

# Keysight E5080A ENA Series Network Analyzer

Installation Guide



# Notices

© Keysight Technologies, Inc. 2015

No part of this manual may be reproduced in any form or by any means (including electronic storage and retrieval or translation into a foreign language) without prior agreement and written consent from Keysight Technologies, Inc. as governed by United States and international copyright laws.

## Manual Printing History

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.

January 2015 First Edition

Manual Part Number

E5080-90000

Edition

First Edition, January 2015

Printed by Keysight Technologies International Japan G.K., 1-3-3 Higashikawasaki-cho, Chuo-ku, Kobe-shi, Hyogo, Japan.

## Warranty

**The material contained in this document is provided “as is,” and is subject to being changed, without notice, in future editions. Further, to the maximum extent permitted by applicable law, Keysight disclaims all warranties, either express or implied, with regard to this manual and any information contained herein, including but not limited to the implied warranties of merchantability and fitness for a particular purpose. Keysight shall not be liable for errors or for incidental or consequential damages in connection with the furnishing, use, or performance of this document or of any information contained herein. Should Keysight and the user have a separate written agreement with warranty terms covering the material in this document that conflict with these terms, the warranty terms in the separate agreement shall control.**

## Technology Licenses

The hardware and/or software described in this document are furnished under a license and may be used or copied only in accordance with the terms of such license

## Restricted Rights Legend

If software is for use in the performance of a U.S. Government prime contract or subcontract, Software is delivered and licensed as “Commercial computer software” as defined in DFAR 252.227-7014 (June 1995), or as a “commercial item” as defined in FAR 2.101(a) or as “Restricted computer software” as defined in FAR 52.227-19 (June 1987) or any equivalent agency regulation or contract clause. Use, duplication or disclosure of Software is subject to Keysight Technologies’ standard commercial license terms, and non-DOD Depart-

ments and Agencies of the U.S. Government will receive no greater than Restricted Rights as defined in FAR 52.227-19(c)(1-2) (June 1987). U.S. Government users will receive no greater than Limited Rights as defined in FAR 52.227-14 (June 1987) or DFAR 252.227-7015 (b)(2) (November 1995), as applicable in any technical data.

## 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 E5080A 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 E5080A 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.

## **Documentation Warranty**

The material contained in this document is provided "as is," and is subject to being changed, without notice, in future editions. Further, to the maximum extent permitted by applicable law, Keysight disclaims all warranties, either express or implied with regard to this manual and any information contained herein, including but not limited to the implied warranties of merchantability and fitness for a particular purpose. Keysight shall not be liable for errors or for incidental or consequential damages in connection with the furnishing, use, or performance of this document or any information contained herein. Should Keysight and the user have a separate written agreement with warranty terms covering the material in this document that conflict with these terms, the warranty terms in the separate agreement will control.

## **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.

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



## Manuals for E5080A

Keysight provides the following three manuals for E5080A. The latest version of all documentations can be downloaded from <http://www.keysight.com/find/E5080A-manual>.

### Installation Guide

The installation guide (this manual) provides start up setup information when you use the E5080A for the first time and troubleshooting information when the Windows cannot be boot up. See this manual first when you use the E5080A for the first time.

### Online Help

The online help provides the information about the quick start, measurement operation, programming, and I/O interface. This is pre-installed in the E5080A. Press [**Help**] hard key on the front panel to open. Quick Start helps in understanding the E5080A operation quickly.

The latest version of online help is available at:  
<http://ena.support.keysight.com/E5080A/manuals/webhelp/eng>.

The online help has context sensitive help, which is a great feature of the E5080A help. It allows you to get information about the selected softkey by pressing the **Help** key in the E5080A or by pressing **F1** in a keyboard attached to the E5080A 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 E5080A. 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.

### Service Guide

The service manual provides information about the parts, troubleshooting, performance test, adjustment and service menu.

## In This Guide...

The following shows the contents of this manual.

### **Chapter 1, "Installation"**

This chapter provides information about how to set up the Keysight E5080A.

### **Chapter 2, "Troubleshooting"**

This chapter describes the troubleshooting during start up and the procedure of the operating system (OS) recovery when the Windows OS has been damaged.

# Contents

## 1 Installation

Checking the Shipment	12
Environmental Requirements	13
Operating Environments	13
Ventilation Requirement	13
Protection Against Electrostatic Discharge (ESD)	14
Ensuring Adequate Free Space around Analyzer for Immediate Disconnection of Power Cable in Case of Emergency	14
Power Supply	15
Verification of the Power Supply	15
Verification and Connection of Power Cable	15
Blown Fuses	16
Starting the E5080A	17
Turning the Power ON and OFF	17
Disconnection from Supply Source	18
Initial Registration of E5080A	20

## 2 Troubleshooting

Troubleshooting during Startup	22
System Recovery	23
Notes on executing the factory recovery function	23
Procedure to execute the factory recovery	23

## Index



# 1 Installation

Checking the Shipment	12
Environmental Requirements	13
Power Supply	15
Blown Fuses	16
Starting the E5080A	17
Initial Registration of E5080A	20

This chapter provides information about how to set up the Keysight E5080A.

## Checking the Shipment

After you receive the analyzer, carry out checks during unpacking according to the following procedure.

**WARNING**

**When unpacking the analyzer, if the exterior of the analyzer (such as the cover, front/rear panel, LCD screen, power switch, and port connectors) appear to be damaged during transport, do not turn on the power switch. Otherwise, you may get an electric shock.**

---

Step 1. Check that the packing box or shock-absorbing material used to package the analyzer has not been damaged.

**NOTE**

If the packing box or shock-absorbing material has been damaged, leave the packing box and shock-absorbing material as is until other inspection items are checked as follows.

---

Step 2. Check the packaged items supplied with the analyzer for any damage or defects.

Step 3. By referring to the furnished contents list, check that all packaged items supplied with the analyzer have been received as per the specified options.

Step 4. After checking, if one of the following applies, contact your nearest Keysight Technologies sales and service office.

- 1 The packing box or shock-absorbing material used to package the analyzer has been damaged or the shock-absorbing material has traces where extreme force has been applied.
- 2 A packaged item supplied with the analyzer has mechanical damage or defects.
- 3 A packaged item supplied with the analyzer is missing.
- 4 A fault has been detected in the subsequent operation check of the analyzer.

If an abnormality is detected in step 1, contact the company that transported the analyzer as well as your nearest Keysight Technologies sales and service office.

## Environmental Requirements

Set up the E5080A where the following environmental requirements are met.

### Operating Environments

Ensure that the operating environment meets the following requirements.

Temperature	0 °C to 40 °C
Temperature range at the error-correction	23 °C ± 3 °C (< 1 °C deviation from the temperature when performing the error-correction)
Humidity	20% to 80% at wet bulb temperature < +29 °C (non-condensation)
Altitude	0 to 2,000 m (0 to 6,561 feet)
Vibration	0.21 G maximum, 5 Hz to 500 Hz

#### NOTE

Above environmental requirements are NOT for the specifications and measurement accuracy of the analyzer, but for the operating environment of the analyzer.

### Ventilation Requirement

To ensure safety requirements, the specifications and measurement accuracy of the analyzer, you must keep the environmental temperature within the specified range by providing appropriate cooling clearance around the analyzer or, for the rack mount type, by forcefully air-cooling inside the rack housing. For more information on environmental temperature to satisfy the specifications and measurement accuracy of the analyzer, see the specification in the *E5080A Datasheet*.

When the environmental temperature around the analyzer is kept within the temperature range of the operating environment specification (See Section “Operating Environments” on page 13), the analyzer conforms to the requirements of the safety standard. Furthermore, under that temperature requirement, the analyzer still conforms to the requirements of the safety standard even when placing the analyzer with cooling clearance as follows:

## 1 Installation

	Requirements
Back	≤ 180 mm
Sides	≤ 60mm (both right and left)

### Protection Against Electrostatic Discharge (ESD)

Set up a static-safe work-station to protect the electronic components from the damage by the electrostatic discharge (ESD) as shown in [Figure 1](#).

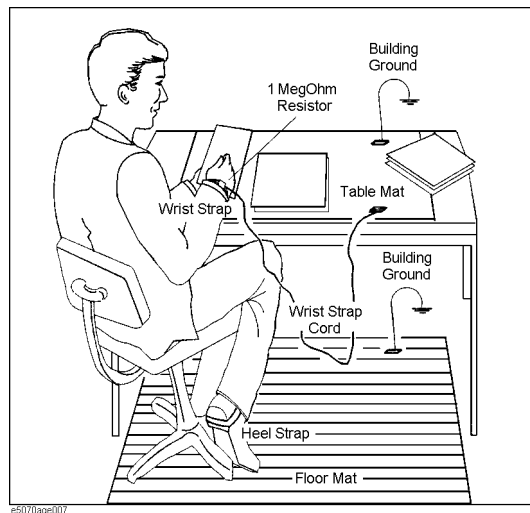


Figure 1 Example of the static-safe work station

### Ensuring Adequate Free Space around Analyzer for Immediate Disconnection of Power Cable in Case of Emergency

As described in “Disconnection from Supply Source” on page 18, the power supply is disconnected by removing the power cable’s connector plug from either the AC outlet or the E5080A unit. When installing the E5080A, ensure that there is sufficient free space around the unit to permit quick disconnection of the plug (from AC outlet or E5080A unit) in case of emergency.



## Power Supply

Before turning on the E5080A power, check the following.

### Verification of the Power Supply

Confirm that the power supplied to the E5080A meets the following requirements:

	Requirements
Voltage	90 to 264 VAC
Frequency	47 to 63 Hz
Maximum power consumption	300 VA

### Verification and Connection of Power Cable

The three-wire power cable attached to the E5080A has one wire serving as the ground. Using this power cable allows the E5080A to be grounded, thereby protecting you against any potential electrical shock from the power outlet.

Step 1. Confirm that the power cable is not damaged.

#### **WARNING**

**NEVER use a power cable showing any sign of damage. Faulty cables can cause electrical shock.**

Step 2. Use the supplied cable to connect between the power cable receptacle (Figure 2 on page 18) on the rear panel of the E5080A and a three-wire power outlet with the grounding prong firmly connected in the ground slot.

#### **WARNING**

**Use the supplied power cable with grounding wire to securely ground the E5080A.**

Power cord list, 16000-99101 shows the power cable options.

## 1 Installation

### Blown Fuses

If the fuse appears to have blown during operation, this instrument may be subject to failure and must be repaired. For any assistance, contact Keysight Technologies Customer contact center listed at the end of this guide.

The E5080A uses the following fuse types:

UL/CSA Type, Slow-Blo, 10 A-250 Vac.

**WARNING**

**DO NOT** replace the fuse yourself as doing this may expose yourself to electrical shock.

---

## Starting the E5080A

This section describes how to turn ON/OFF the E5080A power and how to cut off the power supply in the case of emergency.

### Turning the Power ON and OFF

The standby switch can turn ON/OFF the E5080A. The color on the button shows the status, as indicated below:

Indicator Color	Description
Green	Normal power on status
Orange	Standby status
Red	Illegal power on status

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

#### Turning the Power ON

Step 1. Confirm if the Line Switch on the rear panel is turned ON. The switch should always be turned ON.

Step 2. Press the standby switch once. It changes to green color.

This operation turns ON the power, and the E5080A 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. To turn OFF the power of the E5080A, first, press this standby switch or send a shutdown command from the external controller to activate the shutdown process (the process of software and hardware necessary to turn OFF the power supply). This puts the E5080A into the standby state and the button changes to orange color.

Step 2. Next, if necessary, turn OFF the power supply to the power cable receptacle (Line Switch) on the rear panel.

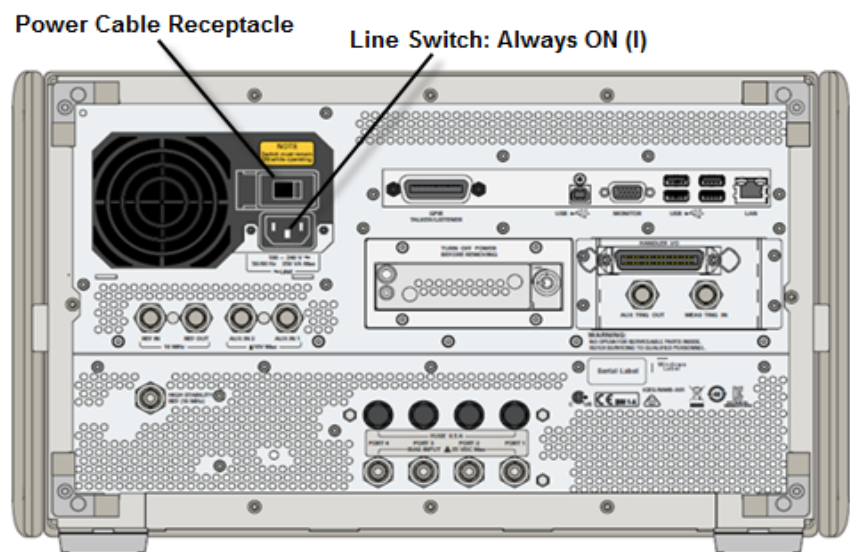
## 1 Installation

### NOTE

Under normal use, **never directly interrupt the power supply to the power cable receptacle on the rear panel when the power supply is turned ON.** Always keep the Line Switch ON and never turn it.

If you directly interrupt the power supply to the power cable receptacle when the power supply is turned ON, or turn OFF the Line Switch, the shutdown process will not work. This could damage the software and hardware of the E5080A and lead to device failure.

Turning ON the power supply after a faulty shutdown may cause the system to start up in a condition called "safe mode." If this occurs, first shut down the system to set it to the standby state and then turn ON the power supply again to start up the system in normal mode.



**Figure 2** Line switch (Always ON) and power cable receptacle

## Disconnection from Supply Source

The power supply of the E5080A is cut off by disconnecting the plug of the power cable (on either AC outlet side or E5080A side). When it is necessary to disconnect the power supply in order to avoid shock hazards, etc., pull out the power cable plug from either the AC outlet side or the E5080A side.

**NOTE**

To allow this operation to be performed smoothly, be sure to follow the guidelines in “Ensuring Adequate Free Space around Analyzer for Immediate Disconnection of Power Cable in Case of Emergency” on page 14.

When turning the power OFF under normal circumstances, always follow the methods described in “Turning the Power OFF” on page 17.

---

## 1 Installation

### Initial Registration of E5080A

When you start up the E5080A for the first time, you need to perform the initial registration of the Windows operating system of the E5080A.

When the Windows agreement message box appears, click Agree. The rest of the procedure runs automatically.

**NOTE**

The Touch Screen does not require any calibration and it works from the very first time you use the E5080A.

---

## 2 Troubleshooting

Troubleshooting during Startup	22
System Recovery	23

This chapter describes the troubleshooting process during start up and the procedure of the operating system (OS) recovery when the Windows OS has been damaged.

### Troubleshooting during Startup

When you encounter problems during start up, see [Table 1](#). System recovery saves most of problems.

**Table 1** Troubleshooting during startup

Symptom	Solution
Turning ON (I) the standby switch does not start up the system.	Confirm that the power cable is properly plugged in. Confirm that the line switch at the rear panel is turned ON.
The system starts up, but it automatically shuts down immediately.	Execute the system recovery.
The system starts up, but it enters the service mode (The status bar at the lower right of the screen displays SVC in red).	
The measurement screen appears after start up, but the power-on test fails with Error Message 241 prompting on a red background in the instrument's message/warning area at the lower left of the screen.	



## System Recovery

By executing system recovery, you can return the E5080A's system (the Windows operating system and the firmware) to the factory state (at the time of purchase<sup>\*1</sup>).

### CAUTION

Strictly follow the steps described below. If you do any operation other than the following steps, the system may not be recovered.

### Notes on executing the factory recovery function

Executing the factory recovery function causes the following conditions:

- In addition to the Windows operating system and the firmware, the following settings of the E5080A are returned to the factory state.
  - Network setting
  - GPIB setting
  - Printer setting
- The driver for the supported printer which is installed after purchase is deleted.
- You need to execute initial registration again.

Files that you have created using the save function (files in the D drive) are not affected. However, Keysight recommends backing them up before executing system recovery for precautionary purposes. For more information on backup, refer to “*Backing Up the Data*” as described in *E5080A Online Help*.

### Procedure to execute the factory recovery

This section describes how to return the contents of the C drive to the factory state.

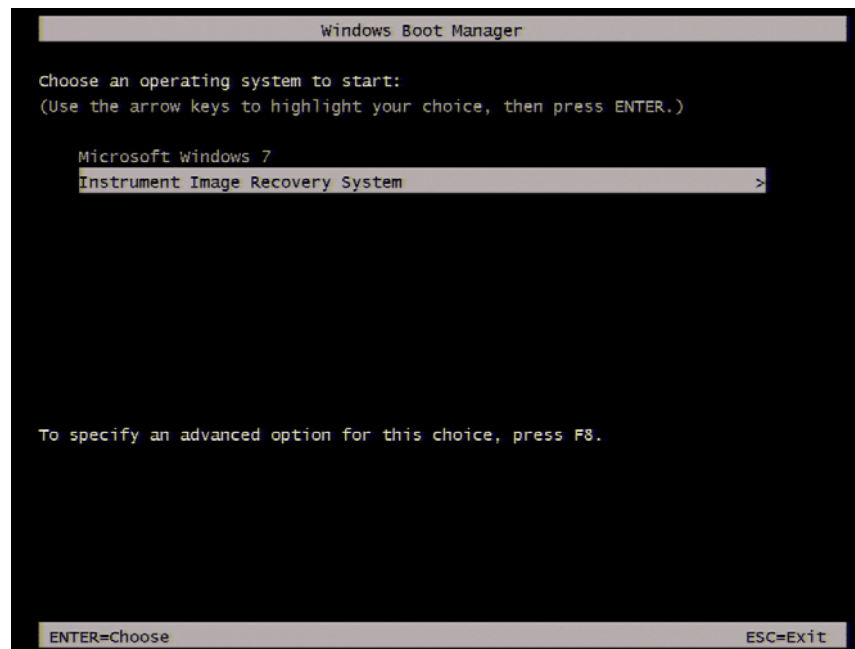
### NOTE

You need a keyboard for this operation.

\* 1. The default setting of the hard disk is recovered during the system recovery. For the hard disk that had failed earlier and had been replaced (after purchase), its default setting may not be the same as the factory state.

## 2 Troubleshooting

- Step 1. Shut down the E5080A.
- Step 2. Disconnect all of the USB device from the USB ports.
- Step 3. Connect the keyboard to the E5080A.
- Step 4. Press the standby switch of the E5080A to turn it ON.
- Step 5. When the screen as shown in the figure below appears, select **Instrument Image Recovery System** and press **[Enter]**.

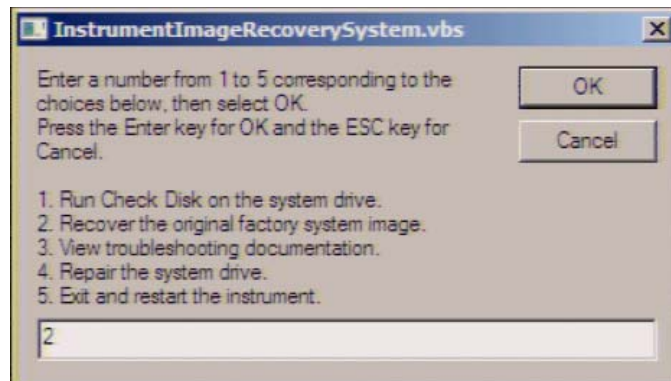


**Figure 3** Instrument Image Recovery System selection screen

### NOTE

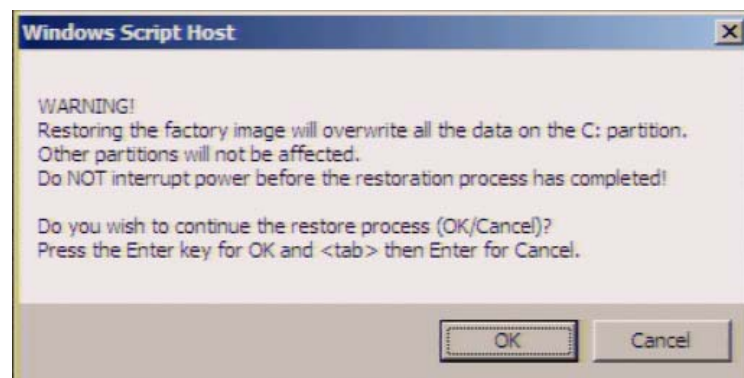
After several seconds, the next screen appears automatically even if you do not press any key.

Step 6. Type **2** to select **Recover the original factory system image** option and press **[Enter]**.



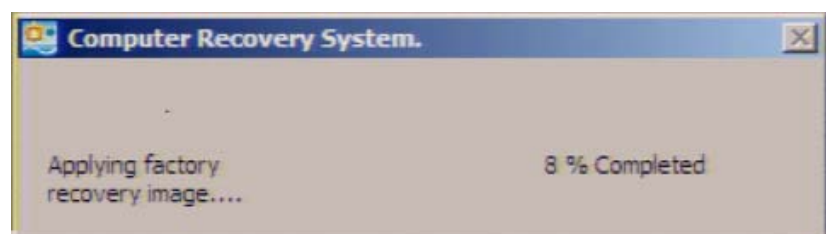
**Figure 4** System recovery selection screen

Step 7. A confirmation message appears. Click **OK** to continue the process.



**Figure 5** System recovery confirmation screen

Step 8. The progress of the system configuration is displayed on the screen. The recovery takes a few minutes depending on the amount of data.

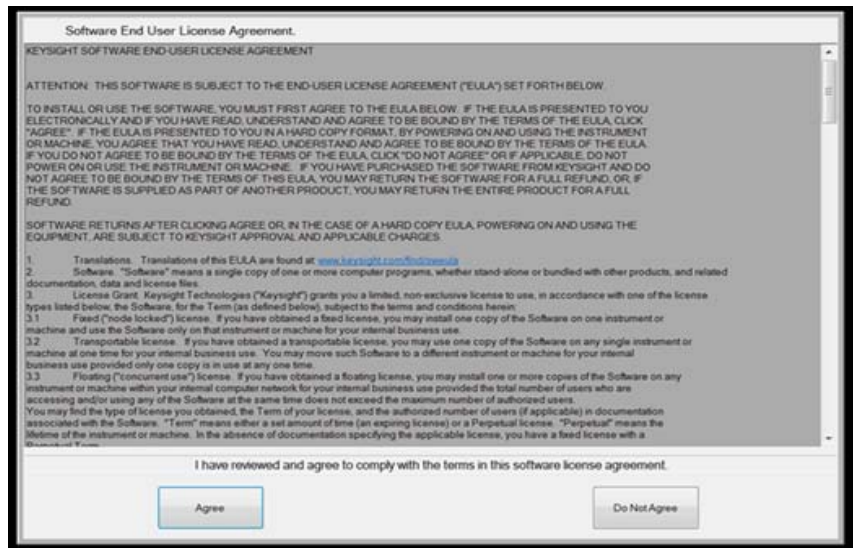


**Figure 6** System configuration progress screen

## 2 Troubleshooting

Step 9. Once the recovery process is completed, completion message prompts. Click **OK**. The E5080A restarts automatically.

Step 10. **Software End User License Agreement** appears . Press **[Agree]**.



Step 11. After the restart, execute initial registration. For information on the execution procedure, refer to “Initial Registration of E5080A” on page 20.

### CAUTION

Never turn OFF the power during the system recovery because doing so may cause serious damage to the E5080A.

# Index

## A

assistance, 6

## D

documentation warranty, 6

## E

environmental requirements  
  operating environments, 13  
  ventilation requirement, 13  
error-correction  
  temperature range, 13  
exclusive remedies, 6

## I

inspection  
  checking the shipment, 12

## M

manual  
  contents, 8

## P

power  
  disconnection from supply  
    source, 18  
  power cable options, 15  
  verification and connection of power  
    cable, 15  
  verification of the power supply, 15

## S

safety  
  symbols, 5  
shutdown  
  turning the power OFF, 17

**Index**



[www.keysight.com](http://www.keysight.com)

© Keysight Technologies, Inc. 2015  
Printed in Malaysia  
First edition, January 2015



E5080-90000

