

MAINTENANCE MANUAL

Site Master™ S400A

Transmission Line and Antenna Analyzer

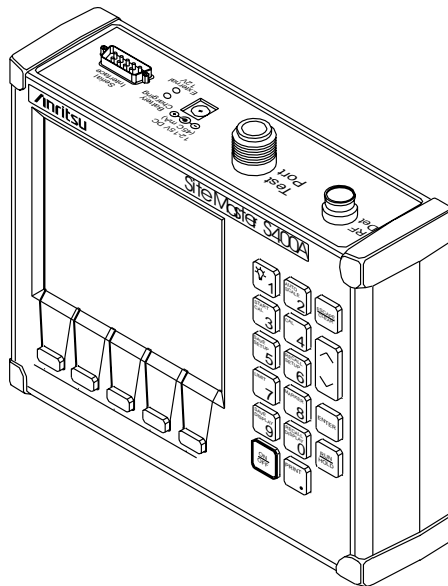


Figure 1. Site Master S400A

1. INTRODUCTION

This manual provides maintenance instructions for the Site Master Model S400A Broadband One-Port Transmission Line and Antenna Analyzer. It describes the product and provides performance verification procedures, parts replacement procedures, and a replaceable parts list.

2. DESCRIPTION

The Site Master S400A (Figure 1) is a hand held SWR/RL (standing wave ratio/return loss) and Distance-To-Fault measurement instrument. It combines a synthesized source, VSWR Bridge, and receiver on a single printed circuit board (PCB). An optional power monitor is also available. A block diagram is shown in Figure 2.

3. PERFORMANCE VERIFICATION

Paragraphs 4 through 7 contain tests that can be used to verify the performance of the Site Master S400A and its components.

3.1. Initial Setup for Testing

1. Press and hold the ESCAPE/CLEAR key, then press the ON/OFF key to turn on the Site Master. (This sets the instrument to the factory preset state.)
2. Release the ESCAPE/CLEAR key and use the Up/Down Arrow key to adjust the contrast to give a readable display.

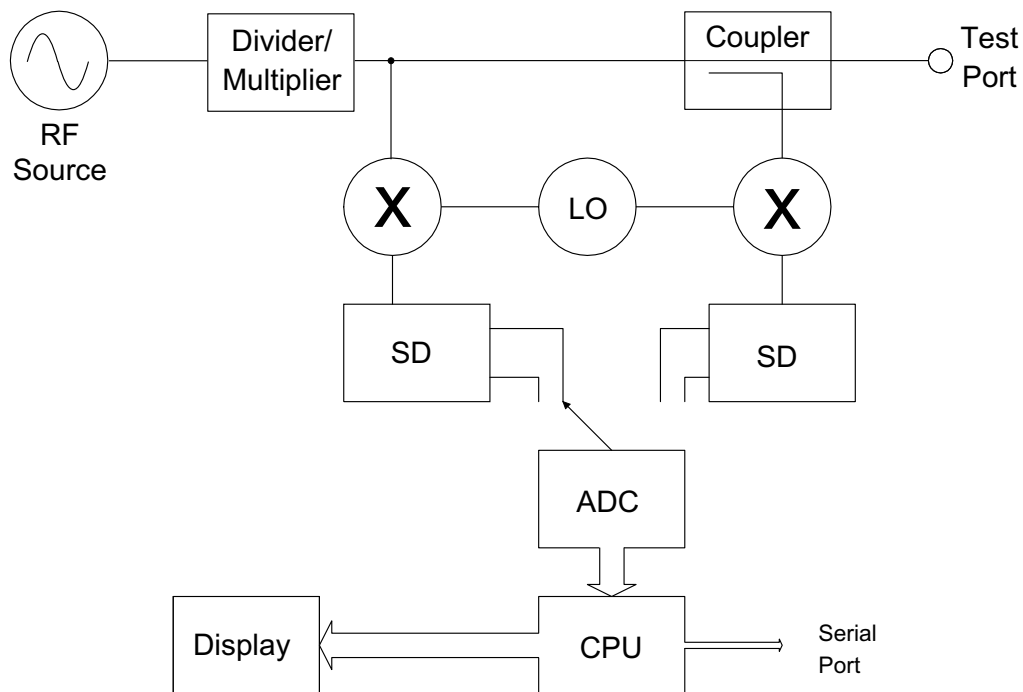


Figure 2. Site Master S400A Block Diagram

4. FREQUENCY ACCURACY

The following test can be used to verify the CW frequency accuracy of the Site Master. Measurement calibration of the Site Master is *not* required for this test.

a. Equipment Required:

- Spectrum Analyzer
Anritsu Model MS2602A

b. Procedure:

1. Press and hold the ESCAPE/CLEAR key, then press the ON/OFF key to turn on the Site Master. (This sets the instrument to the factory preset state.)

NOTE

Before continuing, allow a five minute warm up for the internal circuitry to stabilize.

2. Press the **FREQ** soft key.

3. Press the **F1** soft key, set to 1000.0 MHz, then press the ENTER key.
4. Press the **F2** soft key, set to 1000.0 MHz, then press the ENTER key.
5. Press the **MAIN** soft key to return to the Main Menu.
6. Press the **OPT** soft key to go to the Option Menu.
7. Press the **MORE** soft key to go to the Option Sub-Menu.
8. Press the **B6** soft key to turn Fixed CW on.
9. Connect the RF cable from the Site Master Test Port to the RF Input on the MS2602A.
10. Set up the Spectrum Analyzer as follows:
 - (a) Press Preset.
 - (b) Press Center and enter 1 GHz.
 - (c) Press the Max Hold button.

11. If the Site Master has gone into the hold mode, press the RUN/HOLD key to make the measurement.
12. Use the Spectrum Analyzer marker to measure the center of the response. The frequency should be 1000 MHz \pm 75 kHz.

7. Connect the 20 dB offset to the Test Port and verify that the reading is:
20 dB \pm 1.7 dB
8. Connect the 6 dB offset to the Test Port and verify that the reading is:
6 dB \pm 1.2 dB

5. RETURN LOSS VERIFICATION

The following test can be used to verify the accuracy of return loss measurements. Measurement calibration of the Site Master is required for this test.

a. *Equipment Required:*

- 20 dB offset, Anritsu SC5270
- 6 dB offset, Anritsu SC5237
- Open/Short, Anritsu 22N50
- 50 Ohm Termination, Anritsu 26N50-2 or SM/PL

b. *Procedure:*

1. Press and hold the ESCAPE/CLEAR key, then press the ON/OFF key to turn on the Site Master. (This sets the instrument to the factory preset state.)

NOTE

Before continuing, allow a five minute warm up for the internal circuitry to stabilize.

2. Press the **FREQ** soft key.
3. Press the **F1** key, set the Site Master to its lowest start frequency, then press the ENTER key.
4. Press the **F2** key, set the Site Master to its highest stop frequency, then press the ENTER key.
5. Press the START CAL key and follow the instructions to perform a OSL calibration using a 22N50 Open/Short and 26N50-2 or SM/PL Termination. Verify that noise spikes are below 44 dB and that the trace is smooth. Repeat as necessary.
6. Remove the 26N50-2 or SM/PL Termination.

6. POWER MONITOR VERIFICATION

If the Power Monitor (Option 5) is installed in the Site Master, the following test can be used to verify the accuracy of the power measurements. Measurement calibration of the Site Master is *not* required for this test.

a. *Equipment Required:*

- RF Detector, 10 MHz to 20 GHz, Anritsu 560-7N50B
- 10 dB Attenuator, Weinschel 1R-10
- 30 dB Attenuator, Weinschel 1R-30
- RF Reference Source, 0.050 GHz, Anritsu MA2418A
- DC Power Supply, Anritsu 2000-933

b. *Procedure*

1. Connect the DC Power Supply to the MA2418A Reference Source. (Refer to Figure 3 on the following page.)
2. Connect the RF Detector output to the RF Detector input on the Site Master.
3. Connect the DC Power Supply to the appropriate line voltage to supply power to the MA2418A Reference Source.
4. Press and hold the ESCAPE/CLEAR key, then press the ON/OFF key to turn on the Site Master. (This sets the instrument to the factory preset state.)

NOTE

Before continuing, allow a five minute warm up for the internal circuitry to stabilize.

5. Press the **POWER** soft key.

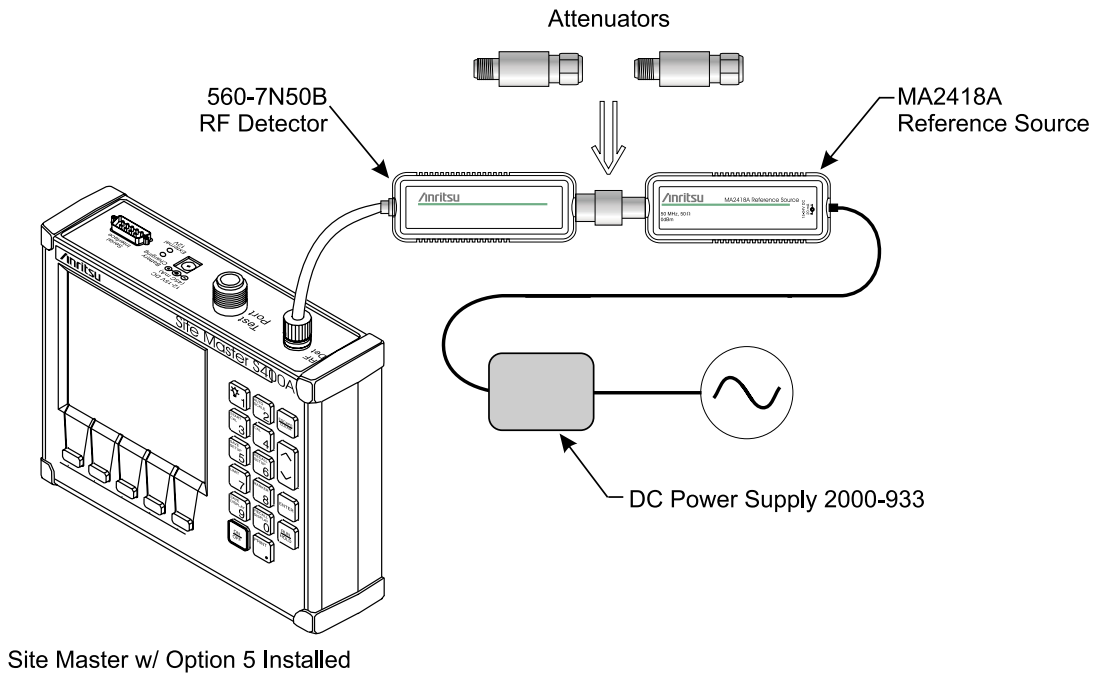


Figure 3. Power Monitor Verification Test Setup

6. Press the **ZERO** soft key to zero the power monitor.
When complete, ZERO ADJ:ON is displayed in the message area.
7. Connect the MA2418A Reference Source to the input of the 560-7N50B RF Detector.
8. Verify that the power monitor reading is 0.0 dBm \pm 1 dB.
9. Disconnect the MA2418A Reference Source from the 560-7N50B RF Detector input.
10. Connect the two Attenuators to the output of MA2418A Reference Source so as to add 40 dB of attenuation (Figure 3).
11. Connect the MA2418A Reference Source with the Attenuators to the input of the 560-7N50B RF Detector.
12. Verify that the power monitor reading is now -40.0 dBm \pm 2 dB.

7. TERMINATION VERIFICATION

This test verifies the accuracy of the Site Master SM/PL termination using the precision return loss mode of the 541XXA Scalar Measurement System. Measurements of terminations using this mode provide results that are traceable to the NIST (National Institute of Standards and Technology) standards for the precision airline.

a. Equipment Required:

- Scalar Measurement System, Anritsu 541XXA
- Offset SWR Autotester, Anritsu 560-97A50-20
- Precision Airline, Anritsu 18N50
- Open/Short, Anritsu 22N50
- 50 Ohm Termination, Anritsu 26N50
- Source Adapter, Anritsu 34NN50A

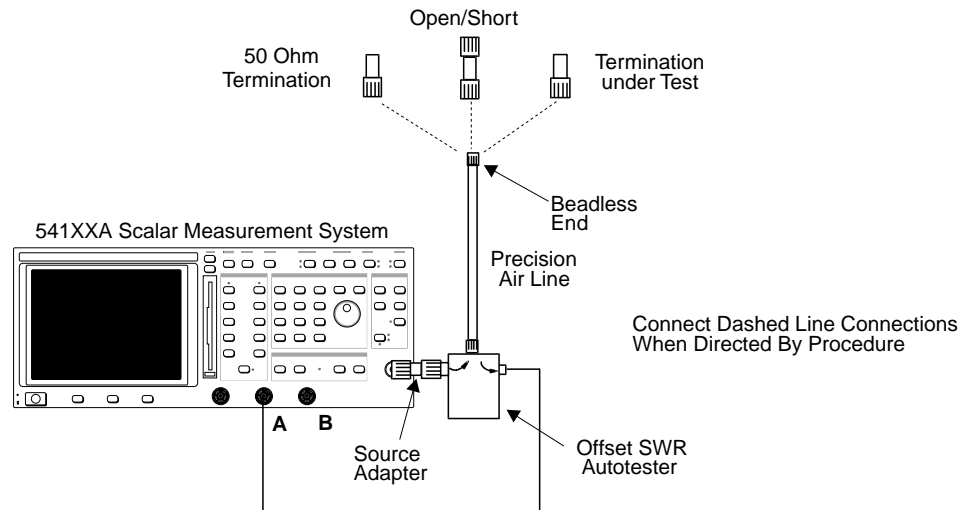


Figure 4. 541XXA Precision Return Loss Test Setup

b. Procedure

1. Connect the test equipment as shown in Figure 4 (above).
2. Press the Power key on the 541XXA to On.
3. Press the System Menu key.
4. Using the Menu up-down keys: Highlight **RESET**, then press the Select key.
5. At the RESET MENU display, use the the Menu up-down keys to highlight **RESET TO FACTORY DEFAULTS**, then press the Select key.
6. Set the signal source for the frequency range as follows:
 - (a) Press the Frequency key.
 - (b) Using the Data Entry Keypad or Data Entry Knob, set the **START** frequency to 0.01 GHz. Press the Enter key.
 - (c) Using the Data Entry Keypad or Data Entry Knob, set the **STOP** frequency to 4.0 GHz. Press the Enter key.
7. Press the Channel 2 Display On/Off key to Off.
8. Press the Channel 1 Menu key.
9. Using the Menu up-down keys: Highlight **PRECISION RL**, then press the Select key.
10. At the PRECISION RETURN LOSS menu display, use the Menu up-down keys to highlight **FINAL**, then press the Select key.
11. Press the Calibration key.
12. At the CALIBRATION menu display, use the Menu up-down keys to highlight **START CAL**, then press the Select key.
13. At the PRECISION RETURN LOSS CALIBRATION menu display prompt, connect the Offset SWR Autotester to Input A, if you have not done so yet.
14. Connect the precision air line to the Offset SWR Autotester test port. Position the air line pointing vertically upward. Downward or horizontal positions make connector pin alignment difficult.

NOTE

Ensure that the beadless end of the precision airline is at the measurement connection point.

15. Press the Select key when ready.

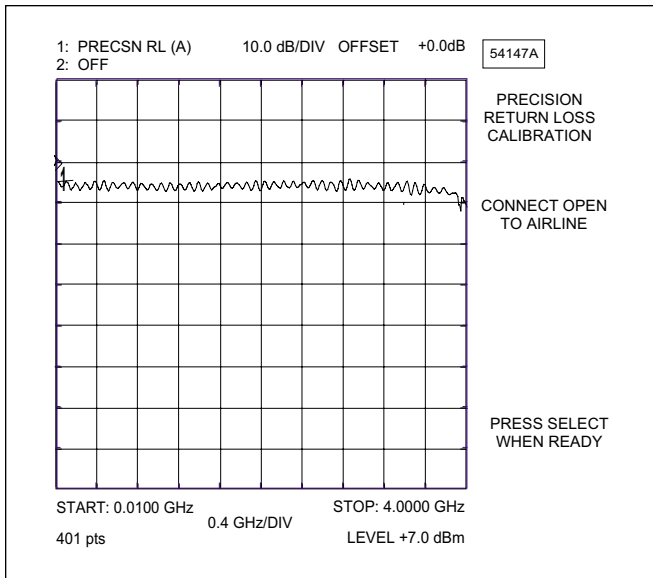


Figure 5. Example of a Good Connection

16. At the PRECISION RETURN LOSS CALIBRATION menu prompt, connect the Open to the beadless end of the air-line. Press the Select key to start the calibration.
17. Verify that the display resembles that shown in Figure 5 (above).

CAUTION

During both calibration and measurement, be sure to properly align the beadless connector of the airline. When the connectors are mis-aligned, a spike will usually be visible on the display.

18. At the next menu prompt, remove the Open and connect the Short to the beadless end of the airline. Press the Select key to start the calibration process.
19. At the next menu prompt, remove the Short and connect the 50 Ohm Termination to the beadless end of the air line. Press the Select key to start the calibration process.
20. When the calibration is complete, remove the 50 Ohm Termination.

21. Connect the SM/PL termination to the beadless end of the air line and press the Select key to begin the measurement.
22. Observe that the waveform displayed resembles that shown in Figure 6 (below).
23. Press the Cursor On/Off key to On.
24. Observe the CURSOR menu readout. The minimum return loss reading for the SM/PL termination should be 42 dB.

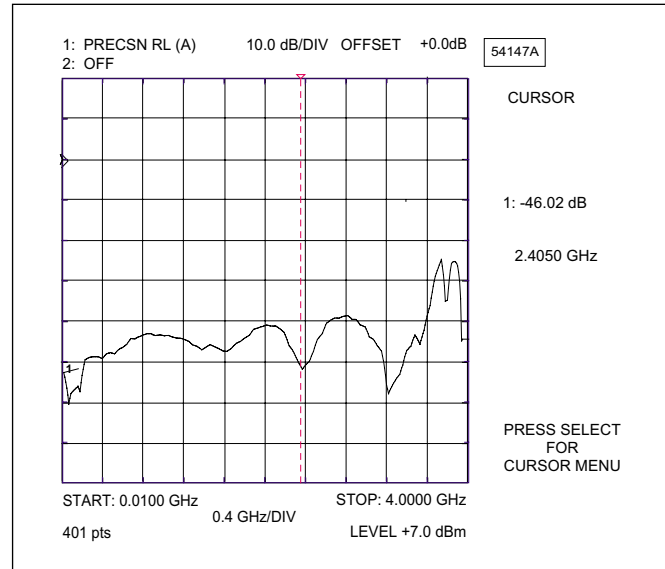


Figure 6. Direct Readout of the Precision Return Loss

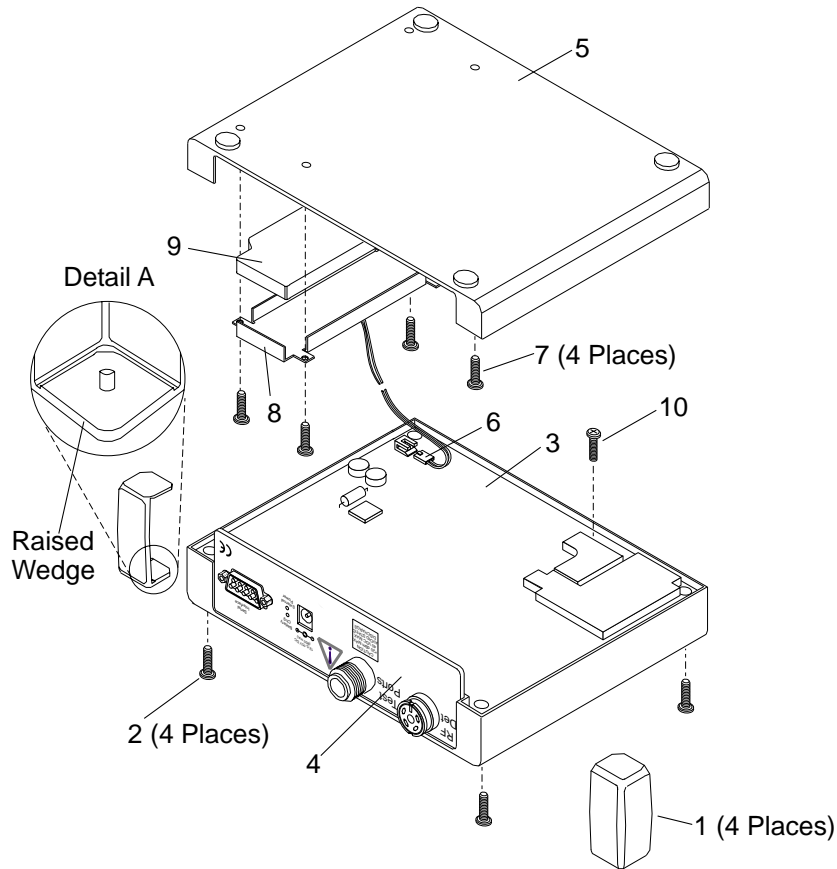


Figure 7. *Site Master Battery Removal*

8. BATTERY PACK REMOVAL

This procedure provides instructions for removing the battery pack. Refer to Figure 7 (above) during this procedure.

1. Place the Site Master face up on a work surface.
2. Remove the four corner rubber bumpers (1).
3. Remove the four screws (PN 900-811) (2).
4. While holding the two halves of the Site Master together, turn it over and set it face down on the work surface.

CAUTION

In the next step, the Main RF PCB assembly (3) and test port panel (4) must stay with the front panel.

5. Remove the bottom half (5) and fold it over to lay upside down on the work surface.
6. Disconnect the battery connector from J6 (6) of the Main RF PCB assembly (3).
7. Remove the four screws (7) holding the battery bracket (8) in place and lift the bracket clear.
8. Remove the battery assembly (9).

9. BATTERY PACK REPLACEMENT

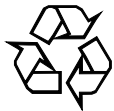
This procedure provides instructions for replacing the battery pack. Refer to Figure 7 (above) during the procedure.

1. Install the new battery assembly (9).

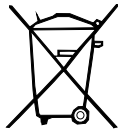
2. Replace the battery bracket (8) and insert the four screws (7) to hold the battery bracket in place.
3. Reattach the battery connector to J6 (6) on the main RF PCB assembly (3).
4. Set the bottom half in place.
5. While holding the two halves together, turn the Site Master over and lay it face up on the work surface.
6. Reinstall the four screws (2).
7. Install the rubber bumpers (1) on all four corners of the instrument.

10. BATTERY DISPOSAL

The battery used in the Site Master is a rechargeable nickel-cadmium (NiCd) battery and is covered by the Battery Directive (91/157/EEC). As such, the battery is marked as follows to indicate controlled disposal.



This marking indicates that the battery is a recyclable product.



NiCd

This marking indicates that the battery requires separate collection and shows the chemical system (Nickel/Cadmium).

Component	% of Cell Weight
Nickel	19 to 26%
Cadmium	17 to 22%

This marking indicates the heavy-metal component concentration as a percentage of battery cell weight.

Spent nickel-cadmium batteries are valuable resources. Because they are reusable, do not throw them away. Arrange for proper return for recycling in your locality. If you do not have access to proper disposal methods, return the battery pack to your Anritsu service center. Service centers will dispose of the unit at no charge. Anritsu service centers are listed in Table 2 (inside back cover).

11. KEY PAD MEMBRANE REPLACEMENT

This procedure provides instructions for replacing the key pad membrane. Refer to Figure 7 (page 7) during the procedure.

1. Place the Site Master face up on a work surface.
2. Remove the four corner rubber bumpers (1).
3. Remove the four screws (PN 900-811) (2).
4. While holding the two halves of the Site Master together, turn it over and set it face down on the work surface.

CAUTION

In the next step, the PCB Assy (3) and test port panel (4) must stay with the front panel.

5. Remove the bottom half (5) and fold it over to lay upside down on the work surface.
6. Disconnect the battery connector from J6 (6).
7. Remove the screw (10) located on the bottom side of the main PCB Assy next to the RF Bridge Assy.
8. Pull the PCB Assemblies clear from the top half of the case.
9. Lift the damaged keypad membrane clear from the keypad assembly.
10. Install a new membrane.

NOTE

Carefully use pliers to pull the rubber tabs tight to ensure that the membrane is flush with the PCB.

12. LCD REPLACEMENT

This procedure provides instructions for replacing the Liquid Crystal Display (LCD). Refer to Figure 7 (page 7) during the procedure.

1. Place the Site Master face up on a work surface.
2. Remove the four corner rubber bumpers (1).
3. Remove the four screws (PN 900-811) (2).
4. While holding the two halves of the Site Master together, turn it over and set it face down on the work surface.

CAUTION

In the next step, the PCB Assy (3) and test port panel (4) must stay with the front panel.

5. Remove the bottom half (5) and fold it over to lay upside down on the work surface.
6. Disconnect the battery connector from J6 (6).
7. Remove the screw (10) located on the bottom side of the main PCB Assy next to the RF Bridge Assy.
8. Pull the PCB Assemblies clear from the top half of the case.
9. Remove the grey/brown cable from the connector J8.
10. Remove the four screws from the LCD PCB assembly.
11. Carefully remove the 20-way ribbon cable from the connector on the keypad PCB assembly.
12. Install the new LCD PCB Assembly.

13. MAIN RF PCB ASSEMBLY REPLACEMENT

This procedure provides instructions for replacing the main RF PCB. Refer to Figure 7 (page 8) during this procedure.

1. Place the Site Master face up on a work surface.
2. Remove the four corner rubber bumpers (1).
3. Remove the four screws (PN 900-811) (2).
4. While holding the two halves of the Site Master together, turn it over and set it face down on the work surface.

CAUTION

In the next step, the PCB Assy (3) and test port panel (4) must stay with the front panel.

5. Remove the bottom half (5) and fold it over to lay upside down on the work surface.
6. Disconnect the battery connector from J6 (6).
7. Remove the screw (10) located on the bottom side of the main PCB Assy next to the RF Bridge Assy.
8. Pull the PCB Assemblies clear from the top half of the case.
9. Remove the four screws holding the LCD assembly, but do NOT disconnect the 20-way connector from the keypad PCB assembly.
10. While using pliers to gently squeeze the nine plastic spacer heads to release them from the Keypad PCB assembly, carefully pull the keypad PCB with the LCD from the main RF PCB assembly.
11. Remove the four standoffs.
12. Remove the three screws holding the main RF PCB assembly to the test port panel.

NOTE

Take care to not lose the mylar pad under Q5.

13. Remove the two hex standoff screws and nuts holding the serial interface connector to the test port panel.
14. Using a $\frac{5}{16}$ -inch wrench, loosen the SMA connector for the Test Port and remove the test port panel.

NOTE

If the Power Monitor (Option 5) is installed, remove the two screws holding the Option 5 PCB assembly to the test port panel and unsolder the wires from pins 1 through 4 of the RF Detector connector on the test port panel.

15. Reverse the above procedure to install the replacement RF PCB assembly.

14. REPLACEABLE PARTS

Replaceable parts for the Site Master are listed in Table 1 (below).

Table 1. Parts List

Part Number	Description	Qty
Accessories		
10580-00023	User's Guide, Site Master S400A	1
2300-211	Software Tools, Site Master	1
2300-223	Support Disk, Site Master	1
40-115	Power Supply	1
22N50	Connector, RF Short, N Male	1
SM/PL	Connector, RF Termination	1
806-62	Cable Assy, Cig Plug, Female	1
800-441	Serial Interface Cable Assy	1
D41955	Carrying Case	1
Replaceable Parts		
510-87	Connector, N female to SMA	1
C41761	Liquid Crystal Display Assy	1
ND45417	Battery Pack Kit	1
ND49527	Main PCB Assy, S400A with RF cable	1
D41766-3	Keypad PCB Assy	1
D40864-2	Membrane Keypad, Main	1
C41767	Membrane, Soft Keys	1

Part Number	Description	Qty
Hardware		
761-10	Cap Vinyl, Black, round, 0.625 ID	1
790-52	Washer, #4, Shoulder, Nylon	1
900-257	Pan Head Screw, 0.312	4
790-445	Spacer PCB, 0.625, Self Mount	9
900-800	Pan Head Screw, #4, 0.312	1
900-811	Pan Head Screw, #4	4
900-326	Nut, Kep, 4-40, 0.312	4
900-697	Pan Head Screw, 4-40, 0.312	3
900-138	Screw, Pan, 2-56/patchlock, 0.18	4
B41753	Gasket, LCD	1
Case Parts		
D40861-3	Case	1
C40863	Bumper	4
50532	ID, Model S400A Label	1

Table 2. Anritsu Service Centers

UNITED STATES

ANRITSU COMPANY
685 Jarvis Drive
Morgan Hill, CA 95037-2809
Telephone: (408) 776-8300
FAX: 408-776-1744

ANRITSU COMPANY
10 New Maple Ave., Unit 305
Pine Brook, NJ 07058
Telephone: (201) 227-8999
1-800-ANRITSU
FAX: 201-575-0092

ANRITSU COMPANY
1155 E. Collins Blvd
Richardson, TX 75081
Telephone: 1-800-ANRITSU
FAX: 972-671-1877

AUSTRALIA

ANRITSU PTY. LTD.
Unit 3, 170 Foster Road
Mt Waverley, VIC 3149
Australia
Telephone: 09-558-8177
Fax: 09-558-8255

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ANRITSU ELECTRONICA LTDA.
Praia de Botafogo 440, Sala 2401
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Telephone: 021-28-69-141
Fax: 021-53-71-456

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ANRITSU INSTRUMENTS LTD.
215 Stafford Road, Unit 102
Nepean, Ontario K2H 9C1
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FAX: (613) 828-5400

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FAX: 0106-1065909236

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FAX: 016-44-61-065

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MEERA AGENCIES (P) LTD
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FAX: 011-686-6720

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FAX: (03) 64-78-334

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FAX: 02-782-4590

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FAX: 02265207

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12 Surrey Square Office Park
330 Surrey Avenue
Ferndale, Randburt, 2194
South Africa
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Fax: 011-787-0446

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Botvid Center
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Stockholm, Sweden
Telephone: (08) 534-717-00
FAX: (08)534-717-0-30

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