Agilent E5072A Network Analyzers

Troubleshooting Guide

First Edition

Agilent Technologies

Manufacturing No. E5072-90100
October 2011

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The manual's printing date and part number indicate its current edition. The printing date changes when a new edition is printed. (Minor corrections and updates that are incorporated at reprint do not cause the date to change.) The manual part number changes when extensive technical changes are incorporated.

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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. Agilent Technologies assumes no liability for the customer's failure to comply with these precautions.

NOTE The E5072A complies with INSTALLATION CATEGORY II as well as POLLUTION DEGREE 2 in IEC61010-1. The E5061B is an INDOOR USE product.

NOTE The LEDs in the E5072A are Class 1 in accordance with IEC60825-1, CLASS 1 LED PRODUCT

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

NOTE This equipment is tested with stand-alone condition or with the combination with the accessories supplied by Agilent 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 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 an Agilent 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 Symbol

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).


In position of push-button switch.


Out position of push-button switch.


Frame (or chassis) terminal. A connection to the frame (chassis) of the equipment which normally include all exposed metal structure.


Stand-by.

WARNING **This warning sign denotes a hazard. It calls attention to a procedure, practice, condition or the like, which, if not correctly performed or adhered to, could result in injury or death to personnel.**

CAUTION This Caution sign denotes a hazard. It calls attention to a procedure, practice, condition or the like, which, if not correctly performed or adhered to, could result in damage to or destruction of part or all of the product.

NOTE Note denotes important information. It calls attention to a procedure, practice, condition or the like, which is essential to highlight.

Certification

Agilent Technologies certifies that this product met its published specifications at the time of shipment from the factory. Agilent 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 to the calibration facilities of other International Standards Organization members.

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Typeface Conventions

Sample (bold)	Boldface type is used when a term is defined or emphasised.
Sample (Italic)	Italic type is used for emphasis.
Sample key	Indicates a hardkey (key on the front panel or external keyboard) labeled “Sample.” “key” may be omitted.
Sample menu/button/box	Indicates a menu/button/box on the screen labeled “Sample” which can be selected/executed by clicking. “menu,” “button,” or “box” may be omitted.
Sample block/toolbar	Indicates a block (group of hardkeys) or a toolbar (setup toolbar) labeled “Sample.”
Sample 1 - **Sample 2** - **Sample 3**	Indicates a sequential operation of **Sample 1**, **Sample 2**, and **Sample 3** (menu, button, or box). “-” may be omitted.

Contents

Contents

1 Troubleshooting

This chapter provides the procedure to isolate a faulty assembly in the E5072A.

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 E5072A Measurement View

You need to exit from the E5072A Measurement View to perform some troubleshooting. The following is the procedure to exit from the E5072A Measurement View.

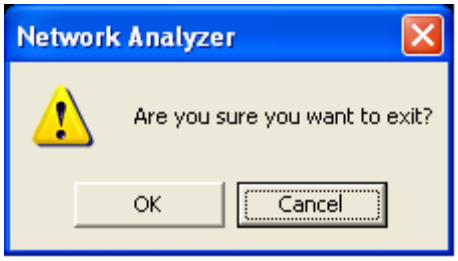
Step 1. Connect the mouse and external keyboard to the connectors on the E5072A rear panel.

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 1-1.

Figure 1-1 **Exit dialog box**



Step 5. Click **OK** in **Exit** Menu. Then the E5072A 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 E5072A 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 E5072A. 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 E5072A. Figure 1-2 shows the trouble isolation flow chart.

Step 1. Turn the instrument power on

About a few minutes after the E5072A is turned on, the measurement view is displayed on the screen. The display on the screen should be similar to Figure 1-12, “Measurement view,” on page 21.

Step 2. Check the display

- If no display appears on the LCD after the E5072A is turned on, go to “No Display Troubleshooting” on page 14.
- If the E5072A stops in booting process despite something being displayed on the LCD, go to “Booting Process Troubleshooting” on page 17.
- The power-on self test is performed once automatically after the E5072A measurement view is displayed. If the power-on self test fails, go to “Troubleshooting Using Diagnostic Test” on page 22.

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 27.

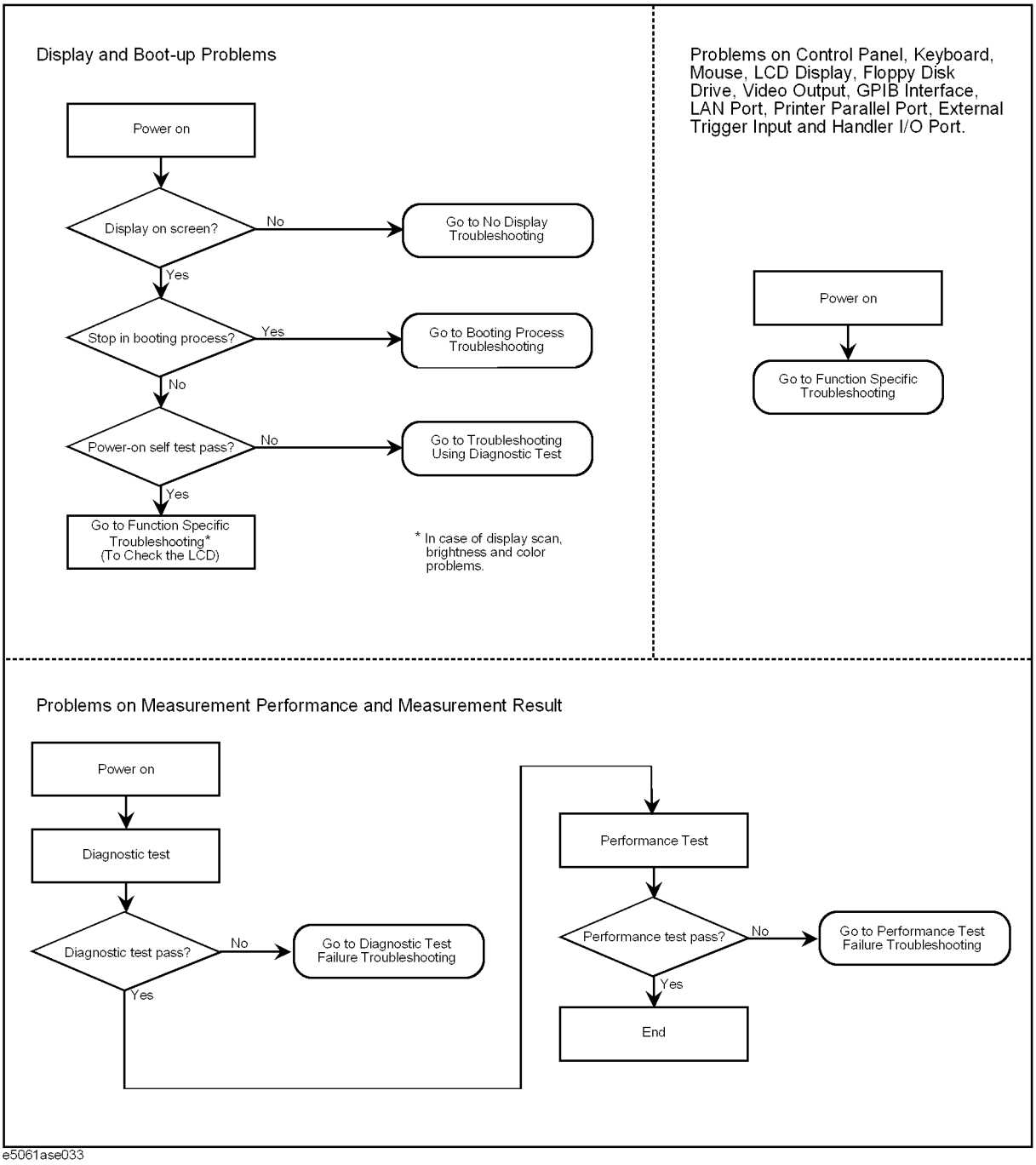
Step 4. Check the measurement function

If the instrument fails performance tests, go to “Performance Test failure Troubleshooting” on page 33.

If the measurement function does not work correctly, perform the diagnostic test provided in the E5072A's service function. When the diagnostic test fails, go to “Diagnostic Test Failure Troubleshooting” on page 25.

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 1-2 Primary trouble isolation flowchart



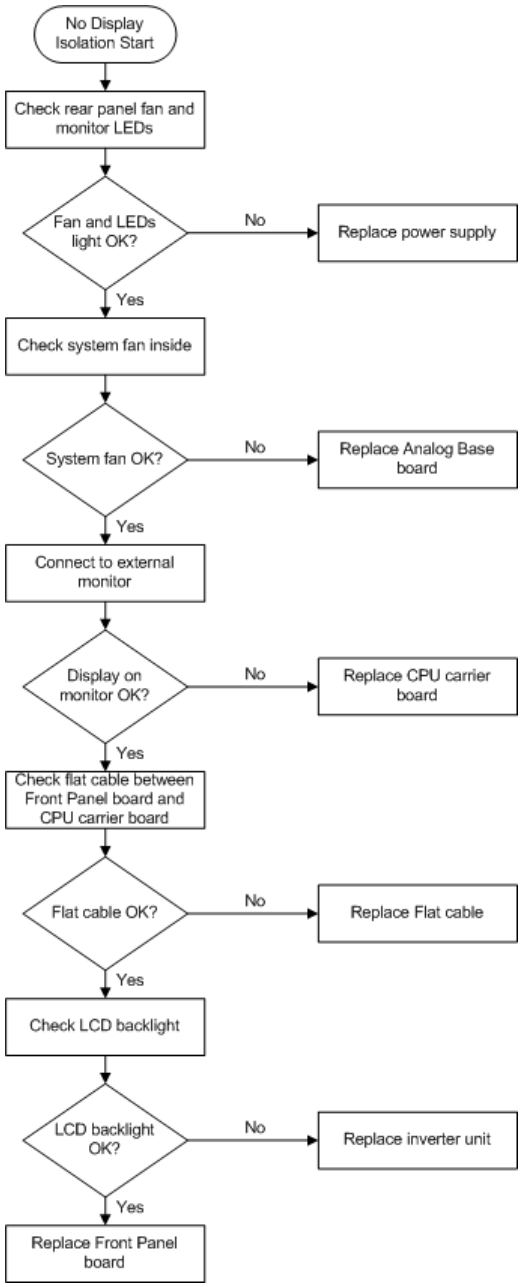
e5061ase033

No Display Troubleshooting

If the E5072A displays nothing despite it is powered from proper ac power line, isolate the failure in accordance with the procedure shown in Figure 1-3.

Connect the keyboard to the E5072A 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 1-3 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 E5072A outer cover and check if the following LEDs light:

- +3.3 V and +5 V DC monitor LEDs on A50 CPU Module as shown in Figure 1-4
- LEDs on DSP module as shown in Figure 1-5

Figure 1-4 **LEDs on CPU module**

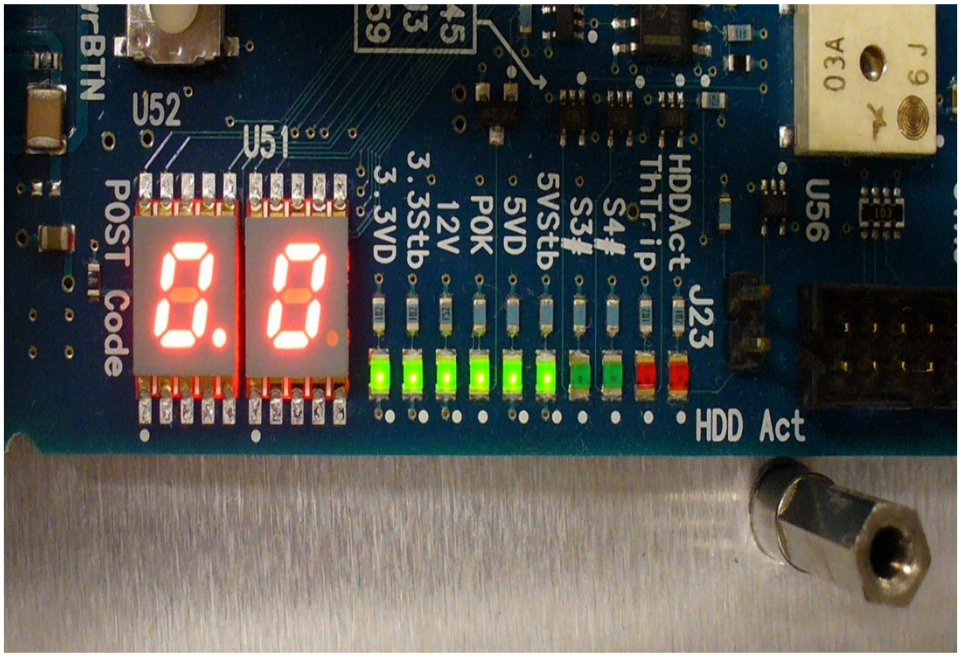
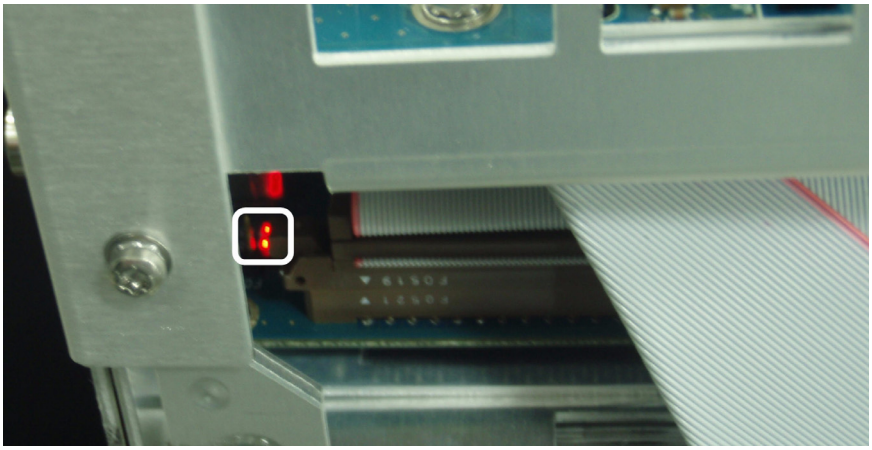


Figure 1-5 **LEDs on DSP module**



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 E5072A don't run, problem seems in the A80 Analog Base board or the flat cable between the A80 Analog Base board and CPU module. In this case, remove the E5072A 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 A80 Analog Base 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 1-6, a problem seems in the CPU module.

Figure 1-6 LED of the Num Lock key

Make sure the following before replacing the CPU module.

- Whether all the connections to the A50 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 E5072A 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 CPU Module and A52 Front Panel I/F board.

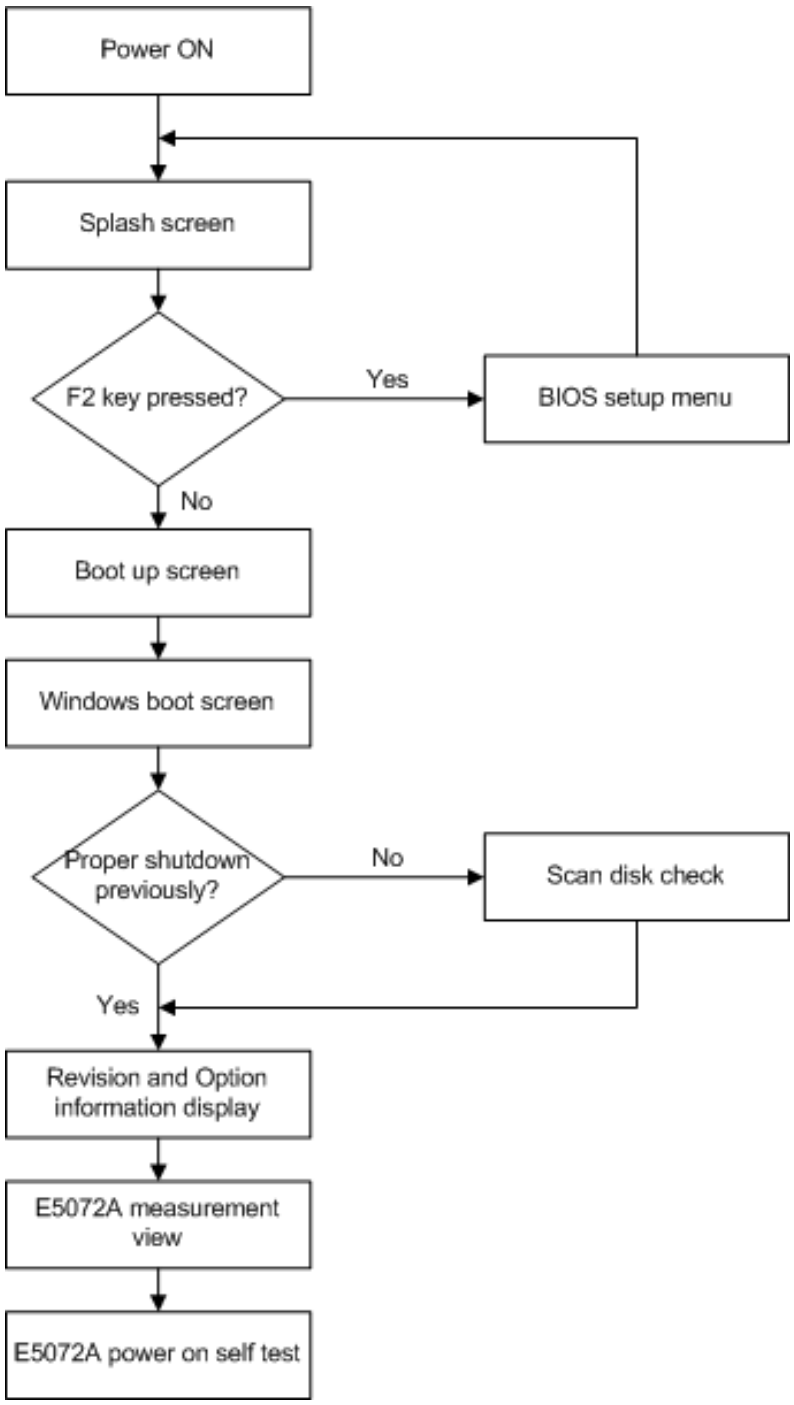
Step 6. Check around the backlight

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 1-7 represents the booting process flow in the E5072A. If the E5072A stops in the booting process, troubleshoot using the following step-by-step procedure.

Figure 1-7 **Booting process flowchart**



Step 1. Splash Screen

The splash screen is displayed with Agilent logo as shown in Figure 1-8.

If the splash screen is displayed, you can assume that the A50 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 unility is agt0nly (0 is Zero, not o).

Figure 1-8 **Splash Screen**

Step 2. Boot up Screen

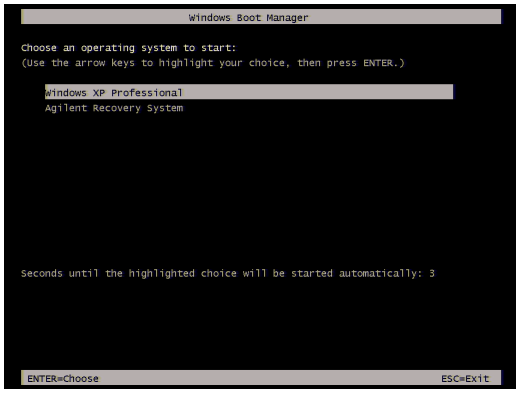
The Boot up screen is displayed as shown in Figure 1-9.

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, select “Agilent Recovery System” as soon as in the screen. For details of the system recovery, refer to the Installation Guide.

http://www.agilent.com/find/e5072a-manual

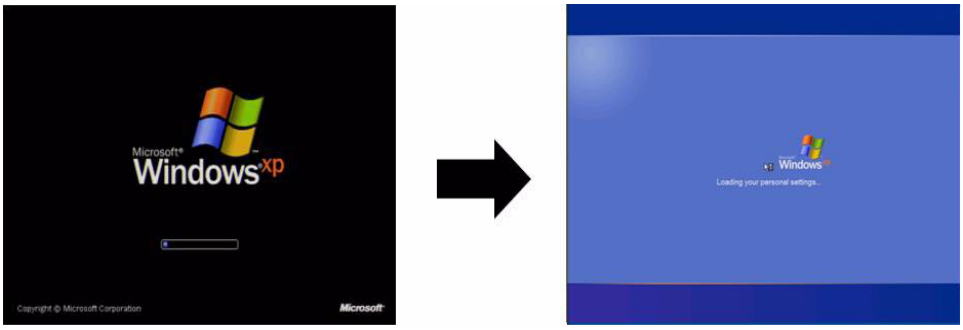
Figure 1-9 **Boot up Screen**



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 1-10. 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 1-10 **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 E5072A 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, execute system recovery. For details of the system recovery, refer to the Installation Guide.

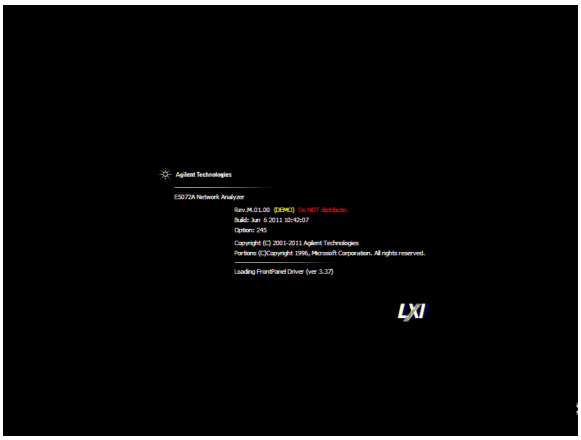
http://www.agilent.com/find/e5072a-manual

If the operating system still doesn't boot up properly after reinstallation, replace the HDD.

Step 4. Revision and option information

The firmware revision and hardware option information along with copyright declaration is displayed as shown in Figure 1-11. The E5072A 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 1-11 **Firmware revision and option information**



If the display whited out, entirely blued or appeared with a dialog box, a harddisk drive problem is suspected. Perform system recovery procedure. For details of the system recovery, refer to the Installation Guide.

http://www.agilent.com/find/e5072a-manual

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 1-12 is displayed after the system initialization is completed without problem.

Figure 1-12 **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 22.

Troubleshooting Using Diagnostic Test

The Agilent E5072A 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 E5072A 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, A91 Synthesizer Module may be faulty.

Contents of the diagnostic test

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

Table 1-1 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 Compression Test
7	Receiver IF Ranging Test

Test equipment required for diagnostic test

Table 1-2 shows the equipment required for performing the diagnostic test.

Table 1-2 **Required equipment**

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

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:

1. Environmental temperature: 23°C ± 5°C

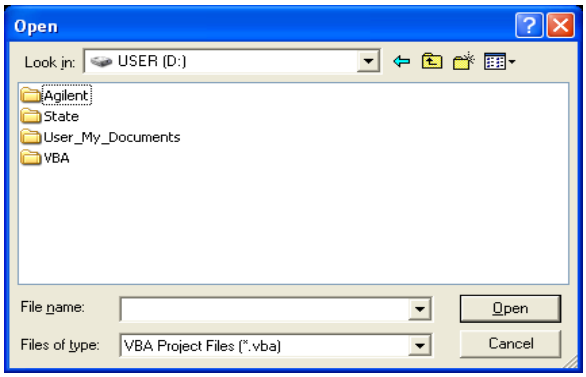
NOTE Do not operate front panel keys, keyboard and mouse during the diagnostic test. Changing the instrument settings while the diagnostic test is in progress will cause incorrect test results.

Step 1. Connect a mouse and an external keyboard to the E5072A'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 1-13.

Figure 1-13 **Open dialog box**



Step 4. Select "User [D]" (preset state) from menu in the "Look in:" box.

Step 5. Double-click "Agilent" folder to open it and to access its menu.

Step 6. Double-click "Service" folder to open it.

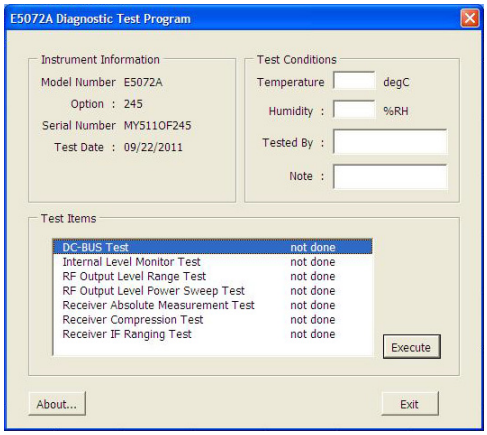
Step 7. Click "DiagnosticTest. VBA" program file to select it from program menu.

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 1-14.

Figure 1-14 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 E5072A, and test date can be entered automatically.

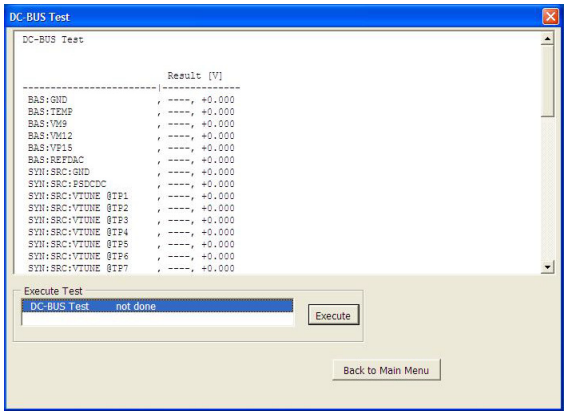
Test Conditions The test conditions, “Temperature”, “Humidity” and person doing the test (“Tested by”) can be entered.

Test Items The following test can be selected. To execute the test you select, click “Execute” button.

- DC-BUS Test
- Internal Level Monitor Test
- RF Output Level Range Test
- RF Output Level Power SweepTest
- Receiver Absolute Measurement Test
- Receiver Compression Test
- Receiver IF Ranging Test

When each test is executed, the test dialog box is displayed. The following screen is an example of the test dialog box.

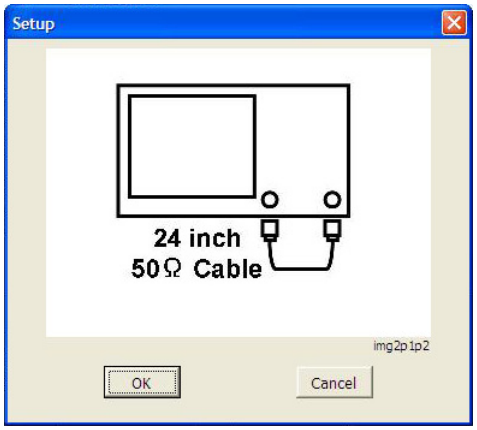
Figure 1-15 Test dialog box



To execute the test, click “Execute” button. To return the E5072A 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 E5072A. Follow the instructions as shown below on the E5072A display for performing the test.

Figure 1-16 Setup dialog box



The test result file named “resultDT.txt” is created on the drive D (D:\Agilent\Service\Log\) of the E5072A 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 1-3 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 1-3.

Table 1-3 Diagnostic tests failure troubleshooting information

Test No.	Test group	Probable faulty board assembly								
		A80	A91	A83	T2-SW	ATT	A92	A2	A84	A85
1	DC-BUS	###	###	###						
2	Internal Level Monitor	###	###	###						
3	RF Output Level Range		##	###	#	#	#	#	#	#
4	RF Output Level Power Sweep			###						
5	Receiver Absolute Measurement		##					###		
6	Receiver Compression							###		
7	Receiver IF Ranging							###		

###: Most suspicious assembly

##: Suspicious assembly

#: Possible faulty assembly

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

The meaning of abbreviations are shown in Table 1-4

Table 1-4 The meaning of abbreviations

Abbreviation	Meaning (Description)
A80	Analog Base Module
A91	Synthesizer Module
A83	Level Vernier Module
T2-SW	Enhanced tsunami switch Module
ATT	Step attenuator Module
A92	RF Front End Module
A2	Receiver Module
A84	Local Distributor Module
A85	Decoder driver Module

Function Specific Troubleshooting

If the E5072A 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 E5072A and the troubleshooting procedure for each function are shown in Table 1-5.

Table 1-5 Major functions and troubleshooting procedures

Function	Description	Troubleshooting
Front panel keys	All the E5072A functions except for VBA and service functions can be set and controlled via the front panel keys.	Refer to “To Check the Front Panel” on page 30.
Touch panel	The E5072A equipped with 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 “To Check the Touch Panel” on page 30.
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 31.
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 “To Check the External Keyboard” on page 31.
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 “To Check the Mouse” on page 31.
Video output	An external color monitor can be used to display the same information as the E5072A LCD display, when it is connected to the Video output connector (24-pin D-Sub) on the rear panel.	Refer to “To Check the Video output” on page 32.
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 “To Check the External Trigger Input” on page 32.
GPIB Interface	The GPIB compatibility allows the E5072A to be operated as a talker/listener on IEEE 488 interface bus.	Refer to “To Check the GPIB” on page 32.
US B Interface	The USB allows USB devices to be connected to E5072A	Refer to “To Check the USB” on page 32.
LAN Interface	The LAN provide connectivity to network.	“To Check the LAN” on page 32

To Check the Device Driver

Make sure first whether the E5072A device drivers are installed properly or not by the following procedure, if a function of specific device in the E5072A doesn't work.

Step 1. Exit from the E5072A measurement view in accordance with the procedure described in “How to exit from the E5072A Measurement View” on page 11. Then, Windows desktop screen is displayed.

Step 2. Click "My Computer" with the right button and select "Properties" as shown in Figure 1-17. Then, the System Properties(Figure 1-18) will appear.

Figure 1-17 Opening System Property Window

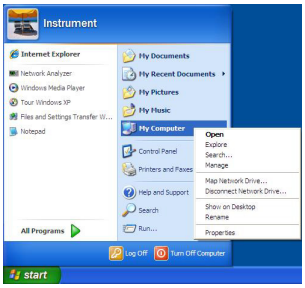
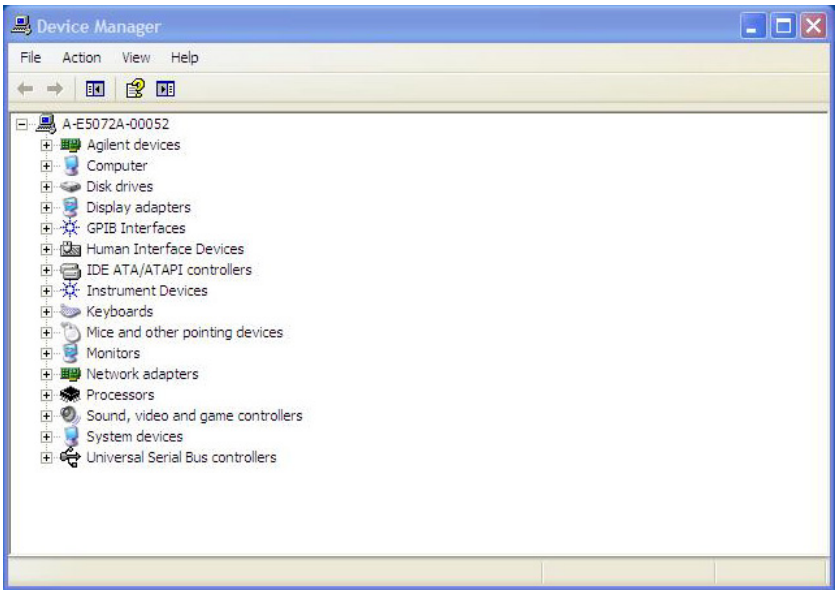


Figure 1-18 System Properties Window (General)

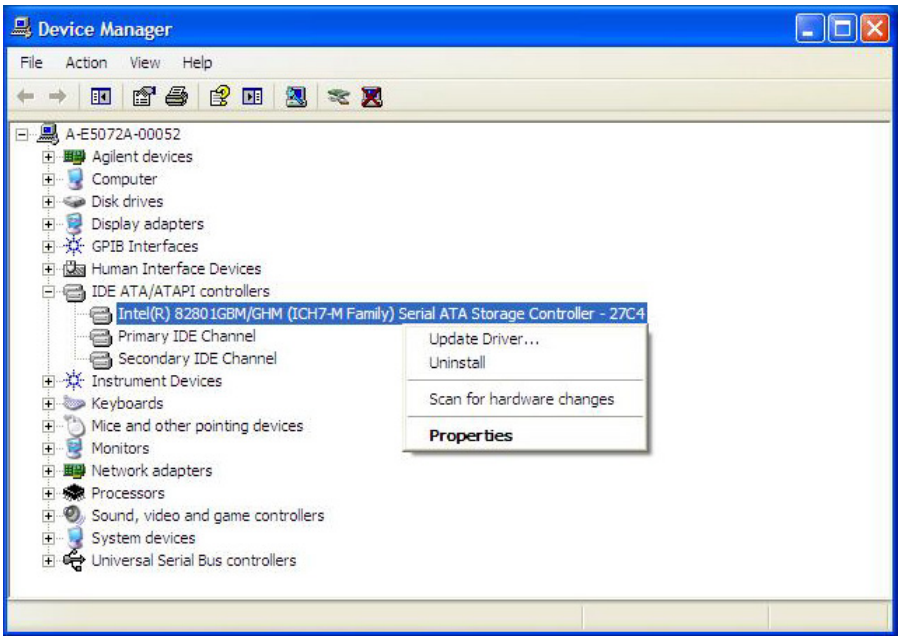
Step 3. Click Hardware tab and Device Manager button. The operating system detects all the necessary device drivers and displays the device names as shown in Figure 1-19.

Figure 1-19 **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 1-20.

Figure 1-20 **Opening Device Driver Property**



If there is a problem with the device driver, perform system recovery. For details of the system recovery, refer to the Installation Guide.

http://www.agilent.com/find/e5072a-manual

To Check the Front Panel

Procedure

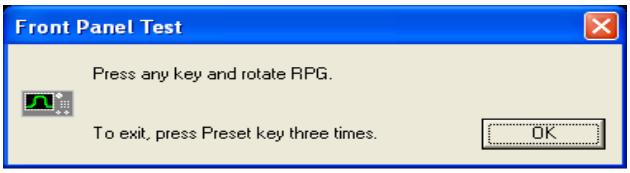
Randomly press the front panel keys and rotate the knob to verify that they work normally.

Step 1. Press System key.

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

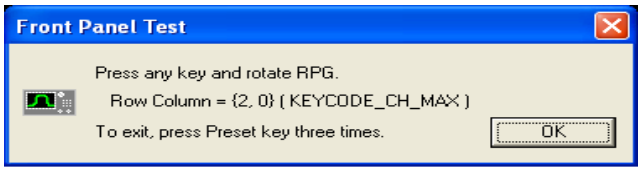
Step 3. Click **Front Panel** in the test menu. This opens "Front Panel Test" dialog box as shown in Figure 1-21.

Figure 1-21 **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 1-22. Turn the rotary knob clockwise or counterclockwise. The dialog box indicates the direction of the turned knob and a count of RPG output.

Figure 1-22 **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.

- 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 below.

Step 4. Connect an external VGA monitor to the VIDEO output port on the E5072A 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, the problem seems to be the LCD display.

To Check the External Keyboard

Procedure

Step 1. Connect the external keyboard to the E5072A 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 E5072A 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 smothly, 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 E5072A 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 E5072A.

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 Ω 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 E5072A performance test program. If the controller cannot detect the E5072A, 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 E5072A. Turn the controller PC on. If the E5072A cannot detect controller PC, the problem seems in the CPU module. Agilent I/O Library should be installed on PC.

To Check the LAN

Procedure

Connect LAN cable to LAN Interface port on the rear panel of E5072A. If E5072A cannot detect network connection, the problem seems in the CPU module.

Performance Test failure Troubleshooting

This section describes the adjustment and troubleshooting procedures used when the E5072A 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 1-6 shows the recommended adjustments when the performance test fails. Select the adjustment program corresponding to the recommended adjustment and perform the adjustment.

Table 1-6 Recommended adjustment for performance test failure

First failed test	Recommended adjustment							
	AUX input	Oven reference	Frequency reference	Synthesizer gain	Source output power	Receiver IF range	Receiver port characteristics	Receiver Absolute Gain
AUX input	√							
Frequency accuracy test (Opt. 1E5)		√						
Frequency accuracy test			√					
RF output level accuracy and flatness test					√			√
RF output level linearity test					√			√
Trace noise test								
Crosstalk & system dynamic range test								
Noise floor test								
Dynamic accuracy test						√		
Uncorrected system performance test							√	√

Adjustment Test failure

Table represents the relationships between the failed test and probable faulty assembly. Select the adjustment program corresponding to the recommended adjustment and perform the adjustment.

Table 1-7 Adjustment Test failure Troubleshooting information

First failed test	Probable faulty board assembly or parts								
	A5	A80	A91	A83	T2-SW	ATT	A92	A2	A85
AUX input		###							
Oven (Opt. 1E5)	###								
Reference Output		###							
Synth Gain			###						
Source Output Power				###	##	##	##	##	#
Receiver IF Range								###	
Receiver Port Characteristic							###		
Receiver Absolute Gain*									

###: Most suspicious assembly

##: Suspicious assembly

#: Possible faulty assembly

* This test will never fail because it is a calculation.

Performance Test failure Troubleshooting

Table 1-8 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 that this table lists some typical cases. There are possibilities that other assembly may be faulty. To troubleshoot further, perform the Diagnostic Test procedures.

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 1-8 Performance Test failure Troubleshooting information

First failed test	Probable faulty board assembly or parts									
	A5	A80	A91	A83	T2-SW	ATT	A92	A2	A84	A85
AUX input		###								
Frequency accuracy test (Opt. 1E5)	###									
Frequency accuracy test			###	##	#	#	#			#
RF output level accuracy and flatness test			##	###	#	#	#	#	#	#
RF output level linearity test			##	###	#	#	#	#	#	#
Trace noise test								###		
Crosstalk & system Dynamic Range test								###		
Noise floor test								###		
Dynamic accuracy test								###		
Uncorrected system performance test							###			

###: Most suspicious assembly

##: Suspicious assembly

#: Possible faulty assembly

Table 1-9 The meaning of abbreviations

Abbreviation	Meaning (Description)
A5	Oven Board
A80	Analog Base Module
A91	Synthesizer Module
A83	Level Vernier Module
T2-SW	Enhanced tsunami switch Module
ATT	Step attenuator Module
A92	RF Front End Module

Abbreviation	Meaning (Description)
A2	Receiver Module
A84	Local Distributor Module
A85	Decoder driver Module

2 Post-Repair Procedures

This chapter lists the procedures required to verify the E5072A operation after an assembly is replaced with a new one.

Post-Repair Procedures

Table 2-1 *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 2-1 Post-Repair Procedures

Replaced Assembly or Part	Required Adjustments Correction Constants (CC)	Verification
A61 DSP Board	Perform the following required adjustments using “Analog I/F Board” in Spot Adjustment of the program.	“To Execute the Diagnostic Test” on page 23 Perform the following performance test: AUX Input Test Frequency Accuracy Test RF Output Level Accuracy and Flatness Test RF Output Level Linearity Test Trace Noise Test Crosstalk & System Dynamic Range Test Noise Floor Test Dynamic Accuracy Test Uncorrected System Performance Test
A5 Reference Oven Board	Perform the following required adjustments using “Oven Board” in Spot Adjustment of the program.	“To Execute the Diagnostic Test” on page 23 Perform the following performance test: Frequency Accuracy Test
A80 Analog Base Module	Perform the following required adjustments using “Analog Base Module” in Spot Adjustment of the program.	“To Execute the Diagnostic Test” on page 23 Perform the following performance test: AUX Input Test Frequency Accuracy Test
A91 Synthesizer Module	Perform the following required adjustments using “Synthesizer Module” in Spot Adjustment of the program.	“To Execute the Diagnostic Test” on page 23 Perform the following performance test: Frequency Accuracy Test RF Output Level Accuracy and Flatness Test RF Output Level Linearity Test Trace Noise Test Crosstalk & System Dynamic Range Test Noise Floor Test Dynamic Accuracy Test Uncorrected System Performance Test

Table 2-1 Post-Repair Procedures

Replaced Assembly or Part	Required Adjustments Correction Constants (CC)	Verification
A2 Receiver Module	Perform the following required adjustments using “Synthesizer Module” in Spot Adjustment of the program.	“To Execute the Diagnostic Test” on page 23 Perform the following performance test: Trace Noise Test Crosstalk & System Dynamic Range Test Noise Floor Test Dynamic Accuracy Test Uncorrected System Performance Test
A83 Vernier Module	Perform the following required adjustments using “Level Vernier Module” in Spot Adjustment of the program.	“To Execute the Diagnostic Test” on page 23 Perform the following performance test: Frequency Accuracy Test RF Output Level Accuracy and Flatness Test RF Output Level Linearity Test Trace Noise Test Crosstalk & System Dynamic Range Test Noise Floor Test Dynamic Accuracy Test Uncorrected System Performance Test
A84 Local Distributor Module	Perform the following required adjustments using “Local Distributor Module” in Spot Adjustment of the program.	“To Execute the Diagnostic Test” on page 23 Perform the following performance test: Frequency Accuracy Test RF Output Level Accuracy and Flatness Test RF Output Level Linearity Test Trace Noise Test Crosstalk & System Dynamic Range Test Noise Floor Test Dynamic Accuracy Test Uncorrected System Performance Test

Table 2-1 Post-Repair Procedures

Replaced Assembly or Part	Required Adjustments Correction Constants (CC)	Verification
T2 Switch	Perform the following required adjustments using “RF Switch” in Spot Adjustment of the program.	“To Execute the Diagnostic Test” on page 23 Perform the following performance test: Frequency Accuracy Test RF Output Level Accuracy and Flatness Test RF Output Level Linearity Test Trace Noise Test Crosstalk & System Dynamic Range Test Noise Floor Test Dynamic Accuracy Test Uncorrected System Performance Test
A92 RF Front End Module	Perform the following required adjustments using “RF Front End Module” in Spot Adjustment of the program.	“To Execute the Diagnostic Test” on page 23 Perform the following performance test: Uncorrected System Performance Test
Step Attenuator Module	Perform the following required adjustments using “Source Step Attenuator Module” in Spot Adjustment of the program.	“To Execute the Diagnostic Test” on page 23 Perform the following performance test: Frequency Accuracy Test RF Output Level Accuracy and Flatness Test RF Output Level Linearity Test Trace Noise Test Crosstalk & System Dynamic Range Test Noise Floor Test Dynamic Accuracy Test Uncorrected System Performance Test
Hard Disk Drive	Perform “Hard Disk” in Spot Adjustment of the program. Calibration of the Touch Screen	Inspect the Booting Process
A50 CPU module	No adjustment needed	Inspect the Booting Process
A52 Front Panel I/F Board	No adjustment needed	“To Check the Front Panel” on page 30
Power Supply Assembly	No adjustment needed	Inspect the Booting Process
LCD	No adjustment needed	Inspect the Booting Process “To Check the LCD” on page 31
Touch panel	Calibration of the Touch Screen	Inspect the Booting Process “To Check the Touch Panel” on page 30

Table 2-1 Post-Repair Procedures

Replaced Assembly or Part	Required Adjustments Correction Constants (CC)	Verification
Inverter Board	No adjustment needed	Inspect the Booting Process
24 bit I/O	No adjustment needed	“To Execute the Diagnostic Test” on page 23

Post-Repair Procedures

A Messages

The E5072A 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 E5072A are displayed in the lower-left area of the E5072A 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 decribed in WebHelp. Please kindly refer to Agilent Website below.
http://ena.tm.agilent.com/e5072a/manuals/webhelp/eng/index.htm#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 Agilent website.
http://ena.tm.agilent.com/e5072a/manuals/webhelp/eng/index.htm#product_information/error_messages/warning_message.htm