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# E5061B Network Analyzer

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## Safety Notices

### CAUTION

A **CAUTION** notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in damage to the product or loss of important data. Do not proceed beyond a CAUTION notice until the indicated conditions are fully understood and met.

### WARNING

A **WARNING** notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in personal injury or death. Do not proceed beyond a WARNING notice until the indicated conditions are fully understood and met.

## Caution



Do not exceed the operating input power, voltage, and current level and signal type appropriate for the instrument being used, refer to your instrument's Function Reference.



Electrostatic discharge (ESD) can damage the highly sensitive microcircuits in your instrument. ESD damage is most likely to occur as the test fixtures are being connected or disconnected. Protect them from ESD damage by wearing a grounding strap that provides a high resistance path to ground. Alternatively, ground yourself to discharge any static charge built-up by touching the outer shell of any grounded instrument chassis before touching the test port connectors.

## Safety Summary

The following general safety precautions must be observed during all phases of operation, service, and repair of this instrument. Failure to comply with these precautions or with specific WARNINGS elsewhere in this manual may impair the protection provided by the equipment. Such noncompliance would also violate safety standards of design, manufacture, and intended use of the instrument. Keysight Technologies assumes no liability for the customer's failure to comply with these precautions.

### NOTE

The E5061B complies with INSTALLATION CATEGORY II as well as POLLUTION DEGREE 2 in IEC61010-1. The E5061B is an INDOOR USE product.

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### NOTE

The LEDs in the E5061B are Class 1 in accordance with IEC60825-1, CLASS 1 LED PRODUCT

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### NOTE

This equipment is MEASUREMENT CATEGORY I (CAT I). Do not use for CAT II, III, or IV.

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**NOTE**

This equipment is tested with stand-alone condition or with the combination with the accessories supplied by Keysight Technologies against the requirement of the standards described in the Declaration of Conformity. If it is used as a system component, compliance of related regulations and safety requirements are to be confirmed by the builder of the system.

---

- Ground the Instrument  
To avoid electric shock, the instrument chassis and cabinet must be grounded with the supplied power cable's grounding prong.
- Do NOT Operate in an Explosive Atmosphere  
Do not operate the instrument in the presence of inflammable gases or fumes. Operation of any electrical instrument in such an environment clearly constitutes a safety hazard.
- Keep Away from Live Circuits  
Operators must not remove instrument covers. Component replacement and internal adjustments must be made by qualified maintenance personnel. Do not replace components with the power cable connected. Under certain conditions, dangerous voltage levels may remain even after the power cable has been disconnected. To avoid injuries, always disconnect the power and discharge circuits before touching them.
- DO NOT Service or Adjust the Instrument Alone  
Do not attempt internal service or adjustment unless another person, capable of rendering first aid and resuscitation, is present.
- Do NOT Substitute Parts or Modify the Instrument  
To avoid the danger of introducing additional hazards, do not install substitute parts or perform unauthorized modifications to the instrument. Return the instrument to a Keysight Technologies Sales and Service Office for service and repair to ensure that safety features are maintained in operational condition.
- Dangerous Procedure Warnings  
Warnings, such as the example below, precede potentially dangerous procedures throughout this manual. Instructions contained in the warnings must be followed.

**WARNING**

**Dangerous voltage levels, capable of causing death, are present in this instrument. Use extreme caution when handling, testing, and adjusting this instrument.**

---

- Do not connect the measuring terminals to mains.

## Safety Symbols

General definitions of safety symbols used on the instrument or in manuals are listed below.

	Instruction Manual symbol: the product is marked with this symbol when it is necessary for the user to refer to the instrument manual.
	Alternating current.
	Direct current.
	On (Supply).
	Off (Supply).
	A chassis terminal; a connection to the instrument's chassis, which includes all exposed metal structure.
	Standby.

## Certification

Keysight Technologies certifies that this product met its published specifications at the time of shipment from the factory. Keysight Technologies further certifies that its calibration measurements are traceable to the United States National Institute of Standards and Technology, to the extent allowed by the Institution's calibration facility or by the calibration facilities of other International Standards Organization members.

## Exclusive Remedies

The remedies provided herein are Buyer's sole and exclusive remedies. Keysight Technologies shall not be liable for any direct, indirect, special, incidental, or consequential damages, whether based on contract, tort, or any other legal theory.

## Assistance

Product maintenance agreements and other customer assistance agreements are available for Keysight Technologies products.

Caution  
Safety Symbols

For any assistance, contact your nearest Keysight Technologies Sales and Service Office. Addresses are provided at the back of this manual.

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## Contents

# 1 General Information

The Service Guide is a guide to servicing the E5061B RF Network Analyzer. The guide contains information requisite to troubleshooting, and repairs.

## Precautions

This section describes cautions that must be observed in operating the E5061B.

### Software Installed

The Windows operating system installed in this machine is customized for more effective operation, and has different functions that are not part of the Windows operating system for ordinary PCs (personal computers). Therefore, do not attempt to use the system in ways other than those described in this manual as doing so may cause malfunctions.

Also note the followings.

- Do not update the Windows operating system installed in this machine to the Windows operating system for ordinary PCs. Doing so will cause malfunctions.
- Do not attempt to update VBA (Visual Basic for Applications) software installed in this machine to its equivalent developed for ordinary PCs. Doing so will cause malfunctions.
- Do not allow any computer virus to infect the system. This machine has no virus check function nor anti-virus software installed.

Keysight Technologies will not be held liable for any failure or damage arising from negligence regarding these prohibitions and warnings.

#### NOTE

If the pre-installed software is damaged somehow, resulting in errant behavior by the machine, perform a system recovery. For further details of system recovery, refer to [Appendix B](#), “System Recovery”.

---

## Organization of Service Guide

Tabs are used to divide the major chapter and appendix of this manual. The contents of each chapter and appendix in this manual is as follows;

### **Chapter 1, “General Information,”**

The Service Guide is a guide to servicing the E5061B RF Network Analyzer. The guide contains information requisite to troubleshooting, and repairs.

### **Chapter 2, “Troubleshooting,”**

This chapter provides the procedure to isolate a faulty assembly in the E5061B.

### **Chapter 3, “Replaceable Parts,”**

This chapter contains information for ordering replacement parts for the E5061B.

### **Chapter 4, “Replacement Procedure,”**

This chapter provides procedure for removing and replacing the major assemblies in the E5061B.

### **Chapter 5, “Post-Repair Procedures,”**

This chapter lists the procedures required to verify the E5061B operation after an assembly is replaced with a new one.

### **Appendix A , “Manual Changes,”**

This appendix contains the information required to adapt this manual to versions or configurations of the E5061B manufactured earlier than the current printing date of this manual. The information in this manual applies directly to E5061B units with the serial number that is printed on the title page of this manual.

### **Appendix B , “System Recovery,”**

This appendix describes how to recover the operating system (Windows XP) when the operating system has been damaged.

### **Appendix C , “Firmware Update,”**

This appendix describes how to update the E5061B firmware. When you want to update the E5061B firmware, refer to this appendix.

### **Appendix D , “Power Requirement,”**

### **Appendix E , “Messages,”**

The E5061B can display error messages as well as messages that indicate the internal operating status of the equipment. This appendix explains what these messages mean. They are listed in alphabetical order.

## Instrument Covered by This Manual

Keysight Technologies uses a two-part, ten-character serial number label attached to the instrument's rear panel. The first five characters are the serial prefix and the last five digits are the suffix.

An instrument manufactured after the printing date of this manual may have serial number prefix that is not listed on the title page. This unlisted serial number prefix indicates the instrument is different from those described in this manual. The manual for this new instrument may be accompanied by a yellow Manual Changes supplement or have a different manual part number. This sheet contains “change information” that explains how to adapt the manual to the newer instrument.

In addition to change information, the supplement may contain information for correcting errors (Errata) in the manual. To keep this manual as current and accurate as possible, Keysight Technologies recommends that you periodically request the latest Manual Changes supplement. The supplement for this manual is identified by this manual's printing data and is available from Keysight Technologies. If the serial prefix or number of an instrument is lower than that on the title page of this manual, see Appendix A, Manual Changes. For information concerning, a serial number prefix that is not listed on the title page or in the Manual change supplement, contact the nearest Keysight Technologies office.

## Required Equipment

**Table 1-1** lists the recommended equipment for performing maintenance on the E5061B.

**Table 1-1 Recommended Test Equipment**

Equipment	Recommended Model	Qty.	Use <sup>1</sup>
Frequency Counter	Keysight 53181A with option 010 & Opt.030 <sup>2</sup>	1	P,A
Power Meter	Keysight E4419B	1	P,A
Power Sensor	Keysight 8482A	1	P,A
Multimeter	Keysight 3458A	1	P,A
Dynamic Accuracy Test Kit	Keysight Z5623A with Opt. H01	1	P
Attenuator/Switch Driver	Keysight 11713A	1	P
Step Attenuator	Keysight 8496G with Opt 001 & Opt.H60	1	P
Amplifier	R&K CA101K301M-3335-RB Or Keysight N4985A S30/ S50	1	P
Calibration Kit	Keysight 85032F	1	P,A
Power Splitter	Keysight 11667A	1	P,A
6 dB Fixed Attenuator	Keysight 8491A with Opt 006/Opt.H60	1	P
10 dB Fixed Attenuator	Keysight 8491A	1	P,A
Feedthrough	Keysight p/n 04192-61002	2	P,A
BNC Tee	Keysight p/n 1250-0781	1	P,A
Dual Banana	Keysight p/n 1251-2277	1	P,A
Short	Keysight p/n 5063-0278	2	P,A
	Keysight p/n 85032-60008	2	P,A
	Keysight p/n 85032-60009	2	P,A

Table 1-1

**Recommended Test Equipment**

Equipment	Recommended Model	Qty.	Use <sup>1</sup>
Cable	Keysight p/n 8120-8862	1	P,A
	Keysight p/n 5062-6691	2	P
	Keysight p/n 8120-1838	4	P,A
	Keysight p/n 8120-1839	1	P,A
	Keysight p/n 8120-1840	1	P,A
Adapter	Keysight p/n 1250-0780	5	P
	Keysight p/n 1250-0077	1	P
	Keysight p/n 1250-1473	1	P
	Keysight p/n 1250-1474	1	P
	Keysight p/n 1250-2879	2	P
Torque Wrench	Keysight p/n 8710-1766	1	P,A
USB/GPIB Interface	Keysight 82357A	1	P,A
Personal Computer with GPIB board		1	P,A

1. P: Performance Tests, A: Adjustment.
2. Opt.050 and Opt.124 can be substituted for Opt.030. In this case, a N(m)-BNC(f) adapter in necessary.

Table 1-2

**Alternative Test Equipment**

Equipment	Model	Qty.	Use <sup>1</sup>
Frequency Counter	Keysight 53131A/132A with Opt.010 and 030 <sup>2</sup>	1	P,A
Feedthrough	Keysight 10100C	1	P,A
Cable	Keysight p/n 5062-6691	1	P,A
Short	Keysight 11512A	2	P
	Keysight p/n 85032-60016	2	P

1. P: Performance Tests, A: Adjustment, T: Troubleshooting
2. Opt.050 and Opt.124 can be substituted for Opt.030. In this case, a N(m)-BNC(f) adapter is necessary.

General Information  
Required Equipment

## 2 Troubleshooting

This chapter provides the procedure to isolate a faulty assembly in the E5061B.

### Introduction

**WARNING**

These servicing instructions are for use by qualified personnel only. To avoid possible electrical shock, do not perform any servicing unless you are qualified to do so.

---

**WARNING**

The opening of covers or removal of parts is likely to expose dangerous voltages. Disconnect the instrument from its power supply beforehand.

---

**CAUTION**

Many of the assemblies in the instrument are very susceptible to damage from ESD (electrostatic discharge). Perform the following procedures only at a static-safe workstation and wear a grounding strap.

---

**CAUTION**

DO NOT operate without following instructions. Programs or files in the instrument may be broken.

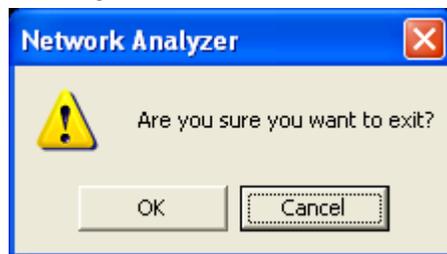
---

## How to exit from the E5061B Measurement View

You need to exit from the E5061B Measurement View to perform some troubleshooting. The following is the procedure to exit from the E5061B Measurement View.

- Step 1.** Connect the mouse and external keyboard to the connectors on the E5061B rear panel.
- Step 2.** Turn the instrument on.
- Step 3.** Press **System** key.
- Step 4.** Click **Service Menu - Exit**. Exit dialog box is as shown in **Figure 2-1**.

Figure 2-1 Exit dialog box



- Step 5.** Click **OK** in **Exit** Menu. Then the E5061B exit the Measurement View, then windows desktop screen appears.

**NOTE**

If you wish to return to the Measurement View, double-click "Network Analyzer" icon.

**NOTE**

If you need to shut down the E5061B and again turn on, perform in accordance with the following procedure.

- a. To get "Start" menu bar displayed, move the pointer to the bottom of the screen with mouse.
- b. Click "Start" and "Shut Down..." in the pull down menu. "Shut Down Windows" dialog box opens.
- c. Select "Shut down" button in the pull down menu.
- d. Click "OK" button in the dialog box.

## To Troubleshoot the Instrument

This section describes basic procedural flow of troubleshooting when servicing the E5061B. The primary procedural tool in this section is the flowchart. The flowchart contains entire troubleshooting path from a failure symptom to the isolation of faulty assembly, and will direct you to the completion of repair in an ordinary manner through the possible failure symptoms. Reference letters (Yes/No) on the flowcharts point to procedural steps that briefly explain the troubleshooting method to be performed next.

### Primary Trouble Isolation

The primary trouble isolation procedure can be performed without disassembling the E5061B. **Figure 2-2** shows the trouble isolation flow chart.

#### Step 1. Turn the instrument power on

About a few minutes after the E5061B is turned on, the measurement view is displayed on the screen. The display on the screen should be similar to **Figure 2-12, “Measurement view,” on page 31**.

#### Step 2. Check the display

- If no display appears on the LCD after the E5061B is turned on, go to **“No Display Troubleshooting” on page 23**.
- If the E5061B stops in booting process despite something being displayed on the LCD, go to **“Booting Process Troubleshooting” on page 27**.
- The power-on self test is performed once automatically after the E5061B measurement view is displayed. If the power-on self test fails, go to **“Troubleshooting Using Diagnostic Test” on page 32**.

#### Step 3. Check the basic function

If the front-panel/keyboard/mouse controls, LCD display, data storage, remote interface or another function (except for measurement part) does not work correctly, go to **“Function Specific Troubleshooting” on page 39**.

#### Step 4. Check the measurement function

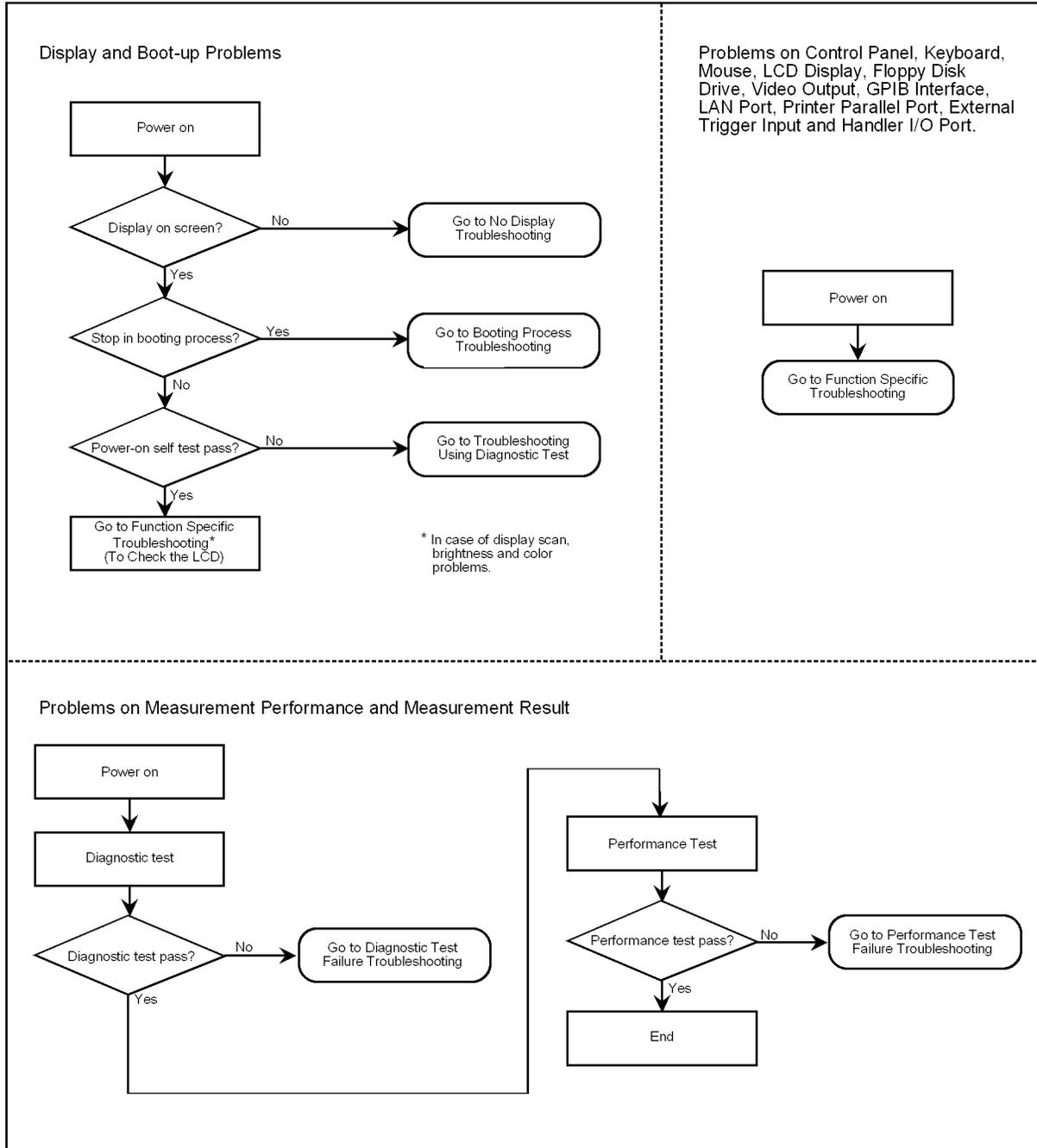
If the instrument fails performance tests, go to **“Performance Test failure Troubleshooting” on page 46**.

If the measurement function does not work correctly, perform the diagnostic test provided in the E5061B's service function. When the diagnostic test fails, go to **“Diagnostic Test Failure Troubleshooting” on page 36**.

#### NOTE

The diagnostic test includes some unique measurement function tests in addition to the tests that are common to the power-on self test. Thus, it is necessary to perform the diagnostic test even if the power-on self test passed.

Figure 2-2 Primary trouble isolation flowchart



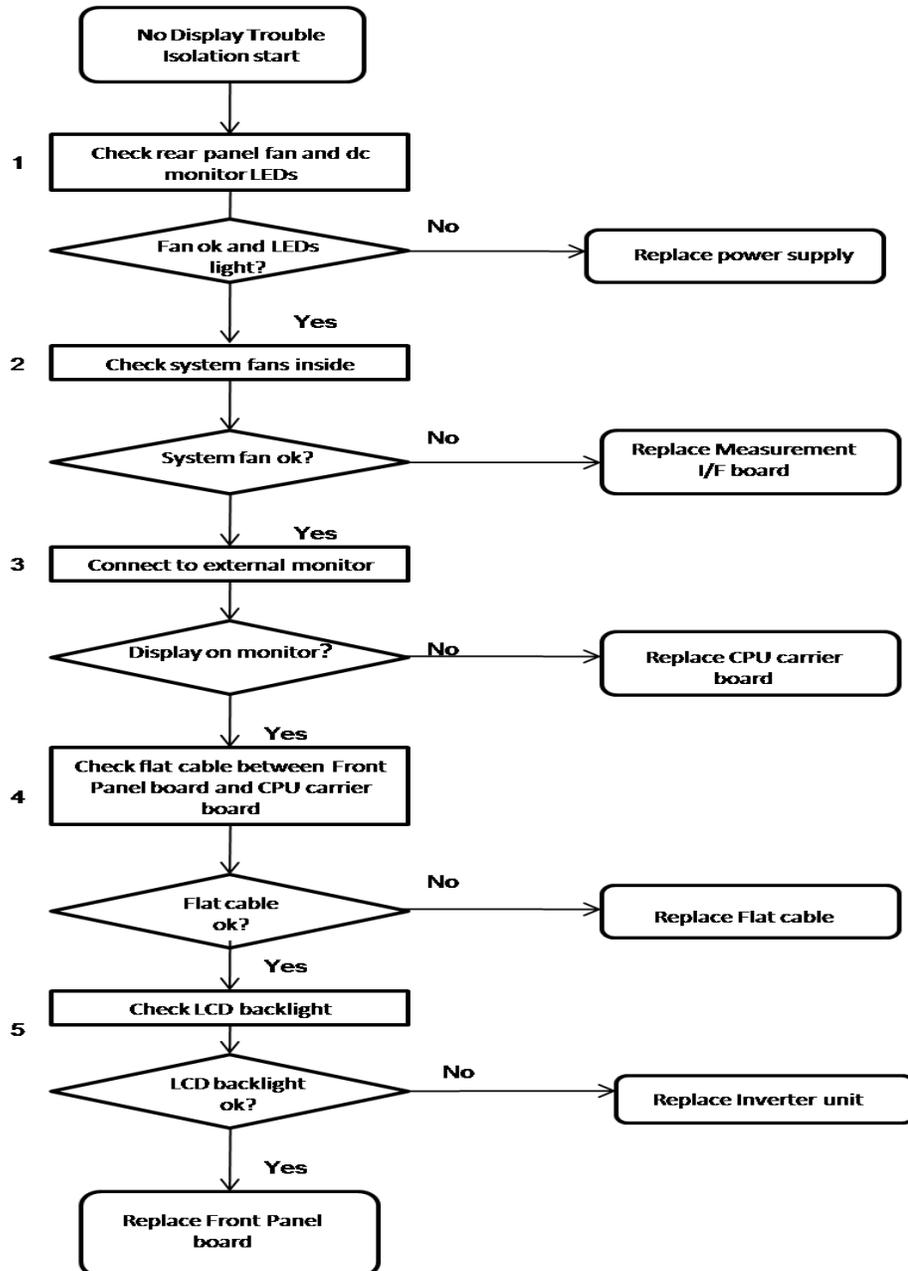
e5061ase033

## No Display Troubleshooting

If the E5061B displays nothing despite it is powered from proper ac power line, isolate the failure in accordance with the procedure shown in [Figure 2-3](#).

Connect the keyboard to the E5061B rear panel connector, turn the power on and start trouble isolation. The methods of trouble isolation are described in the procedural step 1 to 6.

Figure 2-3 No display trouble isolation procedure



**Step 1.** Check fan operation and DC monitor LED

If the rear panel fan (blower) doesn't run, a failure in power supply is assumed. Remove the E5061B outer cover and check if the following LEDs light:

- +3.3 V and +5 V dc monitor LEDs on A50/A60 CPU Module as shown in [Figure 2-4](#)
- LEDs on DSP module as shown in [Figure 2-5](#)

Figure 2-4 LEDs on CPU module

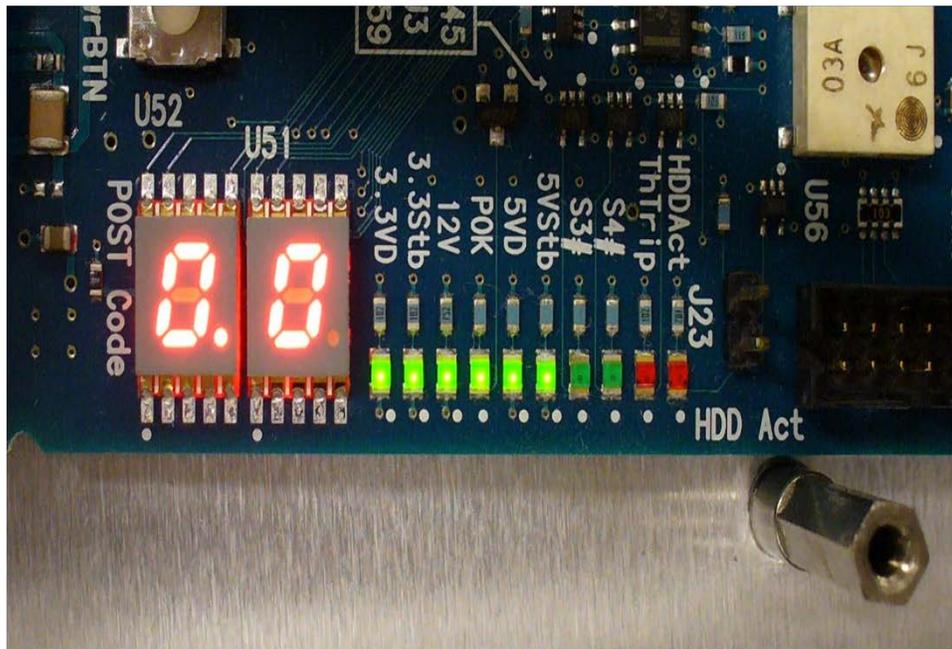
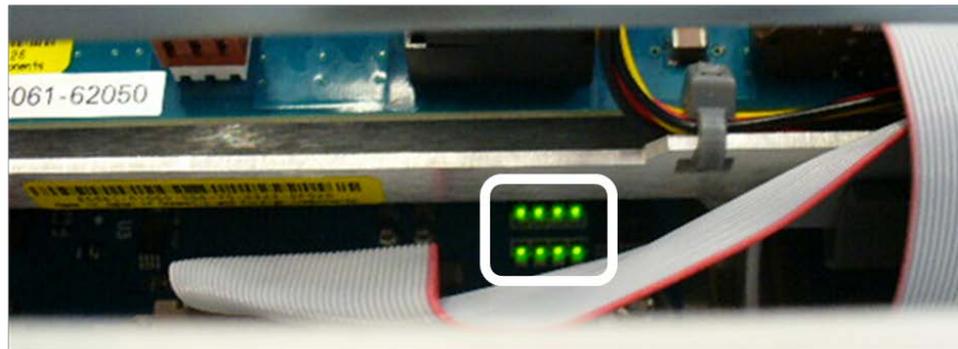


Figure 2-5 LEDs on DSP module



**NOTE**

To check all the outputs of the power supply, measure the dc voltages at the output lead connectors with a DMM. The dc output voltages and lead color information is provided in the module cover label of the power supply.

**Step 2.** Check system fan inside.

If the system fan on the chassis inside the E5061B don't run, problem seems in the A51 Measurement I/F board or the flat cable between the A51 Measurement I/F board and CPU module. In this case, remove the E5061B outer cover and make sure whether the fan run or not.

If a beep and a power shutdown occur immediately after power is turned on, there is a possibility that the fan won't run. The power shutdown occurs the moment the system fan stops by any anomaly. In this case, check the fan that doesn't run.

If the power shutdown occurs without a beep, the problem seems in the A51 Measurement I/F board or the CPU module.

**Step 3.** Check LED of "Num Lock" key

Press "Num Lock" key on the keyboard. If the LED in the key doesn't light as shown in [Figure 2-6](#), a problem seems in the CPU module.

Figure 2-6

LED of the Num Lock key



Make sure the following before replacing the CPU module.

- Whether all the connections to the A50/A60 CPU Module are normal or not. Check if there is any disconnection or connection working loose.

**Step 4.** Checking with the external monitor

Connect an external VGA monitor to the VIDEO output on the E5061B rear panel.

- If something is displayed on the external monitor, the problem is present around the LCD. Also check the A52 Front Panel I/F board because the ON/OFF setting of the LCD backlight is controlled by the A52 Front Panel I/F board.
- If nothing is displayed even on the external monitor, the problem seems in the CPU module.

**Step 5.** Checking flat cable

Check a flat cable between the A50/A60 CPU Module and A52 Front Panel I/F board.

**Step 6.** Check around the backlight

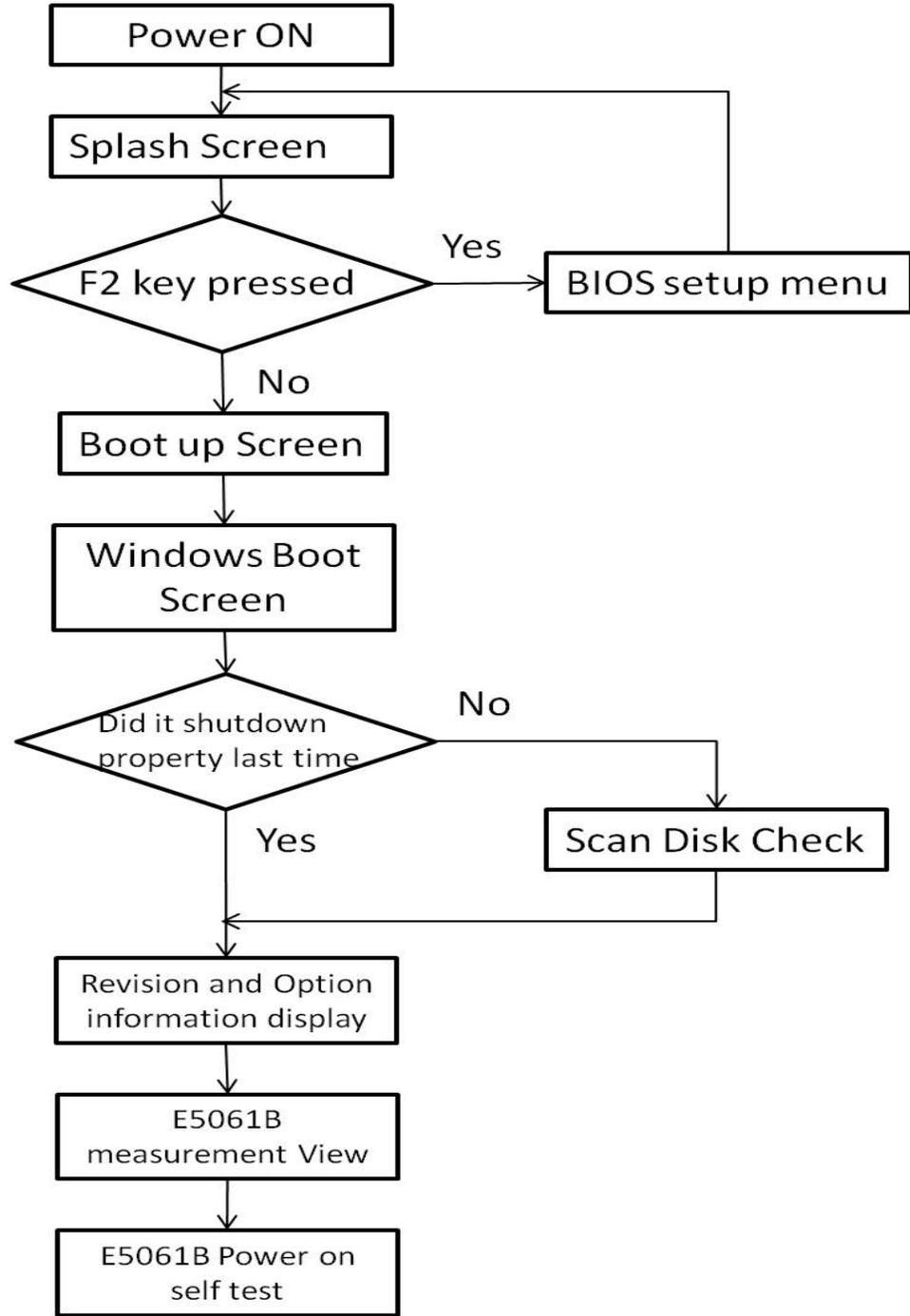
Check inverter board and a cable between the inverter board and A52 Front Panel I/F board. Also check the cables between the LCD and A52 Front Panel I/F board. If the cables are normal, check the LCD.

## Booting Process Troubleshooting

**Figure 2-7** represents the booting process flow in the E5061B. If the E5061B stops in the booting process, troubleshoot using the following step-by-step procedure.

Figure 2-7

Booting process flowchart



### Step 1. Splash Screen

The splash screen is displayed with Keysight logo as shown in [Figure 2-8](#).

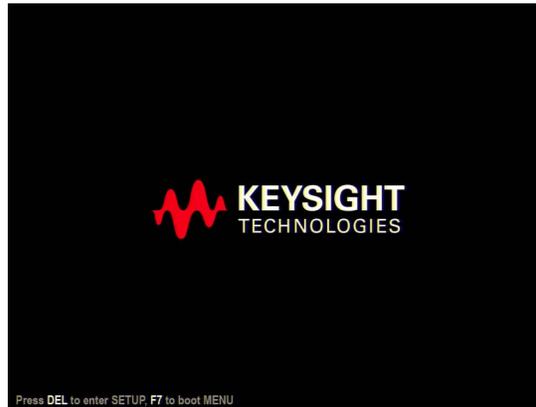
If the splash screen is displayed, you can assume that the A50/A60 CPU Module is functioning correctly.

#### NOTE

While the splash screen is displayed, if you want to run the BIOS setup utility, push F2 key as soon as in the screen. The password to enter BIOS setup utility is agt0ny (0 is Zero, not o).

Figure 2-8

Splash Screen



### Step 2. Boot up Screen

The Boot up screen is displayed as shown in [Figure 2-9](#).

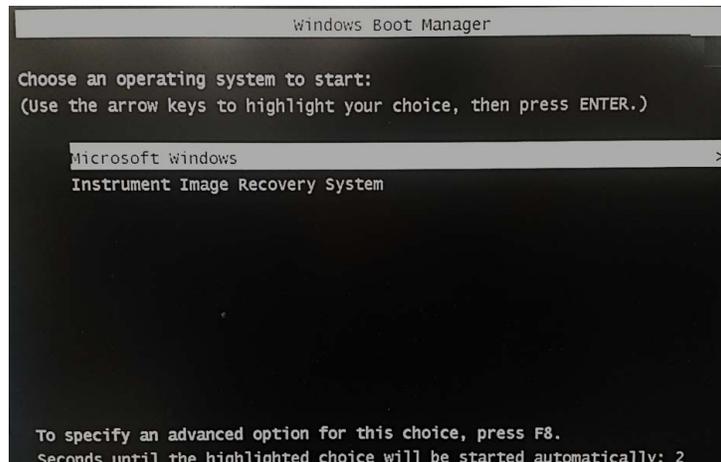
Without choose any choice, the system will continue boot up process after 3 second.

#### NOTE

While the Boot up screen is displayed, if you want to do system recovery, please select “Keysight Recovery System” as soon as in the screen.

Figure 2-9

Boot up Screen

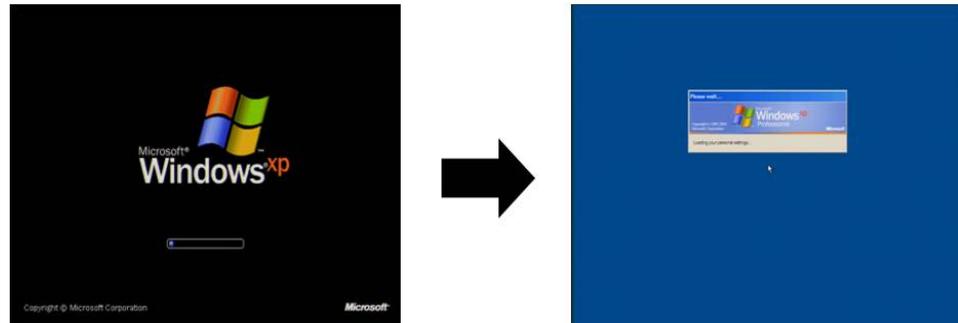


### Step 3. Windows boot screens

The Windows boot screens are displayed. The Windows boot screens consists of two screens. Each screen is displayed in the order as shown in [Figure 2-10](#). If the Windows boot screens are displayed, it is assumed that the HDD works. While the Window screens are displayed, Windows operating system is starting up.

Figure 2-10

Windows boot screens



If you encounter the following problems, try to reinstall the operating system before replacing the HDD.

- "xxx file is missing" is displayed on DOS screen.
- The Window boot screen is not displayed after the splash screen is displayed.
- Windows always boots up with Safe Mode.

#### NOTE

If the E5061B was turned off without shutdown process, Microsoft Scandisk runs while the windows boot screens are displayed. If a serious problem is found in the scandisk, reinstall the operating system. For details of the operating system installation, refer to [Appendix B](#), "[System Recovery](#)," on page 113. If the operating system still doesn't boot up properly after reinstallation, replace the HDD.

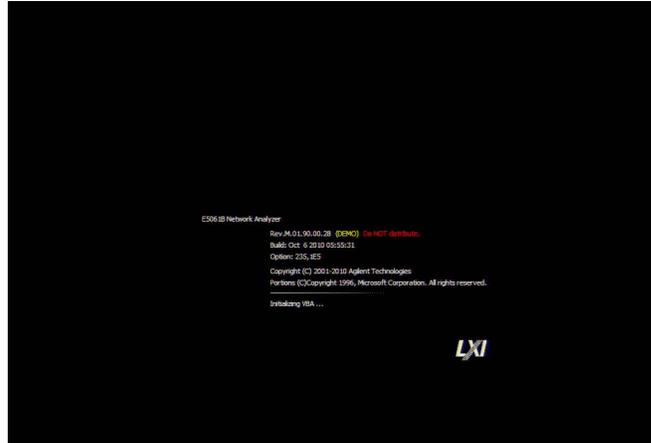
#### NOTE

The operating system automatically checks the device drivers, which are necessary to use the E5061B functions and are installed in the system before the E5061B is shipped from Keysight factory. If the operating system doesn't detect them, a message box is displayed. In this case, install the device driver.

#### Step 4. Revision and option information

The firmware revision and hardware option information along with copyright declaration is displayed as shown in [Figure 2-11](#). The E5061B firmware quickly starts up just before this display appears. While the revision and option information is displayed, the applications of various devices in the system are initialized.

Figure 2-11 Firmware revision and option information



If the display whited out, entirely blued or appeared with a dialog box, a mass storage problem is suspected. Try to perform the mass storage recovery procedure.

#### NOTE

If a message of "Will Shut Down in Five Seconds" is displayed in place of "Initializing.." and the shutdown occurs, the DSP board fails in starting up. The following message may be displayed before the shutdown occurs:

"Fatal Error: Failed to Initialize DSP Driver":

or "Fatal Error: Failed to Initialize DSP":

This message indicates that the DSP board doesn't work or is not properly connected to the DSP board.

"Fatal Error: Failed to Update DSP Code":

If this happened, the DSP board failed in writing DSP program into flash ROM when the firmware was installed first or updated to the newest version. A problem in the DSP or A50 CPU Module is suspected.

#### Step 5. Measurement view

The measurement view as shown in [Figure 2-12](#) is displayed after the system initialization is completed without problem.

Figure 2-12

Measurement view



**Step 6.** Power-on self test

The power-on self test is executed once automatically before the measurement starts. While the power-on self test is in progress, "Power on test" is displayed at the left in the instrument status bar. If the power-on test fails, an error message is displayed there. For more details, refer to ["Troubleshooting Using Diagnostic Test" on page 32.](#)

## Troubleshooting Using Diagnostic Test

The Keysight E5061B has an diagnostic test function to diagnose the analog measurement section and internal dc power supply voltages. The diagnostic test makes it possible to isolate a faulty board assembly. The following paragraphs describe the procedure to perform the diagnostic test.

### Power On Self Test

Power-on self-test always takes place once the E5061B is turned on. When a failure is detected, a message "Power on self test failed" is displayed. The content of the power-on self-test is the same as a part of the diagnostic test program and includes the dc power supply voltage, source PLL synthesizer and level controller (ALC) tests. When the self-test failed, perform the diagnostic test to break down into the individual tests and narrow down failure possibilities.

#### NOTE

The following procedure can be used to restart the power-on self test as required.

- a. Press **System** key.
- b. Click **Service Menu** and, then, **Test Menu** in the softkeys.
- c. Click **Power On Test** to restart the test. Wait until the power-on test ends.
- d. The test result (OK or Failed) is displayed in the **Power On Test** key.

### PLL unlock

When a PLL of the frequency synthesizers is unlocked, not the "Power on self test failed" but "Phase lock loop unlocked" message is displayed. If it occurs, A1 Source Module may be faulty.

### Contents of the diagnostic test

The diagnostic test contains 8 test groups shown in **Table 2-1**. Each test group can be performed independently and verifies one of various operating characteristics of the analog measurement section.

**Table 2-1** Diagnostic test group menu

1	DC-BUS Test
2	Internal Level Monitor Test
3	RF Output Level Range Test
4	RF Output Level Power Sweep Test
5	Receiver Absolute Measurement Test
6	Receiver IF Ranging Test

**Table 2-1 Diagnostic test group menu**

7	Gain-Phase Absolute Measurement Test (Option 3L5)
---	--

Test equipment required for diagnostic test

**Table 2-2** shows the equipment required for performing the diagnostic test.

**Table 2-2 Required equipment**

Required test equipment	Qty	Recommended model
24 inch 50 Ω cable	1	8120-8862, 8120-1839

To Execute the Diagnostic Test

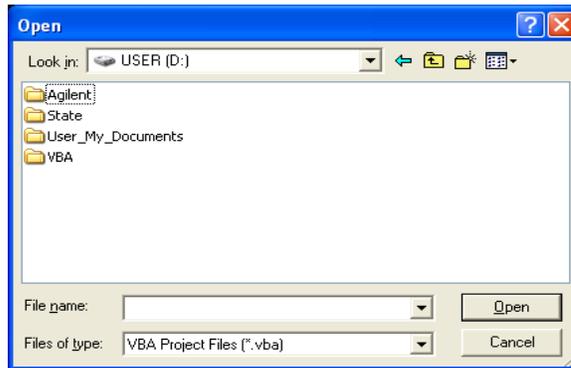
To isolate faulty board assembly in analog section, execute the diagnostic test in accordance with the following procedure. The test procedure needs to be performed using a mouse and an external keyboard in addition to the front panel keys.

**NOTE** To perform the diagnostic test properly, the following conditions must be met:  
 Environmental temperature: 23 °C ± 5 °C

**NOTE** Do not operate front panel keys, keyboard and mouse during the diagnostic test. Changing the instrument settings while the diagnostic test is in progress will cause incorrect test results.

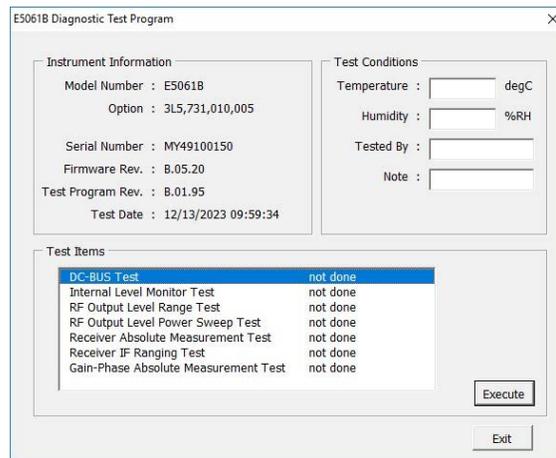
- Step 1.** Connect a mouse and an external keyboard to the E5061B's rear panel connector.
- Step 2.** Press Macro Setup key.
- Step 3.** Press **Load Project** to select **Load Project** function. "Open" dialog box will be displayed as shown in [Figure 2-13](#).

Figure 2-13 Open dialog box



- Step 4.** Select "User [D]" (preset state) from menu in the "Look in:" box.
- Step 5.** Double-click "Keysight" folder to open it and to access its menu.
- Step 6.** Double-click "Service" folder to open it.
- Step 7.** Click "DiagnosticTest.VBA" program file to select it from program menu.
- Step 8.** Click "Open" button to download the diagnostic test program.
- Step 9.** Press **Select Macro** to select **Select Macro** function.
- Step 10.** Press **Module1 main** to open the **Module1 main** program file. "Diagnostic Test Program" dialog box (Main Menu) will appear as shown in [Figure 2-14](#).

Figure 2-14 Diagnostic Test dialog box



- Step 11.** To exit the diagnostic test, click "Exit" button.

## Program Overall

Instrument Information	The option and serial number for the E5061B, and test date can be entered automatically.
Test Conditions	The test conditions, “Temperature”, “Humidity” and person doing the test (“Tested by”) can be entered.
Test Items	The following test can be selected. To execute the test you select, click “Execute” button. <ul style="list-style-type: none"><li>• DC-BUS Test</li><li>• Internal Level Monitor Test</li><li>• RF Output Level Range Test</li><li>• RF Output Level Power SweepTest</li><li>• Receiver Absolute Measurement Test</li><li>• Receiver IF Ranging Test</li><li>• Gain-Phase Absolute Measurement Test (option 3L5 only)</li></ul> When each test is executed, the test dialog box is displayed. The following screen is an example of the test dialog box.

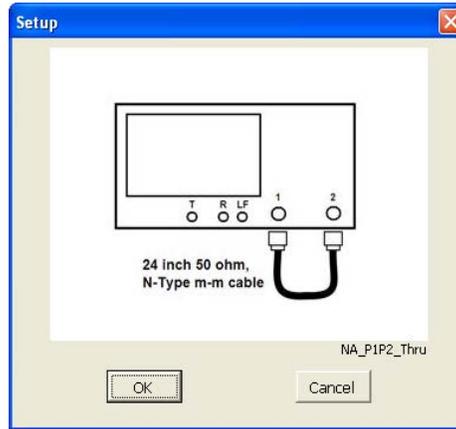
Figure 2-15 Test dialog box



To execute the test, click “Execute” button. To return the E5061B Diagnostic test program dialog box (Main Menu), click “Back to Main Menu”.

The test program will prompt you to connect cables or Short termination to the E5061B. Follow the instructions as shown below on the E5061B display for performing the test.

Figure 2-16 Setup dialog box



The test result file named “resultDT.txt” is created on the drive D (D:\Keysight\Service\Log\) of the E5061B after “Exit” button of the Main Menu is pressed. The text file can be read and edited with a PC.

Diagnostic Test Failure Troubleshooting

**Table 2-3** and **Table 2-4** represents the contents of the diagnostic tests and the relationships of failed tests to probable faulty board assemblies. If the instrument fails the diagnostic test, replace the faulty board assembly as shown in **Table 2-3**.

Table 2-3

Diagnostic tests failure troubleshooting information (Option 3L5)

Test No.	Test group	Failed Test	Probable faulty board assembly		
			A1/A11 Source Module	A2 Receiver Module	A9 LF Source Bias Module
1	DC-BUS Test	ALL		###	##
		A1/A11 Source Module	###	#	#
		A2 Receiver Module		###	#
		A9 LF Source Bias Module		#	###

Table 2-3

Diagnostic tests failure troubleshooting information (Option 3L5)

Test No.	Test group	Failed Test	Probable faulty board assembly		
			A1/A11 Source Module	A2 Receiver Module	A9 LF Source Bias Module
2	Internal Level Monitor Test	ALL	##	###	##
		A1/A11 Source Module	###	#	#
3	RF Output Level Range Test		###	#	#
4	RF Output Level Power Sweep Test		###	#	#
5	Receiver Absolute Measurement Test		#	###	#
6	Receiver IF Ranging Test		#	###	#
7	Gain-Phase Absolute Measurement Test		#	###	#

Table 2-4

Diagnostic tests failure troubleshooting information (option 115/117/135/137/215/217/235/237)

Test No.	Test group	Failed Test	Probable faulty board assembly	
			A11 Source Module	A3/A4 Receiver Module
1	DC-BUS Test	ALL		###
		A11 Source Module	###	#
		A3/A4 Receiver Module		###
2	Internal Level Monitor Test	ALL	##	###
		A11 Source Module	###	#
3	RF Output Level Range Test		###	#
4	RF Output Level Power Sweep Test		###	#

Table 2-4

Diagnostic tests failure troubleshooting information (option 115/117/135/137/215/217/235/237)

Test No.	Test group	Failed Test	Probable faulty board assembly	
			A11 Source Module	A3/A4 Receiver Module
5	Receiver Absolute Measurement Test		#	###
7	Receiver IF Ranging Test		#	###

###: Most suspicious assembly

##: Suspicious assembly

#: Possible faulty assembly

**NOTE**

Diagnostic tests 1 and 2 are common to the power on self test.

---

## Function Specific Troubleshooting

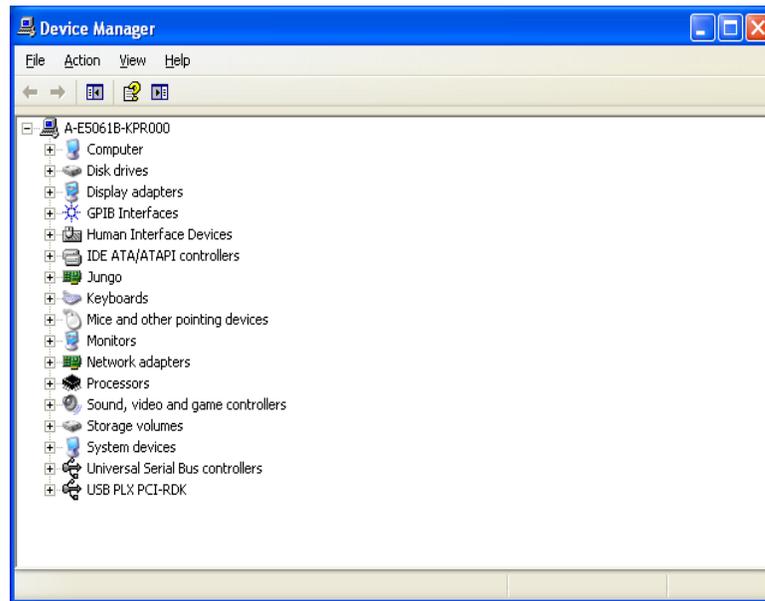
If the E5061B exhibits a failure symptom that is related to a specific function or control such as a front panel key control, display, data storage, remote control interface, printer interface, external trigger, external keyboard or mouse, isolate the trouble using the Function Specific Troubleshooting procedures described below. The major functions of the E5061B and the troubleshooting procedure for each function are shown in **Table 2-5**.

**Table 2-5 Major functions and troubleshooting procedures**

Function	Description	Troubleshooting
Front panel keys	All the E5061B functions except for VBA and service functions can be set and controlled via the front panel keys.	Refer to <b>“To Check the Front Panel” on page 42</b> .
Touch panel	The E5061B equipped with option 016 has a touch screen display that allows all the functions in the menu bars, setup windows and dialog boxes to be set by a touch to the screen panel.	Refer to <b>“To Check the Touch Panel” on page 42</b> .
LCD display	Almost all the information including the measurement value, setup state, result data processing, menu bar, softkey label and others are indicated on the 10.4-inch color LCD display.	Refer to <b>“To Check the LCD” on page 43</b> .
External keyboard	The external keyboard can be used for the entry of numerical and character data when it is connected to USB connector on front and rear panels.	Refer to <b>“To Check the External Keyboard” on page 43</b> .
Mouse	The mouse can be used to move the pointer on the LCD display, select a function and change a setting, when it is connected to USB connector on front and rear panels.	Refer to <b>“To Check the Mouse” on page 43</b> .
Video output	An external color monitor can be used to display the same information as the E5061B LCD display, when it is connected to the Video output connector (24-pin D-Sub) on the rear panel.	Refer to <b>“To Check the Video output” on page 44</b> .
External trigger input	The external trigger input terminal (BNC) on the rear panel allows an external trigger source to be used for measurement trigger.	Refer to <b>“To Check the External Trigger Input” on page 44</b> .
GPIB Interface	The GPIB compatibility allows the E5061B to be operated as a talker/listener on IEEE 488 interface bus.	Refer to <b>“To Check the GPIB” on page 44</b> .
Handler I/O port	The Handler I/O port can be used to transfer a comparator decision output data to and perform timing synchronization with an external handler.	Refer to in <b>“To Execute the Diagnostic Test” on page 33</b> .

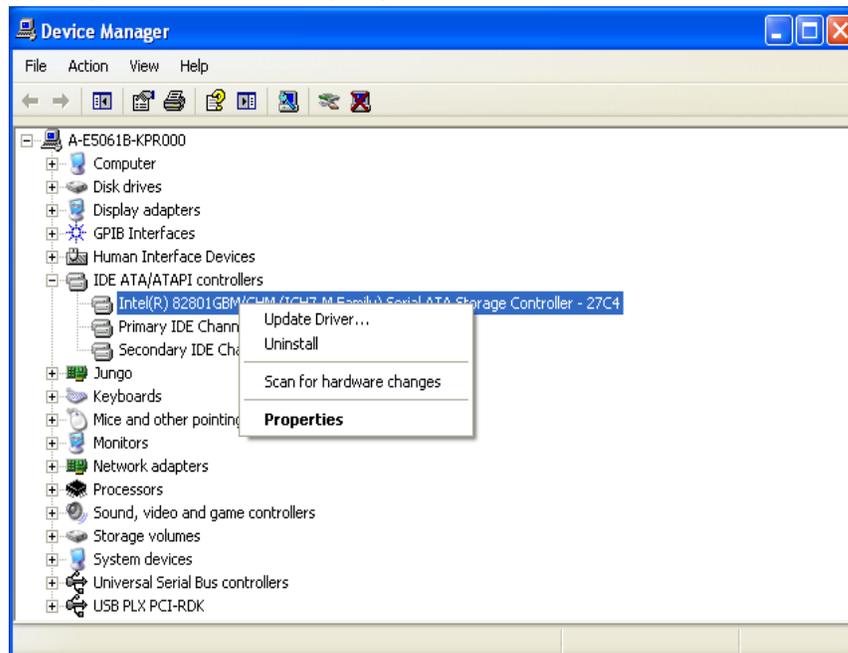


Figure 2-19 System Properties Window (Hardware)



Click the icon with the right button and click Property to show the detail of the status. as shown in Figure 2-20.

Figure 2-20 Opening Device Driver Property



## To Check the Front Panel

### Procedure

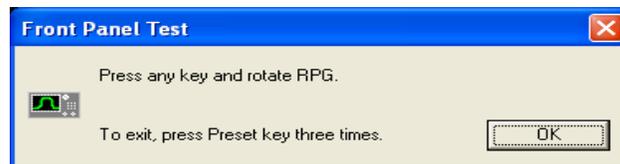
Randomly press the front panel keys and rotate the knob to verify that they work normally.

**Step 1.** Press **System** key.

**Step 2.** Click **Service Menu** and, then, **Test Menu** in the softkeys.

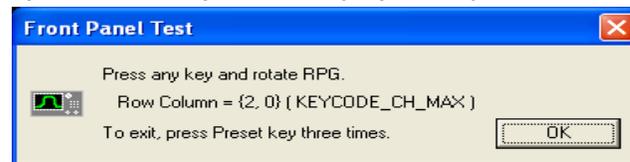
**Step 3.** Click **Front Panel** in the test menu. This opens "Front Panel Test" dialog box as shown in **Figure 2-21**.

Figure 2-21 Front Panel Test dialog box



**Step 4.** Randomly press the front panel keys. The key code along with the name of the pressed key are displayed in the dialog box as shown in **Figure 2-22**. Turn the rotary knob clockwise or counterclockwise. The dialog box indicates the direction of the turned knob and a count of RPG output.

Figure 2-22 Key code and key name display example



**Step 5.** To exit the front panel test, press **Preset** key three times.

- If multiple keys fail to work, a problem in A52 Front Panel I/F board or A50 CPU Module is suspected. Also check the flat cable between the A52 Front Panel I/F board and CPU module.
- If only a specific key doesn't work, check first if the key is subsided in the panel.
- If the rotary knob doesn't work, check the A52 Front Panel I/F board involving the RPG.

## To Check the Touch Panel

### Procedure

By touching the LCD display panel, select or change the setting of a function in the softkey menu and, then, perform the same operation with hardkeys.

Troubleshooting  
Function Specific Troubleshooting

- If the touch panel doesn't work correctly whereas the hardkeys function normally, a failure seems in the touch screen controller assembly or touch-panel LCD assembly. (The touch panel is not replaceable independently of the LCD.)
- Check the cable between the touch screen controller and the serial interface connector on the CPU module.
- If no problem is found in the above checks, a failure in the A50 CPU Module is suspected.

To Check the LCD

**Procedure**

**Step 1.** Press **System** key.

**Step 2.** Click **Service Menu** and, then, **Test Menu** in the softkeys menu.

**Step 3.** Click **Display** in the test menu. The whole of the LCD screen turns Red, Green, Blue, White and Black every 2 seconds and returns to the measurement view. If the color test screen doesn't appear correctly, perform step 4.

**Step 4.** Connect an external VGA monitor to the VIDEO output port on the E5061B rear panel.

- If the monitor screen view is the same as the LCD display, the problem seems in the CPU module.
- If only the LCD display has a problem, check the flat cable between the A52 Front Panel I/F board and CPU module.
- If the cables are normal, check the A51 LCD.

To Check the External Keyboard

**Procedure**

**Step 1.** Connect the external keyboard to the E5061B rear panel USB port.

**Step 2.** Turn the instrument on.

**Step 3.** Press **Meas** key.

**Step 4.** Press **↑** and **↓** keys on the external keyboard, and verify that the cursor on the menu bar moves up and down. If it doesn't work, the external keyboard or the A50 CPU Module may be faulty.

To Check the Mouse

**Procedure**

**Step 1.** Connect the mouse to the E5061B rear panel USB port.

- Step 2.** Turn the instrument on.
- Step 3.** Move the mouse and verify that the mouse pointer move smoothly. If it doesn't move smoothly, check first whether a foreign substance (dust, lint, etc.) is in the track ball hole of the mouse or not.
- Step 4.** Verify that the mouse buttons work normally. If any button doesn't work or the mouse pointer doesn't move, a failure in the mouse or the A50 CPU Module is suspected.

To Check the Video output

#### Procedure

- Step 1.** Connect an external VGA color monitor to the Video output port on the E5061B rear panel.
- Step 2.** Turn the external monitor on.
- Step 3.** Verify that the monitor screen view is the same as the display on the LCD. If the monitor screen view is abnormal, a failure seems in the CPU module.

To Check the External Trigger Input

#### Procedure

- Step 1.** Press **Preset** key to initialize the E5061B.
- Step 2.** Press **Trigger** key.
- Step 3.** Click **Trigger Source** and, then, **External** in the menu bar to set the trigger mode to "External".
- Step 4.** Connect a BNC Short or 50  $\Omega$  termination to the Ext Trig connector on the rear panel and disconnect it. Thereby a measurement trigger should be generated and a measurement result (trace) should be refreshed.
- Step 5.** If no trigger occurs, a failure in the DSP board is suspected.

To Check the GPIB

#### Procedure

Perform the E5061B performance test program. If the controller cannot detect the E5061B, the problem seems in the CPU module.

To Check the USB

**Procedure**

Connect USB cable between controller PC and USB Interface port (USBTMC) on the rear panel of E5061B. Turn the controller PC on. If the E5061B cannot detect controller PC, the problem seems in the CPU module. Keysight I/O Library should be installed on PC.

## Performance Test failure Troubleshooting

This section describes the adjustment and troubleshooting procedures used when the E5061B fails the performance tests. If the performance of the instrument is critical for the test limits and seems to be adjustable, perform first the adjustment(s) related to the failed test. When the test result is far from the tolerance of the test or the performance is not adjustable, isolate the faulty assembly in accordance with the "Performance Tests failure Troubleshooting procedure".

Recommended adjustment for Performance Test failure

**Table 2-6** and **Table 2-7** shows the recommended adjustments when the performance test fails. Select the adjustment program corresponding to the recommended adjustment and perform the adjustment.

**Table 2-6 Recommended adjustment for performance test failure (Option 3L5)**

Test Num.	First failed test	Recommended adjustment													
		Oven reference	Frequency reference	Local gain	Mixer local leakage	Receiver absolute gain Rch	Synthesizer gain	Source output power	DC bias	Receiver IF range	Receiver port characteristics	Receiver absolute gain Tch	Receiver absolute gain LF	Source output power (LF)	DC level monitor
1	Frequency accuracy test														
2	Frequency accuracy test (Opt. 1E5)														
3	RF output level accuracy and flatness test														
4	RF output level linearity test														
5	Trace noise test														
6	Crosstalk & system dynamic range test														
7	Dynamic accuracy test														
8	Uncorrected system performance test														

Table 2-6 Recommended adjustment for performance test failure (Option 3L5)

Test Num.	First failed test	Recommended adjustment													
		Oven reference	Frequency reference	Local gain	Mixer local leakage	Receiver absolute gain Rch	Synthesizer gain	Source output power	DC bias	Receiver IF range	Receiver port characteristics	Receiver absolute gain Tch	Receiver absolute gain LF	Source output power (LF)	DC level monitor
9	LF output level accuracy& flatness test (Opt 3L5)														
10	LF output level linearity test (Opt 3L5)														
11	DC bias accuracy test (Opt 3L5)														
12	Crosstalk & noise level test (Opt 3L5)														
13	Input impedance test (Opt 3L5)														
14	Absolute amplitude accuracy test (Opt 3L5)														
15	Magnitude ratio/phase dynamic accuracy test (Opt 3L5)														
16	Magnitude ratio/phase frequency response test (Opt 3L5)														
17	Trace noise test (Opt 3L5)														
18	DC measurement accuracy test (Opt 3L5)														

Table 2-7

Recommended adjustment for performance test failure (option 115/117/135/137/215/217/235/237)

Test Num.	First failed test	Recommended adjustment									
		Oven reference	Frequency reference	Local gain	Receiver IF Range	Compression	Receiver absolute gain Rch	Synthesizer gain	Source output power	Receiver port characteristics	Receiver absolute gain Tch
1	Frequency accuracy test										
2	RF output level accuracy test										
3	RF output level linearity test										
4	Crosstalk & system dynamic range test										
5	Noise Floor Test										
6	Trace Noise Test										
7	Dynamic Accuracy Test										
8	Compression										
9	IF linearity at 1.195GHz										
10	IF linearity at LF										
11	Uncorrected System Performance test										

Performance Test failure Troubleshooting

Note that this table lists some typical cases. There are possibilities that other assembly may be faulty. To troubleshoot further, perform the Diagnostic Test procedures.

**Table 2-8** and **Table 2-9** represents the relationships between the failed test and probable faulty assembly. If the performance test failure cannot be removed by a proper adjustment, replace the assembly shown in this table.

**NOTE**

When Crosstalk, System dynamic range or Uncorrected system performance test fails, check first whether the connections of the RF semi-rigid cables between the suspicious assembly and others are tight or loose. Also check for possible disconnection (impairment) of the cables and connectors.

Table 2-8

Performance Test failure Troubleshooting information (Option 3L5)

Test Num.	First failed test	Probable faulty board assembly or parts		
		A1/A11 Source Module	A2 Receiver Module	A9 LF Source Bias Module
1	Frequency accuracy test	###	#	#
2	RF output level accuracy and flatness test	###	#	#
3	RF output level linearity test	###	#	#
4	Trace noise test	##	###	#
5	Crosstalk & system Dynamic Range test	##	###	#
6	Dynamic accuracy test	#	###	#
7	Uncorrected system performance test	##	###	#
8	LF output level accuracy& flatness test (Opt 3L5)	##		###
9	LF output level linearity test (Opt 3L5)	##		###
10	DC bias accuracy test (Opt 3L5)		#	###
11	Crosstalk & noise level test (Opt 3L5)	#	###	#
12	Input impedance test (Opt 3L5)		###	
13	Absolute amplitude accuracy test (Opt 3L5)	#	###	#
14	Magnitude ratio/phase dynamic accuracy test (Opt 3L5)	#	###	#

Table 2-8 Performance Test failure Troubleshooting information (Option 3L5)

Test Num.	First failed test	Probable faulty board assembly or parts		
		A1/A11 Source Module	A2 Receiver Module	A9 LF Source Bias Module
15	Magnitude ratio/phase frequency response test (Opt 3L5)	#	###	#
16	Trace noise test (Opt 3L5)	##	###	#
17	DC measurement accuracy test (Opt 3L5)		###	###

Table 2-9 Performance Test failure Troubleshooting information (Option 115/117/135/137/215/217/235/237)

Test Num.	First failed test	Probable faulty board assembly or parts	
		A11 Source Module	A3/A4 Receiver Module
1	Frequency accuracy test	###	#
2	RF output level accuracy test	###	#
3	RF output level linearity test	###	#
4	Crosstalk & system dynamic range test	##	###
5	Noise Floor Test	##	###
6	Trace Noise Test	#	###
7	Dynamic Accuracy Test		
8	Compression		###
9	IF linearity at 1.195GHz		###
10	IF linearity at LF		###
11	Uncorrected System Performance test	#	###

###: Most suspicious assembly

##: Suspicious assembly

#: Possible faulty assembly

## 3 Replaceable Parts

This chapter contains information for ordering replacement parts for the E5061B.

### Ordering Information

To order a part in the replaceable parts lists, quote the Keysight Technologies part number, indicate the quantity required, and address the order to the nearest Keysight Technologies Sales Office.

To order a part not listed in the replaceable parts lists, include the instrument model number, the description and function of the part, and the quantity of parts required. Address the order to the nearest Keysight Technologies Sales Office.

#### Direct Mail Order System

Within the USA, Keysight Technologies can supply parts through a direct mail order system. There are several advantages to this system:

- Direct ordering and shipping from the Keysight Technologies parts center in California, USA.
- No maximum or minimum on any mail order. (There is a minimum amount for parts ordered through a local Keysight Technologies Sales Office when the orders require billing and invoicing.)
- Prepaid transportation. (There is a small handling charge for each order.)
- No invoices.

In order for Keysight Technologies to provide these advantages, please send a check or money order with each order.

Mail order forms and specific ordering information are available through your local Keysight Technologies Sales Office. Addresses and telephone numbers are located in a separate document shipped with the manuals.

## Exchange Assemblies

Under the rebuilt-exchange assembly program, certain factory-repaired and tested assemblies are available on a trade-in basis. These assemblies are offered at lower cost than a new assembly, but meet all factory specifications required of a new assembly.

The defective assembly must be returned for credit under the terms of the rebuilt-exchange assembly program. Any spare assembly stock desired should be ordered using the new assembly part number.

## Replaceable Parts List

The latest replaceable parts list is shown on the Keysight web site. See the [http://www.keysight.com/find/ena\\_support/](http://www.keysight.com/find/ena_support/)

## 4 Replacement Procedure

This chapter provides procedure for removing and replacing the major assemblies in the E5061B.

### Replacing an Assembly

The following steps show the sequence for replacing an assembly in a E5061B Network Analyzer.

1. Identify the faulty group. Refer to **Chapter 2, “Troubleshooting.”**
2. Order a replacement assembly. Refer to **Chapter 3, “Replaceable Parts.”**
3. Replace the faulty assembly and determine what adjustments are necessary. Refer to This chapter and **Chapter 5, “Post-Repair Procedures.”**

#### WARNING

These servicing instructions are for use by qualified personnel only. To avoid electrical shock, do not perform any servicing unless you are qualified to do so.

---

#### WARNING

The opening of covers or removal of parts is likely to expose dangerous voltages. Disconnect the instrument from its power supply.

---

#### CAUTION

Many of the assemblies in this instrument are very susceptible to damage from ESD(electrostatic discharge). Perform the following procedures only at a static-safe workstation and wear a grounding strap.

---

Replacement Procedure  
Required Tools

## Required Tools

The following tools are required for repair of E5061B.

Table 4-1 Required Tools

Assembly	torque screwdriver				flat edge screwdriver	hex key	box torque driver	box torque wrench		open torque wrench
	T8	T10	T15	T20		1.5 mm	5.5 mm	9/16 in.	5/8 in.	5/16 in.
Outer Cover										
Front Panel										
Hard Disk Assembly										
Power Supply Assembly										
A50 CPU Module										
A60 CPU Module										
24 Bit I/O Assembly										
DSP Assembly										
A9 LF Source Bias Module										
A2 Receiver Module										
A3/A4 Receiver Module										
A1 Source Module										
A11 Source Module										
A10 Analog Mother Board										
Ref Oven										
Fan Assembly										
Angle (for Fan Assembly)										
Touch Screen Control Board										
Inverter Board										
Power Switch Assembly										
A52 Front Panel Interface Board / Key Pad										
LCD Assembly										
Front Frame										
Handle Assembly										

## Outer Cover Replacement

### Tools Required

- torque screwdriver, T20
- torque screwdriver, T15 (set to 14 in-lb)

### Removal Procedure

Refer to **Figure 4-1** for this procedure.

- Step 1.** Disconnect the power cable from the E5061B.
- Step 2.** Remove the four bottom feet (item 1).
- Step 3.** Remove the two TORX T20 screws (item 2) fastening the side strap handles.
- Step 4.** Remove the four TORX T15 screws (item 3) fastening the four rear foot.
- Step 5.** Remove the four TORX T15 screws (item 4) fastening the cover.
- Step 6.** Slide up the outer cover and remove it carefully.

### Replacement Procedure

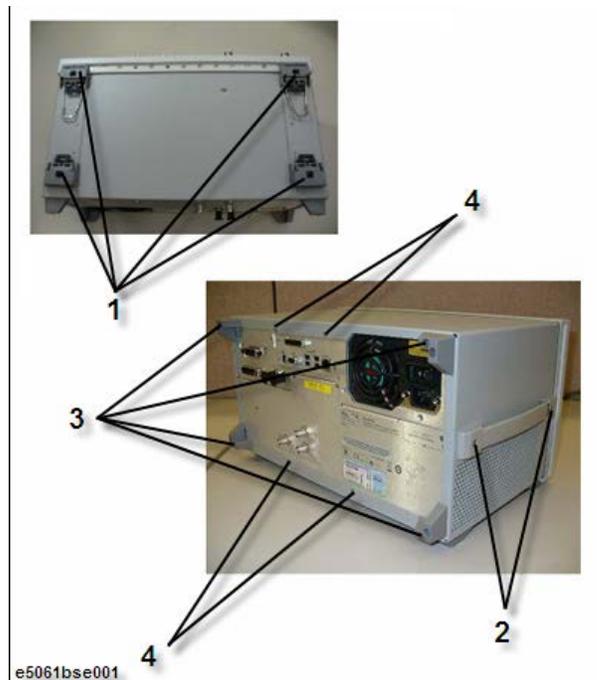
- Step 1.** Reverse the order of the removal procedure.

#### NOTE

Set a torque to 14 in-lb for torque driver when fasten the TORX T15 screws (item 3 and item 4).

Figure 4-1

Outer Cover Removal



## Front Panel Replacement

### Tools required

- torque screwdriver T20
- torque screwdriver T15 (set to 14 in-lb)
- flat edge screwdriver

### Removal Procedure

Refer to **Figure 4-2** for this procedure.

- Step 1.** Remove the Outer Cover as described in “Outer Cover Replacement” on page 55.
- Step 2.** Remove the top trim (item 1) using a flat edge driver.
- Step 3.** Remove the seven TORX T15 screws (item 2) fastening front panel.
- Step 4.** Gradually push the front panel assembly towards the outside.
- Step 5.** Release the flat cable (item 3) from the cable clamp (item 4).
- Step 6.** Disconnect the flat cable (item 3) from the front panel.

### Replacement Procedure

- Step 1.** Reverse the order of the removal procedure.

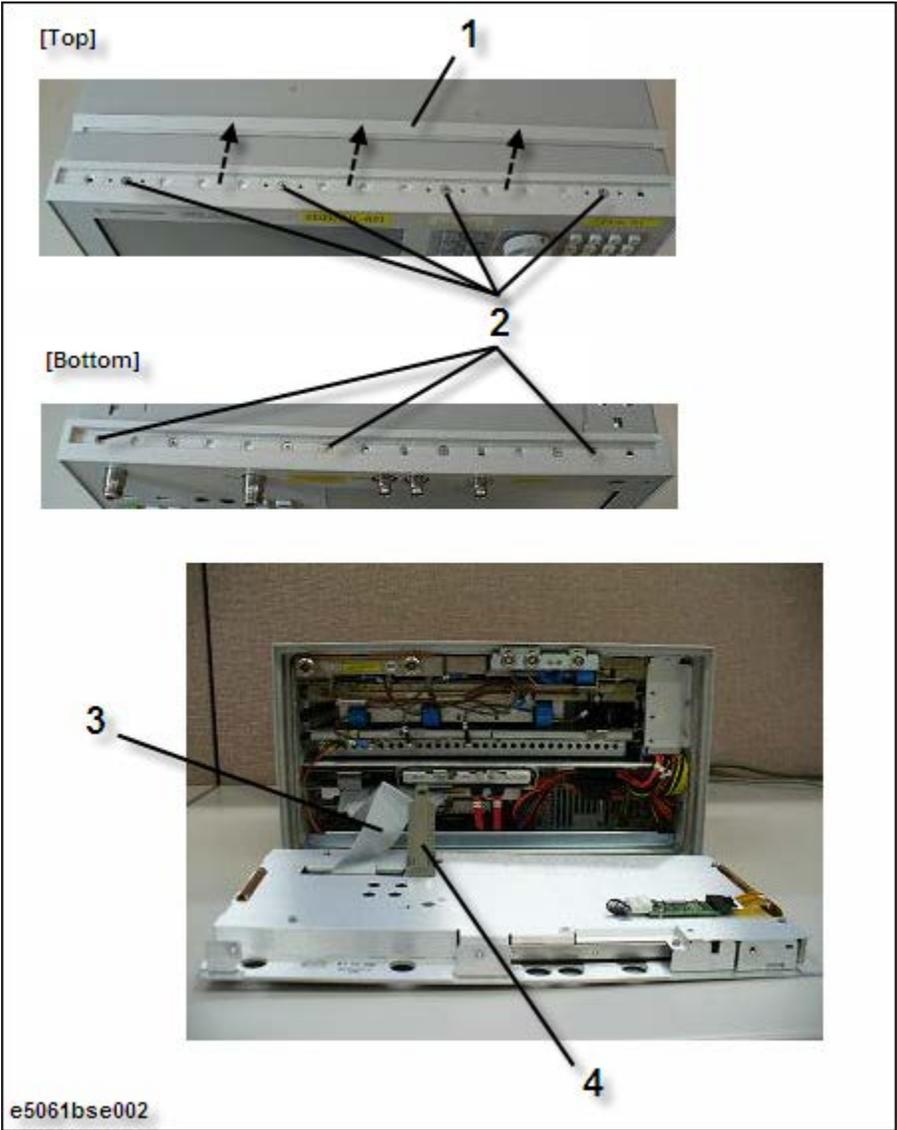
#### NOTE

Set a torque to 14 in-lb for torque driver when fasten the TORX T15 screws (item 2).

---

Replacement Procedure  
Front Panel Replacement

Figure 4-2 Front Panel Removal



## Hard Disk Assembly Replacement (Option 019)

### Tools Required

- torque screwdriver, T15, and T20
- torque screwdriver, T10 (set to 4.4 in-lb, and 9 in-lb)

### Removal Procedure

Refer to **Figure 4-3** for this procedure.

- Step 1.** Remove the Outer Cover as described in **“Outer Cover Replacement” on page 55**.
- Step 2.** Disconnect the power supply cable (item 1) from the Hard Disk Drive.
- Step 3.** Disconnect the S-ATA cable (item 2) from the Hard Disk Drive.
- Step 4.** Release the clamped cables from the clamps (item 3) on the Hard Disk Assembly and the A50 CPU Module.
- Step 5.** Remove the four TORX T10 screws (item 4) fastening the Hard Disk Assembly.
- Step 6.** Lift the Hard Disk Assembly.
- Step 7.** Remove the four TORX T10 screws (item 5) fastening the Hard Disk Drive.

### Replacement Procedure

- Step 1.** Reverse the order of the removal procedure.

#### NOTE

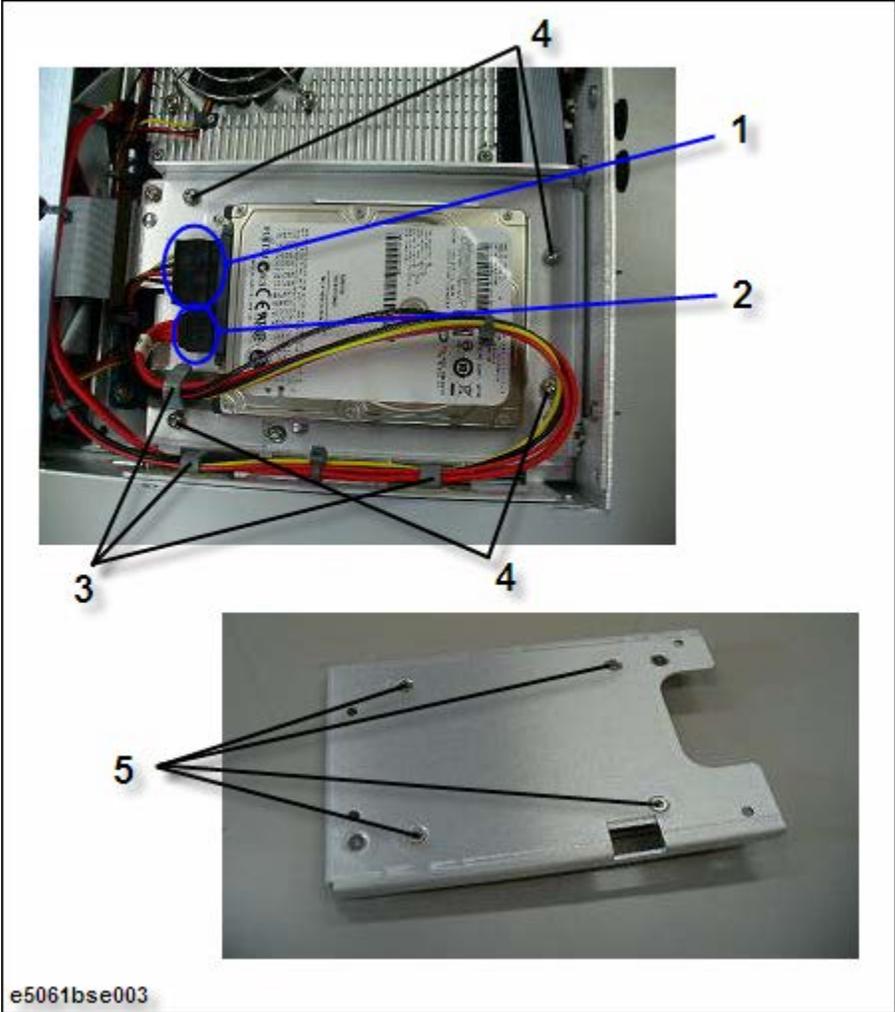
Set a torque to 9 in-lb for torque driver when fasten the TORX T10 screws (item 4).

Set a torque to 4.4 in-lb for torque driver when fasten the TORX T10 screws (item 5).

---

Replacement Procedure  
Hard Disk Assembly Replacement (Option 019)

Figure 4-3 Hard Disk Assembly Removal



## Hard Disk Assembly Replacement (Option 020)

### Tools Required

- torque screwdriver, T15, and T20
- torque screwdriver, T10 (set to 4.4 in-lb, and 9 in-lb)

### Removal Procedure

Refer to **Figure 4-3** for this procedure.

**Step 1.** Remove the four TORX T10 screws (item 1) fastening the Hard Disk Assembly.

**Step 2.** Slide out the Hard Disk Assembly.

**Step 3.** Disconnect the power supply cable (item 2) from the Hard Disk Drive.

**Step 4.** Disconnect the S-ATA cable (item 3) from the Hard Disk Drive.

**Step 5.** Remove the four TORX T10 screws (item 4) fastening the Hard Disk Drive.

### Replacement Procedure

**Step 1.** Reverse the order of the removal procedure.

#### NOTE

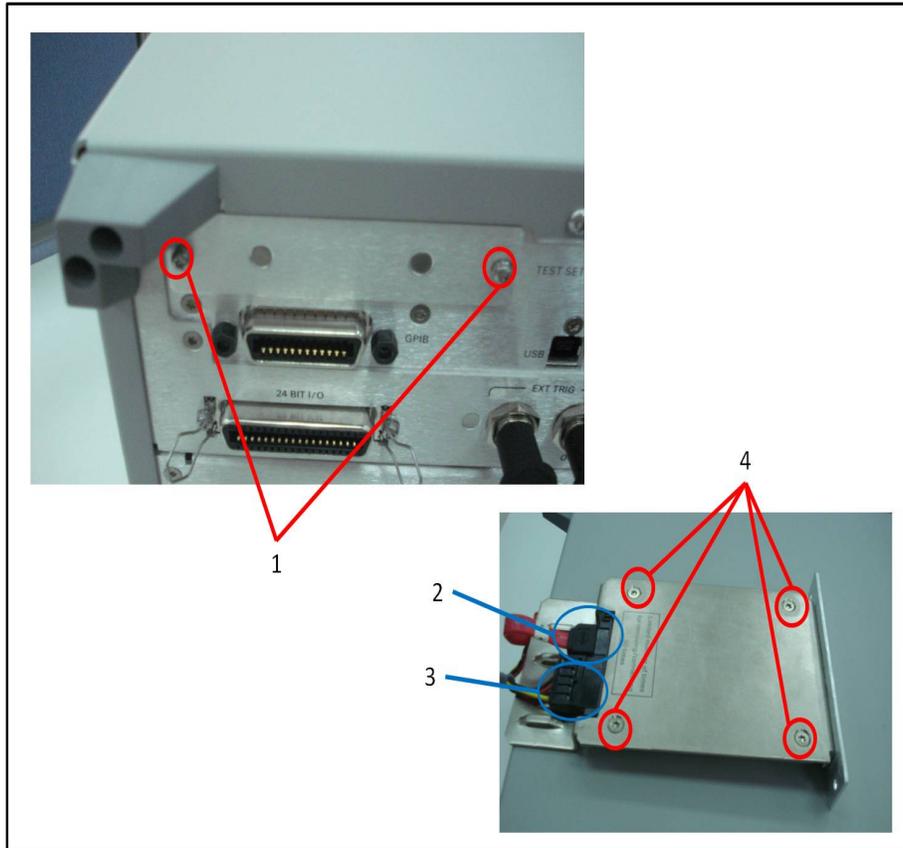
Set a torque to 9 in-lb for torque driver when fasten the TORX T10 screws (item 1).

Set a torque to 4.4 in-lb for torque driver when fasten the TORX T10 screws (item 4).

---

Replacement Procedure  
Hard Disk Assembly Replacement (Option 020)

Figure 4-4 Hard Disk Assembly Removal (option 020)



## Power Supply Assembly Replacement

### Tools Required

- torque screwdriver, T15, and T20
- torque screwdriver, T10 (set to 9 in-lb)
- box torque driver, 5.5 mm (set to 6 in-lb)

### Removal Procedure

Refer to [Figure 4-5](#) for this procedure.

- Step 1.** Remove the Outer Cover as described in [“Outer Cover Replacement” on page 55](#).
- Step 2.** Cut the three cable ties (item 1) on the guide bar.
- Step 3.** Remove the two TORX T10 screws (item 2) fastening the guide bar.
- Step 4.** Disconnect the three power supply cables (item 3) for the Hard Disk Drive, Fan Assembly and A50 CPU Module.
- Step 5.** Remove the two TORX T10 screws and two washers (item 4) fastening the chassis assembly for power supply.
- Step 6.** Remove the three TORX T10 screws (item 5) from the rear panel.
- Step 7.** Lift the power supply assembly.
- Step 8.** Remove the two hex screws (5.5 mm) and two washers (item 6).
- Step 9.** Remove the gasket (item 7), and then, re-install the two hex screws and two washers.

### Replacement Procedure

- Step 1.** Reverse the order of the removal procedure.

#### NOTE

Set a torque to 9 in-lb for torque driver when fasten the TORX T10 screws (item 4 and item 5).

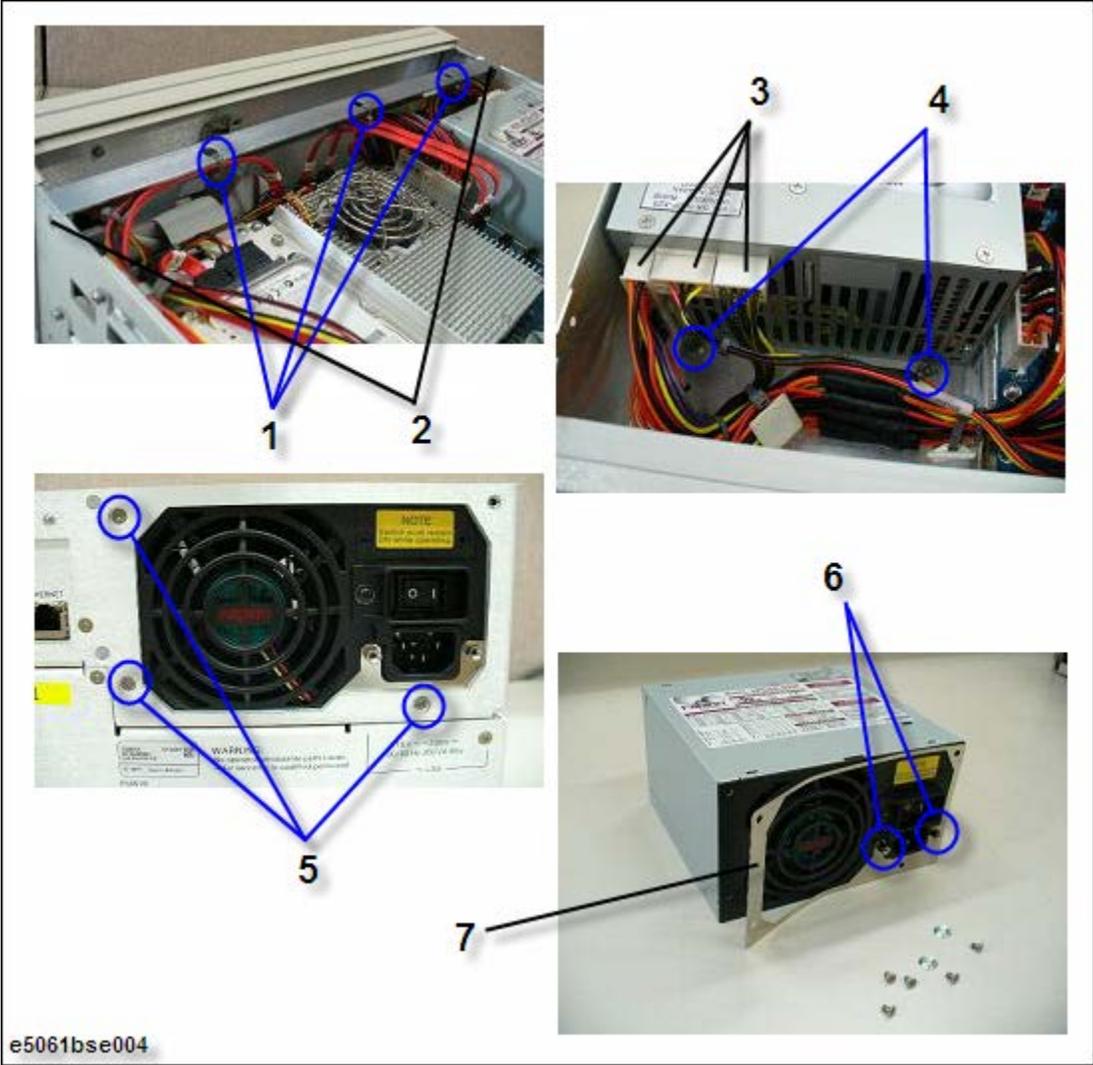
Set a torque to 6 in-lb for box torque driver when fasten the 5.5 mm screws and washers (item 6).

In step 8, the washers must not drop into the power supply.

---

Replacement Procedure  
Power Supply Assembly Replacement

Figure 4-5 Power Supply Assembly Removal



## A50 CPU Module Replacement

### Tools Required

- torque screwdriver, T15, and T20
- torque screwdriver, T10 (set to 9 in-lb)

### Removal Procedure

Refer to [Figure 4-6](#) for this procedure.

- Step 1.** Remove the Outer Cover as described in [“Outer Cover Replacement” on page 55](#).
- Step 2.** Remove the guide bar as described in [“Power Supply Assembly Replacement” on page 62](#).
- Step 3.** Disconnect the power supply cable and S-ATA cable (item 1) from the Hard Disk Drive.
- Step 4.** Release the clamped cables from the three clamps (item 2).
- Step 5.** Disconnect the three cables (item 3) on the A50 CPU Module.
- Step 6.** Remove the flat cable from the clamp (item 4).
- Step 7.** Remove the two S-ATA cables and power supply cable (item 5) from the A50 CPU Module.
- Step 8.** Remove the three TORX T10 screws (item 6) fastening the Chassis Assembly for the A50 CPU Module with Hard Disk Assembly.
- Step 9.** Remove the three TORX T10 screws (item 7) fastening rear panel of the Chassis Assembly for the A50 CPU Module with Hard Disk Assembly.
- Step 10.** Lift the A50 CPU Module with Hard Disk Assembly.
- Step 11.** Remove the four TORX T10 screws (item 8) fastening the A50 CPU Module for the Hard Disk Assembly.
- Step 12.** Lift the Hard Disk Assembly.

### Replacement Procedure

- Step 1.** Reverse the order of the removal procedure.

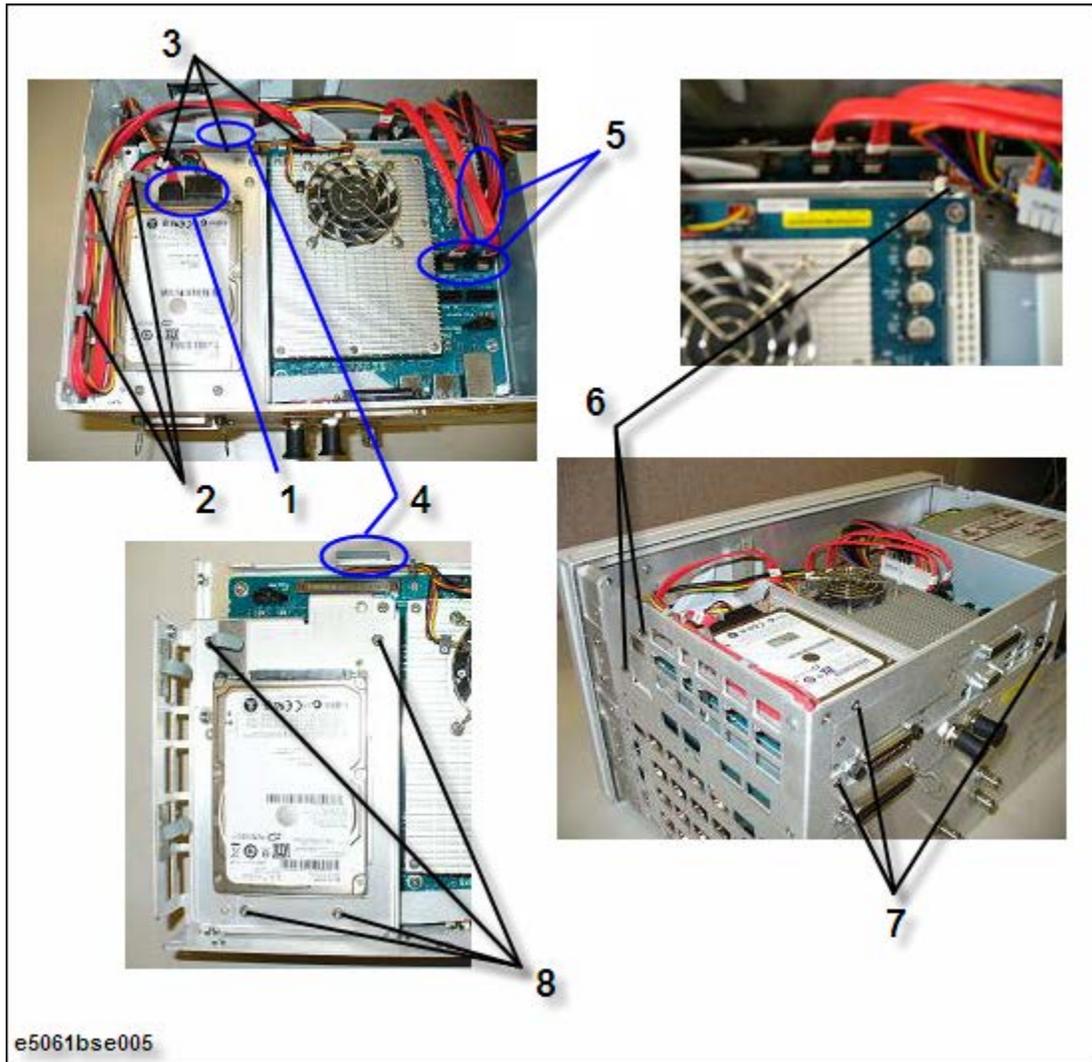
#### NOTE

Set a torque to 9 in-lb for torque driver when fasten the TORX T10 screws (item 6, item 7 and item 8).

---

Replacement Procedure  
A50 CPU Module Replacement

Figure 4-6 A50 CPU Module Removal



## A60 CPU Module Replacement

### Tools Required

- torque screwdriver, T15, and T20
- torque screwdriver, T10 (set to 9 in-lb)

### Removal Procedure

Refer to [Figure 4-7](#) for this procedure.

- Step 1.** Remove the Outer Cover as described in [“Outer Cover Replacement” on page 55](#).
- Step 2.** Remove the guide bar as described in [“Power Supply Assembly Replacement” on page 62](#).
- Step 3.** Remove the Hard Drive as described in [“Hard Disk Assembly Replacement \(Option 020\)” on page 60](#).
- Step 4.** Disconnect the three cables (item 1) on the A60 CPU Module.
- Step 5.** Remove the two S-ATA cables and power supply cable (item 2) from the A60 CPU Module.
- Step 6.** Remove the three TORX T10 screws (item 3) fastening the Chassis Assembly for the A60 CPU Module with Hard Disk Assembly.
- Step 7.** Remove the two TORX T10 screws (item 4) fastening rear panel of the Chassis Assembly for the A60 CPU Module with Hard Disk Assembly.
- Step 8.** Lift the A60 CPU Module with Hard Disk Assembly.
- Step 9.** Remove the two TORX T10 screws (item 5) fastening the A60 CPU Module for the Hard Disk Assembly.

### Replacement Procedure

- Step 1.** Reverse the order of the removal procedure.

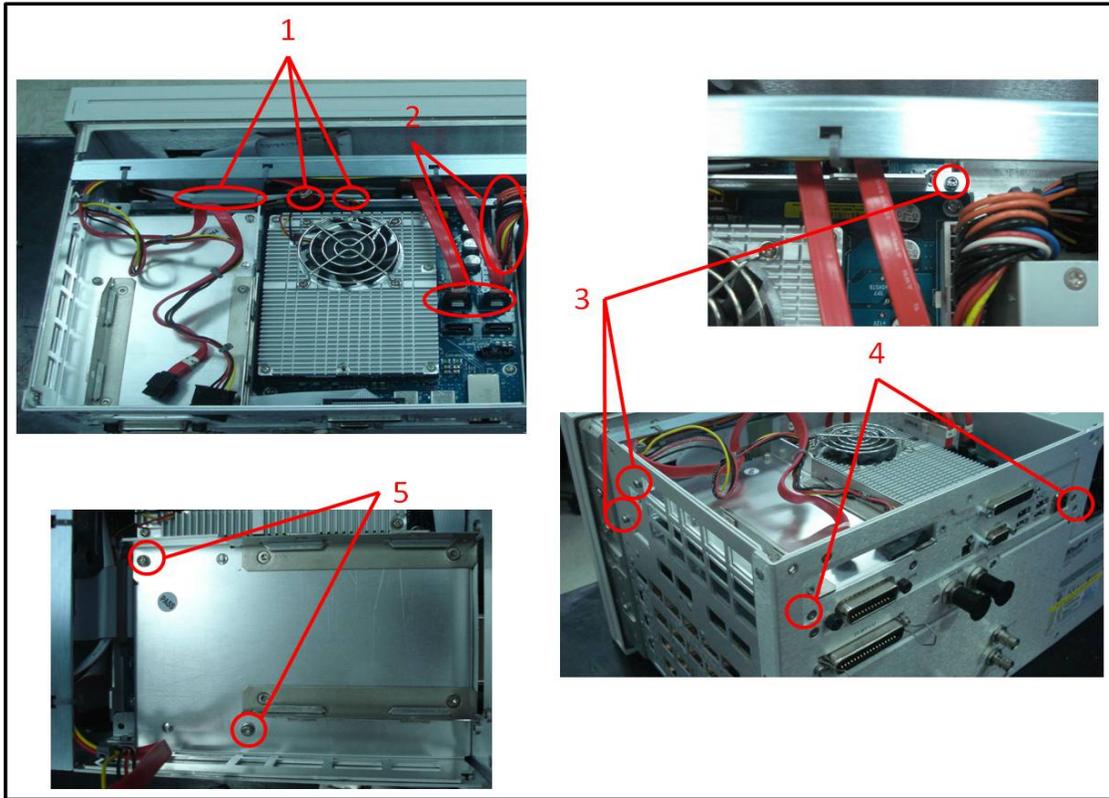
#### NOTE

Set a torque to 9 in-lb for torque driver when fasten the TORX T10 screws (item 6, item 7 and item 8).

---

Replacement Procedure  
A60 CPU Module Replacement

Figure 4-7 A60 CPU Module Removal



## 24 Bit I/O Assembly Replacement

### Tools Required

- torque screwdriver, T15, and T20
- torque screwdriver, T10 (set to 9 in-lb)
- flat edge screwdriver

### Removal Procedure

Refer to **Figure 4-8** for this procedure.

- Step 1.** Remove the Outer Cover as described in “**Outer Cover Replacement**” on **page 55**.
- Step 2.** Remove the Front Panel as described in “**Front Panel Replacement**” on **page 56**.
- Step 3.** Disconnect the flat cable (item 1) from the 24 Bit I/O Assembly and the DSP Assembly.
- Step 4.** Release the flat cable from the clamp (item 2).
- Step 5.** Disconnect the cable (item 3) from the 24 Bit I/O Assembly and the A50 CPU Module.
- Step 6.** Release the cable from the clamp (item 4).
- Step 7.** Remove the two TORX T10 screws (item 5) fastening the 24 Bit I/O Assembly.
- Step 8.** Slide forward the 24 Bit I/O Assembly.

### Replacement Procedure

- Step 1.** Reverse the order of the removal procedure.

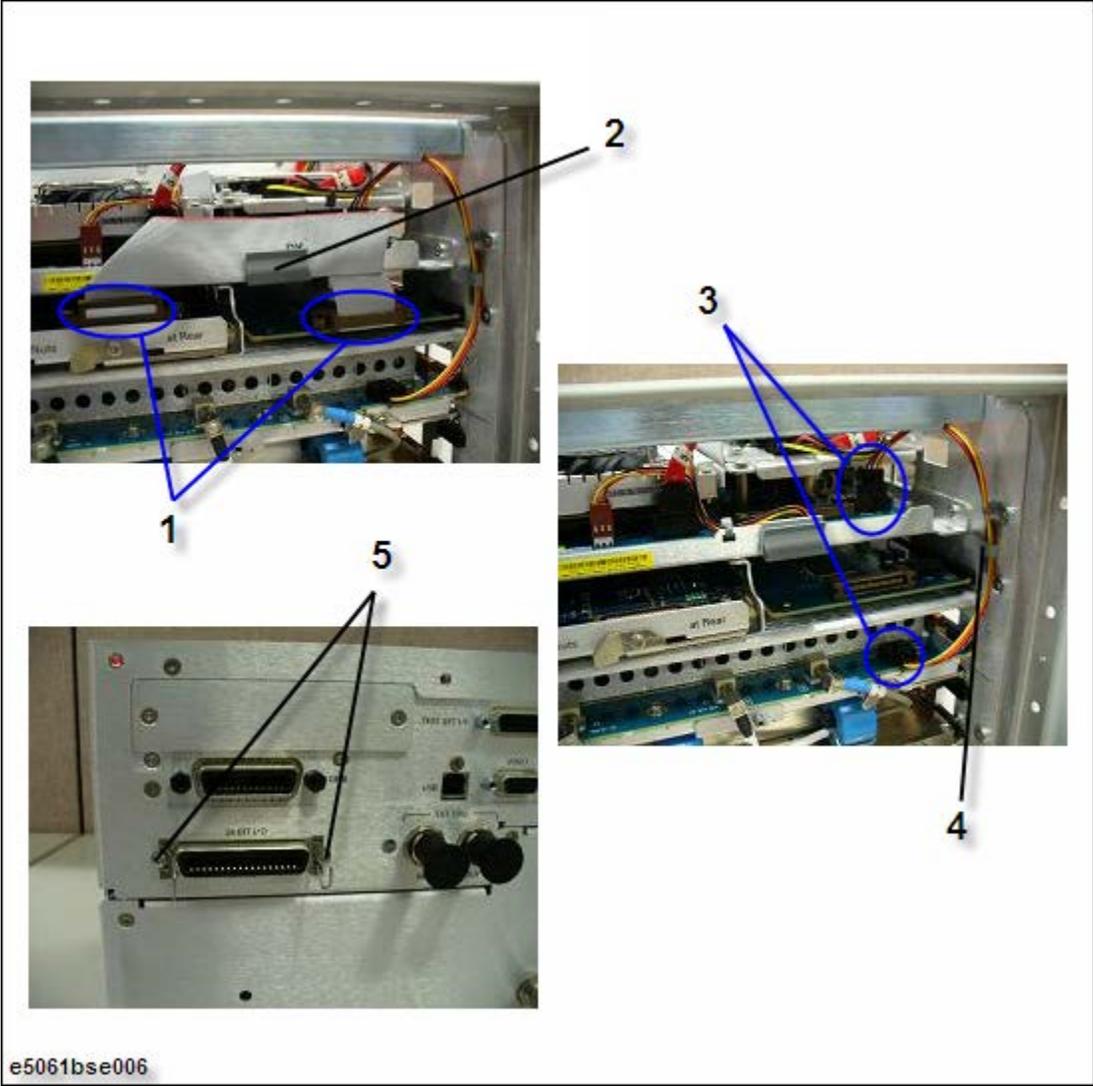
#### NOTE

Set a torque to 9 in-lb for torque driver when fasten the TORX T10 screws (item 5).

---

Replacement Procedure  
24 Bit I/O Assembly Replacement

Figure 4-8 24 Bit I/O Assembly Removal



## DSP Assembly Replacement

### Tools Required

- torque screwdriver, T15, and T20
- torque screwdriver, T10 (set to 9 in-lb)
- box torque wrench, 5/8 inch (set to 30.4 in-lb)
- flat edge screwdriver

### Removal Procedure

Refer to **Figure 4-9** for this procedure.

- Step 1.** Remove the Outer Cover as described in “**Outer Cover Replacement**” on **page 55**.
- Step 2.** Remove the Front Panel as described in “**Front Panel Replacement**” on **page 56**.
- Step 3.** Disconnect the flat cable (item 1) from the DSP Assembly.
- Step 4.** Disconnect the two S-ATA cable (item 2) from the DSP Assembly.
- Step 5.** Remove the two 5/8 inch nuts and the two washers (item 3) from the BNC connectors.
- Step 6.** Remove the two TORX T10 screws (item 4) fastening the DSP Assembly.
- Step 7.** Slide forward the DSP Assembly.

### Replacement Procedure

- Step 1.** Reverse the order of the removal procedure.

#### NOTE

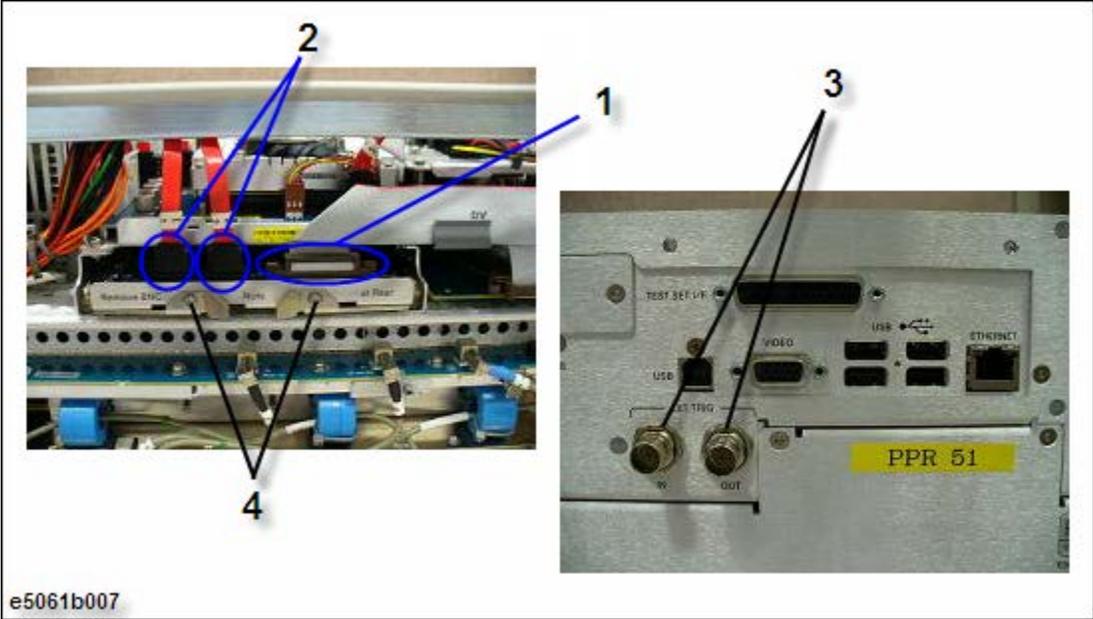
Set a torque 30.4 in-lb for box torque wrench when fasten the 5/8 inch nuts and the washers (item 3).

Set a torque to 9 in-lb for torque driver when fasten the TORX T10 screws (item 4).

---

Replacement Procedure  
DSP Assembly Replacement

Figure 4-9 DSP Assembly Removal



## A9 LF Source Bias Module Replacement

### Tools Required

- torque screwdriver, T15, and T20
- torque screwdriver, T10 (set to 9 in-lb)
- flat edge screwdriver

### Removal Procedure

Refer to **Figure 4-10** for this procedure.

- Step 1.** Remove the Outer Cover as described in “**Outer Cover Replacement**” on **page 55**.
- Step 2.** Remove the Front Panel as described in “**Front Panel Replacement**” on **page 56**.
- Step 3.** Disconnect the cable (item 1) from the A9 LF Source Bias Module.
- Step 4.** Disconnect the three RF cables (item 2) from the A9 LF Source Bias Module.
- Step 5.** Remove the two TORX T10 screws (item 3) fastening the A9 LF Source Bias Module.
- Step 6.** Slide forward the A9 LF Source Bias Module.

### Replacement Procedure

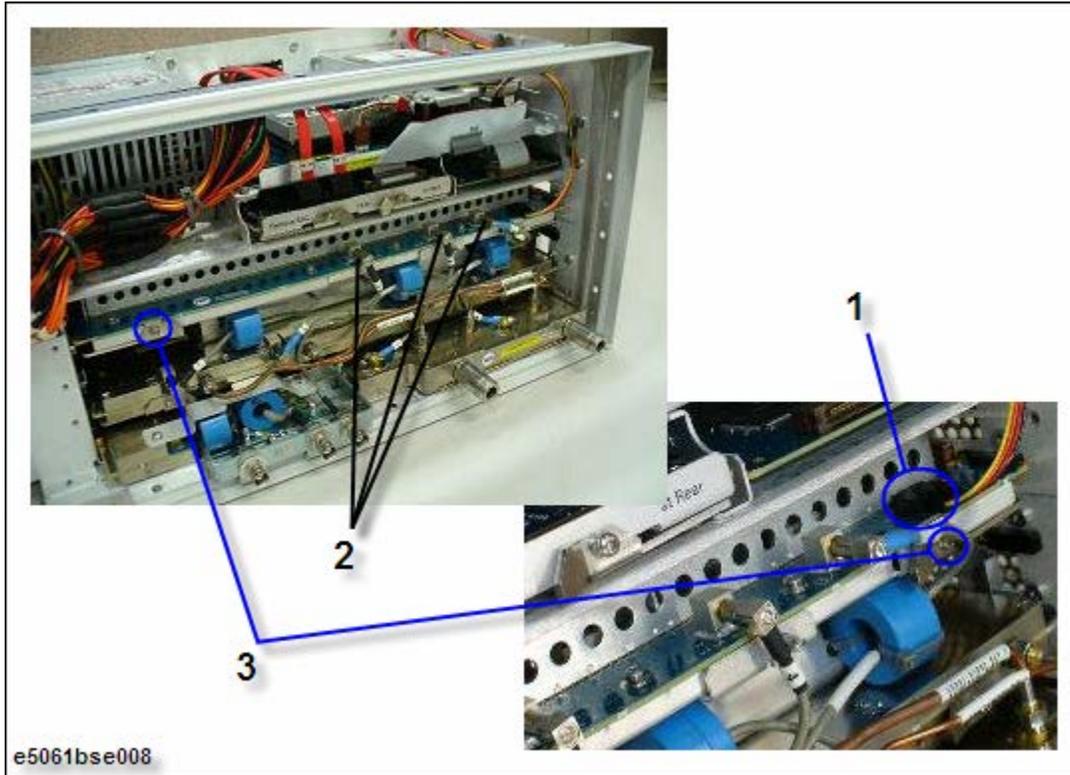
- Step 1.** Reverse the order of the removal procedure.

#### NOTE

Set a torque to 9 in-lb for torque driver when fasten the TORX T10 screws (item 3).

---

Figure 4-10 A9 LF Source Bias Module Removal



## A2 Receiver Module Replacement

### Tools Required

- torque screwdriver, T20
- torque screwdriver, T15 (set to 14 in-lb)
- torque screwdriver, T10 (set to 9 in-lb)
- open torque wrench, 5/16 inch (set to 9.5 in-lb)
- flat edge screwdriver

### Removal Procedure

Refer to **Figure 4-11** for this procedure.

- Step 1.** Remove the Outer Cover as described in “**Outer Cover Replacement**” on **page 55**.
- Step 2.** Remove the Front Panel as described in “**Front Panel Replacement**” on **page 56**.
- Step 3.** Remove the three semi-rigid cables (item 1).
- Step 4.** Disconnect the three RF cables (item 2) from the A2 Receiver Module and the A9 LF Source Bias Module.
- Step 5.** Remove the two TORX T10 screws (item 3) fastening Chassis Assembly for the A2 Receiver Module.
- Step 6.** Remove the TORX T15 screw (item 4) fastening Chassis Assembly for the A2 Receiver Module.
- Step 7.** Slide forward the A2 Receiver Module.

### Replacement Procedure

- Step 1.** Reverse the order of the removal procedure.

#### NOTE

Set a torque to 9.5 in-lb for open torque wrench when fasten the semi-rigid cables (item 1).

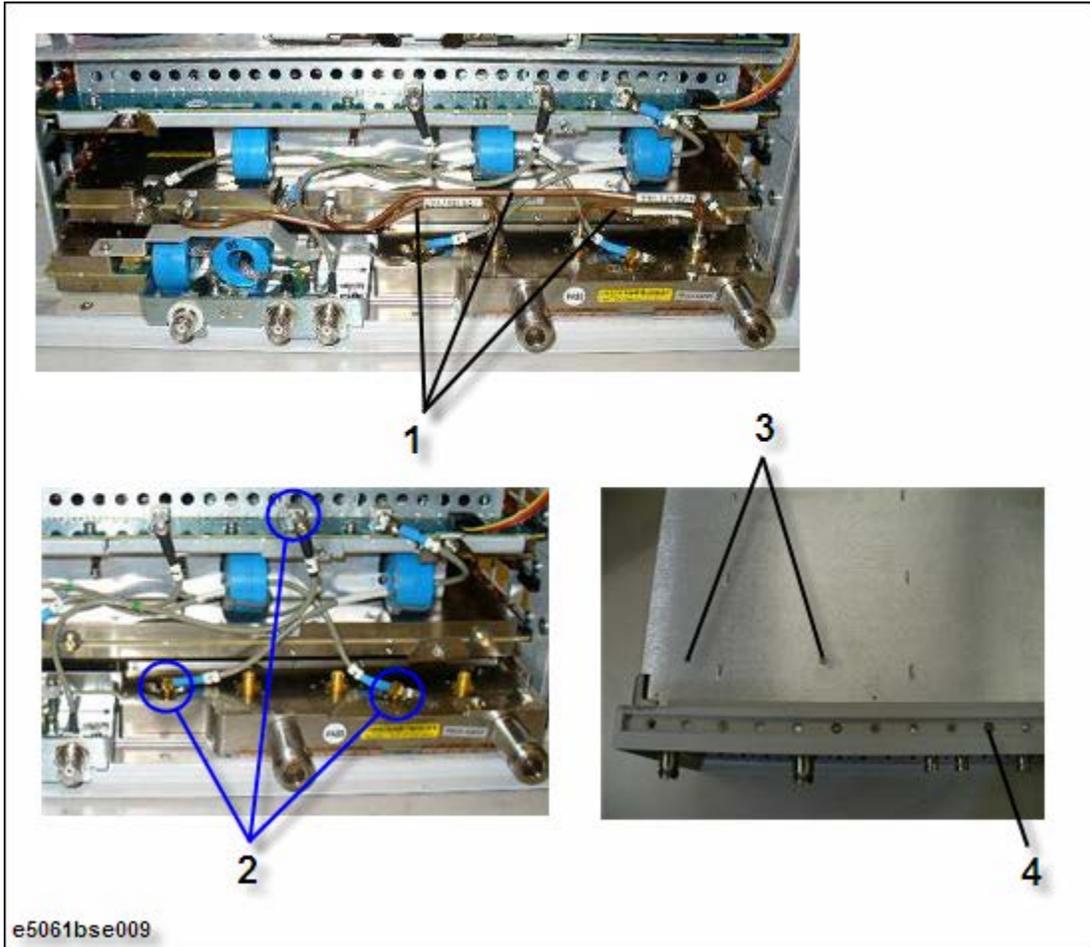
Set a torque to 9 in-lb for torque driver when fasten the TORX T10 screws (item 3).

Set a torque to 14 in-lb for torque driver when fasten the TORX T15 screw (item 4).

---

Replacement Procedure  
A2 Receiver Module Replacement

Figure 4-11 A2 Receiver Module Removal



## A3/A4 Receiver Module Replacement

### Tools Required

- torque screwdriver, T20
- torque screwdriver, T15 (set to 14 in-lb)
- torque screwdriver, T10 (set to 9 in-lb)
- open torque wrench, 5/16 inch (set to 9.5 in-lb)
- flat edge screwdriver

### Removal Procedure

Refer to **Figure 4-12** for this procedure.

- Step 1.** Remove the Outer Cover as described in “**Outer Cover Replacement**” on **page 55**.
- Step 2.** Remove the Front Panel as described in “**Front Panel Replacement**” on **page 56**.
- Step 3.** Remove the two semi-rigid cables (item 1).
- Step 4.** Remove the two TORX T10 screws (item 2) fastening Chassis Assembly for the A3/A4 Receiver Module.
- Step 5.** Slide forward the A3/A4 Receiver Module.

### Replacement Procedure

- Step 1.** Reverse the order of the removal procedure.

#### NOTE

Set a torque to 9.5 in-lb for open torque wrench when fasten the semi-rigid cables (item 1).

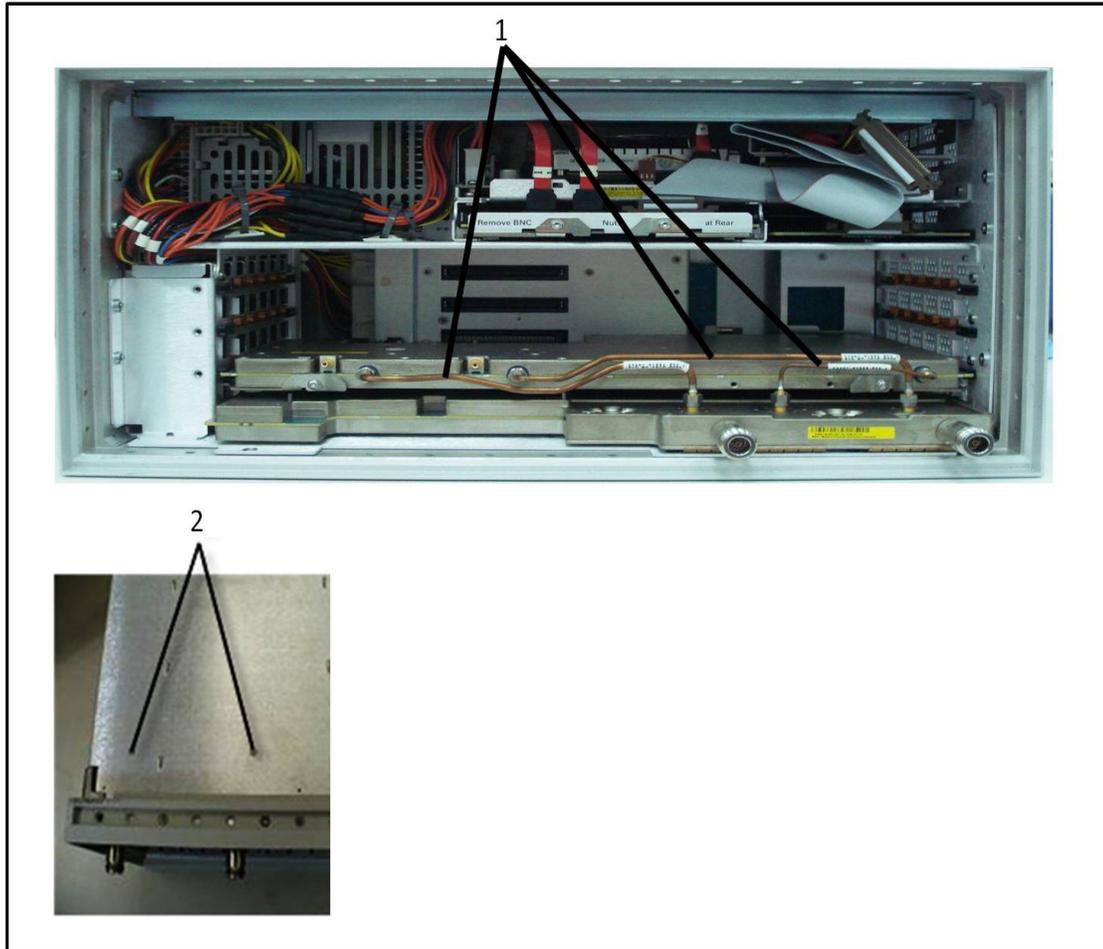
Set a torque to 9 in-lb for torque driver when fasten the TORX T10 screws (item 3).

Set a torque to 14 in-lb for torque driver when fasten the TORX T15 screw (item 4).

---

Replacement Procedure  
A3/A4 Receiver Module Replacement

Figure 4-12 A3/A4 Receiver Module Removal



## A1 Source Module Replacement

### Tools Required

- torque screwdriver, T15 and T20
- torque screwdriver, T10 (set to 9 in-lb)
- open torque wrench, 5/16 inch
- flat edge screwdriver

### Removal Procedure

Refer to **Figure 4-13** for this procedure.

- Step 1.** Remove the Outer Cover as described in “**Outer Cover Replacement**” on **page 55**.
- Step 2.** Remove the Front Panel as described in “**Front Panel Replacement**” on **page 56**.
- Step 3.** Remove the A2 Receiver Module as described in “**A2 Receiver Module Replacement**” on **page 74**.
- Step 4.** Disconnect the four RF cable connectors (item 1) from the A1 Source Module and the A9 LF Source Bias Module.
- Step 5.** Remove the two TORX T10 screws (item 2) fastening the A1 Source Module.
- Step 6.** Slide forward the A1 Source Module.
- Step 7.** Remove the four TORX T10 screws (item 3) fastening bracket and angle for the A1 Source Module.

### Replacement Procedure

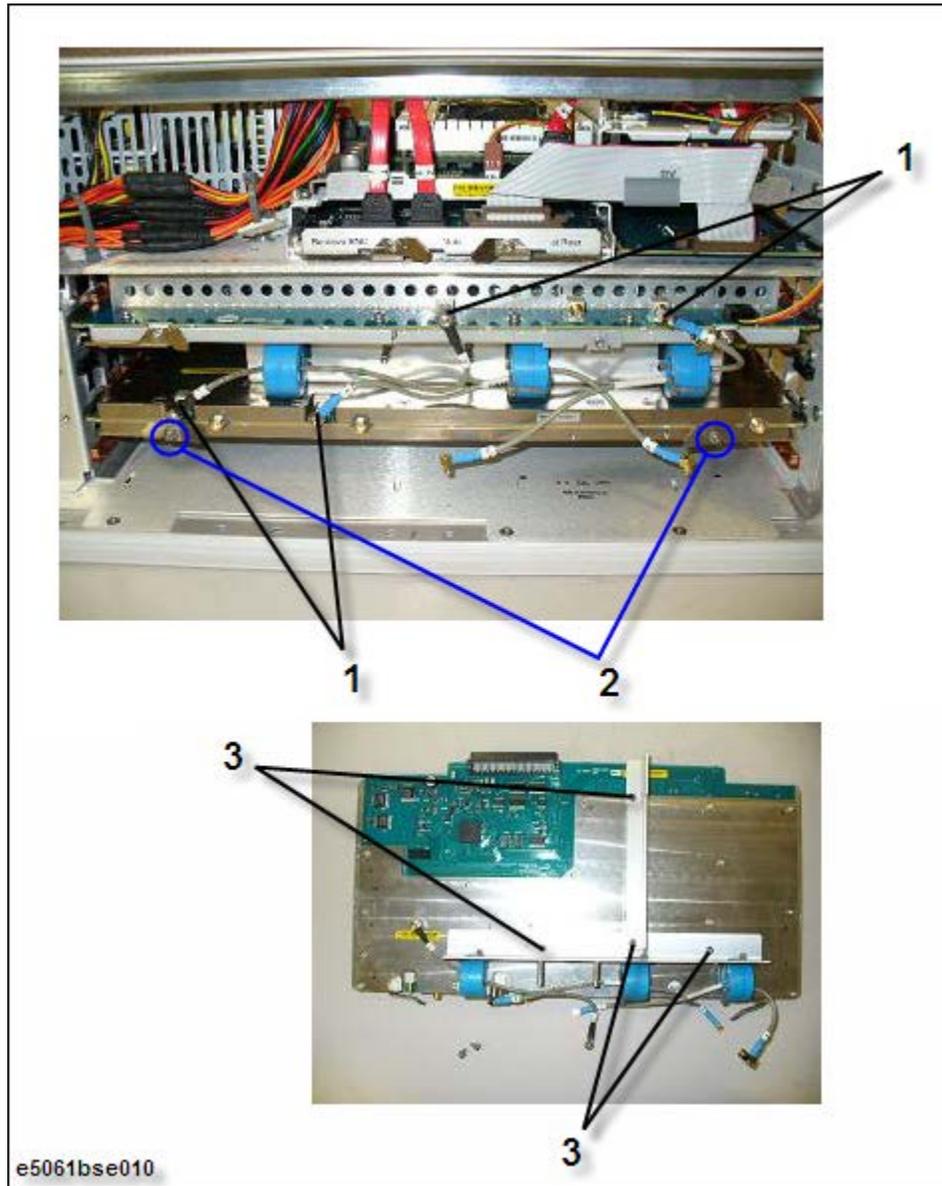
- Step 1.** Reverse the order of the removal procedure.

#### NOTE

Set a torque to 9 in-lb for torque driver when fasten the TORX T10 screws (item 2, and item 3).

---

Figure 4-13 A1 Source Module Removal



## A11 Source Module Replacement

### Tools Required

- torque screwdriver, T15 and T20
- torque screwdriver, T10 (set to 9 in-lb)
- open torque wrench, 5/16 inch
- flat edge screwdriver

### Removal Procedure

Refer to **Figure 4-13** for this procedure.

- Step 1.** Remove the Outer Cover as described in “Outer Cover Replacement” on page 55.
- Step 2.** Remove the Front Panel as described in “Front Panel Replacement” on page 56.
- Step 3.** Remove the A3/A4 Receiver Module as described in “A3/A4 Receiver Module Replacement” on page 76.
- Step 4.** Remove the two TORX T10 screws (item 1) fastening the A11 Source Module.
- Step 5.** Slide forward the A11 Source Module.

### Replacement Procedure

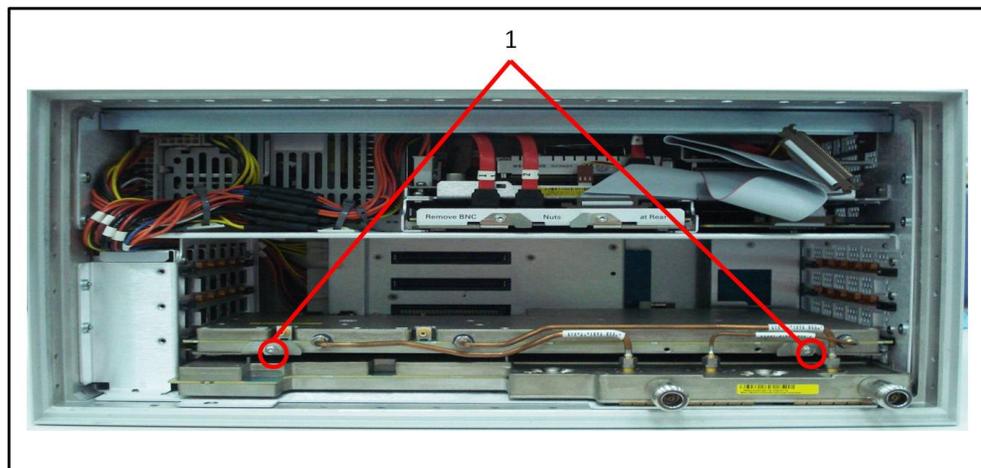
- Step 1.** Reverse the order of the removal procedure.

#### NOTE

Set a torque to 9 in-lb for torque driver when fasten the TORX T10 screws (item 2, and item 3).

Figure 4-14

A11 Source Module Removal



## A10 Analog Mother Board Replacement

### Tools Required

- torque screwdriver, T15 and T20
- torque screwdriver, T10 (set to 9 in-lb)
- box torque wrench, 9/16 inch (set to 30.4 in-lb)
- box torque wrench, 5/8 inch
- open torque wrench, 5/16 inch
- flat edge screwdriver

### Removal Procedure

Refer to [Figure 4-15](#) for this procedure.

- Step 1.** Remove the Outer Cover as described in [“Outer Cover Replacement” on page 55.](#)
- Step 2.** Remove the Front Panel as described in [“Front Panel Replacement” on page 56.](#)
- Step 3.** Remove the following assemblies.
  - Hard Disk Assembly (Refer to [“Hard Disk Assembly Replacement \(Option 019\)” on page 58.](#))
  - A50 CPU Module (Refer to [“A50 CPU Module Replacement” on page 64.](#))
  - DSP Assembly (Refer to [“DSP Assembly Replacement” on page 70.](#))
  - A9 LF Source Bias Module (Refer to [“A9 LF Source Bias Module Replacement” on page 72.](#))
  - A2 Receiver Module (Refer to [“A2 Receiver Module Replacement” on page 74.](#))
  - A1 Source Module (Refer to [“A1 Source Module Replacement” on page 78.](#))
- Step 4.** Remove the three 9/16 inch nuts and the three washers (item 1) from the BNC connectors.
- Step 5.** Remove the seven TORX T10 screws (item 2) fastening the rear panel.
- Step 6.** Remove the TORX T10 screw (item 3) fastening the small unit of the A10 Analog Mother Board.
- Step 7.** Disconnect the two cable connectors (item 4) from the Fan Assembly.
- Step 8.** Disconnect the two cable connectors (item 5) from the Power Supply Assembly.
- Step 9.** Disconnect the two cable connectors (item 6) from the Ref Oven.
- Step 10.** Remove the eleven TORX T10 screws (item 7) fastening the A10 Analog Mother Board.

## Replacement Procedure

**Step 1.** Reverse the order of the removal procedure.

### NOTE

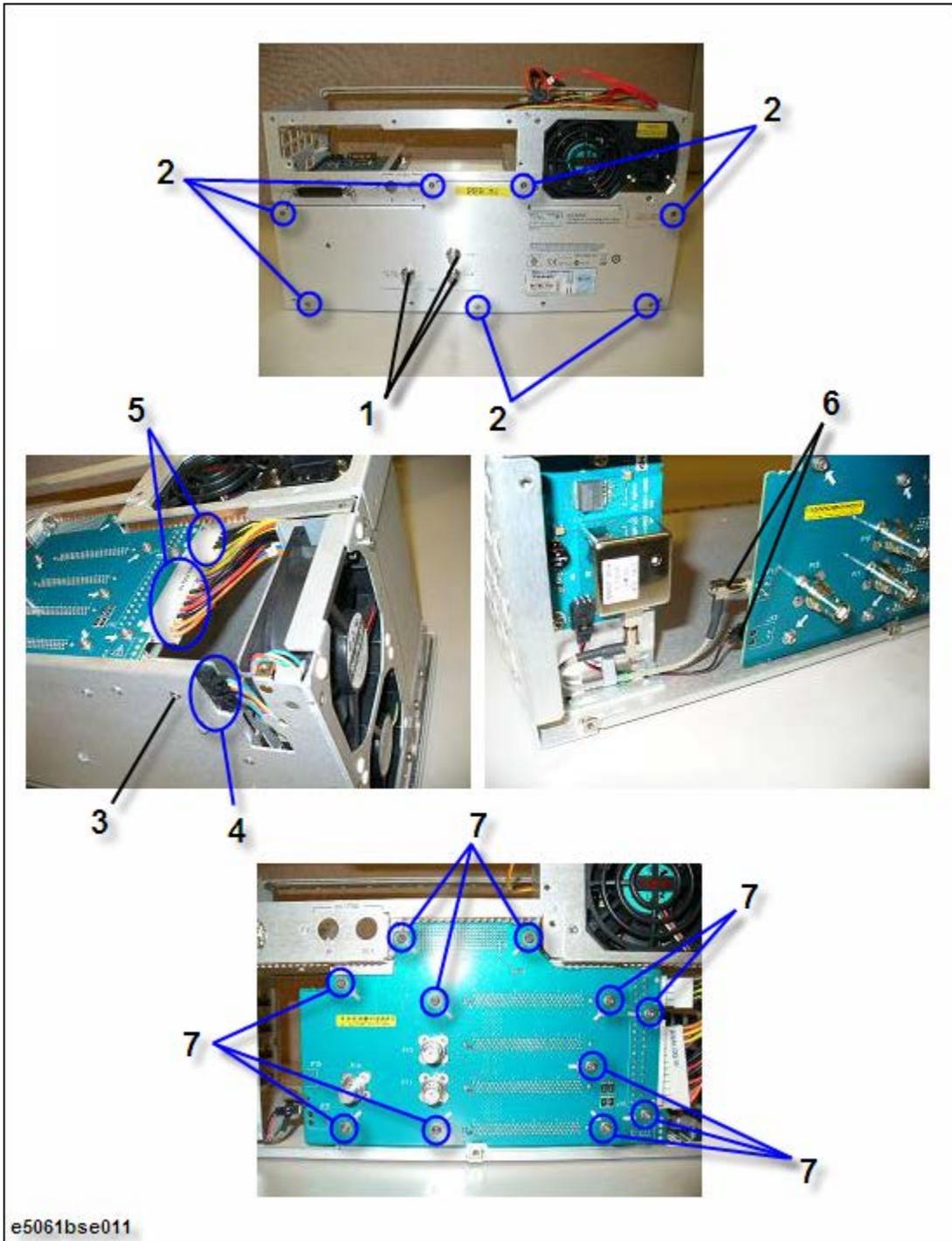
Set a torque to 30.4 in-lb for box torque wrench when fasten the 9/16 inch nuts and the washers (item 1).

Set a torque to 9 in-lb for torque driver when fasten the TORX T10 screws (item 2, item 3, and item 7).

---

Replacement Procedure  
A10 Analog Mother Board Replacement

Figure 4-15 A10 Analog Mother Board Removal



## Ref Oven (Opt. 1E5) Replacement

### Tools Required

- torque screwdriver, T15 and T20
- torque screwdriver, T10 (set to 9 in-lb)
- box torque wrench, 9/16 inch (set to 30.4 in-lb)

### Removal Procedure

Refer to **Figure 4-16** for this procedure.

- Step 1.** Remove the Outer Cover as described in “**Outer Cover Replacement**” on **page 55**.
- Step 2.** Remove the three 9/16 inch nuts and the three washers (item 1) from the BNC connectors.
- Step 3.** Remove the seven TORX T10 screws (item 2) fastening the rear panel.
- Step 4.** Disconnect the two cable connectors (item 3) from the Ref Oven.
- Step 5.** Remove the three TORX T10 screws (item 4) fastening the Ref Oven.
- Step 6.** Lift the Ref Oven.

### Replacement Procedure

- Step 1.** Reverse the order of the removal procedure.

#### NOTE

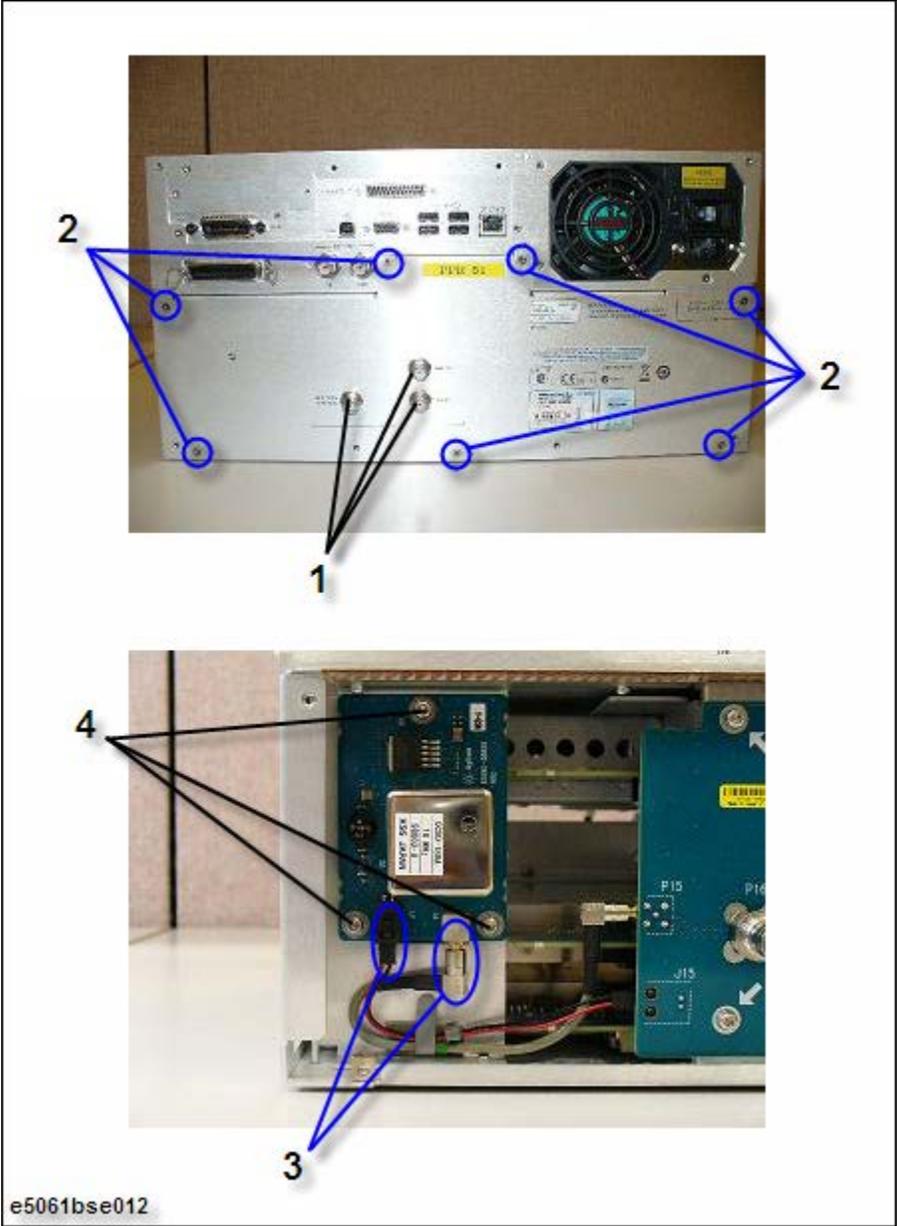
Set a torque to 30.4 in-lb for box torque wrench when fasten the 9/16 inch nuts and the washers (item 1).

Set a torque to 9 in-lb for torque driver when fasten the TORX T10 screws (item 2, and item 4).

---

Replacement Procedure  
Ref Oven (Opt. 1E5) Replacement

Figure 4-16 Ref Oven Removal



## Fan Assembly Replacement

### Tools Required

- torque screwdriver, T15 and T20
- torque screwdriver, T10 (set to 9 in-lb)
- box torque wrench, 9/16 inch (set to 30.4 in-lb)

### Removal Procedure

Refer to **Figure 4-17** for this procedure.

- Step 1.** Remove the Outer Cover as described in “Outer Cover Replacement” on page 55.
- Step 2.** Remove the three 9/16 inch nuts and the three washers (item 1) from the BNC connectors.
- Step 3.** Remove the seven TORX T10 screws (item 2) fastening the rear panel.
- Step 4.** Cut the cable ties (item 3) fastening the Fan Assembly cables.
- Step 5.** Disconnect the two cable connectors (item 4) from the Fan Assembly.
- Step 6.** Remove the six TORX T10 screws (item 5) fastening the Fan Assembly.
- Step 7.** Lift the Fan Assembly.
- Step 8.** Remove the eight rivets (plastic) (item 6) fastening the Fans for the blacket.
- Step 9.** Peel off the tape (item 7) fastening the Fan Assembly cables.

### Replacement Procedure

- Step 1.** Reverse the order of the removal procedure.

#### NOTE

Set a torque to 30.4 in-lb for box torque wrench when fasten the 9/16 inch nuts and the washers (item 1).

Set a torque to 9 in-lb for torque driver when fasten the TORX T10 screws (item 2, and item 5).

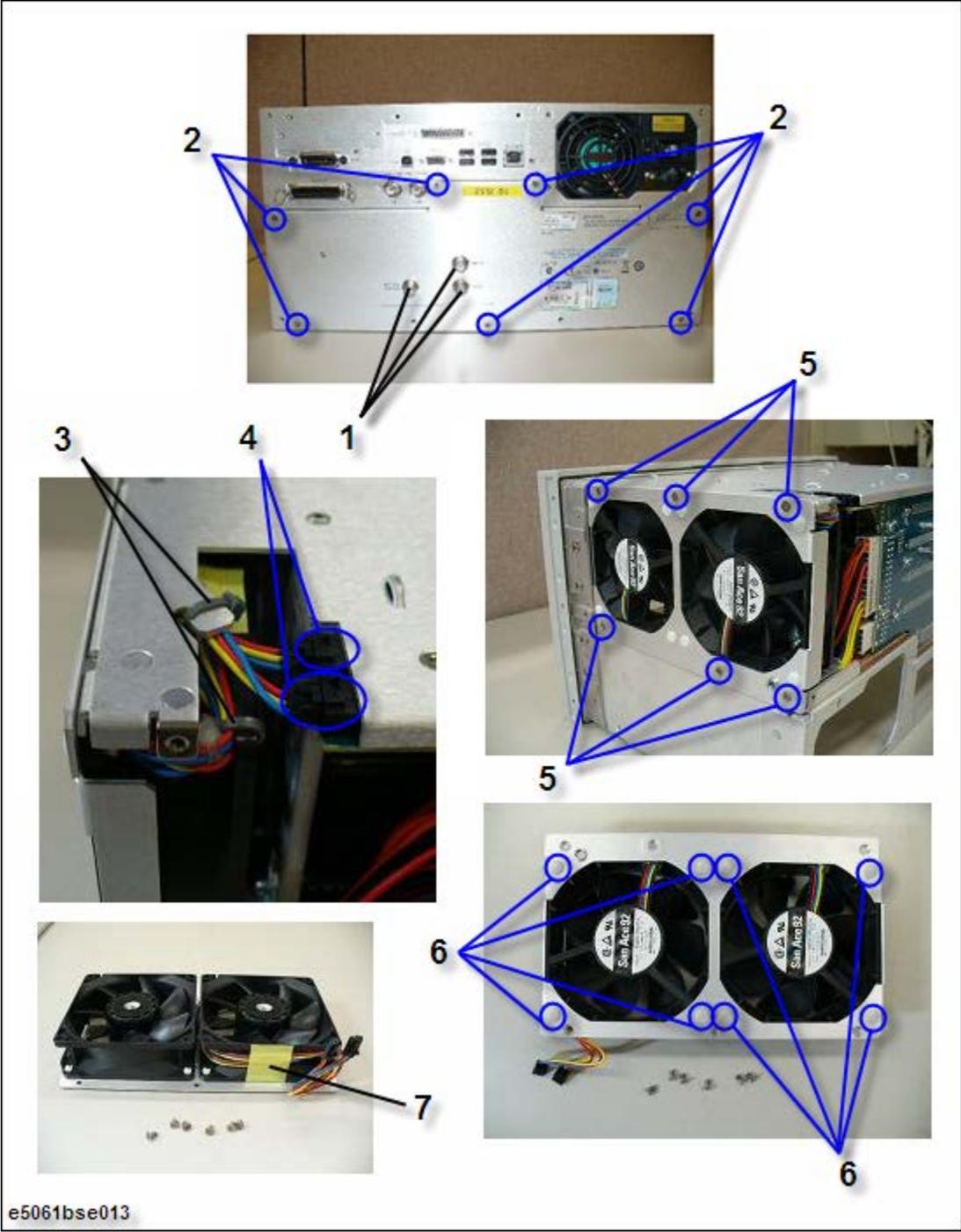
Do not use the rivets (item 6) used once.

Pull the Fan Assembly cables before paste on tape.

---

Replacement Procedure  
Fan Assembly Replacement

Figure 4-17 Fan Assembly Removal



## Angle (Fan Assembly) Replacement

### Tools Required

- torque screwdriver, T15 and T20
- torque screwdriver, T10 (set to 9 in-lb)
- box torque wrench, 9/16 inch

### Removal Procedure

Refer to **Figure 4-18** for this procedure.

- Step 1.** Remove the Outer Cover as described in “Outer Cover Replacement” on page 55.
- Step 2.** Remove the Fan Assembly as described in “Fan Assembly Replacement” on page 86.
- Step 3.** Remove the two TORX T10 screws (item 1) fastening the Angle for Fan Assembly.
- Step 4.** Lift the Angle (item 2).

### Replacement Procedure

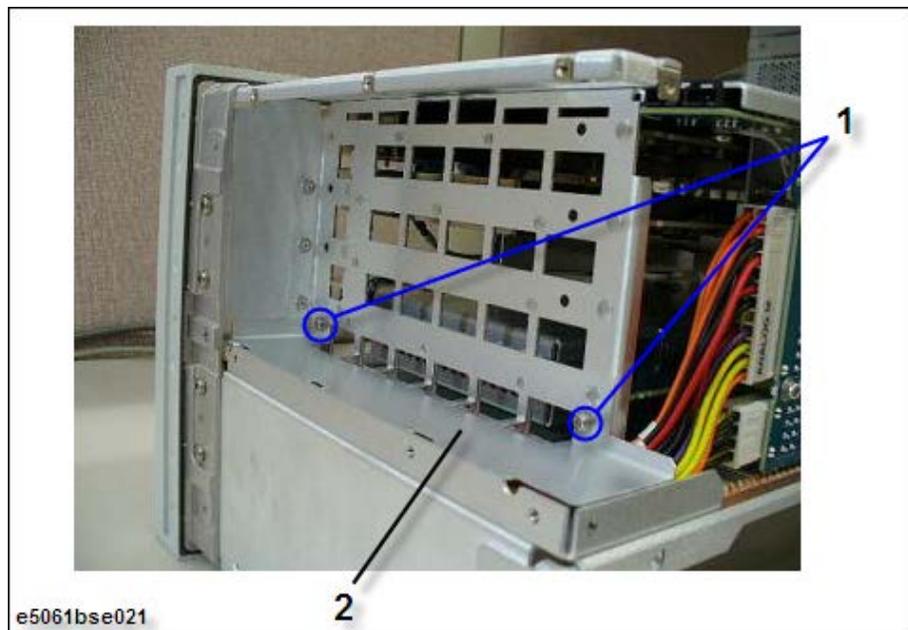
- Step 1.** Reverse the order of the removal procedure.

#### NOTE

Set a torque to 9 in-lb for torque driver when fasten the TORX T10 screws (item 1).

Figure 4-18

Angle (for Fan Assembly) Removal



## Touch Screen Control Board Replacement

### Tools Required

- torque screwdriver, T15 and T20
- torque screwdriver, T8 (set to 5 in-lb)
- flat edge screwdriver

### Removal Procedure

Refer to **Figure 4-19** for this procedure.

- Step 1.** Remove the Outer Cover as described in “Outer Cover Replacement” on page 55.
- Step 2.** Remove the Front Panel as described in “Front Panel Replacement” on page 56.
- Step 3.** Remove the two TORX T8 screws (item 1) fastening the Touch Screen Control Board for the front panel rear side.
- Step 4.** Disconnect the flat cable connector (item 2) from the A52 Front Panel Interface Board.
- Step 5.** Disconnect the flat cable connector (item 3) from the LCD Assembly.

### Replacement Procedure

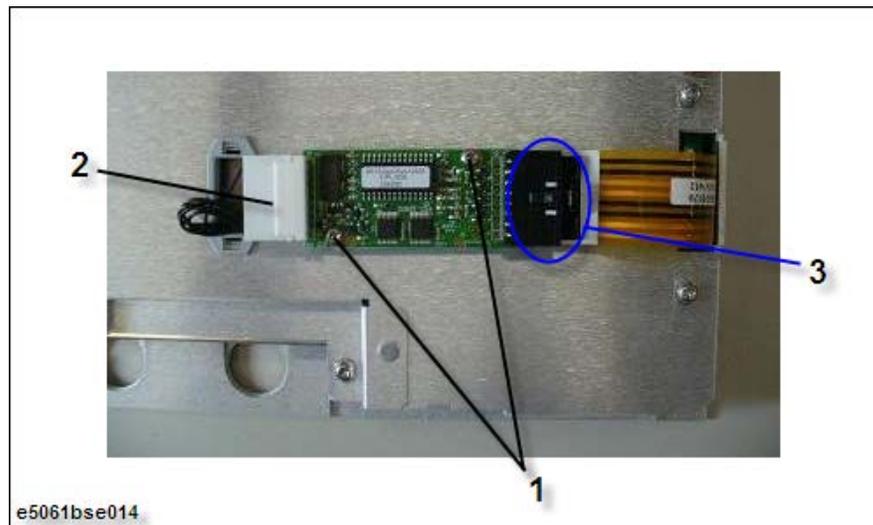
- Step 1.** Reverse the order of the removal procedure.

#### NOTE

Set a torque to 5 in-lb for torque driver when fasten the TORX T8 screws (item 1).

Figure 4-19

Touch Screen Control Board Removal



## Inverter Board Replacement

### Tools Required

- torque screwdriver, T15 and T20
- torque screwdriver, T10 (set to 9 in-lb)
- torque screwdriver, T8 (set to 5 in-lb)
- flat edge screwdriver

### Removal Procedure

Refer to **Figure 4-20** for this procedure.

- Step 1.** Remove the Outer Cover as described in “**Outer Cover Replacement**” on **page 55**.
- Step 2.** Remove the Front Panel as described in “**Front Panel Replacement**” on **page 56**.
- Step 3.** Remove the Touch Screen Control Board as described in “**Touch Screen Control Board Replacement**” on **page 89**.
- Step 4.** Remove the cable clamp (nylon) (item 1) from the front panel rear side cover.
- Step 5.** Remove the six TORX T10 screws (item 2) fastening the front panel rear side cover.
- Step 6.** Lift the front panel rear side cover.
- Step 7.** Remove the two TORX T10 screws (item 3) fastening the Inverter Board Assembly.
- Step 8.** Lift the Inverter Board Assembly, and disconnect the two cable connectors (item 4) from the Inverter Board Assembly.
- Step 9.** Remove the two TORX T8 screws (item 5) fastening the Inverter Board for the plate.

### Replacement Procedure

- Step 1.** Reverse the order of the removal procedure.

#### NOTE

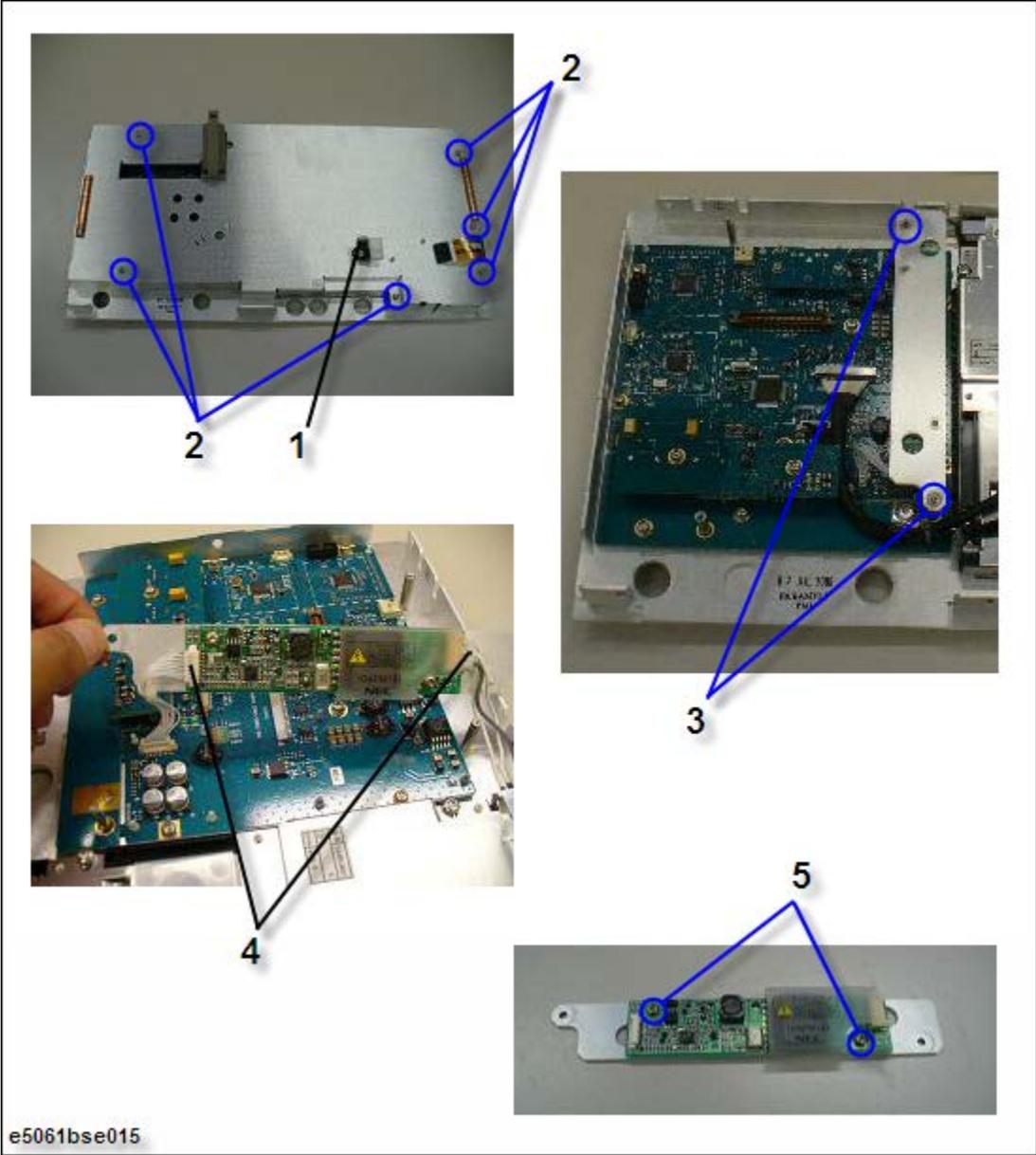
Set a torque to 9 in-lb for torque driver when fasten the TORX T10 screws (item 2, and Item 3).

Set a torque to 5 in-lb for torque driver when fasten the TORX T8 screws (item 5).

---

Replacement Procedure  
Inverter Board Replacement

Figure 4-20 Inverter Board Removal



## Power Switch Assembly Replacement

### Tools Required

- torque screwdriver, T8, T15 and T20
- torque screwdriver, T10 (set to 9 in-lb)
- flat edge screwdriver

### Removal Procedure

Refer to **Figure 4-21** for this procedure.

- Step 1.** Remove the Outer Cover as described in “**Outer Cover Replacement**” on **page 55**.
- Step 2.** Remove the Front Panel as described in “**Front Panel Replacement**” on **page 56**.
- Step 3.** Remove the Touch Screen Control Board as described in “**Touch Screen Control Board Replacement**” on **page 89**.
- Step 4.** Remove the front panel rear side cover as described in “**Inverter Board Replacement**” on **page 90**.
- Step 5.** Disconnect the connector (item 1) of cable from the A52 Front Panel Interface Board.
- Step 6.** Remove the two TORX T10 screws (item 2) fastening the Power Switch Assembly.
- Step 7.** Remove the parts (item 3) of the Power Switch Assembly.

### Replacement Procedure

- Step 1.** Reverse the order of the removal procedure.

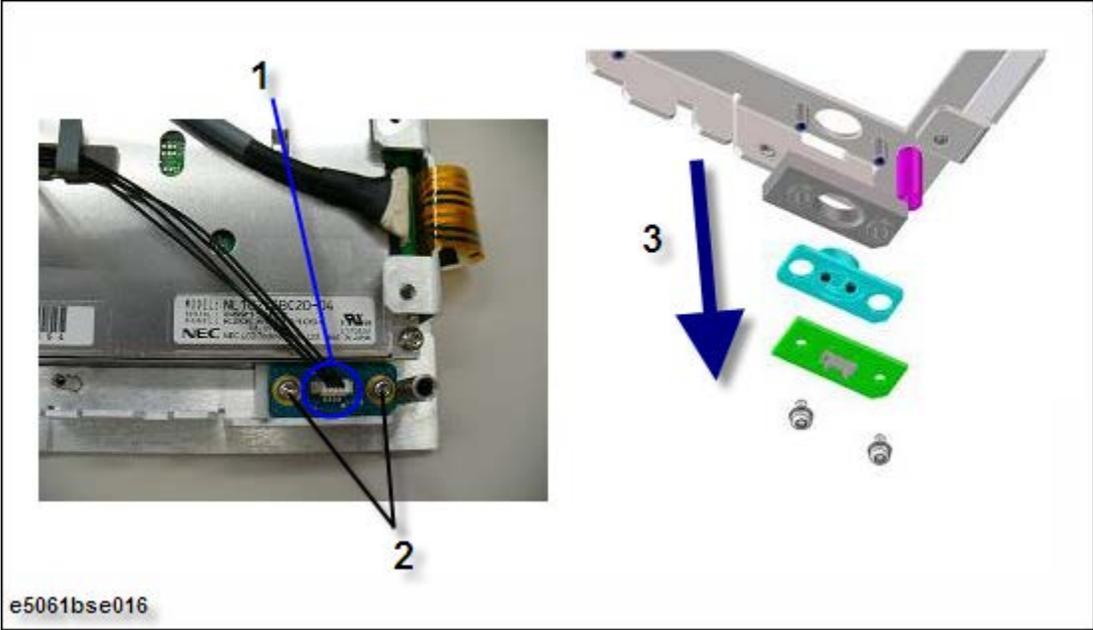
#### NOTE

Set a torque to 9 in-lb for torque driver when fasten the TORX T10 screws (item 2).

---

Replacement Procedure  
Power Switch Assembly Replacement

Figure 4-21 Power Switch Assembly Removal



## A52 Front Panel Interface Board / Key Pad Replacement

### Tools Required

- torque screwdriver, T8, T15 and T20
- torque screwdriver, T10 (set to 9 in-lb)
- hex key, 1.5 mm
- flat edge screwdriver

### Removal Procedure

Refer to **Figure 4-22** for this procedure.

- Step 1.** Remove the Outer Cover as described in “**Outer Cover Replacement**” on **page 55**.
- Step 2.** Remove the Front Panel as described in “**Front Panel Replacement**” on **page 56**.
- Step 3.** Remove the Touch Screen Control Board as described in “**Touch Screen Control Board Replacement**” on **page 89**.
- Step 4.** Remove the Inverter Board as described in “**Inverter Board Replacement**” on **page 90**.
- Step 5.** Remove the rotary knob (item 1) using hex key from the front panel.
- Step 6.** Disconnect the three connectors (item 2) of the cables.
- Step 7.** Remove the TORX T10 screw and washer (item 3) fastening the cable from the LCD Assembly.
- Step 8.** Remove the 13th TORX T10 screws (item 4) fastening the A52 Front Panel Interface Board.
- Step 9.** Remove the Key Pad (item 5) from the A52 Front Panel Interface Board while noting 14 pins (item 6) of rear side on Key Pad.
- Step 10.** Remove the USB module (item 7) of the A52 Front Panel Interface Board carefully.

### Replacement Procedure

- Step 1.** Reverse the order of the removal procedure.

#### NOTE

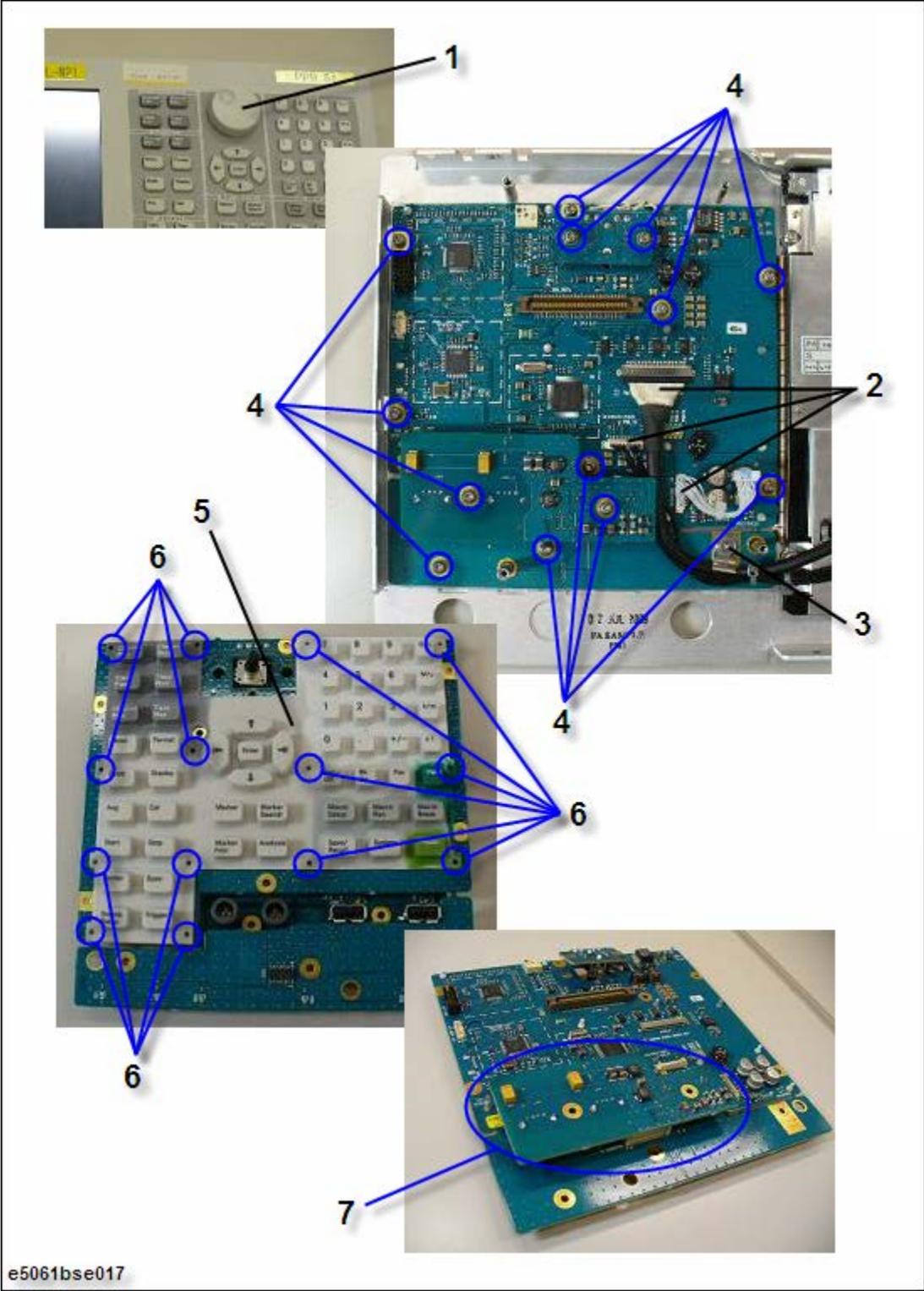
Set a torque to 9 in-lb for torque driver when fasten the TORX T10 screws (item 3, and item 4).

Push the USB module (item 7) sufficiently to ensure connector is fully insert.

---

Replacement Procedure  
A52 Front Panel Interface Board / Key Pad Replacement

Figure 4-22 A52 Front Panel Interface Board / Key Pad Removal



## LCD Assembly Replacement

### Tools Required

- torque screwdriver, T8, T10 and T20
- torque screwdriver, T15 (set to 14 in-lb)
- flat edge screwdriver

### Removal Procedure

Refer to **Figure 4-23** for this procedure.

- Step 1.** Remove the Outer Cover as described in “**Outer Cover Replacement**” on **page 55**.
- Step 2.** Remove the Front Panel as described in “**Front Panel Replacement**” on **page 56**.
- Step 3.** Remove the Touch Screen Control Board as described in “**Touch Screen Control Board Replacement**” on **page 89**.
- Step 4.** Remove the Inverter Board as described in “**Inverter Board Replacement**” on **page 90**.
- Step 5.** Disconnect the two connectors (item 1) of the cables.
- Step 6.** Release the clamped cable from the clamp (item 2) on the LCD Assembly.
- Step 7.** Remove the two cables (item 3) on the LCD Assembly.
- Step 8.** Remove the four TORX T15 screws (item 4) fastening the LCD Assembly.
- Step 9.** Lift the LCD Assembly carefully.

### Replacement Procedure

- Step 1.** Reverse the order of the removal procedure.

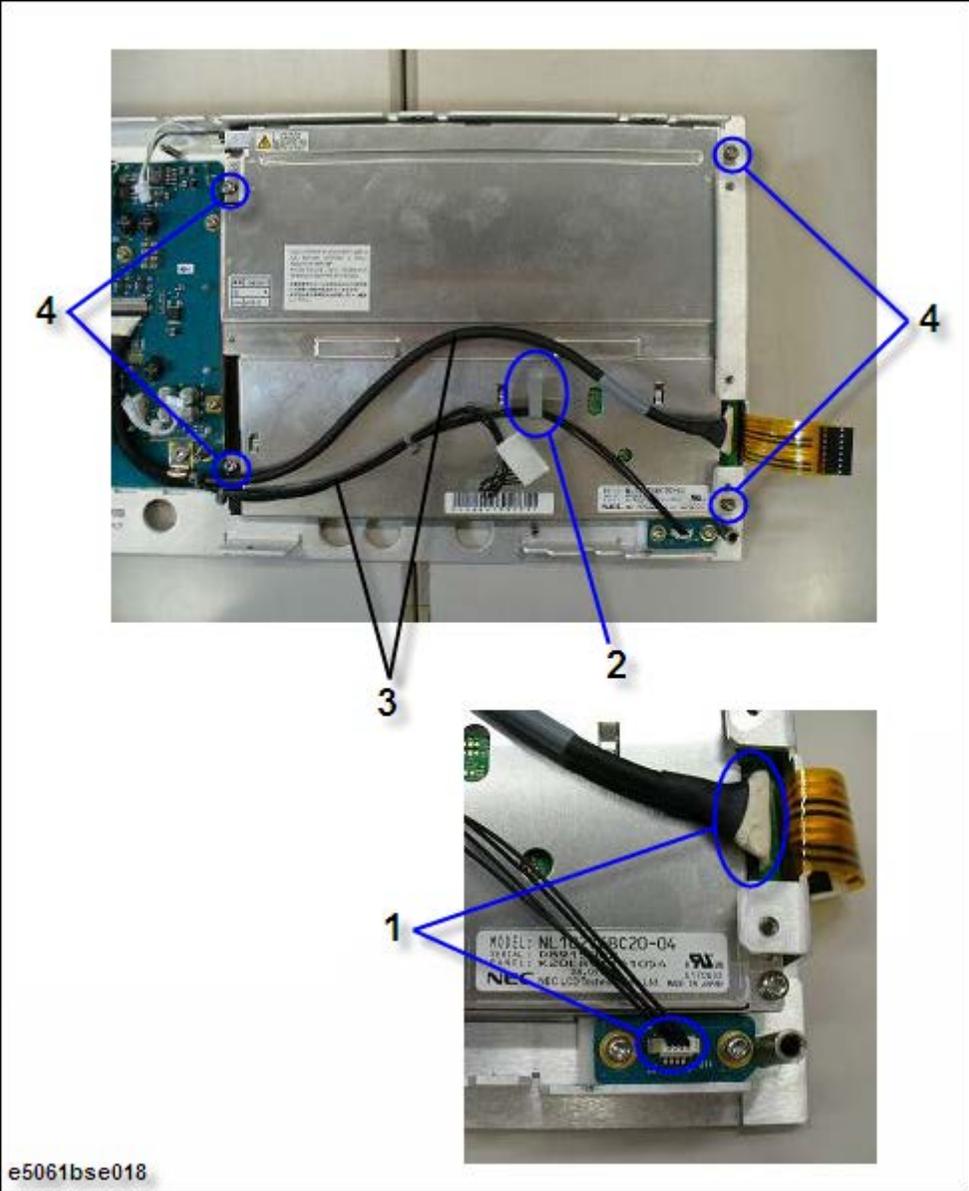
#### NOTE

Set a torque to 14 in-lb for torque driver when fasten the TORX T15 screws (item 4).

---

Replacement Procedure  
LCD Assembly Replacement

Figure 4-23 LCDAssembly Removal



## Front Frame Replacement

### Tools required

- torque screwdriver T20 (set to 21 in-lb)
- torque screwdriver T15 (set to 14 in-lb)
- flat edge screwdriver

### Removal Procedure

Refer to **Figure 4-24** for this procedure.

- Step 1.** Remove the Outer Cover as described in “**Outer Cover Replacement**” on **page 55**.
- Step 2.** Remove the Front Panel as described in “**Front Panel Replacement**” on **page 4-56**.
- Step 3.** Remove the four TORX T15 screws (item 1) fastening the Front Frame.
- Step 4.** Remove the seven TORX T20 screws (item 2) fastening the Front Frame.
- Step 5.** Slide forward the Front Frame.

### Replacement Procedure

- Step 1.** Reverse the order of the removal procedure.

#### NOTE

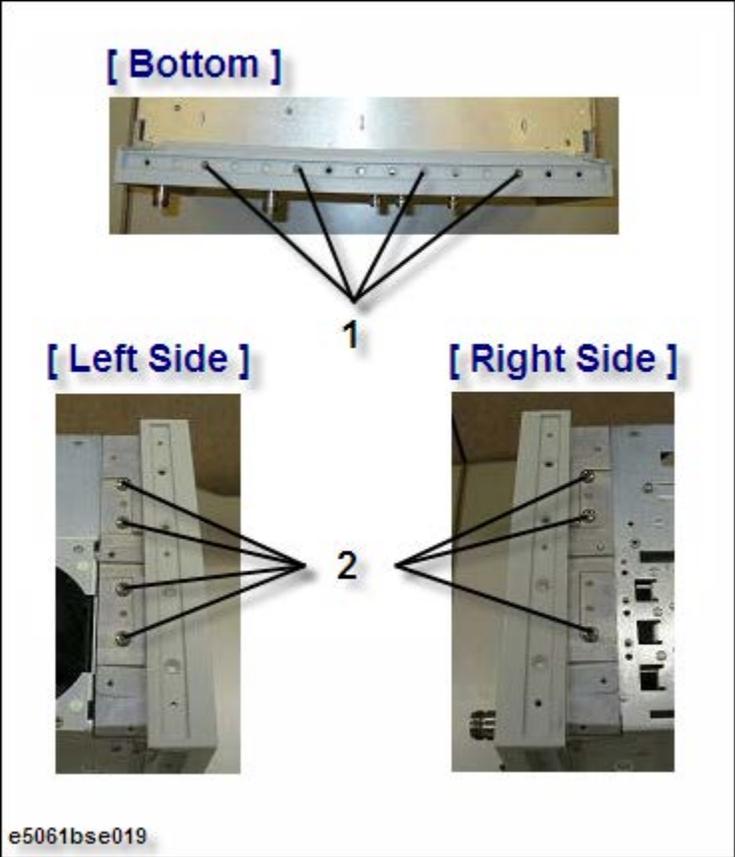
Set a torque to 14 in-lb for torque driver when fasten the TORX T15 screws (item 1).

Set a torque to 21 in-lb for torque driver when fasten the TORX T20 screws (item 2).

---

Figure 4-24

Front Frame Removal



## Handle Assembly Replacement

### Tools required

- torque screwdriver T20

### Removal Procedure

Refer to **Figure 4-25** for this procedure.

**Step 1.** Remove the four TORX T20 screws (item 1) fastening the Handle Assembly.

**Step 2.** Remove the end caps (both side) (item 2) from the Handle Assembly.

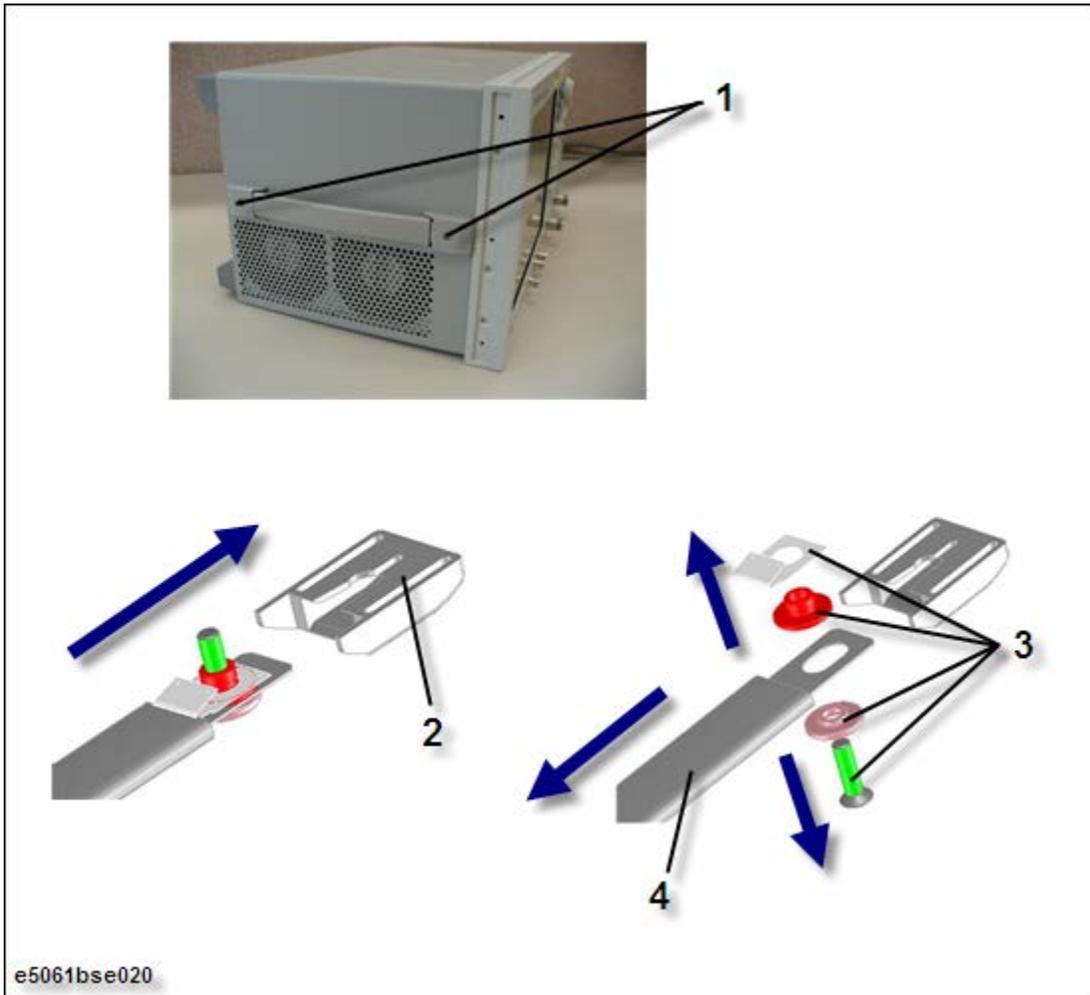
**Step 3.** Detach parts at both sides (item 3) of the Handle Assembly.

**Step 4.** Remove the strap cover (item 4) of the Handle Assembly.

### Replacement Procedure

**Step 1.** Reverse the order of the removal procedure.

Figure 4-25 Handle Assembly Removal



Replacement Procedure  
Handle Assembly Replacement

## 5 Post-Repair Procedures

This chapter lists the procedures required to verify the E5061B operation after an assembly is replaced with a new one.

## Post-Repair Procedures

**Table 5-1** Post Repair Procedures lists the required procedures that must be performed after the replacement of an assembly. These are the recommended minimum procedures to ensure that the replacement is successfully completed.

**Table 5-1 Post-Repair Procedures (Option 3L5)**

Replaced Assembly or Part	Required Adjustments Correction Constants (CC)	Verification
A1 Source Module	Perform the following required adjustments using “A1 Source Module” in Spot Adjustment of the program.	<p><b>“To Execute the Diagnostic Test” on page 33</b></p> <p>Frequency Accuracy Test            RF Output Level Accuracy and Flatness Test            RF Output Level Linearity Test            Trace Noise Test            Crosstalk &amp; System Dynamic Range Test            Dynamic Accuracy Test            Uncorrected System Performance Test            LF Output Level Accuracy Test (Opt 3L5)            LF Output Level Linearity Test (Opt 3L5)            Input Impedance Test (Opt 3L5)            Absolute Amplitude Accuracy Test (Opt 3L5)            Magnitude Ratio/Phase Frequency Response Test (Opt 3L5)            Trace Noise Test (Opt 3L5)            Crosstalk and Noise Level Test (Opt 3L5)            Magnitude Ratio/Phase Dynamic Accuracy Test (Opt 3L5)</p>

Table 5-1 Post-Repair Procedures (Option 3L5)

Replaced Assembly or Part	Required Adjustments Correction Constants (CC)	Verification
A2 Receiver Module	Perform the following required adjustments using “A2 Receiver Module” in Spot Adjustment of the program.	<p><b>“To Execute the Diagnostic Test” on page 33</b></p> <p>Frequency Accuracy Test            RF Output Level Accuracy and Flatness Test            RF Output Level Linearity Test            Trace Noise Test            Crosstalk &amp; System Dynamic Range Test            Dynamic Accuracy Test            Uncorrected System Performance Test            Input Impedance Test (Opt 3L5)            Absolute Amplitude Accuracy Test (Opt 3L5)            Magnitude Ratio/Phase Frequency Response Test (Opt 3L5)            Trace Noise Test (Opt 3L5)            Crosstalk and Noise Level Test (Opt 3L5)            Magnitude Ratio/Phase Dynamic Accuracy Test (Opt 3L5)            DC Measurement Accuracy Test (Opt 3L5)</p>

Table 5-1 Post-Repair Procedures (Option 3L5)

Replaced Assembly or Part	Required Adjustments Correction Constants (CC)	Verification
A9 LF Source Bias Module	Perform the following required adjustments using “A9 Bias Module” in Spot Adjustment of the program.	<p><b>“To Execute the Diagnostic Test” on page 33</b></p> <p>Frequency Accuracy Test            RF Output Level Accuracy and Flatness Test            RF Output Level Linearity Test            Trace Noise Test            Crosstalk &amp; System Dynamic Range Test            Dynamic Accuracy Test            Uncorrected System Performance Test            LF Output Level Accuracy Test (Opt 3L5)            LF Output Level Linearity Test (Opt 3L5)            Input Impedance Test (Opt 3L5)            Absolute Amplitude Accuracy Test (Opt 3L5)            Magnitude Ratio/Phase Frequency Response Test (Opt 3L5)            Trace Noise Test (Opt 3L5)            Crosstalk and Noise Level Test (Opt 3L5)            Magnitude Ratio/Phase Dynamic Accuracy Test (Opt 3L5)            DC Measurement Accuracy Test (Opt 3L5)</p>
A10 Analog Motherboard	No adjustment needed	<p>Inspect the Booting Process</p> <p>When the symptom of failure is out of specification, perform the performance test.</p>
A50 CPU module	No adjustment needed	Inspect the Booting Process
DSP Card	<p>Perform the following required adjustments using “A51 DSP board” in Spot Adjustment of the program.</p> <p>Writing ID</p>	<p>Inspect the Booting Process</p> <p>Executed all of the performance test.</p> <p><b>“To Check the Front Panel” on page 42</b></p> <p><b>“To Check the External Trigger Input” on page 44</b></p>
Front Panel Board	No adjustment needed	<b>“To Check the Front Panel” on page 42</b>

Table 5-1 Post-Repair Procedures (Option 3L5)

Replaced Assembly or Part	Required Adjustments Correction Constants (CC)	Verification
Handler I/O Board	No adjustment needed	<b>“To Execute the Diagnostic Test” on page 33</b>
HDD	Perform “HDD” (Hard Disk Drive) in Spot Adjustment of the program. Calibration of the Touch Screen (for opt. 016)	Inspect the Booting Process
Power Supply Assembly	No adjustment needed	Inspect the Booting Process
LCD	Not adjustment needed	Inspect the Booting Process <b>“To Check the LCD” on page 43</b>
Touch panel (for Opt. 016)	Calibration of the Touch Screen	Inspect the Booting Process <b>“To Check the Touch Panel” on page 42</b>
Inverter Board	No adjustment needed	Inspect the Booting Process

Table 5-2 Post-Repair Procedures

Replaced Assembly or Part	Required Adjustments Correction Constants (CC)	Verification
A11 Source Module	Perform the following required adjustments using “A11 Source Module” in Spot Adjustment of the program.	<b>“To Execute the Diagnostic Test” on page 33</b> Frequency Accuracy Test RF Output Level Accuracy Test RF Output Level Linearity Test Crosstalk & System Dynamic Range Test Noise Floor Test Trace Noise Test Dynamic Accuracy Test Compression Test IF Linearity at 1.195 GHz Test IF Linearity at LF Test Uncorrected System Performance Test.

Table 5-2 Post-Repair Procedures

Replaced Assembly or Part	Required Adjustments Correction Constants (CC)	Verification
A3/A4 Receiver Module	Perform the following required adjustments using “A3/A4 Receiver Module” in Spot Adjustment of the program.	<p><b>“To Execute the Diagnostic Test” on page 33</b></p> Frequency Accuracy Test RF Output Level Accuracy Test RF Output Level Linearity Test Crosstalk & System Dynamic Range Test Noise Floor Test Trace Noise Test Dynamic Accuracy Test Compression Test IF Linearity at 1.195 GHz Test IF Linearity at LF Test Uncorrected System Performance Test.
A10 Analog Motherboard	No adjustment needed	Inspect the Booting Process When the symptom of failure is out of specification, perform the performance test.
A50 CPU module	No adjustment needed	Inspect the Booting Process
DSP Card	Perform the following required adjustments using “DSP board” in Spot Adjustment of the program. Writing ID	Inspect the Booting Process Executed all of the performance test. <p><b>“To Check the Front Panel” on page 42</b></p> <p><b>“To Check the External Trigger Input” on page 44</b></p>
Front Panel Board	No adjustment needed	<b>“To Check the Front Panel” on page 42</b>
Handler I/O Board	No adjustment needed	<b>“To Execute the Diagnostic Test” on page 33</b>
HDD	Perform “HDD” (Hard Disk Drive) in Spot Adjustment of the program. Calibration of the Touch Screen (for opt. 016)	Inspect the Booting Process
Power Supply Assembly	No adjustment needed	Inspect the Booting Process

Table 5-2 Post-Repair Procedures

Replaced Assembly or Part	Required Adjustments Correction Constants (CC)	Verification
LCD	Not adjustment needed	Inspect the Booting Process "To Check the LCD" on page 43
Touch panel (for Opt. 016)	Calibration of the Touch Screen	Inspect the Booting Process "To Check the Touch Panel" on page 42
Inverter Board	No adjustment needed	Inspect the Booting Process

Post-Repair Procedures  
Post-Repair Procedures

## A Manual Changes

This appendix contains the information required to adapt this manual to versions or configurations of the E5061B manufactured earlier than the current printing date of this manual. The information in this manual applies directly to E5061B units with the serial number that is printed on the title page of this manual.

### Manual Changes

To adapt this manual to your E5061B, refer to [Table A-1](#) and [Table A-2](#).

**Table A-1**      **Manual Changes by Serial Number**

Serial Prefix or Number	Make Manual Changes

**Table A-2**      **Manual Changes by Firmware Version**

Version	Make Manual Changes

Keysight Technologies uses a two-part, ten-character serial number that is stamped on the serial number plate. The first five characters are the serial prefix and the last five digits are the suffix.

Manual Changes  
Manual Changes

## B System Recovery

This appendix describes how to recover the operating system (Windows XP) when the operating system has been damaged.

### System Recovery

By executing system recovery, you can return the system of the E5061B (the Windows operating system and the firmware) to the factory state (at the time of purchase<sup>1</sup>).

The procedure of system recovery is described in Installation Guide. Please refer to Keysight website below.

[http://www.keysight.com/find/ena\\_support](http://www.keysight.com/find/ena_support)

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1. If the hard disk failed and has been replaced after purchase, the state when the replacement was performed is recovered.

System Recovery  
System Recovery

## C Firmware Update

This appendix describes how to update the E5061B firmware. When you want to update the E5061B firmware, refer to this appendix.

### Firmware Update

#### Required Equipment

- E5061B (with keyboard and mouse).
- USB mass storage.

#### How to update the E5061B firmware

The firmware update procedure is described in E5061B WebHelp. Please refer to Keysight website as below.

[http://ena.support.keysight.com/e5061b/manuals/webhelp/eng/product\\_information/maintenance/updating\\_firmware.htm](http://ena.support.keysight.com/e5061b/manuals/webhelp/eng/product_information/maintenance/updating_firmware.htm)

Firmware Update  
Firmware Update

## D Power Requirement

### Preparation for Power Supply

Before turning on power to the equipment, be sure to verify the following:

#### Power Requirements

The E5061B requires the following power source:

Requirements	
Voltage	100 -240 VAC $\pm$ 10% (Vpeak ? 120 V)
Frequency	47 to 63 Hz
Maximum power consumption	300 VA

#### Power Cable

In accordance with international safety standards, this instrument is equipped with a three-wire power cable. When connected to an appropriate ac power outlet, this cable grounds the instrument frame. The type of power cable shipped with each instrument depends on country of destination. For power cable options, refer to <http://www.keysight.com/find/powercords>.

#### **WARNING**

For protection from electrical shock, the power cable ground must not be defeated.

The power plug must be plugged into an outlet that provides a protective earth ground connection.

---

## Turning the Power ON and OFF

Perform the following steps to turn the power ON or OFF.

### Turning the power ON

**Step 1.** If the standby switch (⏻) in the lower-left part of the front panel is in the pressed down (⏻) position, press the switch to the popped up position (⏻).

**Step 2.** Press the standby switch to the pressed down position (⏻).

This operation turns ON the power, and the E5061B starts the self-test.

**Step 3.** Confirm that the self-test indicates normal operation.

Normal operation is confirmed by the self-test if no error message appears.

### Turning the power OFF

**Step 1.** Use either of the following methods to turn OFF the E5061B.

- Press the standby switch (⏻) in the lower-left part of the front panel (now in the pressed down (⏻) position) to the popped up (⏻) position.
- Send the shutdown command from an external controller.

These operations will start the E5061B shutdown process (required software and hardware processes for turning the power off), and the power will turn OFF after a few seconds.

#### NOTE

Under normal circumstances, always press the standby switch (⏻), or send the shutdown command from the external controller, to actuate the E5061B shutdown process. **Never cut off the power supply directly by disconnecting the power cable plug from the rear panel of the unit.**

If the power supply is cut off directly by disconnecting the power cable plug or by disconnecting the power supply to the AC outlet, the shutdown process will not be carried out, and there is a risk of damage to the software or hardware of the E5061B.

---

## E Messages

The E5061B can display error messages as well as messages that indicate the internal operating status of the equipment. This appendix explains what these messages mean. They are listed in alphabetical order.

Messages showing the status of the E5061B are displayed in the lower-left area of the E5061B LCD screen. These messages include error messages that occur during the execution of GPIB commands and others that indicate the internal status of the equipment.

Error messages are indicated following the character string “[Err]” and can be read out by a GPIB command. Other kinds of messages are indicated without the “[Err]” character string and cannot be read out by a GPIB command. This section explains the meaning of each message and how to resolve the problem it indicates.

## Error Messages

An error message is displayed against a red background in the instrument message/warning area in the lower left part of the screen. Pushing a front panel key or executing :DISP:CCL command clears the error message. Errors caused by the operation of a front panel key simply appear on the display. They are not stored in the error queue with some exceptions.

An error with a positive error number is one uniquely defined for this instrument. On the other hand, an error with a negative error number is basically one defined for common GPIB devices in IEEE488.2

Error messages are described in WebHelp. Please kindly refer to Keysight Website below.

[http://ena.support.keysight.com/e5061b/manuals/webhelp/eng/product\\_information/error\\_messages/error\\_messages.htm](http://ena.support.keysight.com/e5061b/manuals/webhelp/eng/product_information/error_messages/error_messages.htm)

## Warning Message

A warning message is displayed in the instrument message/Warning area in the lower left part of the display against a gray background. Pushing a front panel key or executing :DISP:CCL command clears the message.

This message simply appears on the display, being not known to a remote environment such as a GPIB. This message is not displayed when another error (against a red background) has already been displayed in the instrument message/Warning area.

The warning messages for this instrument are described in WebHelp. Please refer to Keysight website.

[http://ena.support.keysight.com/e5061b/manuals/webhelp/eng/product\\_information/error\\_messages/warning\\_message.htm](http://ena.support.keysight.com/e5061b/manuals/webhelp/eng/product_information/error_messages/warning_message.htm)

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