

Keysight E4991 B Impedance Analyzer

Notices

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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.

NOTE

This Note sign denotes important information. It calls attention to a procedure, practice, or condition that is essential for the user to understand.

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

When you notice any of the unusual conditions listed below, immediately terminate operation and disconnect the power cable.

Contact your local Keysight Technologies sales representative or authorized service company for repair of the instrument. If you continue to operate without repairing the instrument, there is a potential fire or shock hazard to the operator.

- Instrument operates abnormally.
- Instrument emits abnormal noise, smell, smoke or a spark-like light during operation.
- Instrument generates high temperature or electrical shock during operation.
- Power cable, plug, or receptacle on instrument is damaged.
- Foreign substance or liquid has fallen into the instrument.

Manufacturer's Declaration

Herstellerbescheinigung

GERA- USCHEMISSION

LpA < 70 dB
am Arbeitsplatz
normaler Betrieb
nach DIN 45635 T. 19

Manufacturer's Declaration

ACOUSTIC NOISE EMISSION

LpA < 70 dB
operator position
normal operation
per ISO 7779

Regulatory Compliance Information

This product complies with the essential requirements of the following applicable European Directives, and carries the CE marking accordingly:

- The Low Voltage Directive 2006/95/EC
- The EMC Directive 2004/108/EEC

To obtain Declaration of Conformity, please contact your local Keysight Technologies sales office, agent or distributor.

Safety Notice Supplement

- This equipment complies with EN/IEC61010-1:2010.
- This equipment is of MEASUREMENT CATEGORY I (CAT I). Do not use for CAT II, III, or IV.
- This equipment is a POLLUTION DEGREE 2, INDOOR USE product.
- This equipment is tested in stand-alone condition and in 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.
- Do not connect the measuring terminals to mains.

General Safety Precautions

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 E4991B complies with INSTALLATION CATEGORY II as well as POLLUTION DEGREE 2 in IEC61010-1. The E5080A is an INDOOR USE product.

NOTE

The LEDs in the E4991B are Class 1 in accordance with IEC60825-1, CLASS 1 LED PRODUCT.

- **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 gasses 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 Services 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.

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.

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Assistance

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

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

Manuals for E4991B

Keysight provides the following three manuals for E4991B. The latest version of all documentations can be downloaded from <http://www.keysight.com/find/e4991b-manual>.

Installation Guide

The installation guide provides start up setup information when you use the E4991B for the first time, system recovery procedures and troubleshooting information when Windows cannot boot up. See this manual first when you use the E4991B for the first time.

Troubleshooting Guide

The troubleshooting guide (this manual) provides troubleshooting information when operational problems are encountered on the E4991B. See this manual when you need to troubleshoot the E4991B.

Online Help

The online help provides the information about the quick start, measurement operation, programming, built-in VBA, I/O interface and error message. This is pre-installed in the E4991B. Press the [Help] hard key on the front panel to open. Quick Start helps in understanding the E4991B operation quickly.

The latest version of online help is available at:

<http://ena.tm.keysight.com/e4991b/manuals/webhelp/eng/>

The online help has context sensitive help, which is a great feature of the E4991B help. It allows you to get information about the selected softkey by pressing the Help key in the E4991B or by pressing F1 in a keyboard attached to the E4991B or by clicking the help button in a dialog box. With context sensitive help, users can receive information quickly about the area the user is working in the firmware of the E4991B. It provides information relevant to the task that needs to be accomplished and reduces the time to search relevant information required to complete a task.

In This Guide...

The following shows the contents of this manual.

Chapter 1, "Troubleshooting"

This chapter provides the procedure to isolate a faulty assembly in E4991B.

Chapter 2, "Post Repair Procedure"

This chapter lists the procedures required to verify the E4991B operation after an assembly is replaced with a new one.

Contents

1 Troubleshooting

Introduction	12
How to exit from the E4991B Measurement View	13
To Troubleshoot the Instrument	14
Primary Trouble Isolation	14
No Display Troubleshooting	16
Booting Process Troubleshooting	21
Troubleshooting Using Diagnostic Test	26
Diagnostic Test	26
Function Specific Troubleshooting	28
To Check the Front Panel	29
To Check the Touch Panel	29
To Check the LCD	30
To Check the External Keyboard	30
To Check the Mouse	31
To Check the External Monitor Output Port	31
To Check the External Trigger Input	31
To Check the GPIB	32
To Check the USB	32
Performance Test failure Troubleshooting	33
Recommended Adjustment for Performance Test failure	33
Performance failure Troubleshooting	33
Adjustment failure Troubleshooting	34

2 Post Repair Procedure

Post Repair Procedures	36
License file	36

1

Troubleshooting

Introduction	12
How to exit from the E4991B Measurement View	13
To Troubleshoot the Instrument	14
No Display Troubleshooting	16
Booting Process Troubleshooting	21
Troubleshooting Using Diagnostic Test	26
Function Specific Troubleshooting	28
Performance Test failure Troubleshooting	33

This chapter provides the procedure to isolate a faulty assembly in the E4991B.

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 are 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. Program or files in the instrument may be broken.

How to exit from the E4991B Measurement View

Some troubleshooting procedures require you to exit from the Keysight E4991B Measurement View. The following procedure describes the steps to to exit from the Keysight E4991B Measurement View.

Step 1. Connect a mouse to the connectors on the Keysight E4991B rear panel.

Step 2. Turn the instrument on.

Step 3. Press **System** key.

Step 4. Click **Service**.

Step 5. Click **Exit**.

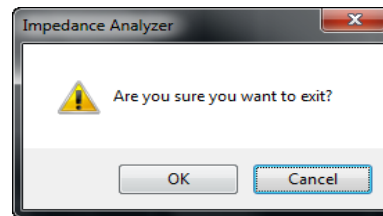


Figure 1 Exit dialog box

Step 6. Click **Yes** in **Exit** menu. The Keysight E4991B exits from Measurement View to Windows desktop.

NOTE

If you want to return to the Measurement View, double-click the "Keysight E4991B" icon on the desktop.

NOTE

if you need to shut down the Keysight E4991B, press the standby switch on the front panel.

To Troubleshoot the Instrument

This section describes the basic troubleshooting procedural flow when servicing the Keysight E4991B. The primary procedural tool in this section is the flowchart. The flowchart contains the entire troubleshooting path from the failure symptom to the isolation of faulty assembly, and will direct you through the repair in an orderly manner through the possible failure symptoms. Reference letters (Yes/No) on the flowchart point to procedural steps that briefly explain the next troubleshooting method to be performed.

Primary Trouble Isolation

The primary trouble isolation procedure can be performed without disassembling the Keysight E4991B. [Figure 2](#) shows the trouble isolation flow chart.

Step 1. Turn the instrument power on.

A few minutes after the E4991B is turned on, the measurement view is displayed on the screen. The display screen should be similar to [Figure 10, “E4991B application,” on page 25](#).

Step 2. Check the display.

- If no display appears on the LCD after the Keysight E4991B is turned on, go to [“No Display Troubleshooting” on page 16](#).
- If the Keysight E4991B stops during booting process despite something being displayed on the LCD, go to [“Booting Process Troubleshooting” on page 21](#).

Step 3. Check the basic function.

If the front-panel/keyboard/mouse controls, LCD display, data storage, remote interface or other function (except the measurement function) does not work correctly, go to [“Function Specific Troubleshooting” on page 28](#).

Step 4. Check the measurement function.

If the instrument fails performance test, go to [“Performance Test failure Troubleshooting” on page 33](#).

If the measurement function does not work correctly, perform the diagnostic tests provided in the Keysight E4991B's service function. If the diagnostic tests fail, go to [“Troubleshooting Using Diagnostic Test” on page 26](#).

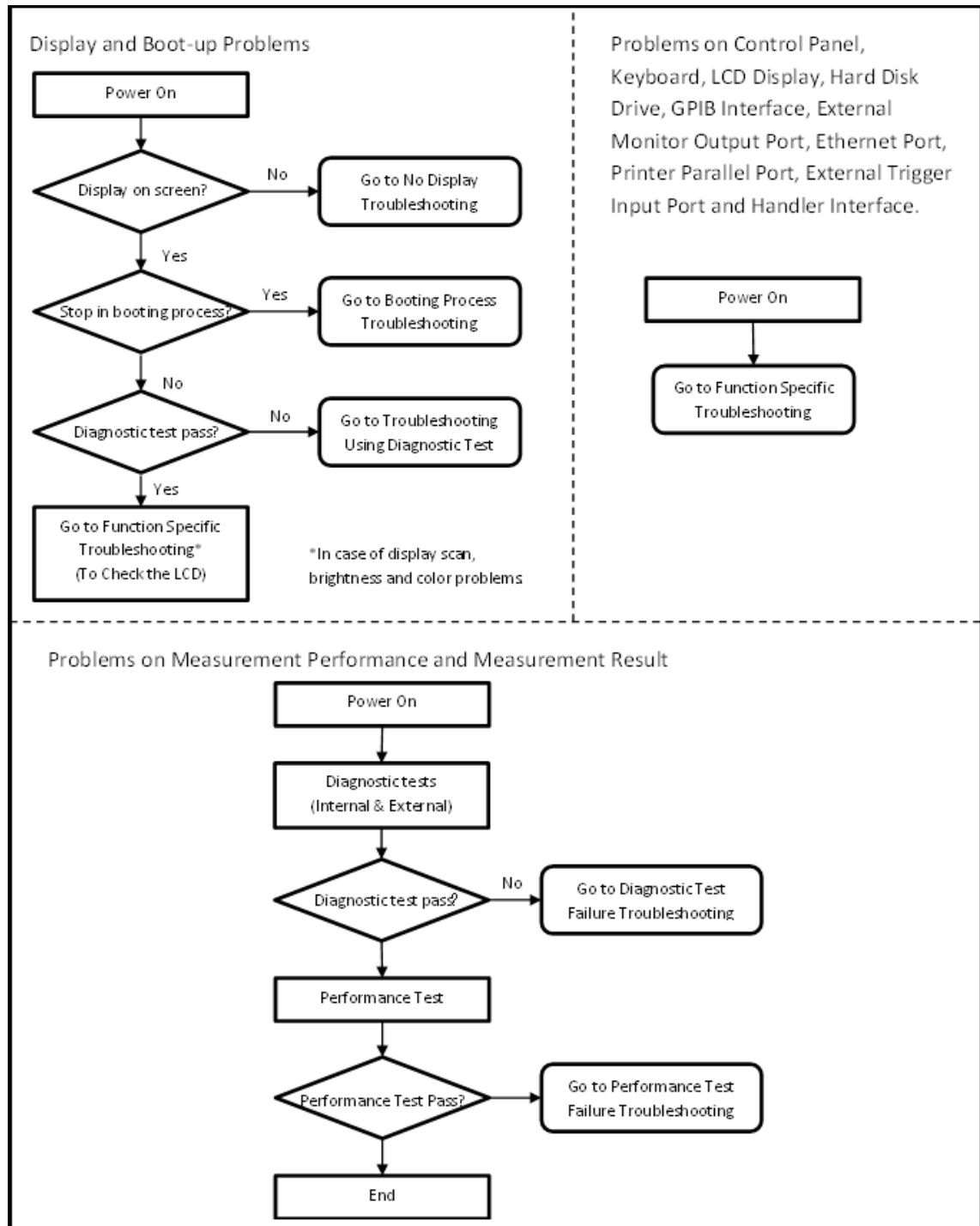


Figure 2 Primary trouble isolation flowchart

No Display Troubleshooting

If the Keysight E4991B displays nothing despite being powered from proper ac power line, isolate the failure in accordance with the procedure shown in [Figure 3](#).

Connect the keyboard to the Keysight E4991B rear panel connector and start trouble isolation. The methods of trouble isolation are described in the procedural step 1 to 6.

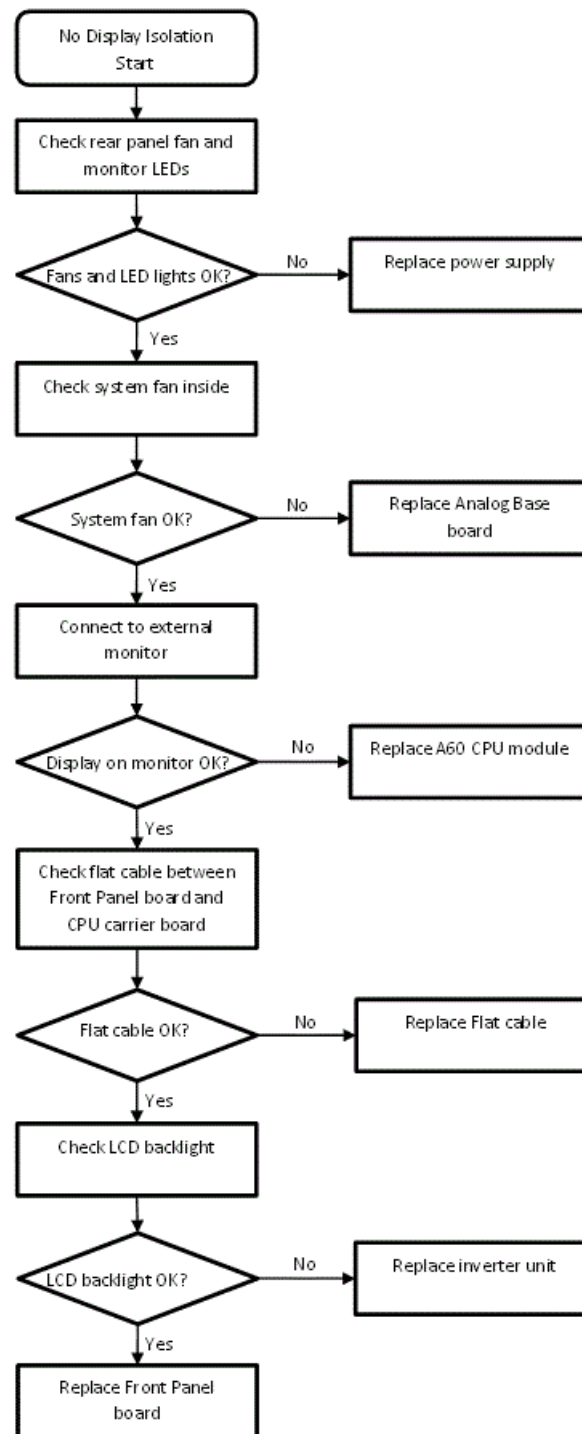


Figure 3 No display trouble isolation procedure

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 Keysight E4991B outer cover and check if the following LEDs light:

- +3.3 V and +5 V DC monitor LEDs on A60 CPU module as shown in [Figure 4](#).
- LEDs on A51 DSP module as shown in [Figure 5](#).

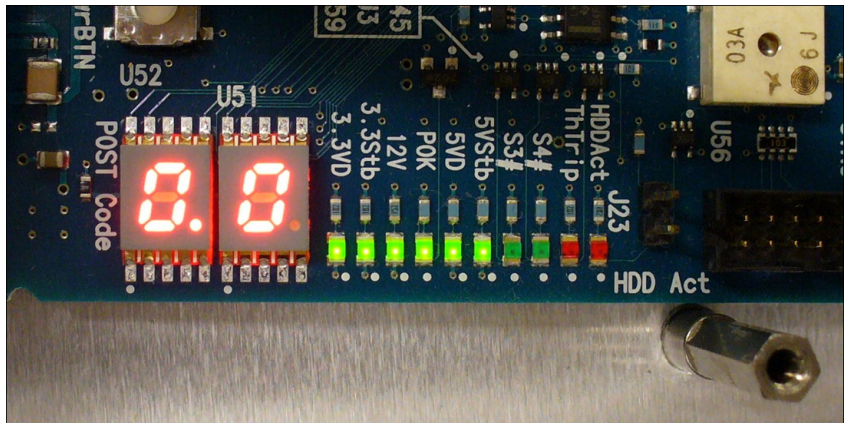


Figure 4 LEDs on CPU module

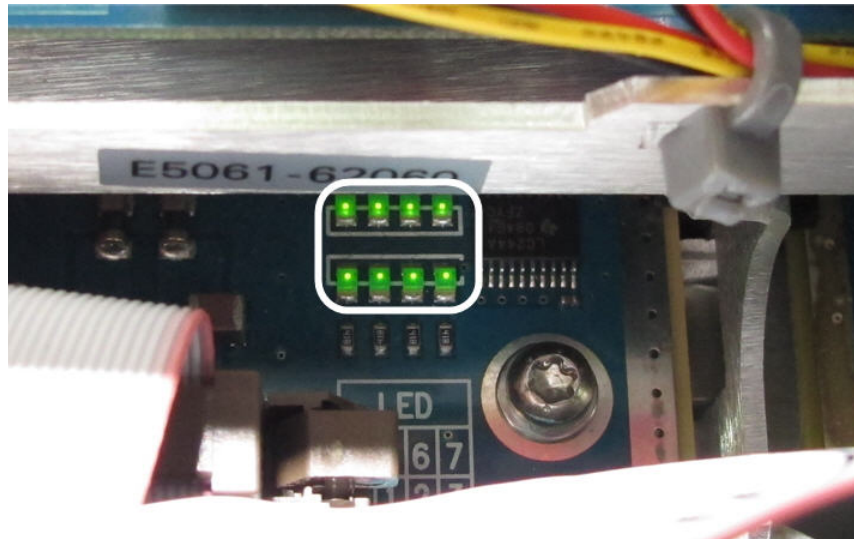


Figure 5 LEDs on DSP module

Step 2. Check system fan inside.

If the system fan, located on the left side of the chassis inside the Keysight E4991B, does not run, the problem seems to be in the A51 DSP board or the flat cable between the A51 DSP board and A60 CPU module. In this case, remove the Keysight E4991B outer cover and determine if the fan runs or not.

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

If the power shutdown occurs without a beep, the problem seems to be with the A51 DSP board or the A60 CPU module.

Step 3. Check LED of “Num Lock” key.

Press the **Num Lock** key on the keyboard. If the LED on the keyboard does not light as shown in **Figure 6**, a problem seems to be in the A60 CPU module.



Figure 6 LED of the Num Lock key

Check the following before replacing the A60 CPU module.

- Connections to the A60 CPU Module are normal
- There are no disconnections or loose connections

Step 4. Check the external monitor

Connect an external VGA monitor to the External Monitor Output Port on the Keysight E4991B rear panel.

- If something is displayed on the external monitor, the problem seems to be related to the LCD display. 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 problems seems to be in the A60 CPU module.

Step 5. Check the flat cable

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

Step 6. Check around the backlight

Check the inverter board and the 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 display.

Booting Process Troubleshooting

Figure 7 represents the booting process flow in the Keysight E4991B. If the Keysight E4991B stops in the booting process, troubleshoot using the following step-by-step procedure.

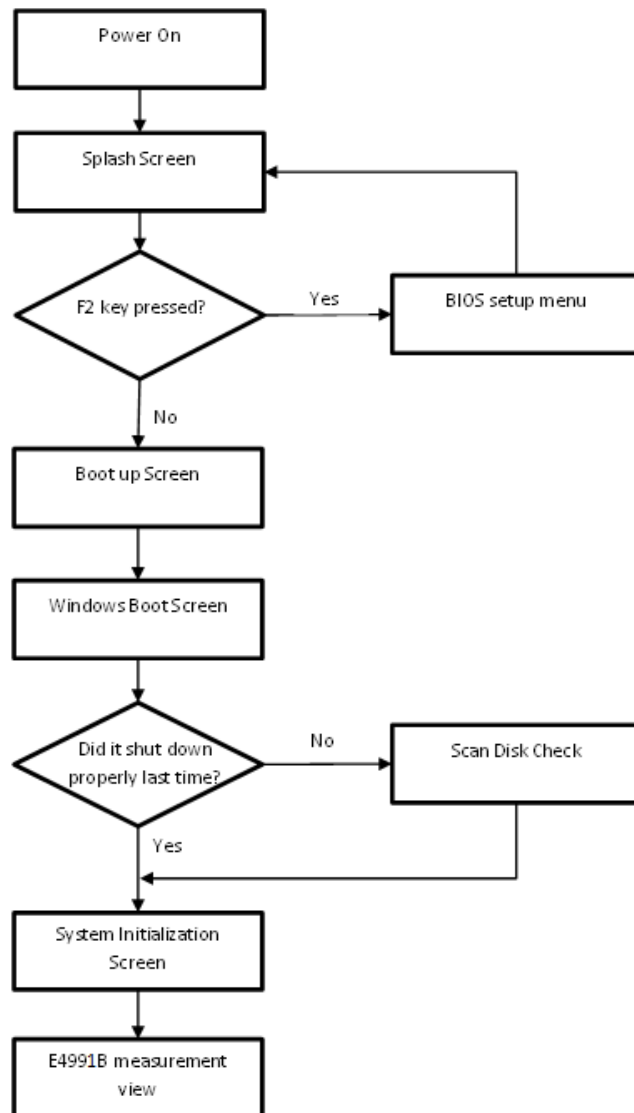


Figure 7 Booting process flowchart

Step 1. Splash Screen.

The splash screen is displayed with Keysight logo

If the splash screen is displayed, you can assume that the 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 on the attached external keyboard as soon as you see the splash screen. The password to enter BIOS setup utility is agtOnly (0 is Zero).

Changing BIOS setting may cause malfunction or lower performance of the instrument.

Step 2. Boot up Screen.

The boot up screen is displayed as shown in [Figure 8](#).

If no selection is made, the system will continue the boot up process after 3 seconds.

NOTE

While the Boot up screen is displayed, if you want to perform system recovery, select **Keysight Recovery System** as soon as the **Windows Boot Manager** screen is displayed. For details of the system recovery, refer to the **Installation Guide**.

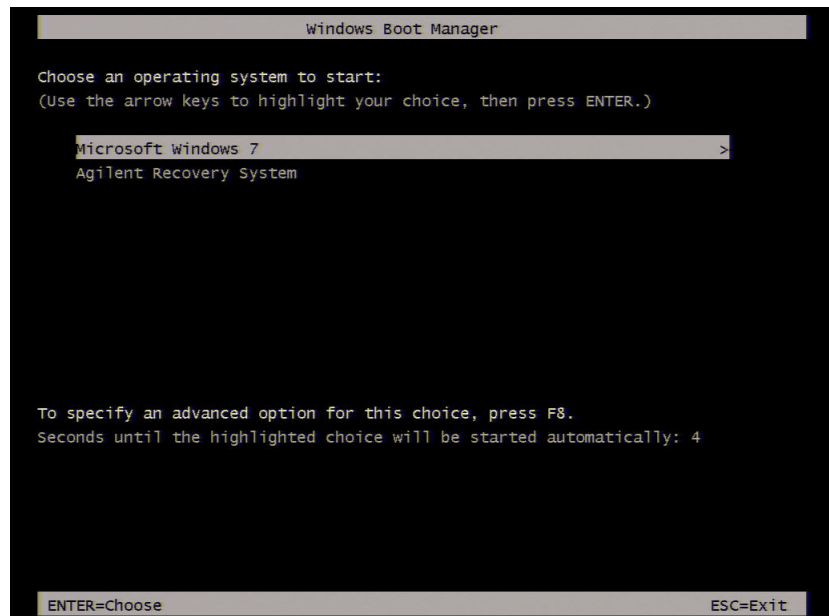


Figure 8 Boot up Screen

Step 3. Windows boot screen.

The Windows boot screen is displayed as shown in Figure 9. If the Windows boot screen is displayed, it is assumed that the SSD works and the Windows operating system is starting up.

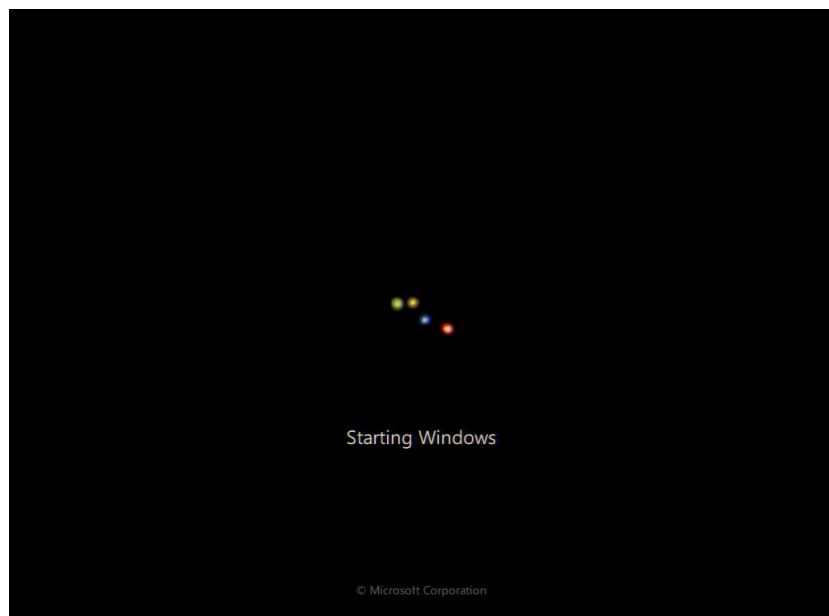


Figure 9 Windows boot screens

If you encounter the following problems, try to execute the system recovery before replacing the SSD.

- “xxx file is missing” message is displayed on DOS screen.
- The window boot screen is not displayed after the splash screen.
- Windows always boots up in Safe Mode.

NOTE

If the Keysight E4991B was turned off without proper shutdown process, **Microsoft Scandisk** runs while the windows boot screens are displayed. If a serious problem is found during the scan, execute the system recovery. For details on executing the system recovery, refer to the **Installation Guide**. If the operating system still does not boot up properly after reinstallation, replace the SSD.

NOTE

The operating system automatically checks the device drivers which are necessary for use in the Keysight E4991B and are installed in the system before the Keysight E4991B is shipped from Keysight factory. If the operating system does not detect them, a message box is displayed. In this case, install the device driver.

Step 4. System Initialization Screen.

The system initialization screen is displayed. If the display whites out, is entirely blue or a dialog box appears, a mass storage problem is suspected. Try to perform the mass storage recovery procedure.

NOTE

If the message “Will Shut Down in Five Seconds” is displayed and shutdown occurs, the A51 DSP board has failed to start up. The following messages 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 does not work or is not properly connected to the DSP board.

“Fatal Error: Failed to Update DSP Code”

If this happens, the DSP board has failed to write the DSP program into the flash ROM when the firmware was first installed or after being updated to the latest version. A problem with the A51 DSP board or A60 CPU Module is suspected.

Step 5. E4991B Application view.

The E4991B application is executed in **Figure 10** after the system initialization is completed without problem.

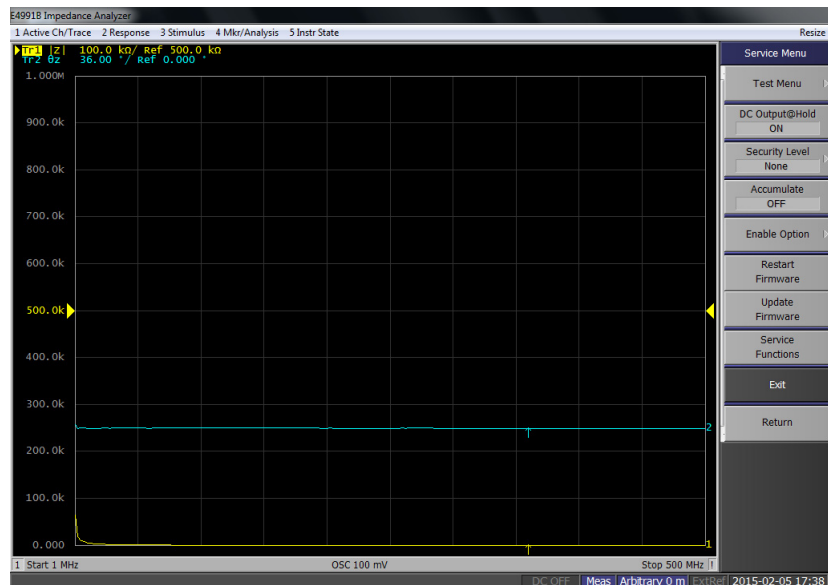


Figure 10 E4991B application

Troubleshooting Using Diagnostic Test

The Keysight E4991B has diagnostic test function to diagnose the analog measurement section and internal dc power supply voltages. The diagnostic tests make it possible to isolate a faulty board assembly. The following paragraphs describe the procedure to perform the diagnostic tests.

Diagnostic Test

To execute the diagnostic test

To isolate faulty board assembly modules, execute the diagnostic test in accordance with the following procedure.

NOTE

To perform the diagnostic test properly, the following conditions must be met:

Environmental temperature: $23^{\circ}\text{C} \pm 5^{\circ}\text{C}$

Warm up time: > 30 minutes

NOTE

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

Step 1. Press **System** key.

Step 2. Click **Service Menu > Test Menu > Diagnostic Test**.

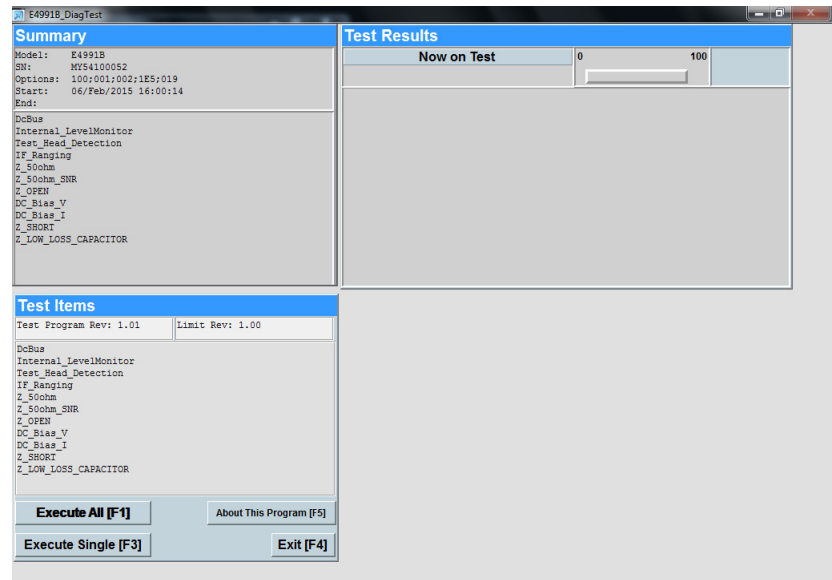


Figure 11 Diagnostic Test

Step 3. Select **Execute All**.

Follow the instruction for connection, then click OK to execute the test.

Diagnostic Test Failure Troubleshooting

Function Specific Troubleshooting

If the Keysight E4991B exhibits a failure symptom that is related to a specific function or control such as a front panel key control, data storage, remote control interface, external trigger, external keyboard or mouse, isolate the trouble using the Function Specific Troubleshooting procedures described below. The major functions of the Keysight E4991B and the troubleshooting procedure for each function are shown in [Table 1](#).

Table 1 Major functions and troubleshooting procedures


Function	Description	Troubleshooting
Front panel keys	All Keysight E4991B functions can be set and controlled via the front panel keys.	Refer to “To Check the Front Panel” on page 29
Touch panel	The touch screen display on the Keysight E4991B allows all functions in the menu bars, setup windows and dialog boxes to be set by a touch to the screen panel.	Refer to “To Check the Touch Panel” on page 29
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 “To Check the LCD” on page 30
External keyboard	The external keyboard can be used for the entry of numerical and character data when it is connected to the USB connector on the front or rear panel.	Refer to “To Check the External Keyboard” on page 30
Mouse	The mouse can be used to move the pointer on the LCD display, select functions and change settings, when it is connected to the USB connected on the front or rear panel.	Refer to “To Check the Mouse” on page 31
External monitor	An external color monitor can be used to display the same information as the Keysight E4991B LCD display, when it is connected to the External Monitor Output Port (15-pin VGA connector) on the rear panel.	Refer to “To Check the External Monitor Output Port” on page 31
GPIO Interface	The GPIO compatibility allows the Keysight E4991B to be operated as a talker/listener on IEEE 488 interface bus.	Refer to “To Check the GPIO” on page 32

Table 1 Major functions and troubleshooting procedures

Handler Interface	The Handler Interface port can be used to transfer comparator decision output data and perform timing synchronization with an external handler.	Refer to “To execute the diagnostic test” on page 26 and “To execute the diagnostic test” on page 26
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To Check the Front Panel

Procedure

Step 1. Press  key.

Step 2. Click **Service Menu - Test Menu - Front Panel**. This opens the Front Panel Test window.

Step 3. Press the front panel keys. Red ticks will appear on the Front Panel Test window whenever the corresponding key on the front panel is pressed. Turn the rotary knob clockwise or counterclockwise. Red ticks will appear on the left of the rotary knob on the Front Panel Test window when you turn counterclockwise and on the right of the rotary knob when you turn clockwise.

Step 4. To exit the front panel test, click the  button.

- If multiple keys fail to work, a problem in the A52 Front Panel I/F board or A80 CPU Module is suspected. Also, check the flat cable between the A52 Front Panel I/F board and A80 CPU Module.
- If only a specific key fails to work, check first if the key is subsided in the panel.
- If the rotary knob fails to work, check the A52 Front Panel I/F board involving the RPG.

To Check the Touch Panel

Procedure

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

- If the touch panel does not work correctly when the hardkeys function normally, a failure seems to be 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 A80 CPU module.
- If no problem is found in the above checks, a failure in the A80 CPU Module is suspected.

To Check the LCD

Procedure

Step 1. Press **System** key.

Step 2. Click **Service - Display Test**. The whole LCD screen turns RED.

Step 3. Tap anywhere on the LCD to go through the color test screen of RED, GREEN, BLUE, WHITE and BLACK. You can also use the rotary knob turned clockwise or press the **ENTRY** keys on the Keysight E4991B front panel.

If the color test screen does not appear, perform Step 4.

Step 3. Connect an external VGA monitor to the External Monitor Output Port on the Keysight E4991B rear panel.



- If the monitor screen view is the same as the LCD display, the problem seems to be in the A80 CPU module.
- If only the LCD display has a problem, check the flat cable between the A52 Front Panel I/F board and A80 CPU Module.
- If the cables are normal, check the A12 LCD module.

To Check the External Keyboard

Procedure

Step 1. Connect an external keyboard to the Keysight E4991B rear panel USB port.

Step 2. Press **System** key.

Step 3. 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 A80 CPU Module may be faulty.

To Check the Mouse

Procedure

Step 1. Connect a mouse to the Keysight E4991B rear panel USB port.

Step 2. Verify that the mouse buttons work normally. If any button does not work or the mouse pointer does not move, a failure in the mouse or the A80 CPU Module is suspected.

To Check the External Monitor Output Port

Procedure


Step 1. Connect an external VGA color monitor to the External Monitor Output Port on the Keysight E4991B 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 to be in the A80 CPU module.

To Check the External Trigger Input

Procedure

Step 1. Press  key.

Step 2. Press **Trigger Mode** key.

Step 3. Click **External** in the menu bar to set the trigger mode to External.

Step 4. Connect a BNC Short or 50 ohm termination to the External Trigger Input Port on the rear panel and disconnect it. A measurement trigger should be generated and a measurement result should be refreshed.

Step 5. If no trigger occurs, a failure in the A51 DSP board is suspected.

To Check the GPIB

Procedure

Perform the Keysight E4991B Performance Test program. If the controller cannot detect the Keysight E4991B, the problem seems to be in the A80 CPU module.

To Check the USB

Procedure

Connect a USB cable between controller PC and USB Interface port (USBTMC) on the rear panel of the Keysight E4991B. Turn the controller PC on. If the Keysight E4991B cannot detect the controller PC, the problems seems to be in the CPU module. Keysight I/O Library should be installed on the PC.

Performance Test failure Troubleshooting

This section describes the adjustment and troubleshooting procedures used when the Keysight E4991B fails the performance tests. If the performance of the instrument is critical for the test limits and seems adjustable, perform first the adjustment(s) related to the failed test. When the test result are far from the tolerance of the test or the performance is not adjustable, isolate the faulty assembly in accordance with the “Performance Test failure Troubleshooting” procedure.

Recommended Adjustment for Performance Test failure

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

Table 2 Recommended adjustment for performance test failure

Failed Performance test item	Recommended Adjustment
Frequency Accuracy	Frequency Reference
Level Accuracy	Synthesizer Gain Source Output Power
DC Bias Accuracy	DC Bias Level
Z Measurement Accuracy	Receiver IF Range Default Cal Coefficient

Performance failure Troubleshooting

Table 3 shows the recommended replacement board when the performance test fails even after adjustment.

Table 3 Recommended replacement board for performance test failure

Failed Performance test item	A21 Source	A6 Receiver	A9 DC Bias	A55 10MHz OCXO	Test Head
Frequency Accuracy	**			*	

Table 3 Recommended replacement board for performance test failure

Frequency Accuracy (1E5)	*			**	
Level Accuracy	**	*			*
DC Bias Accuracy			**		*
Z Measurement Accuracy		*			**

(**: most suspicious, *: suspicious)

Adjustment failure Troubleshooting

Table 4 shows the recommended replacement board when the adjustment fails.

Table 4 Recommended replacement board for adjustment failure

Failed Adjustment item	A21 Source	A6 Receiver	A9 DC Bias	Test Head
Frequency Reference	**			
Source DC Offset	**			
DC Bias Level			**	
ADC		**		
RF Range		**		
Synthesizer Gain	**			
Source Power	**			
Local Gain	**	**		
IF Range		**		
Default Cal Coef				**

(**: most suspicious, *: suspicious)

2

Post Repair Procedure

Post Repair Procedures 36

The license code can be downloaded from the Keysight Software Manager (KSM) or Keysight Software Licensing (KSL). 36

This chapter lists the procedures required to verify the Keysight E4991B operation after an assembly is replaced with a new Impedance Analyzer

Post Repair Procedures

Table 5 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 Post Repair Procedures

Replaced Assembly or Part	Required Adjustment Correction Constants (CC)	Verification
A11 Source Board	Perform the required adjustments using “A21 Source Board” in Spot Adjustment of the program.	Troubleshooting Using Diagnostic Test 26 Perform all of the Performance Test.
A6 Receiver Board	Perform the required adjustments using “A6 Receiver Board” in Spot Adjustment of the program.	Troubleshooting Using Diagnostic Test 26 Perform all of the Performance Test.
A9 DC Bias Board	Perform the required adjustments using “A9 DC Bias Board” in Spot Adjustment of the program.	Troubleshooting Using Diagnostic Test 26 Perform all of the Performance Test.
Test Head	Perform the required adjustments using “Test Head” in Spot Adjustment of the program.	Troubleshooting Using Diagnostic Test 26 Perform all of the Performance Test.
A51 DSP Board	Perform the required adjustments using “A51 DSP Board” in Spot Adjustment of the program.	Troubleshooting Using Diagnostic Test 26 Inspect the Booting Process
SSD (Solid State Drive)	Perform the required adjustments using “HDD” in Spot Adjustment in the program. Copy from license file (.lic) under E:/license	Inspect the Booting Process

License file

The license code for the frequency option () and generation ID (G01) must be installed in E:/license, or the error message will be displayed.

The license code can be downloaded from the Keysight Software Manager (KSM) or Keysight Software Licensing (KSL).