Site Master™

Models S810C and S820C
Antenna and Coax/Waveguide Analyzer

MAINTENANCE MANUAL

Anritsu

490 JARVIS DRIVE • MORGAN HILL, CA 95037-2809

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1. INTRODUCTION

This manual provides maintenance instructions for the Site Master Model S810C and S820C Antenna and Coax/Waveguide Analyzer. It describes the product and provides performance verification procedures, parts replacement procedures, and a replaceable parts list.

2. DESCRIPTION

The Site Master is a hand held SWR/RL (standing wave ratio/return loss) and Distance-To-Fault measurement instrument that combines a synthesized source, VSWR Bridge, and receiver in one unit. An optional power monitor is also available.

The following sections contain tests that can be used to verify the performance of the Site Master models S810C and S820C having any version of firmware.

3. SITE MASTER 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 MS2663C or equivalent

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/DIST** key.
3. Press the F1 soft key, set to 9 GHz, then press the **ENTER** key.
4. Press the F2 soft key, set to 9 GHz, then press the **ENTER** key.
5. On the Site Master, press the **SYS** key, the OPTIONS soft key and then the FIXED CW soft key to turn Fixed CW on.
6. Connect the RF cable from the Site Master Test Port to the RF Input on the Spectrum Analyzer.
7. Set up the Spectrum Analyzer as follows:
   (a) Press the **Preset** key, then select **Preset All** (F1).
   (b) Press the **Frequency** key.
   (c) Press the **1** key and then the **GHz** key to change the Center Frequency to 1 GHz.
   (d) Press the **Span** key.
   (e) Press the **7**, **5**, **0**, and **kHz** keys sequentially to change the Frequency Span to 750 kHz.
   (f) Press the **RBW** key.
   (g) Press the **1**, **0** and **kHz** keys sequentially to change the RBW to 10 kHz.
   (h) Press the **VBW** key.
   (i) Press the **Filter Off** soft key (F3) to turn the VB filter off.
   (j) Press the **Manual** soft key (F1) and use the entry knob to set the VBW to 300 Hz.
   (k) Press the **Amplitude** key.
   (l) Press the **Reference Level** soft key (F1).
   (m) Press the **1**, **0**, and **dBm** soft keys sequentially to set the reference level to 10 dBm.
   (n) Press the **Marker** key.
   (o) Press the **Zone Width** soft key (F5).
   (p) Select the **Spot** soft key (F1).
   (q) Press **A**, **B** then the **Storage** soft key (F5).
   (r) Press the **MaxHold** soft key (F2).

NOTE

If the Site Master has gone into the hold mode, press the RUN/HOLD key to make the measurement.

8. When a smooth peak response appears on the Spectrum Analyzer, press the **Marker Peak Search** key on the Spectrum Analyzer. Verify that the marker peak readout value is 1000 MHz ±75 kHz.

NOTE

Nominal power is approximately 0 to 10 dBm at 1 GHz. 1 GHz is the 1/9th harmonic of the output frequency.

9. On the Site Master, press the **SYS** key, the OPTIONS soft key and then the FIXED CW soft key to turn Fixed CW off.

4. 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:*

- Anritsu SC6815 Calibration/Verification Kit
- Anritsu 800-441 Serial Interface cable
- Personal Computer running Windows 95 or later, one available COM port, a CDROM drive and a 3.5" floppy disk drive

b. *Procedure:*

1. Boot the PC and insert the verification software CD that came with the SC6815 kit into the CDROM drive.
2. On the PC, click the Start button and select Run.
3. In the Run box, type x:\setup (where x is the drive letter of the CDROM drive) and select OK.
4. Follow the on screen setup instructions to install the CAL Verification Software.
5. After the software has been installed, re-boot the PC.
6. On the PC, start the Microwave CAL Verification Software from the Start menu and follow the steps below as presented in the opening window.
7. Install the 800-441 Serial Interface cable to the available PC COM port and the Serial Interface connector on the Site Master Test Connector Panel.
8. 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.

9. On the Site Master, press the **SWEEP** key.
10. Press the Resolution soft key, and select 517.
11. Insert the Calibration Data floppy diskette that came with the SC6815 kit into the PC disk drive.
12. On the PC, select Ok to close the opening window. The test selection screen as shown in Figure 1 will be displayed.

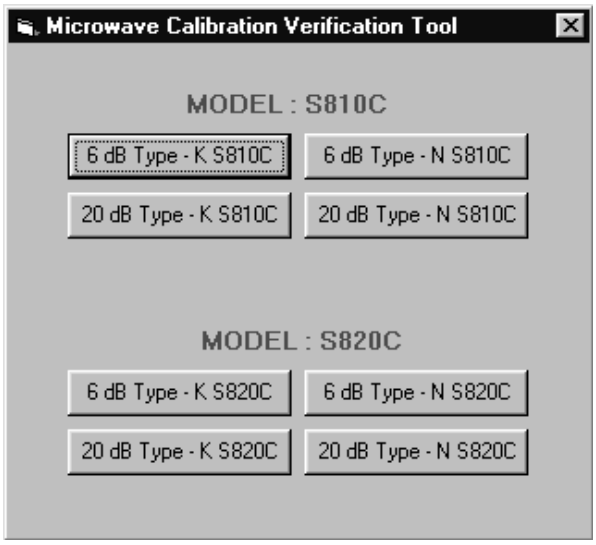

Figure 1. *Calibration Verification Test Selection Screen*

13. Click on the 6 dB Type - K S810C button if the instrument being tested is an S810C, or on the 6 dB Type - K S820C button if the instrument being tested is an S820C.
14. Follow the on screen instructions and connect the Open, Short, Load, and SC6729 6 dB Offset Termination from the SC6815 Calibration Kit to the S8X0C test port when instructed.
15. After the final test, the test results will be displayed on the screen. Verify that the displayed trace is within the limit lines.
16. The final selection screen provides options to save, print or continue testing.

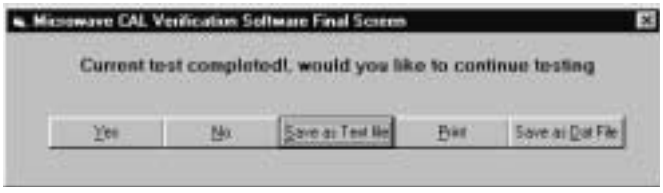

Figure 2. *Calibration Verification Test Final Screen*

17. To save the data as a text file, select Save as Text File. The software will prompt for a name and location to save the file. The data will be saved in a tabular format that can be read by most text editor programs.

18. To save the data as a .dat file, select Save as Dat File. The software will prompt for a name and location to save the file. A .dat file saves the data in a graphical format that can be recalled and viewed using the Verification Software program.

19. To print the data, select Print. The software will first prompt to save the data as a text file (see Step 17) and will then print the data to the default printer connected to the PC.

20. When the final selection screen reappears, click the Yes button to continue.

21. When the test selection screen reappears, click on the 20 dB Type - K S810C button if the instrument being tested is an S810C, or on the 20 dB Type - K S820C button if the instrument being tested is an S820C.

22. Click the Yes button to keep the existing calibration.

23. Follow the instructions on screen to test the 20 dB offset termination. Verify that the measured results are within the limit lines.

24. Save or print the test data if desired.

25. When the final selection screen reappears, click the Yes button to continue.

26. Install the 34RKNF50 to the S8X0C test port.

27. When the test selection screen reappears, click on the 6 dB Type - N S810C button if the instrument being tested is an S810C, or on the 6 dB Type - N S820C button if the instrument being tested is an S820C.

28. Follow the instructions on screen to perform the calibration and measurement.

29. Save or print the test data if desired.

30. Repeat the measurement process for the 20 dB offset termination.

31. Verify that the measured result is within the limit lines.

32. Save or print the test data if desired.

NOTE

For S820C, N Type verification will be performed up to 18 GHz only due to the frequency limit of N Type connector.

5. 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 1-10
- 30 dB Attenuator, Weinschel 1-30
- 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 (Figure 3).
2. Connect the MA2418A Reference Source to the input of the 560-7N50B RF detector.
3. Connect the RF Detector output to the RF Detector input of the Site Master.
4. Connect the DC power supply to the appropriate line voltage to supply power to the MA2418A Reference Source.
5. 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.)
6. Press the MODE soft key.
7. Use the Up/Down arrow key to highlight POWER MONITOR, then press ENTER.
8. Press the ZERO soft key to zero the power monitor.
   When complete, ZERO ADJ:ON is displayed in the message area.
9. Verify that the power monitor reading is 0.0 dBm ± 1 dB.
10. Connect the output of the MA2418A Reference Source to the two attenuators so as to add 40 dB of attenuation (Figure 3).
11. Connect the MA2418A Reference Source and the attenuators to the input of the 560-7N50B RF detector.
12. Verify that the power monitor reading is now –40.0 dBm ±2 dB.

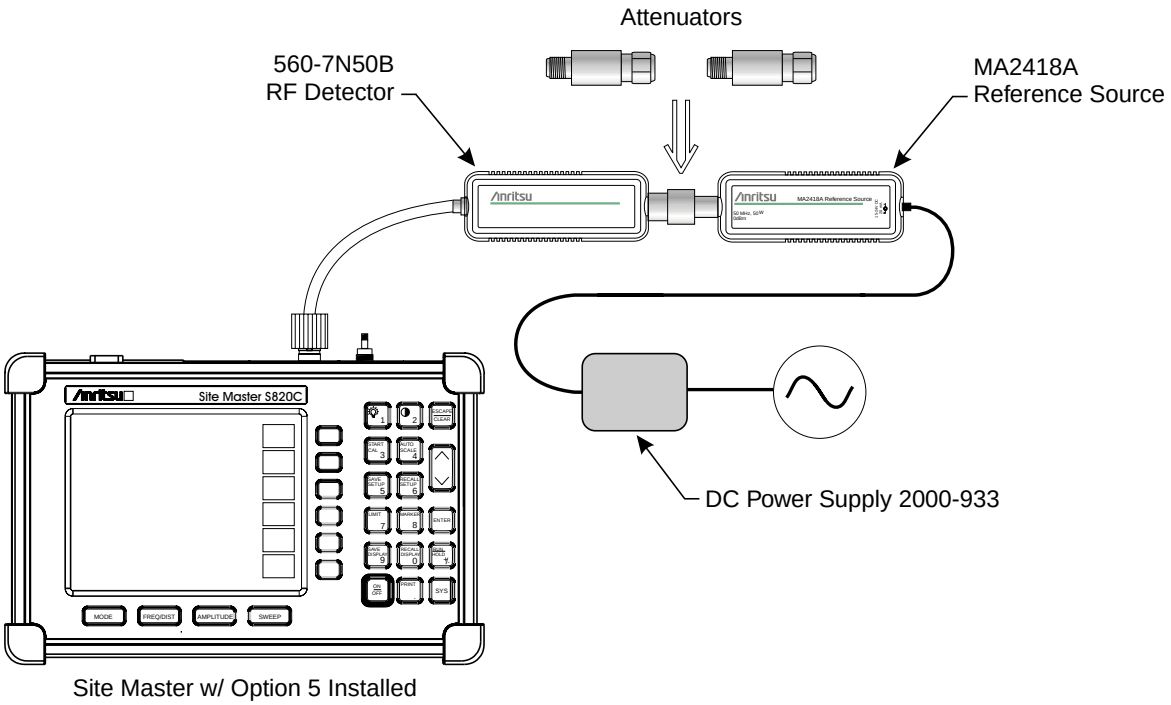

Figure 3. *Power Monitor Verification*

6. TERMINATION VERIFICATION

This test verifies the accuracy of the Site Master 28N50-2 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 18NF50
- Open/Short, Anritsu 22N50
- 50 Ohm Termination, Anritsu 28N50-2
- Source Adapter, Anritsu 34NN50A

b. *Procedure*

1. Connect the test equipment as shown in Figure 4.
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 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 18 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.

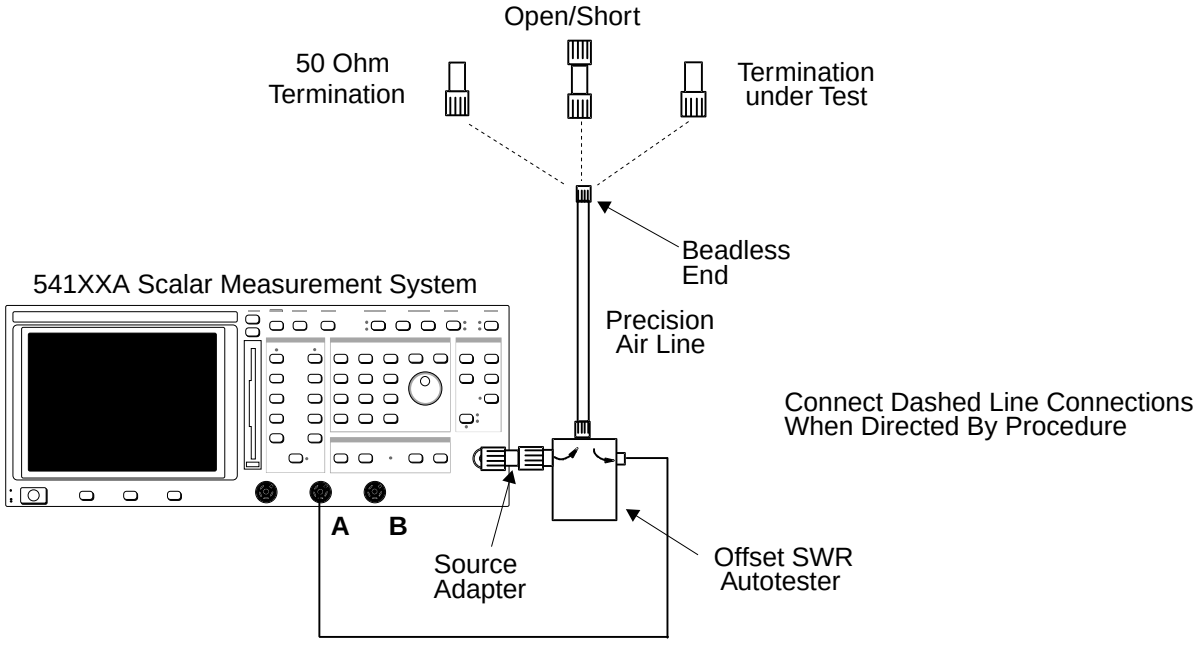

Figure 4. *541XXA Precision Return Loss Test Setup*

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.

16. At the PRECISION RETURN LOSS CALIBRATION menu prompt, connect the Open to the beadless end of the airline. Press the Select key to start the calibration.

17. Verify that the display resembles that shown in Figure 5.

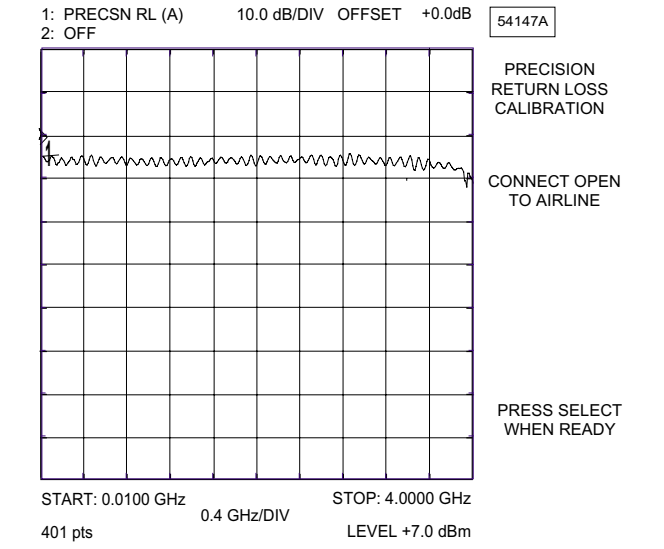

Figure 5. *Example of a Good Connection*

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 termination under test 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 .

Figure 6. *Direct Readout of the Precision Return Loss*

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.

7. BATTERY PACK REMOVAL AND REPLACEMENT

This procedure provides instructions for removing and replacing the Site Master battery pack.

NOTE

Procedures in this manual may apply to many similar instruments. Photos and illustrations used are representative and may show instruments other than the S810C or S820C.

1. With the Site Master standing upright on a stable surface, locate the battery access door (Figure 7).

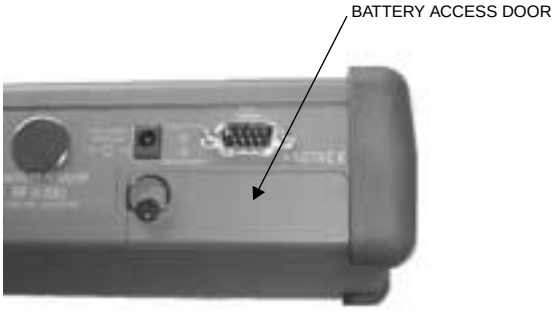

Figure 7. *Battery Access Door Location*

2. Lift up the access door handle and rotate it 90 degrees counterclockwise, as illustrated in Figure 8.

Figure 8. *Rotate the Battery Access Door Handle*

3. Lift the door and remove, as illustrated in Figure 9.

4. Grasp the battery lanyard and pull the battery straight up and out of the unit, as illustrated in Figure 10.

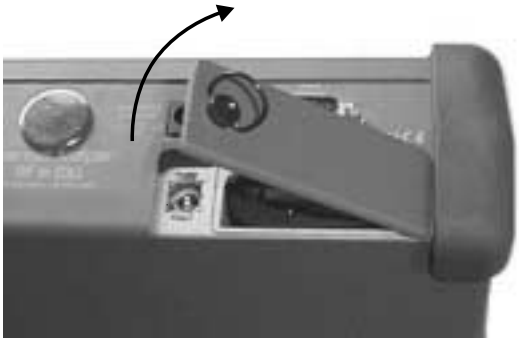

Figure 9. *Removing the Battery Access Door*

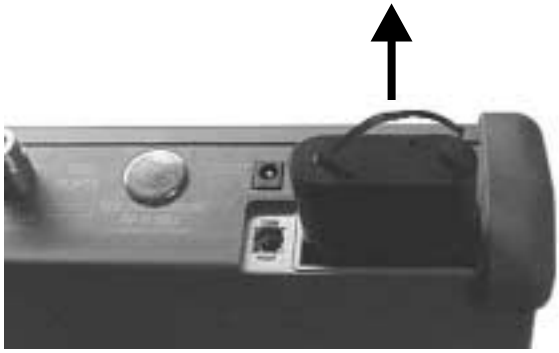

Figure 10. *Removing the Battery*

5. Replacement is the opposite of removal. Note the orientation of the battery contacts, and be sure to insert the new battery with the contacts facing the rear of the unit (Figure 11).

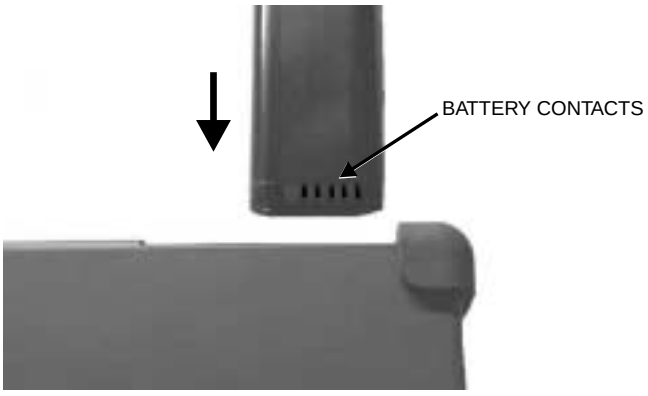

Figure 11. *Battery Orientation*

8. BATTERY INFORMATION

The following information relates to the care and handling of the Site Master battery, and NiMH batteries in general.

- The Nickel Metal Hydride (NiMH) battery supplied with the Site Master is shipped in a discharged state. Before using the Site Master, the internal battery must first be charged for three hours, either in the Site Master or in the optional battery charger (Anritsu part number: 2000-1029).
- Use only Anritsu approved battery packs.
- Recharge the battery only in the Site Master or in an Anritsu approved charger.
- With a new NiMH battery, full performance is achieved after three to five complete charge and discharge cycles.
- When the Site Master or the charger is not in use, disconnect it from the power source.
- Do not charge batteries for longer than 24 hours; overcharging may shorten battery life.
- If left unused a fully charged battery will discharge itself over time.
- Temperature extremes will affect the ability of the battery to charge: allow the battery to cool down or warm up as necessary before use or charging.
- Discharge an NiMH battery from time to time to improve battery performance and battery life.
- The battery can be charged and discharged hundreds of times, but it will eventually wear out.
- The battery may need to be replaced when the operating time between charging becomes noticeably shorter than normal.
- Never use a damaged or worn out charger or battery.
- Storing the battery in extreme hot or cold places will reduce the capacity and lifetime of the battery.
- Never short-circuit the battery terminals.
- Do not drop, mutilate or attempt to disassemble the battery.
- Do not dispose of batteries in a fire!
- Batteries must be recycled or disposed of properly. Do not place batteries in household garbage.
- Always use the battery for its intended purpose only.

8.1. Battery Testing Procedure

1. With the Site Master off and the battery installed, connect the Universal AC Adapter to the 12.5-15VDC (1100 mA) connector. The External Power LED and the Battery Charging LED will light.

NOTE

If the Battery Charging LED does not light, the battery may be too low to immediately start full charging. Leaving the unit connected to AC power for several hours may bring the battery up to a level where full charging can begin. Turn the unit off and back on to see if the Battery Charging LED lights indicating a full charge cycle has begun.

2. Disconnect the AC-DC Adapter when the Battery Charging LED turns off, indicating the battery is fully charged.
3. 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. Press **ENTER** when prompted to continue.
4. Press the **SYS** key, followed by the STATUS soft key. Verify that the indicated battery charge is ≥ 80%. If the value is 80% or above, press the **ESCAPE/CLEAR** key and continue with this procedure.

   If the value is lower than 80%, a discharge/charge cycle may be needed to improve the battery capacity. Completely discharge the battery, as described in Steps 5 and 6 below, and then recharge the battery as described in Steps 1 and 2. If the battery capacity does not increase after a discharge/charge cycle, replace the battery.
5. Press the **START CAL** key (to keep the Site Master from going into HOLD mode) and make note of the test start time.
6. When the Site Master display fades and the Site Master switches itself off, make note of the test stop time.
7. The total test time (Step 5 to Step 6) should be ≥ 2.5 hours. If the battery charge is near 80% and the total test time is <2.5 hours, replace the battery.

9. FRONT PANEL ASSEMBLY REMOVAL AND REPLACEMENT

This procedure provides instructions for removing and replacing the Site Master front panel assembly. With the front panel assembly removed, the LCD display, keypad PCB, keypad membrane, and main PCB assemblies can be removed and replaced.

1. Place the Site Master face up on a work surface.

2. Remove the four rubber corner bumpers by carefully sliding the bumpers off of the case corners (Figure 12).

Figure 12. *Removing the Corner Bumpers*

3. With the bumpers removed, the access holes for the case screws are revealed. Use a Phillips screwdriver to remove the four screws securing the two halves of the Site Master case together.

4. Carefully lift up on the right side (as viewed from the front) of the front half of the case and begin to separate the two halves.

CAUTION

Do not force or pull the two halves of the case apart as there are delicate cables attached between the two halves that must be disconnected first.

5. Carefully depress the latch tab and disconnect the LCD display cable from J14 on the main PCB.

6. Carefully disconnect the keypad interface cable from J13 on the main PCB.

7. Carefully disconnect the LCD display backlight cable from J1 on the main PCB.

8. Remove the front panel assembly.

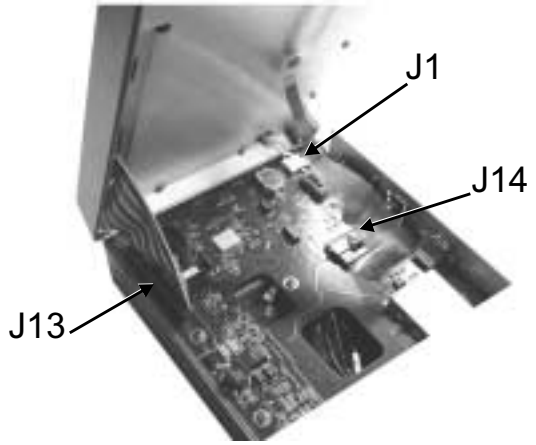

Figure 13. *Site Master Front Panel Cable Connections*

9. Reverse the above steps to replace the front panel assembly.

NOTE

The corner bumpers only mount one way. That is, the raised area inside one end of the bumper (Figure 13) is made to conform to the contour of the front cover only.

Figure 14. *Corner Bumper Detail*

10. LCD ASSEMBLY REPLACEMENT

This procedure provides instructions for removing and replacing the Liquid Crystal Display (LCD) once the front panel assembly has been separated from the Site Master.

1. Remove the front panel assembly as directed in section 9.
2. Place the front panel assembly face down on a protected work surface.
3. Remove the 14 Phillips screws that attach the backing plate to the front panel assembly.
4. Release the LCD display cable from the retaining clip on the front panel backing plate.

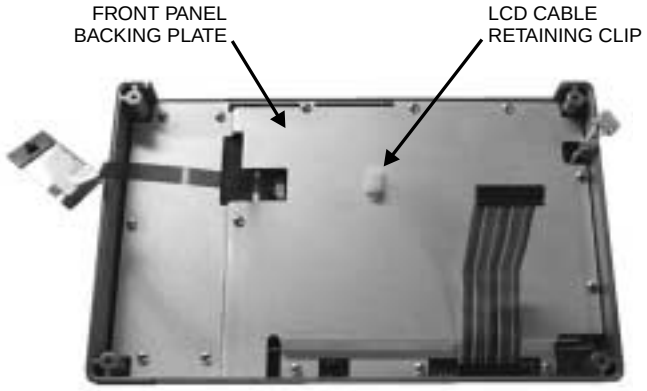

Figure 15. *Front Panel Backing Plate*

5. Remove the front panel backing plate, carefully feeding the LCD cable through the access hole to avoid damage to the cable or connector.
6. Remove the rubber cushion pad from the LCD assembly and remove the assembly.
7. Reverse the above steps to install the replacement assembly.

11. KEY PAD PCB REPLACEMENT

This procedure provides instructions for removing and replacing the key pad PCB.

1. Remove the front panel assembly as directed in section 9.
2. Place the front panel assembly face down on a protected work surface.
3. Remove the 14 Phillips screws that attach the backing plate to the front panel assembly.
4. Release the LCD display cable from the retaining clip on the front panel backing plate (Figure 15).
5. Remove the front panel backing plate, carefully feeding the LCD cable through the access hole to avoid damage to the cable or connector.
6. Remove the rubber cushion pad from the key pad PCB and remove the PCB.

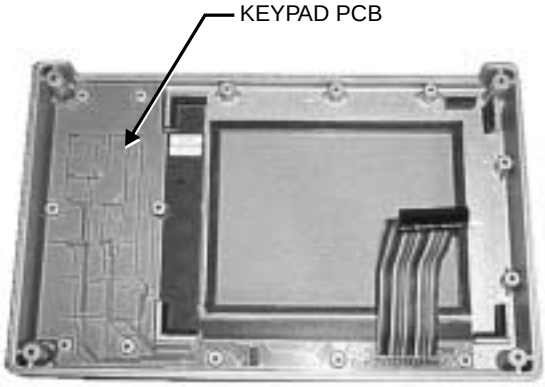

Figure 16. *Front Panel Keypad PCB Location*

7. Reverse the above steps to install the replacement assembly.

12. KEY PAD MEMBRANE REPLACEMENT

This procedure provides instructions for replacing the key pad membrane.

1. Remove the front panel assembly as directed in section 9.

2. Remove the key pad PCB as directed in section 11.

3. Remove the keypad membrane by gently pulling the membrane up and out of the holes in the front panel.

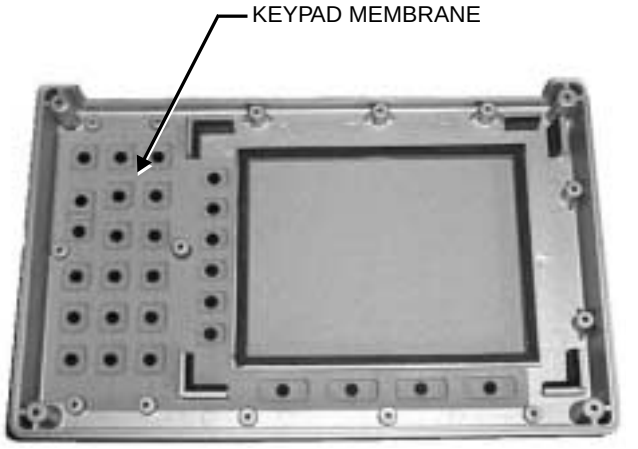

Figure 17. *Front Panel Keypad Membrane*

4. Reverse the above steps to install the replacement membrane.

13. PCB ASSEMBLY REPLACEMENT

This procedure provides instructions for replacing the PCB assembly with the connector panel attached. The assembly consist of the Main PCB and the RF PCB, which must be replaced together.

1. Remove the front panel assembly as directed in section 9.

2. Disconnect the battery connector from J18 on the Main PCB (Figure 18).

3. Remove the three PCB mounting screws and lift the Main PCB assembly up. Carefully unplug the Main PCB from the RF PCB at connector P3 (Figure 19).

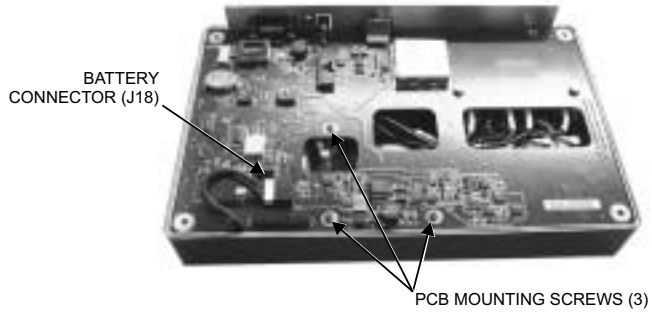

Figure 18. *Main PCB*

4. Hold the Main PCB up and remove the three .25” standoffs and four Phillips screws that secure the RF PCB. Remove and replace both boards as a unit.

NOTE

Calibration data requires that the Main PCB and the RF PCB be replaced only as a set. If the boards should somehow become separated, note that the 3-wire power connector from the Main PCB connects to P1 on the RF PCB. The RF coaxial cables are labeled as to where they connect on each PCB.

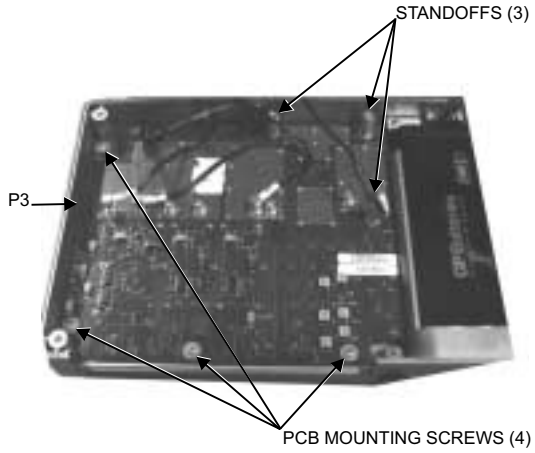

Figure 19. *RF PCB*

5. Reverse the above steps to install the new PCB assembly.

NOTE

The connector panel fits into grooves in the two halves of the case. Make sure the panel is correctly aligned with the grooves before reassembling the two halves together.

14. REPLACEABLE PARTS

Replaceable parts for the Site Master Models S810C and S820C are listed below.

Table 1. *Replaceable Parts List*

Part Number	Description	Qty
	Accessories	
10580-00076	User's Guide, Site Master S810C, S820C	1
10580-00077	Programming Manual, Site Master S810C, S820C (disk only)	1
2300-347	Software Tools CD, Site Master	1
SC6815	Calibration/Verification Kit	1
40-115	Universal AC Adapter	1
2000-1029	Battery Charger	1
34RSN50	Adapter, K(m) to N(f)	1
22N50	Open/Short, N Male	1
28N50-2	Precision Termination, N Male	1
22K50	Open/Short, K Male	1
28K50	Precision Termination, K Male	1
806-62	Automotive Power Adapter	1
800-441	Serial Interface Cable	1
551-1691	USB to RS232 Adapter Cable	1
48258	Soft Carrying Case	1
	Replaceable Parts	
ND57371	Option 5 Input Connector with Cable	1
15-102	Liquid Crystal Display Assembly	1
633-27	Rechargeable Battery, NiMH	1
ND59733	Main/RF PCB Assembly, S810C	1
ND59734	Main/RF PCB Assembly, S810C with Option 5	1
ND60713	Main/RF PCB Assembly, S810C with Option 11NF	1
ND60714	Main/RF PCB Assembly, S810C with Option 5 and Option 11NF	1
ND59735	Main/RF PCB Assembly, S820C	1
ND59736	Main/RF PCB Assembly, S820C with Option 5	1
ND60715	Main/RF PCB Assembly, S820C with Option 11NF	1
ND60716	Main/RF PCB Assembly, S820C with Option 5 and Option 11NF	1
52737-3	Keypad PCB Assembly	1
46649-1	Membrane Keypad, Main	1
633-26	Lithium Coin Clock Battery	1

Part Number	Description	Qty
	Hardware	
900-861	Pan Head Screw, 4-20, 0.365	19
900-869	Screw, 4-40, 0.875	4
900-720	Screw, 4-40, 0.187	3
900-697	Screw, 4-40, 0.312	3
785-927	M-F Stand off, 4-40, 11/16	3
900-326	Kep Nut, 4-40, 0.187	8
	Case Parts	
46652-1	Top Case	1
46653-1	Bottom Case	1
48231-1	Battery Door	1
790-509 790-510 790-511	Battery Door Latch (3 pieces)	1
46655	Case Corner Bumpers	4
46662	LCD Retainer Plate	1
48241	Foam, LCD Corners	8
48278	Foam, LCD Window	1
46659	Foam, LCD Backing	1
46661	Foam, Keypad Backing	1
48246	Foam, Battery Door	4
720-19	Cable Clamp	1
790-515	Spring, Battery Compartment	1
55257	ID Label, Model S810C	1
55259	ID Label, Model S820C	1

Table 2. *Anritsu Service Centers*

UNITED STATES

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

ANRITSU COMPANY
10 NewMaple Ave., Suite 305
Pine Brook, NJ 07058
Telephone: 973-227-8999
FAX: 973-575-0092

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: 03-9558-8177
FAX: 03-9558-8255

BRAZIL

ANRITSU ELECTRONICA LTDA.
Praia de Botafogo 440. Sala 2401
CEP22250-040,Rio de Janeiro,RJ, Brasil
Telephone: 021-527-6922
FAX: 021-53-71-456

CANADA

ANRITSU INSTRUMENTS LTD.
700 Silver Seven Road, Suite 120
Kanata, Ontario K2V 1C3
Telephone: (613) 591-2003
FAX: (613) 591-1006

CHINA (SHANGHAI)

ANRITSU ELECTRONICS CO LTD
2F,Rm.B, 52 Section Factory Bldg.
NO 516 Fu Te Road (N)
Waigaoqiao Free Trade Zone
Pudong, Shanghai 200131
PR CHINA
Telephone: 86-21-58680226
FAX: 86-21-58680588

FRANCE

ANRITSU S.A
9 Avenue du Quebec
Zone de Courtaboeuf
91951 Les Ulis Cedex
Telephone: 016-09-21-550
FAX: 016-44-61-065

GERMANY

ANRITSU GmbH
Grafenberger Allee 54-56
D-40237 Dusseldorf
Germany
Telephone: 0211-968550
FAX: 0211-9685555

INDIA

MEERA AGENCIES (P) LTD
23 Community Centre
Zamrudpur, Kailash Colony Extension
New Delhi, India 110 048
Telephone: 011-6442700/6442800
FAX: 011-6442500

ISRAEL

TECH-CENT, LTD
4 Raul Valenberg St.
Tel-Aviv, Israel 69719
Telephone: (03) 64-78-563
FAX: (03) 64-78-334

ITALY

ANRITSU Sp.A
Rome Office
Via E. Vittorini, 129
00144 Roma EUR
Telephone: (06) 50-2299-711
FAX: (06) 50-22-4252

JAPAN

ANRITSU CUSTOMER SERVICE LTD.
1800 Onna Atsugi—shi
Kanagawa-Prf. 243 Japan
Telephone: 0462-96-6688
FAX: 0462-25-8379

KOREA

ANRITSU SERVICE CENTER
8F Sanwon Bldg.
1329-8 Seocho-Dong
Seocho-Ku
Seoul, Korea 137-070
Telephone: 82-2-581-6603
FAX: 82-2-582-6603

SINGAPORE

ANRITSU (SINGAPORE) PTE LTD
10, Hoe Chiang Road
#07-01/02
Keppel Towers
Singapore 089315
Telephone:65-282-2400
FAX:65-282-2533

SOUTH AFRICA

ETESCSA
12 Surrey Square Office Park
330 Surrey Avenue
Ferndale, Randburt, 2194
South Africa
Telephone: (11) 787-7200
Fax: (11) 787-0446

SWEDEN

ANRITSU AB
Botvid Center
Fittja Backe 13A
145 84
Stockholm, Sweden
Telephone: (08) 534-707-00
FAX: (08) 534-707-30

TAIWAN

ANRITSU CO., LTD.
6F, No. 96, Section 3
Chien Kuo N. Road
Taipei, Taiwan, R.O.C.
Telephone: (02) 515-6050
FAX: (02) 509-5519

UNITED KINGDOM

ANRITSU LTD.
200 Capability Green
Luton, Bedfordshire
LU1 3LU, England
Telephone: 015-82-43-3200
FAX: 015-82-73-1303

NOTES

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