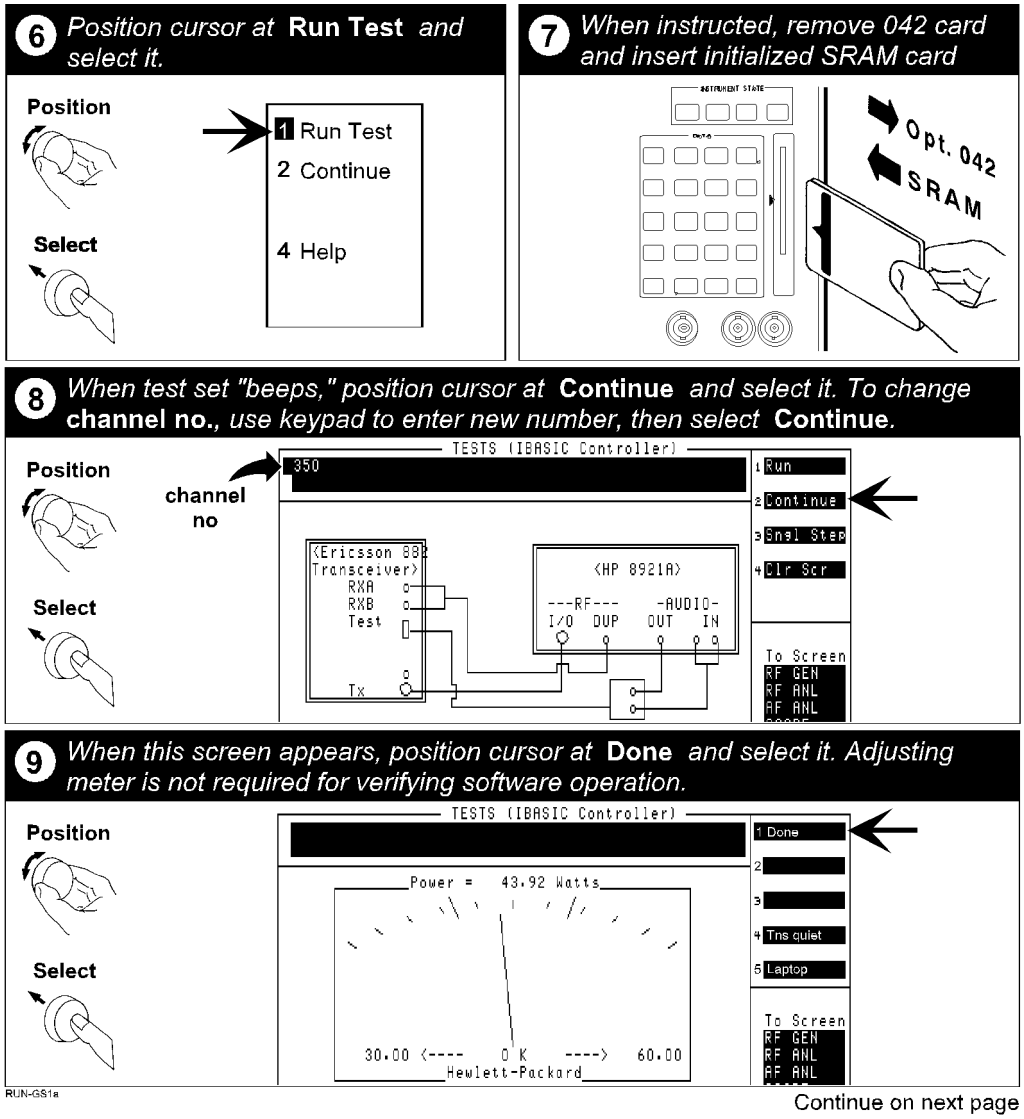
Figure 2-13



Turn page to continue

Verify Local Control Transfer (Continued)

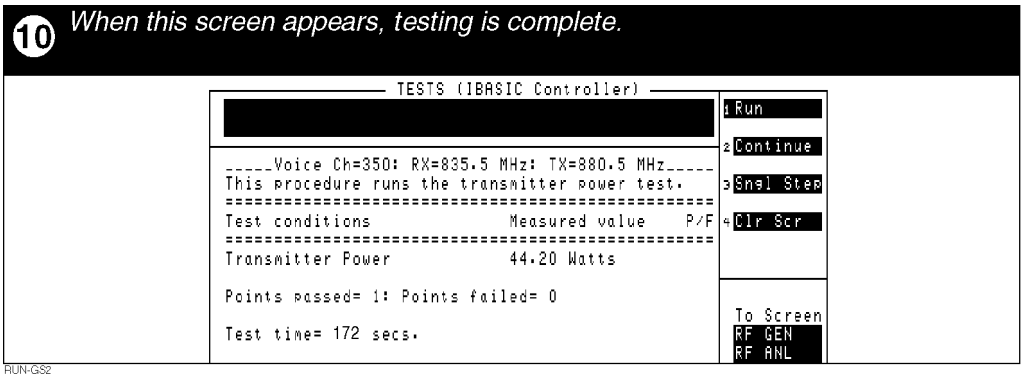
Figure 2-14



Continue on next page

Verify Local Control Transfer (Continued)

Figure 2-15



You have now completed the tasks associated with Getting Started. You have transferred the local control program from your laptop and have run the transmitter power test to confirm the functionality of the test set and local control program transfer. Proceed to Chapter 3, “Product Description,” on page 49 for an introduction to the HP 11807B Option 042 Software and a guide to the organization of this manual.

3 Product Description

HP 11807B Option 042 Software

The HP 11807B Software performs fast, accurate, automated tests that determine RF and audio performance of cellular base stations. Most of the measurement methods and specifications used for these tests are based on methods and values from Ericsson and FCC or EIA test procedures.

The HP 11807B Option 042 software can be used for the installation, maintenance, and/or repair of:

- Model 883
- Model 883M (MCBS, Microcell)
- Model 882D (DTRM)
- Model 882DM (DMTM)

This manual shows connection diagrams for Models 882 and Microcell base stations, but not Model 880.

Base station equipment to be tested may be located at an active cell site or where suitable dc power can be supplied to a Transceiver Module (TRM). Testing with the Test Set and HP 11807B Option 042 Cell Site Software is possible on any transceiver that can successfully be controlled by the local control program.

For a complete list of Tests and their descriptions, see "Test Descriptions" on page 122.

Items Included in the HP 11807B Option 042 Software

- An RJ-11(m) to DB-9(f) cable (part number 08921-61038) for PC (laptop) to Test Set connection to transfer the FX1 file from the personal computer to the memory card
- An RJ-11(m) to quarter plug cable (part number 08921-61032) for Test Set to transceiver connection to download the local control program and control the transceiver
- A One Time Programmable (OTP) memory card containing the preprogrammed
  HP 11807B Option 042 software
- A 128 Kbyte SRAM memory card for storing the Ericsson local control program, test procedures and test results
- The User's Guide presently being used

Software Features

The following features simplify testing:

- While adjustments are being made, a large meter display and auditory feedback are provided.
- When cable connections need to change, system interconnects are graphically shown on the Test Set CRT display.
- Results of tests and pass/fail indications are displayed on the Test Set CRT, and can be printed, or collected in a disk drive, memory card, PC, or HP Palmtop.
- The software allows the operator to change test order, pass/fail limits, testing conditions and equipment configurations.
- RF path losses can be determined and corrected.

Equipment Needed to Begin Testing

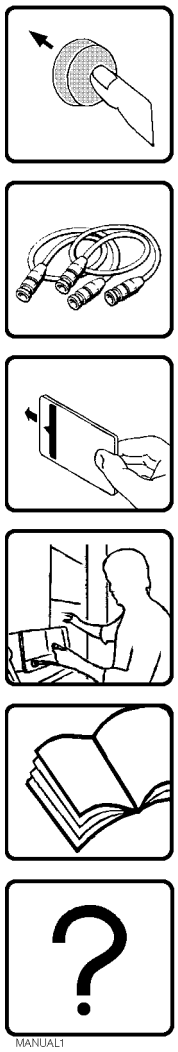
- HP 11807B Option 042 Ericsson Cell Site Test Software
- HP Test Set consisting of one of the following:
  - HP 8921A, Option 500, Dual-Mode Cellular Test System
  - HP 8921D, Dual-Mode Cell Site Test System
- The HP 11807B Option 042 software runs on the Test Set. The HP 8921A Cell Site Test Set allows testing of AMPS while the HP 8921D Dual-Mode Cell Site Test System or the HP 8921A, Option 500, allows testing of both AMPS and the new EIA/TIA Dual-Mode Base Stations.
  - The HP 8921D Dual-Mode Cell Site Test Systems consists of an HP 8921A with the HP 83201A Dual-Mode Cellular Adapter.
  - The HP 8921A, Option 500, Dual-Mode Cellular Test System consists of an HP 8921A with the HP 83204A, Option 001, TDMA Dual-Mode Cellular Adapter.
  - The Test Set firmware revision number must be A.08.04 or higher. You can determine the revision of the firmware by pressing SHIFT CONFIG on the Test Set front panel. The revision number will be displayed in the CONFIGURE screen.
- SRAM memory card(s) for storing Ericsson local control program, test setups and test results (supplied with Option 042).
- Ericsson local control software
- A Personal Computer capable of downloading the Ericsson local control program to the Test Set

- Connection arrangements, see Chapter 4, “Making Connections,” on page 55 for more detail
- Optional
  - HP 83202A Option 042 Ericsson Base Station Accessory Kit, see Chapter 4, “Making Connections,” on page 55 for more detail.
  - Printer and cables to document results.
  - PC, disk drive, or HP Palmtop to store data.

Finding the Information You Need

This manual describes the setup and use of the HP 11807B Software with the Test Set. The book is arranged in self contained chapters to meet the following objectives:

Figure 3-1



GETTING STARTED
- Fast paced, hands on tutorial.
- Basic test set/software operation.
- First time or occasional users.

CONNECTIONS-CHAPTER 4
- Instructions for cabling test set.

USING THE SOFTWARE-CHAPTER 5
- How to load
- How to run
- How to customize
- Conceptual overview

TEST DESCRIPTIONS-CHAPTER 7

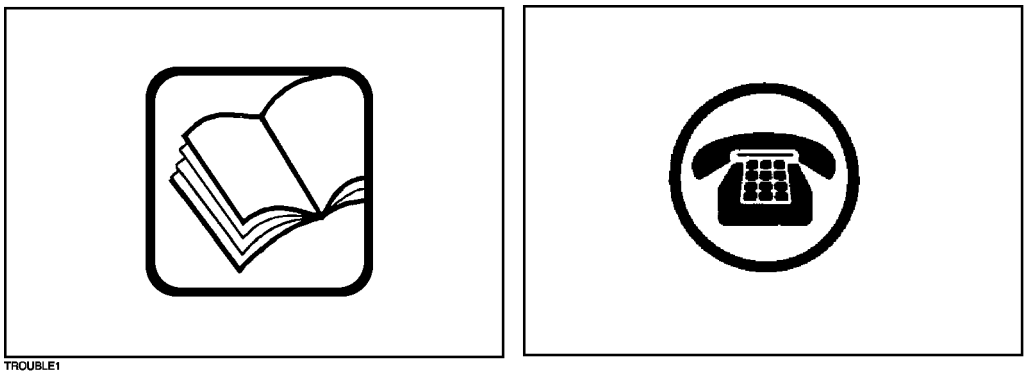
Definitions, special conditions and restrictions for:
- Tests
- Specifications-Pass/fail limits
- Parameters-Test conditions

REFERENCE-CHAPTER 8
- Alphabetically listed
- Detailed descriptions of all the features and functions of the software.
- For the advanced level user.

PROBLEM SOLVING-CHAPTER 9
- Alphabetically listed
- Symptoms and possible corrections to frequent user problems.
- Error Messages

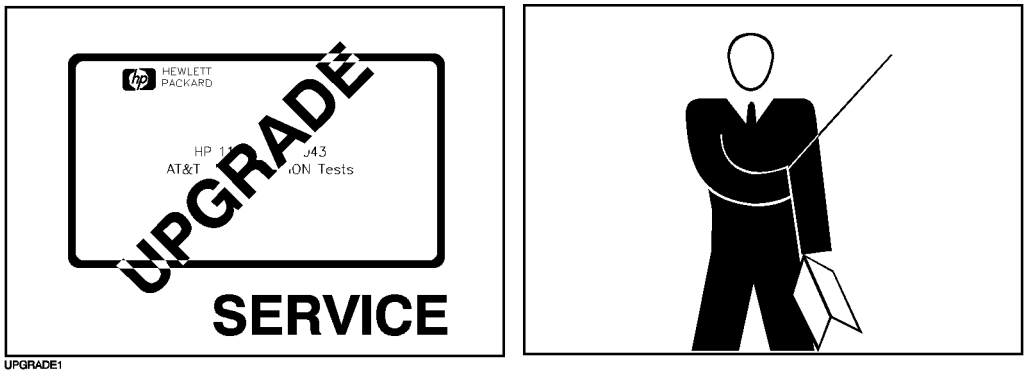
Additional Services Available

Figure 3-2



Consult the Test Set User's Guide or call the HP 8921A Hotline 1-800-922-8920 and give your software model number.

Figure 3-3



Contact your local HP Sales Representative for information about the Software Upgrade Service and the Start Up Assistance Training Course.

4 Making Connections

This chapter lists cables and adapters you need plus the connection diagrams you will use when setting up the HP 11807B software to test your base station.

CAUTION The Test Set can be damaged by transient RF power, continuous RF power, high voltage, electrostatic discharge from cables and other sources. Connections to equipment must be chosen to reduce the risk of damage to the equipment.. The application of RF power greater than 200 mW (+23 dBm) can damage the Test Set DUPLEX OUT port.

Two interface cables are supplied with the HP 11807B Option 042 software.

- An RJ-11(m) to DB-9(f) cable (part number 08921-61038) for PC (laptop) to Test Set connection to transfer the FX1 file from the personal computer to a memory card. This cable can also be used to transfer test results from the Test Set to a personal computer (data collection).
- An RJ-11(m) to quarter plug cable (part number 08921-61032) for Test Set to base station serial control.

There are other cables and adapters required for audio and RF connections. These cables and adapters are listed in the following table. You may use your own cables and adapters or the HP 83202A Option 042 Ericsson Base Station Accessory Kit sold separately. The kits' contents are also listed in the following Table 4-1 on page 58. Connections and configuration for printers or peripherals are not covered in this chapter. "Data Collection (Saving and Retrieving Test Results)" on page 189 or *"Printing" on page 214*.

Connection Cables and Adapters Needed

Table 4-1 Connection Cables and Adapters Needed

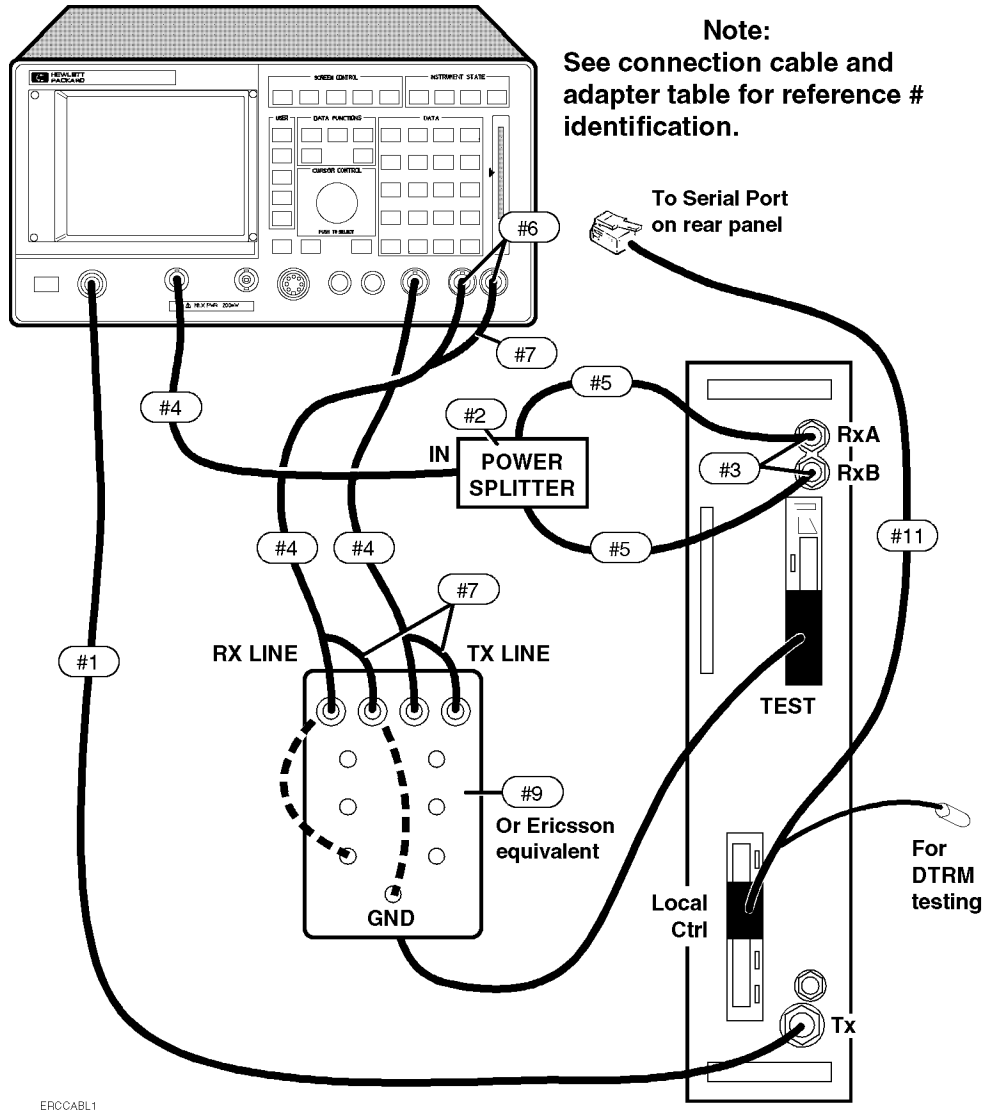
Refer-ence #	Description	Purpose	Quantity Needed	Part Number	HP 83202A Kit
1	N(m) to N(m) RG214 cable, 6ft	TX output to Test Set RF IN/OUT	1	HP 08921-61029	Yes
2	Power splitter 2 Gz. BNC(f), resistive	RXA and RXB to Test Set DUPLEX OUT. Also used to test for cable faults	1	HP 0955-0733	Yes
3	BNC(f) to TNC(m) adapter	Adapt BNC cable to RXA, RXB	3	HP 1250-2441	Yes
4	BNC(m) to BNC(m)cable RG223, 4ft	Audio to Test Set, AUDIO IN/OUT, DUPLEX OUT to splitter, DTRM REF, and one spare cable.	4	HP 8120-1840	Yes
5	BNC(m) to BNC(m) cable RG223, 1ft	Connect RXA, RXB to power splitter	2	HP 8120-1838	Yes
6	BNC(m) to Banana(f) adapter	AUDIO IN, HI and LO	2	HP 1250-2164	Yes
7	Banana(m) to BNC(f) adapter	Test Set AUDIO IN	1	HP 1251-2277	Yes
8	50 Ω termination BNC(m)	Splitter termination for diversity test	1	HP 1250-0207	Yes
None	Adapter BNC(f) to BNC(f)		2	HP 1250-0080	Yes
9	Audio Break Out Box, BNC(f)	Breaks out the audio lines on the Ericsson 882	1	HP 1150-1987	Yes
10	RJ-11(m) to RJ-11(f) dual adapter, 6 wire	Test Set serial “Y” adapter	1	HP 08921-61031	Yes
11	RJ-11(m) to Ericsson Quarter Plug, BNC cable (supplied)	Test Set serial to base station Local Cntrl	1	HP 08921-61032	Yes

Refer-ence #	Description	Purpose	Quantity Needed	Part Number	HP 83202A Kit
12	RJ-11(m) to DB-9(f) cable	Connects the PC serial port to the 08921-61032 cable for direct PC-to-TW port communication.	1	HP 08921-61035	Yes
13	RJ-11(m) to DB-9(f) cable (supplied)	For local control transfer and Data Collection to PC	1	HP 08921-61038	Yes
14	DB-25(m) to RJ-11(m)cable	For Data Collection to serial printer	1	HP 08921-61039	Yes
15	SWR Bridge Type N(m)	For swept and channel VSWR	1	Eagle RLB150N3B or equivalent[1]	No
16	6 dB Pad, BNC(f) to BNC(m)	SWR bridge to Test Set matching. Also used to test cable loss.	2	HP 0955-0698	No
17	BNC(f) to N(m) adapter	SWR bridge to BNC cable	2	HP 1250-0780	No
18	BNC(m) to SMC(m)	REF IN on HP 83204A to DTRM 50 Hz REF connection	1	HP 8120-6285	Yes

1. Eagle, Box 4010, Sedona, AZ 86340 (Telephone: 520-204-2597) (Fax: 520-204-2568)

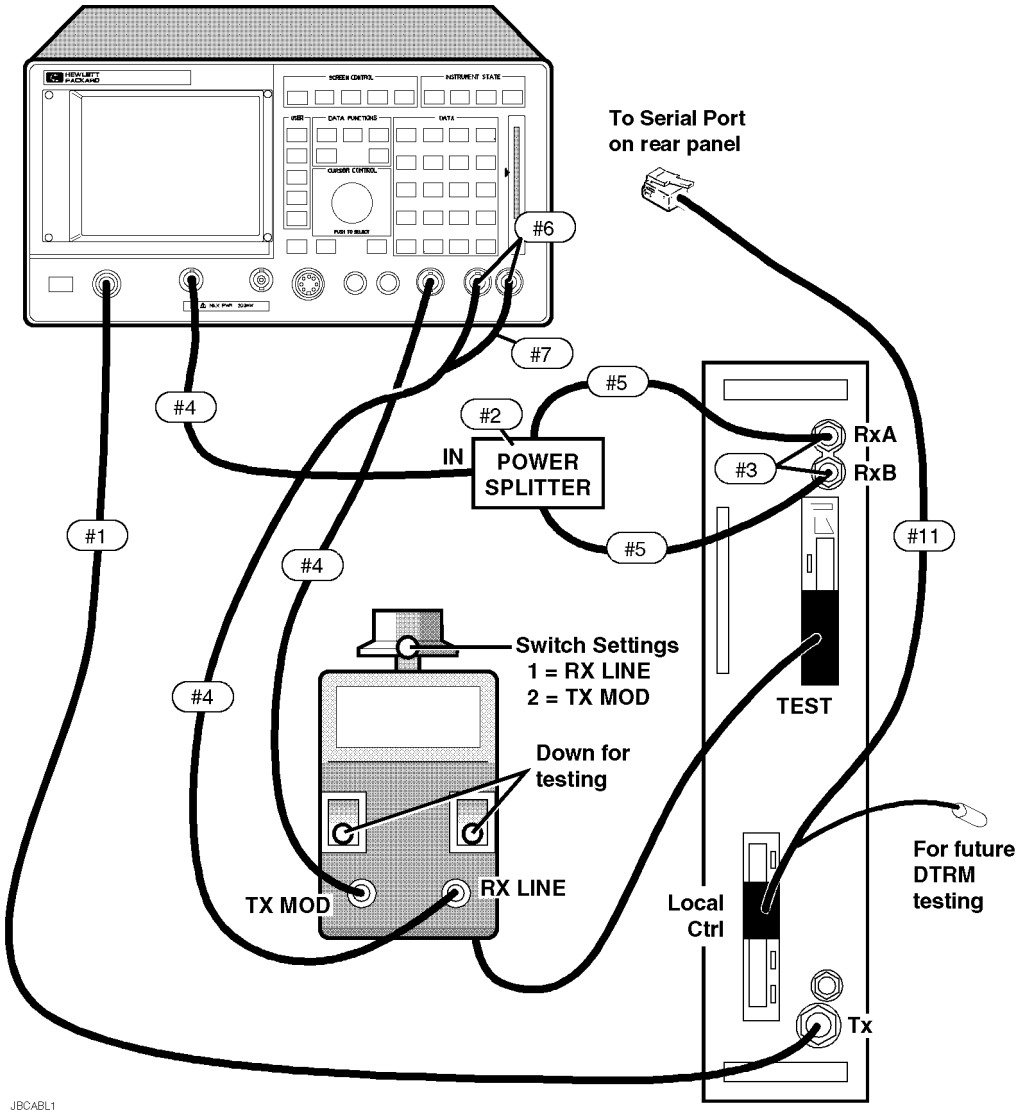
Ericsson Model 882 Connections

Figure 4-1



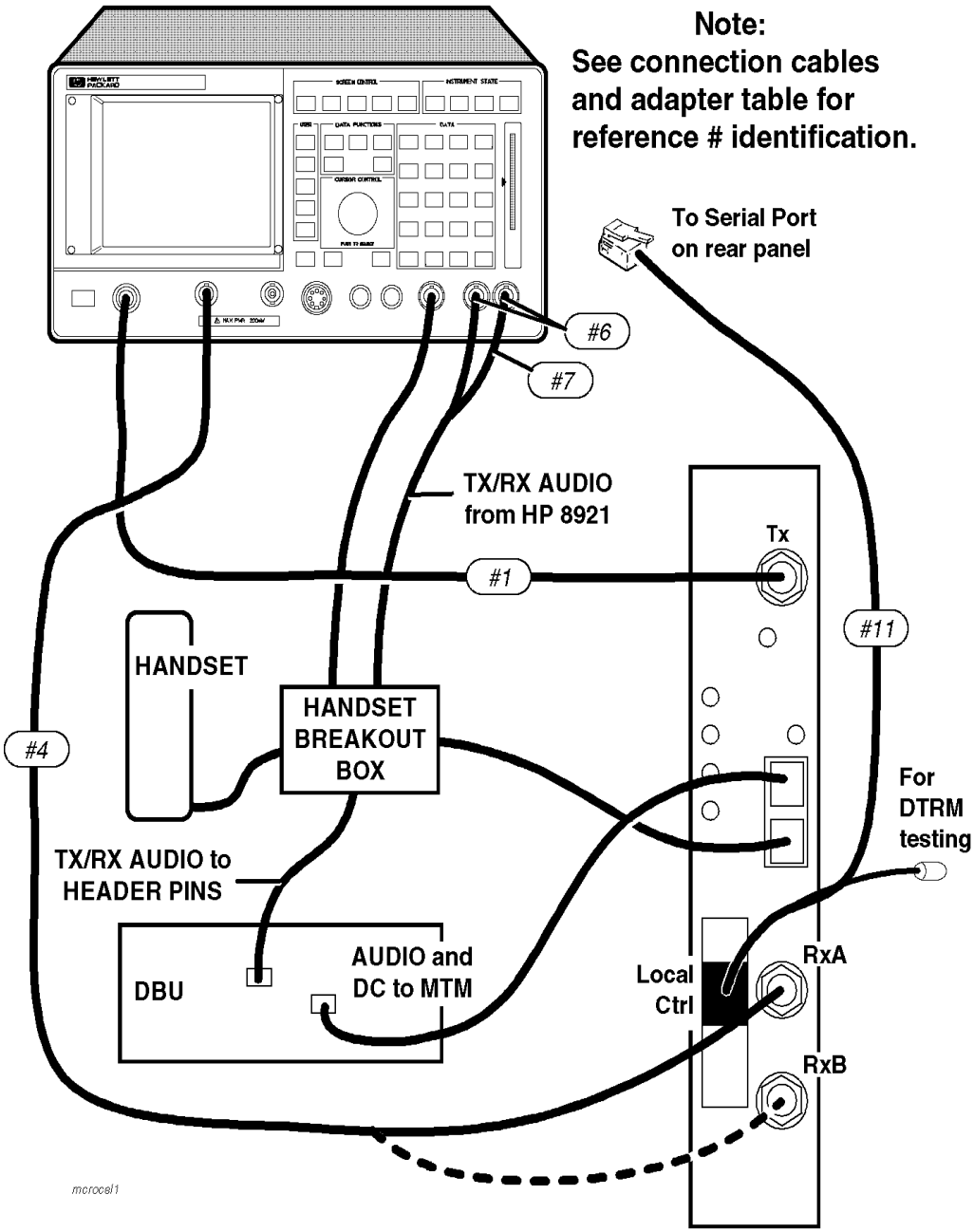
Ericsson Model 882 Connections with the HP 1150-1987 Audio Break-out Box

Figure 4-2



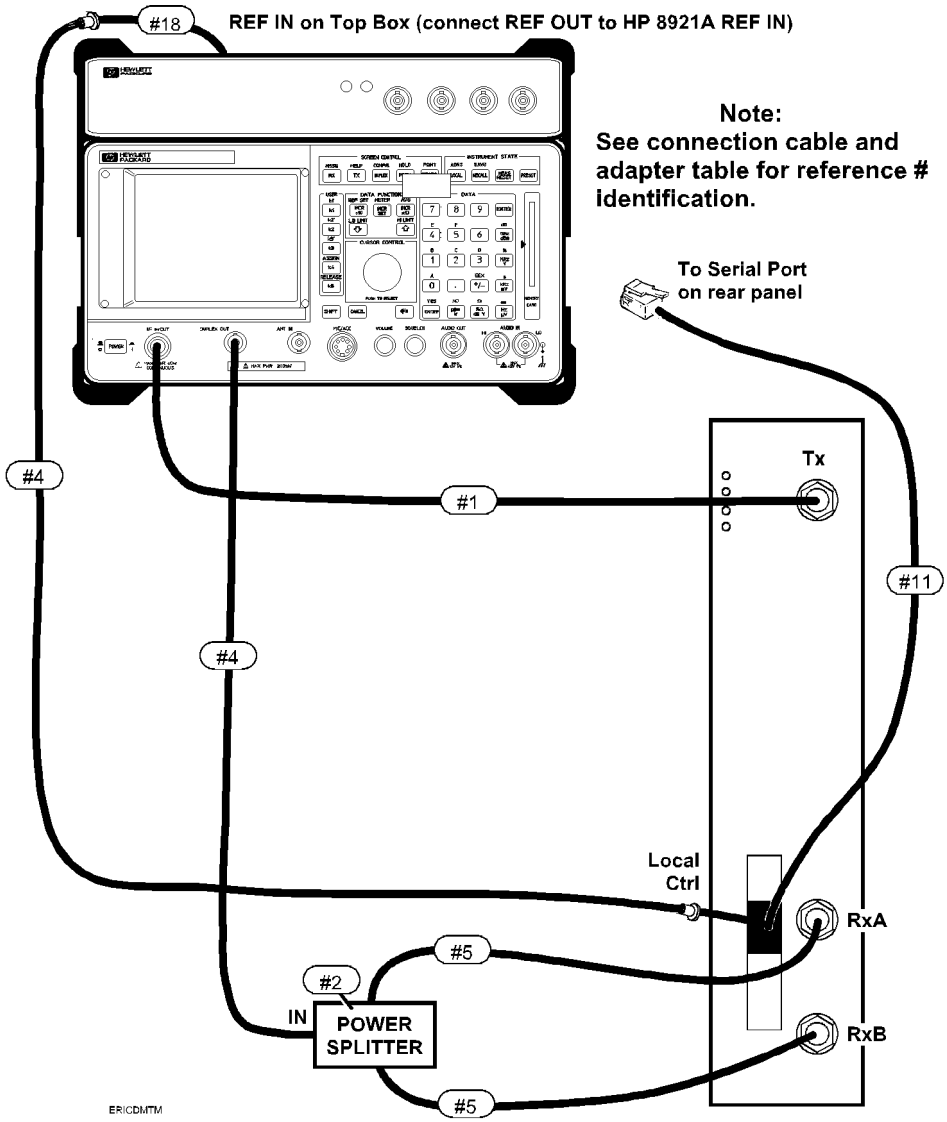
Ericsson Microcell Connections

Figure 4-3



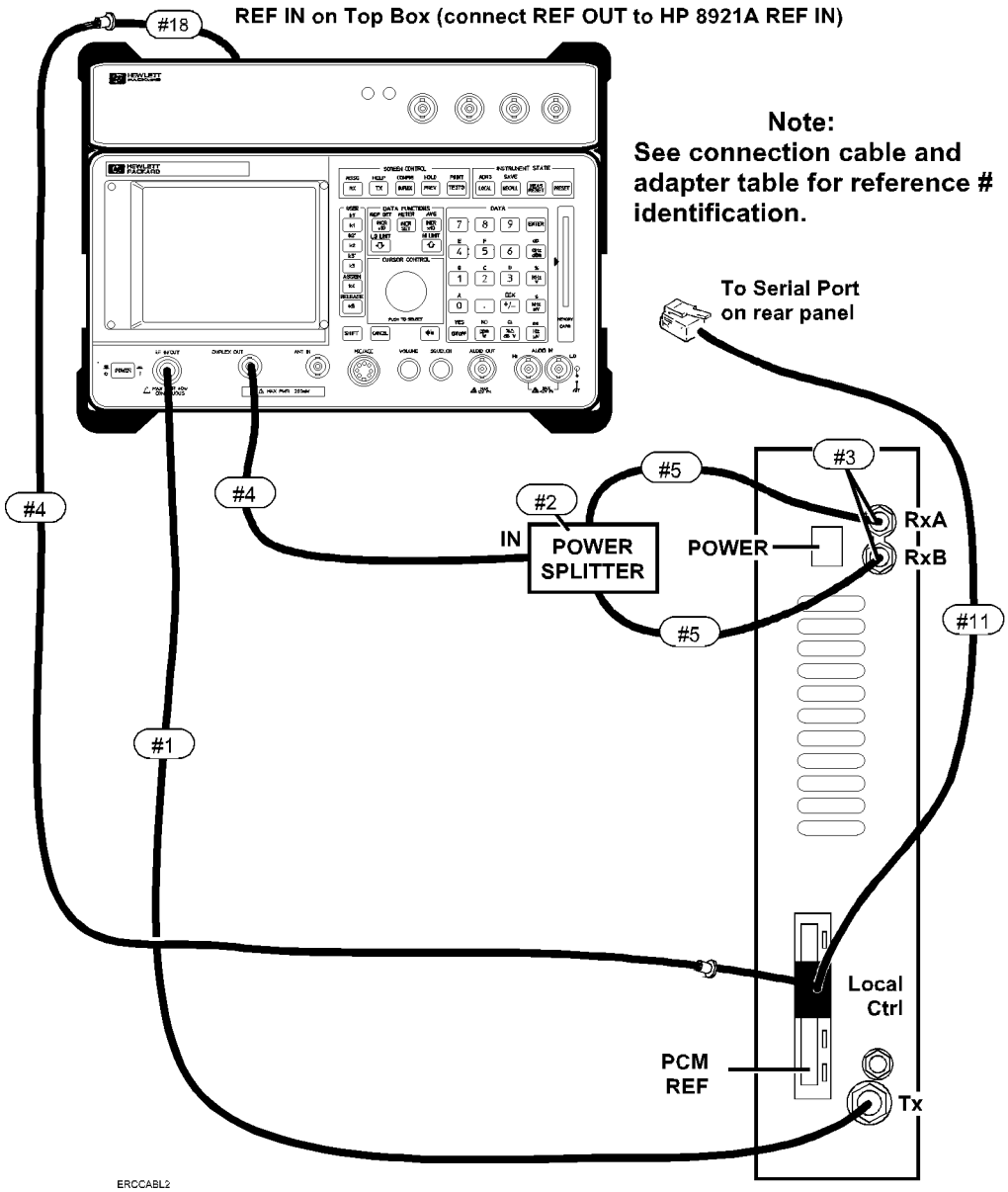
Ericsson Model 882DM (DMTM) Connections

Figure 4-4



Ericsson Model 882D (DTRM) Connections

Figure 4-5



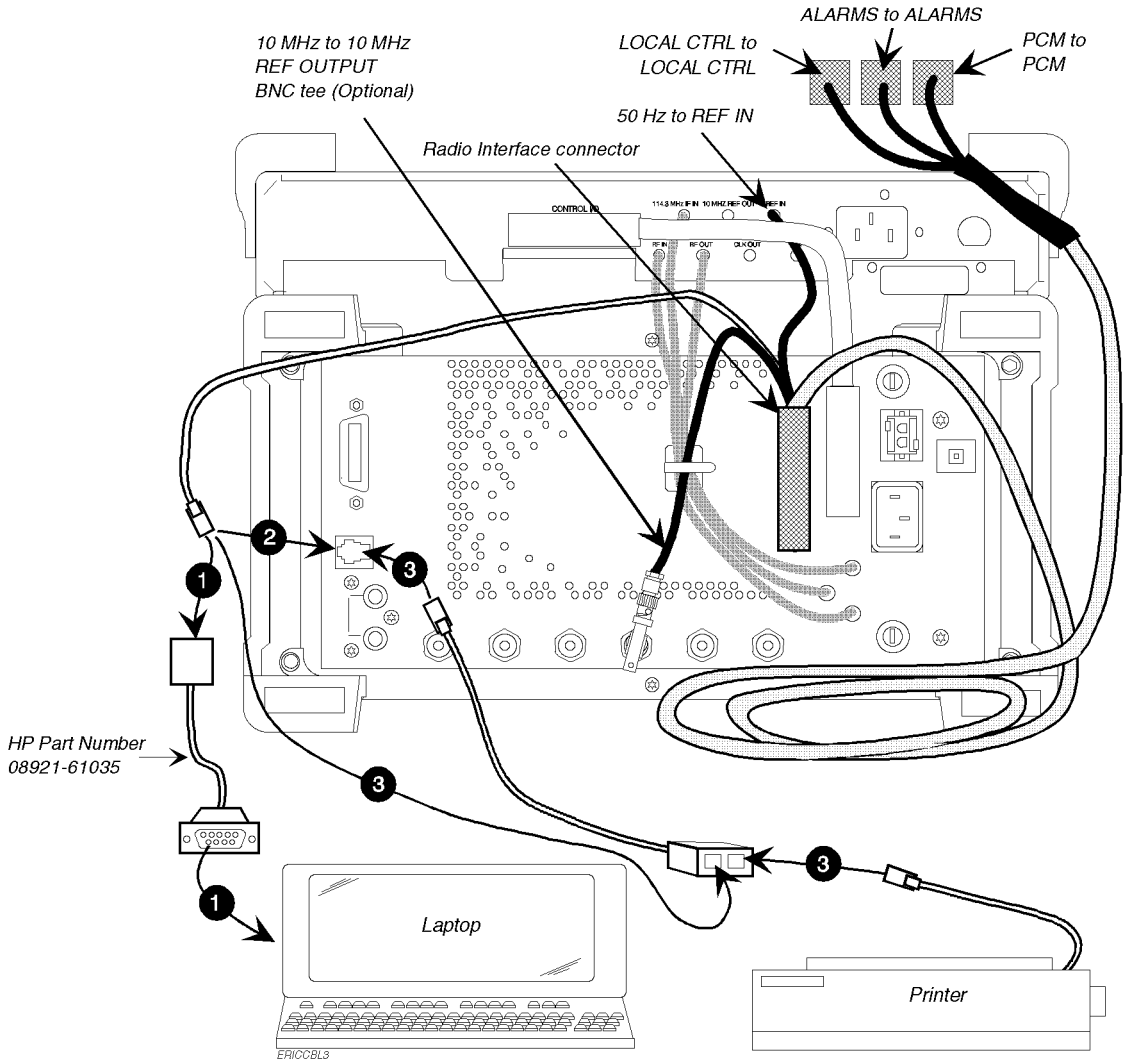
Serial Connections for DTRM

These numbers correspond with the numbers in the drawing on the following page:

1. To make connections when downloading traffic information to DTRM
2. To make connection for HP 8921A's serial port when running HP 11807B software
3. To make connections for HP 8921A's serial port when running HP 11807B software data with data collection on a printer (optional)

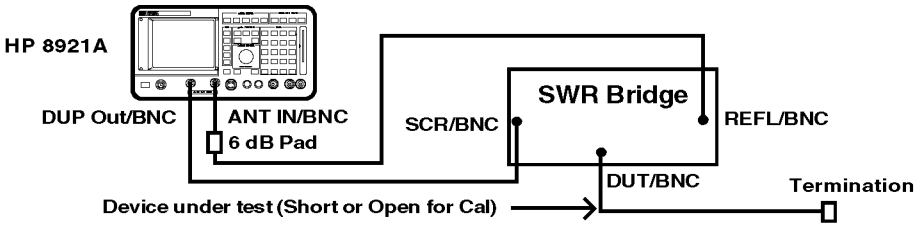
HP 8921D Hardware Option 042 (PCM Reference Generator) Connections

Figure 4-6



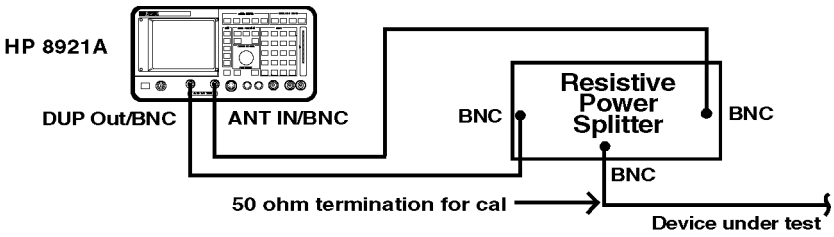
Cable and Antenna Measurement Connections

Figure 4-7 TEST_04 GN Swept Return Loss and TEST_05 GN Discrete Channel Return Loss



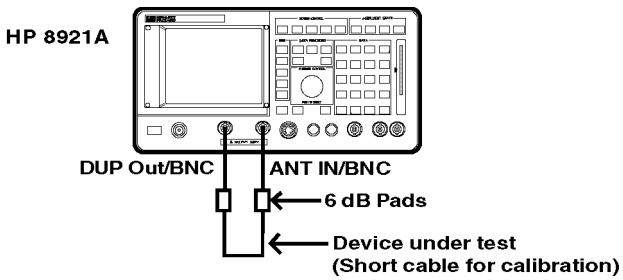
vswra.tif

Figure 4-8 TEST_06 GN Cable Fault Versus Distance



vswrb.tif

Figure 4-9 TEST_07 GN Measure Cable Loss



vswrc.tif

Determining Calibration Parameters

Inaccuracies can occur in your measurements due to cable losses and impedance mismatches in your test system. Calibration factors should be entered as parameters into the Test Parameter screen. The test program will use these calibration factors when running tests. The test software will run with the default values in parameters TX path loss and RX path loss, but you should adjust these values based on your actual cable configuration. TEST_07 - GN Measure Cable Loss can be used to measure path losses.

5 Using the Software with FW Rev. Above A.14.00

Firmware Enhancements

NOTE

The firmware revision A.14.00 in the HP 8921A,D had several enhancements. This chapter applies to users with:

- HP 8921A test sets with firmware revision above A.14.00

  The Test Set's firmware revision is displayed on the top right corner of the CONFIGURATION screen.

- Press SHIFT CONFIG to display the CONFIGURATION screen and read the firmware revision

If you have an HP 8921A Test Set with firmware revision below A.14.00, refer to Chapter 6, "Using the Software/HP 8921A FW Revision Below A.14.00," on page 95. Contact Hewlett-Packard at 1-800-922-8920 for details on upgrading your firmware if desired.

Test Set or System is Defined As:

- HP 8921A, Option 500, Dual-Mode Cellular Test System
- HP 8921D, Dual-Mode Cell Site Test System

Introduction

The software can be run on the factory default settings or customized to your individual needs and specific requirements. This chapter provides detailed information on how to load, run, and customize the software.

The Test Set has two methods of accessing on-line help. In each of the screens in the test environment, k4 (`Help`) accesses specific information about how to set up/use the current screen. SHIFT HELP accesses the master help file, with an alphabetical listing of help topics.

Testing Overview

Pressing TESTS will display what is called the TESTS (Main Menu) screen. To begin testing, you must first load the software and make connections. From this screen you have the option to:

Begin running tests:

- The factory default settings are acceptable for your application or
- The software has already been customized and saved to a memory card

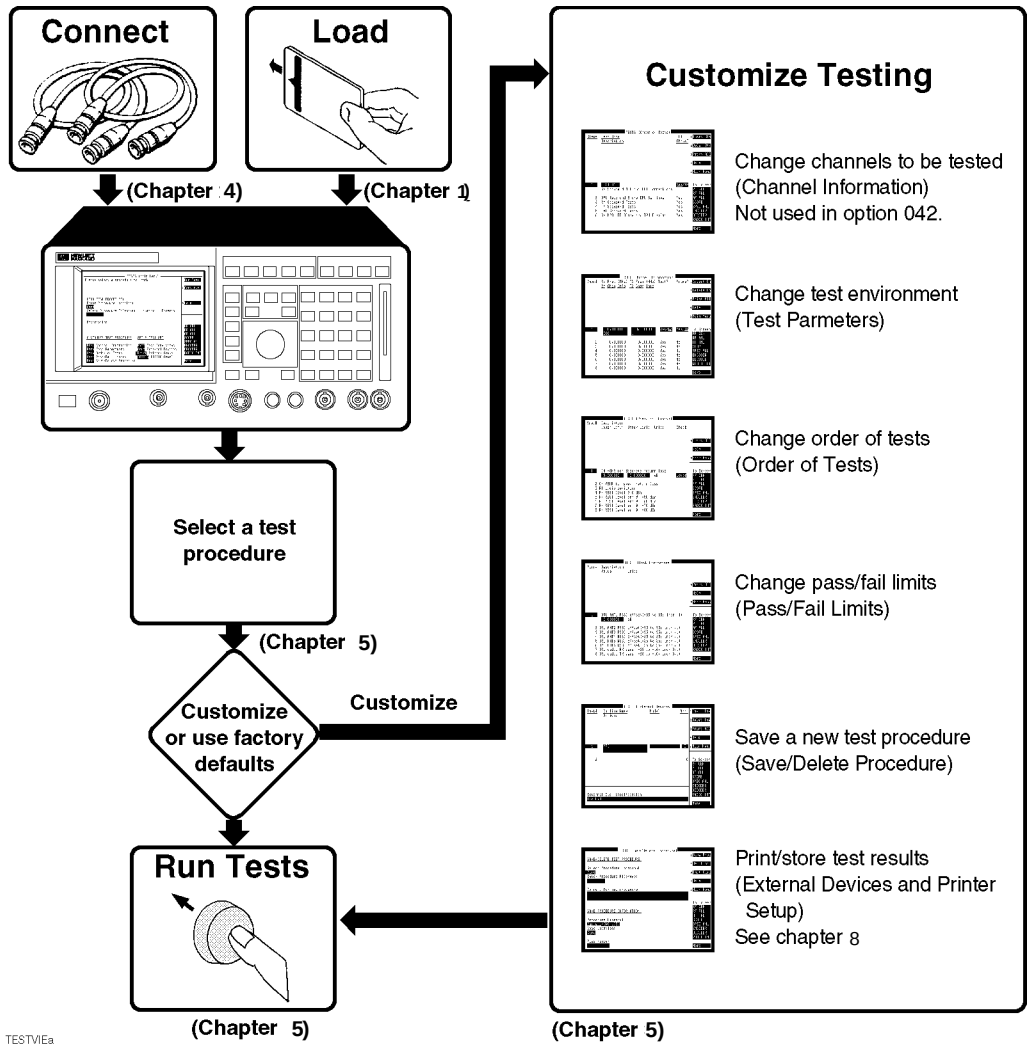
Customize the software:

- Decide which tests you desire to run (Order of Tests)
  - you may want to run all, some, or just one of the tests.
- Change the pass/fail limits for specific measurements (Pass/Fail Limits)
  - you may want the pass/fail limits to have tighter or looser specifications than the default settings.
- Change the test environment and conditions (Test Parameters)
  - decide output format.
  - enter specific information about radio equipment and/or environment.
- Save any or all of the above customized changes to a memory card (Save/Delete Procedure)

Set Up Test Set:

- Print test results or certain screens.
- Decide when and where test results are displayed (`Test Execution Conditions/External Devices`)

Figure 5-1


Connect
Load
(Chapter 4)
(Chapter 1)
Select a test procedure
(Chapter 5)
Customize or use factory defaults
Customize
Run Tests
(Chapter 5)
TESTVIEa
Customize Testing
Change channels to be tested (Channel Information) Not used in option 042.
Change test environment (Test Parmeters)
Change order of tests (Order of Tests)
Change pass/fail limits (Pass/Fail Limits)
Save a new test procedure (Save/Delete Procedure)
Print/store test results (External Devices and Printer Setup) See chapter 8
(Chapter 5)

Before Running Tests

- If you are running tests on the analog 882 or 882M transceivers, you must do the steps in Chapter 1, “Getting Started with FW Above Revision A.14.00 (for 882 and 882M Analog Transceivers Only),” on page 9 or Chapter 2, “Getting Started with FW Below Revision A.14.00 (For 882 or 882M Analog Transceivers Only),” on page 29 first. “Getting Started” stores your local control (FX) file on an SRAM (Static Random Access Memory) memory card so that it may be downloaded to the transceiver before tests are run. If you are running tests on the digital 882D or 882DM transceivers, you will need to have the Ericsson “traffic” software or Radio Channel Software Unit (RCSU) in the transceiver. This can be loaded from the MTSO or from the PC.

  The HP 11807B, Option 042 software emulates both: LCPC and LCPC_R4 Ericsson control software. Therefore, both RCSU30 and RCSU57 can be tested.

- Select a test procedure (plan) from the HP 11807B Option 042 software card. The software is shipped with the following preprogrammed test procedures on the program card.

  `ERICS_882` is used for Model 882 testing.

  `ERICS_MC` is used for Microcell testing.

  `ERICS_DT` is used for DTRM testing.

  `ERICS_DM` is used for DMTM testing.

  `LAPTOP_EM` runs TEST_01 - GN Laptop Emulator.

  `LAPTOP_DT` runs TEST_26 - TDMA Laptop Emulator.

  `CARD_INIT` runs TEST_02 - Memory Card Initialization

  `FX_XFER` runs TEST_03 - Local Control File Transfer.

  `GET_START` runs TEST_10 - TX Power Adjustment used in “Getting Started”.

  `D_C_XFER` runs TEST_08 - GN Data Collection File Transfer.

  `CAB_LOSS` runs TEST_07 - GN Measure Cable Loss.

  `ANT_SWEEP` runs TEST_04 - GN Swept Return Loss.

  `CAB_FLT` runs TEST_06 - GN Cable Fault.

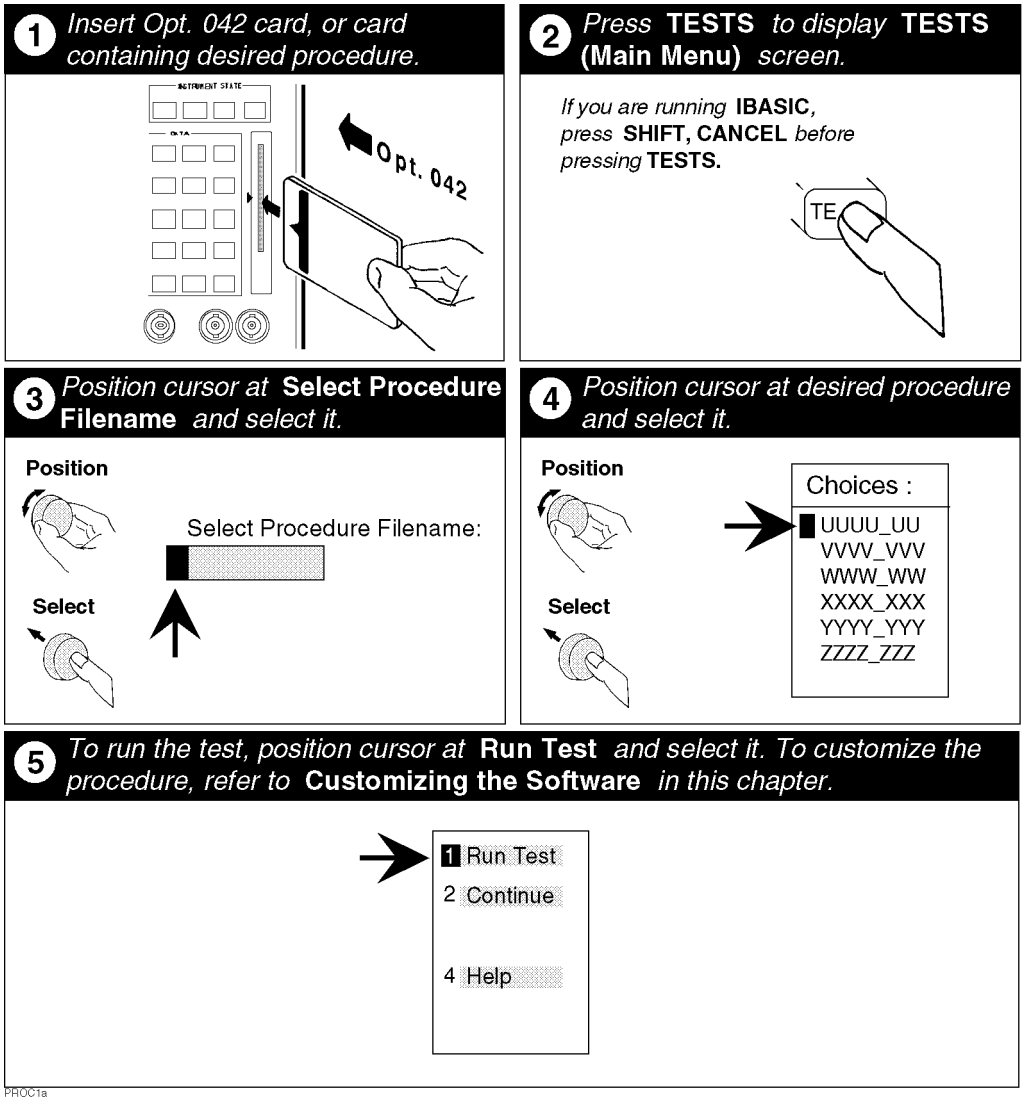
- Before you begin testing, you should have made the appropriate hardware connections. See Chapter 4, “Making Connections,” on page 55, if you have not done so already.

Running Tests

- When tests begin to run, they are executed in the order in which they were entered into the Test Procedure.
- Pressing CANCEL will pause the current test (press `Continue` to continue the test).
- When the `Run Test` softkey is pressed, the Test Set will check to see if the program is already resident in RAM memory. If it is not, it will be loaded from the memory card, a process which takes about two minutes. The contents of the Test Set's RAM memory are retained even while the instrument is powered down.
- After all testing is complete on a given transceiver, you must exit local control so that the transceiver can be put back into service. Run TEST_01 Laptop Emulator or TEST_26 TDMA Laptop Emulator as your last test and select `EXIT LOCAL CONTROL`.

Selecting a Test Procedure

Figure 5-2



The usual sequence for testing an operational cell site is as follows:

1. Use the Ericsson FIOL program running on a personal computer (PC) to contact the Mobile Telephone Switching Office (MTSO) in order to "block" a set of transceivers to be tested. It is convenient to block a set of four which are connected to the same star junction.
2. Run the `ERICS_882`, `ERICS_MC`, `ERICS_DT`, or `ERICS_DM` procedure on each transceiver as appropriate. The 882D (DTRM) or 882DM (DMTM) transceiver will need to have the traffic program loaded before it can be tested. This can be loaded from the MTSO or directly from the PC. Model 882 and Microcell transceivers can be tested without having anything loaded from the MTSO or PC because they receive a download of the local control (FX) file from the memory card automatically (if required) at the beginning of each test procedure.
3. Run the `LAPTOP_EM` or `LAPTOP_DT` procedure to key up and display the spectrum of each transceiver for combiner tuning.
4. Continue to run the `LAPTOP_EM` or `LAPTOP_DT` procedure to de-key each transmitter and exit local control on each transceiver.
5. Use the FIOL program to request the MTSO to "unblock" the transceivers which have just been tested.
6. Repeat steps 1 through 5 for a new set of transceivers.

- The PC can remain connected to the ERI panel (or telephone line) for the duration of testing. There it can be used to block transceivers and to query the MTSO for transceiver channel assignments so that each transceiver can be tested on the channel it will be operating on.
- Test results can be printed, stored on a memory card or transferred to a PC. See "Printing" on page 214 and "Data Collection (Saving and Retrieving Test Results)" on page 189.
- Individual transceivers can be tested on the workbench, in which case only step 2 above applies. The model 882D or 882DM will require PCM reference signals. The HP 8921A hardware Option 042 can supply these.
- At the time of this writing, HP 11807B, Option 042 software is known to be compatible with Ericsson RCSU software revision R2A12, and R57R1B.

Customizing Testing

Because of the diversity of individual testing needs, the software has been designed so that changes may be easily made from the Test Set's front panel. You may store these changes on a memory card so that you may skip these steps in the future. See "Saving a Test Procedure" on page 89.

Because your needs change, the software allows changes to its default settings whenever you need to make them. For example, tests may be inserted or deleted, and later after running the tests you can change the pass/fail limits or decide to test different channels.

Most testing customization is accomplished through the customization screens. These customization screens are accessed from the main TESTS (Main Menu) screen as shown in the following figure. Customizing procedures is explained later in this chapter.

NOTE

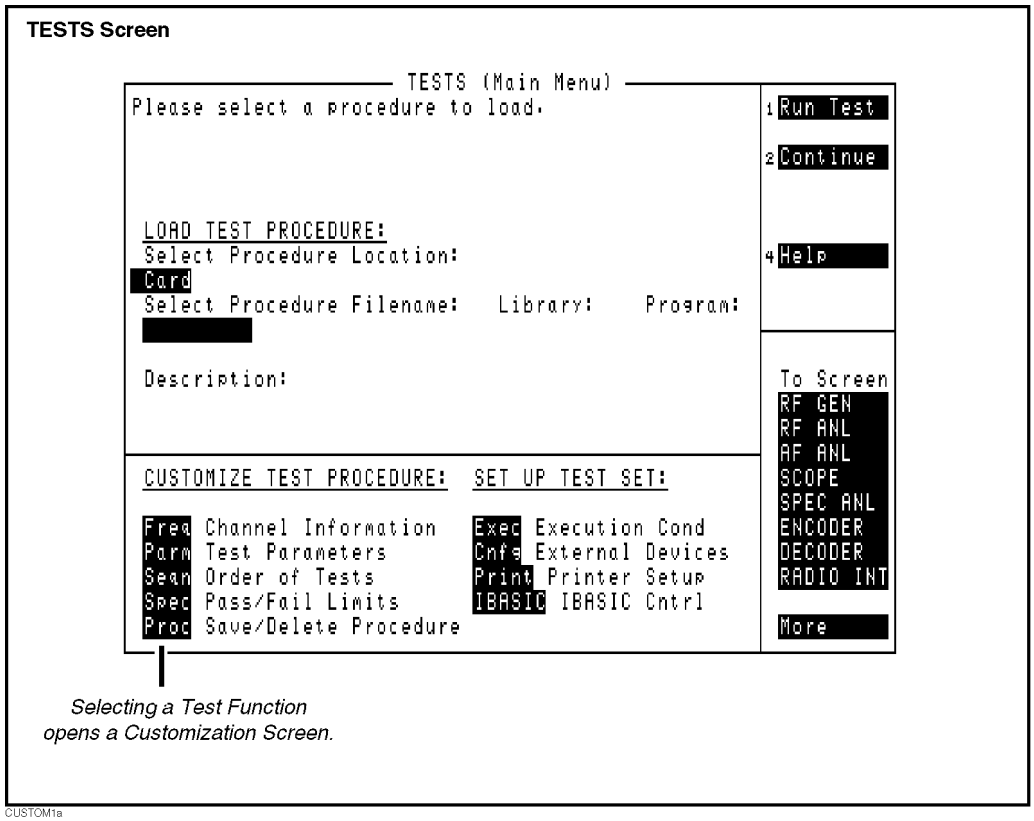
Channel Information, External Devices, Printer Setup, and IBASIC will not be explained in this customizing section.

- Channel Information is not used by the HP 11807B Option 042 software.
- External Devices are used when setting up printers and external disk drives which is explained in *"Disks" on page 200* and *"Printing" on page 214*.
- Printer Setup is used with B.xx.xx revision software only. Currently not available with HP 11807B Option 042 software.
- IBASIC is used when writing your own programs and is not explained in this manual. If you need to write your own IBASIC programs you may acquire the following manuals:
  - HP 8921A,D
    - *HP Instrument BASIC User's Handbook*, HP part number E2083-90601.
    - *HP 8921A Programming Guide*, HP part number 08921-90031.

Beginning Software Customization

All software customization begins by accessing the TESTS Main Menu screen first and then selecting the `CUSTOMIZE TEST PROCEDURE` filed of your choice. Press TESTS on the front panel of the Test Set to access the TESTS Main Menu screen.

Figure 5-3



Changing the Order of Tests

You may define the order of tests to include all, some, or just one of the tests available. When the first test is finished, the next will run. The test sequence will remain in the Test Set's battery backed-up memory until another test sequence is loaded or set up. For information on saving a customized test sequence, see "Saving a Test Procedure" on page 89.

Defining the order of tests is accomplished by inserting or deleting tests from the list of tests that come with the software package. Chapter 7, "Tests, Parameters, Pass/Fail Limits Descriptions," on page 121, for descriptions of tests included in this package.

The following describes how to create a new test sequence.

How to Change the Order of Tests

Figure 5-4

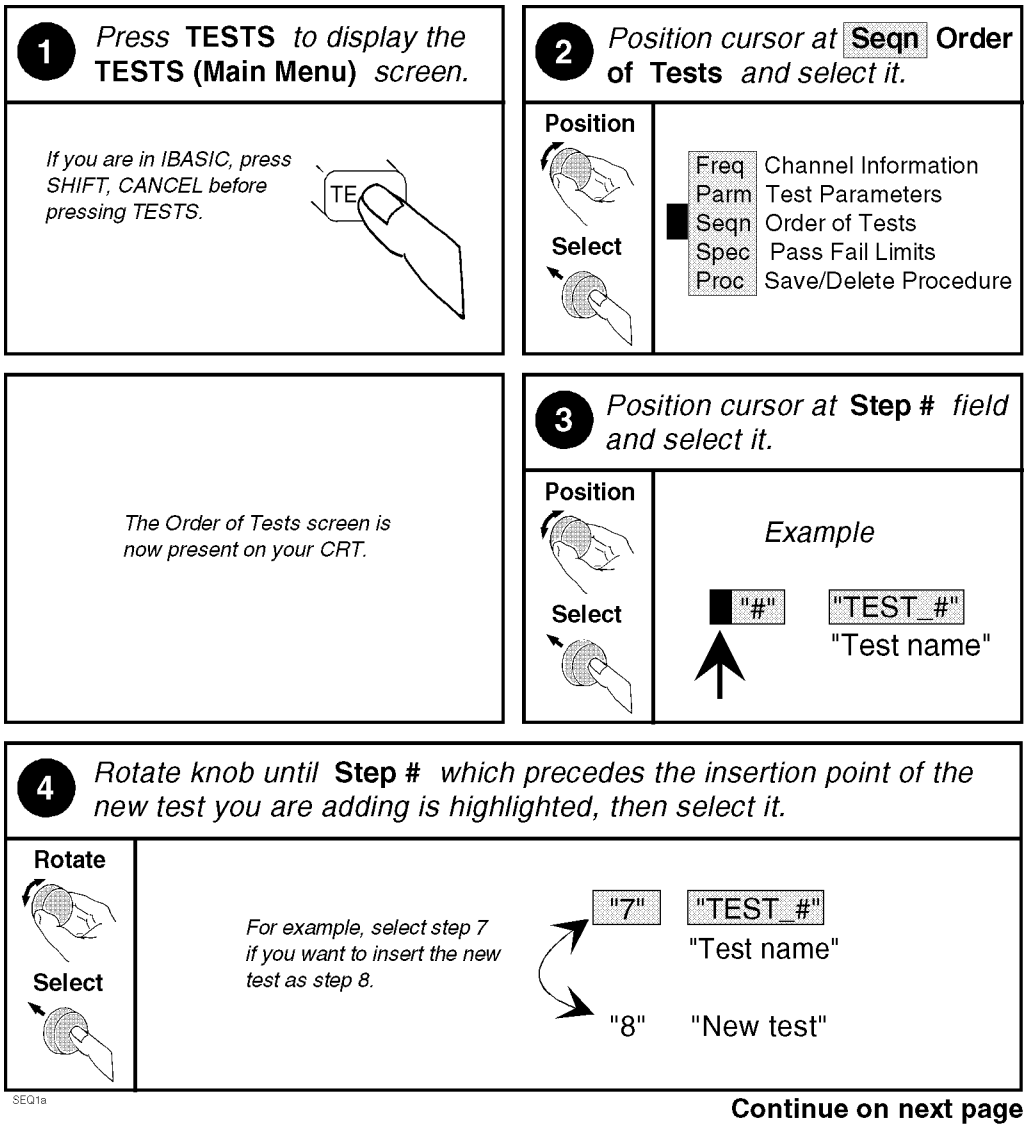


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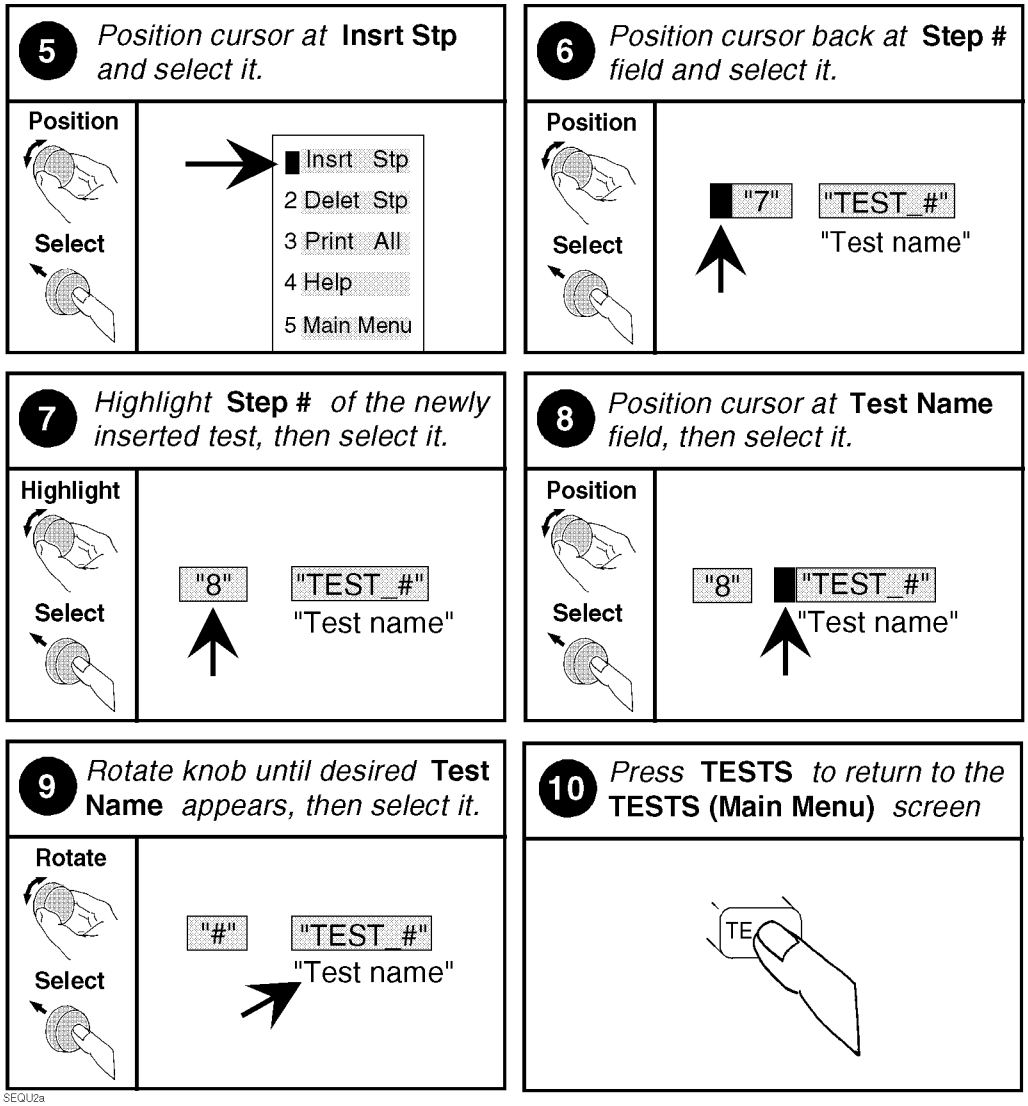
Figure 5-5



NOTE The `All Chans?` field is not used by the HP 11807B Option 042 software.

Changing Pass/Fail Limits

Pass/Fail limits define the values a measurement's result is compared against to determine if the UUT meets its specified standards. Default values are set in the test software. These default values may be changed to suit your particular requirements.

The following describes how to change the pass/fail (upper and lower) limits. "Pass/Fail Limit Descriptions" on page 174 for descriptions of each pass/fail limit. For information on saving customized pass/fail limits, see "Saving a Test Procedure" on page 89.

How to Change Pass/Fail Limits

Figure 5-6

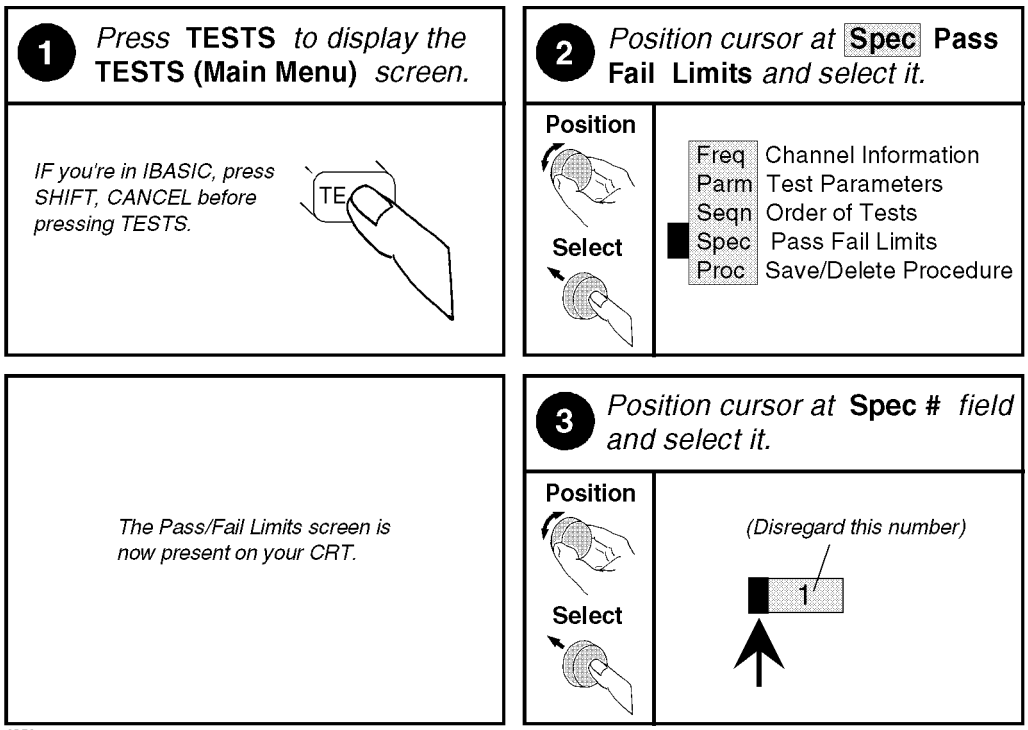


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Figure 5-7

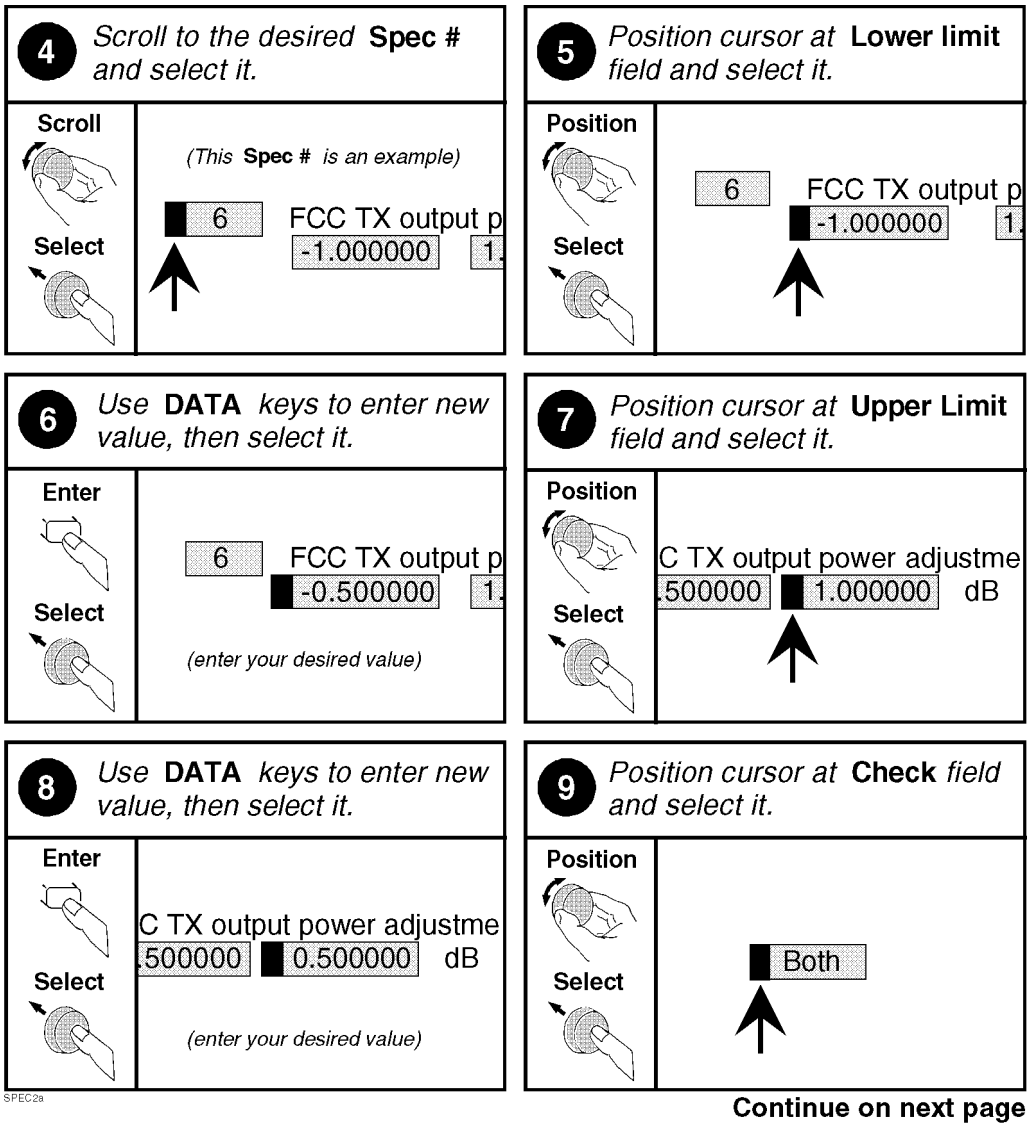

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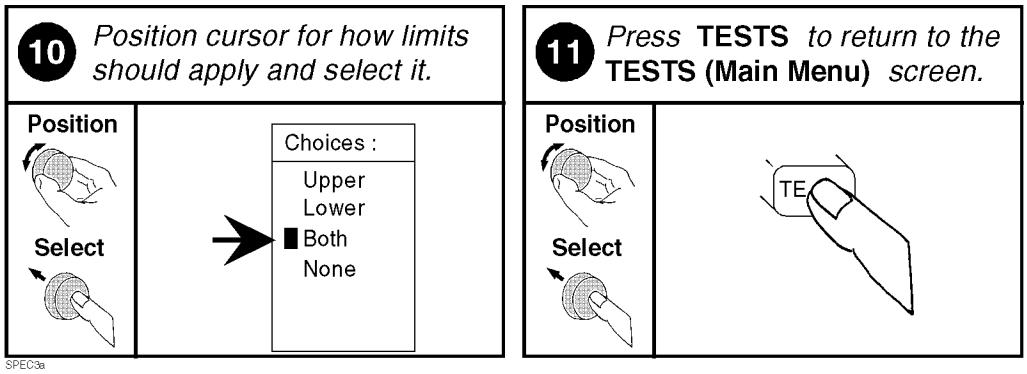
Figure 5-8


10
Position cursor for how limits should apply and select it.
Position
Select
Choices :
Upper
Lower
Both
None
11
Press TESTS to return to the TESTS (Main Menu) screen.
Position
Select
TE
SPEC3a

Changing the Test Parameters

The software uses parameters to optimize the test environment and conditions for your testing situation. Many of the test parameters are determined by examining your test needs. The software comes with default settings for test parameters. Review the defaults for your particular needs. "Parameter Descriptions" on page 166 for descriptions of each test parameter. For information on saving customized test parameters, see "Saving a Test Procedure" on page 89.

The following describes how you can change test parameters through the Test Parameter screen to optimize your testing conditions.

How to Change the Test Environment and Conditions

Figure 5-9

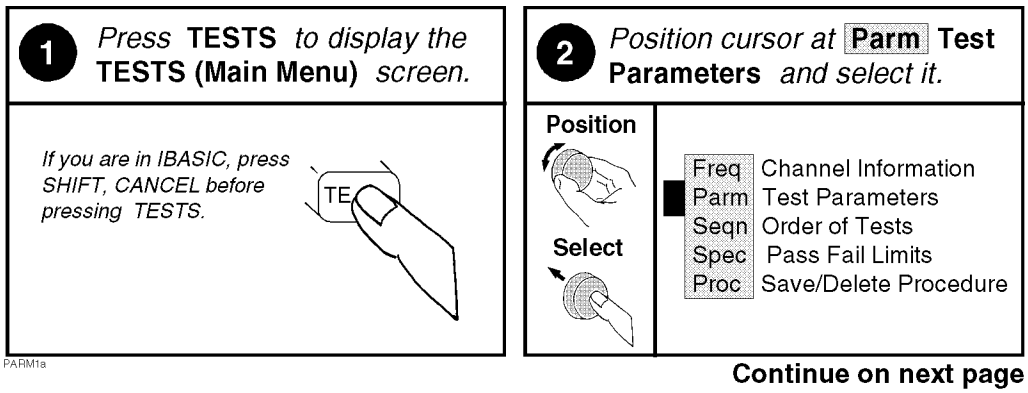


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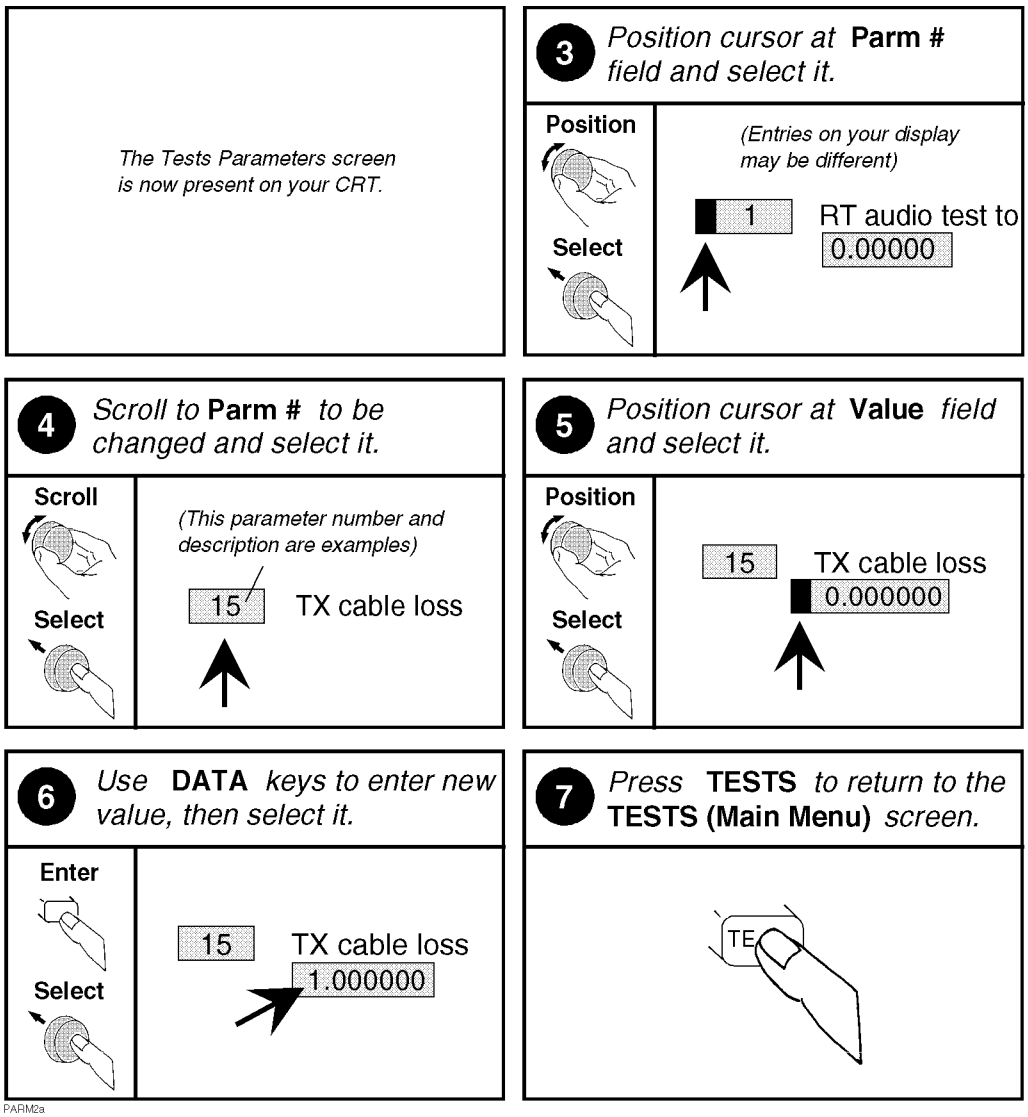
Figure 5-10


The Tests Parameters screen is now present on your CRT.
3 Position cursor at Parm # field and select it.
Position
Select
(Entries on your display may be different)
1
RT audio test to
0.00000
4 Scroll to Parm # to be changed and select it.
Scroll
Select
(This parameter number and description are examples)
15
TX cable loss
5 Position cursor at Value field and select it.
Position
Select
15
TX cable loss
0.000000
6 Use DATA keys to enter new value, then select it.
Enter
Select
15
TX cable loss
1.000000
7 Press TESTS to return to the TESTS (Main Menu) screen.
TE
PARM2a

Saving a Test Procedure

A Test Procedure is a collection of channel information, test parameters, testing order, and pass/fail limits saved in a file that customizes the test software to a specific application. You may save the file to a memory card or disk.

When you save a procedure you will be saving channel information, test parameters, pass/fail limits, and testing order, plus a library that contains the names of all test parameters, pass/fail limits, and tests that are resident in the software. The library file comes from the software and cannot be modified. The library file will be automatically saved on the card or disk that is being used to store the new test procedure.

The following example shows how to save a new procedure to a memory card. For more information concerning procedures, see "Procedures" on page 228.

How to Save a Test Procedure

Figure 5-11

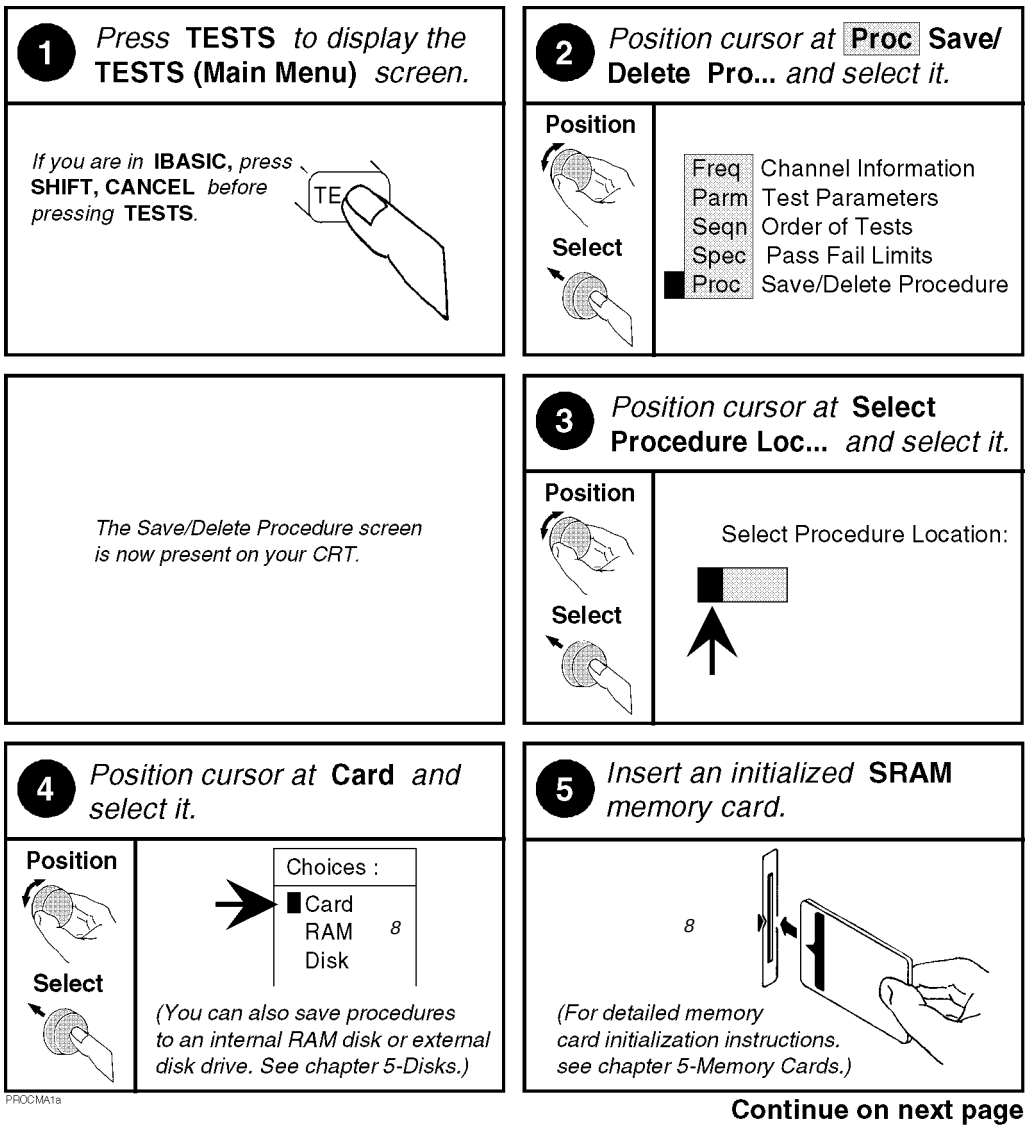


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Figure 5-12

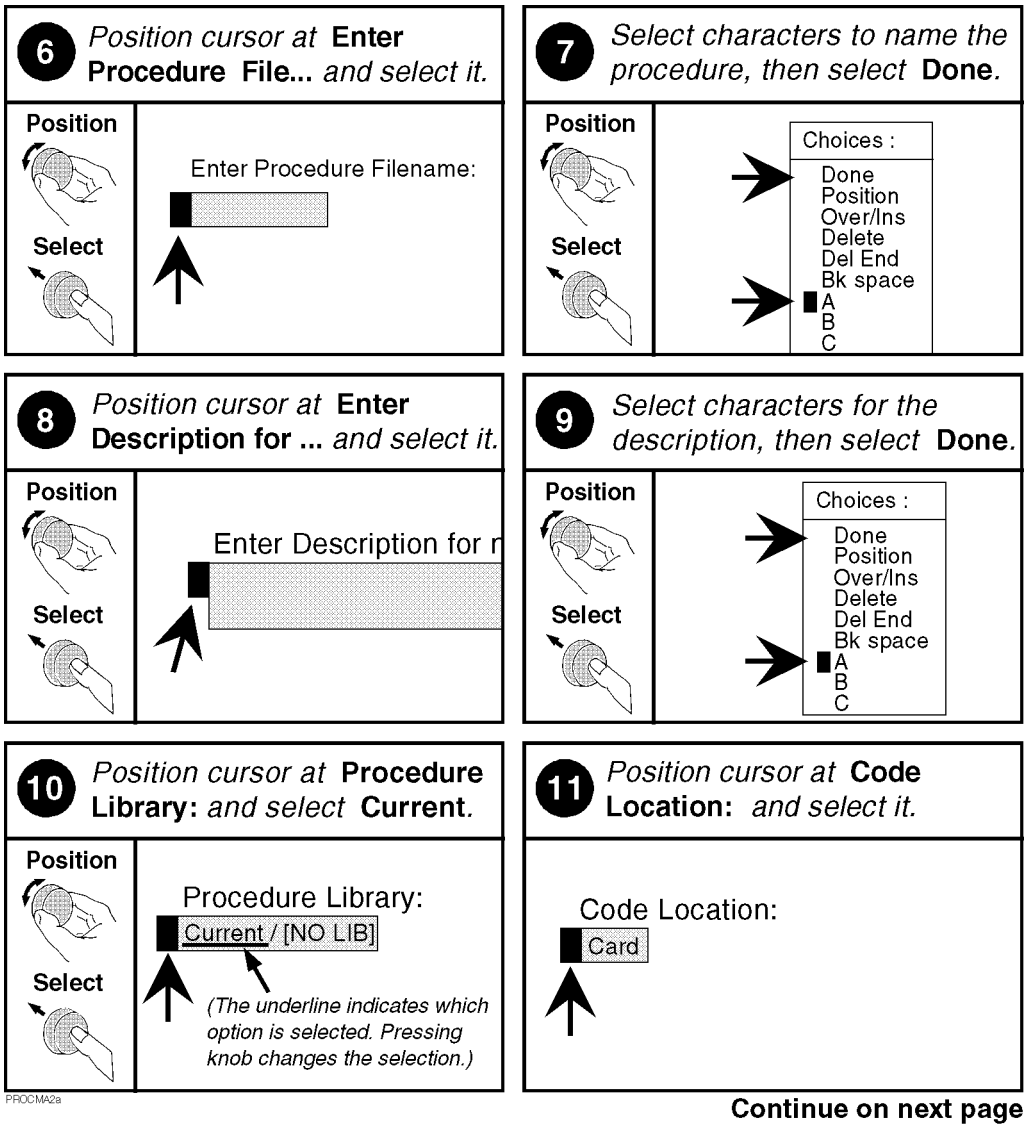

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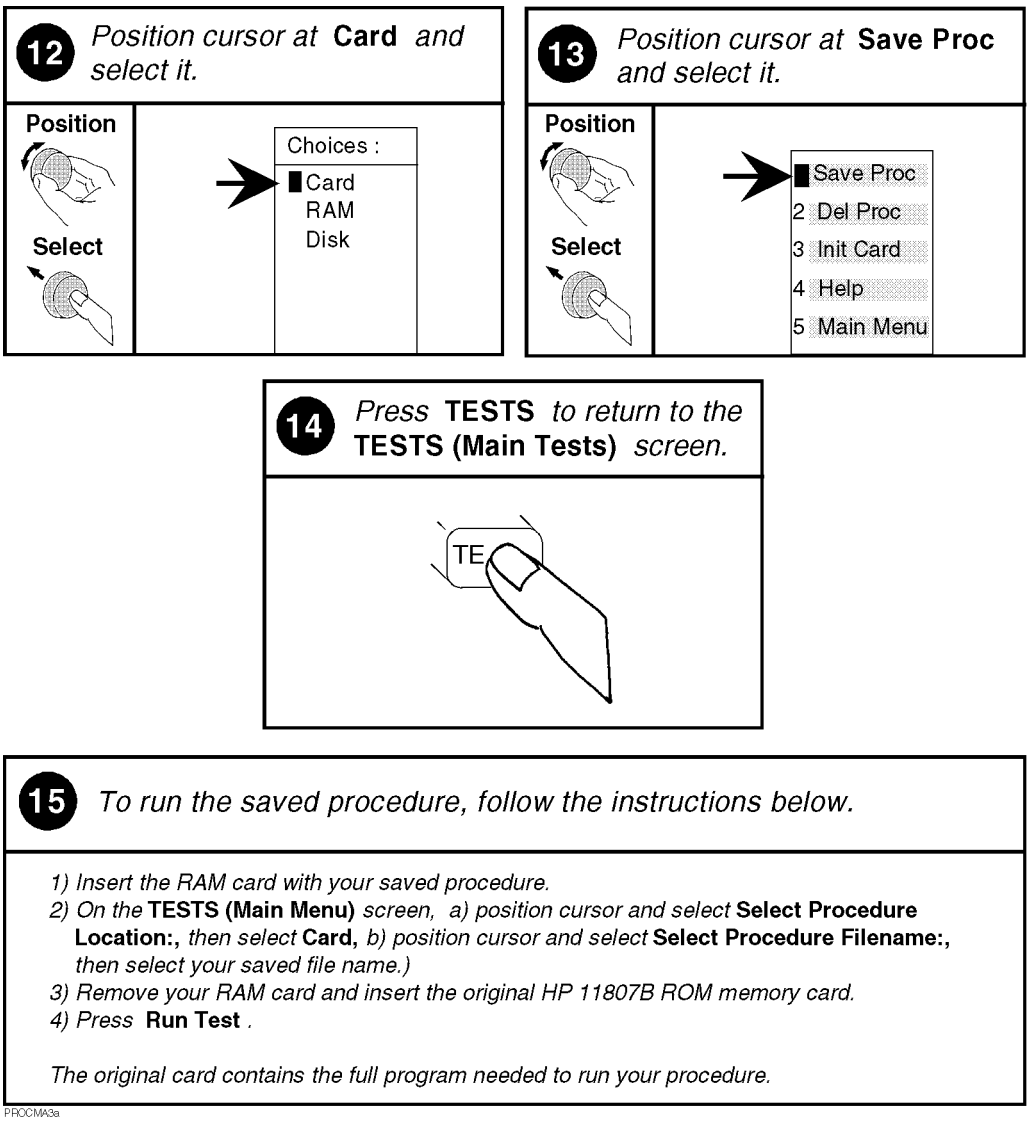
Figure 5-13


12
Position cursor at Card and select it.
Position
Select
Choices :
Card
RAM
Disk
13
Position cursor at Save Proc and select it.
Position
Select
Save Proc
2 Del Proc
3 Init Card
4 Help
5 Main Menu
14
Press TESTS to return to the TESTS (Main Tests) screen.
TE
15
To run the saved procedure, follow the instructions below.
1) Insert the RAM card with your saved procedure.
2) On the TESTS (Main Menu) screen, a) position cursor and select Select Procedure Location:, then select Card, b) position cursor and select Select Procedure Filename:, then select your saved file name.)
3) Remove your RAM card and insert the original HP 11807B ROM memory card.
4) Press Run Test .
The original card contains the full program needed to run your procedure.
PROCMA3a

Changing Test Execution Conditions

`Test Execution Conditions` define how your testing program starts and where and when test output occurs. You may decide to:

- Start the program automatically when the Test System is powered on. (`Autostart`)
- Stop testing when a measurement fails or continue through all of the tests without stopping. (`On UUT Failure`)
- Display (or print) only measurements that fail, or display (or print) all measurements that pass or fail. (`Output Results`)
- Pause between each measurement, or run through the entire test sequence. (`Run Mode`)
- Display output on CRT only, or display on CRT and print hardcopy. (`Output Destination`)

NOTE If printing test results is desired, after selecting `Printer` additional steps are necessary to connect and configure the printer. See "Printing" on page 214.

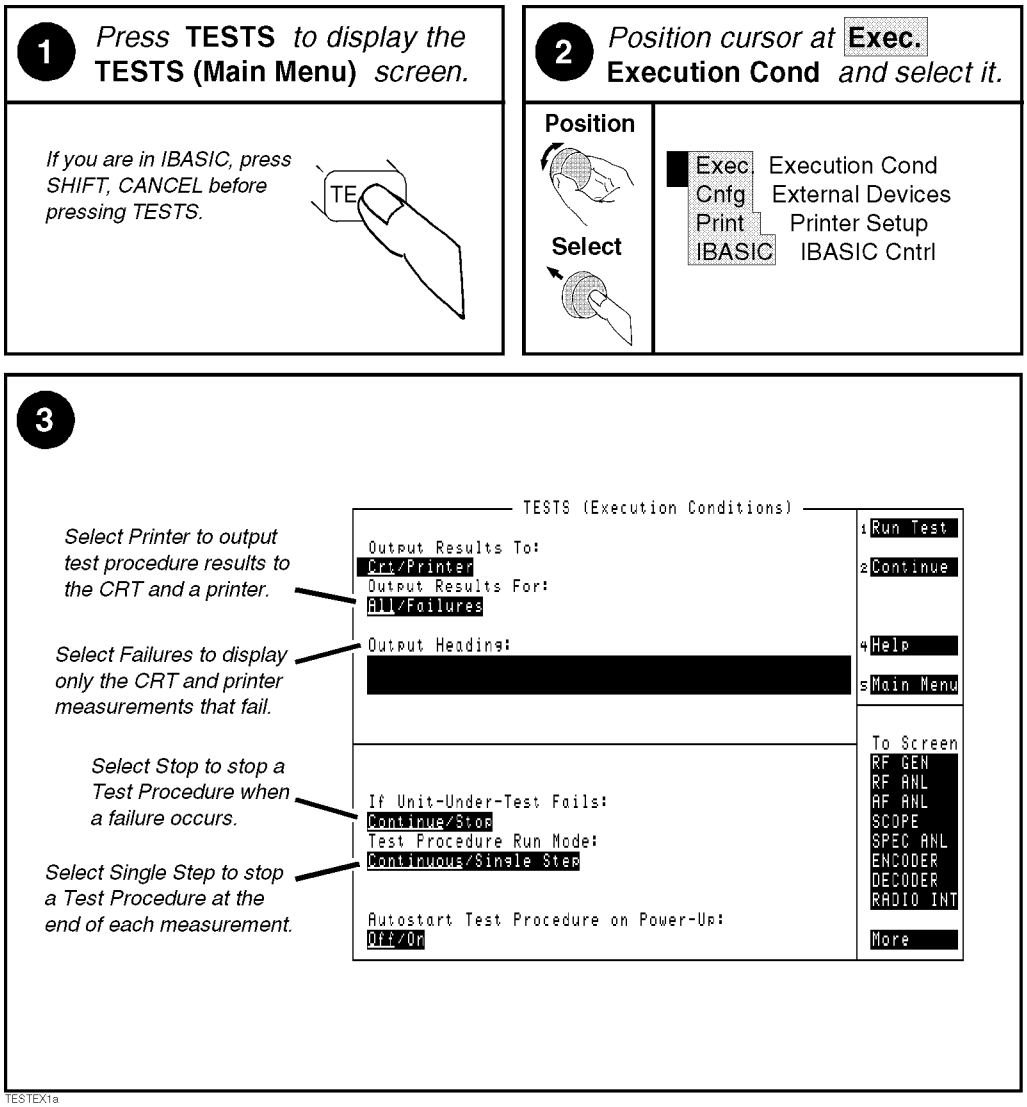
- Enter a title for an output heading for the displayed or printed results. (`Output Heading`) Select the field with the knob and enter the output heading by selecting the appropriate letters and the select `Done`.

`Test Execution Conditions` is located on the TESTS screen. Press TESTS to display them. To change a default setting, position the cursor to the desired field. Pressing the knob ("selecting") will toggle the underlined selection.

`Test Execution Conditions` settings (except for `Autostart`) are not retained after a power-down/ power-up cycle, and will return to their default settings. They are not stored on the memory card when a test procedure is saved.

How to Change Test Execution Conditions

Figure 5-14



Printing and Saving Test Results

Printing and saving test results are features of the HP 11807B software which require additional equipment and configuration. See "Printing" on page 214 for detailed descriptions and instructions for these features.

6 Using the Software/HP 8921A FW Revision Below A.14.00

Firmware Enhancements

NOTE

The firmware revision A.14.00 in the HP 8921A,D had several enhancements. This chapter applies to users with:

- **HP 8921A test sets with firmware revision below A.14.00**

The Test Set's firmware revision is displayed on the top right corner of the configuration screen.

- Press SHIFT CONFIG to display the configuration screen and read the firmware revision.

If you have an HP 8921A with firmware revision above A.14.00, refer to Chapter 5, "Using the Software with FW Rev. Above A.14.00," on page 69. Contact Hewlett- Packard at 1-800-922-8920 for details on upgrading your firmware if desired.

Test Set or System is Defined As:

- HP 8921A, Option 500, Dual-Mode Cellular Test System
- HP 8921D, Dual-Mode Cell Site Test System

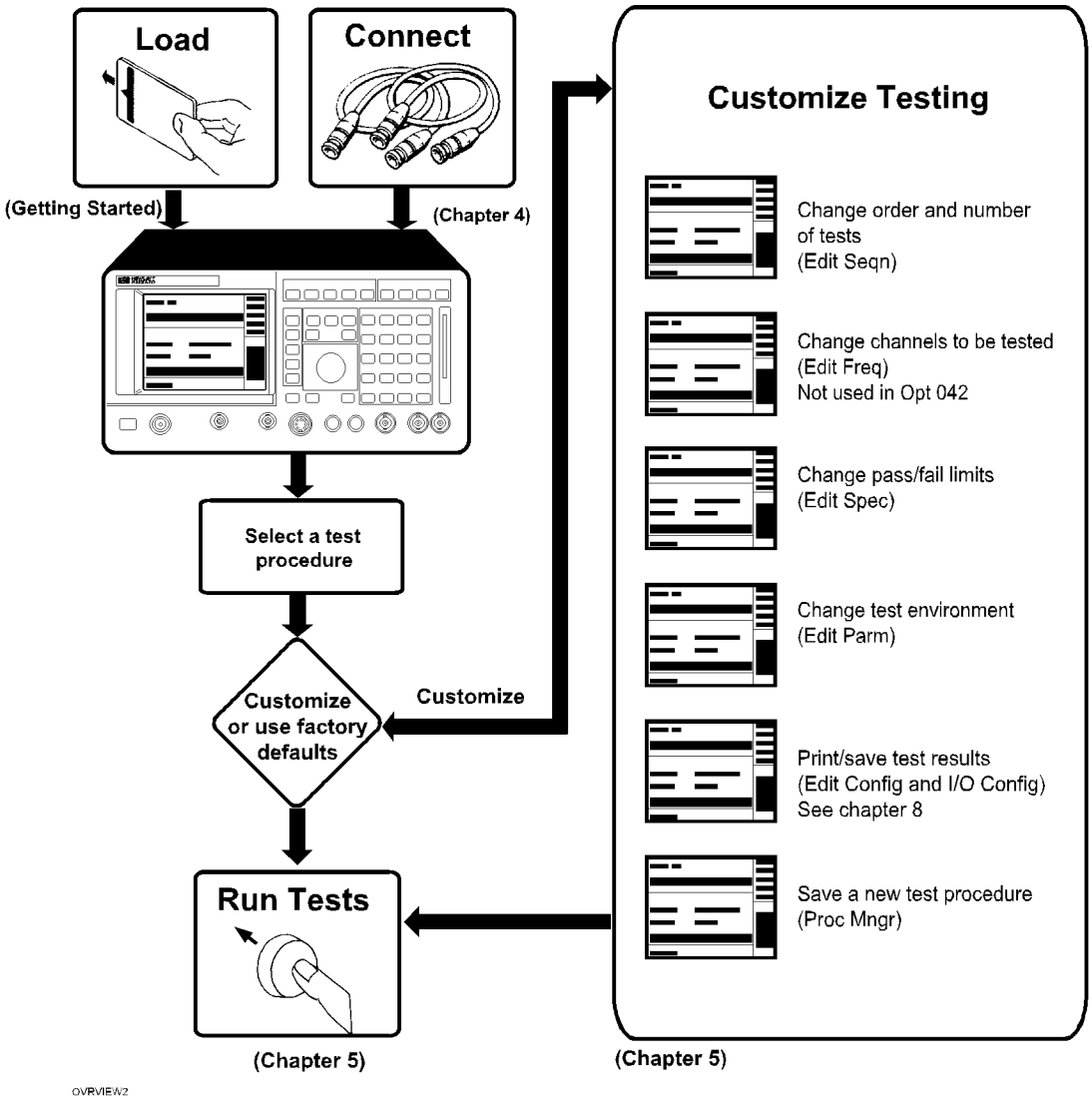
Introduction

The HP 11807B software can be run on the factory default settings or customized to your individual needs and the specific requirements.

This chapter provides detailed information on how to run, and customize the software.

Running Tests Overview

Figure 6-1



Before Running Tests

- If you are running tests on the analog 882 or 882M transceivers, you must do the steps in Chapter 1, “Getting Started with FW Above Revision A.14.00 (for 882 and 882M Analog Transceivers Only),” on page 9 or Chapter 2, “Getting Started with FW Below Revision A.14.00 (For 882 or 882M Analog Transceivers Only),” on page 29 first. “Getting Started” stores your local control (FX) file on an SRAM (Static Random Access Memory) memory card so that it may be downloaded to the transceiver before tests are run. If you are running tests on the digital 882D or 882DM transceivers, you will need to have the Ericsson “traffic” software or Radio Channel Software Unit (RCSU) in the transceiver. This can be loaded from the MTSO or from the PC.

  The HP 11807B, Option 042 software emulates both: LCPC and LCPC_R4 Ericsson control software. Therefore, both RCSU30 and RCSU57 can be tested.

- Select a test procedure (plan) from the HP 11807B Option 042 software card. The software is shipped with the following preprogrammed test procedures on the program card.

  `ERICS_882` is used for Model 882 testing.

  `ERICS_MC` is used for Microcell testing.

  `ERICS_DT` is used for DTRM testing.

  `ERICS_DM` is used for DMTM testing.

  `CANADA882` is used for Model 882 testing with audio line levels for Canada.

  `ERIC_MLDC` is used for testing analog-locating receivers.

  `LAPTOP_EM` runs TEST_01 - GN Laptop Emulator.

  `LAPTOP_DT` runs TEST_26 - TDMA Laptop Emulator.

  `CARD_INIT` runs TEST_02 - Memory Card Initialization.

  `FX_XFER` runs TEST_03 - Local Control File Transfer.

  `GET_START` runs TEST_10 - TX Power Adjustment used in “Getting Started”.

  `D_C_XFER` runs TEST_08 - GN Data Collection File Transfer

  `CAB_LOSS` runs TEST_07 - GN Measure Cable Loss.

  `ANT_SWEEP` runs TEST_04 - GN Swept Return Loss.

  `CAB_FLT` runs TEST_06 - GN Cable Fault.

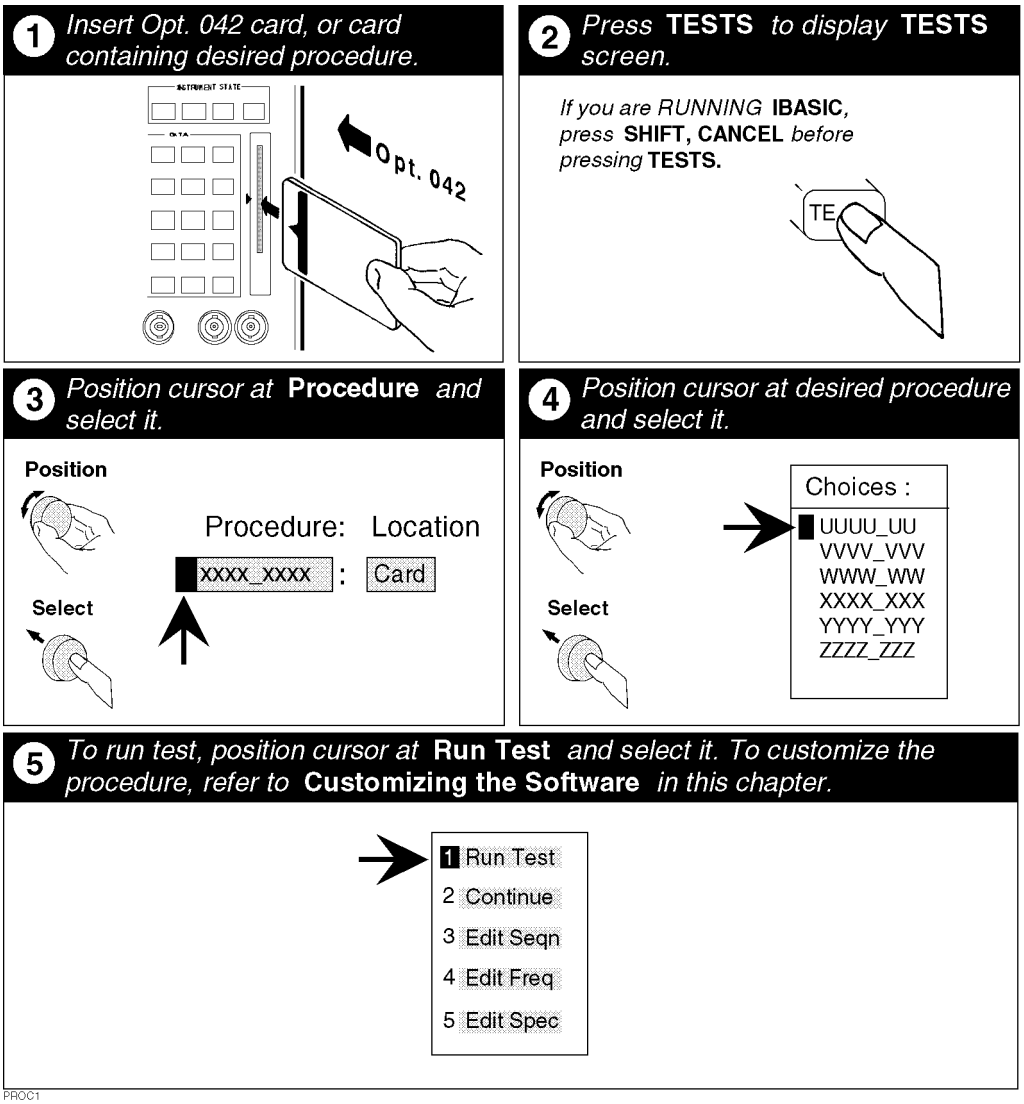
- Before you begin testing, you should have made the appropriate hardware connections. Chapter 4, “Making Connections,” on page 55, if you have not done so already.

Running Tests

- When tests begin to run, they are executed in the order in which they were entered into the Test Procedure.
- Pressing CANCEL will pause the current test (press `Continue` to continue the test).
- When the `Run Test` softkey is pressed, the Test Set will check to see if the program is already resident in RAM memory. If it is not, it will be loaded from the memory card, a process which takes about two minutes. The contents of the HP 8921A/D RAM memory are retained even while the instrument is powered down.
- After all testing is complete on a given transceiver, you must exit local control so that the transceiver can be put back into service. As long as Parameter 27 is set to 0=no, you will be prompted at the end of a transceiver test sequence to exit local control.

Selecting a Test Procedure

Figure 6-2



The usual sequence for testing an operational cell site is as follows:

1. Use the Ericsson FIOL program running on a personal computer (PC) to contact the Mobile Telephone Switching Office (MTSO) in order to “block” a set of transceivers to be tested. It is convenient to block a set of four which are connected to the same star junction.
2. Run the `ERICS_882`, `ERICS_MC`, `ERICS_DT` or `ERICS_DM` procedure on each transceiver as appropriate. The 882D (DTRM) or 882DM (DMTM) transceiver will need to have the traffic program loaded before it can be tested. This can be loaded from the MTSO or directly from the PC. Model 882 and Microcell transceivers can be tested without having anything loaded from the MTSO or PC because they receive a download of the local control (FX) file from the memory card automatically (if required) at the beginning of each test procedure.
3. Run the `LAPTOP_EM` or `LAPTOP_DT` procedure to key up and display the spectrum of each transceiver for combiner tuning.
4. Continue to run the `LAPTOP_EM` or `LAPTOP_DT` procedure to de-key each transmitter and exit local control on each transceiver.
5. Use the FIOL program to request the MTSO to “unblock” the transceivers which have just been tested.
6. Repeat steps 1 through 5 for a new set of transceivers.

- The PC can remain connected to the ERI panel (or telephone line) for the duration of testing. There it can be used to block transceivers and to query the MTSO for transceiver channel assignments so that each transceiver can be tested on the channel it will be operating on.
- Test results can be printed, stored on a memory card or transferred to a PC. See “Printing” on page 214 and “Data Collection (Saving and Retrieving Test Results)” on page 189.
- Individual transceivers can be tested on the workbench, in which case only step 2 above applies. The model 882D or 882DM will require PCM reference signals. The HP 8921A hardware Option 042 can supply these.
- At the time of this writing, HP 11807B, Option 042 software is known to be compatible with Ericsson RCSU software revision R2A12 and R57R1B.

Customizing the Software

The HP 11807B software may need some customizing before it performs in a way that is specific to your testing needs. Because of the diversity of individual testing needs, the HP 11807B software has been designed so that changes may be easily made from the HP 8921A/D front panel. You may store these changes on an SRAM card so that you may skip these steps in the future. See "Saving a Test Procedure Using the Procedure Manager" on page 114.

You may customize your software at any time. Because your needs change, the software allows changes to its default settings when you need to make them and in any order that you choose. For example, tests may be inserted or deleted, and later after running the tests you can change the pass/fail limits or decide to test different channels.

Most testing customization is accomplished through the HP 8921A/D Test Function screens. These Test Function screens are accessed from the main TESTS screen as shown in the following figure. All Test Functions are explained in this chapter by function.

- Decide which tests you need to run (`Edit Sequence`).
  - You may want to run all, some, or just one of the tests.
- Change the pass/fail limits for specific measurements (`Edit Specifications`)
  - You may want the pass/fail limits to have tighter or looser specifications than the default settings.
- Change the test environment and conditions (`Edit Parameters`).
  - Enter specific information about radio equipment and/or environment.
- Save any or all of the above customized changes (to an SRAM card)
- Select options (`Test Execution Conditions`).
  - Print test results.
  - Stop after each test, stop on failure or always continue.
  - Display all test results or only those that fail.

NOTE

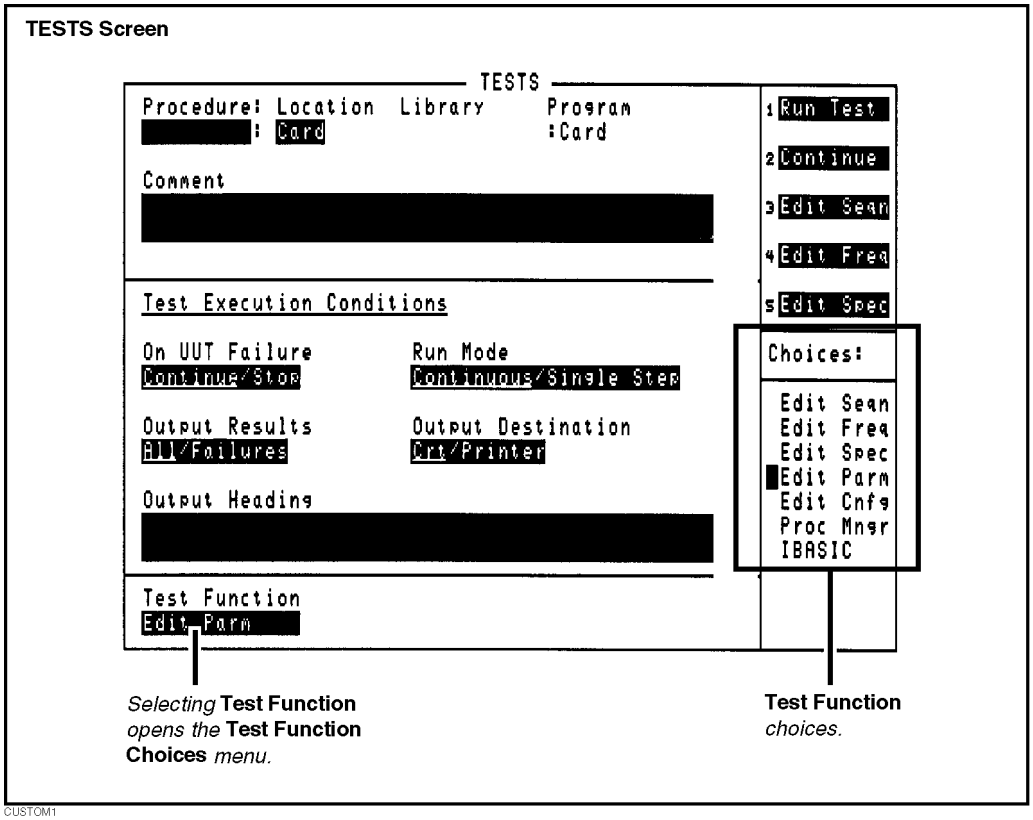
Edit Configuration (Edit Cnfg), Edit Frequency (Edit Freq) and IBASIC will not be explained in this customizing section.

- Edit Configuration (Edit Cnfg) is used when setting up printers and external disk drives which is explained in "Disks" on page 200 and "Printing" on page 214.
- Edit Frequency (Edit Freq) is not used by the HP 11807B Option 042 software.
- IBASIC is used when writing your own programs and is not explained in this manual. If you need to write your own IBASIC programs you may acquire the *Instrument BASIC Handbook,* HP part number E2083-90000. The HP 8921A/D manual also contains information in Chapter 8, "Reference (Alphabetical)," on page 185 and Chapter 9, "Problem Solving," on page 241 about IBASIC operation.

Beginning Software Customization

All software customization begins by accessing the TESTS screen first and then selecting the `Test Function` which will open the `Choices` menu. To access the TESTS screen, press TESTS on the front panel of the test set.

Figure 6-3



Changing a Sequence of Test s (Edit Sequence)

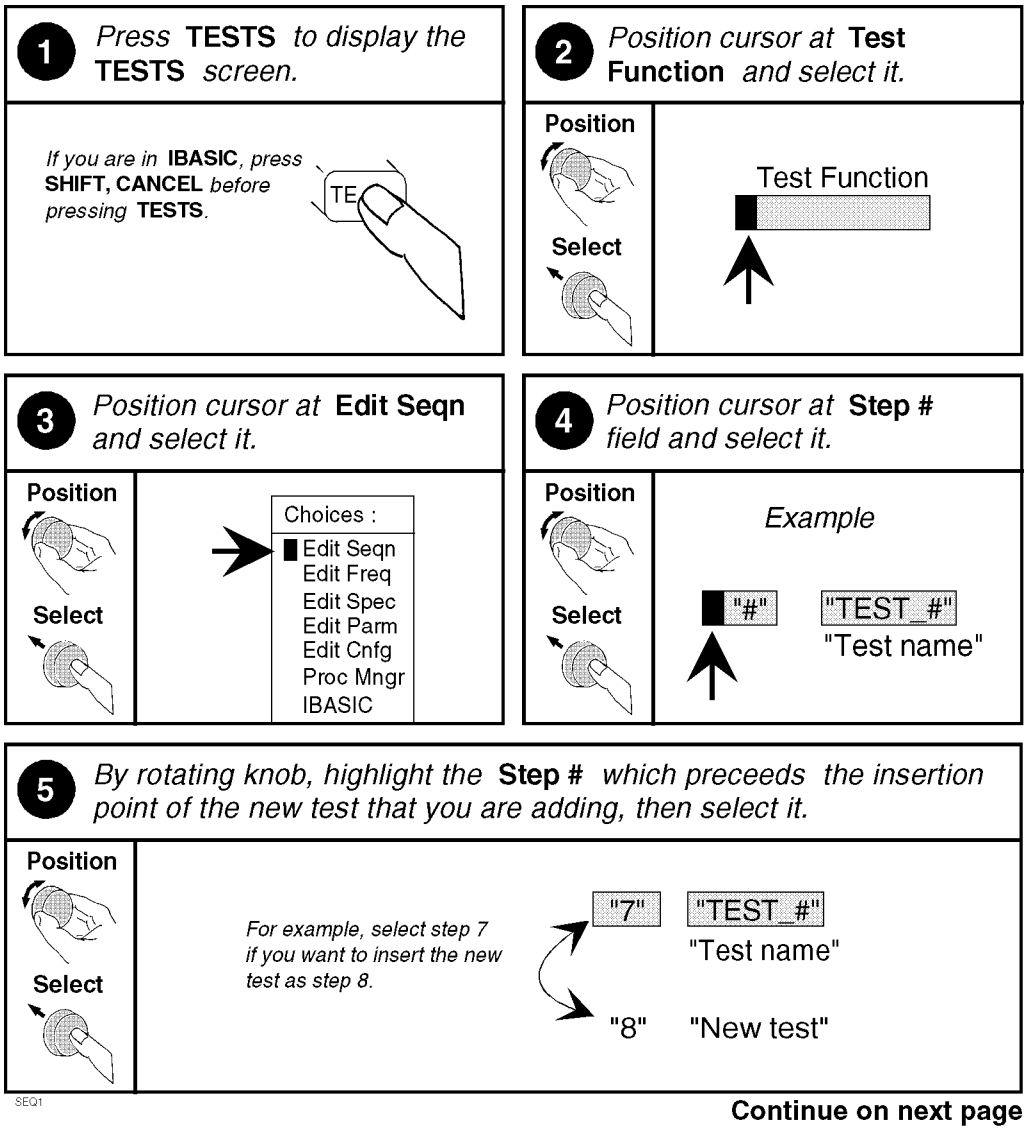
You may define a test sequence to include all, some, or just one of the tests available. When the first test is finished, the next will run. The test sequence will remain in the Test Systems' battery backed-up memory until another test sequence is loaded or set up. For information on saving a customized test sequence, see "Saving a Test Procedure Using the Procedure Manager" on page 114.

Creation of a test sequence is accomplished by inserting or deleting tests from the list of tests that come with the HP 11807B software package. See "Test Descriptions" on page 122, for test descriptions.

The following describes how to create a new test sequence.

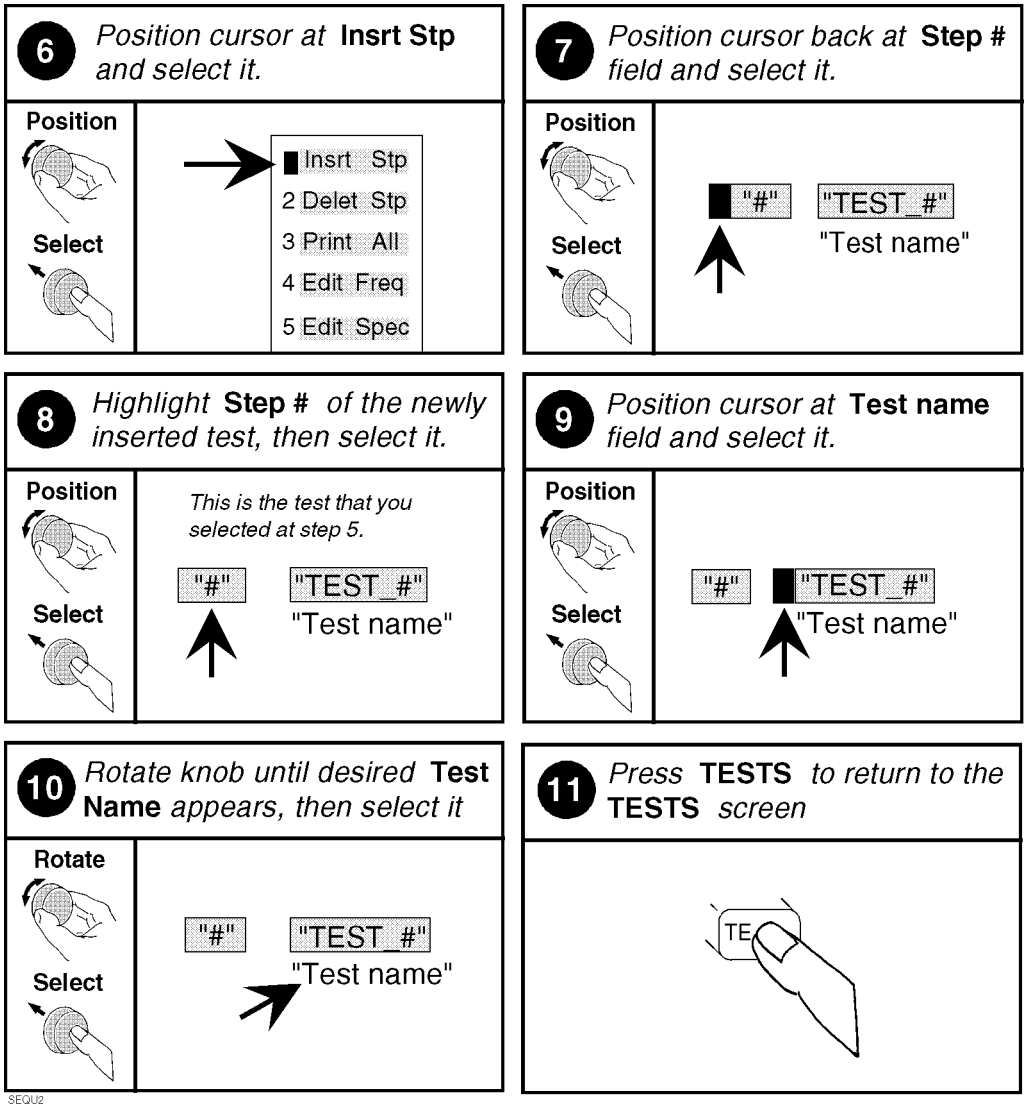
How to Change a Sequence of Tests

Figure 6-4



Continue on next page

Figure 6-5



NOTE The `All Chans?` field is not used by the HP 11807B Option 042 software.

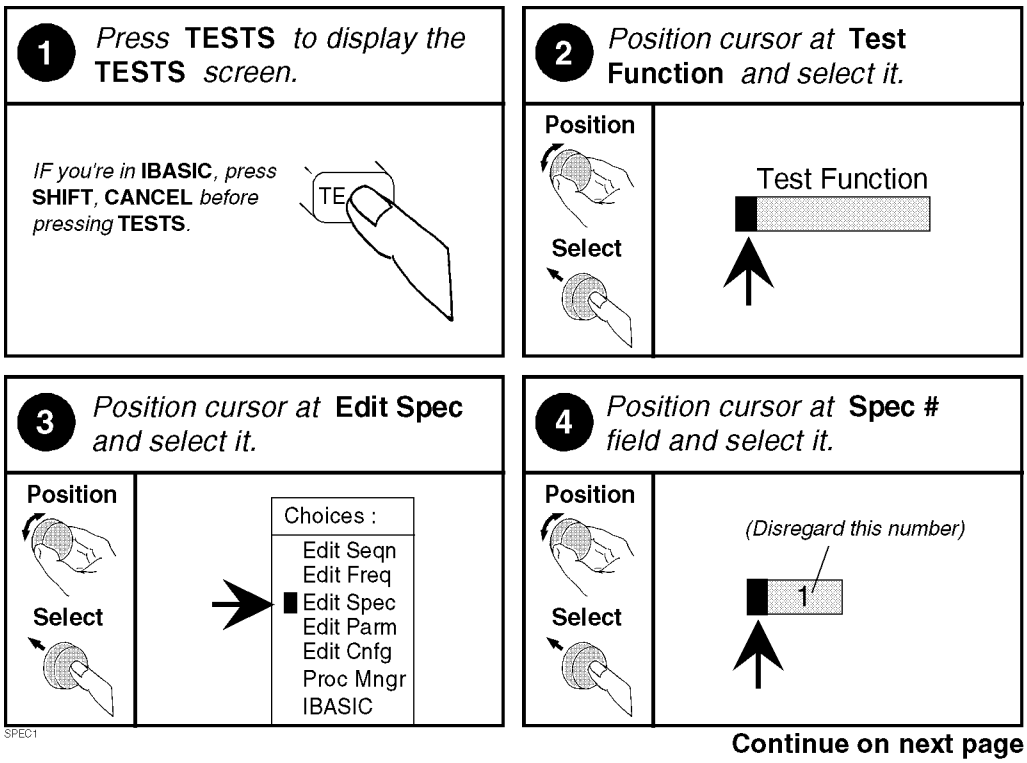
Changing Pass/Fail Limits (Edit Specifications)

Specifications are values that set pass/fail limits for tests. Default values are available in the test software. These default values may be changed to suit your particular requirements.

The following describes how to change the pass/fail (upper and lower) limits in the HP 8921A/D "Edit Specification" screen. See "Pass/Fail Limit Descriptions" on page 174 for descriptions and default values for each specification. For information on saving customized specifications, see "Saving a Test Procedure Using the Procedure Manager" on page 114.

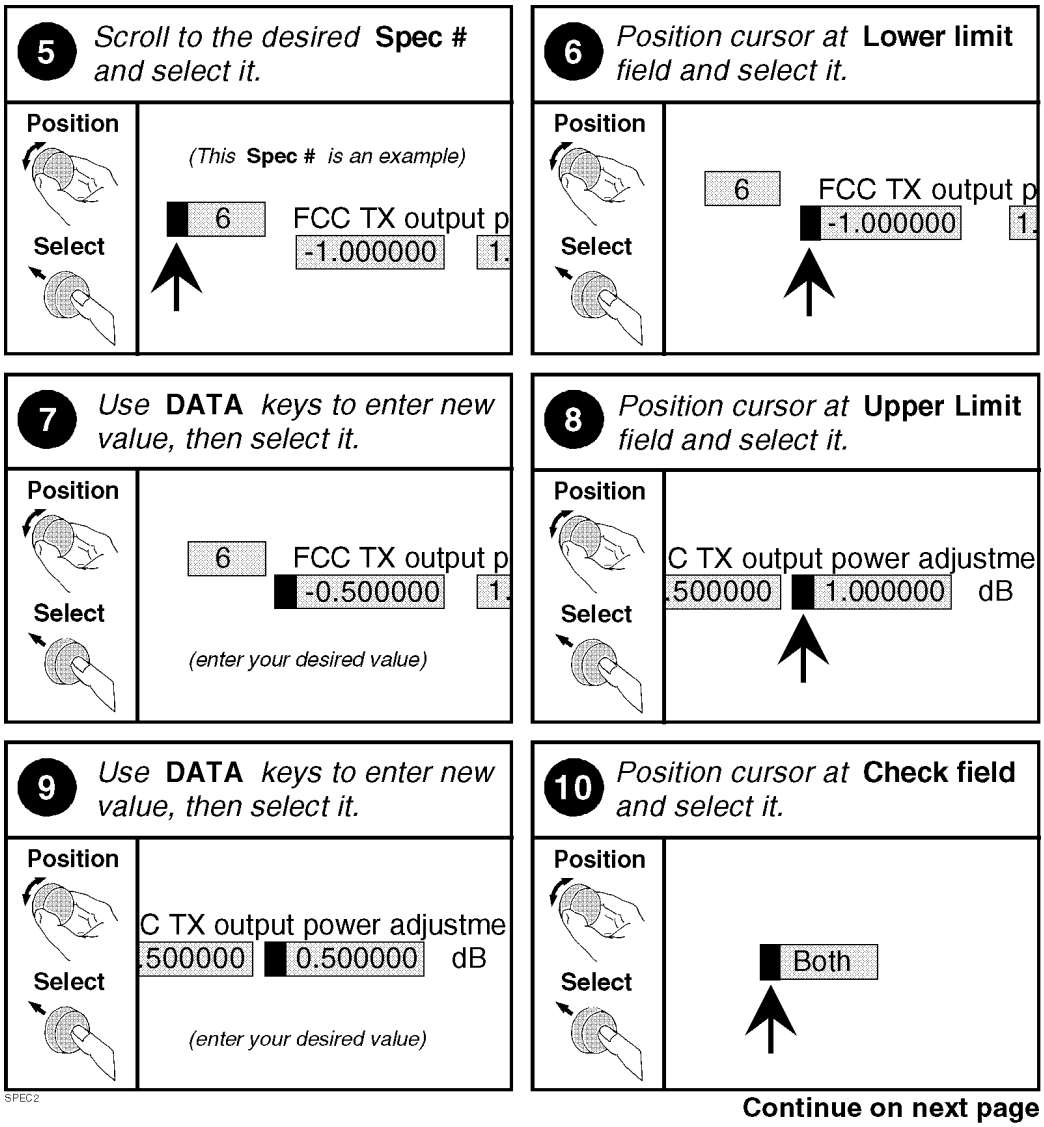
How to Change Pass/Fail Limits

Figure 6-6



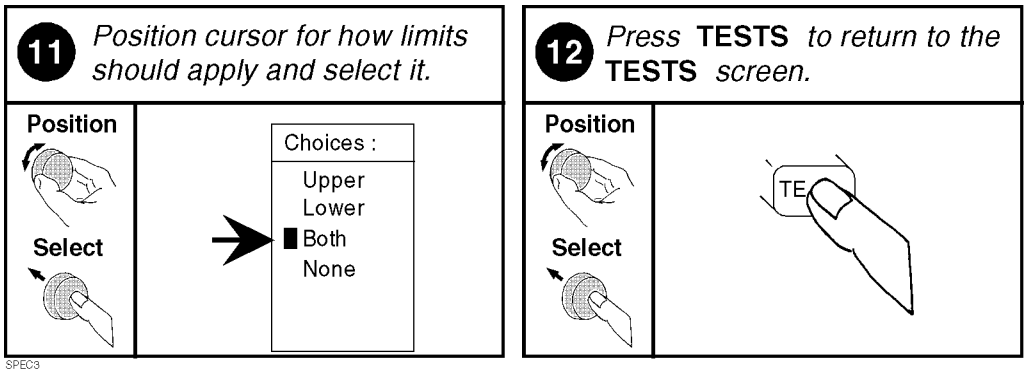
Continue on next page

Figure 6-7



Continue on next page

Figure 6-8


11
Position cursor for how limits should apply and select it.
Position
Select
Choices :
Upper
Lower
Both
None
12
Press TESTS to return to the TESTS screen.
Position
Select
TE
SPEC3

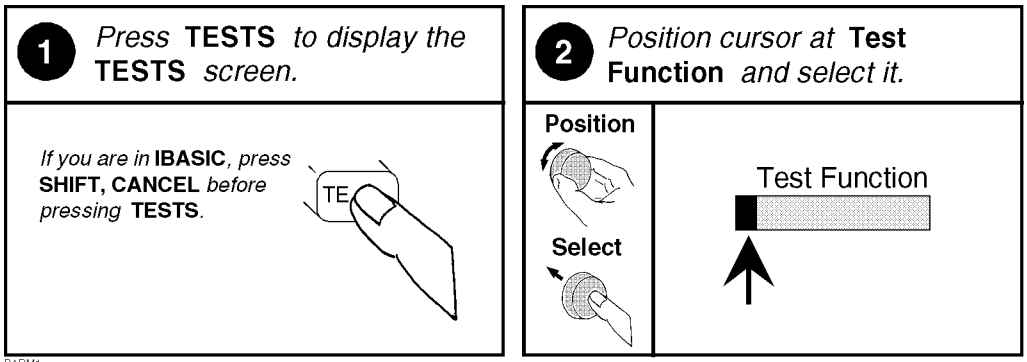
Changing the Test Environment and Conditions (Edit Parameters)

The software uses parameters to optimize the test environment and conditions for your testing situation. Many of the parameters are determined by examining your test needs. Other parameters are determined by performing measurements to calibrate items in your system. Examples of parameters include cable losses, rated system deviation, and what audio test tone frequency your system requires. The HP 11807B software comes with default settings for parameters. The defaults should be reviewed for your particular needs. See "Parameter Descriptions" on page 166 for descriptions and default values for each parameter. For information on saving customized parameters, see "Saving a Test Procedure Using the Procedure Manager" on page 114.

The following describes how you can change parameters through the Edit Parameter screen to optimize your testing conditions.

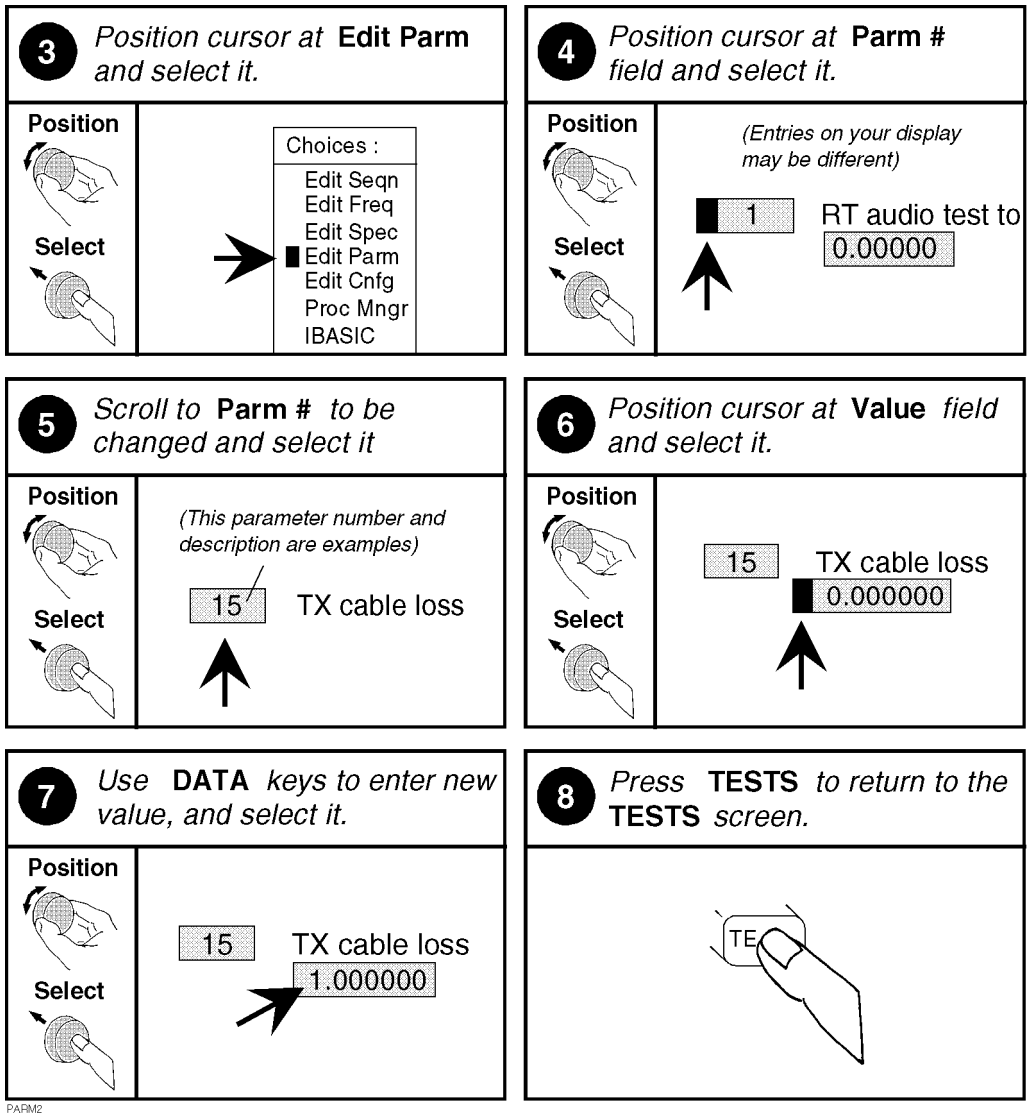
How to Change the Test Environment and Conditions

Figure 6-9



Continue on next page

Figure 6-10


3 Position cursor at Edit Parm and select it.
Position
Select
Choices :
Edit Seqn
Edit Freq
Edit Spec
Edit Parm
Edit Cnfg
Proc Mngr
IBASIC
4 Position cursor at Parm # field and select it.
Position
Select
(Entries on your display may be different)
1
RT audio test to
0.00000
5 Scroll to Parm # to be changed and select it
Position
Select
(This parameter number and description are examples)
15
TX cable loss
6 Position cursor at Value field and select it.
Position
Select
15
TX cable loss
0.000000
7 Use DATA keys to enter new value, and select it.
Position
Select
15
TX cable loss
1.000000
8 Press TESTS to return to the TESTS screen.
TE
PARM2

Saving a Test Procedure Using the Procedure Manager

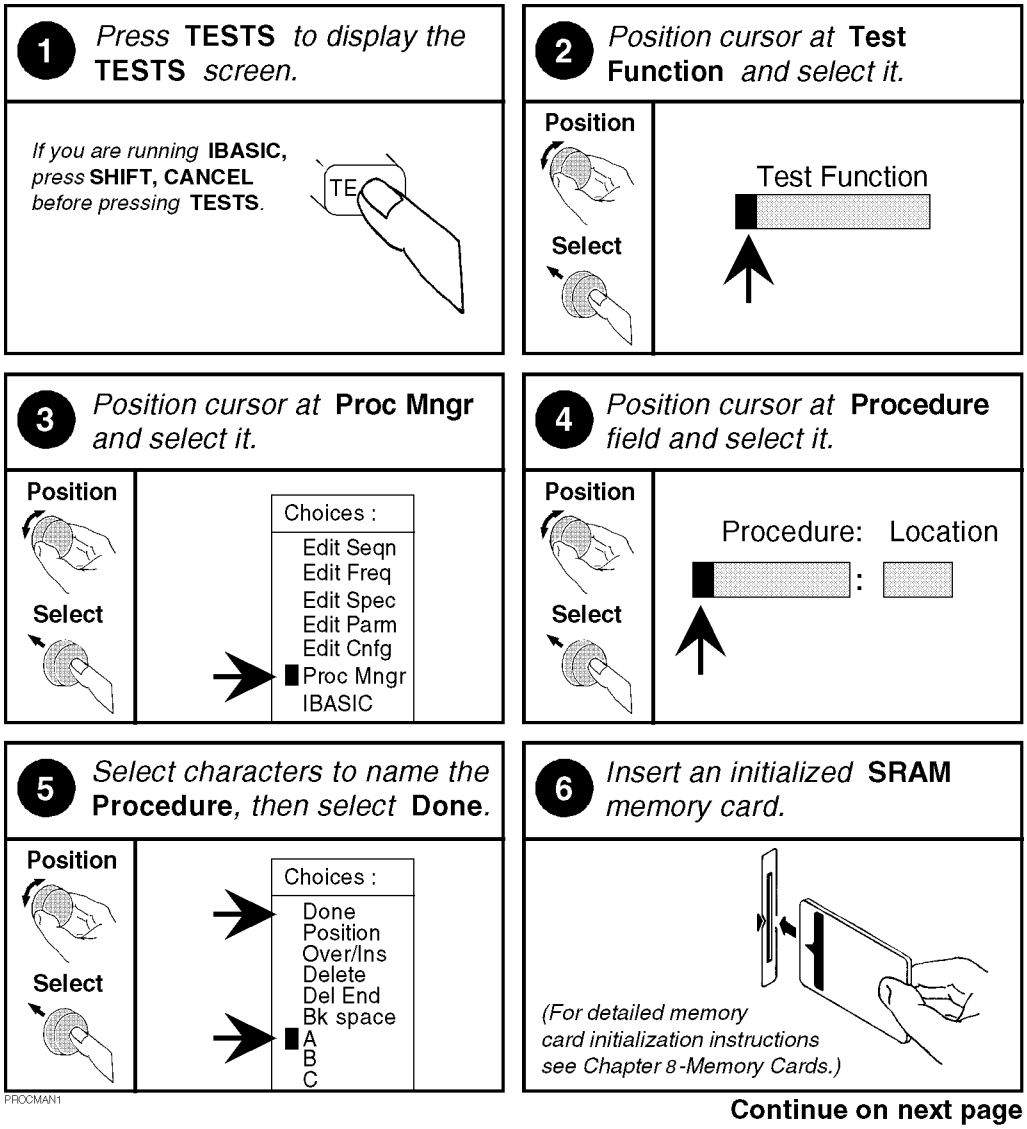
A test procedure is a collection of pass/fail limits (specifications), the test environment and conditions (parameters), and a TEST sequence, saved in a file that customizes the test software to a specific application. You may save the file to a memory card or disk.

When you save a procedure you will be saving parameters, specifications, and a test sequence, plus a library that contains the names of all parameters, specifications, and tests that are resident in the HP 11807B software. The library file comes from the HP 11807B software and cannot be modified. The library file will be automatically saved on the card or disk that is being used to store the new test procedure.

The following example shows how to save a new procedure to a memory card. For more information concerning procedures, see "Procedures" on page 228.

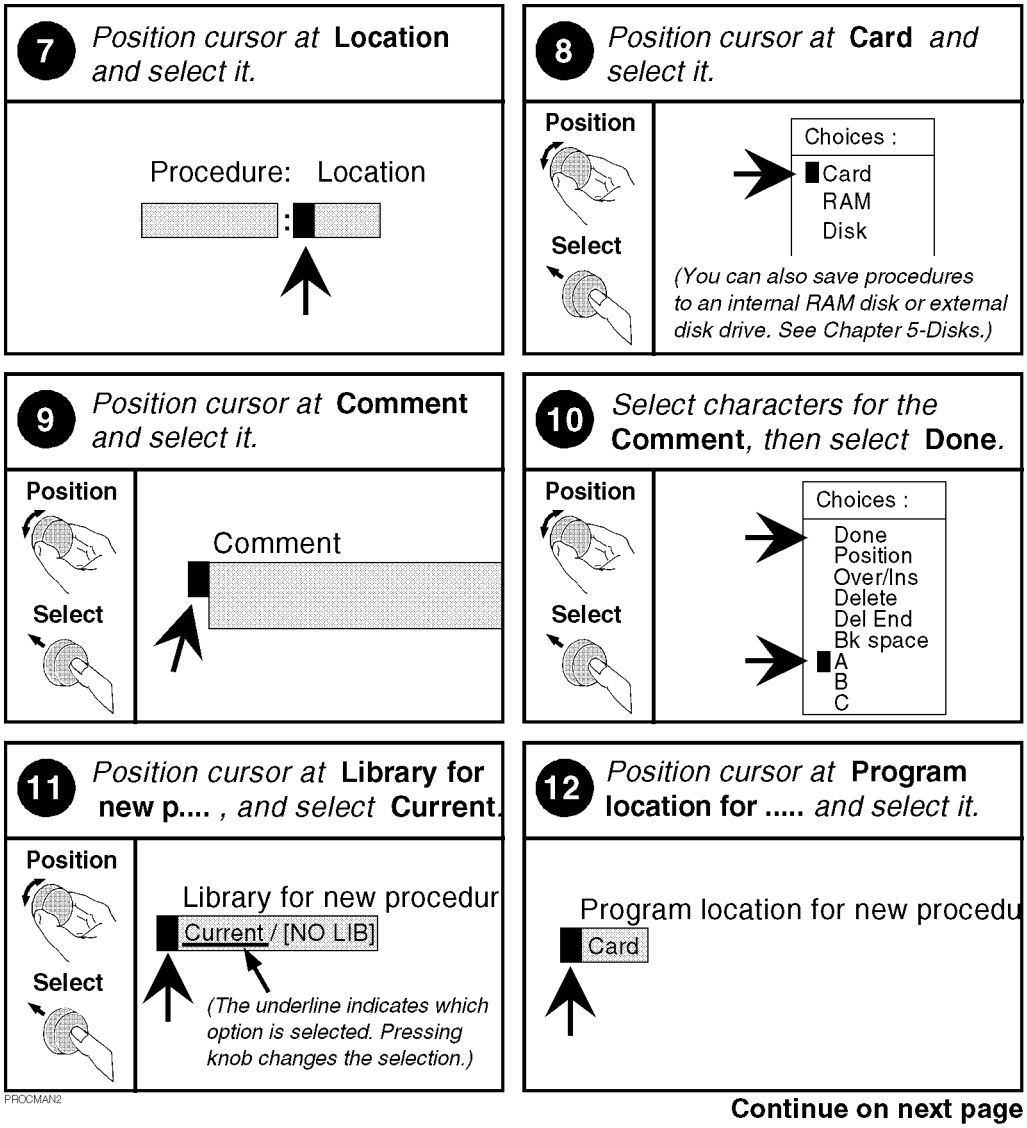
How to Save a Test Procedure

Figure 6-11



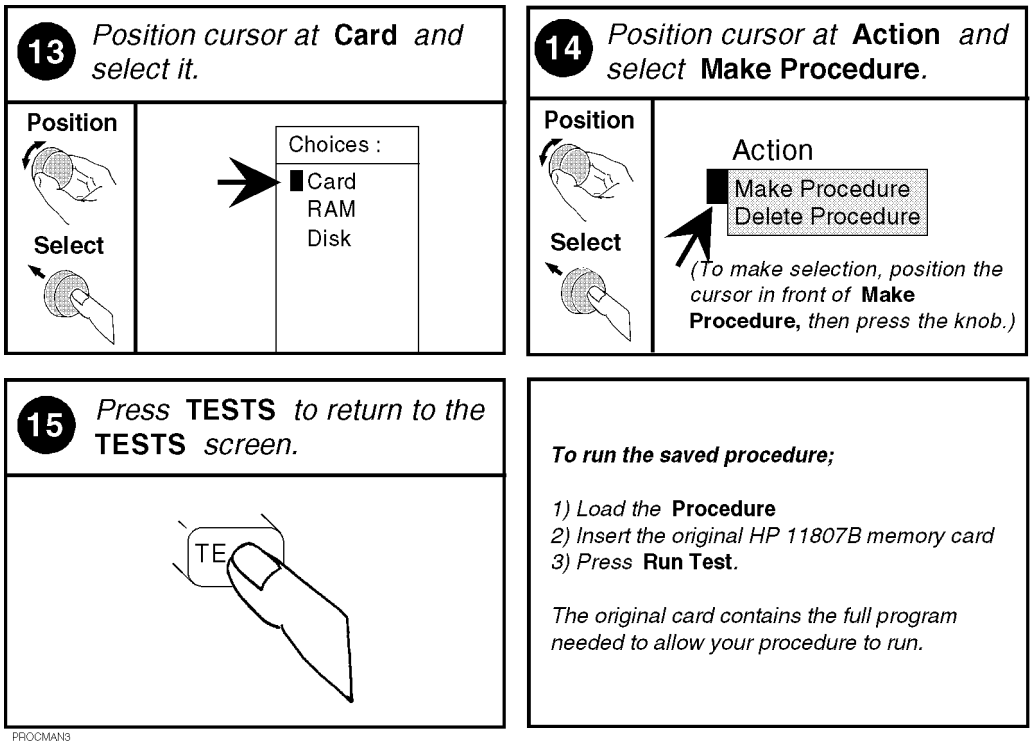
Continue on next page

Figure 6-12



Continue on next page

Figure 6-13


13
Position cursor at Card and select it.
Position
Select
Choices :
Card
RAM
Disk
14
Position cursor at Action and select Make Procedure.
Position
Select
Action
Make Procedure
Delete Procedure
(To make selection, position the cursor in front of Make Procedure, then press the knob.)
15
Press TESTS to return to the TESTS screen.
TE
To run the saved procedure;
1) Load the Procedure
2) Insert the original HP 11807B memory card
3) Press Run Test.
The original card contains the full program needed to allow your procedure to run.
PROCMAN3

Changing Test Execution Conditions

`Test Execution Conditions` define how your testing program starts and where and when test output occurs. You may decide to:

- Start the program automatically when the Test System is powered on. (`Autostart`)
- Stop testing when a measurement fails or continue through all of the tests without stopping. (`On UUT Failure`)
- Display (or print) only measurements that fail, or display (or print) all measurements that pass or fail. (`Output Results`)
- Pause between each measurement, or run through the entire test sequence. (`Run Mode`)
- Display output on CRT only, or display on CRT and print hardcopy. (`Output Destination`)

NOTE If printing test results is desired, after selecting `Printer` additional steps are necessary to connect and configure the printer. See "Printing" on page 214.

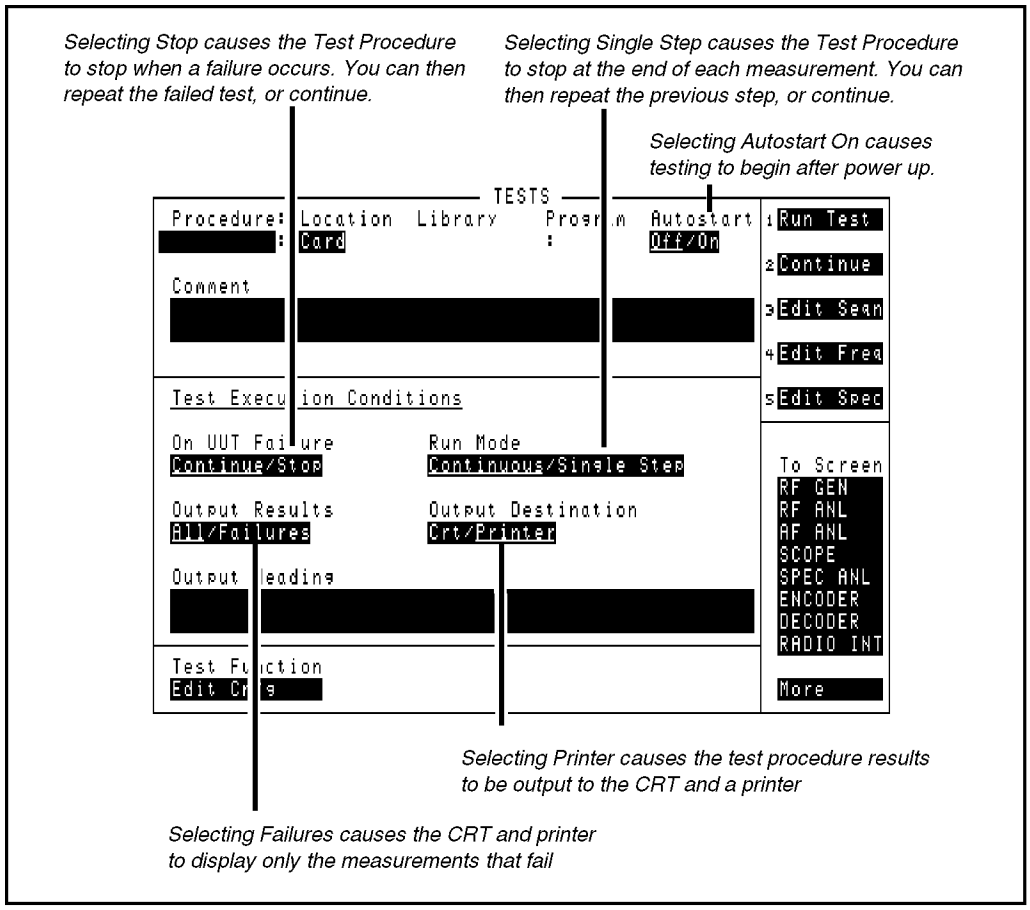
- Enter a title for an output heading for the displayed or printed results. (`Output Heading`) Select the field with the knob and enter the output heading by selecting the appropriate letters and the select `Done`.

`Test Execution Conditions` is located on the TESTS screen. Press TESTS to display them. To change a default setting, position the cursor to the desired field. Pressing the knob ("selecting") will toggle the underlined selection.

`Test Execution Conditions` settings (except for `Autostart`) are not retained after a power-down/ power-up cycle, and will return to their default settings. They are not stored on the memory card when a test procedure is saved.

How to Change Test Execution Conditions

Figure 6-14



TESTEXE1

Printing and Saving Test Results

Printing and saving test results are features of the HP 11807B software which require additional equipment and configuration. See "Printing" on page 214 for detailed descriptions and instructions for these features.

7 Tests, Parameters, Pass/Fail Limits Descriptions

Test Descriptions

Tests are a series of measurements and one or more Tests make up a Procedure (Chapter 5, “Using the Software with FW Rev. Above A.14.00,” on page 69). While you may change the Tests that make up a Procedure, you may not change the measurements the test will perform. Generally, the order in which the Tests are run is not important.

The first few capital letters in the title of each test indicate what the test refers to:

GN = General system parameters

RT = Receiver and Transmitter

RX = Receiver

TX = Transmitter

TDMA = Time Division Multiple Access

TEST_01 - GN Laptop Emulator

This test allows the operator to control the model 882 or Microcell transceiver manually from the Test Set via the RS-232 connection. The following operations are possible:

- Turning the SAT tone on and off and selecting its frequency.
- Setting “data sending” to OFF or CONSTANT SYMBOL.
- Setting the channel number.
- Setting squelch to ENABLED or DISABLED.
- Keying and de-keying the transmitter.
- Setting audio-ways to SPEECH or LINE LOOP
- Reading alarm status.
- Accessing the Test Set’s SPECTRUM ANALYZER screen.
- Exiting local control.

This test must have your local control (FX) program stored on an SRAM card that is resident in the memory card slot on the Test Set.

See Chapter 1, “Getting Started with FW Above Revision A.14.00 (for 882 and 882M Analog Transceivers Only),” on page 9 or Chapter 2, “Getting Started with FW Below Revision A.14.00 (For 882 or 882M Analog Transceivers Only),” on page 29 for instructions to copy and store your local control program from your laptop. The following is an ordered sequence for combiner tuning:

1. Connect the RF IN/OUT connector on the Test Set to the channel tester port on the star junction.
2. Connect the local control cable from the Test Set to each transceiver in turn and using the appropriate fields, select the channel number and key the transmitter.
3. When all of the transmitters connected to a given combiner have been keyed, the `GOTO SPECTRUM ANALYZER` field should be selected. The spectrum analyzer will be set to a 30 MHz span to show the entire cellular band and the program will pause.
4. Select the spectrum analyzer under `To Screen` on the Test Set. Adjust the center frequency (`Center Freq`), reference level (`Ref Level`) and frequency span (`Span`) for best on-screen signal representation. The vertical scale can be set to 1 dB/div or 2 dB/div while tuning the combiner.
5. Tune the combiner. When tuning is complete press the TESTS key and then press (`Continue`).

6. Each transceiver in turn should have the local control cable from the Test Set reconnected and the `EXIT LOCAL CONTROL` field should be selected to put each transceiver back into service.

Pass/fail limits used

None

Parameters used

None

TEST_02 - Memory Card Initialization

This test allows SRAM memory cards to be conveniently initialized. All SRAM memory cards must be initialized before they can be used for the first time.

NOTE When a memory card is initialized, any pre-existing data on the card is lost.

The software will prompt the operator to choose either DOS or LIF format for the card. DOS format is preferable if the card is to be used for data collection because DOS files are “extensible”. This means that the file can grow in size as data is added to it and the operator need not know in advance how many records to reserve for the file. See “Data Collection (Saving and Retrieving Test Results)” on page 189.

Pass/fail limits Used

None

Parameters Used

None

TEST_03 - Local Control File Transfer

This test copies the local control program (FX File) from your PC or laptop computer to an SRAM memory card. After this test is run you will be able to control a model 882 or Microcell transceiver from the Test Set without use of your laptop. This will free you from connecting your laptop to the base station under test and allow your laptop to be used for MTSO communication. Local control file transfer is accomplished by the following:

1. Load the Option 042 software.
2. Initialize the SRAM memory card supplied with the software. See "TEST_02 - Memory Card Initialization" on page 125.
3. Connect your laptop (serial port 1) to the Test Set (serial port) via the supplied interface cable (RJ-11(m) to DB-9(f), part no. 08921-61038).
4. Run "TEST_03 - Local Control File Transfer" on page 126.
5. Select `Continue` in response to inserting an initialized memory card.
6. On the laptop at the `c:\` enter, `mode com1:48,n,8,1`
7. On the laptop at the `c:\` prompt enter, the directory where the local program resides and copy the program. For example, `copy a:\fx1.mpr com1`.

For a complete illustrated method see Chapter 1, "Getting Started with FW Above Revision A.14.00 (for 882 and 882M Analog Transceivers Only)," on page 9 or Chapter 2, "Getting Started with FW Below Revision A.14.00 (For 882 or 882M Analog Transceivers Only)," on page 29.

Pass/fail limits Used

None

Parameters Used

None

TEST_04 - GN Swept Return Loss

NOTE Test Signal Can Cause Interference

This test radiates a test signal when it is used to test antennas or cables with antennas attached to them. Verify that the level and frequency span used for the test cannot result in interference to another antenna nearby. Set the parameter GN RF level for return loss tests (dBm) to the minimum level that provides good resolution for the measurement you are making. Set the frequency range carefully.

After a single sweep is taken, the tracking generator RF level is not changed. A CW signal is therefore being applied to the antenna even after the test finishes.

If you are in an area with other receive antennas nearby, you may want to use TEST_05 - GN Discrete Channel Return Loss. This test measures the return loss at a frequency offset from a selectable range of AMPS channels. The offset (in kHz) from the AMPS channels can be set.

This test measures the return loss of a cable or device in the swept mode. An SWR bridge and a 6-dB pad are connected to the Test Set. The pad is used to improve the mismatch between the SWR bridge and the ANT IN port on the Test Set. The user is prompted at the start of the test to enter the start and stop frequencies. This test uses the spectrum analyzer and tracking generator in the HP 8921A/D. A reference level is measured on the spectrum analyzer with a short or open on the SWR bridge DUT port. The return loss is then measured with the cable-or-antenna-under-test on the SWR bridge DUT port. A plot of return loss versus frequency is displayed on the screen. The measurement value returned is the worst case return loss in the sweep.

The return loss plot can be viewed real time at the end of the test by pressing CANCEL, TESTS, and selecting `Spec Anl` from the `To Screen` menu. To print this screen, press SHIFT PRINT (a compatible printer must be connected, and the Test Set must be configured appropriately. “Printing” on page 214.

VSWR can be calculated from the return loss. The following table contains some of the values from a calculation.

Table 7-1 Return Loss (0 to 20 dB) to VSWR

Return Loss (dB)	0	2	4	6	8	10	12	14	16	18	20
VSWR	infinity	8.7	4.4	3.0	2.3	1.92	1.67	1.50	1.38	1.29	1.22

Table 7-2 Return Loss (20 to 40 dB) to VSWR

Return Loss (dB)	20	22	24	26	28	30	32	34	36	38	40
VSWR	1.22	1.17	1.13	1.11	1.08	1.07	1.05	1.04	1.03	1.03	1.02

The following formula can be used to determine the VSWR from the return loss (=RL in dB):

$$VSWR = \frac{1 + 10^{\frac{-RL}{20}}}{1 - 10^{\frac{-RL}{20}}}$$

VSWR is sometimes stated as a ratio. For example: 1.2:1 or “one point two to one” VSWR. The first number is given in the tables and formula. The second number is always one.

Estimating Antenna Return Loss

If you are measuring the return loss of an antenna connected to the end of a known good feed line, you can approximately determine the return loss of the antenna by subtracting twice the loss. For example, if you measure a return loss of 24 dB and the line is known to have a 2 dB loss, the estimated return loss of the antenna is 20 dB. This estimate is in error if the coaxial line and connectors do not have a return loss somewhat greater than 24 dB.

Pass/fail limits used

GN return loss (dB)

Parameters used

GN RF level for return loss tests (dBm)

TEST_05 - GN Discrete Channel Return Loss

This test measures the return loss for discrete channels. This test is performed at channels entered by the user and offset by a frequency to make the measurement between actual channels. An SWR bridge and a 6 dB pad are required. The pad is used to improve the impedance match at the ANT IN part on the Test Set. A reference level is measured on the spectrum analyzer with a short or open on the SWR bridge DUT port. The return loss is then measured with the cable or antenna-under-test on the SWR bridge DUT port.

This test should be used when there is a chance that a full frequency sweep of the band to be tested may cause interference. In this test, the chance of interference is greatly reduced by selecting an offset that sets a CW test frequency in between the assigned AMPS channels. For example, selecting an offset of 15 kHz places the test signal between adjacent AMPS channels and adjacent NAMPS channels.

See "TEST_04 - GN Swept Return Loss" on page 127 for a return loss to VSWR conversion table and formula and a way to estimate the return loss of an antenna connected to the end of a feed line.

Pass/fail limits used

GN return loss (dB)

Parameters used

GN RF level for return loss tests (dBm)

TEST_06 - GN Cable Fault

NOTE Test Signal Can Cause Interference

When testing cables attached to antennas, test signals will be radiated. Verify that the signal used for the test cannot result in interference to another antenna. The software reduces the signal generator's level except when it is needed to actually perform the measurement.

This test operates over a wide frequency band. The test will always operate with a center frequency of 505 MHz. The frequency span, however, will be determined by the length of the cable measured. Longer cables will use a narrower frequency span. The frequency span will equal 990 MHz for cables less than 50 feet long and equal approximately 99 MHz for cables 500 feet long. It is always safe to assume that the frequency span is less-than-or-equal-to 990 MHz.

This test displays the return loss of a transmission line as a function of the distance down the line. A frequency-swept signal from the DUPLEX OUT port is applied through a resistive power divider to the cable-under-test. Signals reflected from faults in the cable are combined with the DUPLEX OUT signal in the power divider and applied to the ANT IN port. The changing interference of the forward and reflected signals, over the swept frequency band, contains information about the distance to one or more faults. The software uses a Fast Fourier Transform (FFT) to convert the frequency domain into the distance domain. The distance displayed on the Test Set's CRT is the physical distance to the fault with correction for the velocity factor of the cable.

Cable Fault Performance

Measurements of the cable fault location can typically be made up to 500 feet on low-loss cables and 300 feet on higher-loss cables. Resolution of the fault location is approximately 0.4 feet for cable lengths up to 50 feet and then linearly increases to 4 feet for a 500-foot cable.

Selecting Cable Type

When this test is run, a screen will appear which will prompt you for the following information:

- Cable length
- Cable length units
  - Pressing the knob will toggle the selection between feet and meters.
- Cable class
  - Pressing the knob will provide choices for HELIAX, RG, and Custom options.

- The next prompt varies depending on the selection for cable class:
  - If HELIAX is selected, you will be prompted to enter the cable type. A list will appear with choices of foam, air, and flex of varying thickness. Push the knob to select the desired cable type.
  - If RG is selected, you will be prompted to enter the cable type with the example [RG 58/U = 58]. You must enter a value between 0 and 1000.
  - If Custom is selected, you will be prompted to enter the cable's velocity of propagation constant and attenuation per 100 feet (or meters) at 500 MHz. The propagation velocity must be a value between 0 and 1.
- Select `Begin Test` when all the appropriate entries have been made.
- Connect the cables as instructed, and press k2 (`continue`).

NOTE

Velocity Factors and Attenuation

Cables that use polyethylene dielectric typically have a propagation velocity of 0.66. Cables that use a teflon dielectric typically have a propagation velocity of 0.70. If the cable attenuation is unknown, enter 0 dB per 100 feet (or meters). Entering 0 dB/100 will produce return loss values lower than actual, but fault distance can be accurately detected.

NOTE

Typical Cable Fault Return Loss Measurements

Return loss is a ratio of input power to reflected power. For example, if 100 Watts was applied to a cable and 10 Watts was returned, the return loss is 10 dB (10 log (100/10)). In the same example, if 1 Watt was returned, the return loss would be 20 dB (10 log (100/1)). Typical return loss measurements for the cable loss test are listed below:

- Open-Circuit Cable = 0 dB
- Short-Circuit Cable = 0 dB
- 50-Ohm Terminated Cable = 20 to 30 dB
- Antenna = 10 to 20 dB

Return loss measurements below 25 dB should be considered excellent. For best results, the cable output should be terminated in 50 ohms.

Entering Cable Length

The greatest accuracy is obtained when you enter a cable length slightly greater than the actual cable length, considering length uncertainty. If you are not sure of the cable length, enter a value 1.5 times the estimated length. Depending on the return loss of the antenna or device at the end of the cable, you may see a high relative mismatch displayed at the actual length of the cable.

Parameters Used

There are no parameters used in this test.

Pass/Fail Limits Used

There are no pass/fail limits used in this test.

TEST_07 - GN Measure Cable Loss

This test can be used to measure the loss in a two-port device or cable when both ends of the cable are accessible. The loss is measured over a range of RF frequencies specified by the operator.

1. Individual 6 dB attenuators should be connected to the DUPLEX OUT and ANT IN connectors on the Test Set to improve the impedance match on these two ports. HP part number 0955-0698 is a suitable attenuator for this purpose.
2. The operator is prompted to connect a short length of cable between the two pads so that a reference sweep can be made.
3. Finally, the operator is prompted to connect the cable under test between the short calibration cable and one of the pads so that its loss can be measured. A plot of insertion loss versus frequency is displayed.

The insertion loss plot can be viewed real-time at the end of the test by pressing CANCEL, TESTS, and selecting `Spec Anal` from the `To Screen` menu.

Pass/fail limits used

None

Parameters used

GN RF level for return loss tests (dBm)

TEST_08 - GN Data Collection File Transfer

This test reads files from a memory card and transmits them out of the serial port or HP-IB port on the Test Set.

The intended use of this test is to transfer test results which have been stored on an SRAM memory card to a personal computer (PC) or printer. For a discussion of how to store test results on a memory card, see "Data Collection (Saving and Retrieving Test Results)" on page 189. Perform the following steps to accomplish data collection file transfer:

1. Do one of the following:
   a. Connect a PC to the Test Set serial port via the supplied interface cable part number 08921-61038. Set up your terminal emulator software to log received data to a disk file or printer.
   b. Connect a serial printer to the Test Set serial port via cable part number 08921-61039 or equivalent.
   c. Connect an HP-IB printer to the Test Set HP-IB port.
2. Run TEST_08 GN Data Collection File Transfer
3. Insert the SRAM memory card containing the desired test results when prompted to do so and press `Continue`.
4. Use the knob to select the desired output port, either the serial port or HP-IB.
5. A list of all files found on the card will be displayed on the screen. Use the knob to select those that you want to transfer. An asterisk will be appended to each selected file name on the screen to indicate that it has been selected.
6. Use the knob to select the "Transfer Selected Files" field. Each of the selected files will be transmitted out of the selected port along with the associated file name.
7. If you wish to purge (delete) selected files from the memory card, select the "Purge (Delete) Selected Files" field.
8. Use the knob to select the "Exit Data-Collection-File-Transfer" field to terminate this test.

NOTE The serial port parameters are fixed at 9600 baud, 8 data bits, 1 stop bit, and no parity for this test. The terminal emulator or serial printer parameters must be set to match.

Pass/fail limits Used

None

Parameters Used

None

TEST_09 - TX Frequency Adjustment

This test measures the transmitter's carrier frequency. An analog on screen frequency error meter is used so that the user may tune the base station's carrier frequency. The user is prompted to adjust the transmitter frequency until the meter needle is centered. The user then selects Done. The meter incorporates plus and minus specification limits that are set by the pass/fail limit, TX Frequency error.

Pass/fail limits used

TX frequency error (Hz)

Parameters used

GN CU serial control [0=PC 1=HP8921]

RT audio excitation frequency (kHz)

RT units for audio measurements [0=mV, 1=dBm]

TX audio adjustment excitation level (mV/dBm)

TEST_10 - TX Power Adjustment

This test measures the transmitter's output power in Watts or dBm. An analog meter showing TX power is provided for adjustment purposes. The user selects `Done` to accept the value after adjusting the TX power to within the specification limits set by the pass/fail limit, TX Output power.

Pass/fail limits used

TX audio level (mV/dBm))

Parameters used

GN CU serial control [0=PC 1=HP8921]

RT audio excitation frequency (kHz)

RT units for audio measurements [0=mV, 1=dBm]

TX units for RF pwr measure [0=W 1=dBm]

TX audio adjustment excitation level (mV/dBm)

TX path loss (dB)

TEST_11 - TX Audio Level Adjustment

This test measures and allows adjustment of the audio level produced by the transmitter when driven by a specified audio level at the TX LINE input. The audio level from the transmitter is measured between TX MOD and GND on the audio breakout box.

1. The user is prompted to make connections for transmitter audio level adjustment.
2. A specified audio level is provided by the Test Set while the transmitter audio level is monitored on an analog meter.
3. The user then adjusts the TX audio (TX Sens) until the meter reflects a pass condition.
4. The user then selects Done.

Pass/fail limits used

TX audio level (mV/dBm)

Parameters used

RT audio excitation frequency (kHz)

RT units for audio measurements [0=mV, 1=dBm]

TX audio adjustment excitation level (mV/dBm)

TX adjust TxL using loop gain [1 = yes]

TEST_12 - TX Voice Channel Deviation

This test measures the frequency deviation produced by the transmitter when driven by a specified audio level at the TX LINE input. The result of the measurement is compared to a limit set in the TX voice channel deviation pass/fail limit.

Pass/fail limits used

TX voice channel deviation (kHz)

Parameters used

GN CU serial control [0=PC 1=HP8921]

RT audio excitation frequency (kHz))

RT units for audio measurements [0=mV, 1=dBm]

TX audio adjustment excitation level (mV/dBm)

TEST_13 - TX Voice and SAT Deviation

This test measures the peak frequency deviation of the base station. The transceiver is commanded to generate a 5970 Hz SAT tone, and the transmitter is turned on. An audio input defined by the parameters, TX audio adjustment excitation frequency and TX audio adjustment excitation level, is applied to the TX LINE input of the transceiver and the resulting peak frequency deviation is measured.

Pass/fail limits used

TX voice and SAT deviation (kHz)

Parameters used

GN CU serial control [0=PC 1=HP8921]

RT audio excitation frequency (kHz)

RT units for audio measurements [0=mV, 1=dBm]

TX audio adjustment excitation level (mV/dBm)

TEST_14 - TX Maximum Voice Deviation

This test verifies that the instantaneous peak frequency deviation of the transmitter does not exceed the pass/fail limit, TX maximum voice deviation, even when the TX LINE input is overdriven. An audio input defined by the parameters, TX audio adjustment excitation frequency and TX max voice audio level, is applied to the TX LINE input of the transceiver and the resulting peak frequency deviation is measured.

Pass/fail limits used

TX maximum voice deviation (kHz)

Parameters used

GN CU serial control [0=PC 1=HP8921]

RT audio excitation frequency (kHz)

RT units for audio measurements [0=mV, 1=dBm]

TX max voice audio level (mV/dBm)

TEST_15 - TX Data Deviation

In this test, the transceiver is commanded to generate the CONSTANT SYMBOL data stream. The resulting peak frequency deviation is measured.

Pass/fail limits used

TX constant symbol data deviation (kHz)

TX constant symbol data frequency (kHz)

Parameters used

GN CU serial control [0=PC 1=HP8921]

TEST_16 - TX SAT Frequency Error and Deviation

This test measures the frequency error and deviation of the SAT (supervisory audible tone).

Pass/fail limits used

TX SAT frequency error (Hz)

TX SAT frequency error (Hz)

Parameters used

GN CU serial control [0=PC 1=HP8921]

TEST_17 - TX Calculate ERP

This test calculates the power from the transmitter, in Watts, required to produce the desired ERP. The user inputs the following:

1. The desired effective radiated power from the antenna.
2. The lengths of RF transmission line between the transmitter and the antenna.
3. All other known losses between the transmitter and the antenna (such as the combiner, etc.).

Pass/fail limits used

None

Parameters used

None

TEST_18 - RX Line Level Adjustment

This test measures the audio line level output of the receiver. The user is prompted to make the correct audio connections to the receiver. A modulated RF signal is applied to the receiver and its audio output level is measured.

The user is prompted to adjust the RX Lev potentiometer on the base station until the meter indicates an in-limit level. The user then selects `Done`.

For the analog microcell transmitter the RX level adjustment is performed on the RXA receiver. The user is then prompted to change to the RXB receiver, and the line level difference from the RXA Receiver is measured in dB. If the parameter GN check MCBS on only RXA is set to 1=yes, the RXB receiver is not checked.

Pass/fail limits used

RX line level (mV/dBm)

RXB microcell line level difference (dB)

Parameters used

GN CU serial control [0=PC 1=HP8921]

RT audio excitation frequency (kHz)

RT full rated system deviation (kHz)

RT units for audio measurements [0=mV, 1=dBm]

RX RF level for audio adjust (dBm)

RX path loss (dB)

GN check MCBS on only RXA [0=no 1=yes]

TEST_19 - RX Sensitivity

This test measures the sensitivity of the base station's receiver. The Test Set outputs a modulated RF signal to the receiver and varies the RF output level until a SINAD level defined by the parameter, RX sensitivity SINAD level, is obtained with a tolerance of ±0.8 dB. The associated RF output level is reported as the test result.

The receive audio output on a locating receiver (MLOC) does not have a high gain output. Therefore, to test sensitivity on an MLOC it may be desirable to set the Test Set AUDIO IN impedance to float rather than 600 ohm. To select a floating input impedance set parameter RX sens floating audio input [0=no 1=yes] to 1=yes. Consult your Ericsson MLOC documentation for proper setting of this parameter.

NOTE This test is only done on RXA on the analog microcell; therefore, this test should be selected instead on TEST_20 - RX Diversity Sensitivity if you want to test the microcell on only RXA.

Pass/fail limits used

RX sensitivity (dBm)

Parameters used

RT audio excitation frequency (kHz)

RT full rated system deviation (kHz)

RX path loss (dB)

RX sensitivity SINAD level (dB)

RX sens floating audio input [0=no 1=yes]

TEST_20 - RX Diversity Sensitivity

This test is identical to TEST_19 - RX Sensitivity except that the user is prompted to connect only one of the receiver antenna ports at a time (RXA or RXB). For the model 882 transceiver, the user must terminate the unused port on the power splitter with a 50 ohm load. Sensitivity is measured for each of the two antenna ports individually. The diversity sensitivity for each of the antenna ports is reported as an offset, in dB, from the sensitivity measured with both parts driven.

For the microcell transceiver, the user is prompted to connect the generator output to RXB without a splitter. Sensitivity is measured on RXB, and the user is prompted to connect to RXA to measure sensitivity. Checking RXB first minimizes the cable movements if this test is proceeded by T18. The diversity sensitivity for each antenna is reported as absolute RF level in dBm.

If you only want to check the microcell on RXA, substitute TEST_19 - RX Sensitivity for this test.

NOTE See the description of TEST_19 - RX Sensitivity for more information about how the sensitivity measurement is made.

Pass/fail limits used

RX diversity sensitivity (dB/dBm)

Parameters used

RT audio excitation frequency (kHz)

RT full rated system deviation (kHz)

RX path loss (dB)

RX sensitivity SINAD level (dB)

GN check MCBS on only RXA [0=no 1=yes]

TEST_21 - RX Desense

This test measures the receiver's desensitization when the transmitter is keyed. First the receiver's sensitivity is measured as in TEST_19 - RX Sensitivity. Then the transceiver is commanded to key the transmitter, and the receiver sensitivity is measured again. The measured sensitivity must remain the same within a tolerance set by the pass/fail limit, RX desense.

This test is done on RXA for the microcell transceiver.

Pass/fail limits used

RX desense (dB)

Parameters used

GN CU serial control [0=PC 1=HP8921]

RT audio excitation frequency (kHz)

RT full rated system deviation (kHz)

RX path loss (dB)

RX sensitivity SINAD level (dB)

TEST_22 - RX Squelch Test

This test measures and sets the receiver's squelch threshold and hysteresis. The Test Set generates an RF carrier and adjusts the level of this carrier while measuring the audio noise on the RX LINE output of the receiver. The test set finds the RF levels at which the squelch opens and closes and reports them as squelch threshold and squelch hysteresis.

The squelch threshold is reported either as an absolute value in dBm or as an offset from the usable sensitivity, depending upon the setting of the RX squelch threshold parameter.

For the microcell transceiver, this test is only performed on RXA.

Pass/fail limits used

RX squelch hysteresis (dB)

RX squelch threshold (dB/dBm)

Parameters used

GN CU serial control [0=PC 1=HP8921]

RT audio excitation frequency (kHz)

RT full rated system deviation (kHz)

RX path loss (dB)

RX sensitivity SINAD level (dB)

RX squelch threshold (dB/dBm)

TEST_23 - RX RF Level Calibration (AIO)

This test verifies the ability of the base station to measure the level of a received RF signal. The Test Set outputs a modulated RF signal at a specified level to the receiver. The base station internally measures the received RF signal's level and reports back to the Test Set. The value is then compared to the upper and lower limits of signal level in the pass/fail limit, RX RF level from AIO.

For the microcell transceiver, this test is performed first on RXA then on RXB. The user is prompted to change cables between the tests. If the parameter GN check MCBS on only RXA is set to 1=yes, the RXB receiver is not checked.

Pass/fail limits used

RX RF level from AIO

Parameters used

GN CU serial control [0=PC 1=HP8921]

RT audio excitation frequency (kHz)

RX path loss (dB)

RX RF level for AIO/RSSI test (dBm)

ZZ test mode [0=normal 1=demo]

GN check MCBS on only RXA [0=no 1=yes]

TEST_24 - RX Loop Gain Adjustment

This test measures the transceiver's audio loop gain. The transceiver is commanded to set its internal audio path to LINE LOOP. An audio tone with a level given by the parameter, TX audio adjustment excitation level, is applied to the TX LINE input of the transceiver. The audio level returned from the transceiver via the RX LINE output is measured and displayed on a simulated analog meter to facilitate adjustment. The measured loop gain level is compared to the pass/fail limit, RX loop gain level.

Pass/fail limits used

RX loop gain level (mV/dBm)

Parameters used

GN CU serial control [0=PC 1=HP8921]

RT audio excitation frequency (kHz)

RT units for audio measurements [0=mV, 1=dBm]

TX audio adjustment excitation level (mV/dBm)

TX adjust TxL using loop gain [1 = yes]

TEST_25 - RX SAT Detector

This test measures the ability of the transceiver under test to detect a SAT tone.

An RF carrier is generated by the Test Set with a level set by the RX RF level for SAT detector test parameter. The carrier is modulated with each of the three SAT tones in turn.

The AIO levels for SAT and signal-to-noise are read back from the transceiver to the Test Set via RS-232 and reported. They are compared to the RX SAT detector level and RX SAT detector signal-to-noise pass/fail limits.

Pass/fail limits used

RX SAT detector level

RX SAT detector SNR

Parameters used

RX RF level for SAT detector test (dBm)

RX path loss (dB)

TEST_26 - TDMA Laptop Emulator

This test allows the operator to control the model 882D transceiver (DTRM or DMTM) manually from the Test Set via the RS-232 connection. The following operations are possible:

- Setting the channel number.
- Setting the transmitter to continuous or pseudorandom modulation.
- Keying and de-keying the transmitter.
- Reading alarm status.
- Accessing the Test Set SPECTRUM ANALYZER screen.
- Setting the transceiver to local or remode mode.

See the description of "TEST_01 - GN Laptop Emulator" on page 123 for combiner tuning instructions. If the star junction is driven by both analog and digital transceivers then both types of laptop emulators will have to be used.

This test (and all of the TDMA tests) require the "traffic" code or RCSU software to be resident in the digital transceiver.

Pass/fail limits used

None

Parameters used

None

TEST_27 - TDMA Internal Test DTRM/LVM

This test runs the internal tests of the Ericsson digital transceiver (DTRM or DMTM). The TCU, SPU and RADIO modules are tested. Fault codes are read from the DTRM or DMTM to the Test Set via RS-232 and reported. An error is flagged if a fault code is not zero.

This test (and all of the TDMA tests) require the “traffic” code or RCSU software to be resident in the digital transceiver.

Pass/fail limits used

None

Parameters used

None

TEST_28 - TDMA TX Continuous Power

This test commands the DTRM or DMTM to use “continuous” modulation mode and keys the transmitter in the DTRM or DMTM. RF power is then measured using the broad-band peak power detector in the input section of the Test Set. A simulated analog power meter is displayed on the screen. The limits of the meter scale are taken from the table of pass/fail limits. A `Set Atten` softkey is provided so that the user can adjust attenuation in the DTRM or DMTM until the desired power output is obtained. A `Save Atten` softkey is provided so that the user can save the desired attenuation in non-volatile memory in the DTRM or DMTM. The user selects the `Done` softkey to record the measured power and exit the test. The DTRM or DMTM modulation is returned to “pseudorandom” mode and the transmitter is de-keyed.

Pass/fail limits used

TX output power (W/dBm)

Parameters used

TX path loss (dB)

TX units for RF pwr measure [0=W 1=dBm]

TEST_29 - TDMA TX Pseudorandom Power

NOTE

This Test Runs on the HP 8921D or HP 8921A, Option 500

This test only runs on an HP 8921D or the HP 8921A, Opt 500. The HP 8921D is a combination of an HP 8921A and an HP 83201A Dual-Mode Cellular Adapter. The HP 8921A, Option 500 consists of an HP 83204A, Option 001, TDMA Dual-Mode Cellular Adapter.

This test measures the power of the DTRM or DMTM while it is transmitting in the “pseudorandom” modulation mode. Power is measured at the intermediate frequency (IF) of the HP 83201A Dual-Mode Cellular Adapter or the HP 83204A, Option 001. In order to calibrate the paths leading from the Test Set RF IN/OUT connector to the HP 83201A IF or the HP 83204A, Option 001 IF, a “continuous” mode signal is activated in the DTRM or DMTM. The power of this signal is measured using both the broad-band peak power detector in the input section of the Test Set and also the HP 83201A or the HP 83204A, Option 001 Dual-Mode Cellular Adapter. The resulting calibration factor is used to correct subsequent power measurements made on a carrier with pseudorandom p/4 DQPSK modulation. After the calibration factor has been found, the software commands the DTRM or DMTM to use “pseudorandom” modulation mode and keys the transmitter in the DTRM or DMTM. The mean RF power is then measured using the HP 83201A or the HP 83204A, Option 001 Dual-Mode Cellular Adapter. A simulated analog power meter is displayed on the screen. The limits of the meter scale are taken from the table of pass/fail limits. A `Set Atten` softkey is provided so that the user can adjust attenuation in the DTRM or DMTM until the desired power output is obtained.

A `Save Atten` softkey is provided so that the user can save the desired attenuation in non-volatile memory in the DTRM or DMTM. The user selects the `Done` softkey to record the measured power and exit the test. The transmitter is then de-keyed.

Pass/fail limits used

TDMA TX pseudorandom power (W/dBm)

Parameters used

TX path loss (dB)

TX units for RF pwr measure [0=W 1=dBm]

TEST_30 - TDMA TX Modulation Accuracy

NOTE

This Test Runs on the HP 8921D or HP 8921A, Option 500

This test only runs on an HP 8921D or the HP 8921A, Opt 500. The HP 8921D is a combination of an HP 8921A and an HP 83201A Dual-Mode Cellular Adapter. The HP 8921A, Option 500 consists of an HP 83204A, Option 001, TDMA Dual-Mode Cellular Adapter.

This test commands the DTRM or DMTM to enter the “BER and RSSI measurements” mode. The DTRM or DMTM will begin to transmit an RF carrier with p/4 DQPSK modulation. The DTRM or DMTM will also supply a 50 Hz reference signal on pin B-18 of the “ctrl” connector.

The HP 83201A or HP 83204A, Option 001 Dual-Mode Cellular Adapter on the Test Set will measure and report the accuracy of the p/4 DQPSK modulation for each of the three timeslots individually. RMS EVM is measured as well as peak EVM, phase error, magnitude error, origin offset, and frequency error.

The rear panel reference input (REF IN) of the HP 83201A or HP 83204A, Option 001 should be connected to the 50 Hz reference provided by the DTRM or DMTM. Also note that the DTRM or DMTM will require 8 kHz and 2.048 MHz reference signals supplied to its “PCM” connector.

Pass/fail limits used

TDMA TX RMS EVM (%)

TDMA TX peak EVM (%)

TDMA TX phase error (deg)

TDMA TX magnitude error (%)

TDMA TX origin offset (dBc)

TX frequency error (Hz)

Parameters used

None

TEST_31 - TDMA TX Adjacent Channel Power

NOTE

This Test Runs on the HP 8921D or HP 8921A, Option 500

This test only runs on an HP 8921D or the HP 8921A, Opt 500. The HP 8921D is a combination of an HP 8921A and an HP 83201A Dual-Mode Cellular Adapter. The HP 8921A, Option 500 consists of an HP 83204A, Option 001, TDMA Dual-Mode Cellular Adapter.

This test keys the transmitter in the DTRM or DMTM and measures the adjacent, first alternate and second alternate channel power relative to the total power output from the transmitter. The signal from the transmitter has pseudorandom p/4 DQPSK modulation.

For this test, the rear panel reference input (REF IN) of the HP 83201A or the HP83204A, Option 001 should be connected to the 50 Hz reference from pin B-18 of the “ctrl” connector on the DTRM or DMTM.

Pass/fail limits used

TDMA TX adjacent channel power (dB)

TDMA TX alternate channel 1 power (dB)

TDMA TX alternate channel 2 power (dB)

Parameters used

None

TEST_32 - TDMA RX RSSI

NOTE

This Test Runs on the HP 8921D or HP 8921A, Option 500

This test only runs on an HP 8921D or the HP 8921A, Opt 500. The HP 8921D is a combination of an HP 8921A and an HP 83201A Dual-Mode Cellular Adapter. The HP 8921A, Option 500 consists of an HP 83204A, Option 001, TDMA Dual-Mode Cellular Adapter.

This test verifies the ability of a DTRM or DMTM or LVM to measure the level of a received signal. The Test Set outputs a p/4 DQPSK modulated RF signal. to the receiver-under-test. The receiver-under-test will measure the signal level and report it back to the Test Set via RS -232. The value is compared to the upper and lower limits of the TDMA RX RSSI level pass/fail limit.

Pass/fail limits used

TDMA RX RSSI level (dBm)

Parameters used

RX RF level for AIO/RSSI test (dBm)

RX path loss (dB)

GN 882D equip type [0=DTRM 1=LVM]

TEST_33 - TDMA RX Sensitivity (BER)

NOTE

This Test Runs on the HP 8921D or HP 8921A, Option 500

This test only runs on an HP 8921D or the HP 8921A, Opt 500. The HP 8921D is a combination of an HP 8921A and an HP 83201A Dual-Mode Cellular Adapter. The HP 8921A, Option 500 consists of an HP 83204A, Option 001, TDMA Dual-Mode Cellular Adapter.

This test commands the DTRM or DMTM to enter the “BER and RSSI measurements” mode. The Test Set will begin to generate an RF carrier with p/4 DQPSK modulation. The DTRM or DMTM will perform an internal bit error rate (BER) calculation and will report the results back to the Test Set via RS-232. For each timeslot, the software will adjust the RF level generated by the Test Set until the reported BER is approximately equal to the TDMA RX sensitivity BER parameter. (The default value for this parameter is 3 percent.) The associated RF output level is reported as the test result for that timeslot.

The rear panel reference input (REF IN) of the HP 83201A or the HP 83204A, Option 001 should be connected to the 50 Hz reference provided by the DTRM or DMTM. Also note that the DTRM or DMTM will require 8 kHz and 2.048 MHz reference signals supplied to its “PCM” connector.

Pass/fail limits used

RX sensitivity (dBm)

Parameters used

RX path loss (dB)

TDMA RX sensitivity BER (%)

TEST_34 - TDMA RX Diversity Sensitivity (BER)

NOTE

This Test Runs on the HP 8921D or HP 8921A, Option 500

This test only runs on an HP 8921D or the HP 8921A, Opt 500. The HP 8921D is a combination of an HP 8921A and an HP 83201A Dual-Mode Cellular Adapter, which bolts to the top of an HP 8921A. The HP 8921A, Option 500 consists of an HP 83204A, Option 001, Dual-Mode Cellular Adapter which bolts to the top of an HP 8921A.

This test is identical to TEST_33 - TDMA RX Sensitivity (BER) except that the DTRM or DMTM is commanded to enable only one receiver antenna port at a time (RxA or RxB).

The diversity sensitivity for each antenna port is reported as an offset, in dB, from the sensitivity measured with both ports driven.

Diversity sensitivity can be measured on one, two, or three timeslots depending upon the setting of the corresponding parameter.

NOTE

See the description of "TEST_33 - TDMA RX Sensitivity (BER)" on page 161 for more information about how the sensitivity measurement is made.

Pass/fail limits used

RX diversity sensitivity (dB/dBm)

Parameters used

RX path loss (dB)

TDMA RX sensitivity BER (%)

TDMA RX diversity sensitvity no. of slots

TEST_35 - TDMA DTRM/DMTM Product Information

NOTE

This Test Runs on the HP 8921D or HP 8921A, Option 500

This test only runs on an HP 8921D or the HP 8921A, Opt 500. The HP 8921D is a combination of an HP 8921A and an HP 83201A Dual-Mode Cellular Adapter. The HP 8921A, Option 500 consists of an HP 83204A, Option 001, TDMA Dual-Mode Cellular Adapter.

This test reads and displays the product information about the digital transceiver under test. The test always reads the DTRM or DMTM product number, serial number, and R-state. Additional product numbers, serial numbers, and R-states relevant to the TCU, SPU-RX, SPU-TX, PA, LX, RX, FG modules can be read and displayed by setting the parameter TDMA show all product info [0=no 1=yes] to 1=yes.

Pass/fail limits used

None

Parameters used

TDMA show all product info [0=no 1=yes]

TEST_36 - GN Combiner Tuning

This test prepares the spectrum analyzer for manual adjustment of combiners. The Test Set is connected to the output of the Star Net to provide measurements on an entire block of spectrum or provide detailed analysis of an individual channel.

During the test, you are required to enter the maximum signal level expected at the test port. You are then prompted to select the band your transceivers are operating in: A-A, A', B, B'.

You can also press **k5** (`More keys`) to list additional operations. One of these operations is `Chan Zoom`, which sets the spectrum analyzer's span to 30 kHz to "zoom in" on only one channel for close analysis.

You must then key the transmitter(s) connected to the Star Net and press **k1** (`Proceed`) to view the signals on the spectrum analyzer. Press the **Pause/Continue** key to return to the test.

Pass/fail limits used

None

Parameters used

None

TEST_37 - RX Microcell Squelch Adjustment

This test provides squelch adjustment for Ericsson analog microcells. The test also performs a fault check on the Microcell radio under test.

The test requires the use of the Ericsson handset breakout box and handset. During the procedure, you are prompted to enter several commands on the handset to control the microcell.

Look carefully at each screen as it is displayed during the test. Prompts are shown in the area just below the screen title and also below the displayed connection diagrams and meter displays that occur during the tests.

Pass/fail limits used

None

Parameters used

MCBS Carrier Present Threshold

MCBS Carrier Lost Threshold

Parameter Descriptions

Parameters are values you enter that optimize test environment or conditions of the software. Many of the parameters are determined by examining your test needs. Other parameters are determined by performing measurements to calibrate items in your system. Default values are set into the software. Some of these are derived from standard methods of measurement and some are derived from the manufacturer's requirements.

For information on editing parameters, see Chapter 5, "Using the Software with FW Rev. Above A.14.00," on page 69.

Parameters remain in battery-backed-up memory until you select a Procedure to run. If you wish to prevent them from being lost when a new Procedure is selected, you will have to save them in a Procedure. See "Saving a Procedure" on page 228.

To print the parameters list, "To print TESTS screens" on page 227.

The first few capital letters in the title of each parameter indicate what the parameter refers to:

GN = General system parameters

RT = Receiver and Transmitter

RX = Receiver

TX = Transmitter

TDMA = Time Division Multiple Access

ZZ = Other

GN model [0=880 1=882 2=MCBS 3=DTR 4=DM]

This parameter sets the transceiver model to be tested.

GN CU serial control [0=PC 1=HP8921]

This parameter sets the type of serial control unit that will be used to communicate with the Base Station Transceiver Modules. The choices are either a personal computer or the HP 8921 (Test Set). PC control is not available on digital base stations.

GN auto exit adj [0=no, xx=times in spec]

This parameter sets the number of measurements that must be in specification to automatically exit from the meter screen.

Example

If you wish to stop testing after 6 successive measurements have met the specifications set (pass), enter `6`.

GN RF level for return loss tests (dBm)

This parameter sets the RF level that the Test Set outputs for TEST_04 - GN Swept Return Loss, TEST_05 - GN Discrete Channel Return Loss, and TEST_07 - GN Measure Cable Loss.

Example

If you wish the RF level to be 0 dBm, enter `0`.

RT default channel

This parameter sets the default channel for transceiver testing. The user may change the channel when prompted at the beginning of each procedure.

RT audio excitation frequency (kHz)

This parameter sets the audio test tone frequency to be used in testing for both the receiver and transmitter.

Example

If you wish the audio frequency to be 1 kHz, enter `1`.

RT full rated system deviation (kHz)

This parameter sets the rated deviation to be used in testing for both the receiver and transmitter.

Example

If you wish the deviation to be 8 kHz, enter `8`.

RT units for audio measurements [0=mV, 1=dBm]

This parameter sets the measurement units, mV or dBm to be used in the audio tests for both the receiver and transmitter.

TX units for RF pwr measure [0=W 1=dBm]

This parameter sets the measurement units, Watts or dBm to be used in transmitter power measurements.

TX path loss (dB)

This parameter sets the cable loss between the Test Set's input (RF IN/OUT or ANT IN) and the transmitter's output. This value will be added to all RF level measurements performed on the transmitter.

Example

If the cable loss between the transmitter and the Test Set is 2 dB, enter 2.

TX adjust TxL using loop gain [1 = yes]

This parameter determines if the Microcell TxL adjustment will be done using TEST_24 - RX Loop Gain Adjustment. If testing a Microcell and this parameter is set to `Yes`, then the TX audio level adjustment test will not be performed. Adjustments are to be made using TEST_24 - RX Loop Gain Adjustment.

TX audio adjustment excitation level (mV/dBm)

This parameter sets the level of the audio signal that will be applied to the TX LINE input of the transceiver in the following tests: TEST_09 - TX Frequency Adjustment, TEST_10 - TX Power Adjustment, TEST_11 - TX Audio Level Adjustment, TEST_12 - TX Voice Channel Deviation, TEST_13 - TX Voice and SAT Deviation, and TEST_24 - RX Loop Gain Adjustment. The units (mV or dBm) of the signal are set in the parameter, RT units for audio measurements.

The Test Set has an output impedance of less than 1 Ω on the AUDIO OUT port. The TX audio excitation level parameter can be set to a value slightly higher than the specified test line level, for example 259 mV instead of 236 mV (–9.5 dBm instead of –10.3 dBm). This should be done to simulate the unequal voltage division which occurs when the TX LINE input of the transceiver is driven by a 600 Ω audio source.

Example

If the desired excitation level is 259 mV, enter `259`.

TX max voice audio level (mV/dBm)

This parameter sets the level of the audio signal that modulates the transmitter to produce maximum deviation. The units, mV or dBm of the signal are specified in the parameter, RT units for audio measurements. It is used in TEST_14 - TX Maximum Voice Deviation.

Example

If the desired audio level is 500 mV, enter `500`.

RX RF level for audio adjust (dBm)

This parameter sets the RF level of the Test Set's DUPLEX OUT output (plus the parameter, RX path loss) to be used in TEST_18 - RX Line Level Adjustment.

Example

If you wish the RF level to be –60 dBm, enter `–60`

RX path loss (dB)

This parameter sets the amount of loss in the path between the test set's DUPLEX OUT connection and the receiver's RXA and RXB inputs. This value includes the power splitter's loss.

Example

If the pad and cable loss is 7 dB between the Test Set and the RXA and RXB inputs, enter 7.

RX sensitivity SINAD level (dB)

This parameter sets the SINAD level used in sensitivity measurements.

Example

If you wish to set the SINAD level to 12 dB which is the standard level used for most sensitivity testing, enter 12.

RX squelch threshold [0=relative 1=abs]

This parameter sets whether the pass/fail limit, RX squelch threshold is relative or absolute.

RX RF level for AIO/RSSI test (dBm)

This parameter sets the RF level of the Test Set's DUPLEX OUT output (plus the parameter, RX path loss) to be used in TEST_23 - RX RF Level Calibration (AIO) and TEST_32 - TDMA RX RSSI.

Example

To set a level of –87 dBm, enter –87

RX deviation for RF level test (AIO) (kHz)

This parameter sets the frequency deviation to be used in TEST_23 - RX RF Level Calibration (AIO).

Example

To set 2.9 kHz of deviation, enter `2.9`

RX RF level for SAT detector test (dBm)

This parameter sets the RF level used in TEST_25 - RX SAT Detector.

TDMA RX sensitivity BER (%)

This parameter sets the bit-error-rate (BER) used in TEST_33 - TDMA RX Sensitivity (BER).

TDMA RX diversity sensitvity no. of slots

This parameter determines whether the TDMA diversity sensitivity test will be run on one, two, or three timeslots. Using fewer timeslots will reduce the time required to run the test.

ZZ test mode [0=normal 1=demo]

Select 0=normal to choose the standard test mode. 1=demo will select the demo test mode which simulates the actual test without requiring that the DUT to be connected.

RX sens floating audio input [0=no 1=yes]

This parameter configures the audio impedance during T19-RX Sensitivity test. Setting this parameter to 0=no establishes a 600 ohm impedance between the AUDIO IN LO and AUDIO IN HI connectors during this test. When the parameter is set to 1=yes, the AUDIO IN connector center pins are isolated from the ground, providing a floating audio input. Set this parameter to 0=no for voice transceiver testing. The receive audio output on a locating receiver (MLOC) does not have a high gain output. Therefore, it may be desirable to set this parameter to 1=yes for MLOC testing. Consult your Ericsson MLOC documentation for proper setting of this parameter.

TDMA show all product info [0=no 1=yes]

This parameter determines if information in addition to the DTRM or DMTM product information is displayed during TEST_35 - TDMA DTRM/DMTM Product Information. Selecting yes for this parameter will also display product number, serial number, and R-state for the TCU, SPU-RX, SPU-TX, PA, LX, RX, FG modules in the transceiver.

TDMA LCPC version [0=LCPC_R4 1=LCPC]

The HP 11807B Option 042 Ericsson Cell Site Test Software emulates the Ericsson LCPC software to control Ericsson digital transceivers. Versions A.xx.xx of this software emulate the original LCPC software. However, versions B.xx.xx and greater emulate both the original LCPC and new LCPC_R4 software. This parameter determines which LCPC version to emulate. Since the new LCPC_R4 is backwards compatible, the default parameter setting of `0` should control all RCSU software versions loaded in the digital transceiver. However, if you are having trouble communicating with older RCSU versions setting this parameter to `1` may be necessary.

The Local Control PC software (LCPC) communications with the Radio Channel Software Unit (RCSU) loaded in the digital transceiver. When this manual was written, there were two main versions of RCSU software, RCSU30 and RCSU57. Ericsson specifies which version of LCPC software runs with the RCSU version. The old RCSU30 software required the original LCPC software for control. The new RCSU57 software added major new functionality to the transceiver and the test interface also changed. Therefore, a new revision of LCPC software was designed by Ericsson. This new version is named LCPC_R4. This new version LCPC_R4 controls RCSU57 and is backward-compatible with RCSU30.

GN check MCBS on only RXA [0=no 1=yes]

Some 882M analog microcell transceivers are only used with the RXA antenna. Selecting 1=yes for this parameter only checks the RXA antenna on the microcell. Testing only one antenna reduces test time because the user does not have to change antenna connections during test 18, test 20, and test 23. If 0=no is selected, the user will be prompted to connect to RXA and RXB individually during test 18, test 20, and test 23.

GN no prompt at end of test [0=no 1=yes]

Setting this parameter to 0=no will prompt the user to exit local control at the end of an analog transceiver test sequence. For a digital transceiver sequence the user will be prompted to set the transceiver to remote. Exiting local control or returning to remote is necessary to put the transceiver back in service after testing. If this parameter is set to 1=Yes, no prompt will be displayed and the transceiver will be left in local control.

GN 882D equip type [0=DTRM 1=LVM]

This parameter is used to distinguish between a Digital Transceiver Module (DTRM) and a Locating Verification Module (LVM) when parameter GN model [0=880 1=882 2=MCBS 3=DTR 4=DM] is set to 3 (DTR). This is used in TEST_32 - TDMA RX RSSI to control the LVM or DTRM.

MCBS Carrier Present Threshold (dBm)]

This parameter (along with the RF Path Loss parameter value) sets the RF level out of the Test Set's DUPLEX OUT port used in Test_37, RX Squelch Adjustment, for Analog Microcells. The microcell squelch level is adjusted using a GE handset for this 'Carrier Present' level.

For example; if the desired Carrier Present level is -115.5 dBm, enter -115.5.

MCBS Carrier Lost Threshold (dBm)]

This parameter (along with the RF Path Loss parameter value) sets the RF level of the Test Set's DUPLEX OUT port for Test_37, RX Squelch Adjustment for Analog Microcells. The microcell squelch level is adjusted using a GE handset for the carrier lost level.

For example; if the desired Carrier Lost level is -115.5 dBm, enter 115.5.

Pass/Fail Limit Descriptions

Pass/Fail Limits define the values a measurement's result is compared against to determine if the UUT meets its specified standards.

For information on editing Pass/Fail Limits, see "Customizing Testing" on page 78.

The list of pass/fail limits is arranged alphabetically. The first few capital letters in the title of each pass/fail limit indicate what the pass/fail limit refers to (see Prefixes and Abbreviations at the beginning of this chapter).

Pass/Fail Limits remain in battery-backed-up memory until you select a procedure to run. If you wish to prevent them from being lost when a new procedure is selected you will have to save them in a procedure. See "Saving a Test Procedure" on page 89. To print the list of Pass/Fail Limits, see "To print TESTS screens" on page 227.

The first few capital letters in the title of each pass/fail limit indicate what the pass/fail limit refers to:

GN = General system pass/fail limits

RX = Receiver pass/fail limits

TX = Transmitter pass/fail limits

TDMA=Time Division Multiple Access pass/fail limits

GN return loss (dB)

This pass/fail limit sets a limit on the maximum acceptable return loss for the return loss tests, TEST_04 - GN Swept Return Loss and TEST_05 - GN Discrete Channel Return Loss. Only a lower limit is applicable for this pass/fail limit.

Example

If you want a lower limit of 10 dB set, enter `10`.

TX frequency error (Hz)

This pass/fail limit sets the limits in Hertz used in TEST_09 - TX Frequency Adjustment and TEST_30 - TDMA TX Modulation Accuracy. These limits are applied to a frequency meter on the Test Set. The user adjusts the transmitter's frequency within the limits.

Example

If a tolerance of ±1 kHz is desired, enter `–1000` for the lower limit and `1000` for the upper limit.

TX output power (W/dBm)

This pass/fail limit sets the limits used in TEST_10 - TX Power Adjustment and TEST_28 - TDMA TX Continuous Power. The limits are shown on the scale of a simulated analog power meter which is displayed on the screen of the Test Set to facilitate adjustment of transceiver output power.

If the parameter, TX units for RF pwr measure is set to `0`, then the values entered in this pass/fail limit will be interpreted as Watts. If the parameter, TX units for RF pwr measure is set to `1`, then the values entered in this pass/fail limit will be interpreted as dBm.

Example

Assume that the base station being tested has a nominal output of 45 Watts and should be within ±5 Watts. Enter `40` as the lower limit and `50` as the upper limit.

TX audio level (mV/dBm)

This pass/fail limit sets the limits used in TEST_11 - TX Audio Level Adjustment. The TX audio level is adjusted through the front panel TX Sens potentiometer and is compared with the set limits.

If the parameter, TX units for RF pwr measure is set to `0`, then the values entered in this pass/fail limit will be interpreted as Watts. If the parameter, TX units for RF pwr measure is set to `1`, then the values entered in this pass/fail limit will be interpreted as dBm.

Example

To set limits of ±5 mV around 775 mV, enter `770` as the lower limit and `780` as the upper limit.

TX voice channel deviation (kHz)

This pass/fail limit sets the limits used in TEST_12 - TX Voice Channel Deviation.

Example

To set limits of ±1.4 kHz on 8 kHz of deviation, enter `6.6` as the lower limit and `9.4` as the upper limit.

TX voice and SAT deviation (kHz)

This pass/fail limit sets the limits used in TEST_13 - TX Voice and SAT Deviation.

Example

To set limits of ±1.4 kHz on 10 kHz of deviation, enter `8.6` as the lower limit and `11.4` as the upper limit.

TX maximum voice deviation (kHz)

This pass/fail limit sets the limits used in TEST_14 - TX Maximum Voice Deviation.

Example

To set limits of ±3 kHz on 10 kHz of deviation, enter `7` as the lower limit and `13` as the upper limit.

TX constant symbol data frequency (kHz)

This pass/fail limit sets the frequency limits used in TEST_15 - TX Data Deviation.

Example

To set limits of ±5 Hz on a data rate of 10 kHz, enter `9.995` as the lower limit and `10.005` as the upper limit.

TX constant symbol data deviation (kHz)

This pass/fail limit sets the deviation limits used in TEST_15 - TX Data Deviation.

Example

To set limits of ±1.4 kHz on a deviation of 8 kHz, enter `6.6` as the lower limit and `9.4` as the upper limit.

TX SAT deviation (kHz)

This pass/fail limit sets the deviation limits used in TEST_16 - TX SAT Frequency Error and Deviation.

Example

To set limits of ±.4 kHz on a deviation of 2 kHz, enter `1.6` as the lower limit and `2.4` as the upper limit.

TX SAT frequency error (Hz)

This pass/fail limit sets the frequency error limits used in TEST_16 - TX SAT Frequency Error and Deviation.

Example

To set limits of ±3 Hz on the SAT, enter –3 as the lower limit and 3 as the upper limit.

RX line level (mV/dBm)

This pass/fail limit sets the line level limits used in TEST_18 - RX Line Level Adjustment. The units (mV or dBm) of the signal are specified in the parameter RT units for audio measure.

Example

To set limits of ±3 mV on a line level of 236 mV, enter 233 as the lower limit and 239 as the upper limit.

RX sensitivity (dBm)

This pass/fail limit sets the sensitivity upper limit used in TEST_19 - RX Sensitivity. The limit represents the amount that the receiver's sensitivity cannot exceed.

Example

To set a limit of –116 dBm sensitivity, enter –116 as the upper limit.

RX diversity sensitivity (dB/dBm)

This pass/fail limit sets the sensitivity limits used in TEST_20 - RX Diversity Sensitivity. In this test, only one of the two receiver inputs is driven at a time. For the model 882 transceiver, the limits represent the amount that the receiver's usable sensitivity is allowed to degrade in comparison with the case in which both receiver inputs are driven simultaneously. For the model 882D and microcell transceivers, the limits represent absolute RF levels in dBm.

Example

To set a lower limit of 2 dB and an upper limit of 9 dB sensitivity, enter 2 as the lower limit and 9 as the upper limit.

RX desense (dB)

This pass/fail limit sets the limits used in TEST_21 - RX Desense. The limits represent the amount that the receiver's sensitivity (SINAD) is allowed to change when the transmitter is keyed.

Example

To set a lower limit of –1 dB from the sensitivity (SINAD) level and an upper limit of 1 dB from the sensitivity, enter –1 as the lower limit and 1 as the upper limit.

RX squelch threshold (dB/dBm)

This pass/fail limit sets the squelch threshold limits used in TEST_22 - RX Squelch Test. If the parameter, RX squelch threshold is set to `0`, then the values entered in this pass/fail limit will be interpreted as an offset expressed in dB from the usable sensitivity. If the parameter, RX squelch threshold is set to `1`, then the values entered in this pass/fail limit will be interpreted as an offset expressed in dBm.

Example

If it is desired to have a squelch threshold between 0 dB and 7 dB higher than the usable sensitivity, enter `0` as the lower limit and `7` as the upper limit.

RX squelch hysteresis (dB)

This pass/fail limit sets the hysteresis limits used in TEST_22 - RX Squelch Test.

Example

To set a window of (window of hysteresis below the RX squelch threshold) of 1 dB to 4 dB. Enter `1` as the lower limit and `4` as the upper limit.

RX RF level from AIO

This pass/fail limit sets the range of acceptable values to be returned by the transceiver when it makes a signal level measurement in TEST_23 - RX RF Level Calibration (AIO). There are no units associated with this pass/fail limit.

Example

To set a lower limit of 113 and an upper limit of 147, enter `113` as the lower limit and `147` as the upper limit.

RX loop gain level (mV/dBm)

This pass/fail limit sets the limits used in TEST_24 - RX Loop Gain Adjustment. The units (mV or dBm) of the signal are specified in the parameter RT units for audio measurements.

Example

To set limits of ±5 mV on a loop gain level of 236 mV, enter `231` as the lower limit and `241` as the upper limit.

RX SAT detector level

This pass/fail limit sets the lower limit of acceptable values to be returned by the transceiver when it measures the level of detected SAT in TEST_25 - RX SAT Detector. Note that there are no units associated with this pass/fail limit.

Example

To set a lower limit of 50, enter `50` as the lower limit.

RX SAT detector SNR

This pass/fail limit sets the lower limit of acceptable values to be returned by the transceiver when it measures the signal to noise ratio of the detected SAT in TEST_25 - RX SAT Detector. Note that there are no units associated with this pass/fail limit.

Example

To set a lower limit of 50, enter `50` as the lower limit.

RXB microcell line level difference (dB)

This specification sets the pass/fail limits for the difference in dB between measured receiver B and receiver A line levels. This specification is used during the RX Line Level Adjustment Test and only for analog microcell transceivers. The parameter, GN check MCBS on only RXA [0=no 1=yes] must be set to 0=no for this specification to be used.

TDMA TX pseudorandom power (W/dBm)

This pass/fail limit sets the limits used in TEST_29 - TDMA TX Pseudorandom Power. The limits are shown on the scale of a simulated analog power meter which is displayed on the screen of the Test Set to facilitate adjustment of DTRM or DMTM output power.

TDMA TX RMS EVM (%)

This pass/fail limit sets the pass/fail limits for the rms value of the error vector magnitudes measured over one timeslot, used in TEST_30 - TDMA TX Modulation Accuracy.

Error vector magnitude is the magnitude of the vector which connects the ideal signal phasor on the unity circle to the measured signal phasor (after root Nyquist filtering, I/Q origin offset removal, burst amplitude droop removal and carrier frequency error removal) at the detection decision points. The magnitude of this vector represents the “error” between the ideal signal and the measured signal. The rms value is obtained by taking the square root of the sum of the squares of the individual values at each detection decision point over the measured timeslot. The two components which contribute to the magnitude of the error vector are the magnitude error and the phase error. Only the upper limit is used and is entered in %.

Example

If you desire the rms error vector magnitude, measured over one timeslot, to be ≤12.5%, enter 12.5.

TDMA TX peak EVM (%)

This pass/fail limit sets the upper limit for the worst case EVM of any symbol in the measured timeslot.

Example

If you desire the worst case EVM to be ≤20%, enter `20` as the upper limit.

TDMA TX phase error (deg)

This pass/fail limit sets the pass/fail limits for the rms value of the phase error components of the error vectors measured over one timeslot, used in TEST_30 - TDMA TX Modulation Accuracy.

The phase error component is the difference in phase, at the detection decision points, between the measured signal (after root Nyquist filtering, I/Q origin offset removal, burst amplitude droop removal and carrier frequency error removal) and the ideal signal generated from the same data pattern. The rms value is obtained by taking the square root of the sum of the squares of the individual values at each detection decision point over the measured timeslot. Phase error is an indicator of the quality of the phase component of the p/4 DQPSK signal and is one of the components which contribute to the error vector magnitude.

Example

If you desire the rms phase error to be ±45 degrees, enter –45 as the lower limit and 45 as the upper limit.

TDMA TX magnitude error (%)

This pass/fail limit sets the pass/fail limits for the rms value of the magnitude error components of the error vectors measured over one timeslot, used in TEST_30 - TDMA TX Modulation Accuracy.

The magnitude error component is the difference in amplitude, at the detection decision points, between the measured signal (after root Nyquist filtering, I/Q origin offset removal, burst amplitude droop removal and carrier frequency error removal) and the ideal signal generated from the same data pattern. The rms value is obtained by taking the square root of the sum of the squares of the individual values at each detection decision point over the measured timeslot. Magnitude error is an indicator of the quality of the amplitude component of the p/4 DQPSK signal and is one of the components which contribute to the error vector magnitude. Only the upper limit is used and is entered in %.

Example

If you desire the rms magnitude error to be ≤10%, enter 10.

TDMA TX origin offset (dBc)

This pass/fail limit sets the pass/fail limits for the I/Q origin offset, measured over one timeslot, used in TEST_30 - TDMA TX Modulation Accuracy.

I/Q origin offset is a measure of the magnitude of the carrier feedthrough signal relative to the magnitude of the modulated signal at the detection decision points, and is reported in dBc. Carrier feedthrough is an indication of the balance of the I/Q modulator used to generate the p/4 DQPSK signal. If the modulator is balanced the carrier is nulled in the RF spectrum. Imbalance in the I/Q modulator will result in carrier feedthrough and will appear as a DC offset on the demodulated I and Q signals. Only the upper limit is used and is entered in dBc.

Example

If you desire the I/Q origin offset, measured over one timeslot, to be ≤–20 dBc, enter –20.

TDMA TX adjacent channel power (dB)

This pass/fail limit sets the pass/fail limits for the upper and lower adjacent channel power used in TEST_31 - TDMA TX Adjacent Channel Power.

Adjacent channel power is measured at frequency offsets of ± 31 KHz relative to the mean, in-channel output power of the transmitter. Only the upper limit is used and is entered in dB.

Example

If you desire the average power in either the upper or lower adjacent channel to be 26 dB below the mean, in-channel power of the transmitter, enter –26.

TDMA TX alternate channel 1 power (dB)

This pass/fail limit sets the pass/fail limits for the first alternate channel power used in TEST_31 - TDMA TX Adjacent Channel Power.

First alternate channel power is measured at a frequency offset of ±60 kHz relative to the mean, in-channel output power of the transmitter. Only the upper limit is used and is entered in dB.

Example

If you desire the average power in the first alternate channel to be 45 dB below the mean, in-channel power of the transmitter, enter `–45`.

TDMA TX alternate channel 2 power (dB)

This pass/fail limit sets the pass/fail limits for the second alternate channel power used in TEST_31 - TDMA TX Adjacent Channel Power.

Second alternate channel power is measured at a frequency offset of ±90 kHz (second alternate) relative to the mean, in-channel output power of the transmitter. Only the upper limit is used and is entered in dB.

Example

If you desire the average power in the second alternate channel to be 60 dB below the mean, in-channel power of the transmitter, enter `–60`.

TDMA RX RSSI level (dBm)

This pass/fail limit sets the range of acceptable values to be returned by the transceiver when it makes a signal level measurement in TEST_32 - TDMA RX RSSI.

8 Reference (Alphabetical)

This chapter provides detailed descriptions of the features and functions of the HP 11807B software. Topics are arranged alphabetically for quick, easy reference.

Conventions Used

Special presentations of text in this manual reflect the appearance of the item being referred to.

Examples of these special presentations are:

TESTS

A key on the Test Set.

`Procedure:`

Characters displayed on the CRT display.

k1 (`Run Test`)

A USER key, in the key column next to the CRT. `Run Test` is displayed on the CRT.

`0.000000`

A field on the CRT where entries can be made.

Titles of documentation are printed in italics.

The term Test Set refers to the HP 8921D or the HP 8921A, Option 500.

In the steps in this manual the following words are used to describe cursor and entry actions:

- **select** refers to pressing the knob after positioning the cursor in front of the appropriate field (`inverse video` area).
- **choose** means to position the cursor in front of an item in the `Choices:` or `To Screen` menu in the lower right corner of the CRT display, and then press the knob.
- **enter** means to use the numeric keypad, and the ENTER key or measurement units keys to make entries to fields. In some procedures,

  enter is used to describe the action of entering characters into a field.

Copying Files

Files can be copied from one mass-storage device to another using IBASIC COPY commands. For example, to copy a file from an inserted memory card to the left drive of an external dual-disk drive with HP-IB address 700, press TESTS. Select IBASIC Cntrl from the `SET UP TEST SET` list (or `IBASIC` from the `Test Function` field). Position the cursor to the IBASIC command line and select it. Using the character list that appears in the `Choices` menu, enter the following command:

```
COPY "MY_TEST:INTERNAL" TO "MYFILE:,700,0"
```

You can copy a file from a memory card to an SRAM memory card by loading the program from the memory card into the Test Set, inserting an initialized SRAM memory card, and then using the IBASIC SAVE command. Enter the following:

```
SAVE "MY_TEST:INTERNAL"
```

You can list the names of the files stored in a memory card or disk catalog by using the IBASIC CAT command. To display a list of file names on a memory card, enter the following:

```
CAT ":INTERNAL" or CAT
```

If the mass storage is already defined to be the memory card, then `":INTERNAL"` is optional. If you are entering many characters into the IBASIC command line, you will want to connect a terminal to the Test Set. See "Serial Port" on page 235. You will also want to use a terminal if you have many files to list because file names displayed with the `CAT` IBASIC command scroll past the top of the Test Set's CRT display and cannot be scrolled down.

IBASIC is used when writing your own programs and is not explained in this manual. If you need to write your own IBASIC programs you may acquire the following manuals:

- HP 8921A,D
  - *HP Instrument BASIC User's Handbook*, HP part number E2083-90000.
  - *HP 8921 Programming Manual*, HP part number 08921-90031.

See also: "Data Collection (Saving and Retrieving Test Results)" on page 189, "Memory Cards" on page 206 and "Initializing a Memory Card" on page 208.

Data Collection (Saving and Retrieving Test Results)

The software has the capability to save test results to an SRAM memory card, to a disk drive, or to a PC.

Collection to a Memory Card or Disk

You will have to make entries into the `External Devices` (Edit Config) screen to describe the type of data collection you are using.

To configure `External Devices` entries:

1. Press TESTS
2. Select `External Devices` from the `SET UP TEST SET` list (or `Edit Cnfg` from the `Test Function` field).
3. Position the cursor to the `Calling Name` field and select it.
4. Using the list of characters in the `Choices` menu, enter `DATA C` into the `Calling Name` next to `Inst# 1`. The entry will look like:

   ```
   1   DATA C
   ```

   Note: For some SW revisions, DATA C will appear in the `Choices` menu. In this case, you may select DATA C, then Done instead of typing each character individually.
5. Position cursor to the `Addr` field and select it.
6. Using the DATA keypad, enter a number into `Addr`, depending on the type of storage media you will be using (press when complete):

If you are using a memory card, enter `1` into the `Addr`:

```
1  DATA C     1
```

If you are using a disk drive, enter the HP-IB disk address. For example, if the drive you are using is set to 700, then the display needs to look like:

```
1   DATA C    700
```

Calling names can be entered in any order.

The test software supports data storage on Logical Interchange Format (LIF) and Disk Operating System (DOS) disk formats. Storage can be to any of the following file types:

- ASCII files under LIF
- BDAT files under LIF
- HP-UX files under LIF
- DOS files under DOS

You will be specifying the file type with the entry you make into the `Options` field immediately below `DATA C`. If no file type is entered, and the disk format is LIF, the software will select an HP-UX file type. If no file type is entered, and the disk format is DOS, the software will select a DOS file type. For example, if you are using a DOS file and you are not using an extension on the file name, the entry on this screen will look like (`x` is first unused `Inst#`):

```
x   DATA C    700
```

If you are using an ASCII, BDAT or HP-UX file, you can specify the number of records allocated to the file. The DOS file is automatically updated as data is stored, so record allocation is not required. If you are using HP-UX files, you will have to enter `REC=` to establish a usable number of records. `REC=20480` sets the size to be the same as the default number of 256 byte records used for ASCII files (80×256). You can enter the `REC=` after the file type. For example, to use an ASCII file with 200 records of 256 bytes each, you will enter `ASCII REC=200` into the `Options` field.

NOTE For some software revisions, `REC=` and `ASCII REC=` will appear in the `Choices` menu. In this case, you may select `REC=` or `ASCII REC=`, enter the number of records using the DATA keypad, then select `Done`, instead of typing in each character individually.

The display will appear as follows:

```
x    DATA C       700

          ASCII REC=200
```

The default number of records, used when no `REC=` entry is made, is 80.

Items in the `Options` field can be separated by a comma or a space.

See "Initializing a Disk" on page 200 if using a new disk. See "Initializing a Memory Card" on page 208 if using a new memory card. The file types under LIF can be used by the Test Set's IBASIC controller and some HP workstations. The DOS format is required if you wish to use the disk with a PC.

Table 8-1 Data Collection (Saving/Retrieving Tests) Configuration Summary

Inst#	Calling Name Options	Model	Addr	Description
x (first unused #)	DATA Collection	don't care	7xx[1]	To HP-IB disk drive
x (first unused #)	DATA Collection	don't care	1	To memory card
Options:[2]	File types of ASCII, or BDAT, or (EXT),[3] or blank,[4] REC=xxxxx, (number of records)	don't care	7xx[1]	LIF format LIF format DOS file type DOS or HP-UX file type[4] Number of records
x (first unused #)	DATA Collection	don't care	9	Serial to external computer (laptop)

1. xx = Last two digits of HP-IB address.
2. These options apply to disk drive and memory card data collection. They do not apply when collecting data with Addr=9.
3. A DOS file name extension. For example, the file name may be CELL1.EXT.
4. DOS is used if the disk format is DOS. HP-UX is used if the disk format is LIF.

Retrieving Data from a Memory Card

The easiest way to retrieve test results after they have been saved on an SRAM memory card is to run the Data Collection File Transfer Test (TEST 08). See the description of "TEST_08 - GN Data Collection File Transfer" on page 135.

Alternatively, a program to transfer data from a memory card to a terminal emulator is listed below. You can type the program lines into the IBASIC command line from a terminal emulator. See "Configuration for Terminal or PC Operation" on page 198.

To enter the data retrieval program:

1. Press TESTS.
2. Select `IBASIC Cntrl` from the `SET UP TEST SET` list (or `IBASIC` from the `Test Function` field).
3. Position the cursor to the IBASIC command field (large field in the upper part of the display) and select it. From the list of characters in the `Choices` field, enter the following IBASIC program statements and commands.
4. Enter `SCRATCH` to delete the previous IBASIC program. Be sure it's saved first.
5. Enter the following program:

```
10 DIM A$[120]
```

Sets the string length to 120.

```
20 ASSIGN @File TO "RES:INTERNAL";FORMAT ON
```

Opens a path to the memory card file called "RES" (for results).

```
30 ON ERROR GOTO 80
```

Exits at end of file if an error is encountered.

```
40 LOOP
```

Extracts file contents.

```
50 ENTER @File;A$
```

Transfers part of the file to the string.

```
60 OUTPUT 9;A$
```

The string is output at the Serial port.

```
70 END LOOP
```

Goes back to get more of the file.

```
80 END
```

End of the program.

6. Press k1 (`Run`) to run the entered IBASIC program.

NOTE

Difference between `Run` and `Run Test`

The USER (`Run`) key, assigned as a default key on the TESTS (`IBASIC Controller`) screen, will start an IBASIC program that is resident in the Test Set's memory. The USER (`Run Test`) key, assigned as a default key on the TESTS screens, will load and run the program that is called from the `Select Procedure Filename:` and `Select Procedure Location:` entries on the TESTS `Main Menu` screen.

Collection to a PC

Test results can be output through the serial port. A variety of devices can receive the data. An HP Palmtop computer, PC, laptop, or terminal can be used. A terminal emulator can log the test results to a file. Examples of terminal emulator programs are HP AdvanceLink and ProComm, a product of DataStorm Technologies, Inc.

For example: Configuring an IBM-Compatible PC with HP AdvanceLink for DOS

1. Load and run HP AdvanceLink on your PC.
2. Use the following Table 8-2 on page 195, Table 8-3 on page 196, and Table 8-4 on page 196, to set the *Global Configuration*, *Terminal Configuration*, and *Remote Configuration* settings.

Table 8-2 Global Configuration Settings

FIELD	SETTING	FIELD	SETTING
Keyboard	USASCII	Memory Size	32K
Personality	HP	Plotter I/F	None
Language	English	HP Mode	Yes
Terminal Mode	Alphanumeric	Video Type	*Select your display type*
Remote to	*enter PC's serial port #*	Forms Path	*Enter path if used*
Printer I/F	None	Screen Size	*Enter the size*

Table 8-3 Terminal Configuration Settings

FIELD	SETTING		FIELD	SETTING
Terminal ID	2392A		Esc Xfer(N)	YES
Local Echo	OFF		ASCII 8 Bits	YES
CapsLock	OFF		FldSeparator	US
Start Col	01		BlkTerminator	RS
Bell	ON		ReturnDef	CR
XmitFnctn(A)	NO		Copy	Fields
SPOW(B)	NO		Type Ahead	NO
InhEolWrp(C)	NO		ROW Size	80
Line/Page(D)	LINE		Host Prmpt Char	D1
InhHndShk(G)	NO		Horiz. Scroll. Incr.	08
Inh DC2(H)	NO		Large [+] Key	+

Table 8-4 Remote Configuration Settings

FIELD	SETTING		FIELD	SETTING
Baud Rate	4800		SR(CH)	LO
Parity/Data Bits	None/8		Recv Pace	None
Eng Ack	No		Xmit Pace	None
Asterisk	OFF		CS(CB)Xmit	NO
Chk Parity	NO			

To set up for data collection to a PC:

1. Press TESTS.
2. Select `External Devices` from the `SET UP TEST SET` list (or `Edit Cnfg` from the `Test Function` field).
3. Position the cursor to the `Calling Name` field and select it.
4. Using the list of characters in the `Choices` menu, enter `DATA C` (next to Inst#1):
5. Position the cursor to the `Addr` field and select it.

   Using DATA keypad, enter `9` and press ENTER:

```
1     DATA C        9
```

Calling names can be entered in any order.

Configuration for Terminal or PC Operation

It is preferable to enter long strings of characters into fields using a terminal. The characteristics of the serial port, when used for instrument control from a terminal or terminal emulator, are determined by settings on the Test Set's I/O CONFIGURE screen.

Set the following:

- `Serial In` to `Inst`
- `IBASIC Echo` to `On`
- `Inst Echo` to `On`

Set the remaining configuration entries to match the settings of your terminal or PC program.

Equivalent Front-Panel Control Characters

The following table lists the terminal/computer keystrokes that equate to front-panel controls. *Each equivalent character must be preceded by the* Escape *key*.

For example, to remotely access the CONFIGURE screen, you type Esc, C on your terminal/computer. (Be sure to use upper-case C for this example.)

Alternate sequences for 5 commonly-used functions are also available. Hold down the Ctrl (control) key and select the corresponding key for the desired function. (Example: Ctrl/H moves the cursor to the left one space.)

ENTER -^J or ^M

CANCEL - ^C

BACKSPACE - ^H

KNOB_TURN_CW - ^R

KNOB_TURN_CCW - ^L

Table 8-5 Equivalent Front-Panel Control Characters

Function	Equiv. ESC Char.	Function	Equiv. ESC Char.	Function	Equiv. ESC Char.
CANCEL	!	SAVE	G	PRESET	i
PERCENT MHZ_V	(	REF_SET	j	INCR_DIV_10	j
S_KHZ_MV	)	METER	k	INCR_SET	k
BACKSPACE	-	AVG	L	INCR_TIMES_10	l
ENTER	.	LO_LIMIT	M	DOWN	m
RELEASE	0	HI_LIMIT	N	UP	n
K1	1	E	R	SEVEN	o
K2	2	F	S	EIGHT	p
K3	3	B	U	NINE	q
K4	4	C	V	FOUR	r
K5	5	D	W	FIVE	s
K1_PRIME	6	A	X	SIX	t
K2_PRIME	7	EEX	Z	ONE	u
K3_PRIME	8	YES_ON_OFF	[	TWO	v
ASSIGN	9	NO_PPM_W	]	THREE	w
KNOB_TURN_CCW	<	RX	a	ZERO	x
KNOB_TURN_CW	>	TX	b	POINT	y
MSSG	A	DUPLEX	c	PLUS_MINUS	z
HELP	B	PREV	d	OHM_PCT_DEL_DBUV	{
CONFIG	C	TESTS_MAIN	e	DB_GHZ_DBM	|
HOLD	D	LOCAL	f	MS_HZ_UV	}
PRINT	E	RECALL	g		
ADRS	F	MEAS_RESET	h		

Disks

Initializing a Disk

If you are starting with a blank disk, you will have to initialize it to the format you have chosen. Disk drives require specific commands to perform initialization. The Test Set's IBASIC commands to initialize some disks are described here. You should verify that the drive you are using can be controlled by the Test Set and that you are initializing a disk using a drive or PC that has a compatible format.

To initialize a disk to LIF in an HP-IB disk drive:

1. Verify that the Test Set `Mode` on the I/O CONFIGURE screen is set to `Control`:
   a. Press TESTS.
   b. Select `IBASIC Cntrl` from the `SET UP TEST SET` list (or `IBASIC` from the `Test Function` field).
   c. Position the cursor to the IBASIC command field and select it.
   d. With the list of characters in the `Choices` menu, enter the following:

```
INITIALIZE ":,7xx,y"
```

where:
xx = the HP-IB address of the disk drive, and
y = the unit number of the drive

To initialize a disk to DOS in an HP-IB drive:

Follow the procedure for the LIF format, replacing the INITIALIZE statement with `INITIALIZE "DOS:,7xx,y"`.

Retrieving Data from a Disk

One way to retrieve the test results from a disk is to run an IBASIC program. A program to transfer data from a disk to a terminal emulator is given below. You can type it into the IBASIC command line from the terminal emulator.

Be sure your program is saved, because it will be deleted from programmable memory. The file name for this example is "RES". The disk address is 700, and the drive number is 0. The entire file name is `RES:,700,0`.

To enter the data retrieval program:

1. Press TESTS.
2. Select `IBASIC Cntrl` from the `SET UP TEST SET` list (or `IBASIC` from the `Test Function` field).
3. Position the cursor to the IBASIC command field (large field in the upper part of the display) and select it. From the list of characters in the `Choices` field, enter the following IBASIC program statements and commands.
4. Enter `SCRATCH` to delete the previous IBASIC program. Be sure it's saved first.
5. Enter the following program:

```
10 DIM A$[120]
```

Sets the string length to 120.

```
20 ASSIGN @File TO "RES:,700,0"
```

Opens a path to the file called "RES" (for results).

```
30 ON ERROR GOTO 80
```

Exits at end of file if an error is encountered.

```
40 LOOP
```

Extracts file contents.

```
50 ENTER @File;A$
```

Transfers part of the file to the string.

```
60 OUTPUT 9;A$
```

The string is output at the serial port.

```
70 END LOOP
```

Goes back to get more of the file.

```
80 END
```

End of the program.

6. Press k1 (`Run`) to run the entered IBASIC program.

Exiting a Program

Do not press RX or TX to exit the program. Selecting the RX TEST or TX TEST screen causes signal paths internal to the Test Set to be modified. If you exit the program to a screen other than RX TEST or TX TEST, the settings necessary to resume testing will be retained.

After you have made the manual settings you want, press the DUPLEX key as a last step before continuing the software. This will cause the Test Set to be properly set up.

Another way to safely exit is to:

1. Press CANCEL.
2. Press DUPLEX.
3. Press SHIFT SAVE.
4. Using list of characters in the `Choices` menu, enter a register name or number.
5. Select `Done`.
6. Operate the Test Set manually.
7. Press RECALL.
8. Choose the name of the saved setup.
9. Press TESTS.
10. Press k2 (`Continue`).

HP-IB Control Annunciators

The words, letters, and symbols at the top right corner of the CRT display indicate these conditions:

- `R` indicates remote operation from an external controller or IBASIC program in the Test Set. This letter will be displayed while the software is running.
- `L` indicates that the Test Set is listening, and is ready to receive a manual or remote command.
- `T` indicates that the Test Set is talking to another HP-IB device.
- `S` indicates that a service request has been generated.
- `C` indicates that the Test Set is currently an active controller. Control mode is set on the I/O CONFIGURE screen. The Test Set must be a controller if HP-IB peripherals are to be controlled.
- `*` indicates that an IBASIC program is running, or that the IBASIC controller is executing a command.
- `?` indicates that an IBASIC program is waiting for a user response.
- `-` indicates that the IBASIC program is paused.
- `SHIFT` indicates that the SHIFT key was pressed, and that the next key entry will be shifted. (Press SHIFT again to clear).

Logging

Logging is used to monitor all the commands from the Test Set to the base station and all the messages returning from the base station. These commands and messages may be displayed on the CRT or output to a printer.

To enable the logging function:

1. Press TESTS.
2. Select `External Devices` from the `SET UP TEST SET` list (or `Edit Cnfg` from the `Test Function` field).
3. Press k1 (`1 Insrt Ins`).
4. Position the cursor to the `Inst#` field and select it.
5. Rotate the knob to the first vacant `Calling Name` field and select it.
6. Position the cursor to the `Calling Name` field and select it.
7. Enter L O G into the Calling Name field by:
   a. rotating the knob and positioning the cursor beside L in the `Choices` field and selecting it.
   b. repeating for O and G.
   c. positioning the cursor to `Done` in the `Choices` field and selecting it.
8. Position the cursor to the `Addr` field and select it.
9. Choose output mode:
   a. For CRT: Press 1 on the DATA keypad and press ENTER.
   b. For HP-IB printer: Press 70x on the DATA keypad and press ENTER.
   c. For serial printer: Press 9 on the DATA keypad and press ENTER.
10. Press TESTS to return to the TEST Main Menu screen.

NOTE Logging occurs rapidly on the screen. To stop for inspection, press CANCEL. To continue, press the User Key k2 (`2 Continue`).

Table 8-6 Logging Configuration

Purpose	Inst#	Calling Name Options	Model	Addr	Description
Logging Commands/Messages	3	LOGging	don't care	0	Logging off
	3	LOGging	don't care	1	Log to CRT
	3	LOGging	don't care	7xx[1]	HP-IB printer
	3	LOGging	don't care	9	Serial printer

1. xx = Last two digits of HP-IB address.

Memory Cards

Memory cards are inserted into the slot on the Test Set's front panel. The memory card is powered by the Test Set while it is inserted. Arrows printed on the memory card and the Test Set's front panel indicate the direction and orientation of card insertion.

Memory cards are used to store or retrieve the following:

- Software code
- An HP-supplied Procedure, containing:
  - A default TEST sequence
  - Default test parameter values
  - Default pass/fail limit (specification) values
- A Library file
- Procedures you make, optimized for your application
- Data collection files
- Channel Information
- User defined keys

Two types of memory cards are available:

- Static Random Access Memory (SRAM)
- One-Time Programmable (OTP)

SRAM cards have read and write capability. Once programmed, OTP cards have read-only capability.

The software memory card can be removed after the program is loaded into the Test Set memory. The program will remain in memory after a power-down/power-up cycle, until a new program is loaded. Loading a new program will replace the existing program.

SRAM Memory Cards

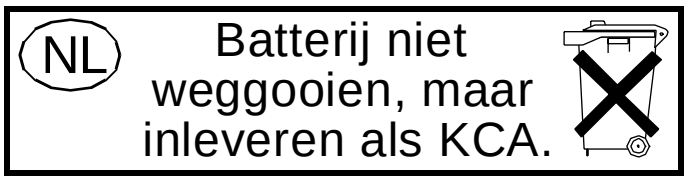
A Static Random Access Memory (SRAM) Card can be used to store test results and procedures you make. The following parts can be used.

Table 8-7 SRAM Memory Card Part Numbers

Memory	Part Number
32 kilobytes	HP 85700A
128 kilobytes	HP 85702A
256 kilobytes	HP 85704A
512 kilobytes	HP 85705A

SRAM memory cards use a lithium batter (part number CR 2016 or HP part number 1420-0383). Programs and data will be retained for over one year if the memory card is stored at 25° C. The memory card is powered by the Test Set while it is inserted. Replace the battery while the memory card is inserted into a powered-up Test Set. To retain data and programs, it should be replaced annually. See the Test Set's user guide. The write-protect switch on an SRAM memory card will write protect the card when it is set toward the outside of the card.

Figure 8-1



Memory Card Storage Space

Procedures use 12-16 records each. A Library uses 20-35 records. A single library must be included on the card. A record is 256 bytes. Approximately 11 kilobytes of overhead is required on each card.

Use the following formula to estimate the storage space needed:

```
Storage Space(in kilobytes) = (Number of Procedures x 4.1) + 20
```

For example, if you want to save ten different procedures, you will need 61 kilobytes of memory. The 64 kilobyte or 128 kilobyte card is sufficient.

The storage space you need for data collection depends on the number of test results that are saved. You will need approximately 4 kilobytes per page of test results that you save. A page of test results is about 57 lines of CRT or printer output.

The storage space of smaller SRAM cards can be quickly used. If you are collecting large quantities of data, data collection using a PC or printer may be preferable.

Initializing a Memory Card

There are several ways to initialize a memory card using this software. One method which is not dependent upon your firmware revision is to run the Memory Card Initialization Test (TEST 02). See the description of "TEST_02 - Memory Card Initialization" on page 125.

You may also initialize memory cards using the `Save/Delete Procedure` screen. However, this is only available on test sets with firmware above revision A.14.00.

- Press TESTS.
- Select `Save/Delete Procedure` from the `CUSTOMIZE TEST PROCEDURE` list.
- Insert the SRAM card in the slot on the front panel. (Make sure the switch on the card is not in the write-protected position).
- Press k3 (`Init Card`).
- Press Yes if you want to continue.

If you have firmware below revision A.14.00, there are two other methods described below in which you may initialize the card and select the format. If you have a terminal emulator attached to the Test Set, you can type a command into the IBASIC command line. A second way to initialize a card is to run the ROM program RAM_MNG.

To initialize an SRAM card using IBASIC

1. Press TESTS.
2. Select `IBASIC Cntrl` from the `SET UP TEST SET` list (or `IBASIC` from the `Test Function` field).
3. Position the cursor to the IBASIC command line and select it.
4. Using the list of characters under the `Choices` menu, enter the following IBASIC command:

For LIF format: `INITIALIZE ":INTERNAL"`

For DOS format: `INITIALIZE "DOS:INTERNAL"`

To initialize an SRAM card using RAM_MNG

1. Press TESTS.
2. Position the cursor to the `Select Procedure Location` (or `Location`) field and select it.
3. From the `Choices` menu, select `ROM`.
4. Position the cursor to the `Select Procedure Filename` (or `Procedure`) field and select it.
5. From the `Choices` menu, select `IB_UTIL` (or `RAM_MNG`).
6. Press k1 (`Run Test`).
7. Follow the displayed instructions.

NOTE Loading RAM_MNG will delete any procedure or program in memory.

Retrieving Data from a Memory Card

The easiest way to retrieve test results after they have been saved on an SRAM memory card is to run the Data Collection File Transfer Test (TEST 08). See the description of "TEST_08 - GN Data Collection File Transfer" on page 135.

Alternatively, a program to transfer data from a memory card to a terminal emulator is listed below. You can type the program lines into the IBASIC command line from a terminal emulator. See "Configuration for Terminal or PC Operation" on page 198.

To enter the data retrieval program:

1. Press TESTS.
2. Select `IBASIC Cntrl` from the `SET UP TEST SET` list (or `IBASIC` from the `Test Function` field).
3. Position the cursor to the IBASIC command field (large field in the upper part of the display) and select it. From the list of characters in the `Choices` field, enter the following IBASIC program statements and commands.
4. Enter `SCRATCH` to delete the previous IBASIC program. Be sure it's saved first.
5. Enter the following program:

   ```
   10 DIM A$[120]
   ```

   Sets the string length to 120.

   ```
   20 ASSIGN @File TO "RES:INTERNAL";FORMAT ON
   ```

   Opens a path to the memory card file called "RES" (for results).

   ```
   30 ON ERROR GOTO 80
   ```

   Exits at end of file if an error is encountered.

   ```
   40 LOOP
   ```

   Extracts file contents.

   ```
   50 ENTER @File;A$
   ```

   Transfers part of the file to the string.

   ```
   60 OUTPUT 9;A$
   ```

   The string is output at the serial port.

   ```
   70 END LOOP
   ```

   Goes back to get more of the file.

   ```
   80 END
   ```

   End of the program.
6. Press k1 (`Run`) to run the entered IBASIC program.

NOTE

Difference between `Run` and `Run Test`

The USER (`Run`) key, assigned as a default key on the TESTS (`IBASIC Controller`)(`Run Test`) key, assigned as a default key on the other TESTS screens, will load and run the program that is called from the `Select Procedure Filename` and `Select Procedure Location` entries on the TESTS `Main Menu` screen.

Parameters

Parameters are values you enter that optimize your use of the test software. Many of the parameters are determined by examining your test needs.

Default values are set into the software. Some of these values are derived from standard methods of measurement and some are derived from the industry standard requirements. Load a Procedure and select the `Test Parameters` screen from the `CUSTOMIZE TEST PROCEDURE` list, to see the default values.

You should verify that parameters are properly set after you select the tests to be placed in your procedure.

Parameters remain in battery-backed-up memory until you select a procedure to run. If you wish to prevent them from being lost when a new procedure is selected, you will have to save them in a procedure. See "Saving a Procedure" on page 228.

To print the parameters list, see "To print TESTS screens" on page 227.

To edit a parameter value:

1. Press TESTS.
2. Select `Test Parameters` from the `CUSTOMIZE TEST PROCEDURE` list (or `Edit Parm` from the `Test Function` field).
3. Position the cursor to the `Parm#` field and select it.
4. Rotate the knob to the desired parameter number and select it.
5. Position the cursor to the `Value` field and select it.
6. Enter the desired value using the DATA keypad and press ENTER.
   - Use the ⇐ key to backspace.
   - Press CANCEL to cancel entries and retain the old value.
7. Press k5 (`Main Menu`) (or TESTS) to return to the TESTS screen.

Pass/Fail Limits (Specifications)

Pass/Fail Limits are values you enter that set passing limits for tests. Default values are available in the test software. They have been derived from standard methods of measurement.

Pass/Fail Limits do not have to be changed when you select a test or change the tests in your procedure. Each test has pass/fail limits that apply to it.

You should verify that pass/fail limits are properly set after you select the tests to be placed in your procedure. Lists of the pass/fail limits used by each of the tests are contained in the test descriptions in chapter 4 of this manual. A lock is provided to prevent access to the pass/fail limits. See "Securing a Procedure" on page 231.

Pass/fail limits remain in the Test Set's battery-backed-up memory until you select a procedure to run. If you wish to prevent pass/fail limits from being lost when a new procedure is selected, you will have to save them in a procedure. See "Saving a Procedure" on page 228.

To print the pass/fail limits list, see "To print TESTS screens" on page 227.

To edit a pass/fail limit value:

1. Press TESTS.
2. Select `Pass/Fail Limits` from the `CUSTOMIZE TEST SET` list (or `Edit Spec` from the `Test Function` field).
3. Position the cursor to the `Spec#` field and select it.
4. Position the cursor to the `Lower Limit` or the `Upper Limit` field and select it.
5. Rotate the knob to the desired pass/fail limit number and select it.
6. Enter desired value using the DATA keypad and press ENTER.
   - Use the ⇐ key to backspace.
   - Press CANCEL to cancel entries and retain the old value.
7. Position the cursor to the

   field and select it. `Check`
8. From the `Choices` menu, select the combination of upper and lower limits to be checked.

Pausing or Stopping a TEST

To pause the program, press CANCEL.

To stop the program, press SHIFT then CANCEL. This performs an IBASIC RESET operation.

NOTE

Changing Settings while Paused

If you make changes to instrument settings while the program is paused, subsequent operation may be unpredictable. Error messages may or may not be displayed. See "Exiting a Program" on page 202

To continue a paused program:

1. Press TESTS.
2. Press k1 (`Continue`).

The test time is displayed when the test is completed. This time includes the time that the program is paused and the time that it is waiting for connection and inputs to be made. If you are testing through midnight, the test time will not display properly.

Printing

You can print any of the following:

- Test results
- TESTS screens
  - ”External Devices” (Edit Cnfg)
  - ”Order of Tests” (Edit Seqn)
  - ”Channel Information” (Edit Freq)
  - ”Pass/Fail Limits” (Edit Spec)
  - ”Test Parameters” (Edit Parm)

How to Print (task list)

There are five basic steps to printing listed below. A detailed description of each of these steps is at the end of this section.

1. Check to see if your printer is supported by the Test Set (see “Supported Printers” on page 214).
2. Determine if your printer requires serial, parallel, or HP-IB connection. Connect the printer to the appropriate port on the Test Set (see “Printer Connection” on page 215).
3. Configure the Test Set for your printer and its interface (see “Configuration for Terminal or PC Operation” on page 198).
4. Instruct the Test Set what to print (see “To print test results” on page 224).

Supported Printers

- HP ThinkJet
- HP QuietJet
- HP PaintJet
- HP DeskJet
- Epson FX-80
- HP LaserJet
- Epson LQ-850

If you do not have one of these printers, consult your printer’s manual for the correct printer settings to emulate one of the supported printers.

Printer Connection

HP-IB Connection

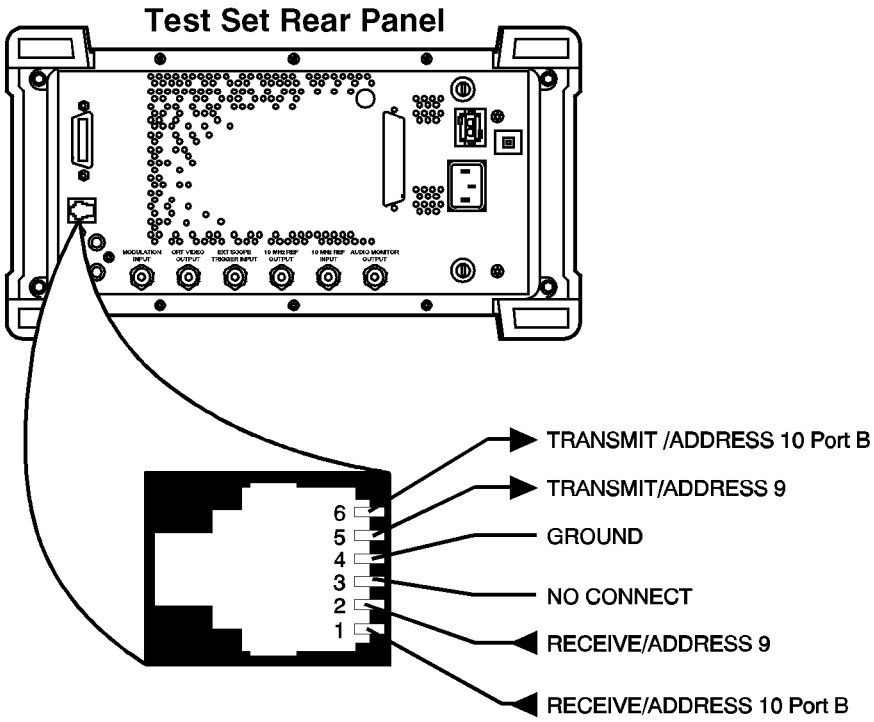
An HP-IB printer can be connected to the Test Set's rear-panel HP-IB connector with an HP-IB cable.

Serial Connection

A serial printer can be attached to the serial port. See figure 5-1. Use the following RJ-11 pins for this connection. You may order this cable from Hewlett-Packard using part number HP 08921-61038.

- RJ-11 Pin 2 - Test Set Receive Data
- RJ-11 Pin 4 - Ground
- RJ-11 Pin 5 - Test Set Transmit Data

Figure 8-2 Test Set RJ-11 Serial Port Connections

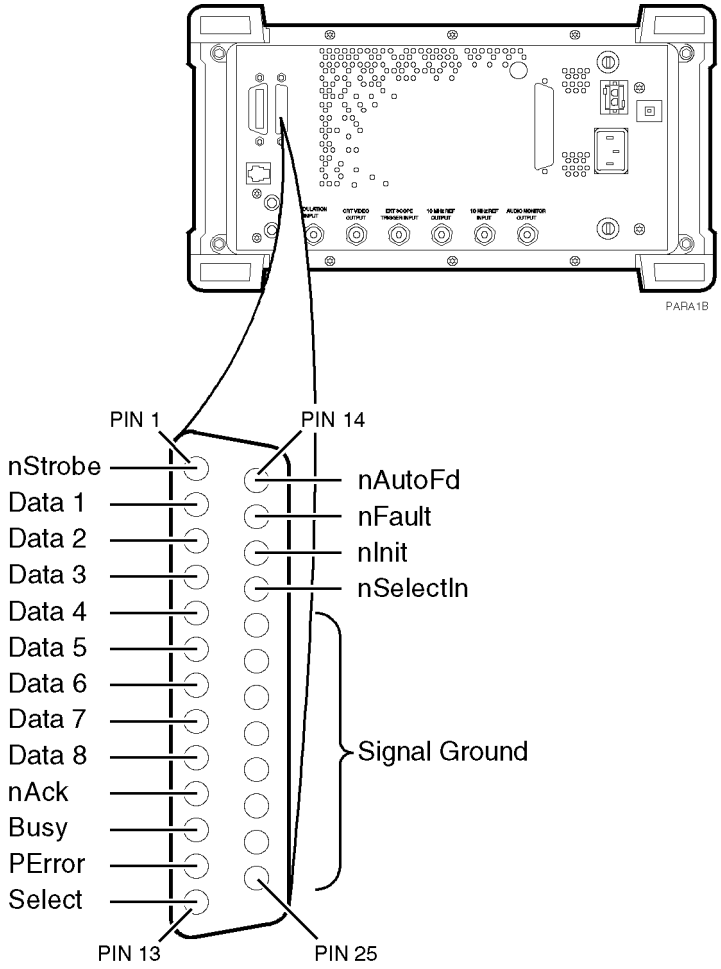


Parallel Connection

NOTE This parallel port is only available on test sets with serial prefix 3503 and above.

A parallel printer can be attached to the parallel port. Use the following figure for pin information. You may order this cable from Hewlett-Packard using part number HP 24542D.

Figure 8-3 Test Set Parallel Port Connections



Configuring the Test Set for Printing

If using a serial printer, you cannot use the serial port for other connections at the same time, such as Data Collection (saving test results). Serial port connections are shown earlier in this section.

NOTE Printer Setup Differences

The HP 8921A had several firmware enhancements. The following Setup Printer section applies to users with:

- HP 8921A test sets with firmware above revision A.14.00.

The Test Set's firmware revision is displayed on the top right corner of the configuration screen.

- Press SHIFT CONFIG to display the configuration screen and read the firmware revision.

If you have an HP 8921A with firmware revision below A.14.00, refer to the next section, titled "To Setup Printer Using HP 8921A FW Below Rev A.14.00" on page 223. Contact Hewlett-Packard at 1-800-922-8920 for details on upgrading your firmware if desired.

To Setup Printer Using HP 8921A FW Above Rev A.14.00

1. Press TESTS
2. Select `Printer Setup` from the `SET UP TEST SET` list.
3. Position the cursor to `Model` and select the desired printer.
4. Position the cursor to `Print Port` and select the desired port.
5. (If HP-IB only) Position the cursor to `Printer Adrs` and enter the HP-IB address for your printer (0-30).
6. Set the following options if desired:
   - Lines/Page (controls the number of lines, 20-120, printed on a page before a form feed is sent to the printer)
   - FF at Start (to cause a form feed at the start of a test sequence)
   - FF at End (to cause a form feed at the end of a test sequence)
7. From the `To Screen` menu, select `More`.
8. From the `Choices` menu, select `IO CONFIG`.
   a. For Serial Printing, set the `Serial Baud` field and other serial communications fields listed under it to correspond to your printer's configuration.
   b. For HP-IB Printing, set the `Mode` field to `Control`.
9. Press TESTS to return to the TESTS (`Main Menu`) screen.

To print test results:

1. Press TESTS
2. Select `Printer Setup` from the `SET UP TEST SET` list.
3. Position the cursor to `Output Results To` and select `Printer`.
4. Position the cursor to `Output Results For` and select `All` if you want all results printed, or `Failures` if you want failures only printed.
5. (Optional) Position the cursor to `Output Heading` and enter your desired heading.

To send Escape Sequences to the printer

The Test Set may be used to send escape sequences to control printer options such as pitch, margins, paper size, and so forth. The software comes with some pre-defined escape sequences compatible with HP printers, listed below, or you have the option to enter others which are compatible with your printer (use your printer's user's manual for the available print features and corresponding escape sequences).

The software already has an implied escape character for the first sequence, you need only to enter the escape sequence following the escape character. However, if you are linking two or more sequences together, you must use the ~ to indicate the escape character between each sequence. If the sequence exceeds the space allotted in the options field, you may continue with additional escape sequences in the next available `Options` field. You must however, still enter `Escape Seq` in the `Calling Name` field and the appropriate address in the `Addr` field for all subsequent entries.

How to send an Escape Sequence:

1. Press TESTS.
2. Select `External Devices` from the `SET UP TEST SET` list.
3. Position the cursor to the `Inst#` field and select it.
4. Rotate the knob until an empty `Calling Name` field appears, and select it.
5. Position the cursor to the `Calling Name` field and select it.
6. Select `Escape Seq` from the `Choices` menu.
7. Position the cursor to the `Addr` (address) field and select it.
8. Position the cursor to the `Options` field (directly under `Calling Name`) and select it.
9. Using the DATA keypad, enter `9` for serial printers, `15` for parallel printers, or `70X` for HP-IB printers, then press ENTER.
10. Select the desired escape sequence from the `Choices` menu if applicable, or enter an appropriate sequence using the list of characters below the choices.

Table 8-8 Escape Sequence Definitions for HP Printers

Escape Sequence	Print Feature
&l66P	Sets page length to 66 lines
&l72P	Sets page length to 72 lines
&l6D	Sets lines per inch to 6 lines
&l8D	Sets lines to inch to 8 lines
(s12h12v6T	Selects 12 characters per inch 12/72 inch character height gothic typeface
&a9L~&l6E	Sets left margin to 9 characters top margin to 6 lines
(s12h12v6T~&a9L~&l6E	Selects 12 characters per inch 12/72 inch character height gothic typeface left margin to 9 characters top margin to 6 lines
&l8d88P	Selects 8 lines per inch 88 lines per page
&l8d96P	Selects 8 lines per inch 96 lines per page
(s16.67h12V~&a17L~&l6E	Selects 16.67 characters per inch 12/72 inch character height left margin to 17 characters top margin to 6 lines

To print TESTS screens:

TESTS screens include:

- ”External Devices”
- ”Order of Tests”
- ”Channel Information”
- ”Pass/Fail Limits”
- ”Test Parameters”

The same general process is used to print the information for all of the above TESTS screens.

1. Make sure that your printer is properly connected and configured as explained earlier in this section.
2. Press TESTS.
3. Select the `CUSTOMIZE TEST PROCEDURE` screen of your choice.
4. Press k3 (`Print All`) and select it.
5. Press TESTS to return to the TESTS (`Main Menu`) screen.

To print exactly what appears on a test screen, press SHIFT then PRINT.

To Setup Printer Using HP 8921A FW Below Rev A.14.00

1. Press TESTS
2. Select `Edit Cnfg` from the `Test Function` field.
3. Position the cursor to the `Inst#` field and select it.
4. Rotate the knob until an empty `Calling Name` field appears, and select it.
5. Position the cursor to the `Calling Name` field and select it.
6. Using the list of characters in the `Choices` menu, enter the word `Printer`. Select `Done` when complete.
7. Position the cursor to the `Model` field and select it (optional).
8. Using the DATA keypad, enter the Model # and press ENTER.
9. Position the cursor to the `Addr` (address) field and select it.
10. Using the DATA keypad, enter `9` for serial printers, `15` for parallel printers, or `70X` for HP-IB printers, then press ENTER.
11. Position the cursor to the `Options` field (directly under `Calling Name`) and select it.
12. Using the list of characters from the `Choices` menu, the following commands may be entered. Separate the commands with commas (example; `LN=60,START,END`)
    a. **LN** equals the number of printed lines per page.
    b. **START** causes a form feed at the start of each printout.
    c. **END** causes a form feed at the end of each printout.
13. From the `To Screen` menu, select `More`.
14. From the `Choices` menu, select `IO CONFIG`.
15. For Serial Printers:
    a. Set the `Serial Baud` field and other serial communications fields listed under it to correspond to your printer's configuration.
16. For HP-IB Printers:
    - Position the cursor to the `Mode` field and select it.
    - From the `Choices` menu, select `Control`.
    - Position the cursor to the `Print Adrs` field and select it.
    - Rotate the knob and select the HP-IB address of your printer.
    - Position the cursor to the `Print To` field. Pressing knob will toggle the underlined selection. Select to underline `HP-IB`.
17. Press TESTS to return to the TESTS screen.

To print test results

1. Make sure that your printer is properly connected and configured as explained earlier in this section.
2. Press TESTS.
3. Position the cursor to the `Output Results To:` field (or the `Output Destination` field). Pressing knob will toggle the underlined selection. Select to underline `Printer`.
4. Position the cursor to the `Output Heading` field and select it.
5. Using the list of characters in the `Choices` menu, enter a printout heading (optional). Select `Done` when the heading is complete.

To send Escape Sequences to the printer

The Test Set may be used to send escape sequences to control printer options such as pitch, margins, paper size, and so forth. You may enter sequences which are compatible with your printer (use your printer's user's manual for the available print features and corresponding escape sequences).

The software already has an implied escape character for the first sequence, you need only to enter the escape sequence following the escape character. However, if you are linking two or more sequences together, you must use the ~ to indicate the escape character between each sequence. If the sequence exceeds the space allotted in the options field, you may continue with additional escape sequences in the next available `Options` field. You must however, still enter `Escape Seq` in the `Calling Name` field and the appropriate address in the `Addr` field for all subsequent entries.

How to send an Escape Sequence:

1. Press TESTS.
2. Select `Edit Cnfg` from the `Test Function` field.
3. Position the cursor to the `Inst#` field and select it.
4. Rotate the knob until an empty `Calling Name` field appears, and select it.
5. Enter `ESCAPE SEQ` using the characters in the `Choices` menu. Select `Done` when you are finished.
6. Position the cursor to the `Calling Name` field and select it.
7. Position the cursor to the `Addr` (address) field and select it.
8. Using the DATA keypad, enter `9` for serial printers, `15` for parallel printers, or `70X` for HP-IB printers, then press ENTER.
9. Position the cursor to the `Options` field (directly under `Calling Name`) and select it.
10. Select the desired sequence using the list of characters below the choices.

Table 8-9 Examples of Common Escape Sequences

Escape Sequence	Print Feature
&l66P	Sets page length to 66 lines
&l72P	Sets page length to 72 lines
&l6D	Sets lines per inch to 6 lines
&l8D	Sets lines to inch to 8 lines
(s12h12v6T	Selects 12 characters per inch 12/72 inch character height gothic typeface
&a9L~&l6E	Sets left margin to 9 characters top margin to 6 lines
(s12h12v6T~&a9L~&l6E	Selects 12 characters per inch 12/72 inch character height gothic typeface left margin to 9 characters top margin to 6 lines
&l8d88P	Selects 8 lines per inch 88 lines per page
&l8d96P	Selects 8 lines per inch 96 lines per page
(s16.67h12V~&a17L~&l6E	Selects 16.67 characters per inch 12/72 inch character height left margin to 17 characters top margin to 6 lines

To print TESTS screens

TESTS screens include:

- ”Edit Cnfg”
- ”Edit Seqn”
- ”Edit Freq”
- ”Edit Spec”
- ”Edit Parm”

The same general process is used to print the information for all of the above TESTS screens.

1. Make sure that your printer is properly connected and configured as explained earlier in this section.
2. Press TESTS.
3. Select the TESTS screen you desire.
4. (`Print All`) and select it.
5. Press TESTS to return to the TESTS screen.

To print exactly what appears on a test screen, press SHIFT then PRINT.

Procedures

A procedure is a collection of test parameters, pass/fail limits and a testing order, saved in a file that customizes the test software to a specific application. You may save the file on a memory card or disk.

You do not have to save a test sequence in a procedure. Each test can be stand-alone if desired. After you choose a procedure, you can choose which of the tests you want to run.

When you save a procedure you will only be saving test parameters, pass/fail limits and a testing order. The memory card or disk must also contain a library file. A library file contains the names of all of the test parameters, pass/fail limits and tests that are in the test software. The library you use will be the library that is supplied with your software. When you save your procedure, the library will be automatically saved on the same card or disk.

The procedure(s) supplied with your software will be listed in the `Choices:` column when you select the `Select Procedure Filename:` (or `Procedure`) field. Procedures will be displayed if your software memory card is plugged in.

Saving a Procedure

After you have set up the test software you can save the setup to an SRAM memory card, disk, or internal RAM memory by doing the following.

The memory card or disk you use must be initialized before its first use. See "Initializing a Memory Card" on page 208 or "Initializing a Disk" on page 200. If you are using a disk drive, you may have to enter the `External Disk Specification` into the TESTS `External Devices` screen (or `Edit Cnfg` screen). It will be used when the `Select Procedure Location:` field on the TESTS screen is `Disk`.

To save a procedure:

1. Press TESTS.
2. Select `Save/Delete Procedure` from the `CUSTOMIZE TEST PROCEDURE` list (or `Proc Mngr` from the `Test Function` field).
3. Position the cursor to the `Select Procedure Location` (or `Location`) field and select it.
4. From the `Choices` menu, select the desired location. The media must be initialized before a file can be saved. To initialize an SRAM card (HP 8921A,D firmware above revision A.14.00 only, otherwise see "Initializing a Memory Card" on page 208):
   - Insert card in the slot on the Test Set's front panel.
   - Press k3 (`Init Card`)
   - Press `Yes`. Note: this will delete any procedures or programs from memory.

   To initialize a RAM disk, see "Memory Cards/Mass Storage" in the *HP8921 Programmer's Guide*.
5. Position the cursor to the `Enter Procedure Filename` (or `Procedure`) field and select it.
6. From the list of characters in the `Choices` menu, enter a filename. Filename must be nine characters or less. When filename is complete, position cursor to `Done` and select it. Procedure filenames that already exist on the card will appear at the top of the list of characters.
7. If you selected `Card`, insert an initialized memory card into the slot on the Test Set's front-panel.
8. Verify that the card or other media is not write-protected. See "Memory Cards" on page 206.
9. Position the cursor to the `Enter Description for New Procedure` (or `Comment for new procedure`) field and select it. From the list of characters in the `Choices` menu, enter comments. When the comments are complete, position the cursor to `Done` and select it.
10. Position the cursor to the `Procedure Library` (or `Library for new procedure`) field and select `Current` (Current underlined). The name of the Library is displayed on the TESTS screen.
11. Position the cursor to the `Code Location` (or `Program location for new procedure`) field and select it.

    From the `Choices` menu, choose memory `Card`, `ROM`, `RAM` or `Disk`. When a procedure is run, the test system will look in this location for a code file if it is not resident in the Test Set's battery-backed-up memory. This location will usually be the software memory card.

12. Press k1 (`Save Proc`) (or position the cursor to the `Action` field and select `Make Procedure`). A procedure will be saved at the location you chose.

Loading a Procedure

A procedure can be loaded from storage media into the Test Set's battery-backed-up memory by doing the following.

To load a procedure:

1. Press TESTS.
2. Position the cursor to the `Select Procedure Location` (or `Location`) field and select it.
3. From the `Choices` menu, choose the desired location where the procedure is stored and select: `Card`, `ROM`, `RAM` or `Disk`.
4. Position the cursor to the `Select Procedure Filename` (or `Procedure`) field and select it.
5. From the `Choices` menu, choose the procedure file that you want to load.
6. Read the `Description` (or `Comment`) field to ensure that the loaded procedure file is the one you want.

Deleting a Procedure

Procedures can be removed from an SRAM memory card, disk or RAM by doing the following.

To delete a Procedure:

1. Press TESTS.
2. Select `Save/Delete Procedure` from the `CUSTOMIZE TEST PROCEDURE` list (or `Proc Mngr` from the `Test Function` field).
3. Position the cursor to the `Select Procedure Location` (or `Location`) field and select it.
4. Position the cursor to the `Enter Procedure Filename` (or `Procedure`) field and select it.
5. From the `Choices` menu, select the desired location.
6. From the `Choices` menu, select the name of the procedure you wish to delete.
7. Press k2 (`Del Proc`) (or position the cursor to the `Action` field and select `Delete Procedure`).
8. Press `Yes` if you wish to continue.

Securing a Procedure

After you have set up your test software with a testing order, channel information, test parameters, and pass/fail limits, you may wish to secure it. This operation will prevent the viewing and changing of those functions. You can select the items you wish to secure or un-secure. An IBASIC ROM program is stored in the Test Set's firmware to do this.

You can secure the procedure that is supplied with the test software. It is shipped un-secured.

After you make a procedure, you can secure it.

To secure a Procedure:

1. Press TESTS.
2. Position the cursor to the `Select Procedure Location` (or `Location`) field and select it.
3. From the `Choices` menu, select `ROM`.
4. Position the cursor to the `Select Procedure Filename` (or `Procedure`) field and select it.
5. From the `Choices` menu, select `IB_UTIL` (or `SECURE_IT`).
6. Press k1 (`Run Test`).
7. Select the location of the procedure you want to secure: k1 memory (`Card`) or k2 (`RAM`).

NOTE

RAM refers to the RAM Disk memory within the Test Set. Before selecting RAM, you must initialize the RAM as a disk. See "Initializing RAM Disks" on page 233.

8. Proceed with the on-line instructions. You may wish to secure only one of the items, such as pass/fail limits.
9. When you are prompted to enter the `pass number`, enter any sequence of numerals 0 through 9 using the DATA keypad. Enter 9 digits or less.

To un-secure a procedure:

To un-secure a procedure, you must know the `pass number`.

1. Press TESTS.
2. Position the cursor to the `Select Procedure Location` (or `Location`) field and select it.
3. From the `Choices` menu, select `ROM`.
4. Position the cursor to the `Select Procedure Filename` (or `Procedure`) field and select it.
5. From the `Choices` menu, select `IB_UTIL` (or `SECURE_IT`).
6. (`Run Test`).
7. Select the location of the procedure you want to un-secure: k1 memory (`Card`) or k2 (`RAM`).
8. Enter the name of the procedure you wish to un-secure.
9. If the procedure has any item secured, you will be asked for the `pass number`.
10. Proceed with the on-line instructions. Select the items you wish to un-secure.
11. When you are prompted, enter the `pass number` using the DATA keypad.

RAM

RAM disk is a section of internal memory that acts much like a flexible disk. Programs can be stored, re-stored, erased, and retrieved.

The RAM disk is partitioned into four separate volumes; 0-3. Each volume is treated as a separate 'disk'. You can also specify the size of each disk in 256-byte increments.

The four RAM disk volumes are designated `:MEMORY,0,0` to `:MEMORY,0,3`. For example, to catalogue the contents of RAM disk volume '0' from the `IBASIC Cntrl` screen, enter

```
CAT ":MEMORY,0,0"
```

Volume 0's contents can be viewed and loaded from the three screens mentioned at the beginning of this section. Volumes 1, 2, and 3 can *only* be accessed from the IBASIC Controller.

NOTE

RAM Disk Erasure

Any existing programs or formatting on RAM is erased if you use the `RAM_MNG` or `COPY_PL` ROM programs, or the SERVICE screen's `RAM Initialize` function.

Therefore, you should only use RAM disks for short-term storage of files.

Initializing RAM Disks

Each RAM disk volume must be initialized before it can be used. Volume 0 can be initialized using the RAM_MNG procedure stored on the internal ROM's `IB_UTIL` menu. Volumes 1, 2, and 3 must be initialized from the `IBASIC Cntrl` screen.

The optional 'volume size' in the following procedure lets you specify the memory area set aside for each disk in 256 byte blocks.

Follow these steps to initialize volumes 1, 2, or 3:

1. Press TESTS.
2. Select `IBASIC Cntrl` from the `SET UP TEST SET` list.
3. Position the cursor to the data entry field and select it.
4. Using the list of characters from the `Choices` menu, enter the following command:

```
INITIALIZE ":MEMORY,0,<volume number 1-3>",<volume size>
   or
INITIALIZE ":MEMORY,0,1",50
```

Saving Tests Results

See “Data Collection (Saving and Retrieving Test Results)” on page 189.

Serial Port

This 6-pin, RJ-11 serial port is used to input and output serial data. Serial data is used for entering programs, printing, and for sending test results to a connected controller, disk drive, or terminal.

Operating Considerations

The two independently controllable serial ports have fixed select codes. Select code 9 is assigned to the primary serial port and select code 10 to the "B" serial port. The primary serial port (select code 9) configuration settings can be made from either the I/O CONFIG screen or from an IBASIC program. The "B" serial port configuration settings can only be made from an IBASIC program. The two serial ports use a three wire connection format:

Primary Serial Port (select code 9):

Transmit (pin 5)

Receive (pin 2)

Ground (pin 4)

B Serial Port (select code 10):

Transmit B (pin 6)

Receive B (pin 1)

Ground (pin 4)

The single ground pin is shared by both ports (see figure, Test Set RJ-11 Serial Port Rear Connector). The IBASIC Controller can send and receive data from either port by using its assigned select code. The primary serial port (select code 9) is used exclusively by the Test System for printing screen dumps to a serial printer. The "B" serial port (select code 10) is used exclusively by the software for control of the UUT.

Use an RJ-11/25 pin RS-232 adapter (HP p/n 98642-66508) and RJ-11 cable (HP p/n 98642-66505) to connect the Test Set to a serial printer, terminal or computer.

To connect a serial printer and the UUT simultaneously use a single RJ-11 to dual RJ-11 adapter (HP p/n 08921-61031). Connect the single end of the adapter to the RJ-11 connector on the rear panel of the Test Set and then connect the serial printer and the UUT RJ-11 cables to either of the ports on the dual end.

NOTE

RJ-11 Connectors

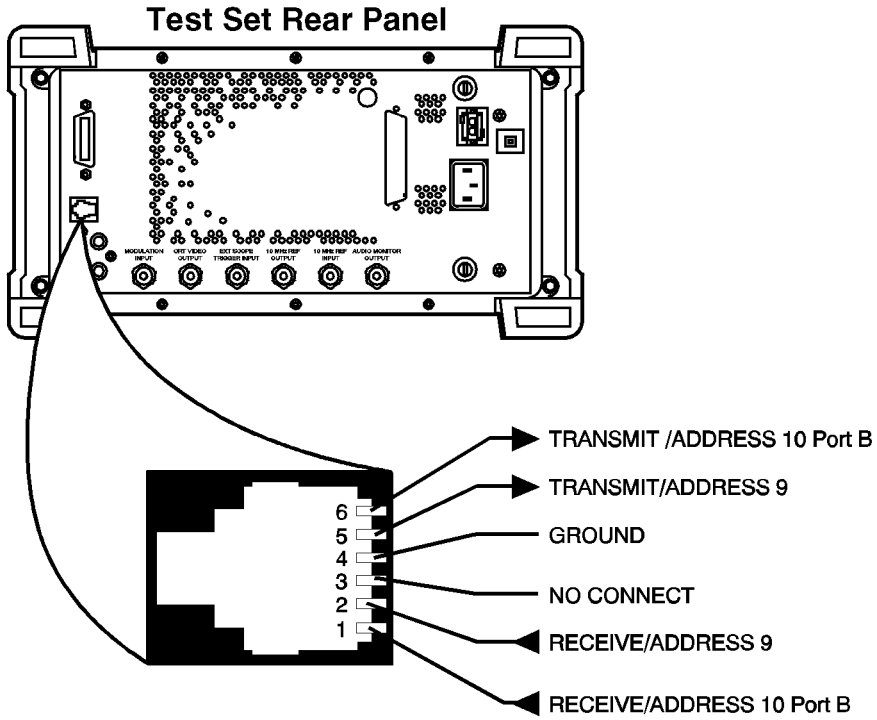
RJ-11 cables and adapters can be wired several ways. If you buy a cable or adapter other than the HP parts listed, verify the connections for the pins indicated in the following table before connecting cables to the instruments.

The following table lists connections for Transmit, Receive, and Ground pins (address 9).

Connections for Transmit, Receive, and Ground pins (address 9)

HP 8921A/D RJ-11 Serial Port		Terminal I/PC 25-Pin RS-232		Terminal/PC 9-Pin RS-232
Pin 2 (RX)	to	Pin 2 (TX)	or	Pin 3 (TX)
Pin 5 (TX)	to	Pin 3 (RX)	or	Pin 2 (RX)
Pin 4 (GND)	to	Pin 7 (GND)	or	Pin 5 (GND)

Figure 8-4 Test Set RJ-11 Serial Port Connections



Test Execution Conditions

In some situations, you may wish to change the way the software works when a test result is obtained. `Test Execution Conditions` allow you to do this.

`Test Execution Conditions` are accessed from the `SET UP TEST SET` list on the `TESTS (Main Menu)` screen. Press TESTS, then select `Execution Cond` to display them. (They are displayed directly on the main TESTS screen in firmware below revision A.14.00).

`Test Execution Conditions` are not retained after a power-down/power-up cycle.

The following `Test Execution Conditions` can be set as needed:

Output Results To: (Output Destination)

You can select either: `Crt` or `Printer` Default:`Crt`

You can specify where test results are to be placed. If you select `Crt`, results will be displayed on the Test Set's CRT. If you select `Printer`, test results will be sent to the CRT and to a printer. You must connect and configure a printer if you select `Printer`. See "Printing" on page 214.

Output Results For: (Output Results)

You can select either: `All` or `Failures` Default:`All`

You can specify if you want only the failed results to be displayed or printed. This will be useful if you generally do not print test results, and want to ensure that failed results are displayed or printed.

Output Heading

You can use this field to enter a heading that will be printed or displayed.

Select the `Output Heading` field. Use the knob to choose and enter the characters that you want to appear in the heading.

Choose `Done` when you are finished.

If Unit-Under-Test Fails (If UUT Fails)

You can select either: `Continue` or `Stop` Default:`Continue`

If you set this to `Stop`, and a pass/fail result is `F`, the program will stop.

Test Procedure Run Mode (Run Mode)

You can select either: `Continuous` or `Single Step`
Default:`Continuous`

You can make tests pause at certain times. If you set this to `Single Step`, the program will pause after a comparison is made between a test determination and the expected result. For example, tests will pause after the program compares the results to a specification. You can continue from the paused state by pressing k2 (`Continue`).

Autostart Test Procedure on Power-Up

You can select either: `On` or `Off` Default: `Off`

You can set up the Test Set so that if the procedure was previously loaded, the procedure will be immediately executed when the test set is powered on.

USER Keys

When you are using the Test Set, you will see the following USER keys assigned appear at times in the top right corner of the display. These keys are assigned to the hard keys k1 through k5. In many cases, these keys can be used as “shortcuts” instead of positioning the cursor and selecting. USER keys are sometimes referred to as softkeys.

`Clr Scr` clears the Test Set’s CRT display.

`Continue` continues the program after it has been paused.

`Delet Stp` is used to the edit items in a test sequence. When you press this key, the test in the displayed sequence that has its `Step #` highlighted (inverse video) will be deleted. The tests that follow in the sequence will be scrolled up by one step.

`Del Proc` is used to delete the selected procedure. When you press this key, you will be prompted to verify the command by pressing Yes.

Press `Done` when you want to exit a test or have completed a task. The program will continue if there is a next test in the sequence or if there are additional program steps in the test being run.

`Help` provides information on how to use the current TEST screen.

`Init Card` is used to initialize a memory card. Before you press this key, verify that the card is inserted correctly and not in the write-protected position.

`Insrt Stp` is used to enter items into a test sequence. When you press this key, the test in the displayed sequence that has its `Step #` highlighted (inverse video) will be copied into a new sequence location, immediately after the highlighted one. The tests that follow in the sequence will be scrolled down by one step. This key does nothing if there are no items in the sequence. Choose a test before using this key to insert another.

`Main Menu` is used to return to the main TESTS screen. The same result is achieved by pressing TESTS.

`Page Up\Page Down` are used to quickly display items in the list when some of the items won’t fit on the screen.

`Run` starts an IBASIC program that has been loaded into the Test Set’s memory.

`Run Test` loads and runs the program that is called from the procedure that has been entered into the TESTS screen `Select Procedure Filename:` entry. If the program is already loaded into the Test Set’s memory, it will be started.

`Save Proc` is used to save the specified procedure.

`Sngl Step` steps the IBASIC program one line at a time. This is different from `Continuous/Single Step` run mode. See *"Test Execution Conditions" on page 237*.

`Stop Test` pauses the test software.

`Take It` causes the program to accept the setting of an adjustment, and proceed with the program. The test, determining if the adjustment is within limits, is ceased.

`Yes\No` are pressed when answering questions displayed on the Test Set's CRT display.

9 Problem Solving

This chapter contains problem modules and error messages. Problem modules alphabetically list the location of the problem with a brief symptom (for example, Test Set Doesn't Power Up). Each problem module describes possible causes and corrections. The error messages section is located at the end of the chapter and provides a brief description of the message as well as possible corrective actions.

If a problem persists, call the HP Factory Hotline from anywhere in the USA (1-800-922-8920, 8:30 a.m. - 5:00 p.m. Pacific time).

NOTE If the Test Set displays an error that states “One or more self-tests failed”, you have a hardware problem. In this case, refer to the Test Set’s *Assembly Level Repair* manual.

Data-Collection Function Does Not Work

- ❏ Check that you have `DATA C` entered in the TESTS (`External Devices`) (or `Edit Config`) menu.

  1. Press TESTS.
  2. Select the `External Devices` screen, from the `SET UP TEST SET` list (or `Edit Config` from the `Test Function` field).
  3. Position the cursor to the `Calling Name` field, push the knob and enter:

     `.DATA C`

- ❏ Check the `Model` field, it should be kept empty since it is not used.
- ❏ Check the `Addr` (address) field to make sure the correct address is entered for where the data is to be stored.

  1. If data is to be stored on an SRAM memory card, enter "`1`" into the `Addr` field.
  2. If data is to be stored on an external computer through the Test Set's RS-232 serial port (if available), enter "`9`" into the `Addr` field.
  3. If data is to be stored on an external disk drive over HP-IB, enter an address of "`700`" or greater into the `Addr` field.

- ❏ Check the `Options` field to make sure it is correctly set up:

  1. **For an external disk drive (LIF format) or an SRAM memory card:**

     a. Enter `ASCII` for saving data as an ASCII file.

     b. Enter `BDAT` for saving data as a Binary-Data file.

     c. As an option, you may enter `REC=xxx`, where "`xxx`" is the number of records for each file. (*The software defaults to 80 records. However, if too small a record size is used, you'll get an* "`End of file error`" *when the test is run.*)

2. **For a DOS disk drive, you may keep the `Options` field empty, or you may enter any of the following key words:**

   a. Enter `ASCII` for saving data as an ASCII file.

   b. Enter `BDAT` for saving data as a Binary-Data file.

   c. Enter `REC=xxx` for the file's record size, where "`xxx`" is the number of records for each file. (*The software defaults to 80 records. However, DOS systems automatically change record size if it's too small.*)

   d. Enter a `(dot extension)` of 3 characters or less for the file name. For example, all model ABCD radio's tested may be organized to have a ".ABC" file extension.

❑ Check the Test Set to make sure it's in the controller mode *if you are using an external disk drive*.

1. Access the `I/O Configure` screen from the `More` field in the `To Screen` menu.

2. Position the cursor to the `Mode` field and select `Control`.

NOTE

When the test operator is prompted to enter a file name where data is to be stored, the protocol for the mass-storage device being used must be followed.

Hierarchial directory paths are not allowed, and all files are created with "`FORMAT ON`".

Also, when initializing a disk, use the following format ("`7xx`" is the disk address, "`y`" is the device selector):

DOS disk: `INITIALIZE "DOS:CS80,7xx,y"`
LIF disk: `INITIALIZE ":,7xx,y"`

Memory Space Problems

The program uses a substantial amount of the Test Set RAM space. If you see a message that indicates a memory problem, check the memory space that has been used.

To determine the memory space used:

1. Load the program, if it is not already loaded, by pressing USER (`Run Test`) and waiting for the program display to appear.
2. Press SHIFT CANCEL to stop the program.
3. Press SHIFT SAVE.
4. Press DUPLEX to exit the TESTS screen.
5. Read the number in front of `free memory`.

If this number is a few percent or less, you may get an error message after saving additional set-ups to SAVE registers.

If you do not have sufficient memory space available, you may need to delete unnecessary save registers.

To delete save_recall registers:

1. Press DUPLEX.
2. Press RECALL.
3. Press ON/OFF to clear register.
4. Press the ON/OFF button again to answer `YES`.

Printing Problems

- ❏ Check that the printer is turned on.
- ❏ Check that the HP-IB, parallel, or serial cable from the Test Set to the printer is connected.

  If have firmware below revision A.14.00 Or you are using software with Revision A.xx.xx

  1. Press TESTS.
  2. Check that `Printer` was selected as the `Output Results To:` (or `Output Destination`) in the `Test Execution Conditions`.
  3. Check that the Test Set is correctly configured for HP-IB, parallel, or serial printing:

     For a HP-IB printer:

     a. Check that the printer's `Calling Name` is "PRINTER" and its address is correctly set up in the `External Devices` (or `Edit Cnfg`) screen.

     b. Check that the `I/O CONFIGURE` screen has been set up correctly:

        i. Print To=HP-IB

        ii. Mode=Control

        iii. Print Adrs=address of your printer

     For a parallel printer:

     a. Check that the printer's `Calling Name` is `PRINTER` and its address is set to `15` in the `External Devices` (or `Edit Cnfg`) screen.

     For a serial printer:

     a. Check that the printer's `Calling Name` is `PRINTER` and its address is set to `9` in the `External Devices` (or `Edit Cnfg`) screen.

     b. Check that the `I/O CONFIGURE` screen has been set up correctly for the printer's baud rate, parity, and so forth.

Refer to the Test Set's *User's Guide* for details about configuring the printer.

Test Results are Unexpected

If one or more tests fail unexpectedly, or you believe there is a problem with the way tests are running, check the settings that are used for the tests.

1. Press TESTS.
2. Select `Execution Cond` from the `SET UP TEST SET` list (HP 8921A,D fw above rev A.14.00 only).
3. Position the cursor to the `Run Mode` field (in Test Execution Conditions) and select `Single Step`.
   a. Run the test.
   b. When the message `Press continue when ready` is displayed in the top line of the IBASIC controller tests screen, press CANCEL to pause the IBASIC program.
4. From the `To Screen` menu, position the cursor to the desired instrument screen and select it.
5. After viewing the instrument settings, press PREV to return to the TESTS screen.

NOTE Do not alter the instrument settings. The IBASIC program will not re-configure the settings when continue is executed. You can alter settings to experiment with the measurement, but they must be returned to their initial settings before leaving the instrument screen.

6. Press k2 (`Continue`) to return to the IBASIC controller.
7. Press k2 (`Continue`) to continue the program.

Test Set Doesn’t Power Up

Check the AC or DC power connection and the setting of the AC/DC switch on the rear panel. See the Test Set’s *User’s Guide*.

Error Messages

Many error messages are coded into the Test Set firmware and test software. If the problem is related to Test Set operation, access the MESSAGE screen to see any messages that have occurred since the instrument was turned on. To do this, press the SHIFT then RX.

Many of the error messages are listed below, alphabetically, with a description of the problem and possible corrections. If you see a message that is not described here, press CANCEL, and then the MSSG key. Other related error messages may be displayed.

For a listing of additional error messages, see the Test System's *User's Guide*, and the *HP 8921 Programmer's Guide*.

If you see an error message that contains a program line number, and it is not listed in this section, please write down the message with the line number and call the factory at 1-800-922-8920.

Error Message Reference

Attempted to de-key the DTRM transmitter. Program in DTRM apparently not loaded and started.

Testing terminated

- Verify all equipment is powered on.

  Base station

  HP 83201A or the HP 83204A, Option 001, TDMA Dual-Mode Cellular Adapter

- Load and start the local control program from the PC (laptop) to the base station.
- Verify the connection between the Test Set and the base station. See Appendix A, “Appendix: Cable Wiring Diagrams,” on page 257 for cable wiring.
- Cycle the power to the base station.

Attempted to key the DTRM transmitter. Program in DTRM apparently not loaded and started.

Testing terminated

- Verify all equipment is powered on.

  Base station

  HP 83201A or the HP 83204A Option 001, TDMA Dual-Mode Cellular Adapter

- Load and start the local control program from the PC (laptop) to the base station.
- Verify the connection between the Test Set and the base station. See Appendix A, “Appendix: Cable Wiring Diagrams,” on page 257 for cable wiring.
- Cycle the power to the base station.

Attempted to run loopback test of DTRM. Program in DTRM apparently not loaded and started.

Testing terminated

- Verify all equipment is powered on.

  HP 83201A or the HP 83204A, Option 001, TDMA Dual-Mode Cellular Adapter

  Base station

- Load and start the local control program from the PC (laptop) to the base station.
- Verify the connection between the Test Set and the base station. See Appendix A, “Appendix: Cable Wiring Diagrams,” on page 257 for cable wiring.
- Cycle the power to the base station.

Base station failed to respond as expected to an attempt to program its state (frequency etc).

Program terminated

- Verify all equipment is powered on.

  Base station

  HP 83201A or the HP 83204A, Option 001, TDMA Dual-Mode Cellular Adapter

- Verify that the cable interfacing the Test Set’s serial port to the base station’s local control port is functioning. See Appendix A, “Appendix: Cable Wiring Diagrams,” on page 257 for cable wiring.
- Cycle the power to the base station.

Base station failed to respond as expected to an attempt to download the local control program.

Program terminated

- Verify all equipment is powered on.

  Base station

  HP 83201A or the HP 83204A Option 001, TDMA Dual-Mode Cellular Adapter

- Verify that the cable interfacing the Test Set's serial port to the base station's local control port is functioning. See Appendix A, "Appendix: Cable Wiring Diagrams," on page 257 for cable wiring.
- Verify that the local control program has been stored on an SRAM memory card and is in the memory card slot on the Test Set's front panel. See Chapter 1, "Getting Started with FW Above Revision A.14.00 (for 882 and 882M Analog Transceivers Only)," on page 9 or Chapter 2, "Getting Started with FW Below Revision A.14.00 (For 882 or 882M Analog Transceivers Only)," on page 29 for the procedure to store the local control program.
- Cycle the power to the base station.

Data collection address cannot be set to 10. Program stopped.

The second serial port in the Test Set has an address of 10. It is used for base station control. The Serial port, having an address of 9, can be used for data collection. If you are collecting data to an HP-IB device, you have to enter all three digits of the address. For additional information, "Data Collection (Saving and Retrieving Test Results)" on page 189

Duplicate file. Over-write old file?

. A file name can only be used once. The entered file name has the same name as one that is already stored on the storage media. If you answer `Yes` to Over-write old file?, the old file will be over-written. Once a file is over-written, it is unretrievable. There is no back-up.

Error 56 in (line number) File name is undefined.

This message is displayed when the Test Set is unable to find a particular file on the memory card. If the message occurs at the beginning of transceiver testing, it is usually the FX1 file which is missing.

- Test 08 can be used to display a catalog of all files on a memory card.
- Test 03 can be used to transfer the FX1 file from a personal computer to a memory card.

Error 80 during Procedure catalog. Catalog aborted.

This message is displayed when the Test System is unable to load a Procedure from a memory card.

- Check that the card is properly inserted and has Procedures saved on it.

ERROR 80 in (line number) Medium changed or not in drive Re-try?

This message is displayed when the Test Set is unable to access valid files from a memory card.

- Check that the card is properly inserted and has Procedures saved on it.

Error in data collection information on cnfg screen.

This message is displayed if the file type or record number is not properly entered into the `External Devices` (or `Edit Configuration`) screen.

To access the `External Devices` (or `Edit Configuration`) screen:

1. Press TESTS.
2. Select `External Devices` from the `SET UP TEST SET` list (or `Edit Cnfg` from the `Test Function` field).
3. Verify that the entries are correct.

For additional information, see "Data Collection (Saving and Retrieving Test Results)" on page 189.

HP-IB Command not accepted. Option not installed.

This message may be displayed when the software tries to control a non-existent Radio Interface Card or non-existent other Test Set option.

- Check the Test Set rear panel for the Radio Interface connector.
- Check which options are installed in the Test Set

CAUTION

Loading this program into the Test Set memory will erase any other programs and Procedures you have loaded. If you have not already done so, save your setups to a Procedure on an SRAM memory card before loading the "LIST_OPTS" program. See "Procedures" on page 228.

1. Press TESTS.
2. Position the cursor to the `Location` field and select it.
3. From the `Choices` menu, select `ROM`.
4. Position the cursor to the `Procedure` field and select it.
5. From the `Choices` menu, select `LIST_OPTS`.
6. Press k1 `Run Test` to display the installed options.

No response from digital transceiver in `Name_of_subprogram`.

Program terminated

- Verify all equipment is powered on.

  Base station

  HP 83201A Dual-Mode Cellular Adapter or the HP 83204A Option 001, TDMA Dual-Mode Cellular Adapter

- Verify the connection between the PC (laptop) and the base station. See Appendix A, “Appendix: Cable Wiring Diagrams,” on page 257 for cable wiring.
- Cycle the power to the base station.

Printer address cannot be set to 10.

The second Test Set serial port, Serial B, has an address of 10. The Serial port, having an address of 9, can be used for printing. If you are using an HP-IB printer, you need to enter all three digits of the printer address. “Printing” on page 214.

The Test Set must be configured in Control Mode. No other controllers may be on the HP-IB bus. Do you want to put the Test Set in Control Mode? Select desired softkey.

The Test Set can be set to operate in the HP-IB `Control` mode or can be set to operate in the `Talk&Lstn` mode. This selection is made on the test Set I/O CONFIGURE screen. If the `External Devices` (or `Edit Cnfg`) screen has entries that require the Test Set to operate as a controller, the software will verify that the Test Set is configured properly. Answer the question `Yes` if you wish to have the entry on the I/O CONFIGURE screen changed.

This software will not run with firmware revision (FW rev. #) **presently installed in the Test Set. Consult software users manual for correct firmware revision.**
The Test Set must have a firmware revision `A.08.00` **or higher. To determine the revision of the firmware:**

- Press CANCEL or shift CANCEL to pause the program.
- Press SHIFT CONFIG to display the CONFIGURE screen.
- View the revision number of the firmware in the upper right corner of the display.

Contact the factory (1-800-922-8920) if you do not have the necessary revision. Firmware is installed in the Test Set by removing the instrument cover and replacing the EPROMS in the controller section, and in some cases, the EPROM on the signaling board.

Timeout error from an external instrument.

This message will be displayed if the Test Set tries to control a device on the HP-IB bus and is unable to do so for 5 seconds.

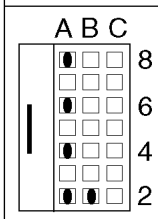
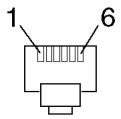
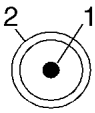
- Check cables.
- Verify that the HP-IB address and other setup conditions of your device are set properly.
- Verify entries made to the `External Devices` (or `Edit Cnfg`) screen.

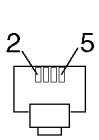
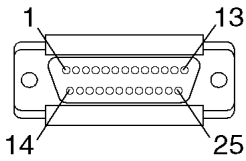
Timeout from printer at address (printer address). Retry?

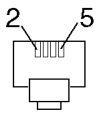
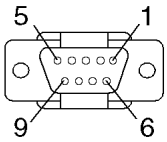
- Check the cable and the connections.

A Appendix: Cable Wiring Diagrams

The HP 11807B Option 042 software utilizes various cables when tests are run. So that new cables may be constructed the following diagrams show pin connections for interface cables that the software uses. Refer to Chapter 4, “Making Connections,” on page 55 for the purpose of the cables.

QUARTEPLUG TO RJ11/BNC 08921-61032		
		
FROM	TO	TO
B2		1
* A2 to A6		
A2		2
A4	1	
A6	4	
A8	6	

RJ11(M) TO DB25 (M) 08921-61039	
	
FROM	TO
5	3
4	7
3	NC
2	2

RJ11(M) TO DB9 (F) 08921-61038	
	
FROM	TO
5	2
4	5
3	NC
2	3
	* 7 to 8
	* 1 to 4 to 6

CONNECT1

* indicates jumpered connection

Glossary

A-B

BPF Band Pass Filter. A filter that increasingly rejects signals as their frequency increases and decreases outside of certain cutoff frequencies. In the test set, audio band pass filters are used to reduce the level of out-of-band signals during certain measurements

C

CANCEL A key used to pause (stop) the IBASIC program running in the test set.

card Refers to the memory card containing the procedures for testing the base station.

`Choices` Refers to a field in the lower right of the test set screen that displays several possible functions for selection.

`Continue` Proceed with the IBASIC software program if it has been stopped (paused).

cursor Refers to the brightened region of the test set screen used to indicate the field/function currently being accessed.

D

Del Step A function to delete a step in the procedure.

Disp Loc A menu function which presents an assembly diagram that displays location of the adjustable component.

E

Edit Cnfg (configuration)

Title of an test set screen that allows you to set up (configure) printers, PCs, disks…

Edit Freq (frequency)

Function which allows you to edit the values of the test frequencies.

Edit Parm (parameters)

Function which allows you to edit the values of the test parameters. See “Procedures” on page -228.

Edit Seqn (sequence) Function which allows you to select a single test and run it or to create your own sequence of tests.

Edit Spec (specifications)

Function which allows you to edit the limits of the test specifications. See “Pass/Fail Limits (Specifications)” on page -212.

ESD ElectroStatic Discharge - A transfer of electric charge from one place to another. Devices can be damaged by the energy transferred during the discharge.

F

field An area on the CRT with an inverse video display (`example`) where entries can be made.

function Refers to a particular field, feature, or operation of the test set.

G

GN Abbreviation for General. GN appears in some titles in the software and indicates that it relates to the general system, as opposed to a transmitter (TX) or receiver (RX).

H

Help A feature providing specific information about how to use the current screen in the TESTS environment. This feature is accessed by pressing k4 (`Help`) from any TEST screen. Note: this feature is only available in the HP 8921A,D firmware above revision A.14.00.

HELP A feature providing additional test set information accessed by pressing SHIFT, then TX (HELP) keys.

highlight Refers to the brightened region (cursor) of the test set screen used to indicate the field/function currently being accessed.

HPF High Pass Filter. A filter that increasingly passes signals as their frequency increases towards, and then is greater than, a certain cutoff frequency. In the test set, audio high pass filters are used to reduce the level of low frequency signals during certain measurements.

I

IBASIC Instrument BASIC is the computer language (code or software) used by the Test Sets' built-in controller. The IBASIC software is downloaded from the CARD into the Test Sets' RAM.

initialize The process of formatting a card or disk prior to storing data.

K

key (USER keys) Keys refer to any of the push buttons on the front panel. The USER keys are a specific grouping of keys labeled k1 to k5 which perform the associated numbered function in the action field located in the upper right or the screen. The USER keys are user programmable.

knob The large tuning dial for cursor control located in the center of the Test Sets' front panel. This knob is rotated to position the cursor on the screen and then pressed to select the particular field or function.

L

library A collection of the names of all of the parameters, specifications, and tests in the test software. The test software and the Test Set's firmware use the library, test software program code file, and a procedure to run a customized application program. A library is stored as a file on a memory card or other mass storage with its associated procedure files.

Location Where to retrieve or save a particular testing procedure eg, disk, CARD, RAM, PC, and so forth.

LPF Low Pass Filter. A filter that increasingly rejects signals as their frequency increases towards, and then is greater than, a certain cutoff frequency. In the test set, audio low pass filters are used to reduce the level of high frequency signals during certain measurement

M

measurement A series of calculations on data measured by the test set. These calculations provide a value to be compared against pass/fail values that verify the performance of the unit-under-test.

Main Menu The screen accessed by pressing the TESTS key, or k5 (Main Menu). It is used to customize and execute (run) automated testing.

Also referred to as the "TESTS" screen.

menu The test set screen displays various tasks to be selected with the cursor control knob or the USER keys; this display is the menu.

message The upper portion of the test set screen is reserved for messages and prompts. Messages give an indication of the status of the test set, for example, **System initialization**

O

OTP One Time Programmable (OTP) refers to a memory card on which code or data may only be stored once; similar to ROM

P

parameters Entries you make for calibration data, base station characteristics, or test customization. They give you flexibility in the way you use the software. Default values for parameters are entered into the software.

pass/fail limits Pass/fail limits are the names of criteria verifying the performance of the unit-under-test. Usually, the associated measurement value must fall within the HI/LO limits of pass/fail values to verify performance of the unit-under-test. Default values in the test software have been derived from standard methods of measurement or from the unit-under-test requirements.

pause Using the CANCEL key pauses the running of IBASIC software and allows access to the keyboard functions. CONTINUE allows the software to proceed.

peak ± max A detector in the test set that measures and computes the maximum of the absolute value of the positive and negative excursions of the measurement. For example, when an FM waveform with a +10 kHz and -9 kHz deviation is applied, 10 kHz will be displayed.

PRESET Sets the test set to its initial power-up state.

procedure A shortened label for test procedure. A procedure is a collection of channels, parameters, pass/fail limits, and testing order, saved in a file, that customizes the test software to a specific application. Procedures are made by editing existing channels, parameters, pass/fail limits, and testing order, and saving the resulting files to a memory card, disk or internal test set RAM.

prompts The upper portion of the test set (inverse video field) is reserved for prompts and messages. The prompt directs the user to take some action. Messages give an indication of the status of the test set.

R

RAM Random Access Memory - The memory in the test set that is used to store program code and data. The test set RAM is battery-backed-up, retaining data and program code when the power is turned off.

ROM Read Only Memory

Run Test Directs the test set to load the program from the current procedure and begin testing (may take up to two minutes).

S

SAT Supervisory Audio Tone - A 5970 Hz, 6000 Hz, or 6030 Hz sine-wave signal that frequency modulates an AMPS cell site voice channel transmitter. The signal is transponded by the base station and is used to help determine RF path integrity.

screen Refers to the video display of the test set.

select To choose a particular field or function. Rotate the CURSOR CONTROL knob and position the highlighted cursor on the chosen field or function, then press the knob. An alternative method is to press the numbered USER key having the same number as displayed alongside the desired function.

sequence The method used in the test set to run one or more TESTs in a desired order. A sequence is entered using the TESTS `(Edit Sequence)` screen.

SINAD Signal plus Noise And Distortion divided by noise and distortion. A measurement result that determines the quality of an audio tone in the presence of noise and distortion. A 12 dB SINAD value is often used when measuring the receiver sensitivity.

softkey The name of the set of keys next to the CRT display that can be assigned to certain special actions or fields. The keys are also called USER keys.

specifications Specifications are the names of criteria verifying the performance of the base station (used in fw below rev A.14.00. See "Pass/Fail Limits (Specifications)" on page -212. The specification value may be changed by using the `Edit Spec` function. Usually the associated measurement value must fall within the HI/LO limits of specification values to verify performance of the base station. Default values in the test software have been derived from standard methods of measurements.

SRAM Static Random Access Memory - A data storage device. SRAM memory cards can be used with the test set to save programs and test results.

Step# Orders the sequence of tests, eg Step #1 may be Test_5, and Step #2 may be Test_26, etc.

U

USER keys A group of keys located immediately to the right of the test set screen that allow the user to more rapidly select certain functions without rotating and pressing the knob. These key assignments are displayed in the upper right portion of the test set screen. The number on the left of the function corresponds to the number on the user key k1 to k5.

V

values The scaler quantities or numbers entered in the inverse video fields of the specifications or parameters. Units of measure (dB, inches, volts, watts, etc.) are contained in the pass/fail limits and test parameters.

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