

Maintenance Manual

Site Master™

S331L

**Handheld Cable and Antenna Analyzer
Featuring Classic and Advanced Modes**

**2 MHz to 4 GHz Cable & Antenna Analyzer
50 MHz to 4 GHz Power Meter**

Anritsu

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Chapter 1 — General Information

1-1 Introduction

This manual provides maintenance instructions for Anritsu Site Master Model S331L. The manual includes:

- General information in this chapter, including:
 - Verification Equipment List ([Table 1-1](#))
 - Replaceable parts list ([Table 1-2](#))
- Performance verification procedures ([Chapter 2, “S331L Performance Verification”](#))
- Battery pack information ([Chapter 3, “Battery Information”](#))
- Parts replacement procedures ([Chapter 4, “Assembly Replacement”](#))
- Troubleshooting procedures ([Chapter 5, “Troubleshooting”](#))
- Blank test records are included in [Appendix A](#).
 - Copy the blank test records from [Appendix A](#) and use them to record measured values. These test records form a record of the performance of your instrument. Anritsu recommends that you make a copy of the blank test records to document the measurements each time a Performance Verification is performed. Continuing to document this process each time it is performed provides a detailed history of instrument performance, which can allow you to observe trends.

Familiarity with the basic operation of the front panel keys (for example, how to change measurement mode, preset the unit, or the meaning of soft key or submenu) is assumed. Refer to the instrument’s User Guide for additional information.

Caution Before making any measurement, verify that all equipment has warmed up for at least 30 minutes.
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1-2 Contacting Anritsu

To contact Anritsu, follow the link www.anritsu.com/contact-us and select the services in your region.

1-3 Product Information, Compliance, and Safety

Read the Handheld Instruments Product Information, Compliance, and Safety Guide (PN: 10100-00065) for important safety, legal, and regulatory notices before operating the equipment. For additional information and literature, visit www.anritsu.com and go to the Test and Measurement Products page to find your instrument type and model, then select the Library tab.

1-4 Recommended Test Equipment

The following test equipment is recommended for use in testing and maintaining the S331L. [Table 1-1](#) is a list of test equipment that is required for verifying the S331L Cable and Antenna Analyzer.

Table 1-1. Test Equipment Required for Cable and Antenna Analyzer Verification and Calibration

Instrument	Critical Specification	Recommended Manufacturer/Model
Frequency Counter	Frequency: 2 GHz	Anritsu Model MF2412B
Open/Short	Frequency: DC to 18 GHz	Anritsu Model 22N50
Precision Load	Frequency: DC to 18 GHz Return Loss: 40 dB min.	Anritsu Model SM/PL-1
6 dB Offset Termination	Frequency: DC to 4.0 GHz	Anritsu Model SC5905
20 dB Offset Termination	Frequency: DC to 4.0 GHz	Anritsu Model SC5906
Synthesized Signal Source	Frequency: 0.1 Hz to 6 GHz Power Output to +13 dBm	Anritsu Model MG3692B with options 2, 3, 4, 22, 15
Power Meter	Power Range: –70 dBm to +20 dBm	Anritsu Single Channel Model ML2437A
Power Sensor	Frequency: 100 kHz to 18 GHz Power Range: –55 dBm to +20 dB	Anritsu Model SC7400
Power Splitter	Frequency: DC to 18 GHz	Aeroflex/Weinschel Model 1870A
RF Coaxial Cable	Frequency: DC to 18 GHz N(m) to N(m), 50 ohm	Anritsu Model 15NN50-0.6B
RF Coaxial Cable	Frequency: DC to 18 GHz N(m) to N(f), 50 ohm	Anritsu Model 15NNF50-0.6B

1-5 Replaceable Parts

Table 1-2. List of Replaceable Parts

Part Number	Description
ND72098<R>	S331L MB/VNA Assembly, Rev 1 units
3-ND80377<R>	S331L MB/VNA Assembly, Rev 2 units
3-ND72099<R>	Power Meter / InstaCal Module with 4 screws
3-15-170	LCD Display including Touch Screen
2000-1676-R	Soft Carrying Case
3-72223	Stylus Pen and Leash (attaches to the Soft Carrying Case)
3-ND74880	Front Case with model ID label, Encoder and Knob
3-ND74881	Rear Case with 4 screws, Anritsu Label, SN Label and Windows License
3-72332-1	Model S331L ID Label
3-ND74882	Battery Cover with 6 screws
3-ND74886	Li-ion Batteries (Qty 2)
3-ND74895	USB Cover
3-ND74883	Top Plate with 6 screws
3-ND81542	Top and Bottom Bumper Set
ND74884	N Connector Plate with cover, nut and washer, Rev 1 units
3-ND83117	N Connector Plate with cover, nut and washer, Rev 2 units
3-72317-1	Keypad to Main board cable
3-70674-3	LCD to Main board cable
40-187-R	AC to DC Power Converter
ND72100	Keypad PCB, includes speaker and 8 screws, Rev 1 units
3-ND80379	Keypad PCB, includes speaker and 8 screws, Rev 2 units
3-71015	Rubber Keypad
3-61360-2	Knob (excluding encoder)
3-72305	Front LCD Gasket
3-72315	Rear LCD Gasket
ND74885	Bracket for the Main Board, includes battery foam and 8 screws
2000-1687-R	N-connector Thumb Wheel

1-6 Firmware Updates

Refer to the S331L User Guide (Anritsu Part Number 10580-00321) for the procedure on updating the firmware.

Chapter 2 — S331L Performance Verification

2-1 Introduction

These tests verify the Cable and Antenna Analyzer, Power Meter and InstaCal functionality on the S331L Site Master. The functional tests include:

- [“Frequency Accuracy Verification” on page 2-1](#)
- [“Return Loss Accuracy Verification” on page 2-2](#)
- [“Power Meter Verification” on page 2-3](#)
- [“InstaCal Verification” on page 2-5](#)

2-2 Frequency Accuracy Verification

The following test is used to verify the CW frequency accuracy of the S331L's RF Source in Cable and Antenna Analyzer mode.

Equipment Required

- Frequency Counter Frequency: 2 GHz Anritsu Model MF2412B
- RF Coaxial Cable Freq: DC to 18 GHz, N(m) to N(m), 50 Ohm, Anritsu Model 15NN50-0.6B

Procedure

1. Verify that the S331L is in Cable and Antenna Analyzer mode and preset the unit.
2. Press **ESC** then the **Sweep (3)** key.
3. Verify that the RF Immunity is set to High.
4. Press the **Freq/Dist** menu key and set both the Start Freq and Stop Freq to 1 GHz.
5. Connect the RF cable from the S331L RF Out/Reflect In to the Frequency Counter.
6. Record the frequency data in [Table A-1, “Cable and Antenna Analyzer Frequency Accuracy” on page A-2](#).
7. Press the **Freq/Dist** menu key and set both the Start Freq and Stop Freq to 3 GHz.
8. Record the frequency data in [Table A-1](#).

2-3 Return Loss Accuracy Verification

The following test can be used to verify the accuracy of return loss measurements. Open/Short/Load calibration of the S331L in Cable and Antenna Analyzer mode is required for this test.

Equipment Required

- Open/Short Frequency: DC to 18 GHz Anritsu Model 22N50
- Precision Load: Anritsu Model SM/PL-1
- 6 dB Offset Termination Frequency: DC to 18.0 GHz Anritsu Model SC5905
- 20 dB Offset Termination Frequency: DC to 18.0 GHz Anritsu Model SC5906

Procedure

1. Verify that the S331L is in Cable and Antenna Analyzer mode and preset the unit.
2. Press the **Measurement** menu key, then press the Return Loss soft key.
3. Press the **Calibration** menu key.
4. Press the Start Calibration soft key. Follow the instructions on the screen using an OSL Cal Method and the Standard Cal Type to perform a calibration.
5. After the calibration is complete, install the 6 dB offset termination.
6. Press the **AutoScl** (.) key to adjust the display for the current trace.
7. Record the min and max values in [Table A-2, “Cable and Antenna Analyzer Return Loss Accuracy Verification” on page A-2](#).
8. Remove the 6 dB offset and install the 20 dB offset.
9. Press the **AutoScl** (.) key to adjust the display for the current trace.
10. Record the min and max values in [Table A-2](#).

2-4 Power Meter Verification

The following test can be used to verify the accuracy of the Power Meter.

Equipment required

- Power Meter: Anritsu Model ML2437A
- Power Sensor: Anritsu Model SC7400
- Synthesizer: Anritsu Model MG3692B
- Power Splitter: Aeroflex/Weinschel Model 1870A
- RF Coaxial Cable: Anritsu Model 15NN50-0.6B

Procedure

1. Connect the SC7400 power sensor to the ML2437A power meter and zero/cal the sensor.
2. Set the SC7400 cal factor to 100 MHz or the next frequency within [Table A-3, “Power Meter Verification” on page A-3](#).
3. Put S331L into Power Meter Mode, choose Calibration and turn Zero On.
4. Press the Frequency key and set the Measurement Frequency to 100 MHz or the next frequency within [Table A-3](#).
5. Connect the MG3692B, SC7400 and S331L to the power splitter as shown in [Figure 2-1](#).

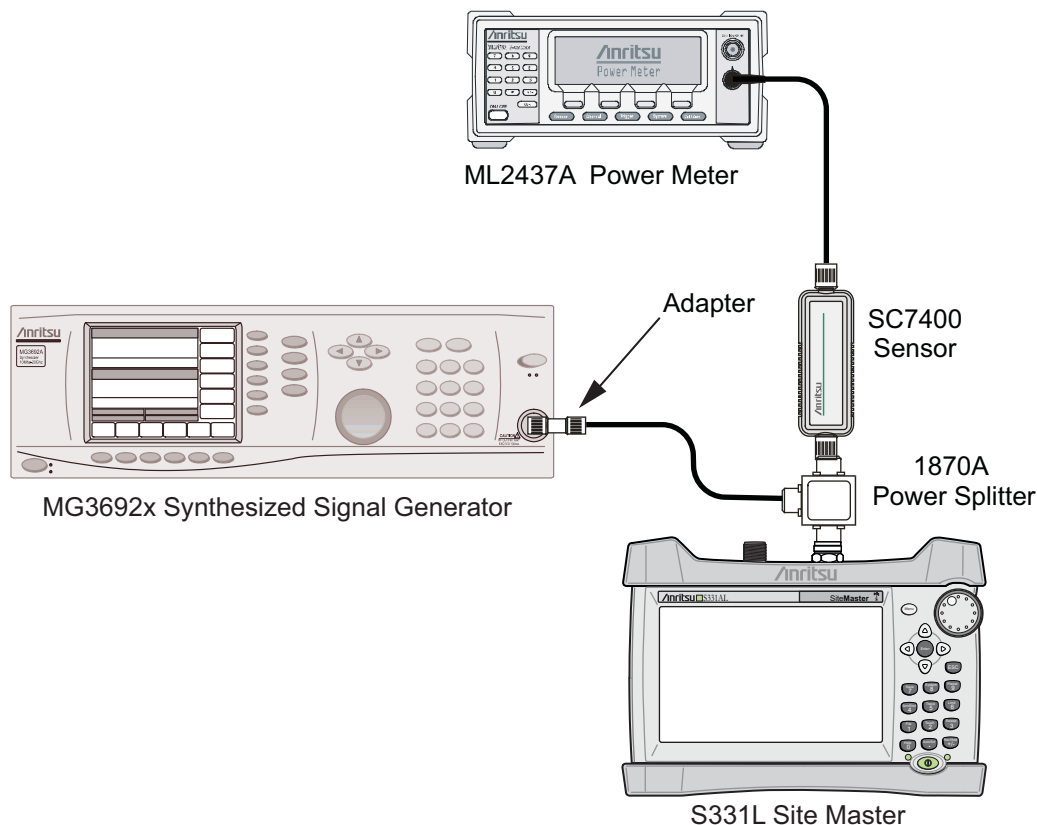


Figure 2-1. Power Meter Measurement Accuracy

6. On the MG3692B, set the frequency to 100 MHz or the next frequency within [Table A-3](#) and adjust the power level so the ML2437A shows 0.0 dBm.
7. Record the S331L's power reading in [Table A-3](#).

8. Adjust the MG3692B's power level so the ML2437A reads -30 dBm.
9. Record the S331L's power reading in [Table A-3](#).
10. Repeat Step 2 through Step 9 for the other frequencies within [Table A-3](#).

2-5 InstaCal Verification

The following test can be used to verify the accuracy of return loss measurements using the InstaCal module to perform an OSL calibration on the S331L.

Equipment Required

- 6 dB Offset Termination Frequency: DC to 18.0 GHz Anritsu Model SC5905
- 20 dB Offset Termination Frequency: DC to 18.0 GHz Anritsu Model SC5906

Procedure

1. Verify that the S331L is in **Cable and Antenna Analyzer** mode and preset the unit.
2. Press the **Measurement** menu key, then press the **Return Loss** soft key.
3. Press the **Calibration** menu key.
4. Press the **Start Calibration** soft key. Follow the instructions on the screen using an InstaCal Cal Method and the **Standard Cal Type** to perform a calibration.
5. After the calibration is complete, remove the cable from the InstaCal port and install the 6 dB offset termination to the end of the cable.
6. Press the **AutoScl** (.) key to adjust the display for the current trace.
7. Record the min and max values in [Table A-4, “Insta Cal Verification” on page A-4](#).
8. Remove the 6 dB offset and install the 20 dB offset.
9. Press the **AutoScl** (.) key to adjust the display for the current trace.
10. Record the min and max values in [Table A-4](#).

Chapter 3 — Battery Information

3-1 General Information

The following information relates to the care and handling of the Anritsu PN ND74886 Lithium-Ion battery pack. The S331L has two separate batteries that should be replaced as a pair. The ND74886 includes two batteries. For information on removing and replacing the S331L batteries, see [Section 4-1 “Replacing the S331L Batteries” on page 4-1](#)

- The batteries supplied with the S331L may need charging before use. Before using the Site Master, charge the internal batteries using the AC-DC Adapter PN 40-187-R.
- Use only Anritsu approved battery packs.
- Recharge the battery only in the S331L, do not attempt to charge in an external charger.
- When the S331L is not in use, and the battery is fully charged, 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 affect the ability of the battery to charge: allow the battery to cool down or warm up as necessary before use or charging.
- Discharge the 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 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.

Chapter 4 — Assembly Replacement

This section will provide a list of tools and procedures to replace the sub-assemblies within the S331L.

Tools Required:

- #1 Philips Screw Driver
- #6 Torx Screw Driver
- 19mm wrench

4-1 Replacing the S331L Batteries

Caution

Electrostatic Discharge (ESD) can damage the highly sensitive circuits in the instrument.

Repair of damage that is found to be caused by electrostatic discharge is not covered under warranty.

The S331L contains components that can be easily damaged by electrostatic discharge (ESD). An ESD safe work area and proper ESD handling procedures that conform to ANSI/ESD S20.20-1999 or ANSI/ESD S20.20-2007 is mandatory to avoid ESD damage when handling subassemblies or components found in the instrument.

This procedure provides instructions for replacing the batteries in the S331L.

1. Remove the bottom bumper..



Figure 4-1. Bottom Bumper Removal

2. Remove the six screws from the bottom of the unit holding the battery cover in place, and remove the battery cover.



Figure 4-2. Battery Cover Removed

3. Remove the battery connectors from the Main board by gently pulling on them and then remove the batteries from the unit..



Figure 4-3. Unplug the Battery Connectors and Remove the Batteries

4. Inserting batteries is the reverse of removing them.

4-2 Removing the Rear Case to Gain Access to Internal Assemblies

1. Remove the batteries as described in [Section 4-1 “Replacing the S331L Batteries”](#)
2. Remove the USB/Power cover assembly by removing the 4 screws.



Figure 4-4. USB / Power Cover Removal

3. Remove the RF Out mounting plate by removing the nut and washer holding the plate to the unit.



Figure 4-5. RF Out Mounting Plate Removed

4. Remove the InstaCal/PM module by removing the four screws holding the module in place and then gently pulling the module out.



Figure 4-6. Remove 4 screws and InstaCal / PM Module

5. Remove the top bumper, so now both bumpers, batteries, battery cover, RF Out top plate and the InstaCal/PM module are all removed..



Figure 4-7. Both Bumpers, Batteries, Battery Cover, RF Out Mounting Plate and InstaCal/PM Module Removed

6. Place the unit face down on a flat smooth surface, so the LCD and Touch screen will not get scratched and remove the four screws (one in each corner).



Figure 4-8. Place Unit Face Down and Remove Four Screws

7. Gently pry the top and bottom covers apart and remove the back cover..



Figure 4-9. Back Cover Removed

8. Closing the case is the reverse of opening.

4-3 Main/VNA PCB Assembly Replacement

Note Procedures in this section are generic, and apply to many similar instruments. Photos and illustrations used are representative and may not match your instrument.

This section describes the removal and replacement of the Main/VNA PCB which is attached to the S331L Case.

1. Remove the batteries as described in [Section 4-1 “Replacing the S331L Batteries”](#) on page 4-1
2. Remove the rear case as described in [Section 4-2 “Removing the Rear Case to Gain Access to Internal Assemblies”](#) on page 4-3.
3. Disconnect the white Keypad and black LCD cable from the Main board..

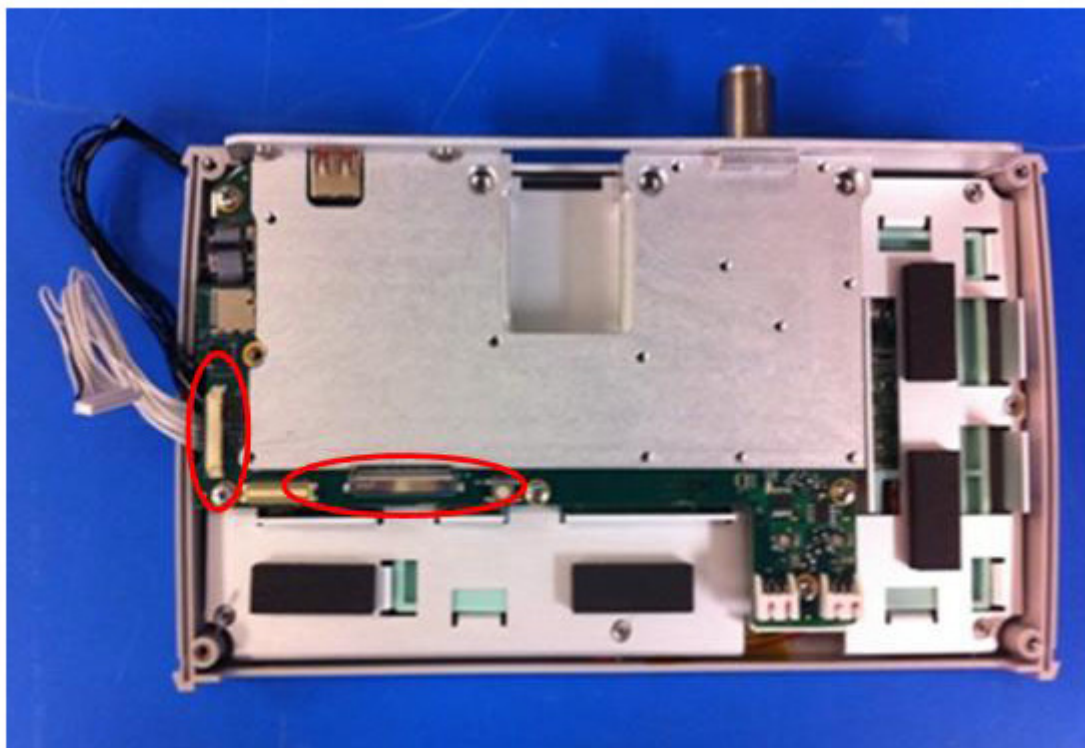


Figure 4-10. Disconnect White Keypad and Black LCD Cables from Main Board

4. Remove the 7 screws holding the VNA assembly to the LCD bracket.

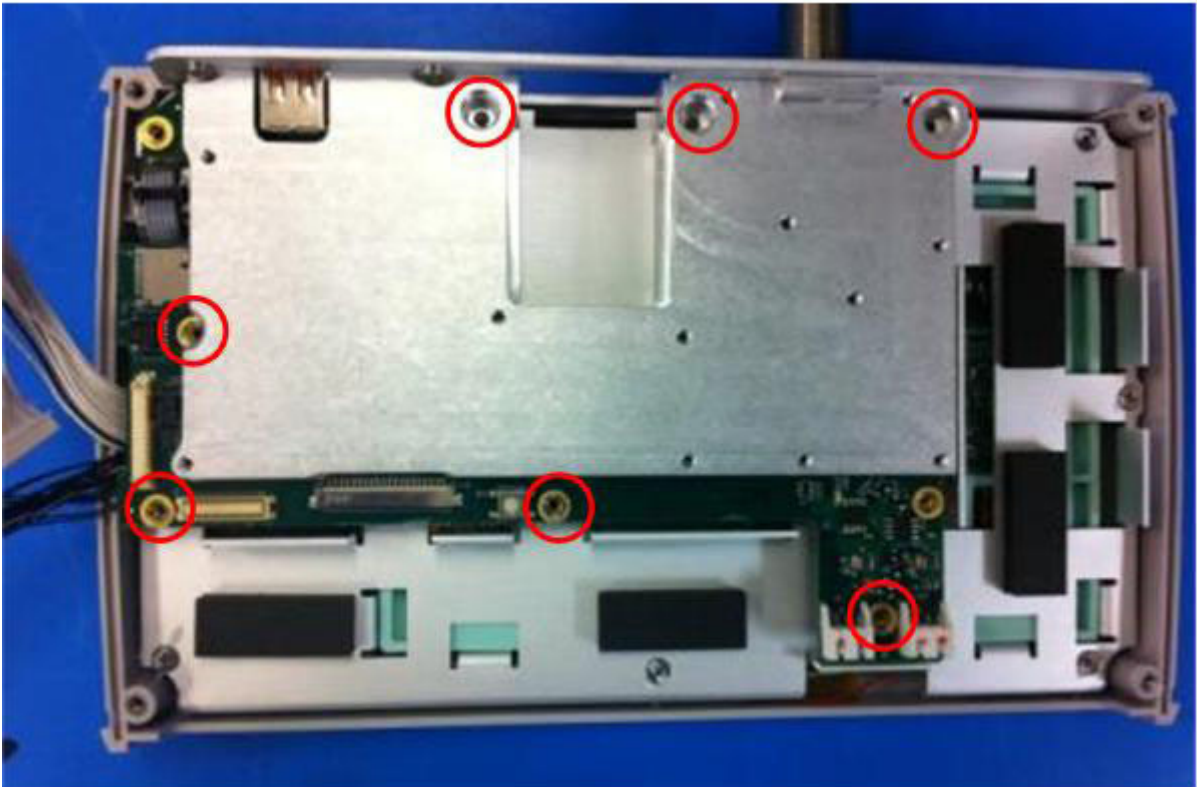


Figure 4-11. Remove 9 Screws

5. Gently separate the VNA from the LCD bracket.
6. Installation is the reverse of removal. Take care to properly fit the connector panel into the grooves in the top of the case and confirm that none of the cables will be pinched when the back case is re-installed.

4-4 InstaCal / Power Meter Assembly Replacement

1. Remove the four screws circled in [Figure 4-12](#).



Figure 4-12. InstaCal / Power Meter Removal

2. Gently pull the InstaCal / Power Meter Assembly out of the unit.
3. Installation is the reverse of removal.

4-5 LCD and Touch Screen Assembly Replacement

This procedure provides instructions for removing and replacing the Liquid Crystal Display (LCD) and touch screen assembly.

1. Remove the batteries as described in [Section 4-1 “Replacing the S331L Batteries”](#) on page 4-1.
2. Remove the rear case as described in [Section 4-2 “Removing the Rear Case to Gain Access to Internal Assemblies”](#) on page 4-3.
3. Remove the VNA Assembly as described in [Section 4-3 “Main/VNA PCB Assembly Replacement”](#) on page 4-6
4. Remove the 8 screws connecting the LCD bracket to the front half of the case ([Figure 4-13](#)).

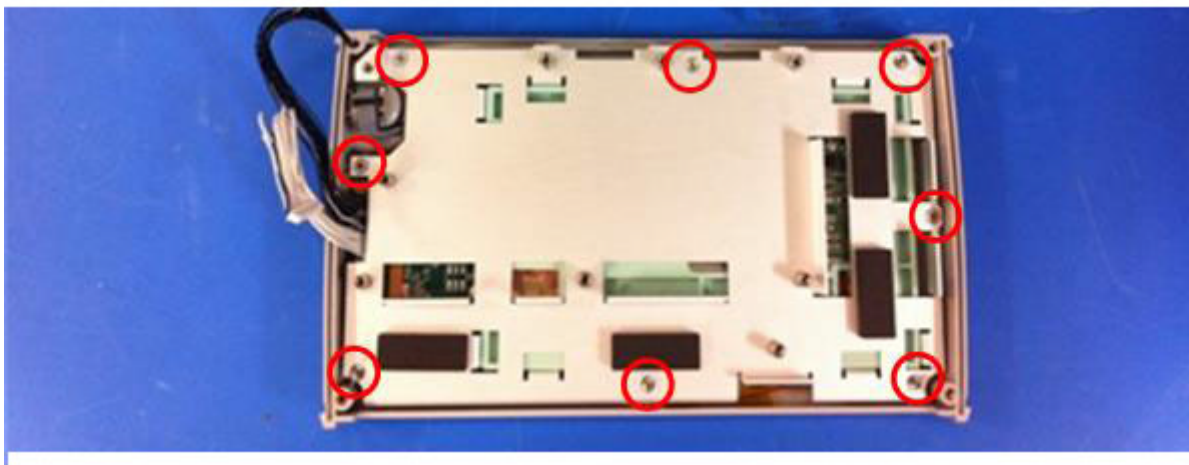


Figure 4-13. Removing the LCD Assembly

5. Remove the LCD rear gasket.



Figure 4-14. Remove Rear Gasket

6. Remove the red and white cable from the keypad PCB by gently pulling it out of the connector.

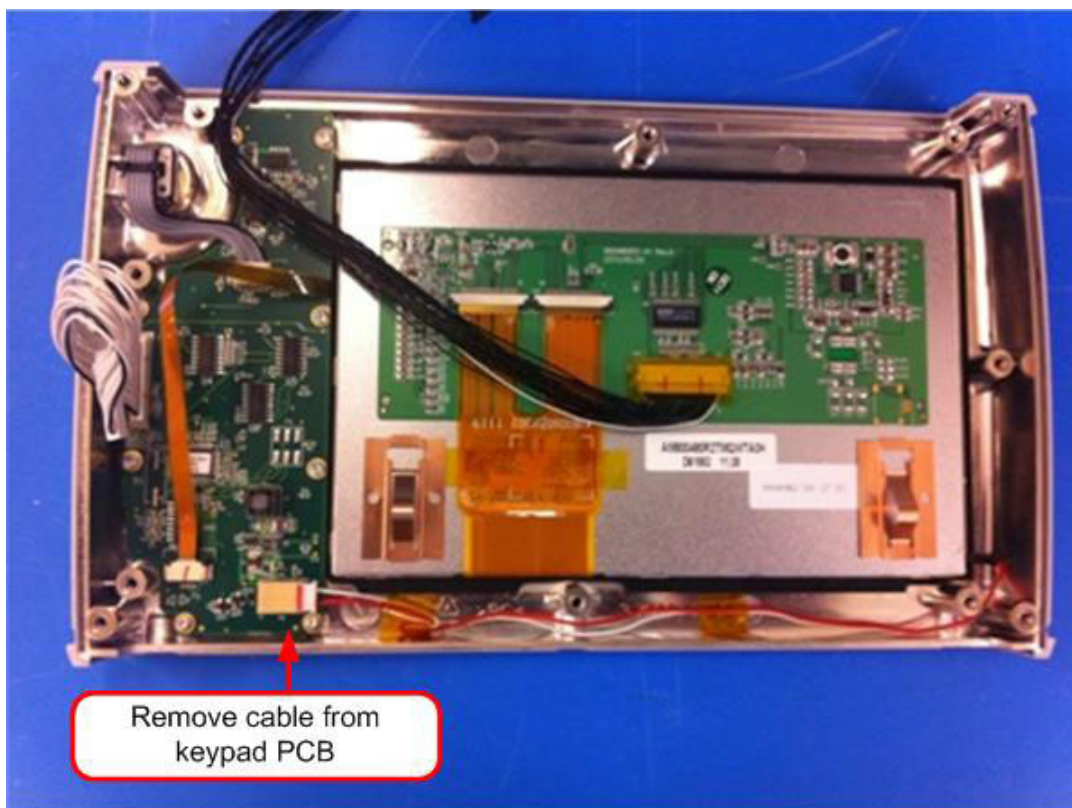


Figure 4-15. Remove Red and White Cable

7. Unlock the flex cable connector and remove the flex cable from the keypad PCB.

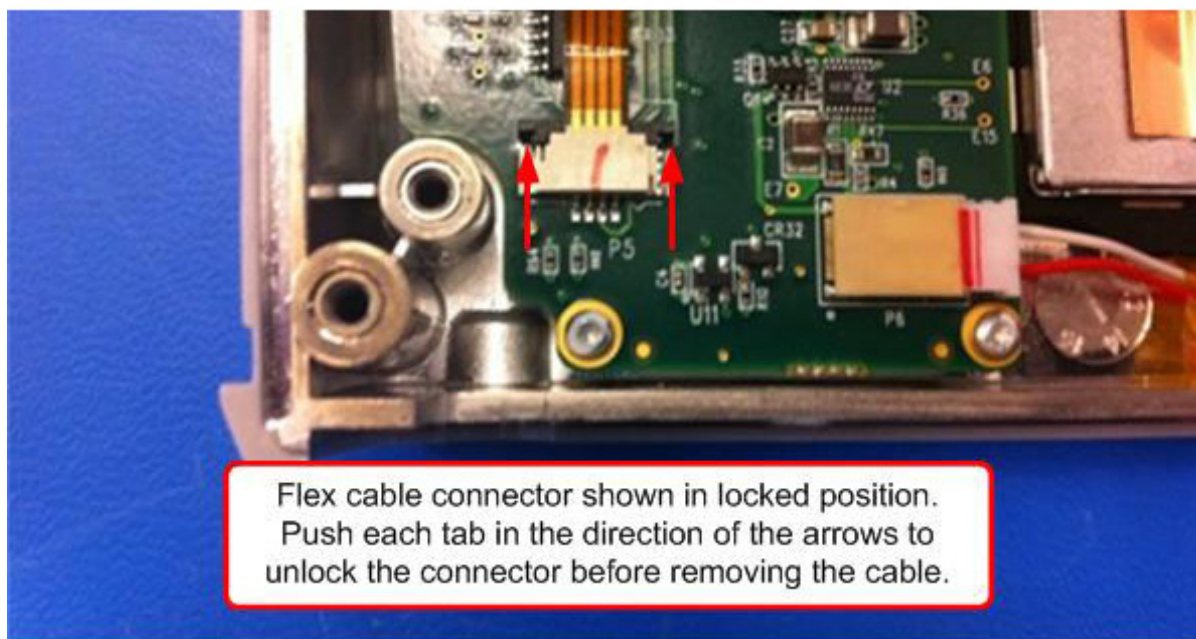


Figure 4-16. Flex Cable in Locked Position

8. Once the flex cable connector is in the unlocked position, then gently pull the flex cable out of the connector.

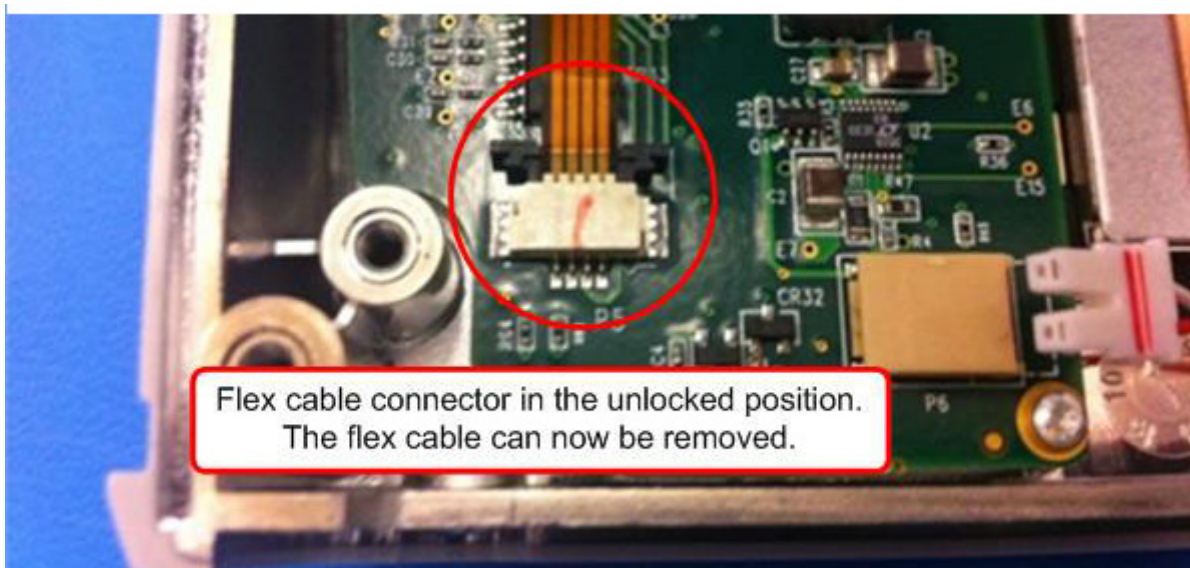


Figure 4-17. Flex Cable Connector in Unlocked Position

9. Gently remove the LCD and touch screen assembly from the front case.
10. Remove the 20 wire cable from the rear of the LCD, which connects the LCD to the Main board.
11. Installation is reverse of the removal.

4-6 Keypad PCB and Rubber Keypad Replacement

1. Remove the batteries as described in [Section 4-1 “Replacing the S331L Batteries”](#) on page 4-1.
2. Remove the rear case as described in [Section 4-2 “Removing the Rear Case to Gain Access to Internal Assemblies”](#) on page 4-3.
3. Remove the VNA Assembly as described in [Section 4-3 “Main/VNA PCB Assembly Replacement”](#) on page 4-6
4. Remove the LCD and Touch Screen Assembly as described in [Section 4-5 “LCD and Touch Screen Assembly Replacement”](#) on page 4-9
5. Gently unplug the encoder cable and use a T6 torx screw driver to remove the 8 torx screws.

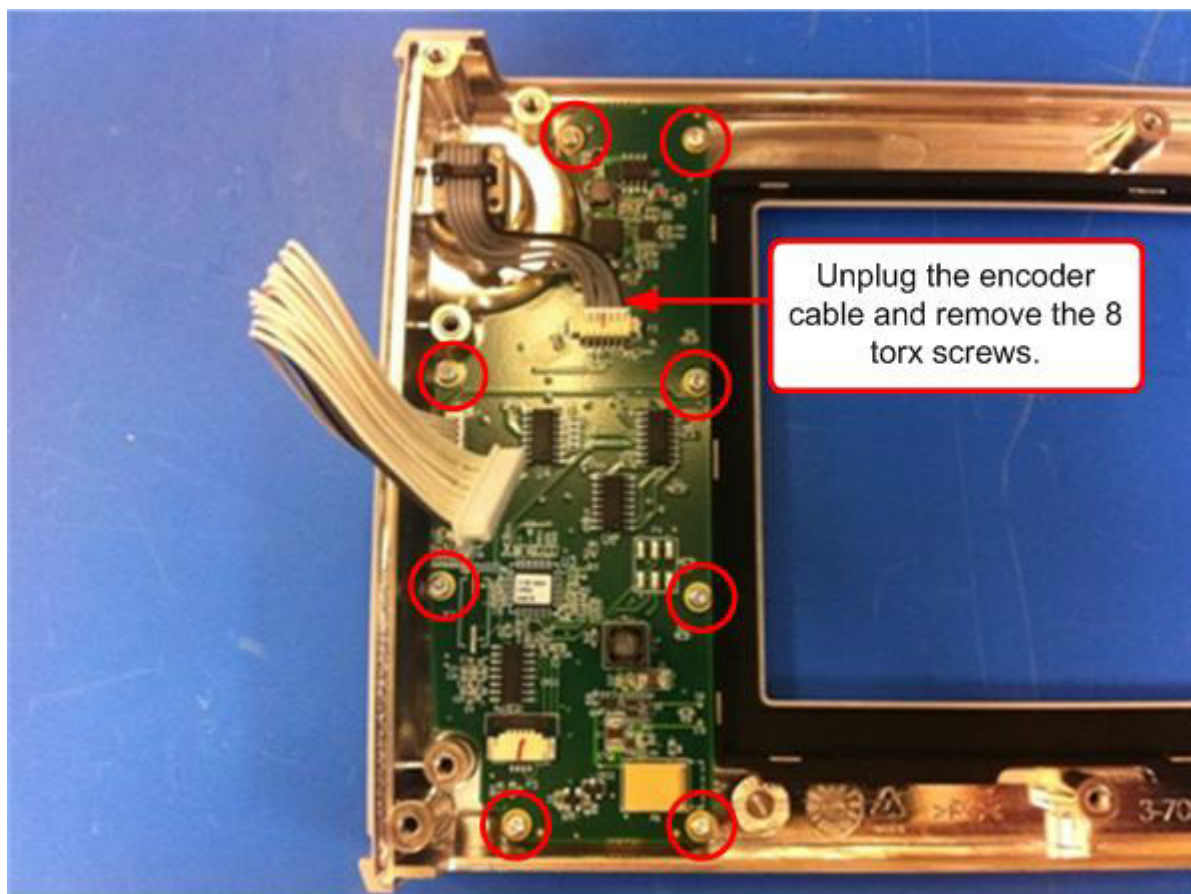


Figure 4-18. Remove Encoder Cable and 8 Torx Screws

6. Carefully remove the keypad PCB from the front case.
7. Once the keypad PCB is removed the rubber keypad can also be replaced if necessary.
8. Installation is reverse of removal.

4-7 SOM Module Replacement

This procedure provides instructions for removing and replacing the SOM module attached to the Main/VNA PCB.

1. Remove the batteries as described in [Section 4-1 “Replacing the S331L Batteries”](#) on page 4-1.
2. Remove the Rear Case as described in [Section 4-2 “Removing the Rear Case to Gain Access to Internal Assemblies”](#) on page 4-3
3. Remove the Main/VNA PCB assembly from the front panel as described in [Section 4-3 “Main/VNA PCB Assembly Replacement”](#) on page 4-6.
4. Remove the top plate by removing the 6 screws shown in [Figure 4-19](#). Note one screw cannot be seen, the arrow is pointing to its location.

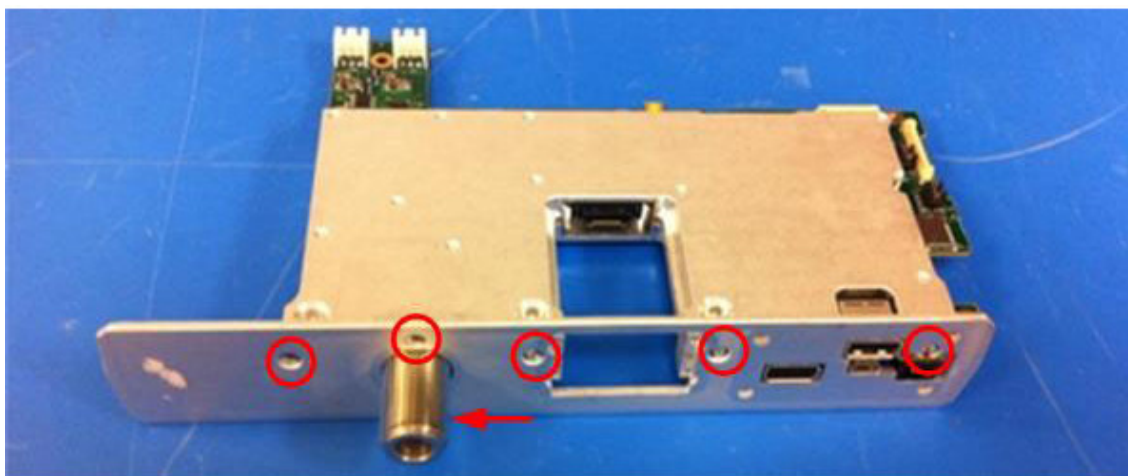


Figure 4-19. Top Plate Removal

5. Remove the two shields on the Main/VNA PCB assembly by removing the 14 screws shown in [Figure 4-20](#).

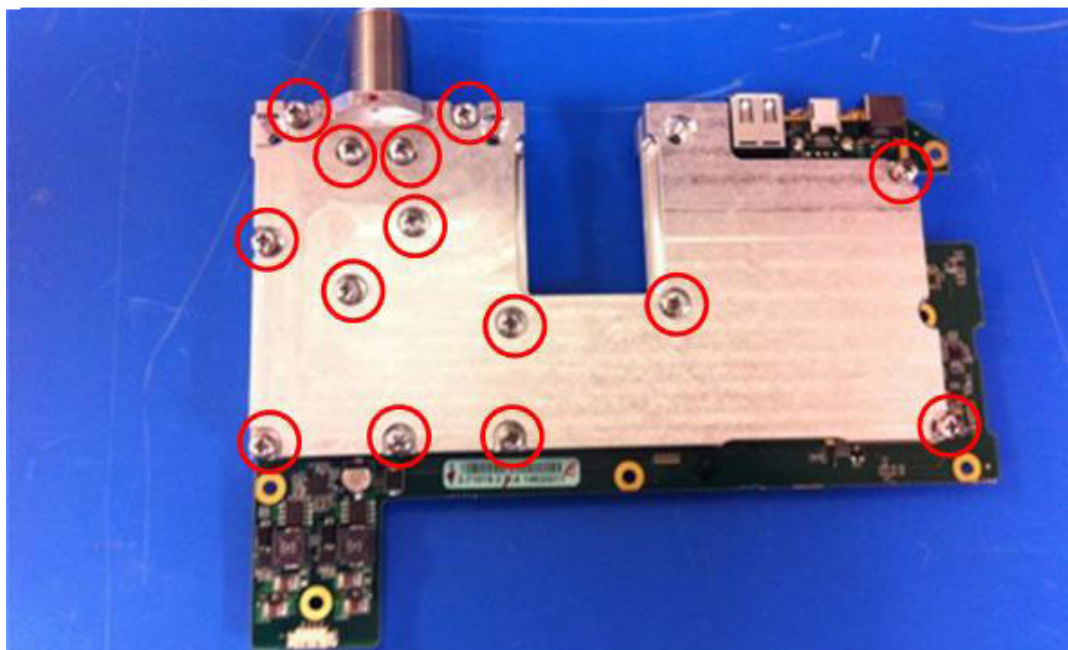


Figure 4-20. Shield Removal

6. With the shields removed the SOM Module can now be removed by gently prying up at each end where the arrows are located until the module releases from the Main/VNA PCB, see [Figure 4-21](#). Make note of the orientation of the SOM Module so it can be installed the same way. For installation gently press the new SOM module in place by supporting the back side of the Main/VNA PCB, to prevent the Main PCB from flexing..

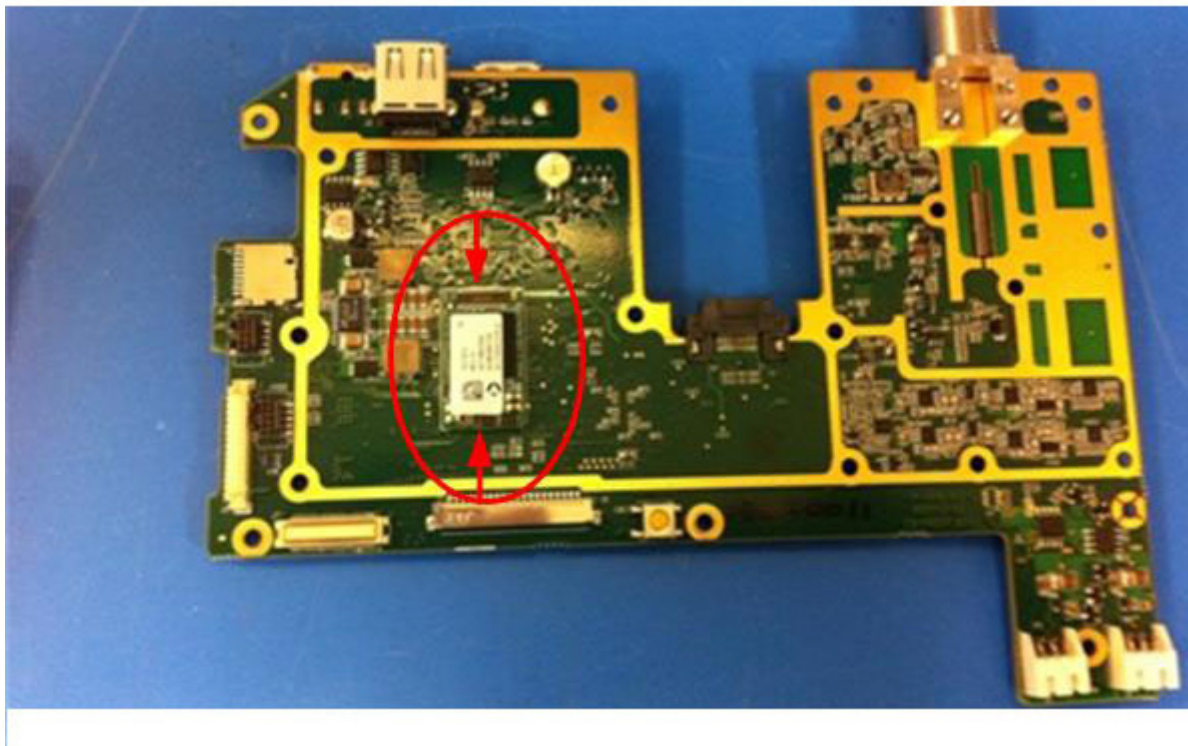


Figure 4-21. With Shields Removed the SOM Can Be Removed

7. After the SOM module has been replaced, then Test Fixture T4011 is needed to re-install the two shields to the Main board.



Figure 4-22. Test Fixture T4011 with Lever in Up Position

8. Install the bottom shield, main PCB and top shield into the T4011 test fixture. Align the screw holes and press the lever to the down position to secure the parts. Once the parts are secure, install the 14 screws to secure the shields to the main PCB.

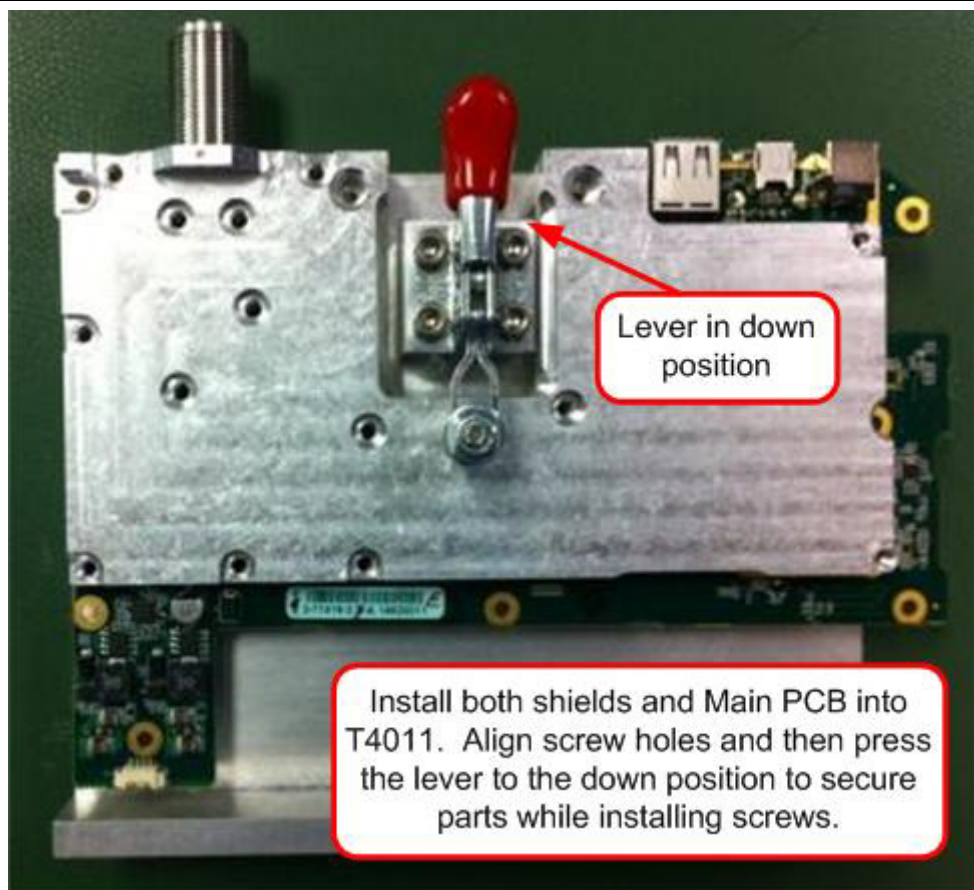


Figure 4-23. Shields, Main PCB and T4011 Test Fixture

9. Install the top plate and remove the Main PCB assembly from the T4011 test fixture.

Chapter 5 — Troubleshooting

5-1 Introduction

This chapter describes the primary troubleshooting operations that can be performed by all Anritsu Service Centers. Perform the troubleshooting suggestions in the order they are listed. Operators of the S331L should refer to the User Guide for troubleshooting help.

Only qualified Anritsu personnel should replace internal assemblies. Major subassemblies shown in [Table 1-2, “List of Replaceable Parts” on page 1-3](#) are typically the items that may be replaced. Because they are highly fragile, items that must be soldered may not be replaced without special training. Removal of RF shields from PC boards or adjustment of screws on or near the shields will detune sensitive RF circuits and will result in degraded instrument performance.

Turn-on Problems

Unit cannot boot-up, no activity occurs when the On/Off key is pressed:

1. Batteries may be fully discharged. Confirm the batteries are installed into the unit and connect the AC to DC converter (Anritsu part number 40-187-R) to the unit allowing the batteries to charge.
2. Battery may be the wrong type. Use only Anritsu approved battery packs. Some non-approved battery packs will fit into the S331L, but are electrically incompatible and will not charge correctly.
3. External power supply may have failed or be the wrong type. Replace the external power supply.
4. On/Off switch is damaged. Replace the keypad PCB or rubber keypad.
5. Main PCB has failed. Replace the Main PCB including the SOM assembly.

Unit begins the boot process, but does not complete boot-up:

1. SOM has failed. Replace the SOM assembly.
2. Main PCB has failed. Replace the Main PCB including the SOM assembly.

Unit makes normal boot-up sounds, but the display has a problem:

1. If the display is dim, check the Brightness setting under the System, Display/Audio Menu.
2. Verify the cable between the LCD and Main PCB is properly seated.
3. Replace the LCD and touch screen assembly.
4. The Main PCB has failed. Replace the Main PCB including the SOM assembly.

Boot-up Self Test fails:

1. Perform a Master Reset.
2. The Main PCB has failed. Replace the Main PCB including the SOM assembly.

Other Problems

Battery Pack Charging Problems: refer to [Chapter 3, “Battery Information”](#).

Power Meter, Problems:

1. If measured power is slightly out of specification, verify the measurement frequency is set to the same frequency as the power being measured.
2. Replace the InstaCal / Power Meter Module.

Cable and Antenna Analyzer Problems:

1. Inspect the RF Out connector for damage.
2. Inspect the Open, Short, Load and cable(s) for damage. Verify their operation on a suitable measurement instrument.
3. Compare an OSL calibration to an InstaCal calibration using 6 and 20 dB offsets to see if the calibration is causing the fault.
4. Refer to the User Guide.
5. VNA module has failed. Replace the Main PCB.

Touch Screen does not react:

1. Verify the flex cable between the touch screen and keypad PCB and ensure it is properly seated into the connector on the keypad PCB and the connector is locked.
2. Replace the touch screen / LCD assembly.
3. Replaced the keypad PCB.

Hard Keys do not react:

1. Verify the cable connecting the keypad PCB to the Main PCB is properly seated at both ends and the cable is not damaged.
2. Verify there is no debris between the rubber keypad and keypad PCB.
3. Replace the keypad PCB.
4. Replace the rubber keypad.

Appendix A — Test Records

This appendix provides test records that can be used to record the performance of the S331L. Anritsu recommends that you make a copy of the following test record pages and document the measurements each time a Performance Verification is performed. Continuing to document this process each time it is performed provides a detailed history of instrument performance, which can allow you to observe trends.

A-1 Test Records for Cable and Antenna Analyzer Verification

S331L Firmware Rev: _____ Operator: _____ Date: _____
Serial Number: _____ Options: _____

A-1 Test Records for Cable and Antenna Analyzer Verification

Table A-1. Cable and Antenna Analyzer Frequency Accuracy

Frequency	Measured Value	Specification
1 GHz (1000 MHz)	MHz	1 GHz \pm 5 kHz (\pm 5 ppm)
3 GHz (3000 MHz)	MHz	3 GHz \pm 15 kHz (\pm 5 ppm)

Table A-2. Cable and Antenna Analyzer Return Loss Accuracy Verification

Offset	Minimum Value	Maximum Value	Specification
Start Frequency = 2 MHz, Stop Frequency = 4 GHz			
6 dB	dB	dB	$-4.3 \text{ dB} \geq x \geq -7.7 \text{ dB}$
20 dB	dB	dB	$-17 \text{ dB} \geq x \geq -23 \text{ dB}$

S331L Firmware Rev: _____ Operator: _____ Date: _____
 Serial Number: _____ Options: _____

A-2 Test Records for Power Meter Verification

Table A-3. Power Meter Verification

Frequency	Input Power	Measured Values	Specification
100 MHz	0 dBm	dBm	0 dBm \pm 1.50 dB
	–30 dBm	dBm	–30 dBm \pm 1.50 dB
1.0 GHz	0 dBm	dBm	0 dBm \pm 0.70 dB
	–30 dBm	dBm	–30 dBm \pm 1.50 dB
2.0 GHz	0 dBm	dBm	0 dBm \pm 1.50 dB
	–30 dBm	dBm	–30 dBm \pm 1.50 dB
3.0 GHz	0 dBm	dBm	0 dBm \pm 1.50 dB
	–30 dBm	dBm	–30 dBm \pm 1.50 dB
4.0 GHz	0 dBm	dBm	0 dBm \pm 1.50 dB
	–30 dBm	dBm	–30 dBm \pm 1.50 dB

A-3 Test Records for InstaCal Verification

S331L Firmware Rev: Operator: Date:

Serial Number: Options:

A-3 Test Records for InstaCal Verification

Table A-4. Insta Cal Verification

Offset	Minimum Value	Maximum Value	Specification
Start Frequency = 2 MHz, Stop Frequency = 4 GHz			
6 dB	dB	dB	$-4.3\text{ dB} \geq x \geq -7.7\text{ dB}$
20 dB	dB	dB	$-17\text{ dB} \geq x \geq -23\text{ dB}$



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